

**UNIVERSITY OF GHANA**



**RESTRUCTURING HEALTH EDUCATION MATERIALS TO IMPROVE  
SEXUAL AND REPRODUCTIVE HEALTH LITERACY AMONG IN-  
SCHOOL ADOLESCENTS**

**BY:**

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**THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA,  
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THE AWARD OF DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE IN  
HEALTH POLICY AND MANAGEMENT**

**SEPTEMBER 202**

## DECLARATION

I, the undersigned, declare that this thesis is the result of my original work and that no part of it has been presented for another degree in this university or elsewhere. All references used have been duly cited.



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## CERTIFICATION

We, the undersigned, now declare that this thesis was under our supervision and therefore consider it credible to enter the authoritative list of certified academic research through the award of a Doctor of Philosophy (Ph.D.) in Health Policy and Management.



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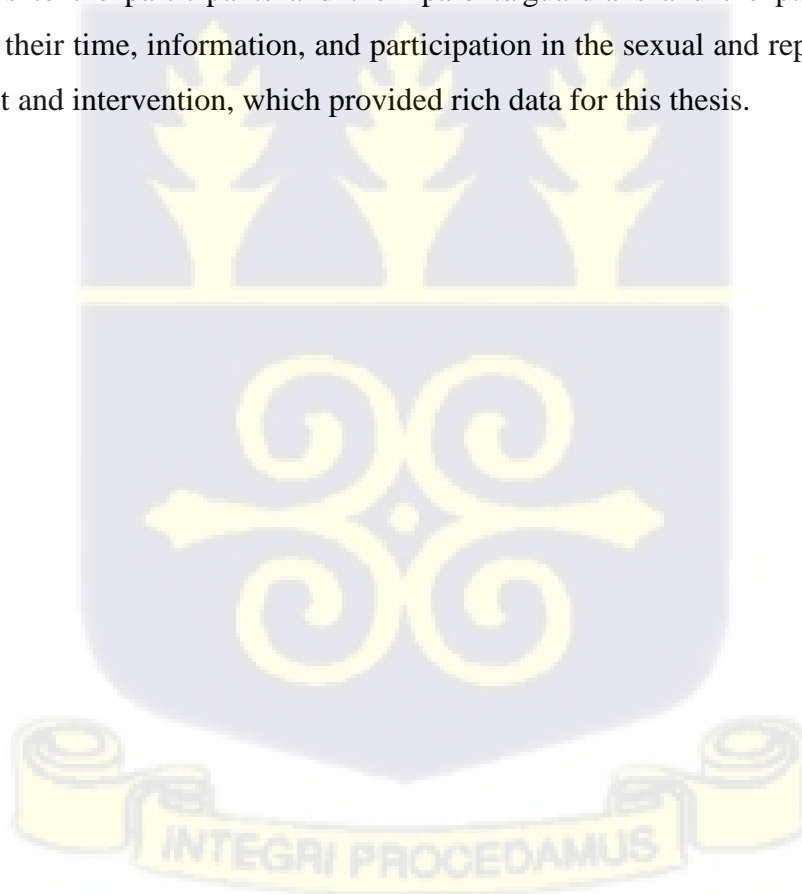
## **DEDICATION**

This thesis is dedicated to my family and loved ones for their diverse encouragement and support, which has brought me this far in my educational pursuits.



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## TABLE OF CONTENT

DECLARATION .....	i
CERTIFICATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENT .....	iv
TABLE OF CONTENT .....	v
APPENDICES .....	xii
LIST OF TABLES .....	xiv
LIST OF FIGURES .....	xvi
LIST OF ABBREVIATIONS .....	xvii
ABSTRACT .....	xx
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>1.0 Chapter INTRODUCTION .....</b>	<b>1</b>
1.1 Background .....	1
1.2 Problem Statement .....	2
1.3 Research Aims and Objectives .....	4
<i>1.3.1 Research Aims.....</i>	<i>4</i>
<i>1.3.2 Research Objectives.....</i>	<i>4</i>
<i>1.3.4 Research Questions.....</i>	<i>5</i>
1.4 Motivation for the Study .....	5
1.5 Research Outline .....	5
<b>CHAPTER TWO .....</b>	<b>7</b>
<b>2.0 CHAPTER TWO LITERATURE REVIEW .....</b>	<b>7</b>
2.1 Chapter Introduction .....	7
2.2 Fundamental Concepts in the Stud .....	7
2.2.1 <i>Adolescent Sexual and Reproductive Health Policy Environment of Ghana .....</i>	<i>7</i>
2.2.2 <i>Sexual and Reproductive Health.....</i>	<i>8</i>
2.2.3 <i>Health Literacy .....</i>	<i>9</i>
2.2.4 <i>Measurement of Health Literacy .....</i>	<i>12</i>
2.2.5 Text Restructuring .....	14
2.2.6 <i>Text Readability and Comprehensibility.....</i>	<i>15</i>

2.2.7 Measures of Text Readability.....	16
2.2.8 Measures of Text Comprehensibility .....	17
2.3 Review of Theoretical Literature .....	18
2.3.1 Cognitive Learning Theory.....	18
2.2.2 The Cognitive Load Theory and the Cognitive Theory of Multi-Media Learning .....	19
2.3.3 Application of CLT and CTML to Health Educational Materials Design .....	21
2.3.4 Limitations of the CLT and the CTML .....	24
2.3.5 Pictorial Realism Theory.....	25
2.4 Empirical Literature .....	28
2.4.1 Literature Review Methodology.....	28
2.4.2 Literature Search Strategy and Terms.....	29
2.4.3 Inclusion Criteria.....	29
2.4.4 Exclusion Criteria.....	30
2.4.5 Data Charting, Collation, and Summarizing.....	30
2.5 Results.....	31
2.5.1 Sample Characteristics .....	31
2.5.2 Scope and Diversity of ASRH Research Activities in SSA.....	33
2.5.3 Adolescent-Parent Communication of SRH.....	33
2.5.4 SRH Decision-making Capacity .....	35
2.5.5 Adolescents' SRH Knowledge .....	36
2.5.6 Access and Barriers to Utilization of ASRH Service .....	38
2.5.7 Adolescent SRH Intervention .....	40
2.5.8 Adolescent SRH Behavior .....	41
2.5.9 Access to SRH Information .....	42
2.5.10 Conclusion and Implication for Further Research.....	43
2.6 Simplified Medical Instructions for Improving Health Literacy .....	44
2.6.1 Results.....	44
2.6.2 Sample Characteristics .....	44
2.6.3 Theoretical Bases of the Studies.....	46
2.6.4 Research Designs.....	47

2.6.5 Application of Cognitive Load Reduction Pictorial Realism, Principles to HEM Development.....	48
2.6.6 Multimedia Instructional Design Processes .....	49
2.6.7. Measures for Validating Visuals for Enhancing Health Text.....	50
2.6.8 Measures of Instructional Effectiveness .....	51
2.6.9 Effectiveness of Cognitive Load Reduction Principles in Health Education .....	52
2.6.10 Implications for Further Research.....	54
2.7 Implications of the Literature for Restructuring SRH Text Materials .....	54
2.8 Conceptual Framework.....	55
2.9 Chapter Summary .....	58
<b>CHAPTER THREE .....</b>	<b>59</b>
<b>3.0 RESEARCH METHODOLOGY .....</b>	<b>59</b>
3.1 Chapter Introduction .....	59
3.2 Research Philosophy.....	59
3.2.1 The Ontology of Pragmatism.....	59
3.2.2 The Epistemology of Pragmatism.....	60
3.2.3 Methodological Consistency between Text Restructuring, ASRHL, and Pragmatism .....	61
3.3 Research Design.....	61
3.4 Study Area .....	62
3.5 Study Population .....	65
3.6 Sample Size and Determination.....	65
3.6.1 Sampling for the SRHL Intervention.....	65
3.6.2 Screening of Participants for Inclusion into the Intervention .....	67
3.6.3 Sampling for SRHL Needs .....	69
3.7 Inclusion Criteria .....	70
3.8 Exclusion Criteria.....	70
3.9 Research Instruments .....	72
3.9.1 SRHL Needs Assessment Tools .....	72
3.9.2 FGD Guide.....	72
3.9.3 Cloze Test.....	72

3.9.4 Self-Reported Vocabulary Knowledge Procedure .....	74
3.9.5 Validation of SRHL Needs Assessment Instruments .....	74
3.9.6 The Test of Functional Literacy in SRH (TOFL-SRH) .....	75
3.9.7 The Test of Decision-Making Skills in SSRH (TD-SRH) .....	76
3.9.8 Validation of SRHL Instruments. ....	77
3.9.9 SRHL Intervention Appraisal Questionnaire.....	78
3.10 Ethical Considerations .....	79
3.11 Data Collection – ASRHL Needs Assessment .....	79
3.11.1 Focus Group Discussion.....	79
3.11.2 Quality of the Qualitative Work .....	80
3.11.3 Readability Analysis of Existing Material .....	80
3.11.4 SRH Text Comprehension .....	81
3.11.5 SRH Vocabulary Knowledge Assessment .....	81
3.12 Analysis of Data from SRHL Needs Assessment.....	82
3.12.1 Focus Group Discussions .....	82
3.12.3 SRH Vocabulary Knowledge.....	82
3.12.4 Cloze Test.....	83
3.13 Development of SRH Learning Materials .....	83
3.13.1 The Initial Design .....	83
3.13.2 Synthesis of Existing SRH Materials.....	83
3.13.3 Restructuring of Existing SRH Text .....	85
3.13.4 Validation of Materials by Stakeholders.....	85
3.13.5 Validation of SRH Materials by Participants .....	86
3.13.6 Review by the Research Supervisors.....	86
3.13.7 Validation by Experts.....	87
3.13.8 Review by Research Supervisors .....	88
3.13.9 Types of Pictures Used.....	89
3.13.10 The Sequence of Lessons .....	89
3.14 SRH Literacy Intervention.....	90
3.14.1 Delayed Assessment .....	90
3.14.2 Data Processing and Analysis.....	91

3.14.3 Scoring and Coding of Test Items.....	91
3.14.4 Statistical Analysis.....	92
3.14.5 Difference in Difference Analysis.....	92
3.14.6 Multivariable Regression Estimates.....	96
3.14.7 Paired Sample T-Test.....	96
1.15 Chapter Summary.....	97
<b>CHAPTER FOUR.....</b>	<b>98</b>
<b>4.0 PRESENTATION OF FINDINGS.....</b>	<b>98</b>
4.1 Chapter Introduction.....	98
4.2 Assessment of SRHL Needs of Young Adolescents in the Effutu Municipality.....	98
4.2.1 The Scope of SRH Knowledge.....	99
4.2.2 Perspectives on SRH Concept.....	99
4.2.3 SRH Information Sources.....	100
4.2.4 Accessible Contents.....	100
4.2.5 Literacy Challenges.....	101
4.2.6 Contraception.....	103
4.2.7 Predominant Sexual Knowledge.....	104
4.2.8 Sexual Behavior and Etiquette.....	104
4.2.9 Sexual Maturation.....	105
4.2.10 Sexually Transmitted Infections (STIs) and Treatment.....	105
4.2.11 Preferred SRH Topics.....	106
4.2.12 SRH Goals.....	106
4.3 Readability Scores of Online and Paper-Based SRH Education Materials.....	107
4.3.1 SRH Text Comprehension Based on the Cloze Test.....	110
4.3.2 Adolescents' SRH Vocabulary Knowledge.....	111
4.4 Readability of the Restructured SRH Educational Materials.....	114
4.5 Effectiveness of the Restructured SRH Educational Materials in Improving ASRHL in the Effutu Municipality.....	114
4.5.1 Participants' Demographic Information and Response Rate.....	115
4.5.2 Participants' Perception of the SRHL Intervention and Education Materials Used.....	16
4.5.3 Descriptive Statistics of Participants' SRHL at Baseline – Eight Weeks Post-end-line.....	117

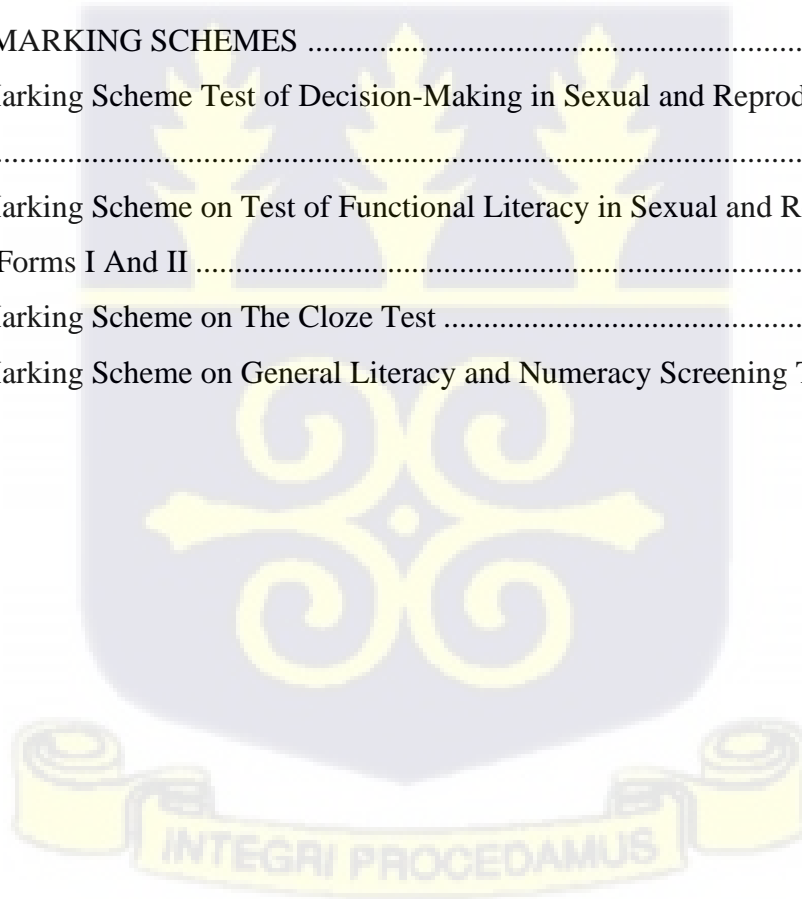
4.6 The Effect of the SRH Education Materials on Functional SRHL of Participants.....	119
4.6.1 <i>The Effect of the SRH Education Materials on the Interactive SRHL of Participants</i> .....	121
4.7 The Additional Effect of Participants' Characteristics on SRHL of Participants .....	123
4.7.1 <i>Test of Basic Assumptions</i> .....	123
4.7.2 <i>Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Functional SRHL</i> .....	123
4.7.3 <i>Multiple Regression Analysis of Additional Effect of Participants' Characteristics on Interactive SRHL</i> .....	125
4.8 Changes in SRHL of Participants at Endline and Eight Weeks Post-End-line .....	127
4.9 Chapter Summary .....	130
<b>CHAPTER FIVE .....</b>	<b>131</b>
<b>5.0 DISCUSSION OF RESULTS .....</b>	<b>131</b>
5.1 Chapter Introduction .....	131
5.2 Objectives of Study.....	131
5.2.1 <i>Summary of Key Findings of the Study</i> .....	131
5.2.2 <i>Findings of Background Information of Participants</i> .....	131
5.2.3 <i>Summary of Key Findings from SRHL Needs Assessment</i> .....	132
5.2.4 <i>Summary of Details on the Restructured SRH Text Material</i> .....	132
5.2.5 <i>Summary of Findings on the Effectiveness of the Restructured Texts</i> .....	132
5.3 Discussion of Findings .....	133
5.3.1 <i>SRHL Needs of Young Adolescents in the Effutu Municipality</i> .....	133
5.3.2 <i>Readability and Comprehensibility Challenges with Existing SRH Texts Materials</i> .....	136
5.4 Effectiveness of the Simplified SRH Materials in Improving ASRHL.....	138
5.5 The Effectiveness of the SRH Education Materials and the Onset of Decay .....	143
5.6 The Relevance of Findings to the Theoretical Literature .....	144
5.6.1 <i>Areas of Overlap with the Theories</i> .....	144
5.6.2 <i>Areas of Disconnection with the Theories</i> .....	145
5.7 Synthesis of Key Research Findings with the Empirical Literature .....	147
5.8 Review of Conceptual Framework with Study Findings.....	148
5.9 Chapter Summary .....	151
<b>CHAPTER SIX .....</b>	<b>152</b>

<b>6.0 SUMMARY OF FINDINGS, RECOMMENDATION, AND CONCLUSIONS .....</b>	<b>152</b>
6.1 Chapter Introduction .....	152
6.2 Summary of Key Findings .....	152
6.3 Contributions of the Research.....	153
6.3.1 <i>Contribution to the Empirical Literature</i> .....	153
6.3.2 <i>Contributions to the Theoretical Literature</i> .....	154
6.3.3 <i>Contributions to Methodology</i> .....	154
6.3.4 <i>Contributions to Health Policy and Management</i> .....	155
6.4 RESEARCH LIMITATIONS .....	156
6.5 RECOMMENDATIONS.....	156
6.5.1 <i>Specific Recommendations</i> .....	156
6.5.2 <i>General Recommendation</i> .....	158
6.6 CONCLUSION.....	158
6.7 SUGGESTIONS FOR FUTURE RESEARCH .....	159
REFERENCES .....	160



APPENDICES .....	182
APPENDIX A: ADDITIONAL RESULTS FROM THE STUDY .....	182
Appendix A1: Multi-Collinearity of Independent Variables Likely to Affect Functional SRHL .....	182
Appendix A2: Multi-Collinearity of Independent Variables Likely to Affect Interactive SRHL .....	183
Appendix A3: Model Summaries for SRHL Intervention on Functional SRHL.....	183
Appendix A4: DID Estimation of Function SRHL Intervention(Excluding Numeracy) .....	184
Appendix 5: Model Summaries of Multivariable Analysis of Time-variant Characteristics and Functional SRHL .....	185
Appendix A6: Multivariable Analysis of Time-variant Characteristics and Functional SRHL..	186
Appendix A7: Model Summaries of Multivariate Analysis of Time-variant Characteristics and Interactive SRHL .....	186
Appendix A8: Multivariable Analysis of Time-variant Characteristics and Interactive SRHL..	186
Appendix A9: Medical Terminologies and Suggested Local Jargon .....	187
APPENDIX B: RESEARCH INSTRUMENTS .....	188
Appendix B1: Test of Functional Sexual and Reproductive Health Literacy (TFSRHL) FORM I.....	188
Appendix B2: Decision-making Skills in Sexual and Reproductive Health (DSSRH) – FORM I.....	195
Appendix B3: Test of Functional Sexual and Reproductive Health Literacy (TFSRHL) Form II .....	199
Appendix B4: Decision-making Skills in Sexual and Reproductive Health (DSSRH) Form II .....	206
Appendix B5: Participants' Appraisal Questionnaire .....	210
Appendix B6: Cloze Test.....	211
Appendix B7: General Numeracy and Literacy Test.....	217
Appendix B8: Vocabulary Knowledge Assessment Passage .....	222
Appendix B8: Scope of Knowledge of Sexual and Reproductive Health - Focus Group Discussion Questions .....	225

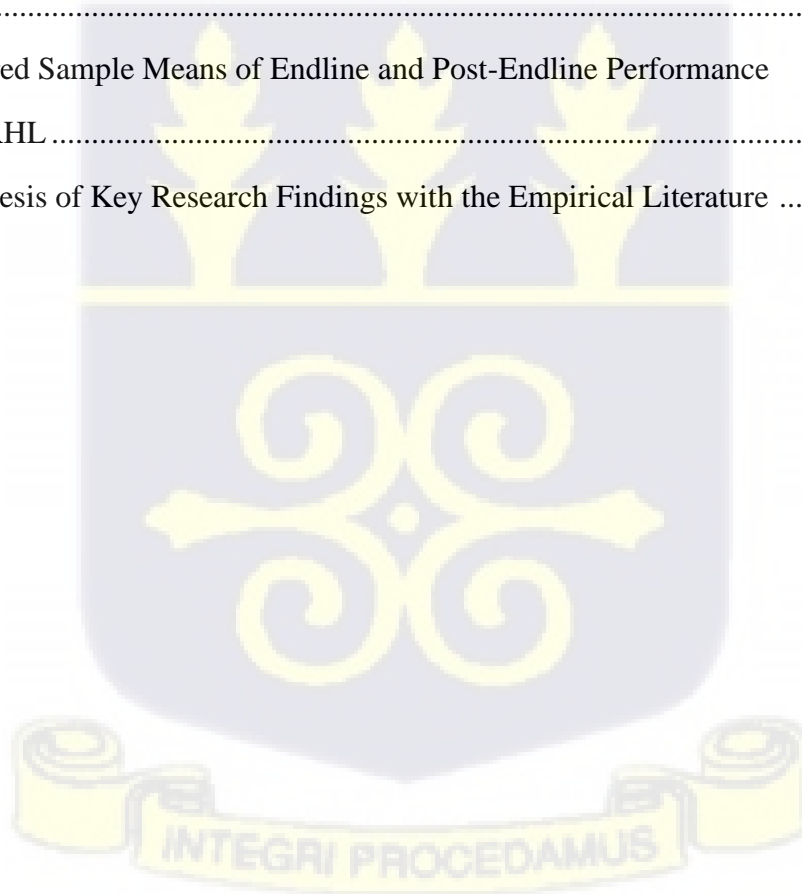
Appendix C: SEXUAL AND REPRODUCTIVE HEALTH EDUCATIONAL MATERIALS	228
Appendix C1: Simplified Text-only Material	228
Appendix C2: Difficult Text Material	262
Appendix C3: Picture-enhanced Text Material	278
APPENDIX D: SUPPORTING DOCUMENTS ON ETHICAL CONSIDERATIONS	339
Appendix D1: Ethics Approval Letter	340
Appendix D2: Letter of Introduction from the Municipal Education Service	341
Appendix D3: Participant Information Sheet and Consent Form – Parents/Guardians	342
Appendix D4: Participants Information Sheet and Consent Form – School Management	346
APPENDIX E: MARKING SCHEMES	350
Appendix E1: Marking Scheme Test of Decision-Making in Sexual and Reproductive Health, Forms I And II	350
Appendix E2: Marking Scheme on Test of Functional Literacy in Sexual and Reproductive Health - Forms I And II	351
Appendix E3: Marking Scheme on The Cloze Test	352
Appendix E4: Marking Scheme on General Literacy and Numeracy Screening Test	353



## LIST OF TABLES

Table 2.2.3: Conceptual Definitions of Health Literacy. ....	10
Table 2.5.1: Sample Characteristics of Studies Included in the Scope of ASRH Research Review .....	32
Table 2.6.2: Sample Characteristics of Studies Included in the Methods for Simplifying HEM Revie .....	45
Table 3.4: Number of Communities and Schools in Effutu Sub-Municipality .....	64
Table 3.6: Selected Sub-Municipalities and Schools for the SRHL Intervention .....	68
Table 3.6.1: Communities, Schools, and Participants Selected for the Study .....	71
Table 4.2: Background Information of Participants – FGD .....	98
Table 4.2.1: Themes and Sub-Theme from the FGD.....	100
Table 4.3: Readability Statistics of Online and Paper-Based SRH Education Material for Adolescents and Young People .....	108
Table 4.3.1 Background Information of Participants – Cloze Test .....	110
Table 4.3.2: Levels of Comprehensibility of Existing SRH Materials Based on the Cloze Test .....	111
Table 4.4: Readability Statistics of the Simplified SRH Educational Material.....	113
Table 4.5.1: Enrollment Details and Background Information of Participants .....	116
Table 4.5.2: Participants' Perception of the SRHL Intervention.....	117
Table: 4.5.3: Descriptive Statistics of Functional and Interactive SRHL of Participants.....	118
Table 4.6: Model Summaries of DID Estimation of the Intervention on Functional SRHL.....	
Table 4.6.1: DID Estimation of the Intervention on Functional SRHL.....	120
Table 4.6.2: Model Summaries of DID Estimation of the Intervention on Interactive SRHL .....	121
Table 4.6.3: DID Estimation of the Intervention on Interactive SRHL.....	122

Table 4.7: Model Summaries Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Functional SRHL .....	123
Table 4.7.1: Multivariable Regression Analysis of Additional Effect of Participants' Characteristics on Functional SRHL .....	124
Table 4.7.2: Model Summaries Multivariable Regression Analysis of Additional Effect of Participants' Characteristics on Interactive SRHL .....	126
Table 4.7.3: Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Interactive SRHL .....	126
Table 4.8: Paired Sample Means of Endline and Post-Endline Performance in Function SRHL .....	128
Table 4.8.1: Paired Sample Means of Endline and Post-Endline Performance in Interactive SRHL .....	129
Table 5.7: Synthesis of Key Research Findings with the Empirical Literature .....	147



## LIST OF FIGURES

Figure 2.4: Details of Papers Retrieved and Reviewed .....	31
Figure: 2.9: Cognitive Load Alignment Process for Improving SRHL.....	57
Figure: 3.4: Map of Effutu Municipality .....	63
Figure 3.13: Participatory and Iteration Design Process of SRH Materials Development.....	84
Figure 3.18.3: Graphical Representation of the DID Estimation Pathways .....	94
Figure 4.3.2: Bar Chart of Young Adolescents' SRH Vocabulary Knowledge I.....	112
Figure 4.3.3: Bar Chart of Young Adolescents' SRH Vocabulary Knowledge II .....	112
Figure 5.8: Revised Conceptual Framework Based on Empirical Findings .....	150



## LIST OF ABBREVIATIONS

SRH	Sexual and Reproductive Health
ASRH	Adolescent Sexual and Reproductive Health
ASRHL	Adolescent Sexual and Reproductive Health Literacy
OHL	Oral Health Literacy
TOFL-RHL	Test of Functional Literacy in Sexual and Reproductive Health
TD-SRH	Test of Decision-making in Sexual and Reproductive Health
SRH-VKP	SRH Vocabulary Knowledge passages
VKP	Vocabulary Knowledge passages
VKS	Vocabulary Knowledge Scale
MEQ	Modified Essay Questions
KFBs	Key Feature Problems
SSA	Sub-Saharan Africa
REALM	Rapid Estimate of Adult Literacy in Medicine
REALM-R	Revised Version of the Rapid Estimate of Adult Literacy in Medicine
TOFLA	Test of Functional Health Literacy in Adults
S-TOFLA	Short Form of the Test of Functional Health Literacy in Adults
MART	Medical Achievement Reading Test
NVS	New Vital Signs
OHL-AQ	Oral Health Literacy for Adult Questionnaire
SRHL-Q	Sexual and Reproductive Health Literacy Questionnaire
HLS-EU	European Consortium Health Literacy Scale

WHO	World Health Organization
AIDS	Acquired Immunodeficiency Syndrome
HIV	Human Immunodeficiency Syndrome
UNFPA	United Nations Fund for Population Activities
GHS	Ghana Health Service
MMAS	Morisky Medication Adherence Scale
NAAL	National Assessment of Adult Literacy
CPC	Competency in Patients Care
PEMAT	Patient Education Materials Assessment Tool
SAM	Suitability Assessment of Materials
CAM	Comprehensibility Assessment of Materials
HEM	Health Educational Materials
RGL	Reading Grade Level
FKI	Flesch-Kincaid Index
FKRGL	Flesch-Kincaid Reading Grade Level
FGA	Fry Graphical Analysis
CL	Coleman-Liau index
SMOG	Simple Measure of Gobbledygook
CLT	Cognitive Load Theory
CTML	Cognitive Theory of Multimedia Learning
STIs	Sexually Transmitted Infections
RCDs	Randomized Control Designs

RCSs	Randomized Control Studies
QED	Quasi-Experimental Design
ARV	Antiretroviral
ART	Antiretroviral Therapy
FGDs	Focus Group Discussions
CRI	Cognitive Response Interviews
QEPARA	Quasi-Experimental and Participatory Action Research design
WIFA	Women in Fertility Age
TSH	Trauma and Specialist Hospital
TIMSS	Trends in International Mathematics and Science Study
BECE	Basic Education Certificate Examinations
PIRLS	Progress in International Reading Literacy Study
MES	Municipal Education Service
MHD	Municipal Health Directorate
PPI	Planned Parenthood International
PPAG	Planned Parenthood Association of Ghana
CDC	Center for Disease Control and Prevention
MS	Microsoft
MSW	Microsoft Word
DID	Difference in Difference
VIF	Variance Inflation Factor

## ABSTRACT

Adolescent sexual and reproductive health presents enormous public health problems in Sub-Saharan Africa. The last few decades have witnessed increased teen pregnancy, HIV prevalence and other sexually transmitted infections, and low uptake of contraceptives. For instance, Ghana has a high teen pregnancy record, even among adolescents aged 10-14. National-level data shows that the Central Region came third among regions with high teen pregnancy prevalence. For example, in the Effutu-Municipality, most basic school adolescents are already in sexual relationships, making access to sexual and reproductive health information and education for adolescent critical in improving outcomes in the region. Access to information, education, and literacy is a sure antidote for reversing adverse outcomes. However, there is a paucity of literature in these areas. While Ghana's adolescent sexual and reproductive health policies emphasize access to comprehensive quality services, information, and education to improve knowledge, there are inconsistencies between policy objectives and actions. National and sub-national assessments of the availability and accessibility of sexual and reproductive health information and education are scarce, making it difficult to appreciate the policies' impact. Assessing adolescents' sexual and reproductive health literacy needs is essential for providing critical feedback to policy-makers on the effectiveness of existing policies and identifying implementational gaps. For instance, adolescents in the Effutu Municipality have limited access to appropriate sexual and reproductive health information. The municipality has no adolescent corners or clubs in schools for sexual and reproductive health education. The situation in the Effutu-Municipality could reflect the national situation, making literacy needs assessment critical for revising existing interventions. This study improves adolescent sexual and reproductive health literacy and related outcomes by assessing adolescents' sexual and reproductive health literacy needs and restructuring existing texts based on the assessment results. The study further assessed the effectiveness of the restructured texts in improving the sexual and reproductive health literacy of young adolescents. The study used a quasi-experimental and participatory action research designs. The study population included all in-school adolescents aged 11-15 living in the Effutu Municipality. Probability and nonprobability sampling were used to select sub-municipalities, communities, schools, and young adolescents. The study was divided into three main phases to achieve the research objectives.

Three hundred and thirty (330) in-school adolescents were projected for the first and second phases. 408 adolescents were projected for the third phase. Although non-probability sampling was the predominant sampling technique, the assignment of in-school adolescents to control and intervention groups was group randomization. The four sub-municipalities and the schools selected were randomly assigned to the control group (T<sub>0</sub>) and three intervention arms (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>). Winneba East Sub-municipality was assigned to T<sub>0</sub>. Winneba West Sub-municipality was assigned to T<sub>1</sub>. Assuakyir-Gyahadze Sub-Municipality was assigned to T<sub>2</sub>. Kojo-Beedu North Low-cost Sub-municipality was assigned to T<sub>3</sub>. The first phase assessed the sexual and reproductive health literacy needs of young adolescents. Needs assessment comprised the scope of adolescents' sexual and reproductive health knowledge, readability, and comprehensibility of existing sexual and reproductive health texts. The researcher also assessed the adolescents' knowledge of sexual and reproductive health vocabulary. The existing texts were gleaned from online and paper-based sources and were assessed for readability and comprehensibility. Data on the scope of sexual and reproductive health knowledge were collected through focus group discussions using a discussion guide. Comprehension and vocabulary knowledge assessment used a cloze test and vocabulary knowledge assessment procedure. Group discussions were analyzed thematically, and readability was analyzed based on five readability algorithms, namely, Flesch reading ease, Flesch Kincaid reading grade level, Gunning Fog index, the simple measure of gobbledygook, and Coleman-lieu index. Comprehensibility of existing materials and vocabulary knowledge were summarized using simple frequency and bar charts. Existing sexual and reproductive health texts were restructured based on the literacy needs assessment results. Three materials were developed. They are the synthesized versions of existing texts (difficult text materials), the simplified text-only and simplified text enhanced with pictures. The last two were the outcome of the text restructuring. Three hundred and twenty-nine adolescents from schools within the four sub-municipalities took the baseline test for sexual and reproductive health literacy and enrolled in the literacy intervention. Participants assigned to T<sub>0</sub> consumed no educational materials. The T<sub>1</sub> group used the synthesized version of the existing texts, T<sub>2</sub> consumed the simplified text-only material, and the T<sub>3</sub> group used the picture-enhanced text. The intervention lasted for six weeks, and the meetings were held once weekly. It involved reading, question, and answer sessions. Trained facilitators, including the researcher, moderated meetings. The end-line test was taken in the seventh week. Only 245 of the participants completed the intervention. A follow-up test was taken eight weeks post-intervention.

Data were analyzed using the difference-in-difference approach and a linear regression model, multiple variable regression, and paired sample t-test. The sexual and reproductive health literacy needs assessment shows that young adolescents in the Effutu Municipality do not understand the concept of sexual and reproductive health. Although some young adolescents admitted to being in a sexual relationship, most adolescents have poor knowledge about sexuality and risky sexual behaviors, contraceptives and methods, and STIs. One major challenge to sexual and reproductive health literacy was the lack of access to information or educational materials. School management, particularly head teachers, and some teachers are opposed to sexual and reproductive health education, and adolescents who seek such information are given negative labels. Young adolescents, especially females, suffer from prejudice and stigmatization related to sexual and reproductive health. The ability to read and understand existing texts was a barrier to sexual and reproductive health literacy among adolescents, as 50% of the participants found that the language of the existing materials was difficult to read and understand. The participants were also unfamiliar with medical terminologies used in the materials. Existing educational materials or texts had higher reading grade levels. The two sexual and reproductive health materials developed for the literacy intervention had reading grade levels that third to sixth-graders could read and understand. The simplified text-only material significantly improved functional literacy 12 units and the picture-enhanced text by 10 units over the same period. Yet, the picture-enhanced material improved reading and understanding by 19 units as opposed to 14 units by simplified text-only. Regarding interactive sexual and reproductive health literacy, all three education materials significantly improved interactive literacy by 10 units, 11 units, and 11 units respectively, among T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub> participants. Learning ability was a material predictor of functional sexual and reproductive health literacy among those receiving picture-enhanced text and the difficult text. Gender, school type, and place of residence were significant predictors of interactive literacy in those receiving the simplified text-only and picture-enhanced text materials. No material changes occurred in the functional literacy of participants who received the picture-enhanced text and the control group eight weeks after the intervention. However, significant gains in functional literacy happened among those who took the difficult text material, but a reduction was recorded among those receiving the simplified text-only. The study offers several strategies for revising existing policies. To improve the sexual and reproductive health knowledge of adolescents in Ghana, advocacy and sensitization among relevant stakeholders, particularly parents, and teachers, to create a sense of

urgency for destigmatizing adolescent sexual and reproductive health is essential. There is a need to set up a reading grade-level threshold for adolescent health information. Existing sexual and reproductive health educational materials should be adjusted to the literacy skills of young adolescents and made easily available and accessible to improve sexual and reproductive health literacy. Although picture-enhanced educational materials effectively improve reading and understanding of sexual and reproductive health, they may present acceptability challenges when utilized in settings with similar sociocultural characteristics to the Effutu Municipality. For this reason, simplified text-only materials may be the cost-effective means to provide sexual and reproductive health education through independent and group learning. However, the existing sexual and reproductive health educational materials have similar effectiveness as the restructured ones in improving the sexual and reproductive health decision-making skills of young adolescents.



## CHAPTER ONE

### 1.0 INTRODUCTION

This chapter provides a background to the study and discusses the status of adolescent sexual and reproductive health in Ghana and sub-Saharan Africa. The chapter articulates the research problem and states the research aims, objectives, and questions. The motivation for the study and outline are also discussed in the chapter.

### 1.1 Background

Adolescent Sexual and Reproductive Health (ASRH) has risen to an immense public health concern in Sub-Saharan Africa (SSA) in the last few decades (Melesse et al., 2020). The Sub-region contributes more than 50% to global teen pregnancy cases (World Health Organization [WHO], 2014; WHO, 2015) and also has a higher prevalence compared to the entire African continent (Kassa et al., 2018). For instance, adolescent pregnancy cases range from 15.8% in Central Africa to 20.4% in East Africa (Kassa et al., 2018). Again, teenagers risk unsafe abortion, sexual violence, and Sexually Transmitted Infections (STI) (Ganchimeg et al., 2013). For instance, available statistics in Ghana show a 5.4% increase in HIV prevalence among young people aged 15-24 between 2013 and 2018 (Ghana AIDS Commission [GAC], 2017).

In Ghana, teen motherhood is at a record high with variation across regions and rural-urban divide (Ghana Demographic and Health Survey [GDHS], 2015; Decosas, et al., 2021). Recent reports indicate that 301 adolescent girls get pregnant every month and 13 get pregnant every day (Ghana Web, 2021). Teenage girls aged 10-14 accounted for 13,444 pregnancies between 2016 and 2020 (United Nations Fund for Population Activities [UNFPA], 2022). The Central Region is third among regions with a higher rate of teen pregnancy in 2020 (City News Room [CNR], 2021; Ghana Web, 2021). The reports also show that 1,327 adolescents aged 10-14 in the region got pregnant in 2020 (CNR, 2021). The problems of increased prevalence of teenage pregnancy in the Ghanaian context is further exacerbated by the fact that the country operates a regime of low family planning uptake, particularly among those aged 13-19 (Nyarko et al., 2014; Grindlay et al., 2018; Keogh et al., 2021). The enormous burden of the ASRH of Ghana demands additional strategies to improve ASRH.

Though health literacy plays a critical role in self-care, informed decision-making, and healthy behaviors, the benefit of Sexual and Reproductive Health Literacy (SRHL) has received limited scholarly attention regarding its role in improving Adolescent Sexual and Reproductive Health (ASRH) outcomes (Melesse et al., 2020; Ajayi et al., 2021). SRHL is crucial for empowering adolescents with the knowledge needed to make informed reproductive health choices, engage in SRH services, and reduce teen pregnancy and recurrent pregnancy (Bennett et al., 2012; Dongarwar and Salihu, 2019; Koenig et al., 2020). In Ghana and SSA, access to SRH information is often informal and unreliable, coming from sources like peers and relatives (Akinfaderin-Agarau et al., 2012; Esantsi et al., 2015; Masemola-Yende et al., 2015; Renzaho et al., 2016; Ahinkorah et al., 2019; Obasi et al., 2019). This can lead to misinformation. Although school curricula and co-curricular activities aim to inform young adolescents about health issues (Awusabo-Asare et al., 2017), their effectiveness in enhancing SRHL at the basic school level remains unclear. While text simplification and multimedia techniques have been explored to enhance readability for low-literate patients (Park & Zuniga, 2020; Sun et al., 2021), existing literature on ASRH is limited in applying such methods. Employing methods that have proven effective in improving health literacy among low-literate individuals in adolescent SRHL will enhance comprehension and engagement with learning materials, reduce misinformation, and bridge SRHL gaps. This study uses quasi-experimental and Participatory Action Research (PAR) approaches to restructure SRH materials into adolescent-centered resources, assessing their effectiveness in improving ASRHL to inform policy and practice.

## **1.2 Problem Statement**

Although the SRH concept is essential to global development goals (Barot et al., 2015), recent literature reviews show that interventions and research on ASRH have majorly concentrated on access and utilization of SRH services. Other research areas include sexual behavior, SRH education programs, ASRH rights, ASRH stigma, and child marriage, with little emphasis on strategies for improving ASRHL (Kalembo et al., 2013; Denno et al., 2015; Meherali et al., 2021; Ajayi et al., 2021; Chidwick et al., 2022). Also, much attention is paid to ASRH knowledge and decision-making agency (Bain et al., 2019; Ivanova et al., 2019; Furry et al., 2019; Finlay et al., 2020; Ahinkorah et al., 2020; Tenkorang et al., 2020). The contradiction is that the success of the abovementioned strategies thrives on ASRHL skills. Additionally, recent reviews have

underscored the need for research on SRH of young adolescents, comprehensive sexuality education, and sexual competency in adolescents (Melesse et al., 2020; Ajayi et al., 2021).

One critical area of health literacy that research has given little attention to is written materials' linguistic characteristics and their implications for adolescent health literacy. The value of health information in improving adolescent health outcomes depends mainly on adolescents' ability to read and comprehend available information (Helitzer et al., 2009). Considerable evidence points to inconsistencies between patients' educational materials and their literacy skills in developed countries (Hansberry et al., 2014; Maghroudi et al., 2021; Rooney et al., 2021). However, this primary research critical for improving SRH literacy among adults and adolescents is scarce in Ghana and SSA. Health information has complex linguistic characteristics that may challenge reading and comprehension to high-literate groups, much less low-literate people like young adolescents. SRH educational materials become inaccessible and lose their utility if written in higher reading grade levels and formatted without consideration for cognitive processes that underlie adolescents' interaction with the materials (Wilson & Wolf, 2009).

Ghana has an adequate policy framework for ASRH (National Population Council [NPC], 2000; Ghana AIDS Commission, 2013; Ghana Health Service [GHS], 2016). Yet, there are gaps between the policy commitment and its application in the educational system (Awusabor-Asare et al., 2017). For instance, the vision of the Adolescent Health Service Policy and Strategy (2016-2020) was to promote equitable access to appropriate, comprehensive, quality, and cost-effective health information and education for adolescents. The target was to reach 90% of adolescents with health information and services and improve the SRH knowledge of 90% of adolescents in Ghana by 2020. Even though, the policy prioritized health education as a strategy to improve knowledge, health literacy, and related issues were left out. The policy's vision can be propelled into realization by improving the health literacy of adolescents. While the strategies outlined by the Adolescent Health Service Policy are in force after the expiry of the policy period, little is known from the national and sub-national perspectives about 1) Access and availability of appropriate and comprehensive SRH information to adolescents. 2) The linguistic challenges inherent in the SRH information available to adolescents. 3) Adolescent Sexual and Reproductive Health Literacy (ASRHL) levels.

An assessment of these areas will provide important feedback on the impact of ASRH policies in Ghana and outline gaps in their implementation. Such data are essential for revising ASRH policies and strategies for improving SRH education and knowledge in adolescents in Ghana.

In the Effutu Municipality, access to structured and safe sources of SRH information is scarce and 60% of adolescents in Junior High Schools (JHSs) are in sexual relationships (Gbagbo, 2020). Anecdotal accounts from the Municipal Health Directorate show a complete lack of adolescent health corners, access to educational materials, and School-based SRH clubs. Given that most adolescents in JHS are sexually active, limited access to SRH education and structured learning materials will deny them the knowledge they need to have about the changes occurring in their bodies. This lack of knowledge may result in unhealthy sexual behaviors and poor SRH outcomes. The gray spaces outlined in the above discussions are considerable research gaps in the health literacy literature of Ghana and SSA. Thus, ASRHL research is essential to inform adjustments in Ghana's adolescent health service policy and guide future interventions for achieving its strategic objectives. This study contributes to the strategies for improving ASRHL and related outcomes by restructuring existing ASRH text materials into adolescent-centered SRH educational materials using evidence-based and participatory approaches. It further assessed the effectiveness of educational materials in improving the SRHL of young adolescents.

### **1.3 Research Aims and Objectives**

#### **1.3.1 Research Aims**

The study aimed to improve ASRHL and related outcomes in the Effutu Municipality and to provide evidence-based strategies that can inform the revision of the Adolescent Health Service Policy and Strategies.

#### **1.3.2 Research Objectives**

The main objective of this study is to restructure existing SRH education materials to improve SRHL in young adolescents.

The specific objectives of the research are to:

1. Assess the SRHL needs of young adolescents in the Effutu Municipality.
2. Restructure existing SRH educational materials to meet the literacy skills of young adolescents in the Effutu Municipality.
3. Evaluate the effectiveness of the restructured SRH educational materials in improving the ASRHL in the Effutu Municipality.

#### **1.3.4 Research Questions**

1. What are the SRHL needs of young adolescents in the Effutu Municipality?
2. What instructional designs are suitable for restructuring SRH educational materials to meet the literacy skills of young adolescents in the Effutu Municipality?
3. How effective are restructured SRH educational materials in improving SRHL in the Effutu Municipality?

#### **1.4 Motivation for the Study**

This study was motivated by the vision and strategic objectives of the 2016 Adolescent Health Service Policy and Strategy, which sought to ensure equitable access to comprehensive, appropriate, and quality health information and education for adolescents in Ghana. The researcher drew inspiration from her rich background and expertise in teaching and learning to assess the scope of adolescents' knowledge of SRH and their literacy needs to inform adjustments in policy strategies. She believes in applying learning theories and principles to evidence-based research to unearth effective strategies for designing appropriate, comprehensive, and quality health information to empower adolescents for healthy living. The researcher believes such research will yield valuable evidence to inform the revision of the Adolescent Health Service Policy and Strategies in new ways to advance adolescent health education and literacy outp

#### **1.5 Research Outline**

The research will be organized into six chapters. The first chapter will discuss the background, research problem, aims, objectives, and questions. The second chapter will provide a review of key concepts in the study. The theories and empirical studies relevant to the research objectives will also be discussed. Chapter three will present the philosophical paradigm, research designs,

and data collection methods. The process for restructuring the existing SRH materials will be provided in addition to the methods for data analyses. Chapter Four will present the results of three research objectives. The fifth chapter will discuss the results and their relevance to the theories and the existing empirical literature. Chapter Six will summarize the study's findings, contribution to theory, empirical literature, and methodology. Chapter Six will also provide the study's contribution to health policy and management, limitations, and recommendations.



## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Chapter Introduction

This chapter presents the theoretical and empirical literature that informed the study. The review is organized into two main parts. In the first part, the researcher extensively discusses the concept of health literacy and text restructuring, followed by discussions of the theories underlying the research. Three theories are discussed: the cognitive load theory, the cognitive theory of multimedia learning, and the pictorial realism theory. The second part discusses empirical literature on the scope of ASRH research in SSA and empirical literature on methods for simplifying health education materials for improving health literacy. The chapter further outlines research gaps in the literature and the implications of the literature for the study. Finally, the chapter provides a conceptual framework based on the theoretical and empirical reviews to guide the study.

#### 2.2 Fundamental Concepts in the Study

Three concepts feature prominently in this research: SRH, health literacy, and text restructuring. The concept of health literacy is discussed, followed by text restructuring.

##### 2.2.1 Adolescent Sexual and Reproductive Health Policy Environment of Ghana

Ghana has a well-defined policy framework for SRH dating back to 1969 (Ghana, 1969). From 1994 to date, several policies have been developed to promote and protect ASRH in Ghana (Ghana Population Council [GPC], 2000; Ghana AIDS Commission, 2013; GHS, 2016; Adjei & Billingsley, 2017). The country has signed on to international declarations on SRH such as the Abuja and the Maputo declarations which illustrate its alignment with global standards. The literature also points to a broad multi-sectoral approach to ASRH, involvement of multiple stakeholders, including ministries, civil society organizations, and community representatives. Ghana operates a multi-tiered framework within which SRH education is developed and delivered. The Ministry of Education collaborates with relevant stakeholders to ensure inclusivity and quality in curriculum development. The school-based Comprehensive Sexuality Education (CSE) is one

of the recent policies that seeks to adopt a multidisciplinary approach to meeting ASRH needs globally (UNFPA, 2010; UNESCO, 2015).

In Ghana, the CSE policy is presently being implemented in Senior High Schools (SHS) and focuses on HIV prevention, interpersonal skills, reproductive physiology, contraception, and pregnancy prevention (Keogh et al., 2018; Biddlecom et al., 2007). The CSE is integrated into Senior High School (SHS) curricula, both core and elective subjects. Apart from the fact that the CSE policy has received a huge public backlash for the attempts to extend it to basic schools, its implementation conflicts with other existing policies and poses significant barriers to its effective delivery in Ghana. There is ambiguity between abstinence-based and comprehensive approaches (Panchaud et al., 2018; Ocran et al., 2022). The content remains limited and heavily emphasizes abstinence. A nationwide study in 2017 reported that only 8% of students reported receiving education on all relevant SRH topics (Awusabo-Asare et al., 2017). Teachers face several challenges in delivering SRH education, including a lack of time, resources, and expertise (Awusabo-Asare et al., 2017).

Although many policies address ASRH in Ghana, very few focus on school-based SRH education, indicating a potential gap between broad policy commitment and their unique application in education. Local actors such as school boards and Parent Teacher Associations (PTA), particularly, those of private and religious-based schools, and their influence over decisions related to the scope and content of SRH education (Awusabor-Asare et al., 2017; Agblevor et al., 2023). Also, there is little mention of how existing policies have been translated into measurable outcomes. Although health education features prominently in most of the ASRH policies, they do not emphasize SRHL. While SRH education is an antecedent of SRHL, the latter is essential in shaping adolescents' ability to understand and act on information from education (Nutbeam, 2000; WHO, 2016).

### **2.2.2 Sexual and Reproductive Health**

SRH is conceptually defined by the UNFPA (nd), as a state of complete physical, mental, and social well-being in the reproductive system. This means that individuals should be able to experience a fulfilling and safe sex life, can produce, and choose whether, when, and how often to do so. Social well-being in this context relates to sexuality, matters of the reproductive system, its functioning, and processes, which include maternal and newborn health, family planning, and adolescent and youth reproductive health (Denno et al., 2015).

### **2.2.3 Health Literacy**

Health literacy is an evolving concept that has gained a cross-cutting priority for delivering safe and quality healthcare in recent years. The development dates back to the National Assessment of Adult Literacy (NAAL) by the National Center for Education and Statistics in the USA (Parnell, 2014). The NAAL reported that most adults lacked health literacy skills and had challenges functioning in the healthcare system (Kutner et al., 2006). Health literacy, therefore, emerged from adult literacy assessment. Nutbeam (2009) has argued that health literacy comes in different forms because it is content and context-specific, particularly when looking at new literacy, such as digital, media, e-health, and financial literacy (Kastis & Carneiro, 2010 ). These forms of literacies are emerging regarding information communication technologies and specialization. Context-specific literacy has become necessary owing to the unique skills required of individuals to function in emerging specialty areas (Nutbeam, 2009). An example is the healthcare context or environment. General literacy skills may not be the only prerequisite to functioning in such an environment. Consequently, health literacy is one of the emerging content-specific literacy related to health.

The concept of health literacy was first adopted in the mid-1970s to illustrate how health information affects the educational systems (Parnell, 2014, Scott et al., 2006). The individual's health literacy gained the limelight in the early 2000s when health systems began emphasizing self-care and self-management of health and diseases (Cutilli & Bennett, 2009). Health literacy has been defined severally by prominent scholars and institutions. Four of the definitions are provided in Table 2.2.3.

**Table 2.2.3: Conceptual Definitions of Health Literacy.**

<b>Author(s)</b>	<b>Year</b>	<b>Definition</b>
WHO/ Nutbeam	1998	“The cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health.”
Institute of Medicine	2004	“The degree to which individuals have capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”
Nutbeam	2000	“The personal, cognitive, and social skills which determine the ability of individuals to gain access and understand, and use information to promote and maintain good health.
Mancuso	2008	“An evolving lifetime process that includes the attributes of capacity, comprehension, and communication.”

*The researcher constructed, 2023*

The first three definitions of health literacy highlight the individual’s ability, cognitive, and social skills as antecedents for gaining expertise in health literacy. The individuals’ ability and social skills may not necessarily guarantee access to information or the infrastructure for accessing information. Therefore, health literacy depends not only on individual ability and skills but also on health system interventions to make available information in formats that match the ability and skill levels of groups and individuals. The reason is that whether individuals have lower or higher cognitive abilities and skills, one thing is common to all of them. That is, the basic mental capacity to process information depending on its presentation or design. As proposed by the logic model of Paasche-Orlow & Wolf (2007), health literacy is a risk factor. As such, the health system has to identify individuals’ abilities through needs assessment and provide education tailored to individual needs and capacities. In doing this, the health system can minimize low health literacy and, by extension, risk factors for disease conditions.

The definitions try to place the responsibility of health literacy at the doorstep of individuals. Access to information depends on individuals’ ability and the health system’s duty to ensure easy access to health information. For instance, young adolescents in peri-urban, rural, and city slums in Ghana may be unable to obtain health information not because they lack such personal attributes, but instead, because their socio-economic deprivation can also deny them such privileges.

Discussing the individual's capacity will be fair if the health system provides easy access to health information in libraries, adolescent corners, and schools, in addition to internet services. Accordingly, the ability to obtain health information is a subjective element. Measuring such an ability in resource-limited countries and communities may be problematic.

Like other literacies, health literacy can be considered a measurable outcome of health education, just as literacy measures are employed to assess the success of school education (Nutbeam, 2009). Due to differences in content and context, health literacy has been defined based on content and context, such as maternal health literacy, oral health literacy, and public health literacy (Freedman et al., 2009; Naghibi et al., 2014). From the viewpoint of context and content, SRHL has been measured. As an emerging content and context in health literacy, SRHL has not been fully researched, particularly in SSA. Drawing from the health literacy literature and the extent of definition, the concept of SRHL should theoretically align with the conceptual definition of health literacy, differing only in content. Therefore, in this research, I adapt the definitions of health literacy to suit the concept of SRHL.

According to Nutbeam (2000), health literacy competencies can be measured at different levels, relating to lower or higher-level literacy. The levels can be described in succession as functional, interactive, and critical health literacy. The levels are differentiated by advancement in skills and knowledge that support better independence and empowerment of individuals for health-related decision-making and the expression of broader health knowledge (Nutbeam, 2009). Mancuso (2008) also identified six dimensions of health literacy competency. They are: operational, interactive, autonomous, informational, contextual, and cultural. The dimensions are graduations, beginning with 1) operational – reading, writing, comprehension, and numeracy. 2) Interactive – problem-solving and decision-making skills. 3) Autonomous – skills to analyze information relevant to one's health. 4) Informational – information searching skills. 5) Contextual – Skills to navigate the healthcare environment. 6) Cultural – skills to apply health information within a social system (Mancuso, 2008).

Two levels of SRHL are of interest in this study, namely, functional SRHL and interactive SRHL defined as follows:

**Functional SRHL** is the level at which young adolescents can read, process, and understand available SRH education materials needed to make helpful SRH decisions.

**Interactive SRHL** is young adolescents' functional SRHL skills and the skills to apply SRH knowledge to solve basic SRH problems and make decisions.

#### **2.2.4 Measurement of Health Literacy**

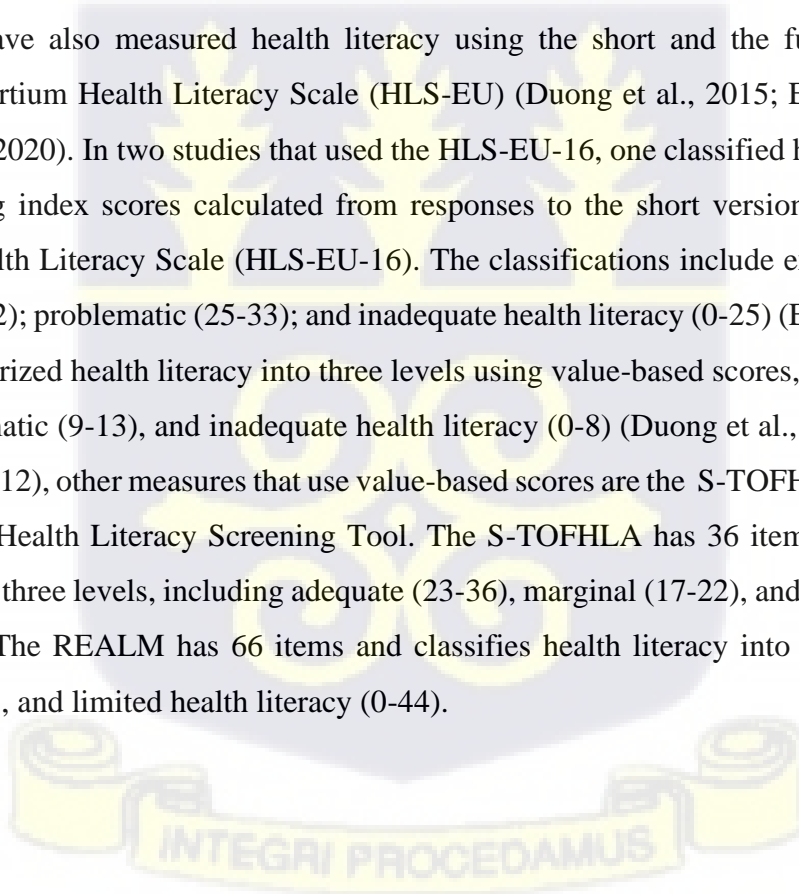
Several validated measures of health literacy are available for measuring the construct of health literacy. They include the Rapid Estimate of Adult Literacy in Medicine (REALM) (Davis et al., 1993). This measure was later compressed into the revised version of the Rapid Estimate of Adult Literacy in Medicine (REALM-R) (Arozullah et al., 2007). Other well-known measures are the Test of Functional Health Literacy in Adults (TOFLA) (Parker et al., 1995), the Medical Achievement Reading Test (MART) (Hanson-Divers, 1997), the New Vital Signs (NVS) (Weiss et al., 2005), the Oral Health Literacy for Adult Questionnaire (OHL-AQ) (Naghbi et al., 2014), and the Sexual and Reproductive Health Literacy Questionnaire (SRHL-Q) (Vongxay et al., 2019). The REALM, the REALM-R, and the MART are word recognition tests. The instruments assess health literacy based on patients' ability to pronounce a group of words. The TOFLA, on the other hand, measures health literacy as regards patients' ability to read and understand passages and phrases using materials from the healthcare setting. The NVS measures literacy based on the patient's ability to make inferences from information on health-related scenarios.

The SRHL-Q, was the only measure found on SRHL. Yet, it measures adolescents' SRH knowledge and functional literacy in condom use. It seems the existing instruments at best measure functional or operational competency in health literacy. The instruments measure word recognition or pronunciation, the ability to comprehend factual health information and basic numeracy application. The remaining measures do not measure higher-order level competencies in health literacy and do not apply to other content and contexts of health. However, the OHL-AQ measures oral health content and assesses patients' comprehension, numeracy, and decision-making skills. The OHL-AQ is compressed and may cover limited domains in oral health. Further, all the

measures are limited to individual capacities, with no attempt to delve into the health system's responsibility for improving health literacy.

In most studies, health literacy is classified into three or four categories. A careful observation suggests that the criterion levels vary based on the measures used (Haun et al., 2012). For instance, Shahid et al. (2022) used the TOFHLA to assess the health literacy of medical patients. Based on the TOFHLA, scores were assigned to three classes of health literacy: adequate health literacy, which ranges from 75-100; marginal, from 60-74; and inadequate, from 0-59. Adequate health literacy was interpreted as reading, comprehending, and interpreting most healthcare texts. Marginal health literacy means difficulty in reading and interpreting healthcare text, and inadequate health literacy means difficulty in reading, understanding, and interpreting health text.

Other studies have also measured health literacy using the short and the full version of the European Consortium Health Literacy Scale (HLS-EU) (Duong et al., 2015; Evans et al., 2019; Svendsen et al., 2020). In two studies that used the HLS-EU-16, one classified health literacy into four levels using index scores calculated from responses to the short version of the European Consortium Health Literacy Scale (HLS-EU-16). The classifications include excellent (>42-50); adequate (>33-42); problematic (25-33); and inadequate health literacy (0-25) (Evans et al., 2019). The other categorized health literacy into three levels using value-based scores, namely, adequate (13-16), problematic (9-13), and inadequate health literacy (0-8) (Duong et al., 2015). According to Haun et al. (2012), other measures that use value-based scores are the S-TOFHLA, the REALM, and the BRIRF Health Literacy Screening Tool. The S-TOFHLA has 36 items and categorizes health literacy at three levels, including adequate (23-36), marginal (17-22), and inadequate health literacy (0-16). The REALM has 66 items and classifies health literacy into adequate (61-66), marginal (45-60), and limited health literacy (0-44).



### 2.2.5 Text Restructuring

Different authors have defined text restructuring (Hirano, 1987; De Larios et al., 1999; Færch & Kasper, 1983; Poulisse (2019). Central to the definitions provided by the authors is that it is a formulation and translation strategy used by Second Language (L2) learners for writing or in production. Thus, the strategy is used to replace the structures of their mother tongue with that of the L2 to express their message without reducing it. Færch & Kasper (1983) first used the term to explain a situation where students realize that they may not finish a local syntactic plan they are using and produce a different plan that allows them to express their message without reducing it. According to Blume & Levenston (1987), lexical simplification is a restructuring strategy for simplifying text in interlanguage production. Lexical simplification aims to replace complicated words with their simpler synonyms while maintaining the text's grammaticality and meaning to improve comprehension among learners (Glavaš & Štajner, 2015; Štajner & Saggion, 2018). Lexical simplification can be done using lexico-semantic resources like WordNet or a manual approach by the author's evaluations of grammar, clarity, and meaning preservation (Glavaš & Štajner, 2015).

In lexical simplification, written inputs are modified through text simplification to make them more comprehensible, reduce cognitive load and improve recall for L2 learners (Crossley et al., 2012; Crossley & McNamara, 2016). Usually, lexical and syntactic changes are made to texts to make them clearer and easier to understand (Yong, 1999). Two techniques are typically used when simplifying text for L2 learners: the structural and intuitive approaches. Under the structural approach, word lists are used, or learning materials are assessed for readability to guide simplifications. The intuitive methods, however, rely on the instructor's writing experiences and opinions about what makes a text more understandable for the intended learners (Crossley et al., 2012).

In the health sector, there is increasing agreement among Public Health and Medical Practitioners that health communication initiatives should be personalized to meet the literacy competencies of the intended audience (Rudd et al., 2000). Best practice norms increasingly pay attention to reading abilities and message elements such as vocabulary, sentence structure, format, and other literacy-related features that restrict access to written materials which are widely used (Rudd et al., 2000).

This is the essence of the present research. For this study, restructuring is defined as using structural and intuitive approaches of text simplification to simplify the lexical and syntactic structure of SRH texts to reduce cognitive load and make it more precise and understandable to young adolescents.

### **2.2.6 Text Readability and Comprehensibility**

Text readability and comprehensibility are structured approaches often employed to assess the difficulty levels of text. The effectiveness of written materials in health education has been proven over time (Gibson et al., 1996; Friedman et al., 2011; Maskell et al., 2018). However, the characteristics of written materials present an enormous challenge to this time-tested method for educating the population. Readability is a core property of Health Education Materials (HEMs) that can affect readers' understanding of the materials. Reading and comprehension are fundamental to all other levels of health literacy. The practical way to foster an alignment between text difficulty and literacy competencies of low-literate persons is to create simplified (i.e., easy-to-read) material. Creating simplified HEMs begins with assessing the readability and comprehensibility of existing HEMs (Prabhu et al., 2016). Readability assessment uses a systematic formula to determine an individual's grade level to read and comprehend written materials. Readability considers the number of syllables or characters in a particular text. Conversely, comprehension is measured by testing the individual's understanding of HEM (Szabó et al., 2021).

Institutions such as the Institute of Medicine, National Institute of Health, and US Department of Health and Human Services recommend that HEM should be written at 4<sup>th</sup> to 6<sup>th</sup> Reading Grade Level (RGL) (Paasche-Orlow et al., 2003; Nielsen-Bohlman et al., 2004; Centers for Disease Control and Prevention [CDC] et al., 2010). Despite the central role of easy-to-read HEMs in health literacy, studies have consistently reported higher readability levels of HEMs in various health contexts and contents. Evidence from ophthalmology, radiology, general healthcare, surgical, and point-of-care materials using various readability algorithms point to poorer readability and quality of HEMs (Agarwal et al., 2013; Hansberry et al., 2014; Williams et al., 2016; Delaney et al., 2021; Szabó et al., 2021). Among studies assessing the readability of web-based HEMs, Delaney et al. (2021) reported a cumulative mean Reading Grade Level (RGL) of

all web-based materials on radiation safety at 13.3, far higher than the recommended RGL of six and below. The mean percentage of long words was significantly higher than complex, hard, unfamiliar, and long sentences. A study from a primary surgical sub-specialty website also found that many more participants used information from websites included in the assessment and rated the information as good as those handed down by doctors. Yet, the readability analyses showed that materials retrieved from 8 out of the 14 sites had higher RGLs, with most having RGLs above 17 (Hansberry et al., 2014).

Patient education materials published in journals are also reported to have higher reading grade levels, regardless of the type of journal. Rooney et al. (2021) assessed the RGL of 2,585 patients' educational materials published in high-impact journals and found that an overwhelming number were above the recommended RGL. The authors reported a mean RGL of 11.2 – 13.8 for the aggregate materials assessed. A readability assessment of patient-oriented educational materials in dermatology reported higher RGLs of materials. Seven hundred and six (706) materials assessed had a mean score between 8.9 and 14.3, with 98% of the materials written above the 7<sup>th</sup> RGL (Prabhu et al., 2016). Based on the above findings, it is evident that most written HEMs, online and paper-based, may be above the general and health literacy skills of readership, making them linguistically inaccessible to a more significant proportion of users. The prevailing circumstance requires that existing HEMs are assessed for readability and comprehensibility to inform health literacy actions.

### **2.2.7 Measures of Text Readability**

A cocktail of readability algorithms has been used since the first half of the 20<sup>th</sup> century (Ley & Florio, 1996). They include the Flesch Reading Ease, Flesch-Kincaid Index (FKI) or Flesch-Kincaid Reading Grade Level (FKRGL), Fry Graphical Analysis (FGA), Gunning Fog Index (GFI), the Coleman-Liau index (CL), FORCAST formula, Simple Measure of Gobbledygook (SMOG), New Dale-Chall readability formula, New Fog Count, and the Raygor readability estimate (Powell et al., 2021; AlKhalili, 2015; Hansberry et al., 2014; Williams et al., 2016). Carefully considering the studies' outputs, there is a consistently high readability level of HEM with some variation in output across the various readability algorithms. The output discrepancies

may result from the criterion score of each algorithm (Hansberry et al., 2014). Also, it is argued that the FKI undervalues RGLs by nearly two grades (Powell et al., 2021).

More than one assessment tool is recommended to improve the validity of readability assessment results. Yet, no gold standard readability indicators is mentioned (Badarudeen & Sabharwal, 2010). Studies use a combination of readability algorithms to improve the accuracy of results regarding the difficulty level or otherwise of HEMs. For example, in a study of online HEM on various specialties, the authors found that nine out of ten different algorithms indicated that HEMs were written high above the recommended level on the various specialties assessed. While all nine of the analysis reported higher mean scores of RGLs, the New Fog count produced the lowest mean score of RGL, compared to the SMOG, which recorded the highest mean score of RGL (Agarwal et al., 2013). Literature reviews published in the last decade also report higher RGL (ranging from 8 – 11) of written and online patient education material (Williams et al., 2016). As noted earlier, the FKI reported lower mean scores of RGLs than tools such as the SMOG and the GFI (Powell., 2021).

### **2.3.8 Measures of Text Comprehensibility**

The challenge with the health literacy literature's status is that the text readability concept is used to measure text comprehensibility. Meanwhile, the two concepts are complementary and cannot be used interchangeably. The field of health literacy seemed saturated with readability assessment of HEM (Trivedi et al., 2014; Patel et al., 2015; AlKhalili et al., 2015; Boztas et al., 2017; Guan et al., 2018), to the neglect of comprehensibility of HEM. Some studies assess text comprehensibility using readability measures (Wang et al., 2009; Trivedi et al., 2014; Munsour et al., 2017). The inconsistencies may be related to how readability has been defined. Some scholars defined readability as the level of comprehension required to gain a good hold of the text being read (Albright et al., 1996). Conversely, some literacy scholars have expressed different opinions and have distinguished between the two concepts. For instance, Wray and Dahlia (2013) have emphasized that readability is related to a text's linguistic characteristics, which determines the ease or difficulty with which a person may read and understand the text. Readability differs from one text to another, and it does not change based on reader characteristics (Wissing et al., 2016).

Text comprehensibility is the ability of a reader to understand a text and to communicate it as intended by the author of the text (Adelberg & Razek, 1984). Comprehensibility of HEM uses various measures, some of which are named in the measures of health literacy. Others include Competency in Patients Care (CPC), which measures health literacy as regards patients' ability to read and understand passages and phrases using materials from the healthcare setting (Szabó et al., 2021). There is also the Patient Education Materials Assessment Tool (PEMAT), which assesses the understandability and actionability of HEM (Shoemaker et al., 2014). The Suitability Assessment of Materials (SAM) and Comprehensibility Assessment of Materials (CAM) scale also evaluate the suitability and comprehensibility of websites (Helitzer et al., 2009). HEM assessment results generally point to low comprehension levels and frustration in reading, particularly among laypersons and low-literate persons (Tan et al., 2018; Szabó et al., 2021). Although studies point to poor medical vocabulary knowledge among patients, limited data are available on this subject and are outdated (Cole, 1979; Spees, 1991). Yet, the literature points to poor knowledge of medical words, challenges with understanding, and misinterpretation of medical words among patients.

### **2.3 Review of Theoretical Literature**

The theoretical review focuses on three main theories: 1) the cognitive theory of multimedia learning. 2) The cognitive load theory. 3) The pictorial realism theory. The discussion begins with a macro perspective of the theories underlying the study and, later, the individual theories. The cognitive load theory and the cognitive theory of multimedia learning are discussed together, followed by the pictorial realism theory.

#### **2.3.1 Cognitive Learning Theory**

The cognitive load theory and the cognitive theory of multimedia learning are cognitive learning theories. Cognitive learning theories emerged in the early 1920s due to the quest to overcome the limitations of behavioral theories (Yilmaz, 2011). The cognitivist argues that prior knowledge and mental processes are primary in behavior orientation (Deubel, 2003; Yilmaz, 2011). Cognitivism is credited to the works of Jean Piaget, Jerome Bruner, Edward Chase Tolman, and Lev Vygotsky. However, cognitive theories gained prominence in education in the second half of the twentieth century. Several empirical works on cognitive processes within the cognitive framework, such as

concept formation, memory formation, and attention within that period, emphasize the role of human cognition in behavior change (Yilmaz, 2011). Cognitive learning examines structures and processes to describe learning and behavior change. It is concerned with the human cognitive architecture, how it processes and stores information, and the role of the individual learner in knowledge acquisition and integration (Merriam et al., 2007; Simon, 2001).

### **2.3.2 The Cognitive Load Theory and the Cognitive Theory of Multi-Media Learning**

The Cognitive Load Theory (CLT), as used by Sweller (1988), and the Cognitive Theory of Multimedia Learning (CTML), as proposed by (Mayer, 2001), are both concerned with the structure of information and how it can effectively improve learning premised on how the human mind works. The construct cognitive load represents the load placed on the working memory by a series of cognitive processes, including understanding, schema formation, automation, and problem-solving (Ginns & Leppink, 2019). Both theories believe that three primary structures in human cognition are critical to information processing, namely the sensory memory, the working memory, and the long-term memory (Sweller, 1999).

The CLT focuses on the working memory and views it as a working space by which information is rehearsed and used for decision-making, which gets lost or stored in the long-term memory (Sweller et al., 1998). The working memory has functions for recall or little temporary active thoughts. From the works of Cowan and his colleagues (2005; 2008; 2012), the working memory has space to process 3-4 verbal chunks of information or short sentences at a time for storage in long-term memory. Cowan's findings presuppose that information overload would be beyond four verbal chunks, preventing long-term memory storage. Hence, poor learning will take place. Working memory is responsible for cognitive tasks related to language comprehension, problem-solving, and planning. However, Cowan (2005) found that the limit of working memory differs among individuals, varies across age, and accounts for differences in people's intellectual abilities. Long-term memory has an unlimited capacity for storing knowledge and serves as additional processing capacity through schemers. Schemers are mental formations resulting from aggregating different information elements processed by the working memory as a single entity. Schemers are valuable for the optimal use of working memory and help automate skills and decision-making.

CTML operates on the dual-channel and active information processing hypotheses in addition to the limited capacity assumption of the CLT. CTML emphasizes the role of sensory memory in information processing. The theory presents instructional media based on how the human mind functions, as merely presenting words and pictures together does not foster the goal of multimedia learning. It views learning as a dynamic process involving filtering, selecting, organizing, and integrating information. According to Mayer (2001, 2005), sensory memory has two channels for processing auditory/verbal and visual information (Mayers, 2001a, p. 68). Learners require more mental effort to process verbal representations than pictorial representations, which are original modes of knowledge representations. Information processing is improved when the auditory and visual channels are combined. Thus, combining pictorial and written representations optimizes learning (Mayer, 2009; p. 47).

The CLT and CTML posit that the working memory has limited information processing capacity (Mayer. 2001, 2009; Wouters et al., 2008). However, the CLT states that information presents three cognitive loads: intrinsic, extraneous, and germane. Intrinsic cognitive load is related to the nature of the information or task, specifically, the number of elements or units of information and their interaction. It is fixed and unchangeable for learners with a given level of expertise (Sweller, 2011). More complex/technical information or tasks have a higher intrinsic load than simpler ones. For example, long sentences with many polysyllabic words may be difficult to understand compared to more straightforward and shorter sentences. It is usually the case because the former has more elements that interact than the latter. Extraneous cognitive load is related to the unessential aspect of learning materials or instructional procedures that require learners to simultaneously process many elements of information (Sweller, 2011). It may include information irrelevant to the learning objectives, complex icons, and needless animations. In a situation like this, the learner would waste cognitive resources trying to process the information irrelevant to the learning objective. Germane cognitive load is activated when information is presented to enable the learning and building of schemers.

From the CTML perspective, instructions are optimal only when they aid learners in processing information actively. This action is invoked when learners can select relevant materials (visual and text), organize them into coherent pictorial and text representations, and integrate them with

existing relevant knowledge (Mayers, 2001a, p. 68). The CLT suggests that the three loads combined must not surpass the working memory capacity to promote the active processing of information. An increase in one cognitive load will call for a decrease in another. Therefore, where the intrinsic cognitive load is higher, it is necessary to reduce the extraneous cognitive load so that the two loads combined do not exceed the working memory capacity to prevent sub-optimal learning (Wouters et al., 2008). The lesser the extraneous cognitive load, the more effective learning becomes (Moreno & Park, 2010). Overall, the CTML emphasizes individual differences in learning and requires instructional designers to ascertain learners' prior knowledge regarding a particular instruction.

The CLT has undergone some theoretical review (Sweller et al., 2019). The theory suggests that learning instruction will lead to one of three different processes. They are 1) Generative processing, which refers to the cognitive effort that has to be expended to understand the material and is partly related to learners' motivation. 2) Essential processing (i.e., intrinsic load). It describes the cognitive effort needed to hold the learning material in the working memory. This process largely depends on the difficulty level of the learning material. Such elements include the learner, the learning task, and the learning environment (i.e., noise and high temperature) (Choi et al., 2014). 3) Extraneous processing (extraneous load). It expresses wasting cognitive effort on details that do not support learning objectives.

### **2.3.3 Application of CLT and CTML to Health Educational Materials Design**

Research has implemented strategies to enhance learning by manipulating cognitive load, such as increasing germane load, adjusting intrinsic load, and reducing extraneous load. The “Teach to Goal” strategy for heart failure self-management is an example of applying CLT to improve health literacy in patients with low literacy skills (Baker et al., 2011). Researchers have applied CLT concepts, effectively addressing redundancy and split attention in educational materials (Mirza et al., 2019; Roodenrys et al., 2012). For instance, adaptive multimedia learning, a technique that customizes training to individual learners, has gained popularity for its effective cognitive load management (Kalyuga, 2008). In CTML, techniques such as segmenting information and, the use of visual aids have been employed to reduce extraneous load and improve learning outcomes in

patients with lower health literacy (Lee & Nathan-Roberts, 2021; Mbanda et al., 2020; Goodman & Lambert, 2022).

Studies have demonstrated statistically significant improvement in health literacy when visual aids are co-created with the target audience, including individuals with limited literacy (Mbanda et al., 2020). Low health literacy is associated with higher cognitive load, reduced information retention, and poor performance in health-related tasks (Meppelink et al., 2016; Wolf et al., 2012). Mental abilities, particularly reasoning, and problem-solving, significantly influence the relationship between health literacy and health outcomes, explaining variations in the physical relationship between literacy and health outcomes, explaining variations in physical health and depressive symptoms (Wolf et al., 2012; Serper et al., 2014). The CLT emphasizes presenting information in a way that reduces cognitive demands and enhances comprehension, particularly for individuals with low literacy (Meppelink et al., 2016). This approach highlights the importance of tailoring health communication to improve outcomes for low-literate populations by minimizing cognitive overload.

The two theories propose several principles sound in minimizing cognitive load and freeing up space in the working memory for germane processing. (Sweller & Chandler, 1994; Sweller et al. 1998; Sweller et al., 2010; Sweller et al., 2011; Mayer, 1997, Mayer & Moreno, 2003). Six CLT and CTML principles are considered relevant to SRH text restructuring and are summarized below.

### ***The Redundancy Principles***

The redundancy principle relates to instructional presentation formats. It states that instructions should be presented in a format that guarantees complete understanding for the learner and is devoid of irrelevant explanatory information. The purpose is to reduce the extraneous cognitive load of instructions and improve learning outcomes. Learning instructions with unnecessary explanations or using multiple ways to present information increases cognitive load and promotes redundancy. Studies have shown that adherence to this principle improves comprehension and learning efficiency (Kablan & Erden, 2008; Liu et al., 2012).

### ***The Modality Effect***

The modality effect is the positive impact of employing visuals and texts to develop learning instructions. It ties in with the contiguity principle of the CLT (Mayer & Anderson, 1992). It enables the visual and auditory modes to complement each other in information processing and promotes cognitive load reduction in knowledge construction. Evidence from pictograph validation among low-literate and low-socioeconomic groups shows that pictographs with text improve understanding. In this study, learning contents combining pictures and text were perceived to have more clarity than those without text (Dowse & Ehlers, 2004; Choi, 2012).

### ***Coherence Principle***

The principle of coherence is championed both by the CLT and the CTML (Mayer, 2009; Sweller, 2011). The principle is concerned with excluding unnecessary information from multimedia instructions to minimize the processing of extraneous load. Only pictures and text supportive of the learning objectives should be included.

### ***The Split Attention Effect***

Split attention relates to presentation formats that divide attention between two relevant forms of information, such as audio and text or animations and static pictures. Another example is having a diagram depicting a concept on one page and providing textual information about the diagram on another page. Presentations of this nature divide learners' attention between the two instructions and increase extraneous cognitive load. It would be appropriate to provide learners with animations only or pictures only than both. Based on this principle, the contiguity principle was proposed by Mayer and Anderson (1992). Like the split-attention effect, the contiguity principle states that multimedia instructions will be effective if words and visuals are presented adjacent to each other in time and space.

### ***Segmenting Principle***

This principle is also known as chunking. It states that learning is optimized when multimedia messages are broken down and grouped into controllable pieces to enable learners to learn at their own pace (Mayer, 2009, p. 174). An example is breaking down longer sentences into shorter and more meaningful segments.

### ***Personalization Principles***

Learning will improve when multimedia presentations use words in a conversational style instead of a formal style. This principle promotes using informal language and active words rather than passive words.

#### **2.3.4 Limitations of the CLT and the CTML**

Mayer's argument that pictorial representations are original modes of knowledge and are more intuitive and closer to visual experience has been criticized for lack of applicability to contents in the social science domain (DeWestelinck et al., 2005). Applying descriptive or depictive external visual representation to such a knowledge domain may not help. Also, different knowledge domains use different visualization systems. Therefore, pictures may not apply in knowledge domains without iconic sign systems. It may present learners with interpretation difficulties when applied and affect their selection process and organizational processing (De Westelinck et al., 2005).

The CLT has also been criticized similarly. Schnotz & Kürschner (2007) have questioned Sweller's conception of intrinsic load and have argued that intrinsic load is a function of educational objectives and not 'one size fits all' as described by the CLT. What constitutes intrinsic load depends on the educational objectives and the learner's expertise levels. However, the intrinsic load of a particular learning task is fixed for those with the learning prerequisite (Schnotz & Kürschner, 2007). From Schnotz and Kürschner's work, cognitive load management may not always require load reduction but an alignment of instructional help to learners' expertise, as intrinsic and extraneous loads largely depend on learners' expertise level. The amount of load must be just adequate. Learning tasks should not be too challenging to overburden the working memory and too easy to create sub-optimal learning.

The critical role of expertise-instruction alignment is further accentuated by the "100,000-hour rule" (Ericsson et al., 1993). The rule suggests that transfer of learning does not always depend on the instructional approach developed based on the CTML principles but also on the time it takes to learn a complex subject matter and the frequency of practice the learner adopts. Hence, learners'

experience and the amount of time spent practicing a task are critical factors in learning. Artino and Durning (2012) also identified learners' motivation as indispensable in learning transfer.

Given Schnotz & Kürschner (2007)'s critique of the CLT, the main strength of the theory for this research is cognitive load alignment or adjustment. The purpose is to adjust the extraneous and intrinsic loads of existing SRH learning materials to the competency levels of young adolescents. However, the CLT is not concerned with dual coding or modality as the CTML. Through its modality, coherence, and contiguity principles, the CTML tries to free cognitive space for germane processing by combining pictures and text. The strength of the CLT and CTML to complement each other in cognitive load management makes them valuable for achieving the research objectives. It is important to note that the CTML stresses using simple visuals, tying it to only one end of the realism continuum. Also, the CTML does not provide boundary conditions for using simple visuals, making it challenging to apply all its principles to some subject domains such as SRH. It is unlikely that simple visuals would work best for SRH learning. However, the health literacy literature reports using pictures and animations of varying degrees of fidelity for enhancing HEM (Berry, 1991; Townsend et al., 2008). The visuals have different levels of detail, some of which have been proven more effective for learning than others. However, the level of visual details appropriate for optimal learning in SRH is not well documented. For this reason, introducing pictorial realism in developing pictures closer to learners' visual experiences will hone our understanding of the possible impact of detailed visuals on SRH learning among young adolescents.

### **2.3.5 Pictorial Realism Theory**

Pictorial realism is a concept in the art discipline and is credited to the works of Wollheim (1970) Willson (1975), and Goodman (1976), among others. As cited in Lopes (2004), Goodman states that realism is relative and is determined by the standard representation system for a particular culture at a specific moment. Pictorial realism, therefore, depends on how well-established a representation system is in a specific usage context. If a symbol system is well-known to a group of people, that image is deemed realistic.

Pictorial realism in cognitive learning is credited to the works of Dale (1946) and Finn (1969), and Dwyer Jr (1967), Dwyer (1971). Pictorial realism is a design principle that suggests visually displayed images should correspond to the viewer's mental image (American Psychological Association [APA], dictionary of Psychology, nd). Pictorial realism is also a measure of how pictures resemble objects in the real world. Realistic pictures are essential sources of knowledge because they are more like objects than other representations and do not mislead (Abell, 2007). The basic assumption of realism is that learning will be more effective as the number of cues in the learning situation increases. Thus, the more life-like a stimulus is, the higher the probability it has for facilitating learning (Finn, 1953). Some studies in cognitive learning and instructional design have shown that visual illustrations with more realistic colors than nonrealistic materials with color improve understanding (Levie & Lentz, 1982; Townsend et al., 2008). Also, Dwyer & Lamberski (1983) have argued that color code is an attention-getting strategy that has a measurable effect on cognitive learning compared to text or labels.

Be that as it may, the assumption of realism contradicts the core tenet of the CLT and the principle of coherence proposed by the CTML. CLT stresses reducing extraneous details to ease information processing and recollection (Sweller, 2011). Adding more details to visual representations will increase learners' cognitive load. For example, the coherence principle also advocates excluding unnecessary details from information (Mayer, 2009), making detailed visualization inconsistent with cognitive load reduction. It is also reasoned that realistic details can result in visualization challenges for learners with poor spatial abilities. Using realism among such learners may lead to unfavorable learning outcomes (Huk, 2006). On this premise, it is justifiable to argue that realism contradicts a core principle of cognitive load reduction.

Despite the incongruity, pictorial realism represents a continuum with one end entailing visuals with higher details or fidelity (i.e., three-dimensional photos) (Skulmowski et al., 2021). Such visuals have lots of depth, details, texture, and varied colors, mainly representing their real object in the physical world. On the other end of the realism continuum is abstract visuals with lower fidelity (i.e., two-dimensional) (Dwyer, 1967), consisting of line drawings, silhouettes, and icons.

The puzzle yet to be exhausted is which end of the realism continuum offers an efficient and most appropriate visual representation for optimizing learning. Empirical studies experimenting with both two-dimensional and three-dimensional visuals have presented mixed results. Some studies in cognitive learning and instructional design have shown that visual illustrations with more realistic colors than nonrealistic materials with color improve understanding (Levie & Lentz, 1982; Townsend et al., 2008). Also, Scheiter et al. (2009) investigated the comparative effectiveness of schematized and real visual representations in learning about cell reproduction. The authors found lower learning outcomes among students who used the realistic visualization than those who used the schematized version. Differences in learning outcomes in this study were attributed to the visual complexity that may be associated with realistic visuals on mitosis (Scheiter et al., 2009).

A study of motor skill acquisition also suggests that the effectiveness of realistic visuals may be related to the learner's perception or preferences instead of cognitive (Lucas, 2019). In this study, although learners preferred realistic visuals to visuals with less fidelity, higher knowledge was recorded among participants using schematic visuals, although the score was insignificant. Regarding a knowledge test and self-efficacy score, participants viewing three-dimension visuals performed better for motor skills than those receiving the two-dimension visuals. Further studies on transfer performance using distractive and less distinctive shapes found that using realistic imagining in learning less distinctive shapes (fictional bone) increased cognitive load. But lowered cognitive load in learning distinct shapes (dog skull anatomy). Also, a retrieval cue experiment using the parotid gland found a linear relationship between the degree of realism used during learning and retrieval tests. This experiment revealed that realistic visualization would enhance retention test performance among learners who use realistic imaging to learn (Skulmowski et al., 2021). In this study, the authors also found that learning outcomes of schematic visualization with less fidelity can be improved using verbal description, particularly for the text-based test.

The above findings offer a clue and understanding of which visual representations give favorable learning outcomes and under what conditions. It emphasizes that neither of the two ends of the realism continuum is superior to the other and that each is relevant to different learning objectives, learning instructions, and subject domains. For instance, the high-fidelity visuals of the heart photograph in Dwyer Jr's (1967) experiment may not be helpful for accurate information regarding

the heart's function. Still, they may be relevant in helping medical students identify the different parts of the heart later in their professional lives. In other studies, naming high color-diagnostic objects was facilitated when they were correctly colored than when they were in black and white. Low-colored-diagnostic objects did not benefit from exact colors (Therriault et al., 2009; Redmann et al., 2014). This evidence also shows that realism is object-specific. While realistic visuals may facilitate recognition and learning of particular objects, high-fidelity visuals may not be relevant to other objects.

In the healthcare literature, realistic visuals convey concepts and emphasize signs and symptoms (DeWalt et al., 2004; Townsend et al., 2008). It has been found that research participants generally prefer colored pictographs to black-and-white line drawings, which corroborates the assertion that high-fidelity visuals are more related to learners' perceptions than cognitive ones (Lucas, 2019). Consequently, when designing multimedia instructions, consideration should be given to the learning objectives, the characteristics of learners, the subject domain, the cueing technique identified to facilitate learners' achievement, and the test method. Thus, cognitive load management is a critical consideration for developing multimedia instructions.

## **2.4 Empirical Literature**

The empirical literature was reviewed using a scoping approach. The researcher set out to review empirical research on ASRHL in SSA. Yet, the search output revealed a lack of research in this domain. Hence, the review was extended to cover research activities on ASRH in SSA to hone her understanding of the research gaps in ASRH. The second part of the review focuses on research on simplified HEM and health literacy in low-literate people.

### **2.4.1 Literature Review Methodology.**

The literature was summarized using a scoping review methodology. The term “scoping review” is used cautiously in this context because the requirements of scoping review were not met due to time and limited access to databases. For example, the literature search scope was limited and could not include all the relevant data sources. However, the scoping method was motivated by the literature review objectives, which sought to 1) establish the scope, diversity, and type of research activities on SRH of adolescents and young people in SSA (Arksey & O'Malley, 2005).

The purpose was to identify significant research gaps in ASRH in SSA and to establish a basis for the present study. 2) Examine how research has been conducted on simplified HEM for improving health literacy in low-literate people (Tricco et al., 2016; Munn et al., 2018). The primary aim of the second research question was to obtain profound insight into instructional designs for improving health literacy in low-literate people.

#### **2.4.2 Literature Search Strategy and Terms**

The literature search was conducted using both structured and unstructured searches. Given that ASRH and simplified HEM for improving health literacy is a health-specific discourse, the search was limited to databases relevant to health-related disciplines, including Health Sources, Medline, EBSCO Host, Science Direct, and ProQuest. Other sources included online searching of crucial journals: BioMed Central, Sage, and Taylor and Francis. The researcher used keywords and phrases to represent related constructs or concepts in the search process. Keywords were adolescent, young peoples, sexuality, sexual health, sexual and reproductive health, combined with studies, “or” research, “or” literacy “or” knowledge, “or” needs, “or” communication, “or” research education, and intervention, and regional focus, namely, Sub-Saharan Africa, “and” East Africa, West Africa, “and” Southern Africa. Regarding simplified HEM for improving health literacy, multiple keywords were used, including strategies, simplified, pictures, pictographs, picture-based, patient educational materials, health educational materials, medical instructions, and low-literate patients, in combination with patient educational materials, “or” health educational materials, “or” medical instructions “or” instructional design “or” instructional development and outcome with a focus on comprehension “or” knowledge “or” recall “or” adherence, “or” health literacy. The unstructured search involved a targeted literature search using Google Scholar and Google search engines. Other unstructured search strategies were snowball and citation searches for additional relevant publications.

#### **2.4.3 Inclusion Criteria**

Studies were included in the ASRH review if they were peer-reviewed, full-text articles, national survey reports, and other reports on ASRH and young people aged 10-24 in SSA, published in English between 2010 to 2020. The study population was defined based on the official definition of adolescents and young people by the WHO, which classified individuals aged 10-19 as

adolescents and persons aged 15-24 as young people (WHO, 2013). Studies included in the simplified HEM for enhancing health literacy were peer-reviewed, full-text articles from various regions, written in English and published between 2000 and 2020. An extended period was used for the simplified HEM to enable access to a wide range of peer-reviewed articles since research in the domain was quite limited.

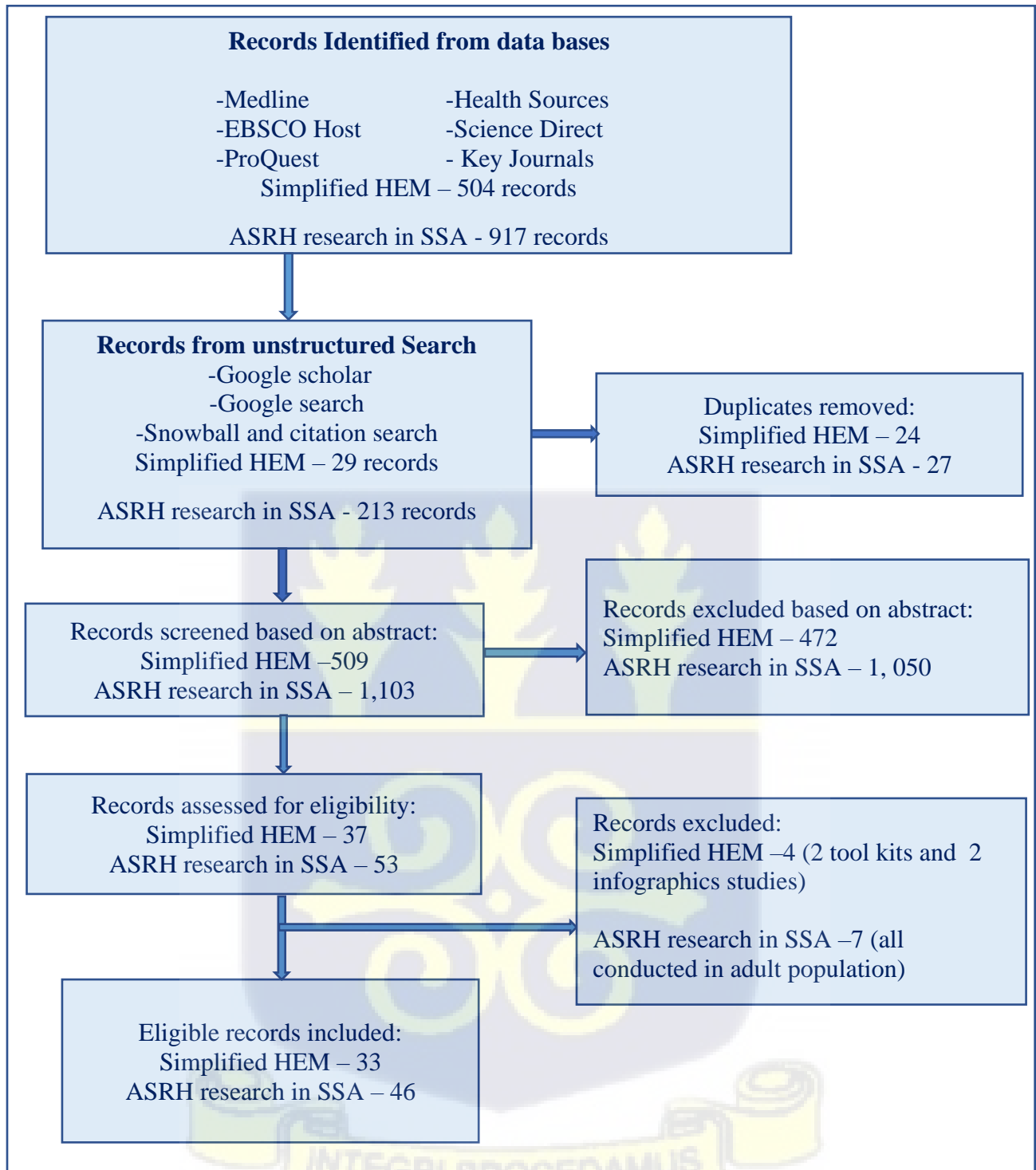
#### **2.4.4 Exclusion Criteria**

Studies providing insufficient information, such as abstracts, letters, and those published before 2010, were excluded from the ASRH and the simplified HEM review. Studies done in locations other than SSA were also excluded from the ASRH review. Studies published before 2000 and those from gray literature that were not accessible to the researcher were also excluded from the simplified HEM review. Details of studies retrieved and included in the two aspects of the empirical review are summarized in Figure 2.5

#### **2.4.5 Data Charting, Collation, and Summarizing**

Data charting was performed using a narrative rendition. Extensive information about the study's findings and some precise information regarding authorship, location or country, population, sample size, and data collection methods were recorded manually using Microsoft Word. Findings gleaned from the studies were summarized in two parts. First, primary numerical analysis was performed for the characteristics of the studies included in the review for the ASRH and the simplified HEM for improving health literacy in low-literate people. Second, qualitative data analysis was performed on the extracted findings by qualifying quantitative findings to allow for integration with other qualitative findings (Levac et al., 2010). Thematic analysis was performed on the findings of the studies employing manual coding. Codes were developed from the findings to describe their content, and common patterns were identified among the codes as themes.

The themes were compared against the extracted findings and were revised and redefined to make them valuable and coherent. Seven themes were established based on the scope and diversity of ASRH studies included in the review. However, findings of studies reporting simplified HEM for improving health literacy in low-literate people were classified into six main categories. Results of the scope and diversity of research activities on ASRH in SSA are first discussed followed by the results of simplified HEM for improving health literacy in low-literate people.



**Figure 2.4: Details of Papers Retrieved and Reviewed**

## 2.5 Results of the Scope and Diversity of Research Activities on ASRH in SSA

### 2.5.1 Sample Characteristics

The sample characteristics are presented in Table 2.5.1. Out of the 1,103 records, 46 studies met the inclusion criteria. Ghana recorded the highest (n=11) number of studies, followed by South Africa (n=10) and Nigeria (n=7). Cape Verde and the Democratic Republic of Congo had one study each. Most studies included in the review used primary data, and the study populations were primarily adolescents and young people. Thirteen (13) of the studies used school-based recruitment. A significant number of the studies were done among adolescents and young people aged 14-24, but only four recruited participants aged 10-15.

**Table 2.5.1: Sample Characteristics of Studies Included in the Scope of ASRH Research Review**

<b>Regional/Country Focus</b>		<b>Study Population</b>	
Kanya	2	Adolescents and young people	29
South Africa	9	In-school adolescents (school-based recruitment)	13
South Africa and Tanzania	1		
Ghana	11	<b>Age of participants</b>	
Ethiopia	4	6-12	1
Congo DR	1	10-15	4
Uganda	4	10-19	21
Nigeria	7	14-24	8
Cape Verde	1	12-30	3
Sub-Saharan Africa	3	Stakeholders	5
Literature review	3		
		<b>Study design/methods</b>	
		Qualitative	14
		Quantitative	18
<b>Data Sources</b>		Mixed method	5
Secondary data	3	Randomized control trial	3
Primary data	40	Quasi-experimental studies	1
Literature review	3	Not mentioned	2

*Source: researcher constructed, based on literature from 2010 – 2020*

One of the studies was done among children aged 6-10. Three studies used a mix of adults and adolescents in their study sample. Three studies were randomized control designs (Namisi et al., 2013; Rokicki et al., 2016; Ofole, 2022), and one used quasi-experimental designs (Mason-Jones et al., 2011). Most (14) were qualitative and quantitative (18) studies, and five used mixed-method

designs (Awusabo-Asare et al., 2017; Engelbert Bain et al., 2019; Ivanova et al., 2019; Thurman et al., 2020; Gbagbo, 2020).

### **2.5.2 Scope and Diversity of ASRH Research Activities in SSA.**

The themes established from the findings of studies included in the review were: 1) adolescent-parent communication of SRH. 2) SRH decision-making capacity. 3) Adolescents' SRH knowledge. 4) access and barriers to utilization of ASRH service. 4) ASRH interventions. 6) Adolescents' SRH behavior. 7) Access to SRH information. The details are discussed in the order that follows.

### **2.5.3 Adolescent-Parent Communication of SRH**

Five studies in the review focused on SRH communication between parents/guardians and adolescents. Even though such communication occurs in the home, particularly between mothers and the girlchild, the practice is not without challenges (Muhwezi et al., 2015; Maina et al., 2020). Adolescent-parent communication of SRH is disadvantaged by factors such as unsupportive parental perception of ASRH conversation and prejudice. Conversations are accompanied by fear appeal, making most adolescents shun such conversations because of the mistrust, stigma, and insults that characterize adolescent-parent conversations. Parents perceived adolescents as spoiled children lacking good morals and proper behavior. Anytime such conversations occurred, adolescents were stigmatized and labeled negatively, with words such as 'spoilt,' 'bad,' 'no morals,' 'dangerous,' and 'shameless' (Asampong et al., 2013; Muhwezi et al., 2015).

In Ghana, SRH stigma poses a significant risk to ASRH. Hall et al. (2018) found community values and attitudes hostile to all shades of ASRH. Sexual behavior and its repercussions, such as pregnancy, abortion, and childbirth, are highly stigmatized and despised by society. Adolescents who partake in such acts are labeled 'spoilt' and 'immoral' children. Adolescents are stigmatized through marginalization, gossip, prejudice, and ill-treatment, particularly when a girl gets pregnant. SRH stigmatization mainly results in shame, humiliation, and a negative self-image, culminating in silence and secrecy on matters of sexual reproduction. The literature mentioned factors such as place of residence, religious affiliation, and educational status as factors of

stigmatization. Hall et al. (2018) found that young adolescents who lived in Accra, with Islamic religious affiliation, and dropped out of school suffered from SRH stigmatization.

The prohibitions related to ASRH restrict such conversations in the home and restrict discussions to abstinence, the consequences of early sexual activities, personal hygiene, morality, housekeeping, signs of puberty, and the importance of formal education to the girlchild (Muhwezi et al., 2015; Knopf et al., 2017). There is also a lack of openness in the conversation, probably due to stigma. Despite the social proscriptions, some parents believe SRH conversations are appropriate for older adolescents or those who have completed second-cycle education. In this study, the adolescents and parents believe that the onset of sexual activities should begin at age 18 or more, primarily when a person is engaged in economic activities to earn a living (Asampong et al., 2013). Adolescents aged 11-14 were considered very young for SRH discussions (Muhwezi et al., 2015). The popular reason underlying parents' disapproval of SRH conversations with adolescents is the fear that adolescents would commit to a sexual relationship when exposed to SRH information.

While the home could present a valuable platform for SRH education, misconceptions and taboos about adolescent SRH education are an enormous threat. For instance, one of the studies found a significant association between parent or teacher-adolescent communication and condom use at all times (Namisi et al., 2013). Females with higher communication mean scores consistently used condoms compared with those with lower mean scores, which stresses the essential role of SRH communication in the home. Tenkorang et al. (2020) have also mentioned that early exposure to SRH information delays the age of sexual debut. Yet, long-standing traditional norms bar open discussions about sex and sexuality in Sub-Saharan African societies. Parents may also be uninformed about fundamental issues of SRH and its potential for reducing adverse outcomes such as pregnancy and STIs. Lack of such knowledge among parents can hinder progress in ASRH. In this case, research interventions for improving parents' SRH knowledge and mental preparedness to openly discuss age-appropriate SRH issues with young adolescents would be essential in supporting adolescents to navigate the teenage years.

Evidence from an interventional study on ways to improve parent-adolescent sexual health communication shows that the mental health of adolescents and parents/guardians are essential agents for improving sexual health communication (Thurman et al., 2020). The intervention's results emphasized that parents' listening ability and openness in discussing sexual health matters are critical stimulants for such engagements. The intervention promoted parent-adolescent sexual health communication, such that 10 out of 22 topics on SRH formed aspects of SRH conversation between parents/caregivers and adolescents at the end of the intervention. Also, Goodnight et al. (2014) found parental perceived control regarding sex communication and endorsement of the same as elements influencing parents/guardians' communication of sex-related topics with adolescents. This means that caregivers/parents of adolescents would engage in sexual conversations with the young adolescents if they believe such knowledge is essential.

#### **2.5.4 SRH Decision-making Capacity**

Studies on adolescents' agency for SRH-related decision-making were rare. Only two studies mainly focused on adolescents' decision-making capacity among those aged 14-19. (Engelbert Bain et al., 2019; Ahinkorah et al., 2020). However, other studies included in the review reported findings on SRH decision-making. One study was a multi-national study on decisions about contraceptive use in SSA. The study found higher decision-making capacity among adolescents but varied across age and number of years of education. Decision-making capacity was related to contraceptive use (Ahinkorah et al., 2020). The older the adolescent, the higher their decision-making capacity and likelihood of using contraceptives. The other study was done among adolescents who had never been pregnant (Engelbert Bain et al., 2019). It was found that adolescents wanted to be the ones to decide whether to terminate or keep a pregnancy. Yet, the agency to make such decisions was influenced by age, the ability to fend for oneself, societal norms and pressure, parental threats, and the timing of establishing pregnancy status (Engelbert Bain et al., 2019). In Ghana, adolescents aged 15-19 had lower reproductive health decision-making capacity. Contraceptive use intentions and unwanted pregnancy were also associated with reproductive health decision-making capacity (Anasi & Nwalo, 2012).

Further to the scarcity of studies on decision-making capacity, there is a general lack of such studies among young adolescents. Establishing the SRH decision-making capacity of young adolescents contributing to teen motherhood will inform interventions for improving their SRH decision-making abilities. This argument is supported by Ahinkorah et al.'s (2020) finding that reproductive health decision-making capacity improves contraceptive use. Thus, improving the SRH decision-making capacity of young adolescents will help reduce adverse SRH outcomes. Also, the two studies assessing decision-making capacity were based on demographic health survey data. Only one of the studies used primary data. Decision-making capacity was measured by the recall of SRH choices which could lead to over or under-reporting. This approach may not be suitable for measuring the decision-making capacity of young adolescents who lack experience and are likely to be underreported due to fear and stigma.

### **2.5.5 Adolescents' SRH Knowledge**

Several studies included in the review were related to adolescent SRH knowledge (Melaku et al., 2014; Esantsi et al., 2015; Abiodun et al., 2016; Kyilleh et al., 2018; Furry et al., 2019; Finlay et al., 2020). The studies provided mixed findings on adolescent SRH knowledge. For instance, sex education was provided in schools in South Africa. Yet, adolescents described the scope as inadequate because it did not cover negotiation skills, especially what to do in an unfavorable environment where one needs to make an informed choice (Mushwana et al., 2015). In this study, adolescents knew about STIs and risky sexual behaviors. Abiodun et al. (2016) reported moderate knowledge of modern contraceptives among adolescents. In some parts of Ghana, Ethiopia, and other East African countries, most adolescents demonstrated knowledge about contraception, reproduction, HIV/AIDS, and prevention (Esantsi et al., 2015; Knopf et al., 2016). Adolescents and young people aged 13-21 in Ethiopia knew about contraceptives and could mention at least one method of contraception and where to source them. Condom, abstinence, and injectables were the most known contraceptive method (Melaku et al., 2014). Knowledge about condoms, withdrawal, and the usefulness of contraceptives was prevalent among adolescents in the Democratic Republic of Congo (Muanda et al., 2018).

In some studies, factors such as wealth, adolescent-parents SRH conversation, ever had a sexual partner, age, access to telephone and the internet, place of residence, and the number of years in school were factors related to SRH Knowledge (Melaku et al., 2014; Abiodun et al., 2016; Furry et al., 2019; Finlay et al., 2020). Adolescents with SRH information access were twice as knowledgeable about emergency contraceptives than those without. However, females were less knowledgeable about emergency contraceptives than males. Adolescents' misconception about condom use was also reported. There was the belief that condom interferes with sexual pleasure. Also, adolescents patronizing condoms were given derogatory tags (Kyilleh et al., 2018).

While knowledge of menstruation was common, especially among females, poor knowledge of menstruation, HIV, other STIs, pubertal changes or sexual maturation, sex and reproduction, and contraceptives were reported, particularly in young adolescents and worse among those out of school (Melaku et al., 2014; Esantsi et al., 2015; Abiodun et al., 2016; Knopf et al., 2016 Kyilleh et al., 2018; Furry et al., 2019, Finlay et al., 2020). For example, the best-known methods of preventing HIV in Uganda were abstinence and condom use. Significantly few adolescents aged 13-19 knew about injectables and pills. HIV and syphilis were the best-known STIs. Symptoms of STIs were also not common, and menstrual hygiene practice was difficult due to limited access to sanitary pads (Ivanova et al., 2019).

The above discussions clearly show a lack of age-appropriate and comprehensive knowledge of SRH among adolescents in SSA. It also emphasizes the school system's essential role in transmitting such knowledge to adolescents. The substantial number of studies using in-school adolescents suggest that the school system provides some ASRH education. However, most studies did not report the content, scope, and mode of delivery of the content by the school system. Nonetheless, Awusabo-Asare et al. (2017), in their assessment of sex education implementation in Ghana, found that some SRH topics were taught as part of the school curriculum and co-curriculum in basic and high schools. Even so, the content was not comprehensive, limited to pubertal changes, reproductive organs, abstinence, and HIV. At the basic and secondary levels, SRH topics are integrated into social studies, integrated science subjects, and the school-based health program. (Awusabo-Asare et al., 2017). The lack of comprehensive ASRH content delivered by the school system may not adequately prepare adolescents to steer their sexual and reproductive lives. It is

also unknown whether the mode of delivery of the content and the text in use promotes understanding and retention of knowledge among adolescents. Research in this area will hone our understanding of the impact of school-based curriculum and co-curriculum on ASRH knowledge.

### **2.5.6 Access and Barriers to Utilization of ASRH Service**

Six studies examined service utilization (Okereke, 2010; Bogale et al., 2010; Tavares et al., 2012; Abiodun et al., 2016; Jonas et al., 2018; Muanda et al., 2018). In two studies from Cape Verde, and Nigeria, services utilization was typical among young adolescents (Tavares et al., 2012; Abiodun et al., 2016). For instance, condom use was prevalent in adolescents aged 13 and 14 years in Cape Verde (Tavares et al., 2012). Religious affiliation, ever dated before, availability of services, regular access to a telephone, reproductive health conversations with parents, SRH stigma, and awareness of SRH services were factors affecting service utilization (Tavares et al., 2012; Renzaho et al., 2016; Hall et al., 2018). In some parts of Nigeria, a center was available for providing contraceptives to adolescents. However, patronage of the center was hampered by poor information dissemination and stigma related to visits to the center and condom use (Okereke, 2010).

Similar barriers to contraceptive use were also reported in the Democratic Republic of Congo. Lack of information on contraceptives, negative attitude of providers with attendant lack of confidentiality, and misconceptions about contraceptive use were barriers to contraceptive use (Muanda et al., 2018.). In Ghana, SRH stigma was a significant barrier to contraceptive use among adolescents and young women, such that young people accepting family planning concealed it from their families (Hall et al., 2018). Another variable found to influence contraceptive use was the convenience of its use. In a district in Ghana, adolescents in basic schools admitted to frequent use of emergency contraceptives for convenience (Gbagbo, 2020). In this study, condom use was not regular because sexual intercourse occurred spontaneously, especially when the opposite sex found themselves in an obscure environment. Where planned sexual intercourse occurred, a condom was used in the first sexual intercourse with a partner. Once a relationship was established, condom use was deemed unnecessary (Gbagbo, 2020). In a study from South Africa (Jonas et al., 2018), institutional-level challenges and provider beliefs were remarkable barriers to providing ASRH services, mainly abortion services and the sale of condoms to adolescents aged 12. Yet,

among other providers, considerations for the high prevalence of adolescent pregnancy, education, and the future good of adolescents were motivations for providing adolescents with reproductive health services. Provider motivations for providing ASRH services highlight prospects for disabling the prohibitions of ASRH education and contraceptive use.

Improving information dissemination on contraception is an essential determinant of utilization. Despite that, socially entrenched norms and traditions pose a considerable challenge to health systems' efforts to encourage contraceptive use and responsible behaviors in adolescents of SSA. The negative social attitude toward ASRH is a surprise in a society that once socialized adolescents into SRH skills through puberty rites. If shrouding SRH issues in secrecy helped promote abstinence, the gains of such a practice should be evident for all to see. It is necessary to uphold traditions and norms when they are valuable in improving human dignity and welfare. The considerable burden of ASRH beckons us to open the discourse to identify mechanisms to overcome the deeply entrenched ASRH stigma and negative labeling in SSA.

Self-efficacy was a factor that shaped contraceptive use, especially condom use (Bogale et al., 2010; Gebeyehu et al., 2020; Nwaozuru et al., 2020). Three studies retrieved examined the effect of self-efficacy of condom use but none on other SRH services. The studies examined safe sex and condom use self-efficacy. It was found that knowledge plays a remarkable role in the mean self-efficacy score of in-school adolescents. Nwaozuru et al. (2020) and Gebeyehu et al. (2020) found a significant relationship between HIV and condom knowledge accuracy on safe sex and condom use self-efficacy. Other notable factors related to safe sex and condom use self-efficacy included future orientation and goal, age, social support, history of condom use and unintended sex, and religion. In Ethiopia, condom use was concentrated among people below 21 years who had primary education and were unmarried (Bogale et al. 2010). Adolescents with significant perceived vulnerability to HIV, higher response efficacy, and self-efficacy had never used condoms. Self-efficacy, vulnerability, and attitude to condom use contributed significantly to condom use intention. Perceived vulnerability to HIV, attitude toward condom use, and response efficacy significantly influenced condom use (Bogale et al. 2010).

From the findings of the studies, ASRH services could be generally available, yet, its use can be impeded by systemic and other service quality-related factors. For instance, Kyilleh et al. (2018) identified a lack of privacy, prejudice, and an unfriendly service environment as significant deterrents to SRH service use among adolescents in Ghana. In South Africa, the lack of 24-hour SRH services was one of the reasons for teenage pregnancy (Mushwana et al., 2015). In South Africa and Uganda, living in rural areas, poor knowledge of contraceptives, and lack of privacy were notable barriers to condom use and HIV counseling and testing (Naidoo et al., 2015; Ivanova et al., 2019). The case of Ghana and South Africa stresses the urgent need to make SRH services more friendly to adolescents in addition to knowledge and awareness creation. Thus, research needs to revisit the nuances in social norms and their impact on ASRH to inform policy and practice.

### **2.5.7 Adolescent SRH Intervention**

Six (6) of the studies reviewed were Interventional studies (Mason-Jones et al., 2011; Kalembo et al., 2013; Goodnight et al., 2014; Rokicki et al., 2017; Thurman et al., 2020; Tenkorang et al., 2020). Two were a literature review of interventions for improving ASRH and school enrolment (Kalembo et al., 2013; Wamoyi et al., 2014). The literature reviews show that SRH interventions can improve reproductive health knowledge, HIV knowledge, risk communication, reduction of intimate partner violence, and STI infection among participants. Only one intervention recorded adverse outcomes related to HIV risk in women. The few articles retrieved could be due to the scope of the search and not limited research attention to adolescent SRH education interventions in the last decade. One of the studies evaluated the impact of the comprehensive sex education piloted in some selected schools across Ghana and reported the massive success of the intervention. Among the achievements of the comprehensive sexuality education pilot was increased knowledge in the topics introduced, delayed sexual debut, and rejection of myths associated with HIV infection. There were, however, variations in the timing of sexual debut based on religious affiliation, gender, and place of residence (Tenkorang et al., 2020). One of the interventional studies assessed text-messaging programs on sexual education and its effect on sexual and reproductive behavior and knowledge among adolescents and young people (Rokicki et al., 2017). The intervention arm receiving unidirectional messages improved their sexual and reproductive health knowledge by 15%, and those receiving interactive messages improved by 29%.

The gains in knowledge were sustained over 15 months. Yet, none of the two types of messaging significantly affected the age of sexual debut or sexual intercourse.

The third study was also a school-based intervention to delay sexual debut and promote condom use in South Africa. The study found no significant difference in sexual debut between treatment and control groups. Yet, study dropouts were likelier to have had sex without condoms than intervention participants (Mason-Jones et al., 2011). Only one interventional study was found on psychoeducation to sexual health literacy of adolescents in secondary school (Ofole, 2022). The intervention materials were developed using a participatory approach. The treatment group recorded improved sexual health literacy over the control group, indicating that such intervention could be reliable for improving ASRHL.

### **2.5.8 Adolescent SRH Behavior**

Many studies reported a high prevalence of sexual relationships, unplanned sexual activities, STIs, and abortion among adolescents (Naidoo et al., 2015; Esantsi et al., 2015; Kyilleh et al., 2018; Furry et al., 2019). The age of sexual debut was as early as nine years. In two studies (Naidoo et al., 2015; Renzaho et al., 2016) done among 9<sup>th</sup> – 11<sup>th</sup> graders aged 13-17 years, sexual relationships were more prevalent in rural than in urban adolescents. In Ghana, Gbogbo (2020) found that 65% of in-school adolescent respondents were in sexual relationships. Sexually active females engage in sexual intercourse more than males but have fewer sexual partners than their male counterparts (Kyilleh et al., 2018). From the studies, the median age for the sexual debut was 15 years, and the minimum age was 12 years. In Uganda, Condom and pill use for first sexual intercourse was deficient, and most pregnant adolescent females have had babies before (Renzaho et al., 2016). In South Africa, Mushwana et al. (2015) reported that adolescents go into early sexual activities without contraceptives, hoping they will not get pregnant or abort when pregnant. Early sex and pregnancy resulted in STIs, depression, and suicidal tendencies in adolescents. Adolescent females who got pregnant became pregnant for a second time (Masemola-Yende et al., 2015).

The prevalence of sexual activities with its attendant pregnancies and abortion reecho the urgency to improve education and ASRHL, particularly education on contraceptive use. A more structured approach to SRH education will help stem the tide of negative sexual behaviors and teen pregnancy

in SSA. It will also be helpful to explore social support as a coping mechanism in adolescent pregnancy to support adolescents in navigating the pregnancy and childcare period characterized by stigma and shame. The increased sexual activities in females were influenced by gender, as most of them were victims of forced sex (Renzaho et al., 2016; Ivanova et al., 2019). However, pleasure, conformity to a group norm, love, disability, living arrangement, and financial favors were the lures of early sex (Renzaho et al., 2016; Kyilleh et al., 2018).

### **2.5.9 Access to SRH Information**

Most studies in the review provided data on adolescent access to SRH information. (Nobelius et al., 2010; Anasi & Nwalo, 2012; Akinfaderin-Agarau et al., 2012; Masemola-Yende et al., 2015; Kyilleh et al., 2018; Ibegbulam et al., 2018; Ivanova et al., 2019). In most of these studies, the internet, school, health providers, pornographic materials, radio, sexual partners, media, church programs of SRH, and peers were the usual sources of SRH information (Nobelius et al., 2010; Masemola-Yende et al., 2015; Ibegbulam et al., 2018; Ivanova et al., 2019). Information seeking was periodic among in-school adolescents who searched for information on general SRH education, sexual hygiene, STIs, contraceptives, abstinence, and female circumcision. The motivation for seeking SRH information online was privacy and avoiding stigma and censure from adult relatives. While adolescents preferred SRH information online, digital literacy and skills were huge impediments.

Adolescent digital literacy can be instrumental in promoting SRH literacy and knowledge. Having a smartphone, tablet, and laptop was an incentive to learn SRH (Ibegbulam et al., 2018). Among those using mobile phones, health information access from Nokia Life tools and other electronic health networks was patronized (Akinfaderin-Agarau et al., 2012). There was a massive preference for SRH information delivered via SMS, voice calls, and voice mail (Akinfaderin-Agarau et al., 2012). Reasons offered for this preference were ease of reference, rereading, clarity, understandability, and faster feedback. For example, voice call was preferred for clarity and understandability of the language used (Akinfaderin-Agarau et al., 2012). Ease of reference and confidentiality are qualities of SRH information valuable to adolescents, possibly due to the prohibitions on open discussion of sexual issues in the SSA context. A critical consideration of the above qualities will help overcome entrenched barriers to ASRH information.

Informal sources of SRH information included parents/guardians, usually centered around abstinence, HIV, and pregnancy (Ivanova et al., 2019). Contrary to the usual attitude of parents to SRH education, some mothers educate their adolescents on sexual relationships once they find the teenager in a love relationship (Masemola-Yende et al., 2015). In addition, parents, peers, and sexual partners were major advisors to adolescents on contraceptives-related matters because they offered an open discussion on sexual issues and pregnancy prevention. Nobelius et al. (2010) reported how out-of-school adolescents receive SRH information from Uganda. The authors found that SRH information was presented with parental control, making the adolescent a passive participant in such discussions. Their role in the conversation was to listen and take what parents said without room for feedback. Adolescents judged conversations with grandparents on SRH as negatively framed narratives and warnings. Such presentation practices did not meet the needs of the modern-day adolescent. (Nobelius et al., 2010).

One of the studies from Ghana (Awusabo-Asare et al., 2017) identified a supportive legal and policy environment for school-based curriculum and co-curriculum. However, the scope of the school curriculum and the number of hours allocated for SRH lessons, especially in senior high schools (SHS), were insignificant. The topics do not comprehensively address ASRH needs, such as sexual negotiation skills, contraceptive access, risk management, gender-based violence, and autonomy (Awusabo-Asare et al., 2017). Another challenge to school-based SRH education is the lack of comprehensive SRH learning material. Fewer SRH topics are integrated into some core subjects at the JHS and SHS levels, and no learning materials are available specifically for SRH education.

#### **2.5.10 Conclusion and Implication for Further Research**

Generally, the literature suggests a lack of access to SRH information from sources that volunteer privacy, trust, and open discussion. Making such information sources available to adolescents would promote interest in SRH education and learning. ASRH research in SSA seems to focus mainly on output-related issues rather than the antecedents. Studies on SRH knowledge, service provision and utilization, behavior, parent-adolescent SRH communication, decision-making capacity, and stigma are outputs that largely depend on antecedents such as SRH education and

literacy of the population. The lack of research on ASRHL corroborates other review findings (Melesse et al., 2020; Ajayi et al., 2021). Even though there have been interventions in SRH education, very few measured impact on SRHL. There is a lack of literature on literacy challenges with available information and materials (both school-based curriculum and co-curriculum) and their difficulty levels for adolescents. It also appears that little attempt has been made to measure and assess SRHL levels of adolescents and adults. Unlike health literacy, few measures exist on SRHL, particularly for young adolescents. Future research should focus on these critical areas of SRHL essential for improving adolescents' SRH knowledge, autonomy, and decision-making capacity.

Additionally, very few studies are available on young adolescents. Meanwhile, this age bracket contributes more to the burden of adolescent pregnancy, and they are at a higher risk of getting STIs, including HIV. Considering that young adolescents are more vulnerable to deception, unwanted pregnancy, and STIs, SRH educational interventions and research are critical for preparing them with the information needed to manage sexual desires, deception, and heresy. Other domains requiring further research and intervention are ASRH stigma reduction and incentives for parent-adolescent communication of SRH.

## **2.6 Simplified Medical Instructions for Improving Health Literacy**

### **2.6.1 Results**

The findings of studies included in the review were categorized under seven main themes. 1). Theoretical bases of studies. 2) Research design. 3). Application of cognitive load principles to HEM design. 4) Multimedia instructional design processes. 5) Measures for validating visuals for enhancing health text. 6) Measures of instructional development. 7) Effectiveness of Cognitive Load Reduction Principles in Health Education.

### **2.6.2 Sample Characteristics**

Table 2.8.1 presents the sample characteristics of studies included in the review. Close to half of the studies were published between 2000 and 2010. Out of the 33 articles included in the review, sixteen (n=16) studies were from the United States of America (USA). Three (n=3) were from

Europe, namely, the Netherlands (n=2), Finland (n=1), and Germany (n=1). Two (n=2) of the studies were from Iran, and one (n=2) was from Taiwan.

**Table 2.6.2: Sample Characteristics of Studies Included in the Methods for Simplifying HEM Review**

<b>Regional/Country Focus</b>		<b>Study Population</b>	
USA	16	Low and highly literate people	13
South Africa	3	Patients	11
Taiwan	2	Migrants	1
Australia	1	Students/pupils	2
Finland	1	People living with HIV (PLHIV)	1
Netherland	2	Parents	1
Germany	1		
Iran	2		
Literature review	4	Randomized control trial (RCT)	10
Nigeria	1	Quasi-experimental design	7
		Mixed-method	4
<b>Data Sources</b>		Qualitative	3
Primary data	29	Quantitative/survey	3
Literature review	4	Qualitative, iterative, and participatory design	1
<b>Age of participants</b>		Action research	1
18 years and above	21	<b>Period</b>	
Less than 18 years	2	2000 – 2010	15
No mention of age	6	2011-2022	18

*Source: researcher constructed, based on literature from 2000 – 2020*

South Africa had three (n=3) studies (Dowse & Ehlers, 2004; Carstens et al., 2006; Dowse et al., 2014), Australia one (n=1) study (Price et al. 2007), and four (n=4) literature reviews (Choi, 2011; Watson & McKinstry, 2009; Wang & Voss, 2020; Park & Zuniga, 2020). The majority (27) of the studies employed primary data, had patient respondents (10), and low-literate non-clinical persons (9). Six of the studies did not mention the age of participants. Yet, 18 of the studies used participants aged 18 and above. Almost all studies assessed the effectiveness of multimedia instructions in patient education. Only one examined the role of simplified text in improving health literacy in low-literate older people (Sun et al., 2021). Multimedia instructions are expensive to develop, especially in resource-limited countries. On this basis, exploring the effectiveness of the various techniques for minimizing cognitive load and optimizing learning will aid in arriving at

the most cost-effective instructional design. The USA had the highest number of studies, possibly because they are a model worth imitating concerning health literacy.

While SSA Africa has a higher illiterate and semi-literate population, South Africa was the only country identified to have studied medical instructional designs for low-literate people. For instance, in a multinational study in SSA, McClintock et al. (2020) found that 2 out of 3 respondents included in their analysis had low health literacy. Available statistics also show that SSA has a lower literacy rate (Zua, 2021). On the flip side, the figures mentioned in these studies are averages, and variations could be across sub-regions and countries. Given SSA's relatively low literacy rate, simplifying health information to improve readability and understanding within the population is critical. While using text and pictures to improve comprehension is not alien to the health sectors in SSA, literature on the methodologies for developing such instructions and their effectiveness in improving health literacy and behavior are lacking.

### **2.6.3 Theoretical Bases of the Studies.**

Only three of the studies were informed by theories. Two were premised on the cognitive theory of multimedia learning (Choi, 2011; Choi, 2012), and one was informed by the cognitive theory of behavior change (Kalichman et al., 2013). Even though most studies experiment with picture-enhanced instructions, it is surprising that only a few of the studies were informed by theories. Theories are critical in predicting the outcomes of interventions and provide principles that interventions must follow (Corcoran, 2007). Text simplification and effective learning fundamentally relate to human cognitive architecture and processes. Such instructional designs may not be developed without recourse to theories of human cognition. It is possible that most of the studies were premised on cognitive principles that underlie human cognition and learning, which are manifested in the multimedia and cognitive load reduction techniques employed in the studies. However, establishing the theoretical basis for the use of cognitive principles is essential in demonstrating the effectiveness of instructions in improving learning outcomes.

#### 2.6.4 Research Designs

Nine (n=10) of the studies used randomized control design (RCD) (Leiner1 et al., 2004; Dowse & Ehlers, 2004; Kripalani et al., 2007; Negarandeh et al., 2013; Kalichman et al., 2013; Dowse et al., 2014; Meppelink et al., 2015; Hill et al., 2016; Housten et al., 2020). Five (n=7) used quasi-experimental design (Houts et al., 2001; DeWalt et al., 2004; Houts et al., 2006; Price et al., 2007; Zeng-Treitler et al., 2014, Sim et al., 2021) and four (n=4) were literature review (Watson & McKinstry, 2009; Choi, 2011; Wang & Voss, 2020; Park & Zuniga, 2020). Four (n=4) studies used a mixed-method design (Ha'meen-Anttila et al., 2003; Townsend et al., 2008; Kim et al., 2009; Van Beusekom et al., 2017). Three of the studies were survey/quantitative studies (Carstens et al., 2006; Schwartzberg et al., 2007; Chuang et al., 2010,) and five (n=5) were qualitative, including action research and iterative and participatory designs (Zeng-Treitler et al., 2008; Choi, 2012; Wolpin et al., 2016; Hasani et al., 2016; Lühnen et al., 2018). Six of the RCDs used a two-group before-after design (Dowse & Ehlers, 2004; Leiner1 et al., 2004; Kripalani et al., 2007; Dowse et al., 2014; Hill et al., 2016) and three used a three-way between-subject before-after design (Negarandeh et al., 2013; Kalichman et al., 2013; Housten et al., 2019). Quasi-experimental designs used were one group before and after design (DeWalt et al., 2004; Houts et al., 2006), one-group post-test only design (Houts et al., 2001; Zeng-Treitler et al., 2014), and three-way within-subject design (Price et al. 2007).

Most studies that adopted qualitative and mixed-method designs evaluated picture-enhanced HEMs. Two Randomized Controlled Studies (RCS) and four quasi-experimental studies developed and evaluated the pictures for the instructional materials. Some studies combined qualitative and quantitative strands to achieve specific research objectives. While some studies used focus group discussions and interviews to evaluate pictograph recognition, perception, understanding, and preferences, others used quantitative evaluation methods. Employing qualitative methods for validating pictures is most appropriate given the deductive and iterative process that characterizes the development of picture-enhanced instructions, primarily where the interest of the evaluation is related to recognition, preferences, and perception. Most experimental studies were before-after designs; very few used a one-group posttest-only. Even though the posttest-only design is an acceptable actual experimental and quasi-experimental design (Cnaan & Tripodi, 2010), it is suggested that the before-after design is a marker of a proper experimental

design. Posttest-only designs are helpful in an actual experiment when a pre-test is impossible (Rogers & Revesz, 2019). A pretest is vital in determining the comparability of the control and experimental groups before the intervention/treatment (Rogers & Revesz, 2019). Also, a pretest helps to overcome possible confounders that may arise from selection bias.

The sample size in Randomized Control Designs (RCDs) and quasi-experimental designs ranged between 37 - 559 participants. The smallest sample size in the RCD studies was 37 participants; the highest was 559. Only two of the RCDs used effect size sample calculation. One study used moderate effect size sample calculation (Kalichman et al., 2013), and the other used G\* power sample size calculation (Hill et al., 2016). Conversely, the sample size used in the quasi-experimental designs ranged between 21 – 118 participants. Three used convenient sampling (DeWalt et al., 2004; Carstens et al., 2006; Zeng-Treitler et al., 2014), and the remainder did not mention the sampling technique. The results show a wide variation in the sample size used across studies. The sample size variation may be due to the studies' specific research objectives and approaches.

### **2.6.5 Application of Cognitive Load Reduction and Pictorial Realism, Principles to HEM Development**

Visual aids such as pictograms and picture-enhanced HEM using varying degrees of realism are common multimedia techniques used in improving health literacy. Some studies used pictograms to develop medicine leaflets (Ha'meen-Anttila et al., 2003; Beusekom et al., 2017) and pill cards (Dowse & Ehlers, 2004; Dowse et al., 2014). Two studies done among heart failure patients used a color system to emphasize worsening heart conditions (DeWalt et al., 2004; Townsend et al., 2008). One was done among colorectal cancer patients and used illustrations and animation (Meppelink, et al., 2015). In others, colored pictures (Wolpin et al., 2016), gray-scale, and color photos (Townsend et al., 2008; Lühnen et al., 2018) were used. Two studies employed videos and static pictures (Housten et al., 2019) and animated cartoons (Leiner1 et al., 2004). Two used pictures that vary in fidelity from black-and-white drawings, semi-realistic colored drawings, semi-realistic line drawings, 2-part representative colored photos, colored cartoon-like illustrations, and silhouettes (Carstens et al., 2006; Townsend et al., 2008). Other visuals named were stick figures (Houts et al., 2001; Choi, 2012). The heterogeneity of graphics used in the

studies reflects the nuances in the knowledge domains pursued. Although the instructions were all health-related, each was developed for a specific health context. For example, pharmaceuticals used pictograms to enhance medicine labels, perhaps due to their usefulness in substituting written instructions and indications (Tijus et al., 2007).

Additionally, the pictures used in the studies varied in their degree of realism, though none of the studies provided reasons for the pictures used. Combining text with pictures primarily aims to optimize comprehension among patients or readership. For this reason, attention should be given to the fidelity levels of pictures employed to enhance the text. However, the bottom line to effective learning is reducing the extraneous cognitive load of learning materials (Chandler & Sweller, 1991). Pictures with less color and fidelity, such as black-and-white photos, grey-scale images, line drawings, and silhouettes, focus on essential details, reduce cognitive load, and ensure quick recognition of objects (Michas & Berry, 2007). They are helpful when the target readership has limited content knowledge and for strengthening a message's influence (Malamed, 2021).

Others have also suggested that realistic pictures illustrate color-diagnostic objects more than black-and-white pictures (Therriault et al., 2009; Redmann et al., 2014). Consequently, consideration should be given to the intended readership's characteristics, prior knowledge, learning objectives, and knowledge domain when selecting images to enhance texts. It is also essential to resort to the science of learning, cognition, and behavior (Wilson & Wolf, 2009). The picture-enhanced text was used in knowledge domains like HIV/AIDS and Antiretroviral (ARV)/ Antiretroviral Therapy (ART), nutrition, pharmaceuticals, cancer, risk communication in heart failure, general medical issues, discharge instructions, diabetes management, breast care, osteoporosis, and polio vaccination. Picture-enhanced instructions improved adherence, self-care, health literacy, comprehension, and recall skills.

### **2.6.6 Multimedia Instructional Design Processes**

A total of seventeen studies developed and or evaluated existing pictures. Eight out of the seventeen studies evaluated and modified preexisting pictures used in their specific health context (Dowse & Ehlers, 2004; Carstens et al., 2006; Ha'meen-Anttila et al., 2003; Kim et al., 2009; Chuang et al., 2010; Choi, 2011; Zeng-Treitler et al., 2014; Meppelink, et al., 2015; Lühnen et al.,

2018). The other nine created and evaluated new pictures (DeWalt et al., 2004; Zeng-Treitler et al., 2008; Townsend et al., 2008; Meppelink, et al., 2015; Kripalani et al., 2016; Hill et al., 2016; Hasani et al., 2016; Wolpin et al., 2016). Among those evaluating pictures, the glyph system (Zeng-Treitler et al., 2014; Hill et al., 2016); mock-up scenarios (Zeng-Treitler et al., 2008); other participatory approaches (Zeng-Treitler et al., 2008; Wolpin et al., 2016); iterative design process (Kripalani et al., 2007); and formative evaluation (Kripalani et al., 2007) were used. The approaches employed to develop and evaluate pictures were primarily participatory and iterative. The glyph system involves creating symbols and setting up rules regarding their use, which will require the participation of the target users. Also, mockups are techniques for obtaining user feedback and rely mainly on users' views and experiences.

The user-centered approach shows prospective user perception, preferences, and experiences are essential to developing picture-enhanced instructions. It also suggests that the processes adopted by the eight studies to develop the instructions conformed to established standards and are grounded in the users' ideas and circumstances (Brandt, 2006; Stone et al., 2018). The participatory process generates essential feedback from users and stakeholders for improving instructions. The importance of such an approach cannot be overemphasized since most pictures have limited universal applications. Adapting them to local circumstances is impossible without the application of user-centered principles.

#### **2.6.7. Measures for Validating Visuals for Enhancing Health Text**

Several of the studies validated static pictures among intended users using several subjective measures, including interpretation and level of confidence in the interpretation of the pictures, recognition, comprehension, and clarity (Ha'meen-Anttila et al., 2003; Dowse & Ehlers, 2004; DeWalt et al., 2004; Townsend et al., 2008; Chuang et al., 2010; Wolpin et al., 2016; Beusekom et al., 2017). Confidence in the interpretation of pictographs was measured using a subjective certainty rating on a scale of 1-10. Only one study used objective measures to assess the recognition of pictographs measures (Hill et al., 2016; Zeng-Treitler et al., 2014). Other studies, however, validated pictures based on participants' perceptions, impressions, and preferences (Carstens et al., 2006; Kripalani et al., 2007; Kim et al., 2009; Hasani et al., 2016; Lühnen et al., 2018). The recall was also used to measure pictures' effectiveness (Zeng-Treitler et al., 2008; Zeng-

Treitler et al., 2014; Hill et al., 2016). Two studies measured immediate recall (Hill et al., 2016; Zeng-Treitler et al., 2014), and one measured immediate and delayed recall one-week post-evaluation (Zeng-Treitler et al., 2008).

Data on picture validation were gleaned using Focus Group Discussions (FGDs), unstructured, structured, and semi-structured interviews, Cognitive Response Interviews (CRI), and questionnaires. Four of the studies used FGDs (Townsend et al., 2008; Hasani et al., 2016; Wolpin et al., 2016; Lühnen et al., 2018); four used interviews (Ha'meen-Anttila et al., 2003; Carstens et al., 2006; Van Beusekom et al., 2017; Van Beusekom et al., 2017; Zeng-Treitler et al., 2008); one used interviews and FGD (Hasani et al., 2016); and two used a combination of CRI and FGDs (DeWalt et al., 2004; Townsend et al., 2008). For studies that used expert review, one used expert review (Van Beusekom et al., 2017), and another used a combination of expert review and participant interview (Choi, 2011). Four studies also used questionnaires to collect data on pictograph validation (Dowse & Ehlers, 2004; Chuang et al., 2010; Kim et al., 2009; Hill et al., 2016). Combining qualitative and quantitative methods in such studies would help uncover how participants' thoughts and experiences affect their interpretation of visuals, which is impossible with any single approach. Where intended users can establish the appropriate interpretation of a picture, the picture becomes more helpful in improving understanding than the text alone.

### **2.6.8 Measures of Instructional Effectiveness**

Most of the studies assessed the effectiveness of picture-enhanced text in improving health literacy. Health literacy tools used included the Subjective Numeracy Scale (SNS) (Houston et al., 2019), comprehension test (Dowse & Ehlers, 2004), and the number of years in school (Carstens et al., 2006). Other instruments are the Test of Functional Health Literacy in Adults (TOFHLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). The Short Form of Test of Functional Health Literacy in Adults (S-TOFHLA) and the Brief Health Literacy Screener (BHLS) were used in some studies (DeWalt et al., 2004; Kripalani et al., 2007; Choi, 2011; Van Beusekom et al., 2017; Kalichman et al., 2013; Meppelink, et al., 2015; Houston et al., 2019; Wang & Voss, 2020; Park & Zuniga, 2020). The Morisky Medication Adherence Scale (MMAS) (Houts et al., 2001) was used for measuring medication adherence, and the Self-Care and Self-Efficacy Scales

(DeWalt et al., 2004; Kripalani et al., 2007).). The studies assessed health literacy, comprehension, medication adherence, self-care, self-efficacy, and appropriate medication use.

Pre-intervention assessments were general literacy and numeracy. Health literacy assessment focused on functional health literacy, the first health literacy level. Reading and comprehending health information are critical aspects of health literacy, but that is not all there is to people's ability to apply knowledge gained through reading and understanding, decision-making is also an essential aspect of health literacy. Research should go beyond measures of functional health literacy to look at interactive and critical health literacy skills. Picture-enhanced instructions aim to improve the readability and understanding of health information in low-literate people. Yet, all the studies used text-based measures to evaluate intervention outcomes, comprehension, and recall. If low-literate people have difficulty reading and understanding text-based information, then using text-based assessment tools would be problematic in obtaining the needed responses. Future research must consider picture-based measures for assessing health literacy and related outcomes.

### **2.6.9 Effectiveness of Cognitive Load Reduction Principles in Health Education**

Studies have examined the use of simplified text and multimedia techniques to reduce cognitive load in health education materials and improve health literacy. Picture-enhanced HEMs are well explored in the health literacy literature, particularly in low-literate individuals, to reduce adverse events and low medication compliance (Knapp et al., 2005; Webb et al., 2008). HEM enhanced with pictures helps improve recall, particularly immediate recall in medication instruction and home care instruction (Zeng-Treitler et al., 2014; Hill et al., 2016; Wolpin et al., 2016; Park & Zuniga, 2020). However, the influence of visuals on recall was further related to literacy levels and level of education. For instance, Housten et al. (2019) experimented with different picture-enhanced instructions. In the experiment, the mean gist score significantly increased among participants with adequate health literacy compared to those with low literacy. Among school children, Ha'meen-Anttila et al. (2003) found that pictograms in the instructional leaflet improved recall among 7<sup>th</sup>-grade children compared to 5<sup>th</sup> – 6<sup>th</sup> graders. The ability to identify a pictogram was also higher among the 7<sup>th</sup> graders. In two studies, less-fidelity pictures facilitated a higher recall rate than complex pictures, especially among L1 learners (Houts et al., 2001; Zeng-Treitler et al., 2014). Meppelink et al. (2015) found that non-difficult text with illustration improves recall

in people with low and higher health literacy. Non-difficult text with and without illustrations also improved informed decisions in low-literate people, and those with illustrations improved informed decisions in high-literate people (Meppelink et al., 2015).

Picture-enhanced materials also improve knowledge and adherence. Studies have found improved knowledge of ARV and side effects, HIV/AIDS, and adherence to counseling (Dowse et al., 2014). However, studies on heart failure patients reported inconsistencies in research outputs such as knowledge and self-care. In some studies, picture-based instructions enhanced self-care behavior and self-efficacy (Park & Zuniga, 2020), and others reported no changes in knowledge (DeWalt et al., 2004; Negarandeh Et Al., 2013; Kalichman et al., 2013). In a study on nutrition, there was a reduction in total calories and calories from fat among participants post-intervention (DeWalt et al., 2004). Two of the studies measured the effect of picture-based HEM on understanding. Pictograms on medication labels also found increased levels of understanding. Such labels were better understood by patients than text-only labels (Dowse & Ehlers, 2004).

Yet, it was less effective in improving understanding and recognition in low-literate people than in marginally and adequately literate people (Van Beusekom et al., 2017). One of the reasons for this outcome may be due to the level of abstraction of pictures used, as found in Carstens et al. (2006). The findings suggest that combining pictures with text in the studies must have resulted in more cognitive load, requiring higher cognitive ability for information processing. One of the interventional studies on Oral Health Literacy (OHL) among low-literate older people assessed the effect of simplified text and picture-enhanced HEM in improving OHL (Sun et al., 2021). In this study, health literacy improved after the educational intervention for all intervention groups. Yet, those who used the easy-to-read text and picture-enhanced material improved significantly in OHL. Although picture-enhanced materials improve literacy and behavior, in other studies, easy-to-read materials with illustrations failed to improve attitude and behavioral intention in both high and low-literate people (Meppelink et al., 2015). In this study, it was also found that difficult text enhanced with pictures improves recall and attitude.

### **2.6.10 Implications for Further Research**

The review broadly suggests emphases of research on picture-enhanced HEMs compared to easy-to-read ones. Exploring the utility of simplified text-only materials is essential for establishing cost-effective designs for improving literacy. SSA lacks literature on health literacy in various health contexts and content. Given that SSA has a comparatively higher low-literate and illiterate population, research in these areas is critical in informing national policy on the readability level of HEMs and other written public information. Increased scholarship in instructional designs for improving reading and understanding of health information is necessary to empower vulnerable groups in the population for self-care and healthy behaviors.

### **2.7 Implications of the Literature for Restructuring SRH Text Materials**

The theories and the empirical literature on methods for simplifying HEM for low-literate people have several implications for restructuring health education materials. The areas of significance are:

#### ***Understanding the Literacy Challenges of Prospective Users***

Understanding the literacy challenges of prospective readership of a particular knowledge domain is essential for cognitive load reduction. Relevant questions for this study would be: 1) What are users' prior knowledge of SRH? 2) What are the literacy skills of users? 3). What are the literacy challenges inherent in the existing ASRH education materials? Answering these questions will help establish a suitable educational or learning objective(s) and determine whether cognitive load adjustment is necessary.

#### ***Cognitive Load Reduction***

Where cognitive load adjustment demands load reduction instead of increase, text simplification based on users' literacy skills and prior knowledge is required (Crossley et al., 2014; Rets et al., 2022). There should be a fit between users' competency levels and the intrinsic and extraneous loads of the material to optimize information processing and increase understanding (Crossley et al., 2014; Crossley et al., 2012).

### ***Picture-enhanced Materials Design***

SRH text can be enhanced with pictures to optimize sensory and working memory efficiency and improve comprehension and knowledge of SRH. Combining the appropriate pictures with text would help reduce cognitive load and connect users with critical and age-appropriate SRH topics. However, the effect of visuals on comprehension could be moderated by the learning abilities of readers, gender, context, school type, and learners' visual/color perception. Under this circumstance, validation of the pictures regarding understanding, perception, and recognition is critical. It will do a lot of good if learners' color vision is assessed to ensure they have no color perception challenges.

### ***Text-Picture Arrangement***

Based on the segmenting principles and split attention effect (Mayer and Anderson, 1992; Mayer, 2009, p. 174), pictures must be presented beside texts. Short sentences are useful to ensure optimal information processing and understanding. For example, messages should be presented actively, and technical words should be simplified as much as possible. The use of bullets or numbering will be essential in segmenting the texts.

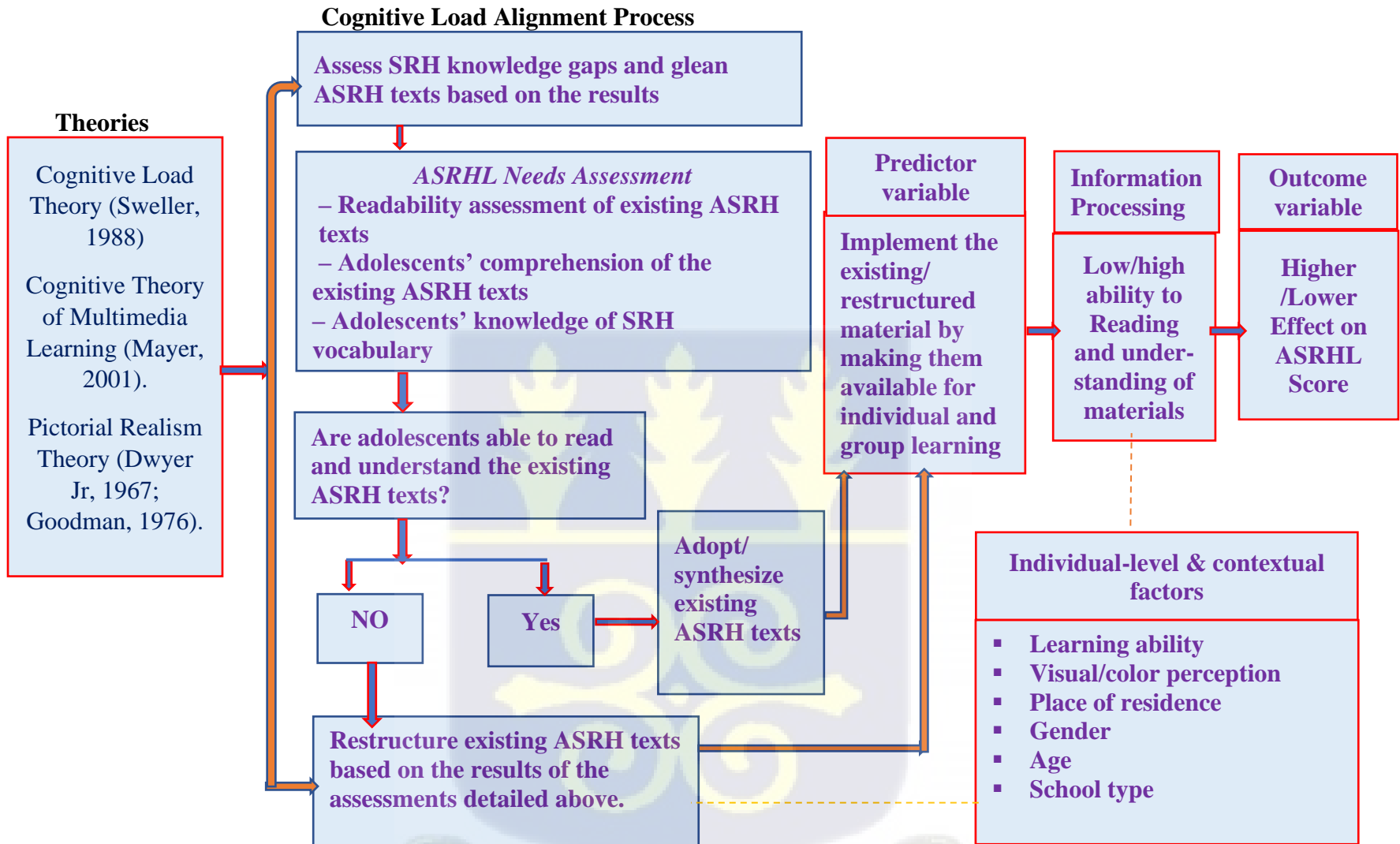
## **2.8 Conceptual Framework**

Figure 2.9 presents the conceptual framework for the study. From the strengths and weaknesses of the theories, the three of them are complementary. Employing only one theory will not provide a sound theoretical basis to explore alternative instructional designs suitable for restructuring the existing SRH educational materials for optimizing health literacy in young adolescents. Drawing from the theories, the cognitive load adjustment technique will be appropriate to restructure SRH educational materials.

The cognitive load adjustment process involves gleaning and assessing existing SRH materials for readability and comprehensibility to establish the need for restructuring. Where the assessment results show that the cognitive load of the materials matches adolescents' literacy skills, the existing materials become the predictor variable that must be administered to observe its effect on SRHL. If otherwise, there is the need to adjust it to meet the literacy skills of young adolescents by restructuring the materials. The restructured materials then become the predictor variable. Once the materials are administered, it is assumed that young adolescents may be able or unable to

process the information. However, information processing in this framework assumes the “black box” concept. Therefore, one can observe only the input and output behavior of the framework. The ability of young adolescents to read and understand the SRH educational materials can be determined by their literacy scores after a reasonable period. In this case, the literacy score becomes the outcome variable. It is important to emphasize that variables such as learning ability, visual or color perception, age, gender, place of residence, and the school of adolescents can moderate the ability to read and understand. Hence these variables should be considered during the restructuring process. The yellow broken lines emphasize the moderating effect of the variables.





**Figure: 2.8: Cognitive Load Alignment Process for Improving SRHL**

## 2.9 Chapter Summary

The chapter discussed the concepts used in the research, including the concept of SRH, health literacy, and text restructuring. Three theories, namely, the CLT, the CTML, and the pictorial realism theory, and their implications for restructuring SRH texts, are considered in the chapter. Two sets of empirical literature are discussed: the scope, diversity, and type of research activities on SRH of adolescents and young people in SSA and how research has been conducted on simplified medical instructions for improving health literacy in low-literate people. The empirical literature discusses the literature review methodology, findings, and implications for further research. Finally, the chapter provides the conceptual framework to guide the study.



## CHAPTER THREE

### 3.0 RESEARCH METHODOLOGY

#### 3.1 Chapter Introduction

This chapter discusses the philosophical paradigm, the research design, and the methodology. The chapter discusses the pragmatists' research paradigm and its relevance to the research design and methods. The chapter further discusses the study population and sampling. The process for developing the SRH educational materials and instruments is also provided in the chapter. The literacy intervention, data collection, and analysis procedures are discussed in the chapter.

#### 3.2 Research Philosophy

A research paradigm describes the fundamental ideas or shared assumptions about the nature of reality and knowledge. It informs researchers' actions and shapes their worldviews (Kuhn, 1970; Creswell & Clark, 2017). This research is premised on the pragmatists' assumptions about knowledge production. The pragmatist philosophical movement started in the later part of the 19<sup>th</sup> century in the United States. It is credited to the works of Charles Sanders Peirce, William James, George Herbert Mead, John Green, and John Dewey, among others (Kaushik & Walsh, 2019). The movement began due to rejecting traditional beliefs about the nature of reality, knowledge, and inquiry. Pragmatism is founded on the idea that researchers should employ the philosophical or methodological strategy that is most effective for the specific research problem under investigation, and it is associated chiefly with mixed-method or multiple methods (Johnson & Onwuegbuzie, 2004; Cornish & Gillespie, 2009). Pragmatism is derived from the Greek word "Pragma," which denotes activity and serves as the basis of the research philosophy (Pansiri, 2005).

##### 3.2.1 The Ontology of Pragmatism

The pragmatists' views about the nature of reality go beyond those established by the positivism-constructivism divide to frame reality through action or experiences or what is practical or relevant. As the name suggests, pragmatism proposes that practical activity is the basis of knowledge and is determined by its value to action (Cornish & Gillespie, 2009). The accurate measure of knowledge is its value for a given interest. Pragmatists believe knowledge is a tool for action, not

a reflection of reality. Instead of questioning whether knowledge reflects the underlying realities, emphasis is placed on its purpose (Cornish & Gillespie, 2009). For instance, knowledge about the readability and comprehensibility of HEM in health literacy is valuable in reducing cognitive load and creating easy-to-read HEM. Such material will help improve health literacy in low-literate populations. Thus, the test for good knowledge is whether or not it can be applied to solve practical problems. Pragmatists also underscore experimentation and experience. They argue that our views and understanding of external things are founded on our experiences (Wilson, 2015). Knowledge is constructed but also premised on our interaction with things external to us. It suggests that knowledge exists in the outside world but must be experienced by people (Johnson & Onwuegbuzie, 2014).

### **3.2.2 The Epistemology of Pragmatism**

Pragmatists believe knowledge is socially constructed through socially shared experiences to adapt and influence the world (Johnson & Onwuegbuzie, 2004; Deen, 2011). Knowledge is derived through experience, and social interactions impact how people perceive the world. The individual's knowledge is distinct because it is hinged on their experiences (Johnson & Onwuegbuzie, 2004; Kaushik & Walsh, 2019). The pragmatists' epistemology is premised on Dwyer's concept of inquiry, which connects experiences and activities through the process of inquiry. Pragmatism proposes that our experiences and actions are historical and context-based and may limit our ability to forecast the outcomes of our future actions based on experience. The principles of pragmatism tie in with Participatory Action Research (PAR). This research design attempts to propose a solution to societal problems and therefore places value on the perspectives, experiences, and priorities of affected groups and communities. We can identify ASRH knowledge gaps, literacy skills, and preferences of adolescents through PAR. With such knowledge, we can create adolescent-centered SRH educational materials for improving ASRHL. Given the limitations of our previous experiences, an inquiry must always precede actions (Morgan, 2014). SRH educational materials should be developed through scientific inquiry to guide future behaviors and actions in ASRH.

### **3.2.3 Methodological Consistency between Text Restructuring, ASRHL, and Pragmatism**

The pragmatists' consensus on the most effective ways to acquire knowledge about the world favors practical methods over ideological ones. Pragmatist researchers employ the positivists' and constructivists' methods instead of dividing them into distinct ontological and epistemological classes (Frega, 2011; Morgan, 2014). They encourage scholars to consider whose interests are served in a particular context by using a particular knowledge in their research (Cornish & Gillespie, 2009). Pragmatism underscores the plurality of approaches and a detailed assessment of knowledge that best serves a group or community's interests in a particular setting by considering the value of experiential knowledge gleaned through individuals' lived experiences. Pragmatism guided the selection of a mixed-method approach to restructuring SRH text and experimentation.

Combining PAR with quasi-experimental designs allowed the researcher to restructure ASRH educational materials anchored on adolescents' prior knowledge and experiences, priorities, and literacy skills. Developing ASRH educational material using the pragmatists' assumptions would have more practical relevance for ASRHL than materials written using technical and unfamiliar language with little value to the adolescent. The second purpose was to experiment with the educational materials to determine their relevance and actionability in improving ASRHL and informing strategies for improving access to SRH information and knowledge. Employing qualitative and quantitative data collection methods provided a comprehensive understanding of the SRHL needs of young adolescents. Such data is valuable for developing educational material to improve SRH literacy and knowledge. Experimenting with the material will help determine the value of the educational materials in improving ARHL and, by extension, outcomes. The research outcomes will further illustrate how a mixed-method approach to SRH materials design and literacy intervention works within the pragmatists' paradigm.

### **3.3 Research Design**

This research employs Quasi-Experimental and Participatory Action Research designs (Leykum et al., 2009; Waardenburg et al., 2020). A quasi-experimental design is prospective or retrospective research in which participants self-select one of many different treatment groups, or the researcher assigns participants to one of several treatment groups for comparison purposes (Maciejewski, 2020). A quasi-experimental design seeks to establish a cause-and-effect relationship between

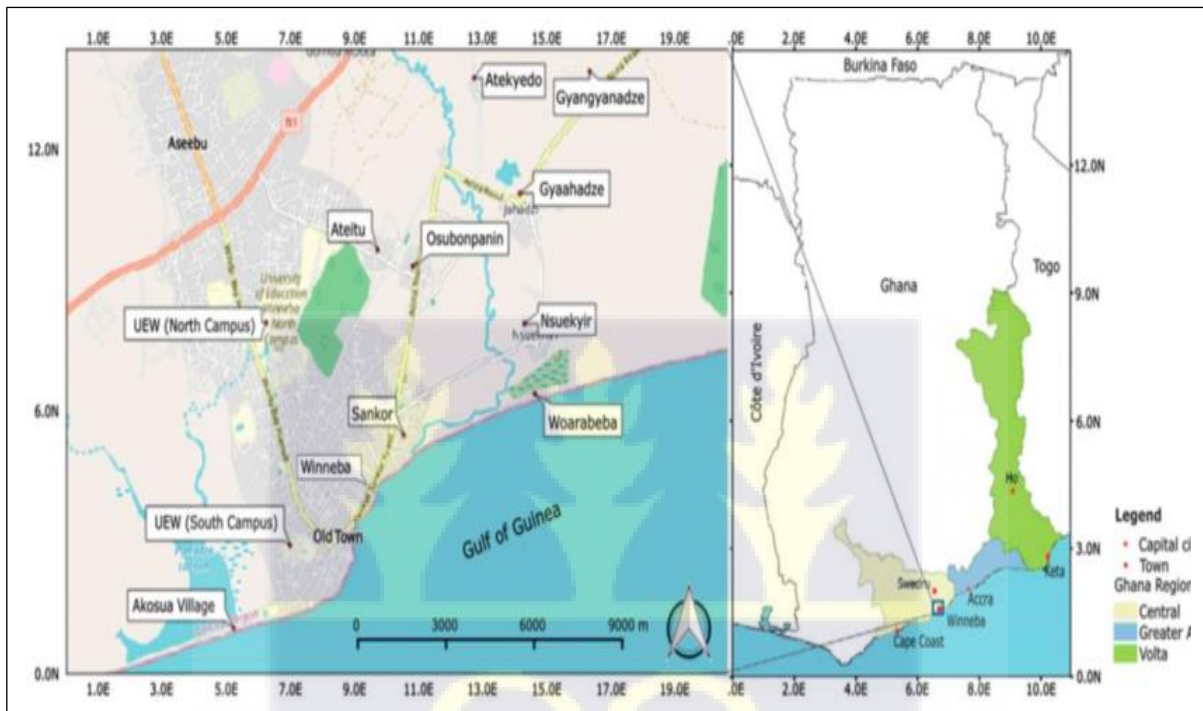
predictor and outcome variables. PAR is a shared and self-reflective inquiry in which the researcher and participants work together to understand and improve a situation or a particular practice (Grbich, 1998). The method involves a repeated adjustment cycle by which the researcher and local and relevant stakeholders improve upon a particular practice or situation. The researcher involves local stakeholders to facilitate an understanding of the local context and situation by collecting and analyzing data to determine the change that must follow.

The Quasi-Experimental and Participatory Action Research designs is a two-prong design that combines participatory, qualitative, and quantitative research methods suitable for addressing the research problem. It facilitated the development of adolescent-centered SRH educational materials for experimentation through an interventional study that can be generalized and, at the same time, addresses adolescents' SRHL needs at the local level. The quasi-experimental approach allowed for testing of the effectiveness of the SRH learning materials in improving ASRHL to inform policy and improve practice. It was impossible to achieve the research objectives without a collaborative research design between the PAR and the quasi-experimental design. The PAR design was useful in understanding ASRHL needs and how adolescents construct meaning into the concept of SRH. Using PAR, created an opportunity to identify other contextual and cultural issues shaping ASRHL and solicited input from adolescents and other relevant stakeholders to create picture-enhanced and text-only SRH educational materials.

### **3.4 Study Area**

The study area is the Effutu Municipality in the Central Region of Ghana. Effutu Municipal was selected based on research findings that 60% or more of basic school adolescents are already in sexual relationships (Gbagbo, 2020). It was also selected based on an anecdotal account from the public health arm of the Municipal Health Directorate (MHD) which shows that the municipality has no adolescent corners, school-based SRH clubs, and educational materials for school health education. The municipality has a population of 83,695. Women of reproductive age and expected pregnancy are estimated at 20,087 and 3,348, respectively. In the municipality, adolescents aged 10-14 years stand at 11,550 (Trauma and Specialist Hospital [TSH], 2021). Effutu Municipal has four sub-municipalities. They include Winneba East, Winneba West, Essuekyir-Gyahadze, and Kojo-Beedu North Low-Cost. Each sub-municipality is divided into communities. Data from the

Municipal Education Service shows that 55 schools, including 28 public basic schools and 27 private schools. 22 out of the 27 private schools are basic schools. The remaining are pre-schools and early grade schools. Essuekyir-Gyahadze is a rural community, and the more significant part of Winneba East and Winneba West comprises slum communities inhabited by fisherfolks or natives. Figure 3.4 presents a map of the Effutu Municipality.



Source: Google images

**Figure 3.4: Map of Effutu Municipality.**

Conversely, Kojo-Beedu North Low-Cost has a large land area as planned communities, particularly the southern area. However, the northern part of Kojo-Beedu North Low-Cost comprises a cluster of old and new settlements. Winneba East has 6 public basic schools and 9 private basic schools. Winneba West has 7 public basic schools and 2 private basic schools. Kojo-Beedu North Low-Cost has 9 public basic schools and 8 private basic schools. Essuekyir-Gyahadze has 6 public basic schools and 4 private basic schools. Table 3.4 presents further and better details on the sub-municipalities, their communities, and basic schools within the Effutu Municipality.

**Table 3.4: Number of Communities and Schools in Effutu Sub-Municipality**

Winneba West	No. of Schools		Kojo-Beedu-North Low-Cost	No. of Schools	
	Public	Private		Public	Private
Abasraba South	1	1	Low Cost		3
Domeara			Ansaful	1	
Otutuase			Winneba Junction		2
Penkye			New Winneba	1	1
Alatakokwado			Bombirimu (Sign Board)		
Ponkoekyir			Ntakorfam	1	
Adansi	2		Seed Co		
Komantsi			Nantwibuom		
Ofunhnyam/ Aboadze			North Campus (UEW)	5	
Mburabamu			SSNIT		
Ndaamba			Egyaa Lodge		
Akosua Village/Police Training			Gyatakrom		
Lancaster	4	1	Kojo Beedu North	1	
			Yaanua Hostel Arina		2
<b>Winneba East</b>			<b>Essuakyir Gyahadzi</b>		
Donkuyanmu			Essuekyir	2	
Obrawugum	1		Gyahadze	1	1
Sankor	1	3	Ateitu		
Don Bosco	2		Gyangyanadze	1	
Osakam			Atekyedo	1	
Fetteh No 1		1	Osubonpanyin	1	1
Fetteh No 2			Worabeba		
Zongo			Pumping Station		
Sakagyanu			Ekorfo		
Kwendrum					
Flamingo		2			
Victoria Road		1			
Eyipey					
Abasraba North	1				
Kojo Beedu South	1				
Brosam		1			
Water Works		2			
Dwoma					
Kokobim					

Constructed by researcher using data from the Effutu Municipal Education Service, 2021.

### **3.5 Study Population**

The study population included all in-school adolescents in grades seven (7) and eight (8), aged 10-14, living in the Effutu Municipality. However, most grade seven (7) and eight (8) pupils in the municipality were between 12 and 19 years old, and none were ten (10) years old. Given the available age group, the population was revised to include those aged 11-15. The 7<sup>th</sup> and 8<sup>th</sup> graders were considered for this study due to the phenomenal record of pregnancy upsurge among young adolescents in Ghana (UNFPA, 2022). Also, the age group was considered to fill the gap created by the overconcentration of research on older adolescents (Melesse et al., 2020). Moreover, Sani et al. (2018) have recommended that SRH education is most useful for young adolescents before the age of sexual debut. Not all young adolescents in the municipality have had their sexual debut, and the study would benefit them. The 7<sup>th</sup> and 8<sup>th</sup> graders were also preferred to avoid likely attrition from school completion, preparation for mock examinations, and variations in the academic calendar for primary and JHS schools.

### **3.6 Sample Size and Determination**

Table 3.8 summarizes the total sample size employed and attrition from the study. The study was divided into three main phases to achieve the research objectives. ASRHL needs were assessed in phase one and existing SRH materials were restructured into simplified text-only and picture-enhanced text in phase two. In the third and last phase, the effectiveness of the learning materials in improving ASRHL was assessed. Given this, different sample sizes were used for each phase. The sampling for the SRHL intervention is first discussed, followed by sampling for the SRHL needs assessment.

#### **3.6.1 Sampling for the SRHL Intervention**

A multistage sampling technique was used in this phase. Sampling was done at different levels for the ARHL intervention. At the first level, all four sub-municipalities were included. The second level involved the sampling of communities. Thirteen (13) communities were purposefully sampled based on the availability of a basic school, location, and acceptance of the intervention by the school management. The location of a community was used as a selection criterion to ensure that communities that have basic schools and share common boundaries are selected and grouped. The aim was to create clusters of schools to allow for group randomization. This randomization

type helped reduce cross-over effects and contamination likely to arise from assigning schools within the same community to different treatment arms. In Kojo-Beedu North Low-Cost, five communities were selected. They are Ansahful, Winneba Junction, New Winneba, Ntakorfam, and North Campus (UEW). Two communities, Don-Bosco and Sankor, were selected from Winneba East. In Winneba West, Adansi and Lancaster communities were included.

Four communities were also selected from Essuakyir/Gyahadze. The Communities include Osubonpenyin, Attekyedo, Gyahadze, and Gyinyinadze. Five schools in Kojo-Beedu North Low-cost consented to join the intervention. Three basic schools from Winneba West and three from Winneba East agreed to participate. In Essuakyir/Gyahadze, four basic schools agreed to participate. In the third stage, 408 male and female in-school adolescents aged 11-15 were targeted for the intervention. The 408-sample size was determined using the formula for comparing two proportions in randomized controlled trials (Sakpal, 2010). Sampling calculation followed the formula  $n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{(p_1 (1-p_1) + (p_2 (1-p_2)))/(p_1 - p_2)^2\}$ , assuming a 10% dropout rate (Sakpal, 2010). This technique was adopted to determine the sample size, given its inherent ability to establish the magnitude of the experimental effect (Sakpal, 2010). The sample size was estimated based on the outcome of a previous study (Dowse et al., 2014). The procedure is as follows:

$n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{(p_1 (1-p_1) + (p_2 (1-p_2)))/(p_1 - p_2)^2\}$ . Where:

$P_1$ = percentage increase in knowledge in the intervention group of the previous study = 0.32.

$P_2$ = percentage knowledge increase in the previous study's control group = 0.061.

$Z_{\alpha/2}$  = level of significance (5%) = 1.96 and  $Z_{\beta}$  = type two error or power (80%) = 0.84.

When plugged into the formula, the equation yielded  $n = 92$  adolescents aged 11-15.

The sample size was adjusted to include a 10% dropout rate.

Using the formula,  $N_1 = n/(1-d)$ .  $N_1 = 92/ (1 - 0.1) = 92/0.9 = 102$ .

Therefore,  $N_1 = 102$  adolescents aged 11-15 years.

On this premise, the study assigned 102 participants to the control group ( $T_0$ ) and 102 to each of the three intervention arms  $T_1$ ,  $T_2$ , and  $T_3$ .

### 3.6.2 Screening of Participants for Inclusion into the Intervention

The selection of the 408 participants began with multi-level screening. In-school adolescents were screened for learning ability based on general literacy and numeracy tests, visual acuity, and color vision. One thousand and sixteen (1,016) male and female in-school adolescents aged 11-15 from the sixteen (16) schools included in the intervention were screened for basic literacy and numeracy. Table 3.6 presents details of sub-municipalities, schools, and gender and age distribution of the participants screened from grades 7 and 8 of the sixteen schools. The numeracy and literacy test had five reading comprehension and five numeracy test items. Questions were based on end-of-term examination questions on reading comprehension for Grade six (6) pupils from a school that did not participate in the intervention. The test comprised a passage similar to those administered by the Progress in International Reading Literacy Study (PIRLS) in 2016, specifically, the passage on reading to acquire and use information (Mullis et al., 2016).

The numeracy test was adopted from The Trends in International Mathematics and Science Study (TIMSS), particularly the grade 4 mathematics assessment (Mullis et al., 2019). The decision to use the 4<sup>th</sup> graders' question was made after discussions with two JHS teachers and an assessment and evaluation expert. Five (5) mathematics test items were adopted from the TIMSS. They include questions on word problems, the area of a figure, a bar chart, a pie chart, and the perimeter of a figure. Pupils in grades seven and eight from the 16 schools took comprehension and mathematics tests. The average time allowed for the test was 20 minutes. Questions were marked and graded using the Basic Education Certificate Examinations (BECE) grading system. Pupils with aggregate 1 and 2 had 70% -100% of total marks, and those with aggregate 7 – 9 had 0 – 49% of total marks. Participants' scores were calculated based on the percentage correct of the total test items using Microsoft Excel 2013. The numeracy and literacy screening ensured that two categories of participants were included in the intervention. They included those with higher learning abilities (aggregate 1 and 2) and those with lower learning abilities (aggregate 7-9). It allowed the researcher to determine the contribution of participants' learning abilities to SRHL apart from the reading materials. Four hundred thirty-five (435) pupils were selected from the screening for learning ability. (See Appendix B7 from page 217) for the general numeracy and literacy test questions).

**Table 3.6.: Selected Sub-Municipalities and Schools for the SRHL Intervention**

Description	Sub-municipalities and Basic Schools				
	Kojo-Badu North Low-cost				
	Ntakro-fam M.A. Basic Sch.	Ansaful M.A. Basic Sch.	New Winneba M.A. Basic	Blessed Assurance Prep. Sch.	Effutu Municipal Ass. Basic
Age					
10-14	34	60	44	18	34
15-19	24	25	18	11	26
Gender					
Male	22	39	32	10	22
Female	36	46	30	19	36
<b>Total</b>	<b>58</b>	<b>85</b>	<b>62</b>	<b>29</b>	<b>60</b>
	Winneba East				
	Zion Basic Sch.	Cynclare Preparatory Sch.	Unipra Inclusive Basic Sch.		
Age					
10-14	31	22	72		
15-19	69	11	36		
Gender					
Male	39	14	48		
Female	61	19	60		
<b>Total</b>	<b>100</b>	<b>33</b>	<b>108</b>		
	Winneba West				
	Don-Bosco Cath Sch. B	Don-Bosco Cath Sch. A	Odobiriba Academy		
Age					
10-14	51	46	39		
15-19	60	49	8		
Gender					
Male	44	44	28		
Female	67	51	19		
<b>Total</b>	<b>111</b>	<b>95</b>	<b>47</b>		
	Essuakyir/Gyahadze				
	Gyahadze M.A. Basic Sch.	Ampah Preparatory Sch.	GYingyan- adze M.A. Basic	Attekyedo M.A. Basic Sch.	Atteitu M.A. Basic Sch.
Age					
10-14	21	53	22	10	36
15-19	24	8	16	11	25
Gender					
Male	26	28	17	11	15
Female	21	33	21	10	46
<b>Total</b>	<b>47</b>	<b>61</b>	<b>38</b>	<b>21</b>	<b>61</b>

The next level of screening was the visual acuity and color vision test. All 435 participants were screened for visual acuity and color vision or deficiency tests. The screening for visual acuity was by the Snelling chart, and color vision was assessed using the Ishihara color balls. Participants who failed the visual acuity or color vision tests were excluded from the study and referred to school management for needed attention. An ophthalmic Nurse, trained research assistants, and the researcher performed the screening. Of the 435 participants screened for visual acuity and color vision, 418 adolescents passed the test. However, only 332 parents consented to their children participating in the intervention, and 329 enrolled for the baseline test. The four sub-municipalities were randomly assigned to intervention arms and the control groups. Schools in Winneba East were assigned to T<sub>0</sub>, the control group. Those in Winneba West were assigned T<sub>1</sub>. Schools in Essuekir/Gyahadze to T<sub>2</sub> and those in Kojo-Beedu North Low-cost were assigned to T<sub>3</sub>. The summary of the sampling process is presented in Table 3.6.1.

### **3.6.3 Sampling for SRHL Needs**

The researcher assessed SRHL needs using a sequential mixed method. The first part assessed the scope of adolescents' SRH knowledge. Sampling was done in four stages. Two Sub-municipalities were randomly picked in the first stage, including Kojo-Badu-North Low-cost and Winneba West. Three communities, namely, North-campus (UEW), Abasraba North, and Lancaster were randomly selected from the two sub-municipalities. Three schools were purposefully selected, one from each community, based on religion, academic performance, and consent from school management. One school was chosen from the best-performing, moderately performing, and poorly performing categories using a sampling frame from the Municipal Education Service. The aim was to glean data on knowledge gaps from varied perspectives. Only three schools were considered for the discussions due to data saturation. Similar responses were obtained from adolescents after the second and third group discussions, and the researcher concluded that including more schools would glean no new data. Hence, data from the three schools were deemed adequate in unearthing ASRH knowledge gaps. In the last stage, 60 in-school adolescents were projected for recruitment based on the expected number of Focus Group Discussions (FGD) and the group size. Six groups of 10 participants were projected for the FGDs. The 10 participants per group were premised on the optimal group size for FDGs (Von Seggern & Young, 2003; Rabiee,

2004). However, fifty-two in-school adolescents had their parents consenting and gave personal permission for participation.

The second part of the SRHL needs assessment used four sampling stages, which examined young adolescents' comprehension of existing SRH educational materials and their vocabulary knowledge. Three sub-municipalities were picked at random. They include Kojo-Beedu North Low-cost, Winneba West, and Essuakyir-Gyahadze. In the second stage, the researcher picked six (6) communities, including North-campus (UEW), Adansi, Obrawugum, Osumbonpanyin, Attekyedu, and Gyngyindze, based on the availability of schools. Seven (7) schools were purposefully selected in the third stage using consent from school management. In the final stage, 270 in-school adolescents were projected for inclusion. The projected sample size was estimated using a confidence level of 90% ( $z = 1.645$ ), 5% margin of error ( $ME = 0.05$ ), and 50% standard deviation ( $SD = 0.5$ ); substituting this into the formula  $(z\text{-score})^2 \times (SD)(SD) / (\text{margin of error}) = [(1.645)^2 \times (0.5)(0.5) / (0.05)^2] = 270$  (Singh & Masuku, 2014). However, two hundred and sixty-three (263) in-school adolescents who provided parental consent and personal assent were recruited for the assessment. Four out of the seven schools were randomly picked and sixty adolescents who assented to participation in the vocabulary knowledge assessment were recruited for the assessment. Fifteen participants, comprising males and females were recruited from each school.

### **3.7 Inclusion Criteria**

Four principal criteria were applied to the selection of adolescents for the research. 1) Gender/age, male or female in-school adolescents should be between 11-15 years old. 2) The participant was expected to be in JHS 1 or JHS 2. 3). Participants for the SRHL intervention must complete all the screening tests: visual acuity, color vision, and learning ability assessment. 4) Informed consent, participants were to have written informed consent from parents and give personal verbal permission.

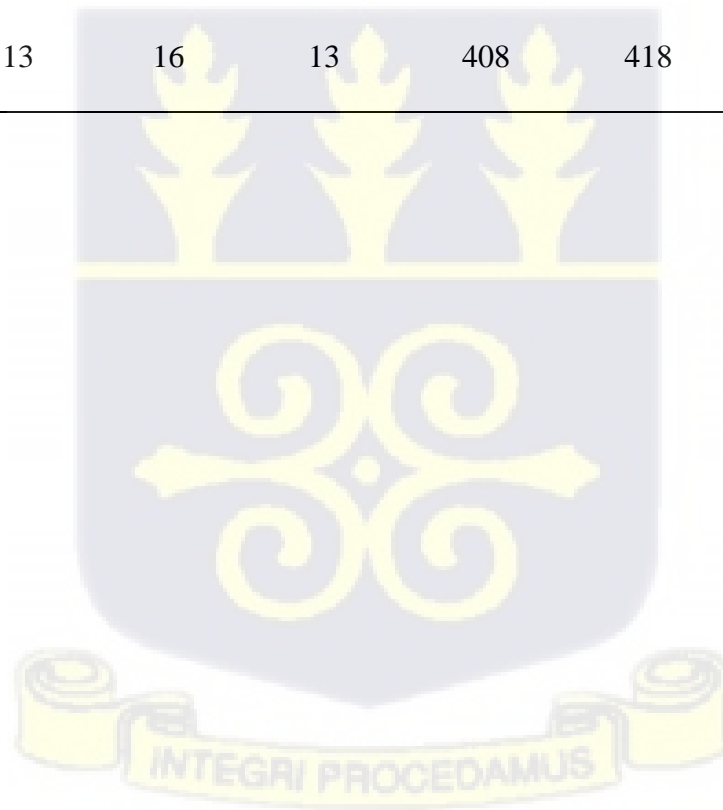
### **3.8 Exclusion Criteria**

Adolescents who were not in school, aged 16 or more years, not in JHS 1 and 2, and those outside JHSs selected for inclusion in the research were not part of the study.

**Table 3.6.1: Table of Communities, Schools, and Participants Selected for the Study**

Data type	Sub-Municipalities	Communities	Number of schools		Number of in-school adolescents				
			Number enrolled	Number Completed	Number Targeted	Number Screened	Number Consented	Number Enrolled	Number Completed
(FGDs)	2	3	3	3	60		52		52
Comprehension and vocabulary knowledge Assessment.	3	6	7	7	270		263		263
SRHL Intervention	4	13	16	13	408	418	332 (79%)	329 (99%)	245(74%)

Source: Constructed by the researcher,



### **3.9 Research Instruments**

Three instruments were deployed to collect data for the SRHL needs assessment and three for the SRHL. The data collection instruments for the needs assessment are first discussed, followed by those used in measuring SRHL.

#### **3.9.1 SRHL Needs Assessment Tools**

Instruments to assess young adolescents' SRHL needs included an FGD guide, a cloze test, and SRH Vocabulary Knowledge passages (SRH-VKP). Because data collection was done at different times, the first two assessment tools had a section for sociodemographic information. Details of the needs assessment tools are discussed as follows.

#### **3.9.2 FGD Guide**

The researcher developed the FGD guide for assessing how adolescents construct meaning into the SRH concept, their knowledge of relevant topic domains in SRH, how they access SRH services, information, and associated challenges, and their SRH goals. The FGD guide had questions structured around eight (8) primary themes. Namely, 1) SRH concept and sources of information. 2) SRH information access and challenges. 3) Contraceptives and methods. 4) personal relationships and risky sexual behaviors. 5) STIs. 6) Reproduction and related issues. 7) SRH service utilization. 8) SRH choices. (See Appendix B9 from pages 225 for the FGD guide).

#### **3.9.3 Cloze Test**

As part of the SRHL needs assessment, the comprehensibility of existing materials on SRH was assessed from adolescents' perspectives using a cloze test. The test is a valuable measure of comprehension of text (Nielsen, 2011; Wissing et al., 2016). The Cloze procedure is a method of omitting bits of a passage by mutilating its language pattern, and the test taker is tasked to replace the missing pieces to make the patterns whole again (Wissing et al., 2016). The test taker's answers are scored and used to measure comprehensibility. Cloze comes in different forms. They include multiple-choice cloze, oral type cloze, C-test, and fill-in-the-blanks (Farhady, 1996). Among these varieties of cloze, the multiple-choice cloze is the most common test to measure readers' understanding of a passage (Sattarpour & Ajideh, 2014; Kumazawa, 2016; Odo, 2018). Hence,

this study used a multiple-choice cloze test to assess comprehension of existing text on SRH. In a multiple-choice cloze test, test takers are not asked to produce a set of words to complete a passage. Instead, they are provided with options comprising distractors and one correct answer, and the test taker is asked to select the correct option to replace the mutilated portions. The multiple-choice cloze test was developed in the following steps.

The test had two sections. The first section assessed respondents' sociodemographic background, including age, gender, grade level, and school type. The second section had the cloze test constructed based on existing SRH materials. Five websites out of thirteen whose materials were restructured into the SRH educational materials were randomly picked for comprehension assessment. Eight (8) SRH topics were randomly selected from the five websites and used to construct the cloze test. The topics include HIV, syphilis, emergency contraception, chlamydia, Copper IUD, abstinence, ovulation, and menstrual cycle. An 80–120-word passage was selected from each topic for the cloze. Even though a standard cloze test uses a passage of 250-300 words (Farhady, 1996), the passage length in this study did not meet the requirement for a standard cloze test. The reason was to ensure that the test covered more topics in the materials retrieved from the five websites and to minimize the number of cloze items to reduce tiredness.

The rational deletion strategy was used for the deletion of words. Instead of deleting every  $n^{\text{th}}$  word from the passages, content words were deleted. That is words with specific meanings in the sentences that make up the passage. This procedure was preferred over mechanical deletion as it allowed the deletion of words that contribute to passage comprehension. This deletion procedure helped to overcome the limitation of the mechanical deletion procedure, which often leads to the deletion of words that contribute to syntax rather than meaning (Kobayashi, 2002). In all, thirty-nine cloze items were created. Five cloze items were developed from each passage except the passage on ovulation, which had only four cloze items. (See Appendix B6 from pages 204-210 for the cloze test instrument).

### **3.9.4 Self-Reported Vocabulary Knowledge Procedure**

SRH vocabulary knowledge of young adolescents was assessed using a self-reported vocabulary knowledge procedure. The researcher used insights from the Vocabulary Knowledge Scale (VKS) developed by Wesche & Paribakht (1996), particularly the self-reported levels (IV and V). The self-reported levels measure vocabulary knowledge by giving a list of words to participants to demonstrate their knowledge of each word. Participants are to write the meaning/synonyms of the words or form sentences with the words. (Culligan 2015; Iqbal & Komal, 2017). Following the self-reported procedure, five of the passages used for the cloze test were selected to assess SRH vocabulary knowledge. The length of the passages was between 200 and 250 words. The topics included the menstrual cycle, ovulation, syphilis, emergency contraception, and chlamydia. Participants were to read and self-report words they did not understand by underlining them with a pencil and verbally indicating whether they were familiar, understandable, or otherwise. Even though the procedure employed to assess SRH vocabulary knowledge is unconventional compared to validated tests for assessing vocabulary knowledge, it was helpful due to the context-specific nature of SRH vocabulary. It would have been inappropriate to resort to the traditional test focusing on sources of English words and their frequency count, which may be irrelevant to SRH. The procedure was valuable in determining participants' SRH vocabulary knowledge and how to modify the existing SRH materials. (See Appendix B8 from page 222 for the passages)

### **3.9.5 Validation of SRHL Needs Assessment Instruments**

Data collection instruments validated by experts in the area. Three experts validated the FGD guide and the cloze test. For the FGD guide, an expert in Public Health and a Medical Officer with expertise in health education validated the guide. The reviewers suggested that the researcher include questions on the dangers of early sex and pregnancy and the SRH goals of young adolescents in the FGD guide.

Concerning the cloze test, a two-member panel and the researcher first reviewed the cloze test. The panel members were experts in Science Education. Each cloze item was examined for appropriate construction of the stem and detractors. The purpose was to ensure that participants would understand the question stem and complete a cloze test while ensuring that the stem did not provide a clue to the correct answers. The medical officer with expertise in health education also

reviewed the questionnaire to check whether the content represents SRH topic domains relevant to young adolescents. The cloze test was revised based on the experts' comments and was pretested among thirty-four (34) in-school adolescents. Chronbach's Alpha was used to check the reliability, Alpha ( $\alpha$ ) = 0.82. According to Tavakol & Dennick (2011), an alpha value between 0.7–0.95 is an acceptable range for reliability. Hence, the cloze test had acceptable reliability. Regarding the passages used in assessing participants' vocabulary knowledge in SRH, the experts suggested increasing the length of the SRH passages for the reading sessions. Initially, the passages ranged from 150 to 170 words, but this was increased to 200 and 250.

### **3.9.6 The Test of Functional Literacy in SRH (TOFL-SRH)**

The TOFL-SRH was developed following the cloze procedure. The purpose of this tool was to evaluate adolescents' ability to read and comprehend the SRH educational material used for the SRHL intervention. Previously used measures of health literacy, namely, the Rapid Estimate for Adult Literacy in Medicine (REALM), the Rapid Estimate for Adult Literacy in Medicine Revised (REALM-R), and The Medical Achievement Reading Test (MART) were not valid for this study. These existing measures center around word recognition or sight-reading abilities and have no utility for assessing SRH contents (Altin et al., 2014; Naghibi et al., 2014). Given the unusefulness of these measures, the researcher adopted the cloze procedure to develop the assessment tool to measure participants' ability to comprehend the simplified SRH educational materials developed for the literacy intervention. The cloze test is a well-recognized empirical comprehension test for assessing reader understanding of content (Kobayashi, 2002; Nielsen, 2011; Gellert & Elbro, 2013). The cloze procedure is employed to develop other measures of health literacy, such as the Test of Functional Health Literacy in Adults (TOFHLA) (Parker et al., 1995) and the Oral Health Literacy for Adult Questionnaire (OHL-AQ) (Naghibi et al., 2014). The TOFL-SRH was constructed using insight from the TOFHLA, the OHL-AQ, and the multiple-choice cloze procedure.

The TOFL-SRH had two sections, literacy, and numeracy. It was constructed following three steps. In the first step, the researcher randomly selected eight (8) out of twenty (20) topics covered by the learning materials. A limited topics were included to reduce the test items to a bearable number to avoid fatigue and boredom in participants. The second step was the deletion of words. The

rational or random deletion procedure was used to delete content words from the passages. The aim was to ensure the deletion of words contributing to the passages' meaning. Question items were numbered from 1-30. The test provided four alternative words for each deleted word. The participants were to choose the correct options to complete the cloze. The third step was the construction of the numeracy test. The section had five test items on the menstrual cycle. Question items were multiple-choice, and a participant was to use a two-month calendar provided in the questionnaire to calculate and determine the correct answer for each question.

### **3.9.7 The Test of Decision-Making Skills in SSRH (TD-SRH)**

The TD-SRH aims to assess young adolescents' ability to apply knowledge gained from the SRH learning material to make decisions regarding their SRH lives. The assessment tool was developed following the methods for assessing higher-order cognitive skills (Anderson & Krathwohl, 2001). It has been in the medical field to assess the clinical decision-making skills of medical students using this procedure. Common cognitive skills tests in the medical field include the Key Feature Problem (KFB) (Page & Bordage, 1995) and the Modified Essay Questions (MEQ). As cited in Knox (1980), the Royal College of Medical Practitioners introduced the MEQ. The MEQ comprises short clinical scenarios or events in evaluating a case. The scenarios, structured questions, and a format for scoring are given. The questions are selected at suitable points in the scenarios, and the participant's task is to answer the questions (Moeen-uz-Zafar Khan, 2011).

The KFP is similar to the MEQ, except that participants' responses are related to only essential steps in solving the problem. The KFP also presents structured responses in a multiple-choice format but allows more than one correct answer to be selected from a tall list. It allows participants to select multiple correct answers to ensure their responses reflect real-life situations. The KFP represents an improvement over the multiple-choice format (Farmer & Page, 2005). The MEQs and the KFP are used to assess cognitive abilities such as recognition of knowledge, reasoning, and problem-solving abilities (Moeen-uz-Zafar Khan, 2011). Based on the MEQ and KFP techniques, the TD-SRH provided a 348-word scenario of SRH problems common to young adolescents. The scenario covered physical changes at puberty, menstruation, STIs, pregnancy, unsafe sex, and sources of SRH information. A series of structured questions were constructed based on the scenario to elicit responses from the participants. Questions were in a multiple-choice

format. The TD-SRH has 10 question items with eight (8) alternative answers (numbering A to H) for each question item. Participants were to select two or more correct answers. The eight (8) possible answers were given to prevent participants from randomly selecting answers.

The TOFL-SRH and the TD-SRH had two forms (i.e., multiple test forms). The first form is a group of questions making up the first version of the test that participants are expected to answer (Rogers, 2012). However, a second form of the TOFL-SRH and the TDS-SRH were created by varying the first forms (i.e., questions) and presenting the same questions as those in the first form, but scrambling the items in terms of their arrangement. The goal was to discourage participants from employing clues detected during the pretest (baseline) to answer the posttest (end-line). Form I of the TOFL-SRH is labeled TOFL-SRH<sub>0</sub> and that of TD-SRH is categorized as TD-SRH<sub>0</sub>. Forms II were labeled TOFL-SRH<sub>1</sub> and TD-SRH<sub>1</sub>, respectively. (See appendices B1 and B2 from pages 188-195 for the Form I of TD-SRH and TD-SRH). For the Form II of the TD-SRH and TD-SRH, (see appendices B3 and B4 from pages 199-206).

### **3.9.8 Validation of SRHL Instruments.**

The researcher validated the TOFL-SRH and the TD-SRH at multiple levels. The two instruments were first reviewed by a three-member team in science education and later by two experts in assessment and evaluation. The experts reviewed the test items to ensure they covered a significant proportion of the learning material for the intervention. The review also checked whether question items could induce retrieval and distract participants when looking for the correct answers. The experts suggested that the researcher use relevant detractors and ensure that key concepts are written in total for a start and subsequently in abbreviation. They further recommended creating a second form of the tests to use the first form in the baseline and the second for end-line data collection. Additional recommendations included pretesting the two forms to check for difficulty, discrimination, and distraction of question items and responses. Following the revision, the instruments were referred to two other experts in health service research who also suggested that the preferred names suggested by adolescents should be put in brackets against their technical jargon to facilitate understanding of the questions. They also emphasized the need to test the difficulty level of question items.

The TOFL-SRH<sub>0</sub> and TD-SRH<sub>0</sub> were pretested among 280 school adolescents aged 11-15 (170 participants for the TOFL-SRH<sub>0</sub> and 110 for the TD-SRH<sub>0</sub>) from two private schools. The TOFL-SRH<sub>1</sub> and TD-SRH<sub>1</sub> were pretested among 291 adolescents aged 11-15 (147 for the TOFL-SRH<sub>1</sub> and 144 for the TD-SRH<sub>1</sub>) in one public school. The data were processed and checked for reliability using Cronbach's Alpha. The TOFL-SRH<sub>0</sub> had  $\alpha_0$  value of 0.57. However, the TD-SRH<sub>0</sub> had  $\alpha_1$  of 0.07. The value of the TOFL-SRH<sub>1</sub> was 0.60, and that of the TDS-SRH<sub>1</sub> was 0.33.

Given the unacceptable alpha values, question items in the first and second forms were analyzed for difficulty, discrimination, and distraction by computing the relevant indices. Microsoft Excel (2013) was used for the item analysis. The instruments were revised and pretested again. The TOFL-SRH<sub>0</sub> and TDSSRH<sub>0</sub> were pretested separately among 47 and 35 in-school adolescents and had  $\alpha_0$  values of 0.70 and 0.70, respectively. TOFL-SRH<sub>1</sub> and the TD-SRH<sub>1</sub> were also piloted among 70 in-school adolescents (30 participants for the TOFL-SRH<sub>1</sub> and 40 for the TD-SRH<sub>1</sub>).  $\alpha_1 = 0.85$  and 0.70 for TD-SRH<sub>1</sub> and TD-SRH<sub>1</sub>, separately.

### **3.9.9 SRHL Intervention Appraisal Questionnaire**

The appraisal questionnaire was in four parts. The first part consisted of questions on participants' sociodemographic information. The second part had four items with Yes and No responses. It sought to ascertain whether participants could learn the materials at home and the support they received in learning the material. The third part was a 5-point Likert instrument with responses ranging from strongly agree (1) to strongly disagree (5). This part had ten Likert items. The strongly agree means participants concur with the statement, and the strongly disagree means participants object to the statement. The third part was a single 5-point Likert item with options Very much (1) to not at all (5). Very much means that participants liked the intervention, and not at all mean participants objected to the intervention. (See appendix B5, on page 210, for the evaluation questionnaire).

### **3.10 Ethical Considerations**

Approval for data collection was obtained from the Municipal Education Service (MES). The researcher entered the schools through the MES by obtaining an introductory letter to the schools. The objectives and purpose of the research were explained to participants, including risk, benefit, and the right to withdraw at any time. Additional explanations were given to some parents via phone calls, email, and text messages. Data collection commenced after parents/guardians had provided written informed consent. Participation was voluntary and at the discretion of the participants and their parents/guardians. The anonymity of participants was enforced by managing data to ensure that they were not traceable to the participants. Ethics approval was obtained from the Ghana Health Service (GHS) Ethics Review Committee.

### **3.11 Data Collection – ASRHL Needs Assessment**

ASRHL needs assessment was performed using multiple data sources: FGDs, readability analysis of existing SRH materials, comprehensibility assessment (cloze test), and SRH vocabulary knowledge assessment. The details of the data collection process are discussed in turns and as follows.

#### **3.11.1 Focus Group Discussion**

Six (6) FGDs were organized in three schools (two FGDs in each school) to identify knowledge gaps in SRH. Separate discussions were held for males and females separately. Six groups were created, and the group size for adolescent males ranged between three (3) and six (6) participants. Adolescent female groups ranged between twelve (12) and fifteen (15) participants. Fewer male adolescents met the inclusion criteria than females, which explains the differences in group size. Group discussions were done using the FGD guide. A male Nurse Prescriber moderated the male group discussions, and the researcher moderated the female group discussions. The duration of group discussion ranged from 45 – 60 minutes. Discussions were done in Fante (the widely spoken language in the Effutu Municipality) and the English Language. Using two languages was valuable in creating a friendly atmosphere for free expression. Participants' responses were recorded using audio recorders and field notes. Research assistants recorded notes. Data were collected over one week.

### **3.11.2 Quality of the Qualitative Work**

The quality of the qualitative work was ensured by adhering to the measures of trustworthiness. Polit and Beck (2016) talk of trustworthiness as the level of confidence that qualitative researchers have in their data. In addition to validating the data collection tools, trustworthiness was maintained by relying on four main criteria discussed by Stahl & King (2020). The measures included credibility, transferability, dependability, and confirmability. Credibility was exemplified by explaining the research purpose and procedures to participants one week before and holding separate meetings for males and females to boost their confidence and foster freedom of expression. Validation of participants' responses was also done to show the credibility of the results (Bryman, 2016). To demonstrate transferability, the design, and methodology used for the qualitative aspects of the needs assessment are thoroughly described to guarantee the study's replicability. Measures of dependability of results included code recording of data in three months to check for consistency. Confirmability was achieved by triangulating data from field notes and audio recordings. Two research assistants did data translation and transcribing and were later authenticated by the researcher (Stahl & King, 2020).

### **3.11.3 Readability Analysis of Existing Material**

Using SRH knowledge gaps identified from the FGDs and the literature review, SRH texts related to domains that represented gaps in SRH knowledge of adolescents were gleaned through an unstructured search on the Google search engine. Material was included if it was written in the English language, if it was text-only, or text and graphics. Materials targeting adolescents, young people, and those with content relevant to adolescents were also included. The materials were retrieved from KidsHealth, SafeTeens, Young Men's Health, Planned Parenthood International (PPI), Planned Parenthood Association of Ghana (PPAG), Center for Disease Control and Prevention (CDC), Avert, HealthLink BC, Women's Health, Mayo Clinic, Maristops Ghana, the Ghana Education service, and the basic eight science textbooks. Electronic versions of materials from the websites were copied into Microsoft Word. In cases where the text was in PDF format, it was converted into a Microsoft Word document for analysis. Paper-based texts were typed verbatim in Microsoft Word without any modifications to the passages.

Text readability was assessed using the free online text readability consensus calculator (version 1.0). For each of the materials included in the analysis, the first 150 words were selected for processing by the consensus calculator. If a sentence was not finished after 150 words, the researcher continued until the end of that sentence. The readability assessment aimed to establish the complexity of existing SRH materials and align them to young adolescents' literacy skills. Although other readability assessment tools exist, five metrics were preferred due to widespread use in the health literacy literature (Munsour et al., 2017; Rooney et al., 2021). They were: the Flesch Reading Ease, FKRGL, the GFI, the SMOG, and the Coleman-lieu (CI). Five algorithms were combined to improve the validity and accuracy of results regarding the difficulty level of the existing SRH materials (See pages 107 of the thesis for the readability indices).

#### **3.11.4 SRH Text Comprehension**

Young adolescents' comprehension of existing SRH text was assessed using a cloze test constructed by the researcher. The test was self-administered and was taken by 263 grade 7 and 8 pupils aged 11-15. Questions were in multiple-choice formats with option A-D. Participants were asked to choose the correct options to fill the blank spaces provided to make a complete passage. The maximum duration allowed to complete the cloze test was 25 minutes.

#### **3.11.5 SRH Vocabulary Knowledge Assessment**

Data on adolescents' SRH vocabulary knowledge was collected following the comprehension assessment. Four out of the schools that participated in the cloze test were included. The researcher included male and female groups of 6-7 participants aged 12 – 15. During group meetings, details of the activity participants were to complete were explained to them. Each of them was given the vocabulary knowledge passages to read silently and underline the difficult-to-understand words. This task was done in 45 minutes. After the silent reading, the passages were collected back. The facilitator mentioned the underlined words and asked participants to verbally indicate whether they had heard them or if it was their first time coming across them. The participants were also asked to suggest local jargon to replace the difficult-to-understand words in the text. Responses from participants were audio-recorded. The reading and discussion session lasted for one hour and thirty minutes. Discussions were done in the English and Fante languages. The meeting was held

separately for males and females. The researcher and two trained research assistants facilitated the sessions.

### **3.12 Analysis of Data from SRHL Needs Assessment**

#### **3.12.1 Focus Group Discussions**

Discussions recorded in the local language (Fante) were translated into English Language text. Discussions done in English were transcribed into text together with the field notes. Two research assistants proficient in the English language did the translation. The researcher checked content validity using response validation and transcript authentication. The researcher also compared the translated and transcribed text with the audio to ensure that participants' views and statements were captured completely and accurately by the transcribers/translators. The researcher used QD-Miner to do the data processing and coding. Code-recoding was done in three-month intervals to allow for comparison and consistency with the earlier codes. Data saturation was reached when no new codes were identified from the text. Codes were merged and classified based on the themes in the discussion guide using common patterns among the codes. Relevant sentences and phrases were selected to support the themes. The initial themes were further categorized into main and sub-themes and compared against the data set for revision purposes. Finally, themes and sub-themes were redefined to make them articulate and valuable.

#### **3.12.3 SRH Vocabulary Knowledge**

The responses on familiarity with SRH words or terminologies were translated into English text. Those marked "difficult to understand" by the participants were tallied from the SRH VKP. Words marked as unfamiliar were also tallied, and word frequency count was computed for each difficult-to-understand and unfamiliar word. Words and their frequencies were sorted into familiar but incomprehensible words and unfamiliar and incomprehensible ones. The local jargon suggested to replace the difficult-to-understand words was teased out of the participants' responses and tabulated. The frequency counts were transformed into bar charts using Microsoft (MS) Excel 2013. Two charts were generated, namely familiar but incomprehensible words and unfamiliar and incomprehensible words.

### **3.12.4 Cloze Test**

Test items were marked based on a marking scheme created by the researcher. A correct answer was awarded one (1) mark, and an incorrect answer received zero (0). Question item scoring was done by calculating each test instrument's correct percentage of responses. Hence, the correct percentage was arrived at by dividing the Total Correct Responses (TCR) by the Total Expected Responses (TER) multiplied by a hundred (percentage correct =  $TCR/TER \times 100$ ). Data were processed using Statistical Package for Social Sciences (SPSS version 20.0). Sociodemographic data included gender, age, grade level, school type, and religion. Age and grade levels were numeric and were entered as given. Gender and school types were dichotomous variables coded *zero* if the respondent was a male and *one* if the respondent was a female. School type was coded as *zero* if the participant's school was private and *one* if the participant's school was public. Religion was a categorical variable with three categories: Christianity, Islam, and others. Christianity was coded 0, Islam 1, and others 2. ). Text comprehensibility was categorized into three levels, as by Tan et al.(2018), Wissing et al. (2016), and Kušec et al. (2006). They are: independent level ( $\geq 60 - \leq 100$ ), instructional level ( $\geq 40 - < 60$ ), and frustration level ( $> 0 - < 40$ ).

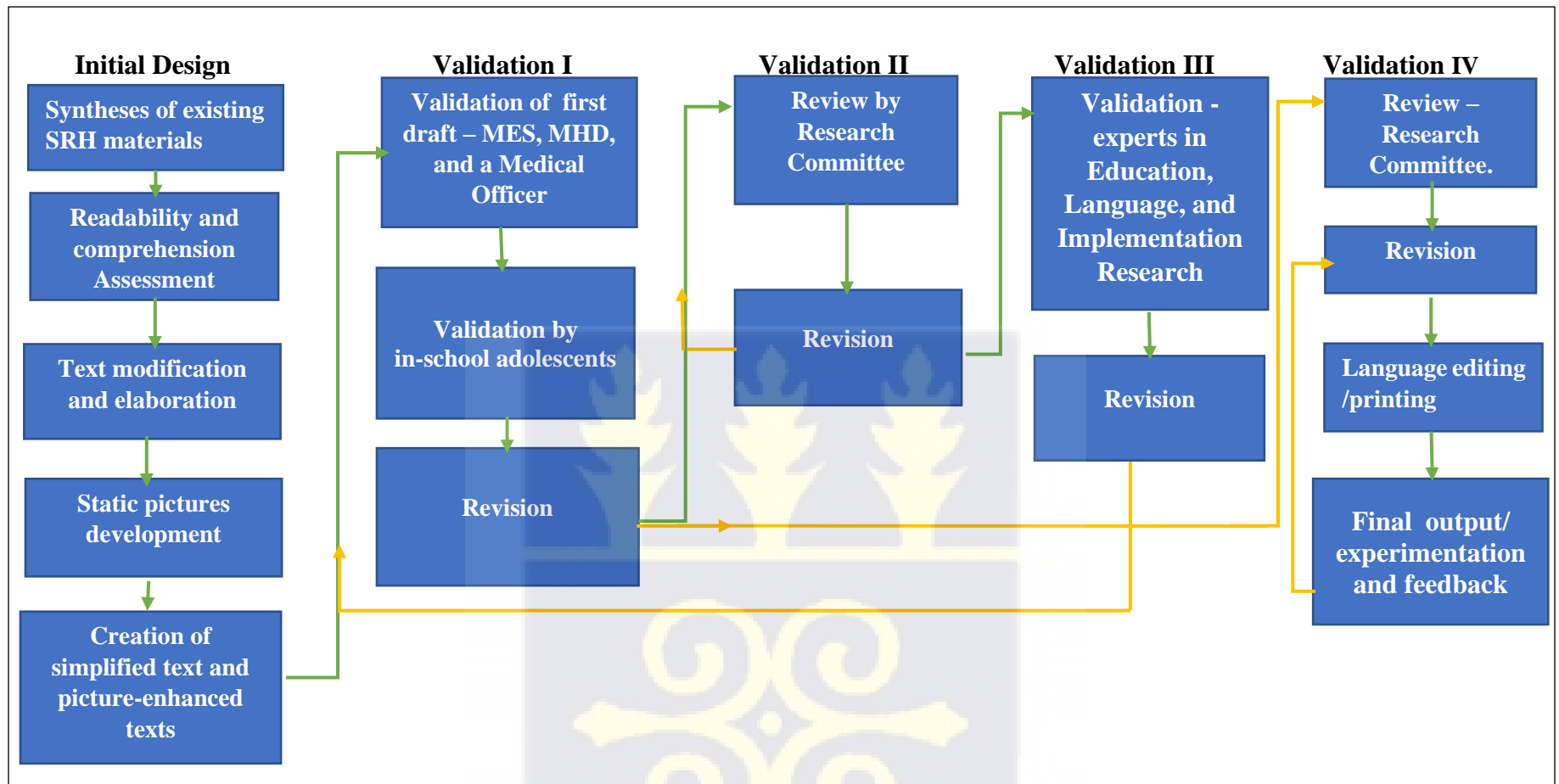
### **3.13 Development of SRH Learning Materials**

This study used two main learning materials: a synthesis of existing Online and Paper-based SRH materials and a simplified version of the existing SRH materials. Two versions of the simplified material were created, including text-only and picture-enhanced versions. Figure 3.13 describes the iteration and participatory processes employed in the materials development. The details of the process are discussed as follows.

#### **3.13.1 The Initial Design**

#### **3.13.2 Synthesis of Existing SRH Materials**

A synthesis of all the materials assessed for readability was prepared and grouped into six broad domains: 1) Pubertal changes. 2) Sexual activities and risky sexual behaviors. 3) Friendship. 4) Abstinence. 5) Sexually transmitted infection. 6) Contraception. The existing texts were synthesized using Microsoft Word, font size 18, and Times New Roman font.



**Figure 3.13: Participatory and Iteration Design Process of SRH Materials Developme**



### **3.13.3 Restructuring of Existing SRH Texts**

Two different materials were developed, including syntheses on existing SRH text, labeled as difficult text material, and restructured or simplified text material. The simplified material was presented in two formats: simplified text-only and picture-enhanced text materials. The synthesized SRH materials were simplified by combining structured and intuitive approaches. The readability indices of the existing text and the comprehension assessment results were the basis for simplifying the texts. Simplification and elaborations were adopted to meet the target participants' literacy skills. The researcher relied on her writing experiences and opinions about what makes a text more understandable for the intended learners. The first draft of the simplified material was prepared using Microsoft Word (MSW, 2013), font: Times New Roman, font size: 20. The first draft of the simplified text was a guide to developing static pictures to enhance the text. A Graphic Artist developed a pool of one hundred and twenty (120) static pictures to enhance the simplified text. The static pictures were employed to enhance the first draft of the simplified text into a picture-enhanced SRH text format. Thus, the simplified text was presented in two formats: simplified text-only and picture-enhanced SRH educational materials.

### **3.13.4 Validation of Materials by Stakeholders**

Given that the picture-enhanced material had the exact text as the simplified text-only format, the former was subjected to the validation process to validate pictures and text concurrently. The first draft of the picture-enhanced material was validated by a team from MES, The Municipal Health Directorate (MHD), and the Director of Health Service (a Medical Officer) at the University of Education, Winneba. The MES team comprised the Municipal Director of Education, the Girl Child Coordinator for the municipality, the Public Relations Officer, the Guidance and Counseling Coordinator, and four other officers of the MES. The researcher presented the draft to the team using an overhead projector. The team members were to comment on the text's clarity and give their perception of the pictures. The discussion was done in English, and responses were audio recorded. The MHD team and the Medical Officer were to check content suitability and accuracy and give their views on the pictures.

The MES team raised concerns about the "sensitivity" of five pictures and recommended changes to some pictures to represent the text accurately. For instance, the team suggested pictures to represent concepts such as "the right guy or girl," "reproduction," "ask yourself," "ovulation," "the withdrawal method," and "painful urination." The team further suggested static pictures to enhance some concepts and text. They also recommended crossing sensitive pictures with red ink to signal to young adolescents that they are undesirable. The MHD team suggested changes in the sequence of topics and sub-topics. The draft was revised using comments from the MES team, the MHD, and the Medical Officer. Pictures that received comments were modified based on the suggested changes. The Graphic Artists also created new pictures to replace those considered unfit. The picture-enhanced material was revised to include the modified and newly created pictures. The text was further revised into a new draft to reflect changes proposed for the text.

### **3.13.5 Validation of SRH Materials by Participants**

The new draft of the picture-enhanced learning material was presented to the adolescents who participated in the FGDs. The FGD participants were intentionally used because they proposed the combination of pictures and text as the preferred SRH educational material for young adolescents. The picture-enhanced format was projected to the participants in a focus group to comment on their appropriateness, sensitivity, and suitability in illustrating the text. Picture validation was done in English and Fante. Participants' responses were recorded by audio, translated, and transcribed to guide the revision of the pictures to address the participants' concerns and suggestions, leading to the third draft of the picture-enhanced material.

### **3.13.6 Review by the Research Supervisors**

The picture-enhanced text material was referred to the research supervisors for review. After further perusal and consideration of pictures and text, the supervisors recommended the following revisions to the material: 1) The material should begin with an introductory paragraph explaining the SRH concept. 2) Revision of the lesson on sexual activities and abstinence to include local examples and health risks associated with the different categories of sexual activities. Rape and defilement were also recommended for inclusion. 3) Lessons should be sequenced in a way that will promote the SRH goals of the adolescent. The purpose was to ensure that the SRH learning

materials adequately promote the SRH goals of young adolescents (abstinence) and the moral values of the Ghanaian people while addressing other knowledge domains critical to the young adolescent. The picture-enhanced text material was revised and referred to the supervisors for further comments. In their second review, they recommended that the materials be referred to experts in the Faculty of Educational Studies, University of Education, Winneba, for expert review.

### **3.13.7 Validation by Experts**

Based on the advice of the research committee, the material was sent to an Assessment and Evaluation Expert, an Educational Psychologist, a Language Expert, and an expert in implementation research at the University of Education, Winneba. The assessment and evaluation expert and the educational psychologist reviewed the learning material. The two experts stressed the need to apply the redundancy and the segmenting principle of the CTML and CLT (Sweller et al., 1998; Mayer, 2009) to ride the text of excessive explanatory information. They recommended that the text be summarized into an abridged version so participants could learn them quickly. They also suggested that items in bullets should be changed to numbering to foster easy recall. The two experts referred the SRH materials to a language (English) expert to help compress the text. The language expert advised that the original learning materials should be kept and labeled as an "expanded version" because it contains helpful information that facilitators/educators may use in delivering the lesson. After compressing the text, the simplified text-only format was scaled down from 43 to 30 pages, and the picture-enhanced format from 84 to 58 pages.

The abridged version of the text-only format was referred to the Assessment and Evaluation Expert, an Educational Psychologist, for a second review, which was done with the researcher. The experts approved the material for the intervention. However, the implementation research expert recommended that the material be returned to the target participants, the MES, and the MHD for their final comments. The purpose was to gain stakeholders' approval of the content and to determine whether target readerships have difficulty reading and understanding the content of the learning material.

The MES and the MHD were sent copies of the picture-enhanced format to review and give final comments. The researcher also randomly picked four schools out of the schools that participated in the SRHL needs assessment. Sixty (60) in-school adolescents aged 12-15 assented to participate in the proofreading. Reading was done through group meetings with pupils to have them read and comment on the text's comprehensibility and the pictures' fitness. Pupils were assigned different lessons to read aloud and underline words they found challenging to pronounce or understand. Discussions were held after the reading session to listen to the adolescents' comments. Adolescents proposed that words such as "Family Unit Nurse" should be changed to "Family Planning Nurse." "Infection" should be changed to "illness/sickness." "Defilement, musturbation, abstinence, pornographic, contraception, and cuddling" were challenging words. The participants indicated they were unfamiliar, difficult to pronounce, or understand. The researcher explained the words to the participants, and they agreed with the researcher on the following modifications: 1) "Pornographic" should be explained in parentheses as "porno," a local name for pornography. "Abstinence" was to be explained to mean "no sexual activity," and "Contraception" should be explained to mean "ways to avoid pregnancy."

On the other hand, the MES suggested the inclusion of same-sex sexual relations in the lesson. According to the Girl Child Coordinator, there have been reported cases of same-sex sexual practices in some of the basic schools. Thus, educating them on the dangers of such practices would be expedient. The MHD asked for clarity on some aspects of the content and suggested that all sensitive pictures representing risky sexual behaviors should be crossed with red ink instead of ruby red. The team from the MHD also suggested minor changes to aspects of the content. The two formats of the learning material were revised to incorporate the comments and suggestions made by the target participants and relevant stakeholders.

### **3.13.8 Review by Research Supervisors**

A draft of the picture-enhanced material was reverted to the research supervisors for final review. Upon reviewing the material, the supervisors came up with some minor comments to be addressed in the final draft. The two formats of the material were printed after the final revision and language editing.

### **3.13.9 Types of Pictures Used**

The static pictures used to enhance the SRH text varied in their degree of detail. It comprised cartoon-like and semi-realistic colored drawings, realistic pictures, and silhouettes. The use of detailed and less detailed pictures was helpful, given the nuances in the concepts and objects they sought to illustrate. For example, silhouettes and semi-realistic colored drawings were valuable in illustrating sexuality and sexual health risks while watering down the sensitivity of those pictures, particularly to young adolescents. Detailed pictures were adopted to illustrate products such as contraceptives more realistically. The cartoon-like and semi-realistic drawings helped illustrate persons and objects based on suitability. The arrangement of pictographs in the text followed the split attention, contiguity, and coherence principles of the CTML and CLT. Premised on principle, pictures were fixed next to the text they sought to illustrate. The purpose was to prevent divided attention between the text and the pictures (Sweller, 2011; Mayer, 2009).

### **3.13.10 The Sequence of Lessons**

Lessons were organized in a sequence that promotes abstinence while providing age-appropriate but comprehensive information on SRH. The learning material introduces the concept of SRH and how it may apply to young adolescents. The first lesson presents pubertal changes, including a detailed discussion of ovulation and the menstrual cycle. In the second lesson, the material explains sexual activities and sexual health risks. Other topics in this lesson are rape and defilement and Ghanaian values regarding same-sex sexual practices. Lesson three talks about friendship and basic etiquette. In the fourth lesson, abstinence, the benefits of abstinence, and how adolescents can control sexual desires were discussed. Lesson five presents STIs, causes, and treatment. Lesson six introduces the young adolescent to contraception. The purpose of introducing discussions on contraception in the last lesson was to ensure that the young adolescent first understands sexual behaviors, the dangers of early sex, and the importance of abstinence. Thus, early sex and contraceptive use should be the last resort when abstinence is difficult for young adolescents. (See appendices C1, C2, and C3 from pages 228 278 for the educational materials).

### 3.14 SRH Literacy Intervention

The intervention provided SRH education and assessed in-school young adolescents' ability to read and understand the three different SRH materials. It also assessed adolescents' ability to apply SRH knowledge to decision-making. The intervention followed three steps. In step one, the researcher collected baseline data. It involved measuring participants' ability to read and understand the educational materials (functional SRHL) and their ability to apply SRH knowledge to make decisions (interactive SRHL) by administering the TOFL-SRH<sub>0</sub> and the TDS-SRH<sub>0</sub> tests. All four groups (T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub>) participated in the test. The maximum time allowed for the TOFL-SRH<sub>0</sub> was 25 minutes, and that of the TDS-SRH<sub>0</sub> was 20 minutes. However actual time used for the TOFL-SRH<sub>0</sub> was between 18 and 25 minutes, and that of the TDS-SRH<sub>0</sub> was 15 to 20 minutes.

The second step of the intervention was the random assignment of sub-municipalities to control and treatment arms of the intervention. Schools in the Winneba East sub-municipality were assigned to T<sub>0</sub>, the control group, and received no treatment. Those in the Winneba West sub-municipality were assigned to T<sub>1</sub> and received the difficult SRH text material. Schools in Essuakyer-Gyahadze were assigned to T<sub>2</sub> and received the simplified text-only material. Finally, schools in the Kojo-Beedu North Low-Cost sub-municipality were assigned to T<sub>3</sub> and received the picture-enhanced text. All participants and school management of the treatment groups received a copy of the respective educational materials one week before the start of the intervention. The aim was to inform parents and school managers of the content and document their reactions, if any.

The intervention involved reading sessions held once every week for six (6) weeks. Each participant was assigned a passage in the educational materials to read at home before the session. During each reading session, participants took turns to read their assigned pages aloud to the hearing of other participants in the meeting. This strategy ensured that participants read portions of all the lessons at least once before the close of the intervention. The class sizes for the reading sessions ranged between 4 and 20 participants, depending on the number of participants who met the inclusion criteria in each school. Separately, meetings were scheduled for males and females but on the same day and time. The reading session followed questions and answer sessions. Each session lasted for one (1) hour, 30 minutes for reading, and 30 minutes for question and answer. The researcher and ten research assistants (five males and five females) trained as facilitators facilitated the reading sessions in the various intervention schools. The research assistants were

third-year Health Administration and Education students from the University of Education, Winneba. They were between the ages of 21-25 and were trained to use the learning materials and facilitate the reading and question sessions. The expanded version of the picture-enhanced format was the facilitators' guide for the reading and questions sessions. The researcher purposefully selected the age range of research assistants to meet the preferences of young adolescents. The intervention was closed at the end of the sixth week.

The intervention's last step was to conduct an end-line assessment. Three (3) different test instruments were used. They included the TOFL-SRH<sub>1</sub>, the TDS-SRH<sub>1</sub>, and an appraisal questionnaire to evaluate the intervention. Participants were asked to appraise the intervention immediately after the last lesson. Given that one hour was allotted each week for meetings, the TOFL-SRH<sub>1</sub>, the TDS-SRH<sub>1</sub>, for functional and interactive literacy assessment was conducted at most one week after the close of the intervention. The maximum time allowed for the TOFL-SRH<sub>1</sub> was 25 minutes, and that of the TDS-SRH<sub>1</sub> was 20 minutes.

#### **3.14.1 Delayed Assessment**

The functional and interactive health literacy tests were repeated eight (8) weeks after the end-line data collection. The purpose was to determine how long adolescents could retain their understanding and knowledge of the lessons and their ability to apply them in decision-making. The assessment was done using TOFL-SRH<sub>0</sub> and TDS-SRH<sub>0</sub>.

#### **3.14.2 Data Processing and Analysis**

Data processing included marking, scoring, coding of question items, data entry, and analyses.

#### **3.14.3 Scoring and Coding of Test Items.**

Sociodemographic information was in two parts. 1) Respondents' information included gender, age, grade level, and school type. Age and grade level were numeric and were entered as stated by the participants. Gender and school type were dichotomous variables coded as 0 if the respondent was a male, 1 if the respondent was a female, 0 if the respondent's school was private, and 1 if the respondent's school was public. Participants' learning ability was coded 0 if they scored 0-49% in the general literacy and numeracy test and 1 if they scored 70-100%.

Place of residence was coded 0 if the participant's community falls within the Effutu Municipality's rural areas and 1 if urban. Three categories of functional and interactive SRHL were defined for the descriptive statistics. Participants with functional and interactive SRHL test scores of 75% - 100% were classified as adequately literate, 60% -74% as moderately literate, and 0 – 59% as inadequately literate (Shahid et al.,2022). All the test instruments (the TOFL-SRH<sub>0</sub>, TDS-SRH<sub>0</sub>, TOFL-SRH<sub>1</sub>, and TDS-SRH<sub>1</sub>) answered by the participants were marked using a researcher-developed marking scheme. (See Appendix E2 and E3 on pages 350-351 for the scheme). Test item scoring was done by calculating the percentage correct of the responses to each test instrument. A correct answer was awarded one (1) mark, and an incorrect answer received zero 0. Therefore, the percentage correct was arrived at by dividing the Total Correct Responses (TCR) by the Total Expected Responses (TER) multiplied by a hundred (percentage correct =  $TCR/TER \times 100$ ). Data were first entered into Microsoft Excel 2013.

#### **3.14.4 Statistical Analysis**

The sociodemographic information and the intervention appraisal questionnaire were coded and processed using SPSS version 23.0. The data were presented using percentages and summary measures. Data from SRHL intervention were processed using STATA. Three different analyses were undertaken. 1) DID analysis to determine the effect of the intervention on adolescents' SRHL. 2) Multivariable regression to estimate the additional effect of participants' characteristics on SRHL. 3). Paired sample t-test to assess the onset of decay in adolescents' SRHL eight weeks post-intervention.

#### **3.14.5 Difference in Difference Analysis**

The DID is used as the analytical approach to estimate the actual effect of the SRHL intervention on adolescents' SRHL. DID operate on some primary assumptions: 1) the model is applied to quasi-experiment or non-equivalent control group designs. 2) The design is based on the parallel trend assumption, which presupposes that the treatment group would have developed the same way over time as the control group if they had not received the intervention, and this is referred to as counterfactual. 3) Non-independence observation assumes that the model measures participants before and after the intervention to tackle the causes of the outcome that may persist over time.

The DID was preferred to paired t-test because the SRHL intervention of this study was delivered using a quasi-experimental design which was longitudinal. SRHL was assessed at baseline and end-line on the same participants. The DID will help eliminate the biases that could have arisen from paired t-tests (Albouy, 2004; Colombia School of Public Health [CSPH], 2022). Estimating common trends between the intervention and control groups would have helped overcome the biases from end-line data comparisons in the treatment group that may result from trends due to other outcome causes. However, given the limited period available, the researcher could not glean data at different points over a long period to achieve that. The regression model for the DID is as follows:

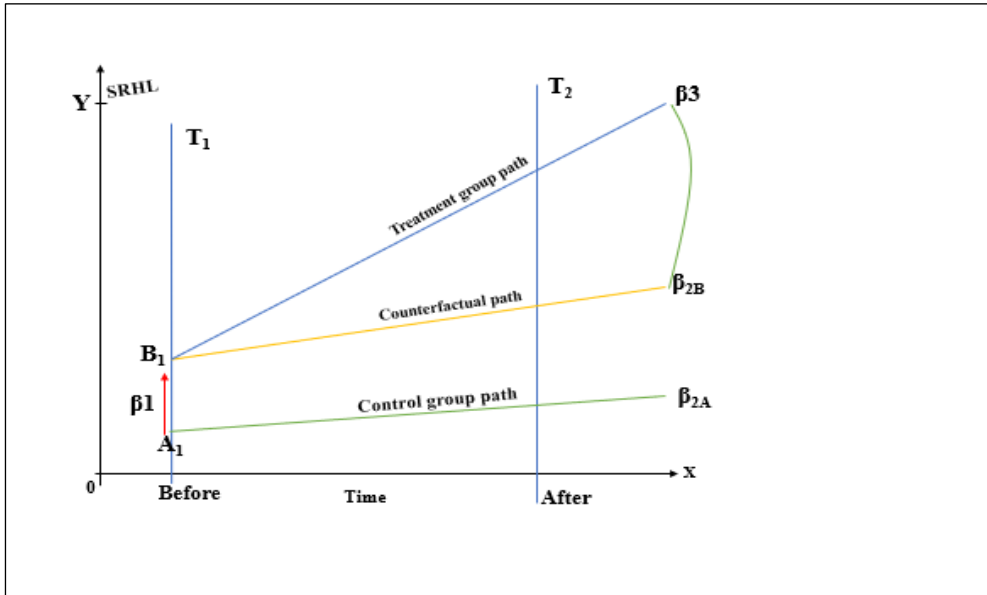
$Y_{i,t} = a + \beta_1 * T_i + \beta_2 * P_t + \beta_3 * T_i * P_t + \epsilon_{i,t}$ , where:

**T<sub>i</sub>** and **P<sub>t</sub>** are *dummy variables*, and **Y<sub>i,t</sub>** is the *outcome* (i.e., SRHL) of the in-school adolescent *i*. **T<sub>i</sub>** is a variable with two possible values: 1 if the in-school adolescent participated in the SRHL intervention and 0 if they did not participate.

**P<sub>t</sub>** is a variable with two possible values: 0, the period before the SRHL intervention, and 1, the period after the intervention.

**T<sub>i</sub>\*P<sub>t</sub>** is the outcome of the interaction between the time and the SRHL intervention. It takes on the value 1 only when the outcome of the in-school adolescent who participated in the SRHL intervention and the period after are considered. **ε<sub>i,t</sub>** is the error term of the regression.

The parameters **a**, **β<sub>1</sub>**, **β<sub>2</sub>**, and **β<sub>3</sub>** are for the regression under evaluation. Parameter **a** is the average outcome of the adolescent who did not participate in the SRHL intervention in the period before the intervention. Parameter **β<sub>1</sub>** is the initial difference between the intervention and control groups. **β<sub>2</sub>** is the difference in the outcomes of the participants who did not participate in the intervention between the two periods, and **β<sub>3</sub>** is the effect of the SRHL intervention. Figure 3.18.3 demonstrates the pathways for estimating the effect of the intervention.



*Adapted by researcher (Li et al., 2012)*

**Figure 3.16.3: Graphical Representation of the DID Estimation Pathways**

From the graph, the control group is denoted by **A**, and **B** represents the intervention group. **A<sub>1</sub>** represents the control group at baseline, and **B<sub>1</sub>** represents the intervention group at baseline. **Y** is the outcome variable (SRHL), and **X** denotes time. Line **T<sub>1</sub>** expresses the SRHL of adolescents before the intervention, and **T<sub>2</sub>**, the SRHL of adolescents after the intervention. The parameter **β<sub>1</sub>** is the differences in baseline between the control and intervention groups and is modeled as follows:

$$\begin{aligned} & \Sigma(Y|T=1, t=0) - \Sigma(Y|T=0, t=0) \\ & = \Sigma (a + \beta_1 * 0 + \beta_2 * 0 + \beta_3 * 0 * 1 + \epsilon_{i,t}) - \Sigma (a + \beta_1 * 0 + \beta_2 * 0 + \beta_3 * 0 * 1 + \epsilon_{i,t}). \end{aligned}$$

The parameter **β<sub>2</sub>**, which is represented on the graph as **β<sub>2A</sub>**, denotes change across time for the control group (i.e., the baseline of the control group minus the end-line of the intervention group) and is modeled as:

$$\begin{aligned} & \Sigma(Y_{i0}|T=0, t=0) - \Sigma(Y_{i,t}|T=0, t=1) - \\ & \Sigma (a + \beta_1 * 0 + \beta_2 * 0 + \beta_3 * 0 * 0 + \epsilon_{i,t}) - \Sigma (a + \beta_1 * 0 + \beta_2 * 1 + \beta_3 * 1 + \epsilon_{i,t}) \end{aligned}$$

The parameter  $\beta_3$  is the change across time for the intervention group and is denoted as  $(\beta_2 + \beta_3)$ , which is the gap between  $\beta_{2B}$  (the counterfactual) and the blue line (treatment group path) and is expressed as:

$$DD = \Sigma(Y|T=1,t=1) - \Sigma(Y|T=1,t=0) \\ = \Sigma(a + \beta_1 * 1 + \beta_2 * 1 + \beta_3 * 1 * 1 + \epsilon_{i,t}) - \Sigma(a + \beta_1 * 0 + \beta_2 * 0 + \beta_3 * 0 * 0 + \epsilon_{i,t}).$$

The counterfactual represents the changes in SRHL that could have occurred in the intervention group over time without the intervention. This is premised on the parallel trend assumption which is the counterfactual equal changes in the control group across time. It implies that without subtracting the counterfactual from changes in the intervention group across time, the effect of the SRHL intervention would include other factors in the Effutu Municipality that contributed to changes in adolescent SRHL during the intervention period other than the intervention itself. The actual effect of the SRH intervention would be realized when the counterfactual is decoupled from  $\beta_3$ . Consequently, the regression parameter  $\beta_3$  is the DID between the intervention and control groups across time expressed as:

$$DD = [\Sigma(Y|T=1,t=1) - \Sigma(Y|T=1,t=0)] - [\Sigma(Y|T=0,t=1) - \Sigma(Y|T=0,t=0)] \\ = (\beta_2 + \beta_3) - \beta_2 = \beta_3.$$

Separate regression models were determined for the three intervention arms (i.e., T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub>) for the functional and interactive SRHL. However, statistical hypotheses were developed for only  $\beta_3$  of each model since it is the parameter of interest. The hypotheses are as follows:

#### ***Functional SRHL***

**H<sub>01</sub>:** existing or difficult SRH texts have no significant effect on the functional SRHL of adolescents.

**H<sub>02</sub>:** simplified SRH text-only materials have no significant effect on the functional SRHL of adolescents.

**H<sub>03</sub>:** picture-enhanced SRH text materials have no significant effect on the functional SRHL of adolescents.

#### ***Interactive SRHL***

**H<sub>01</sub>:** existing or difficult SRH texts have no significant effect on the interactive SRHL of adolescents.

**H<sub>02</sub>:** simplified SRH text-only materials have no significant effect on the interactive SRHL of adolescents.

**H<sub>03</sub>:** picture-enhanced SRH text materials have no significant effect on the interactive SRHL of adolescents.

### 3.14.6 Multivariable Regression Estimates

The multivariable regression sought to estimate the additional effect of adolescents' characteristics on their functional and interactive SRHL. The covariates for the multivariable regression estimates were tested for multicollinearity and Variance Inflation Factor (VIF). The regression estimates for the additional effect of participants' characteristics on their SRHL were modeled as follows:

$FSRHL_{i,t} = a + \beta_1 * \text{Age} + \beta_2 * \text{school type} + \beta_3 * \text{Gender} + \beta_4 * \text{place of residence} + \beta_5 * \text{learning ability}$ .

$ISRHL_{i,t} = a + \beta_1 * \text{Age} + \beta_2 * \text{school type} + \beta_3 * \text{Gender} + \beta_4 * \text{place of residence} + \beta_5 * \text{learning ability}$ .

Where  $a$  = the constant and  $\beta_1, \beta_2, \beta_3, \beta_4,$  and  $\beta_5$  are the regression coefficient. The statistical hypotheses are as follows:

#### ***Functional SRHL***

**H<sub>01</sub>:** there is no significant relationship between the covariates age, school type, place of residence, gender, learning ability, and functional SRHL.

#### ***Interactive SRHL***

**H<sub>01</sub>:** there is no significant relationship between the covariates age, school type, place of residence, gender, learning ability, and interactive SRHL.

### 3.14.7 Paired Sample T-Test

Differences in the functional and interactive SRHL scores of participants of the control and the intervention arms end-line and eight weeks post-end-line were assessed using paired sample t-test. The mean differences were estimated based on the following formula:

$$t = \frac{\sum d}{\sqrt{\frac{(\sum d^2) - (\sum d)^2}{n - 1}}}$$

Where  $d$ : is the difference per paired value and  $n$  = is the number of samples. The hypotheses are as follows:

**H<sub>01</sub>:** the mean difference in functional SRHL is 0 from the end-line to eight weeks post-end-line.

**H<sub>02</sub>:** the mean difference in interactive SRHL is 0 from end-line to eight weeks post-end-line.

### 3.15 Chapter Summary

The chapter discussed the research philosophy and design. It also details the sample size sampling methods, data collection instrument, and how adolescents' SRHL needs were assessed. The SRH educational materials development and intervention are further discussed in the chapter. The process for developing pictures used to enhance the simplified SRH text is also provided. Finally, the chapter presented how data coding and analysis were performed for the SRHL needs assessment and the literacy intervention.



## CHAPTER FOUR

### 4.0 PRESENTATION OF FINDINGS

#### 4.1 Chapter Introduction

This chapter presents the findings of the research. Results are presented based on the study objectives. The SRHL needs assessment findings cover the SRH knowledge of young adolescents, the readability of existing SRH educational materials, adolescents' comprehension, and their SRH vocabulary knowledge. The readability indices of the simplified materials developed for the literacy intervention are provided in the chapter. Lastly, the results of the effectiveness of the educational materials in improving SRHL in young adolescents are also presented. Under this objective, the descriptive statistics on the functional and interactive health SRHL are presented. Results on participants' appraisal of the intervention, the effect of the educational materials in improving SRHL, and the changes in SRHL eight weeks post-intervention are also presented in this chapter.

#### 4.2 Assessment of SRHL Needs of Young Adolescents in the Effutu Municipality

The researcher assessed the scope of SRH knowledge of young adolescents. The readability of online and paper-based SRH educational materials likely within adolescents' reach and comprehensibility are reported. Adolescents' SRH vocabulary knowledge is also presented under this objective. The results are discussed in the following turns.

**Table 4.2: Background Information of Participants – FGD**

<b>Description</b>	<b>Freq (%)</b>	<b>Description</b>	<b>Freq (%)</b>
	<b>N = 52</b>		<b>N = 52</b>
<b>Age</b>		<b>Grade Level</b>	
12	9 (17%)	Grade 7	29 (56.%)
13	16 (30.7%)	Grade 8	23(44%)
14	14 (26.9%)		
15	13 (25%)	<b>Religion</b>	
Mean age	13.2	Christianity	39 (75%)
		Islam	23 (25%)
<b>Gender</b>			
Male	15 (28.8%)		
Female	37 (71.2%)		

*Constructed by the researcher, 2023.*

#### 4.2.1 The Scope of SRH Knowledge

Sixty in-school adolescents were projected for the FGDs that assessed the scope of SRH knowledge. However, 52 out of the 60 participants with parental consent participated in the discussions, giving a response rate of 87%. The mean age of participants was 13 years, and the maximum was 15 years. The majority of the participants were females and were grade seven pupils. Table 4.2.0 provides detailed demographic information of participants. Seven main themes emerged from the FGDs. They are 1) Perspectives on the concept of SRH. 2) SRH information sources. 3) Contraception. 4) Predominant sexual knowledge. 5) Sexually Transmitted Infections. 6) Preferred SRH topic domains. 7) SRH goals. However, SRH information sources had two sub-themes: Content available and literacy challenges. Predominant sexual knowledge also had two sub-themes, namely, sexual behavior and etiquette and sexual maturation. The themes and sub-themes are presented in Table 4.2.1 and are discussed with relevant illustrative quotes in the following turns.

#### 4.2.2 Perspectives on SRH Concept

The participants' perspectives on the concept of SRH were somewhat unrelated to the concept. Some participants conceptualized SRH as personal hygiene and socially approved mannerisms. Participants expressed their perspectives in the following statement:

*“SRH is how we keep our vagina.”* (A female from school one).

*“Sir, it is about keeping your reproductive organs clean, for example, bathing twice daily and brushing your teeth.”* (A male participant from school three).

*“Madam, it is how we keep ourselves clean as adults.”* (A female school two).

Others also conceptualized SRH as socially approved mannerism and pubertal changes. Their views are captured in the following statement:

*“Madam, we need to protect ourselves by wearing decent dresses so that if older people see us, we won't have a problem with them, so they will know that we are good girls...with this, no man will also have affection for us.”* (A female from school three).

**Table 4.2.1: Themes and Sub-Theme from the FGD**

<b>Main Themes</b>	<b>Sub-themes</b>	<b>Main Findings</b>
Perspectives on the concept of SRH		No knowledge of the SRH concept
Sources of SRH information		Over-reliance on informal sources of information. Little access to paper-based and online sources of information.
	Contents available	Personal hygiene, abstinence, and good manners.
	Literacy challenges	Difficult-to-and-understand paper-based and online SRH information, and ASRH prejudice and stigma.
Contraception		Knowledge of short-term contraceptives and unsafe abortion methods.
Predominant Sexual Knowledge	Sexual behaviors and etiquette	Adequate knowledge about the etiquette of personal friendship, signs of pregnancy, the need to test for pregnancy, and the choices to make. Very little knowledge about risky sexual behaviors.
	Sexual maturation	Well knowledgeable in the signs but had limited knowledge of the menstrual cycle
STIs and treatment		Adequately aware of HIV/AIDS, Gonorrhoea and vaginal yeast, but limited knowledge about their symptoms and transmission.
Preferred SRH topics		Preferred topics included abortion, abstinence, contraception, decent dressing, the menstrual cycle, personal friendship, and reproduction.
SRH goals		Abstinence was a universal SRH Goal

*Constructed by the researcher, 2023.*

*“It is when an individual begins to develop during his teenage.”*

*“Sir, it is about changes that occur.... the boy or girl will start to develop. The girl will start developing breasts, and the boy will grow 'big' eh!..., you know.”* (A male from school three)

#### **4.2.3 SRH Information Sources**

Adolescent participants consulted diverse but mostly informal sources for SRH information. Key sources included relatives, teachers, and books. According to the participants, the only book source was the science textbook. Very few had internet access and had ever tried searching for information from Google. Examples of sources mentioned included the following:

*“Madam, we get information from our parents, teachers, and guidance and counseling people. Madam, we also get information from wise adolescents and older people.”* (A female from school two).

*“Sir, we are taught in school. Yes, Sir, our teachers sometimes teach them in our school lessons.”* (A male from school three).

#### **4.2.4 Accessible Contents**

SRH information within participants' reach focused on abstinence, pubertal changes, and personal hygiene. However, the content for males was quite distinct from those given to female adolescents. While the males mentioned issues related to sexual maturation, the content from females seemed to center around abstinence and decent dressing. Participants highlighted the contents below.

*“Sir, they said some physical, emotional, and psychological changes happen when adolescents develop. The information is in our textbook.”* (A male from school 3).

*“They teach us how to protect ourselves from sexual intercourse.”* (A female from school one).

*“Madam, they teach us to keep ourselves and avoid visiting men in their rooms. They also teach us how to dress correctly.”* (Another female from school 1).

#### **4.2.5 Literacy Challenges**

There were mixed reactions to linguistic challenges, whereas some participants said they could read and understand information from textbooks, others suggested challenges and said some words were difficult to read and understand. Some participants shared their experiences and offered

suggestions for improving information access and removing literacy barriers in the following statements:

*“Yes, madam, we do not understand them.”* (Massive response from the female discussion group in school one).

*“Madam, as for me, if I do not understand, I check it in the dictionary when I get to the house to find the meaning.”* (A female from school three).

*“Madam, I use my parents' phone to search for the meaning of difficult words on Google. “Yes, me too.”* (A female from school three)

*“Madam, the English language used is too high.”* (A female from school).

Digital literacy and resources were also significant barriers to information access. Most adolescents expressed interest in SRH information, but skills and resource challenges hindered their curiosity. Some adolescents expressed their bother and said:

*“No (unanimous response). Sir, most of us do not have smartphones. It's like, I do not know how to use the internet to look for information.... yes, if I get a smartphone, I will learn how to look for such information.”* (A male from school one).

*“I do not have a smartphone. Madam, me too..... I have not searched for information on the internet before.”* (A female from school two).

Aside from literacy challenges, ASRH prejudice and stigma were noteworthy barriers, such that young adolescents have challenges opening up to adults on matters of sexual health and reproduction. It was also observed from the audio recordings that it was more difficult for females to share views on sexual relationships than males. Participants, particularly females, expressed their frustration and said:

*“Sometimes we have problems in our personal lives and want explanations and guidance on what to do, but we cannot ask our teachers, parents, or older family members.”* (A female from school three).

*“Madam, whenever we try a conversation on issues regarding sex, they get annoyed. They shout at us, saying we are 'bad' and 'spoilt' children.”* (Another female from school three).

#### 4.2.6 Contraception

Oral contraceptives, particularly emergency contraceptives, male condoms, and the withdrawal method were well-known among the participants. One other widespread knowledge among female participants was methods of unsafe abortion. The participants provided the following examples:

*“Yes, madam – No, madam.”* (Mixed responses of female participants from school two).

*“Madam, some people wear a condom, and others use P-2 (postinor-2).”* (A female in school from one).

*“Madam, others use Lydia (an oral contraceptive brand name).”* (Another female in school from one).

*“Sir, if the feeling for sex becomes unbearable, sex happens even if there is no condom.....but I remove my penis when the ‘juice’ is about coming out.”* That is to say, ejaculate. (A male from school two).

*“Madam, you can also do an abortion.....like taking a pack of paracetamol. Others use sugar and paracetamol with alcohol to do abortions.”* (A female from school two).

*“Madam, you can also use Nescafe.”* (Another female from school two).

*“Sir, some people take medicines to abort the baby after getting pregnant. I heard some people grind glass into water and drink it..... some die, and others don't.”* (A Male from school one).

Adolescent participants were aware of where they could source oral contraceptives and condoms. Prominent among the sources were pharmacies, chemical shops, and hospitals. Others also mentioned herbal medicine providers. The participants expressed this in the following statements.

*“Sir, you will get some at the hospital. Yes, it is good to get it from the hospital.....I know someone who wanted to have one there, so I assume it is good.”* (A male from school 1).

*“Madam, Herbal Shops ... eh, sometimes in the cars when traveling. some people boil concoctions and drink them at home as contraceptives.”* (A female from school two).

*Yes, some are herbs brought from the farm. The herbal medicine people also have it.”* (Another female from school two).

The adolescents were unaware that Family Health Units in public hospitals and health centers provide contraceptive services. Those who believed they could get contraceptive services from hospitals expressed it in the following statement.

*“Madam, you must go to the OPD to get the pregnancy-stopping medicines when you get to the hospital.”* (A female from school two).

*“No, madam, the abortion room is where you can get one. No, not that place. It is the theatre.”* (Another female from school two).

#### **4.2.7 Predominant Sexual Knowledge**

Participants demonstrated sound knowledge of signs of sexual maturation, except menstruation. Other areas of proper knowledge were etiquettes in personal friendship and the dangers of early sexual activities. These findings are discussed under the sub-themes of sexual behavior, etiquette, and sexual maturation.

#### **4.2.8 Sexual Behavior and Etiquette**

Adolescent participants seemed abreast with the do's and don'ts in personal friendship. The following are their views.

*“Madam, we have friends, and at other times we learn and play together..... but sexual intercourse in this kind of friendship is not good.”* (A female from school two).

*“Madam, the opposite sex should not share a very close friendship. Yes, madam, fondling the breast and kissing are not 'good'.... Yes, no pressing of buttocks.”* (A female from school one)

Participants were largely unaware of the classifications of sexual activities and their associated risks. Vaginal intercourse was a known activity, and pregnancy was considered the only risk in sexual intercourse. Yet, some males admitted to having sexual partners. Participants expressed themselves in the following statement.

*“No, Sir, we do not have girlfriends – Yes, Sir, we have some.”* (Mixed responses from males in school two).

*“Sir, getting pregnant and being a schoolgirl may cause you to drop out.”*  
*“Yes, Sir, it can also destroy one's future.”* (Two males from school three).

Few participants knew that condomizing during sexual intercourse was a safe sex practice. To most participants, safe sex is when sexual intercourse happens between regular sexual partners and in situations where the female is not intoxicated with alcohol. Some females shared the following views:

*“Madam, safe sex is when the lady avoids drunkenness so that if she gets pregnant, she can figure out the father of her child.”* (Another female from school two).

*“Yes! Yes! Madam, unsafe sex is having sex while drunk making you unable to figure out the partner.”* (Another female from school two).

#### **4.2.9 Sexual Maturation**

The signs of sexual maturation were the predominant knowledge among the participants. However, knowledge of the menstrual cycle and safe and unsafe periods was lacking. Participants expressed their knowledge and the lack of it in the following ways:

*“Madam, with the menstrual cycle, sometimes the blood flows for five, seven, and six days.”* (A female from school three).

*“Yes, madam, the 28 days is the safe period, and the five to seven days is the unsafe period.”* (Another female from school three).

*“Madam, From one to 28 days, you will not get pregnant when you engage in sexual intercourse, and from five to 7 days, you can get pregnant if you engage in sexual intercourse.”* (A female from school two).

*“Madam, the boys experience weird dreams,.....eshm 'like doing the thing' when they sleep.”* (A female from school two).

*“Sir, growing hair in the pubic areas is a sign that you have reached puberty. Boys will begin to produce sperm and start having wet dreams.”* (A male from school three).

*“Sir, boys gain weight, height, and broad shoulders..... others also have pimples on their faces.”* (Another male from school three).

#### **4.2.10 Sexually Transmitted Infections (STIs) and Treatment**

Adolescents showed fair knowledge of STIs by citing relevant examples such as HIV, gonorrhea, and syphilis and how they can be diagnosed. Others, however, had very little knowledge about them. Among those who knew STIs, symptoms of HIV were better known than the other STIs they

mentioned. Just like the responses on contraception, a mix of sources of treatment for STIs were named by the participants. While some adolescents mentioned formal sources, others named informal sources. Participants mentioned the following examples.

*“Madam, an example of STI is moniliasis. Another one is Bilharzia.... ehm, yes, and bacteria too.”* (A female from school one)

*“Madam, STI, it’s when one engages in sexual intercourse and gets illnesses like HIV, gonorrhoea, or syphilis.”* (Another female from school two).

*“Before being sure you have an STI, you must take a test. For example, with HIV/AIDs, you will realize you have grown lean and weak, so you will need to see a medical doctor.”* (A female from school three).

#### **4.2.11 Preferred SRH Topics**

Participants expressed interest in learning more about SRH and suggested topics such as abortion, abstinence, contraception, decent dressing, the menstrual cycle, personal friendship, and reproduction. But SRH information was hard to reach or other times, non-existent. Participants expressed their interest and frustration in the following ways:

*“Madam, we need the book in easy-to-read writing or picture versions. Such a book will be attractive and give us a better understanding of the message.”* (A female from school three).

*“Because of the older people’s attitude towards us on such matters, we would be happy to have easy-to-read booklets that we could use privately to educate ourselves.”* (a female from school two).

#### **4.2.12 SRH Goals**

Although some participants indicated they have sexual partners, almost all mentioned abstinence as their SRH goal. The chief reasons for abstinence were age, inability to cater to a family, and educational aspiration. Here are some expressions from participants.

*“I will not have sex.....I will go to bed doing nothing. I will take a book and learn when the feeling to have sex continues.... because I want to be a pilot.”* (A male from school three).

*“Sir, abstinence.....because we are too young to care for ourselves and a mother.”* (A male from school two).

*“Madam, abstinence from sex.”* (Overwhelming response from females in all three schools).

*“Madam, I want to focus on my books and get the good things education can bring me. I want to learn and grow into a noble and responsible lady.”* (A female from school two).

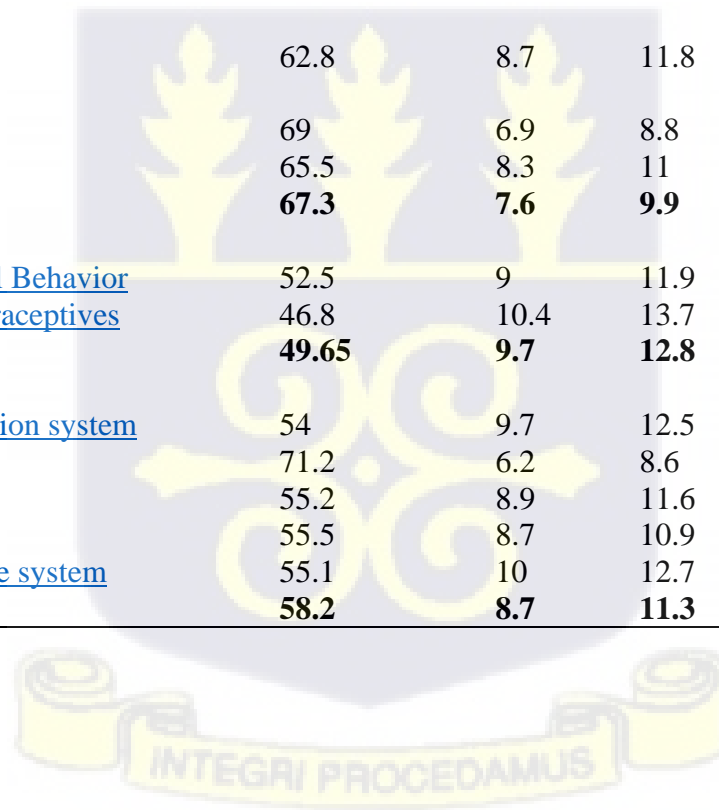
#### **4.3 Readability Scores of Online and Paper-Based SRH Education Materials.**

Table 4.3 presents the readability indices of the existing SRH educational materials. Readability indices were computed based on five different readability formulas: the Flesch reading ease, the FKRGL, the GFI, the SMOG, and the CI. Thirty-four SRH educational materials retrieved from the internet and one paper-based source were assessed for readability. The Flesch reading ease scores range from 40% to 72% across all the material sources, indicating that most educational materials may be difficult to read by young adolescents. Scores below 40% are very difficult to read, and those between 40%-59% are difficult to fairly difficult to read. Scores between 60%-70% are standard and 80% - 90% are very easy to read. Sources that had very difficult to fairly difficult to read and understand texts were: Young Men's Health (54.6); HealthLink BC (49.65); Teen's Health (58.2), Mayo Clinic (37.5), and the Office on Women's Health (49.5). Sites with texts that had standard reading ease scores included Planned Parenthood (69.1), PPAG (60.3), and CDC (67.3).

Consistent with the Flesch reading ease scores, the GFI indicates that a significant proportion of the education materials were between hard (Fog score of 9) to very difficult (Fog score of 14+) to read. The average scores of FKRGL also show that most of the materials can be understood by average pupils in grades 8-9 or those in second-cycle institutions (FKRGL=14.9), as most materials recorded RGLs between 8 and 16. Like the FKRGL, the SMOG and the CI indicate the school grade level an individual must attain to read the materials. Most of the educational materials from the Young Men's Health site had SMOG and CI scores of ten or above RGL, which suggest that average students in grade ten or more can read and understand the text. The CI output had a higher RGL (above ten) across materials from the various sites. Table 4.3.0 presents the results.

**Table 4.3: Readability Statistics of Online and Paper-Based SRH Education Material for Adolescents and Young People**

Site name	Topic domain	Flesch Reading Ease	Flesch Kincaid	Gunning Fog Formula	SMOG Index	Coleman-Liau Index
Young Men's Health	<a href="#">Contraceptives</a>	44.2	12.9	16.7	12.1	10
	<a href="#">Gonorrhoea</a>	62.2	7.3	11.5	8.3	9
	<a href="#">HIV/AIDS</a>	64.9	7.5	9.6	7.2	10
	<a href="#">Puberty in girls</a>	69.7	7.7	11.3	8.3	8
	<a href="#">Syphilis</a>	57.9	8.6	11.6	8.9	9
	<a href="#">Trichomoniasis</a>	40.9	11.7	13.7	10.4	11
	<a href="#">Emergency contraceptive</a>	47.8	15.4	11.6	11.4	10
	<a href="#">Withdrawal methods</a>	49.8	11.6	14.5	10.7	10
	<b>Average Score</b>	<b>54.6</b>	<b>10.3</b>	<b>12.5</b>	<b>9.6</b>	<b>9.6</b>
AVERT	<a href="#">Syphilis</a>	62.8	8.7	11.8	8.8	9
CDC	<a href="#">HIV/AIDS</a>	69	6.9	8.8	6.9	10
	<a href="#">HIV/AIDS</a>	65.5	8.3	11	8	8
	<b>Average score</b>	<b>67.3</b>	<b>7.6</b>	<b>9.9</b>	<b>7.4</b>	<b>9</b>
HealthLink BC	<a href="#">High-Risk Sexual Behavior</a>	52.5	9	11.9	8.7	12
	<a href="#">Emergency Contraceptives</a>	46.8	10.4	13.7	10.3	11
	<b>Average score</b>	<b>49.65</b>	<b>9.7</b>	<b>12.8</b>	<b>9.5</b>	<b>11.5</b>
Teens Health	<a href="#">Female reproduction system</a>	54	9.7	12.5	9.2	11
	<a href="#">Rape</a>	71.2	6.2	8.6	6.7	7
	<a href="#">Syphilis</a>	55.2	8.9	11.6	9.2	11
	<a href="#">Chlamydia</a>	55.5	8.7	10.9	8.8	11
	<a href="#">Male reproductive system</a>	55.1	10	12.7	9.4	11
	<b>Average Score</b>	<b>58.2</b>	<b>8.7</b>	<b>11.3</b>	<b>8.66</b>	<b>10.2</b>



**Continuation of Table 4.3**

Safe Teens.org	<a href="#">Contraceptives</a>	67.2	7	8.8	6.6	11
Mayo Clinic	<a href="#">Intrauterine device</a>	43	13.8	17	12.3	10
	<a href="#">Vaginal yeast infection</a>	31.9	16	21.1	15.7	13
	<b>Average score</b>	<b>37.5</b>	<b>14.9</b>	<b>19</b>	<b>14</b>	<b>11.5</b>
MedlinePlus	<a href="#">Symptoms of yeast infection</a>	56	8.6	10.9	8.2	10
Planned Parenthood	<a href="#">Birth Control</a>	72.5	6.9	9.5	6.9	8
	<a href="#">Parent/adolescent comm</a>	71.1	7.8	9.6	6.6	7
	<a href="#">What do you know about STDs</a>	72	6.8	9.3	6.7	7
	<a href="#">Best kind of birth control</a>	65.7	8.9	11.6	8.1	8
	<a href="#">Sexual activities</a>	67.8	7.3	9.1	7	8
	<b>Average score</b>	<b>69.1</b>	<b>7.7</b>	<b>9.9</b>	<b>7.1</b>	<b>7.5</b>
Office On Women's Health	<a href="#">Female external genital organ</a>	39.5	12.1	16.7	12.3	12
	<a href="#">Your Menstrual cycle</a>	59.5	8.9	11.5	8.9	9
	<b>Average score</b>	<b>49.5</b>	<b>10.5</b>	<b>14.1</b>	<b>10.6</b>	<b>10.5</b>
Marie Stopes Gh.	<a href="#">Contraceptives</a>	57.2	9.3	12.5	9.1	10
JHS Science Textbook	Reproduction	54.3	9.9	12.9	9.6	10
Ghana Education Service	<a href="#">Amazing girls guide to menstruation</a>	58.5	10.4	13.5	9.7	9
PPAG	<a href="#">Contraceptives</a>	54.9	9.5	11.9	9.2	11
	<a href="#">Female condom</a>	65.6	7.4	9.8	7.4	9
	<b>Average Score</b>	<b>60.3</b>	<b>8.45</b>	<b>10.9</b>	<b>8.3</b>	<b>10</b>

Constructed by the researcher, 2023

### 4.3.1 SRH Text Comprehension Based on the Cloze Test

The cloze test assessed the understandability of the existing SRH texts among a cross-section of target participants. From Table 4.3.1, 263 out of the 270 in-school adolescents who submitted parental consent participated in the cloze test, giving a response rate of 97%. The mean age of participants was 14.1, and the maximum age was 15. More (54%) females participated in the test than males (46%). Most (60%) of the participants were grade 7 pupils and were Christians (94%). All participants were from public schools. Table 4.3.1.1 presents the results of the participants' comprehension of available online and paper-based educational materials.

**Table 4.3.1 Background Information of Participants – Cloze Test**

Description	Freq (%) n=263	Description	Freq (%) n=263
<b>Age</b>		<b>Grade Level</b>	
11	2 (8%)	Grade 7	158 (60%)
12	10 (3.8%)	Grade 8	105 (40%)
13	57 (21.6%)	<b>Religion</b>	
14	100 (38%)	Christianity	247 (94%)
15	94 (35.7%)	Islam	14 (5%)
<b>Mean age</b>	14.1	Others	2 (0.76%)
<b>Gender</b>			
Male	121 (46%)		
Female	142 (54%)		

*Constructed by the researcher, 2023.*



**Table 4.3.2: Levels of Comprehensibility of Existing SRH Materials Based on the Cloze Test**

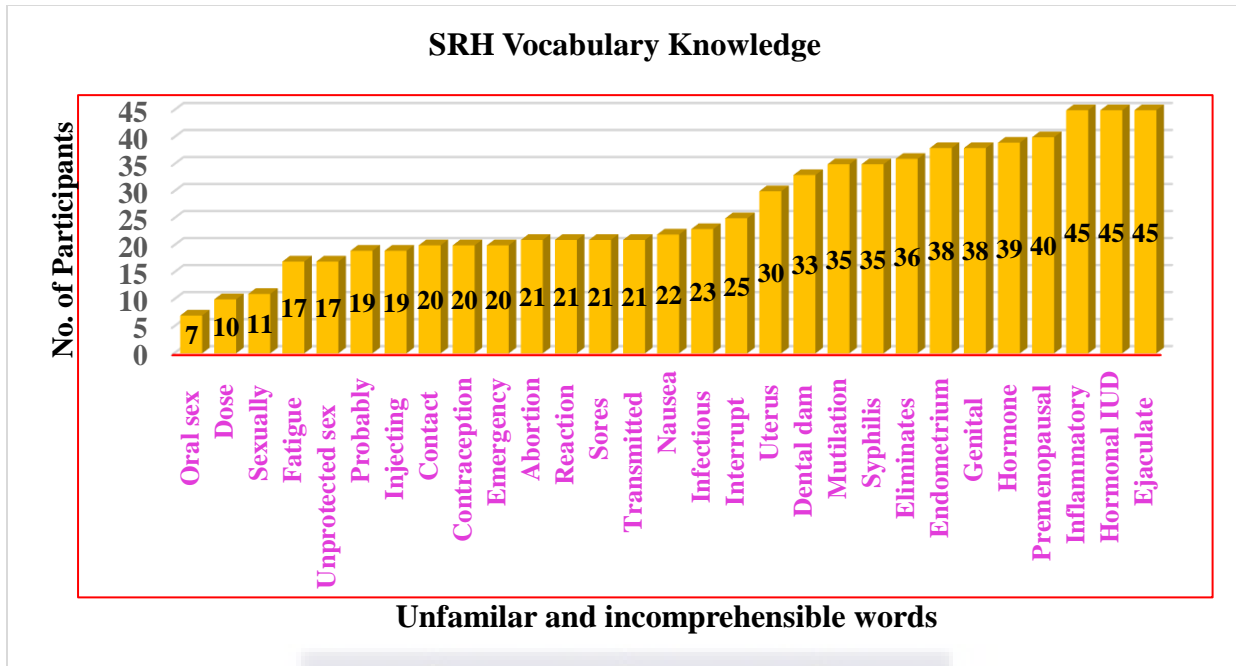
No. of participants	Percentage	Correct Answer (%)	Level of Comprehension
78	29%	$\geq 60 - \leq 100$	Independent level – readers can cope with the language of the materials.
131	50%	$\geq 40 - < 60$	Instructional level – readers unable to cope with the language of the materials (needing the support of an educator )
54	21%	$> 0 - < 40$	Frustration level – the language of the material is too difficult for readers to cope with or understand.
Mean marks in (%)		50.48±13	

*Constructed by the researcher, 2023.*

The mean cloze score (50.48%) shows that most of the target population for the intervention would be unable to make acceptable meaning out of the SRH materials available online and the JHS science textbook without instructional assistance. Only 29% of the participants demonstrated the ability (60% – 100% score) to cope with the content of the educational materials.

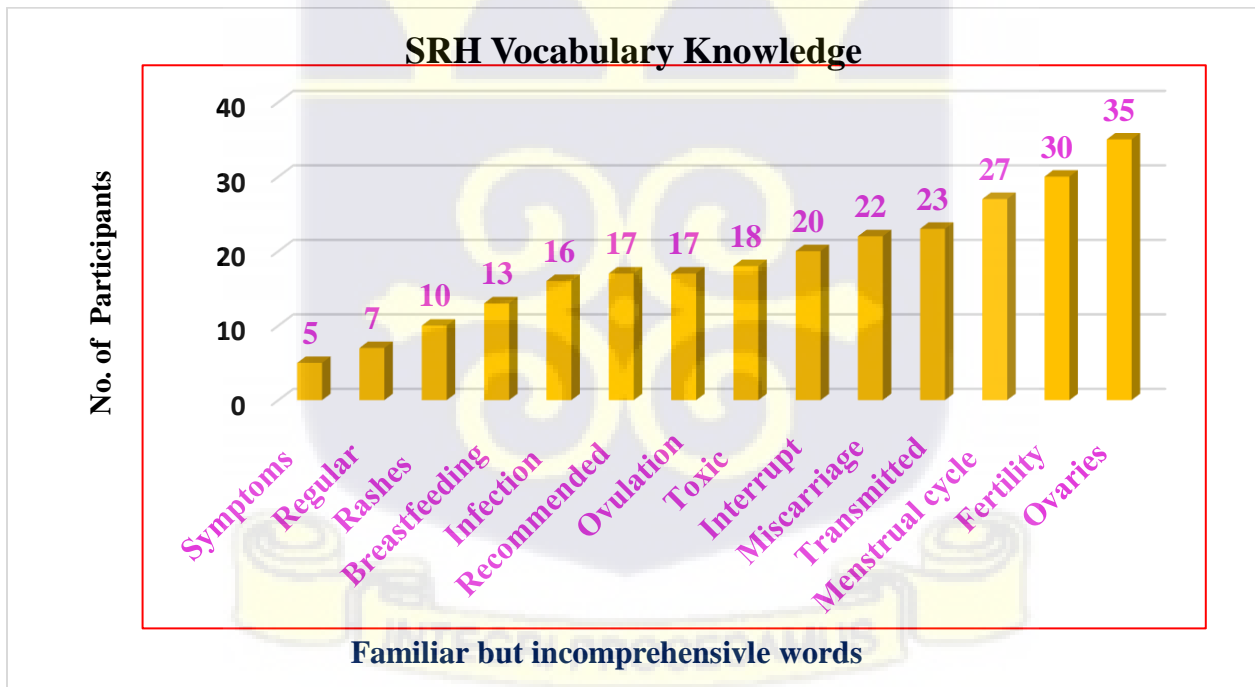
#### **4.3.2 Adolescents' SRH Vocabulary Knowledge**

Sixty out of the 263 participants in the cloze test participated in the vocabulary knowledge assessment. Participants consisted of 30 females and 30 males, all in grades 7 and 8. The vocabulary knowledge assessment ascertained the lexicon of SRH words that the participants were familiar with and had at least surface understanding. Figures 4.3.2. and 4.3.2.1 present 43 unfamiliar and incomprehensible/difficult words and familiar but incomprehensible/difficult words in the SRH passages assessed by the adolescents. Words that were unfamiliar and difficult were 29 in number, and words familiar but difficult were 14. Given the challenge participants expressed with pronunciation and understanding of some medical terms they labeled “difficult and unfamiliar,” further discussions were held with the participants to suggest local jargon to elaborate them. All sixteen local and familiar jargon were suggested to replace difficult and unfamiliar medical terms. (see Appendix A9 for details on the suggested local jargon).



Constructed by the researcher, 203.

**Figure 4.3.2: Bar Chart of Young Adolescents' SRH Vocabulary Knowledge I**



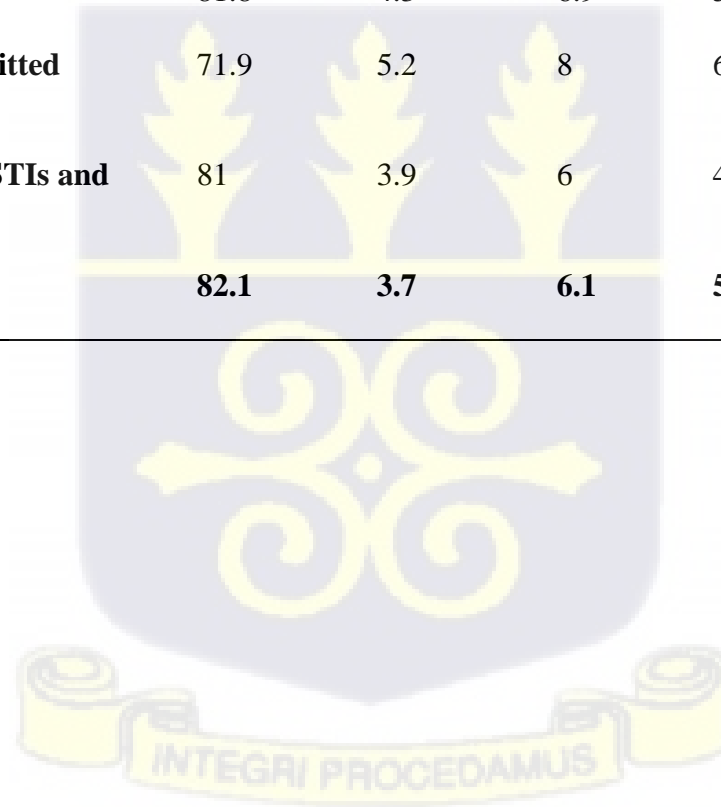
Constructed by the researcher, 203.

**Figure 4.3.2.1: Bar Chart of Young Adolescents' SRH Vocabulary Knowledge II**

**Table 4.4: Readability Statistics of the Simplified SRH Educational Material**

<b>Site name</b>	<b>Topic domain</b>	<b>Flesch Reading Ease</b>	<b>Flesch Kincaid</b>	<b>Gunning Fog Formula</b>	<b>SMOG Index</b>	<b>Coleman-Liau Index</b>
<b>Lesson one</b>	<b>Pubertal changes</b>	89.6	2.6	5.4	4.6	6
<b>Lesson two</b>	<b>Sexual activities</b>	76.4	4.6	6.2	5.7	6
<b>Lesson three</b>	<b>Friendship</b>	91.7	2.1	4.5	3.8	7
<b>Lesson four</b>	<b>Abstinence</b>	81.8	4.3	6.9	5.7	6
<b>Lesson five</b>	<b>Sexually transmitted infections</b>	71.9	5.2	8	6.3	9
<b>Lesson six</b>	<b>Ways to Avoid STIs and Pregnancy</b>	81	3.9	6	4.8	6
	<b>Average Score</b>	<b>82.1</b>	<b>3.7</b>	<b>6.1</b>	<b>5.2</b>	<b>6.6</b>

*Constructed by the researcher, 203.*



From Figure 4.3.2, 13 words were unfamiliar and incomprehensible among 30 – 45 participants. The most unfamiliar and incomprehensible words were ejaculate, hormonal IUD, inflammatory, premenopausal, and endometrium. The least unfamiliar and incomprehensible words were oral sex, sexual, and dose. The most familiar but least comprehensible words were ovaries, fertility, menstrual cycle, transmitted, and miscarriage.

#### **4.4 Readability of the Restructured SRH Educational Materials**

Three SRH educational materials were developed to improve SRHL. They are 1) the synthesized text which is labeled difficult text material. 2) The simplified text-only material. 3) The picture-enhanced text material. Table 4.4 presents the readability statistics of the simplified SRH text for the literacy intervention. From the table, the average Flesch reading ease (82) shows that the simplified text developed by the researcher is easy to read, ranging from very easy to read (91.7) to fairly easy to read (71.9). The average Fog index (6.1) suggests the text is easy to read. The FKRGL and the SMOG indices suggest that the simplified text can be understood by average pupils in grades two (2.1) to six (6.3).

#### **4.5 Effectiveness of the Restructured SRH Educational Materials in Improving ASRHL in the Effutu Municipality**

The effectiveness of the simplified SRH educational materials in improving SRHL is explained from four main dimensions. First, the researcher assessed participants' perceptions of the intervention and the SRHL education materials. Second, measurement of the materials' effect on the participants' SRHL using the DID approach. Third, the additional effect of the participants' characteristics in improving SRHL. Fourth, the researcher measured the differences in SRHL of adolescents' end-line and eight weeks post-end-line to determine the onset of decay in SRH knowledge acquired during the intervention. The results are presented as follows.



#### **4.5.1 Participants' Demographic Information and Response Rate**

Three hundred thirty-two (332) participants provided parental consent to participate in the intervention. Of this number, 329 (99%) enrolled for the baseline SRHL test. However, one private and two public schools pulled out of the intervention at different stages. Reasons accounting for the pullout were disapproval of the inclusion of two topics, namely, sexual activities and contraception. Five parents were on record to have communicated their disapproval of the topics and consequently withdrew their wards from the intervention. A cross-section of teachers who found the lessons inconsistent with their personal and religious beliefs also resisted the intervention. The teachers mounted pressure on the heads of the schools to boycott the intervention. Finally, they succeeded in pulling out of the intervention, even though most heads of schools expressed interest in the intervention at the beginning.

In some schools, the complaint was that the picture-enhanced text material caused fascination among the participants, such that they were only interested in looking at the pictures instead of learning. As a result, 63 participants from the three schools withdrew from the intervention, and 24 could not participate in the end-line test. In all, 245 participants completed the SRHL intervention and took the end-line tests, giving a completion or response rate of 74% based on the number of participants in the baseline test, but 73.7% of the number that provided parental consent. Nonetheless, six (6) tests were rejected from the interactive SRHL due to inadequate responses, which brought the number of participants for the interactive SRHL test to 239. Two hundred and four (204) out of 245 participants could participate in the repeated tests eight weeks post-end-line.

Table 4.5.1 presents the demographic information of participants who completed the intervention. Most of the 245 participants who completed the intervention were between 14 (35.3%) and 15 (36.9%) years. More (60%) of them were in grade seven, were females (64.3%), and were from public schools (81.9%). Fifty-three percent (55%) of the participants were classified as having lower learning abilities (those who had aggregates 6-9 in the general literacy and numeracy screening test), and 47% were categorized as having higher learning abilities (aggregates 1&2)

**Table 4.5.1: Enrollment Details and Background Information of Participants**

Description	Freq (%) n=245	Description	Freq (%) n=245
<b><i>Participants at Baseline</i></b>		<b><i>Participants at Endline</i></b>	
Cont. group	76 (22.9%)	Cont. group	69 (28%)
T <sub>1</sub>	66 (19.9%)	T <sub>1</sub>	22 (9%)
T <sub>2</sub>	87 (26.2%)	T <sub>2</sub>	78 (32%)
T <sub>3</sub>	103 (31%)	T <sub>3</sub>	76 (31%)
<b><i>Age</i></b>		<b><i>Grade Level</i></b>	
11	1 (0.4%)	Grade 7	127 (52%)
12	15 (5.6%)	Grade 8	118 (48%)
13	52 (21%)	<b><i>School type</i></b>	
14	87 (36%)	Private	44 (18. %)
15	90 (37%)	Public	201 (82%)
<b>Mean age</b>	14.0	<b><i>General Literacy and numeracy scores</i></b>	
<b><i>Gender</i></b>		70 – 100 (aggregate 1&2)	114 (47%)
Male	87 (36%)	10 – 50 (aggregate 6 – 9)	131 (53%)
Female	158 (64%)		

*Constructed by the researcher, 2023.*

#### 4.5.2 Participants' Perception of the SRHL Intervention and Education Materials Used

Table 4.5.2 presents the participant's perception of the intervention and the three SRH educational materials. One hundred and sixty-two (162) participants responded to the questionnaire. Thirteen percent (13%) were in T<sub>1</sub>, 52% were participants in T<sub>2</sub>, and 35% were from T<sub>3</sub>. Most of the participants from T<sub>1</sub> used the difficult text material and agreed that the material was easy to read (52.4%) and easy to understand (42.9%). The modal response of those using the simplified text-only material strongly agreed, indicating that 77.4% of the participants found the educational material easy to read. The modal response regarding the understandability of the materials was 65.5%. The picture-enhanced material had the highest (89.5%) number of participants strongly agreeing that it is easy to read. Sixty-one percent (61.4%) also strongly agreed that it was easy to understand. Regarding the relevance of the intervention, most participants in T<sub>1</sub> (57.1%), T<sub>2</sub> (82.1%), and T<sub>3</sub> (78.9%) strongly agreed that the intervention was helpful to their daily lives. The majority of T<sub>1</sub> (42.9%), T<sub>2</sub> (92.9%), and T<sub>3</sub> (87.9%) indicated that they very much liked the intervention. A more significant proportion of the participants also strongly agreed T<sub>1</sub> (57.1%), T<sub>2</sub> (79.8%), and T<sub>3</sub> (87.7%) that content should be taught to all JHS pupils.

**Table 4.5.2: Participants' Perception of the SRHL Intervention**

Items	T <sub>1</sub> n=21	T <sub>2</sub> n=84	T <sub>3</sub> n=57
Able to read SRH material after			
Yes	21(13)	76 (47%)	48 (29%)
No	0	8 (5%)	9(6%)
Learn SRH material alone after school	2 (1%)	6(4%)	5(3%)
Learned SRH material with friends after school	5(3%)	47(29%)	43(27%)
Learned SRH material with parents after school	8(5%)	22(14%)	7(4%)
No response	6(3%)	9(6%)	2(1%)
Took part in reading and question sessions			
Yes	21(13%)	84(52%)	57(35%)
No.	0	0	0

**Modal Values and responses in (%)**

SRH material was easy to read	2[11(52.4%)	1[65(77.4%)	1[51(89.5%)
The material was easy to understand	2[9(42.9%)	1[55(65.5%)	1[51(61.4%)
Lessons followed time allowed	2[10(47.6%)	1[58(58.6%)	1[51(61.4%)
Was able to speak openly during the lessons	2[9(42.9%)	1[62(73.8%)	1[45(80.1%)
Had time to share my thoughts on the lessons	2[12(57.1%)	1[58(69%)	1[40(70.2%)
The facilitator answered all my questions	1[10(47.6%)	1[72(85.9%)	1[49(86%)
Could share my views easily with my mates	2[7(33.3%)	1[38(45.2%)	1[36(63.2%)
Did not feel shy during the lessons	1[15(71.4%)	1[59(70.2%)	1[44(77.2%)
Lessons were helpful to my daily life	1[12(57.1%)	1[69(82.1%)	1[45(78.9%)
Other JHS pupils should be taught the lessons	1[12(57.1%)	1[67(79.8%)	1[50(87.7%)
Overall, how do you like the lessons	1[9(42.9%)	1[78(92.9%)	1[50(87.7%)

*Constructed by the researcher, 2023. Appraisal of the intervention was measured from Strongly agree to disagree Strongly. Where: 1=strongly agree, 2 = agree, 3 = Not sure, 4 = Disagree, and 5 = Strongly disagree. The overall likeness of the lesson was measured very much to Not at all. Where: 1 = Very much, 2 = Much, 3 = Not sure, 4 = Not much, and 5 = Not at all.*

**4.5.3 Descriptive Statistics of Participants' SRHL at Baseline – Eight Weeks Post-end-line**

Table 4.5.3 presents the descriptive statistics of the functional and interactive SRHL. Thirty-five percent (35%) of the participants in T<sub>0</sub> recorded marginal, and 0% had adequate functional SRHL at the end-line compared to (13%) marginal and (0%) adequate literacy at baseline. Eighteen percent (18%) and 0% of participants in T<sub>1</sub> had marginal and adequate functional literacy separately, as opposed to 0% marginal and 0% adequate literacy at baseline. However, more participants (45%) had marginal literacy, and 24% had adequate literacy at the end-line in T<sub>3</sub>, compared to 17% marginal and 0% adequate literacy, respectively.

**Table: 4.5.3: Descriptive Statistics of Functional and Interactive SRHL of Participants**

<b>Functional SRHL</b>							
<b>Marks (%)</b>	<b>Description</b>	<b>Baseline</b>	<b>Endline</b>	<b>8 weeks post-end-line</b>	<b>Baseline</b>	<b>Endline</b>	<b>8 weeks post - end-line</b>
		<b>T<sub>0</sub></b>				<b>T<sub>1</sub></b>	
75 – 100	Adequate literacy	0	0	0	0	0	8(44%)
60 – 74	Marginal literacy	9(13%)	24(35%)	23(47%)	0	4(18%)	8(44%)
0 – 59	Inadequate literacy	60(87%)	45(65%)	26(53%)	22(100%)	18(82%)	2(12%)
		<b>T<sub>2</sub></b>				<b>T<sub>3</sub></b>	
75 – 100	Adequate literacy	0	26(33%)	8(11%)	0	18(24%)	13(20%)
60 – 74	Marginal literacy	12(15%)	20(26%)	31(43%)	13(17)	34(45%)	33(52%)
0 – 59	Inadequate literacy	66(85%)	32(41%)	33(46%)	63(83%)	24(31%)	18(28%)
<b>Interactive SRHL</b>							
		<b>T<sub>0</sub></b>				<b>T<sub>1</sub></b>	
75 – 100	Adequate literacy	11(16%)	12(17%)	9(18%)	0	0	0
60 – 74	Marginal literacy	22(32%)	22(32%)	20(40%)	5(23%)	10(45%)	10(56%)
0 – 59	Inadequate literacy	36(52%)	35(51%)	21(42%)	17(77%)	12(55%)	8(44%)
		<b>T<sub>2</sub></b>				<b>T<sub>3</sub></b>	
75 – 100	Adequate literacy	5(6%)	26(34%)	16(22%)	11(16%)	27(38%)	30(47)
60 – 74	Marginal literacy	20(26%)	35(45%)	28(39%)	20(28%)	28(39%)	20(31%)
0 – 59	Inadequate literacy	52(68%)	16(21%)	28(39%)	40(56%)	16(23%)	14(22%)

Constructed by the researcher, 2023. SRHL means sexual and reproductive health literacy. T<sub>0</sub> = control group, T<sub>1</sub> = intervention group that received the difficult text material, T<sub>2</sub> = intervention group that received the simplified text-only, and T<sub>3</sub> = group that was given the picture-enhanced text.

Regarding interactive SRHL, 45% of participants in **T<sub>2</sub>** recorded marginal literacy, and 34% had adequate interactive literacy at the end-line as opposed to 26% and 6%, respectively, at baseline. In **T<sub>3</sub>**, 38% of adolescents improved to adequate and marginal (39%) interactive SRHL, as against 16% and 28%, separately at baseline. All the groups increased in the number of adolescents recording marginal functional SRHL eight weeks post-end-line. The intervention groups had a reduction in participants recording adequate functional SRHL except for **T<sub>1</sub>**. Concerning interactive SRHL, the **T<sub>2</sub>** group had a reduction in the number of adolescents with marginal and adequate interactive SRHL. The control group (40%) and **T<sub>1</sub>** (56%) saw a marginal increase in adolescents improving in marginal interactive SRHL eight weeks post-end-line.

#### 4.6 The Effect of the SRH Education Materials on the Functional SRHL of Participants

**Table 4.6: Model Summaries of DID Estimation of the Intervention on Functional SRHL**

Model 1 ( <b>T<sub>1</sub></b> )	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>Adjusted R<sup>2</sup></i>
Model	1987.38	3	662.46	4.59	0.0040	0.0559
Residual	25811.21	179	144.19			
Model 1 ( <b>T<sub>2</sub></b> )						
Model	12063.18	3	4021.06	27.87	0.0001	0.2135
Residual	42412.41	294	144.25			
Model 1 ( <b>T<sub>3</sub></b> )						
Model	9297.36	3	3099.12	19.12	0.0001	0.1578
Residual	46524.47	287	162.10			

*Constructed by the researcher, 2023. SS means the sum of squares, DF= degree of freedom. T<sub>0</sub> = control group, T<sub>1</sub> = intervention group that received the difficult text, T<sub>2</sub> = intervention group that received the simplified text-only, and T<sub>3</sub> = group that was given the picture-enhanced text.*

Table 4.6 presents the model summaries of the three regression outputs on functional SRHL. The sum of squared residuals of the three models shows that a higher proportion of changes in functional SRHL can be attributed to factors outside of the regression models. The F statistics indicate that the difficult text is substantial evidence in explaining 5.7; P = 0.0040 of functional SRHL in **T<sub>1</sub>**. The simplified text-only material explains 27.87; P = 0.0001 of functional SRHL in **T<sub>2</sub>**. The picture-enhanced text is robust in explaining 19.12; P = 0.0001 in **T<sub>3</sub>**. The adjusted R<sup>2</sup> values were (0.0559) for **T<sub>1</sub>**, **T<sub>2</sub>** (0.2135), and **T<sub>3</sub>** (0.1578). Explaining 5.5% variability in function SRHL of **T<sub>1</sub>** compared to 21% in **T<sub>2</sub>** and 15% in **T<sub>3</sub>**.

Table 4.6.1 presents the result of the SRHL intervention's effect on the participants' functional SRHL. The  $\beta_1$  coefficients for the three models show that functional SRHL before the intervention (baseline) was negative in the intervention arms as opposed to the control group. The T<sub>1</sub> arm was a dip of -7.46; CI=-13.25-1.67; P=0.012, the T<sub>2</sub> arm (-0.81units; CI=-4.67-3.05; P=0.68), and T<sub>3</sub> arm (-0.016units; CI= -4.16-4.14 P=0.99). The  $\beta_2$  coefficients show an average gain (3.32) in functional SRHL in the control group over the intervention period, and similar gains would have been recorded in the three arms without the intervention. However, only the T<sub>1</sub> arm recorded a significant  $\beta_2$  coefficient. The  $\beta_3$  coefficients estimate the actual effect of the educational materials used for the intervention. The difficult text material (T<sub>1</sub>) significantly affected the participants' functional SRHL by 5.77 CI=-2.42 -13.97; P=0.166.

**Table 4.6.1: DID Estimation of the Intervention on Functional SRHL**

Details	Coefficient	Stand. Error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1 (T<sub>1</sub>)</b>						
Outcome at baseline ( $\beta_1$ )	-7.462	2.93	-2.54	0.012	-13.25	-1.67
Gains over time less treat. ( $\beta_2$ )	3.316	2.03	1.63	0.105	- 0.70	7.33
Intervention's effect ( $\beta_3$ )	5.773	4.15	1.39	0.166	-2.42	13.97
Constant	34.871	1.43	24.30	0.001	32.04	37.70
<b>Model 2 (T<sub>2</sub>)</b>						
Outcome at baseline ( $\beta_1$ )	-0.809	1.96	-0.41	0.680	-4.67	3.05
Gains over time less treat. ( $\beta_2$ )	3.316	2.04	1.63	0.105	-0.69	7.32
Intervention's effect ( $\beta_3$ )	12.287	2.78	4.40	0.001	6.79	17.77
Constant	34.871	1.44	24.29	0.001	32.04	37.69
<b>Model 3 (T<sub>3</sub>)</b>						
Outcome at baseline ( $\beta_1$ )	-0.016	2.11	-0.01	0.994	-4.16	4.14
Gains over time less treat. ( $\beta_2$ )	3.316	2.16	1.54	0.126	-0.93	7.57
Intervention's effect ( $\beta_3$ )	10.262	2.98	3.43	0.001	4.37	16.14
Constant	34.871	1.52	22.91	0.001	31.87	37.86

*Constructed by the researcher, 2023.*

Also, there was significant positive evidence (12.28 units; CI=6.79-17.77; P=0.001) that the simplified text-only material affected the functional SRHL of participants in the T<sub>2</sub> arm. The picture-enhanced text material also had a significant positive effect (10.26 units; CI=4.37-16.14; P=0.001) on the functional SRHL of participants in the T<sub>3</sub> arm. The null hypotheses for the treatment effect of models two (T<sub>2</sub>) and three (T<sub>3</sub>) are rejected. The researcher concludes that the simplified text-only and picture-enhanced SRH education materials positively impact SRHL in

young adolescents. The null hypothesis is accepted in the case of model one ( $T_1$ ). Based on the results, it can be said that difficult text has no impact on SRHL in young adolescents. At 95% confidence intervals, the alpha and beta values fall within the specified ranges. Although relatively narrow, the confidence interval does not include a zero value, confirming that the results are significant at a 5% confidence level.

From Appendix A4, the table shows a different outlook when the numeracy test was removed from the regression models. The difficult text material continued to be insignificant (4.39; CI=-5.27-14.07; P=0.371), affecting the participants' ability to read and understand the material. The picture-enhanced text material was effective (19.91; CI=13.23-26.59; P =0.001) in improving the participant's ability to read and understand the material by approximately six units above that of the simplified text (14.10; CI=7.40-20.80; P=0.001).

#### 4.6.1 The Effect of the SRH Education Materials on the Interactive SRHL of Participants

Table 4.6.2 presents the model summary of the interactive SRHL. The residual sum of squares of the three models shows that a higher proportion of the changes in interactive SRHL are due to factors outside of the regression models. The F statistics suggest that the simplified text explains substantially (5.70-unit P= 0.0008) the changes in interactive SRHL of the  $T_2$  group.

**Table 4.6.2: Model Summaries of DID Estimation of the Intervention on Interactive SRHL**

$T_1$	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>F Prob.</i>	<i>Adjusted R<sup>2</sup></i>
Model	2453.34	3	817.78	3.89	0.0100	0.0438
Residual	39121.92	186	210.33			
$T_2$						
Model	3953.65	3	1317.88	5.70	0.0008	0.0451
Residual	68384.26	296	231.03			
$T_3$						
Model	4683.14	3	1561.05	6.59	0.0003	0.0557
Residual	66574.08	281	236.92			

*Constructed by the researcher, 2023. SS = sum of squares, DF = degree of freedom.  $T_0$  = control group,  $T_1$  = intervention group that received the difficult text,  $T_2$  = intervention group that received the simplified text-only, and  $T_3$  = the group that was given the picture-enhanced text.*

The picture-enhanced text also explains 6.59 units;  $P = 0.0003$  of interactive SRHL in  $T_3$ , except for  $T_1$ , which was insignificant (3.89;  $P=0.0100$ ). The adjusted  $R^2$  values are (0.0438) for  $T_1$ ,  $T_2$  (0.0451), and  $T_3$  (0.0557), explaining 4.5% variability in interactive SRHL of  $T_1$  compared to 4.3% in  $T_2$  and 5.5%  $T_3$ .

**Table 4.6.3: DID Estimation of the Intervention on Interactive SRHL**

Scores	Coefficient	Stand. Error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1</b>						
Outcome at baseline ( $\beta_1$ )	-11.632	3.42	3.40	0.001	-18.38	-4.87
Gains over time less treat. ( $\beta_2$ )	-2.183	2.43	-0.90	0.371	-6.98	2.62
Intervention's effect ( $\beta_3$ )	10.808	4.84	2.23	0.027	1.25	20.36
Constant	58.507	1.72	33.99	0.001	55.11	61.90
<b>Model 2</b>						
Outcome at baseline ( $\beta_1$ )	-3.975	2.50	-1.59	0.113	-8.89	-0.95
Gains over time less treat. ( $\beta_2$ )	-2.183	2.55	-0.86	0.393	-7.20	2.83
Intervention's effect ( $\beta_3$ )	11.601	3.52	3.30	0.001	4.68	18.52
Constant	58.507	1.80	32.43	0.001	54.95	62.05
<b>Model 3</b>						
Outcome at baseline ( $\beta_1$ )	-0.803	2.58	-0.31	0.756	-5.88	4.28
Gains over time less treat. ( $\beta_2$ )	-2.183	2.58	-0.31	0.769	-5.88	4.28
Intervention's effect ( $\beta_3$ )	11.145	3.64	3.06	0.002	3.96	18.32
Constant	58.507	1.83	32.03	0.001	54.91	62.10

*Constructed by the researcher, 2023*

The educational materials' effect on participants' interactive SRH is presented in Table 4.6.3. The  $\beta_1$  of the three models points to negative interactive SRHL of participants in the treatment arms before the intervention. Among participants of the  $T_1$  arm, interactive SRHL had significantly dipped (-11.63 units; CI=-18.38--4.87;  $P=0.001$ ). In the  $T_2$  and  $T_3$  arms, interactive literacy had decreased by (-3.97; CI=-8.89 - -0.95;  $P=0.11$ ) and (-0.80; CI=-5.88-4.28;  $P=0.75$ ), respectively. The  $\beta_2$  coefficients show that an average loss (-2.18) in interactive SRHL over the intervention period was recorded in the controls group, and the same would have been recorded in the three arms without the intervention. The actual effect of the difficult text material ( $T_1$ ) on participants' interactive SRHL was (10.81 units; CI= 1.25-20.36;  $P=0.03$ ). The simplified text-only material had a material effect (11.60 units; CI=4.68-18.52;  $P =0.001$ ) in the  $T_2$  arm, and the picture-enhanced text material had a material impact (11.15 units; CI=3.96-18.32;  $P=0.002$ ) on the interactive SRHL of the  $T_3$  participants. At 95% confidence intervals, the alpha and beta values

are within the specified ranges. Although relatively narrow, the confidence interval does not include the value zero, confirming that the results are significant at a 5% confidence level. Informed by the results, the null hypotheses for the three intervention arms are rejected. The researcher concludes that all three SRH texts can positively impact the interactive SRHL of young adolescents.

#### 4.7 The Additional Effect of Participants' Characteristics on SRHL of Participants

##### 4.7.1 Test of Basic Assumptions

The covariates for the multivariable regression were checked for multicollinearity and VIF separately for functional and interactive SRHL. (See appendices A1 and A2 on pages 182-183 for the correlation matrices). Tables 4 and 4.7.3 present the results of the VIF. From the tables in appendices A1 and A2, the values of the pairwise correlations were far below the value 1, indicating that the covariates do not influence each other (Alin, 2010). All the variances of the predictors' coefficients, represented by the VIF values, were below 4.0 except for school type, which was greater than four but less than 5. The VIF values corroborate the results of the correlation matrix that almost all the covariates were not correlated (Daoud, 2017).

##### 4.7.2 Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Functional SRHL

**Table 4.7: Model Summaries Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Functional SRHL**

Model 1 (T <sub>1</sub> )	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>F Prob</i>	<i>Adjusted R<sup>2</sup></i>
Model	5806.44	4	1451.61	52.41	0.0001	0.9073
Residual	470.84	17	27.69			
Model 2 (T <sub>2</sub> )						
Model	6668.76	5	1333.75	3.29	0.0108	0.1498
Residual	24314.26	60	405.24			
Model 3 (T <sub>3</sub> )						
Model	9857.65	5	1971.53	3.88	0.0037	0.1611
Residual	35561.30	70	508.02			

*Constructed by the researcher, 2023. SS = sum of squares; DF = the degree of freedom. T<sub>0</sub> = control group, T<sub>1</sub> = intervention group receiving the difficult text, T<sub>2</sub> = intervention group receiving the simplified text-only, and T<sub>3</sub> = group was given the picture-enhanced text.*

Table 4.7 presents the model summaries of the multivariable regression analysis of the additional effects of participants' characteristics on the functional SRHL of participants. The sum of squared residuals of models two (24314.26) and three (35561.30) show that a higher proportion of the additional effect can be attributed to factors beyond the model. Also, the models' F statistics show that the covariates' effect on functional SRHL is 3.29;  $P = 0.0108$  for  $T_2$  and 3.88;  $P = 0.0037$  for  $T_3$ . In model one ( $T_1$ ), the covariates explain 90% of the variability in functional SRHL, not due to the intervention. The adjusted  $R^2$  of model one is consistent with the F statistics (52.41;  $P = 0.0001$ ), which specifies that the covariates are jointly significant in predicting functional SRHL in  $T_1$ .

**Table 4.7.1: Multivariable Regression Analysis of Additional Effect of Participants' Characteristics on Functional SRHL**

Functional SRHL	VIF	Coefficient	Stand. Error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1 (<math>T_1</math>)</b>							
Age	1.05	-1.002	0.37	-2.71	0.015	-1.78	-0.22
School type	-	0	(omitted)	-	-	-	-
Gender	1.13	-3.266	2.56	-1.28	0.219	-8.65	2.13
Place of residence	1.14	-2.382	5.75	-0.41	0.684	-14.51	9.75
Learning ability	1.04	33.141	2.47	13.40	0.001	27.92	38.36
Constant	-	56.024	7.92	7.08	0.001	39.32	72.72
<b>Model 2 (<math>T_2</math>)</b>							
Age	1.17	1.684	2.46	0.68	0.497	-3.24	6.61
School type	4.20	-9.424	11.40	-0.83	0.412	-32.24	13.38
Gender	1.12	10.137	5.46	1.86	0.068	-0.77	21.05
Place of residence	3.83	12.773	10.54	1.21	0.231	-8.33	33.87
Learning ability	1.13	-2.872	5.26	-0.55	0.587	-13.39	7.65
Constant	-	29.325	34.06	0.86	0.393	-38.82	97.47
<b>Model 3 (<math>T_3</math>)</b>							
Age	1.12	-3.086	2.55	-1.21	0.231	-8.17	2.00
School type	1.03	-16.534	9.75	-1.70	0.094	-35.98	2.91
Gender	1.02	7.777	5.50	1.41	0.162	-3.19	18.75
Place of residence	1.06	4.885	5.95	0.82	0.414	-6.97	16.74
Learning ability	1.04	15.011	5.286	2.84	0.006	4.47	25.55
Constant	-	97.703	37.65	2.60	0.012	22.62	172.79

Constructed by the researcher, 2023. VIF means variance inflation factor.

Table 4.7.1 presents the additional effect of participants' characteristics on functional SRHL. Among participants of T<sub>1</sub>, learning abilities have a positive (33.14; CI=27.92-38.36; P=0.001) relationship with functional SRHL. The result shows that when all the other covariates and the SRHL treatment are held constant, a unit increase in learning abilities will result in a 33% increase in the functional SRHL of adolescents. While learning abilities (-2.87; CI=-13.39-7.65; P=0.587) did not show significant proof of an influence on functional SRHL of T<sub>2</sub> participants, it had a positive and material effect (15.01; CI=4.47-25.55; P=0.006) on the functional SRHL of T<sub>3</sub> participants. Holding the other covariates and the SRHL treatment constant, a unit increase in learning abilities will result in a 15% improvement in functional SRHL of those using the picture-enhanced text material.

Learning abilities continued to exhibit evidence in predicting functional SRHL in T<sub>1</sub> (32.77; CI=27.61-37.95; P=0.001) and T<sub>3</sub> (15.20; CI=4.57-25.84; P=0.006) when time-invariant characteristics of the participants were excluded from the three models. (see Table A4B of Appendix A for results). Though relatively narrow, at 95% confidence intervals, the alpha and beta values were found within the defined ranges of the confidence intervals. The values do not include zero (0), confirming that the results are significant at a 5% significance level. The null hypotheses for the covariates in the three models are accepted, except for learning abilities. The alternative hypotheses for learning abilities in models one and three are accepted. The researcher concludes a significant relationship exists between participants' learning abilities and functional SRHL when difficult text and picture-enhanced SRH materials are used.

### **4.7.3 Multiple Regression Analysis of Additional Effect of Participants' Characteristics on Interactive SRHL**

The model summaries of the multivariable regression analysis of additional effects of participants' characteristics on the interactive SRHL are presented in Table 4.7.2. The residual sum of squares of all three models, T<sub>1</sub> (1709.96), T<sub>2</sub> (21532.8735), and T<sub>3</sub> (11131.0059), indicate that the additional variability in interactive SRHL is due to other factors outside of the regression models. The F values of the three models T<sub>1</sub> (0.25; P =0.9037), T<sub>2</sub> (3.79; P. = 0.0051), and T<sub>3</sub> (1.91; P= 0.1047) indicate that the additional effect of the covariates is not significant in predicting interactive SRHL, except that of T<sub>2</sub>.

**Table 4.7.2: Model Summaries Multivariable Regression Analysis of Additional Effect of Participants' Characteristics on Interactive SRHL**

<b>Model 1 (T<sub>1</sub>)</b>	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>F Prob</i>	<i>Adjusted R<sup>2</sup></i>
Model	101.85	4	25.46	0.25	0.9037	-0.1658
Residual	1709.96	17	100.58			
<b>Model 1 (T<sub>2</sub>)</b>						
Model	7420.56913	5	1484.11	3.79	0.0051	0.1887
Residual	21532.8735	55	391.50			
<b>Model 1 (T<sub>3</sub>)</b>						
Model	1689.5448	5	337.91	1.91	0.1047	0.0629
Residual	11131.0059	68	176.68			

*Constructed by the researcher, 2023.*

**Table 4.7.3: Multivariable Regression Analysis of Additional Effects of Participants' Characteristics on Interactive SRHL**

Functional SRHL	VIF	Coefficient	Stand. Error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1(T<sub>1</sub>)</b>							
Age	1.04	0.259	0.70	0.37	0.718	-1.23	1.74
School type	-	0	(omitted)				
Gender	1.13	-0.389	4.87	-0.08	0.937	-10.67	9.88
Place of residence	1.14	10.103	10.96	0.92	0.370	-13.03	33.23
Learning ability	1.05	-0.275	4.71	-0.06	0.954	-10.22	9.66
Constant	-	43.859	15.08	2.91	0.010	12.03	75.68
<b>Model 2 (T<sub>2</sub>)</b>							
Age	1.17	2.177	2.48	0.88	0.385	-2.80	7.16
School type	3.85	-10.883	11.30	-0.96	0.340	-33.54	11.77
Gender	1.17	12.967	5.71	2.27	0.027	1.53	24.41
Place of residence	3.50	13.215	10.39	1.27	0.209	-7.62	34.05
Learning ability	1.18	-3.196	5.51	-0.58	0.564	-14.22	7.84
Constant	-	20.295	34.43	0.59	0.558	-48.71	89.29
<b>Model 3 (T<sub>3</sub>)</b>							
Age	1.14	-0.488	1.57	-0.31	0.758	-3.63	2.66
School type	1.08	-12.825	6.42	-2.00	0.050	-25.65	-0.00
Gender	1.01	-1.312	3.45	-0.38	0.705	-8.21	5.58
Place of residence	1.05	7.709	3.73	2.07	0.043	0.25	15.16
Learning ability	1.06	-1.955	3.30	-0.59	0.556	-8.55	4.64
Constant	-	84.987	22.97	3.70	0.000	39.07	130.90

*Constructed by the researcher, 2023. VIF means variance inflation factor.*

The adjusted  $R^2$  (-0.1658) for model one explains -16% of the variability in interactive SRHL. Model two (0.1887) explains 18.87% of the variation compared to model three (0.0629).

The covariates' additional effect on interactive SRHL is presented in Table 4.7.2. From the results, gender shows material proof (12.96; CI=1.53-24.41; P=0.027) of predicting interactive SRHL of participants in T<sub>2</sub>. Place of residence (7.70; CI=0.25-15.16; P=0.043) and school type (-12.82; CI=-25.65 - -0.00; P=0.050) also show significant evidence of predicting the interactive SRHL of participants in T<sub>3</sub>. The results mean that holding all the other covariates and the SRHL treatment constant, being female increases a person's interactive SRHL by approximately 13% more than a male in T<sub>2</sub>. In T<sub>3</sub>, residing in an urban community increases one's interactive SRHL by 7% compared to residing in a rural community. Also, attending a public school reduces one's interactive SRHL by nearly 13% less than attending a private school. The null hypotheses for gender in model two and the place of residence and type of school for model three are rejected. The researcher concludes that there is a significant relationship between gender, school type, and place of residence and young adolescents' interactive SRHL.

The null hypotheses for the remaining covariates in the three models (age, gender, place of residence, and learning abilities) for T<sub>1</sub>, (age, school type, place of residence, and learning abilities) for T<sub>2</sub>, and (age, gender, and learning abilities) for T<sub>3</sub> are accepted. The results show no significant relationship exists between each covariate and interactive SRHL. At 95% confidence intervals, the alpha and beta values are within the specified ranges. Although comparatively narrow, the confidence intervals do not include the value zero, confirming that the results are significant at a 5% confidence level.

#### **4.8 Changes in SRHL of Participants at Endline and Eight Weeks Post-End-line**

Table 4.8 presents the paired sample means of participants' functional SRHL scores end-line and eight weeks post-end-line for the intervention and control groups. The results indicate slight changes in the mean score of the control group end-line (49.37; CI=48.82-56.73) and eight weeks post-end-line (52.78; CI=44.98-56.73). At 95% confidence intervals, no material evidence of a change ( $t=1.5360$ ;  $P=0.1311 < 0.05$ ) was recorded in the functional SRHL of participants in the control group. Therefore, the null hypothesis is accepted: no decay in functional SRHL occurred

in the control group between the end-line and eight weeks post-end-line. In T<sub>1</sub> and T<sub>2</sub>, significant changes occurred in the participants' mean scores, T<sub>1</sub> (48.06; CI=42.19-53.92) end-line and eight weeks post-endline (57.61; CI=50.34-64.88) (t=2.6297; P=0.0176 <0.05). In T<sub>2</sub>, a mean score of 63.25; CI=60.06-66.44 was recorded at endline and 59.38; CI=56.15-62.60 eight weeks post-endline (t=-2.9127; P=0.0048 < 0.05). The alternative hypotheses for T<sub>1</sub> and T<sub>2</sub> are accepted. The researcher concludes that at 95% confidence intervals, significant positive changes in functional SRHL occurred among the T<sub>1</sub> participants between the end-line and eight weeks after the intervention. However, the change was negative among the participants of T<sub>2</sub>.

**Table 4.8: Paired Sample Means of Endline and Post-Endline Performance in Function SRHL**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>t-statistic</b>	<b>P-value</b>	<b>95% Conf. Interval</b>	
<b>Control group (T<sub>0</sub>)</b>						
<b>Eight weeks post-end-line</b>	52.78	13.77	1.5360	0.1311	48.82	56.73
<b>Endline</b>	49.37	15.26			44.98	53.75
<b>Difficult text material (T<sub>1</sub>)</b>						
<b>8 weeks post-end-line</b>	57.61	14.62	2.6297	0.0176	50.34	64.88
<b>Endline</b>	48.06	11.79			42.19	53.92
<b>Simplified text-only material (T<sub>2</sub>)</b>						
<b>8 weeks post-end-line</b>	59.38	13.74	-2.9127	0.0048	56.15	62.60
<b>Endline</b>	63.25	13.58			60.06	66.44
<b>Pictograph-enhanced text material (T<sub>3</sub>)</b>						
<b>8 weeks post-end-line</b>	64.09	14.53	-0.9638	0.3388	60.46	67.72
<b>Endline</b>	65.55	13.04			62.29	68.80

*Constructed by the researcher, 2023*

The results of the paired sample mean of participants' interactive SRHL scores of the three intervention groups and the control group are presented in Table 4.8.1. Three groups, namely, the control group, T<sub>1</sub>, and T<sub>3</sub> produced no material evidence of differences in participants' interactive SRHL at the end of the intervention and eight weeks after. The control group had a mean score of 49.37; CI=44.98-53.75 at end-line and 52.77; CI=48.82-56.73 eight weeks post-end-line (t=1.5360; P=0.1311 < 0.05). Among the T<sub>1</sub> participants, a mean score of 57.39; CI=52.33-62.45

was made at the end-line and 58.44; CI=53.02-63.87 after eight weeks ( $t=0.4393$ ;  $P=0.6660 < 0.05$ ). In both the control and  $T_1$  groups, there were marginal changes in the mean score after eight weeks, though insignificant.

**Table 4.8.1: Paired Sample Means of Endline and Post-Endline Performance in Interactive SRHL**

Variables	Mean	Std. Dev.	t-statistic	P-value	95% Conf. Interval	
<i>Control group (T<sub>0</sub>)</i>						
<i>8 weeks post-end-line</i>	52.77	13.77	1.5360	0.1311	48.82	56.73
<i>Endline</i>	49.37	15.26			44.98	53.75
<i>Difficult text material (T<sub>1</sub>)</i>						
<i>8 weeks post-end-line</i>	58.44	10.91	0.4393	0.6660	53.02	63.87
<i>Endline</i>	57.39	10.18			52.33	62.45
<i>Simplified text-only material (T<sub>2</sub>)</i>						
<b>8 weeks post-end-line</b>	63.39	16.85	-2.7155	0.0083	59.43	67.35
<b>Endline</b>	69.43	12.69			66.45	72.41
<i>Pictograph-enhanced text material (T<sub>3</sub>)</i>						
<i>8 weeks post-end-line</i>	69.42	17.06	-0.8683	0.3885	65.16	73.68
<i>Endline</i>	70.98	13.59			67.58	74.38

*Constructed by the researcher, 2023*

A reduction in mean scores was recorded for end-line (69.43; CI=66.45-72.41) and eight weeks after the intervention (63.39; CI=59.43-67.35) ( $t=-2.7155$ ;  $P=0.0083 < 0.05$ ) in  $T_2$ . The researcher accepts the null hypotheses of the control group,  $T_1$  and  $T_3$ . At a 95% confidence interval, it is conclusive that no material evidence of changes in mean scores occurred in the participants' interactive SRHL at the end-line and eight weeks after the intervention. The alternative hypothesis for the  $T_2$  group is, however, accepted. The researcher concludes that solid proof of reduction in the participant's interactive SRHL occurred between the end-line and eight weeks after the intervention.

#### **4.9 Chapter Summary**

The chapter presented the results of the study following the study objectives. Results were presented on the SRHL needs of young adolescents in the Effutu Municipality, which focused on the scope of SRH knowledge, readability of online and paper-based SRH education materials, their comprehension, and the SRH vocabulary Knowledge of the young adolescents. The chapter also provided the readability statistics of the restructured SRH texts used in the literacy intervention. Finally, the results were also presented on the effectiveness of the restructured SRH texts in improving the SRHL of young adolescents and the onset of decay.



## CHAPTER FIVE

### 5.0 DISCUSSION OF RESULTS

#### 5.1 Chapter Introduction

This chapter discusses the results of the study based on the research objectives. A summary of the study findings precedes the discussions. The SRHL needs of young adolescents in the Effutu Municipality are first discussed, followed by those of the literacy intervention. The contribution of the research to the existing empirical literature and theories is also presented in the chapter.

#### 5.2 Objectives of Study

The study had three objectives. The first was to assess the SRHL needs of young adolescents in the Effutu Municipality. The second was to restructure existing SRH education materials to meet the literacy skills of young adolescents. The third was to evaluate the effectiveness of the restructured SRH education materials in improving ASRHL in the study area.

##### 5.2.1 Summary of Key Findings of the Study

##### 5.2.2 Findings of Background Information of Participants

Fifty-two (52) in-school adolescents aged 11-15 were recruited to participate in six FGDs, and 263 were recruited from seven schools to participate in the comprehensibility assessment of existing SRH education materials and SRH vocabulary knowledge. The mean age of the FGDs participants was 13.2. Seventy-one percent (71.2%) were females, and 28.8% were males. The mean age of participants in the comprehension and vocabulary knowledge assessment was 14.1. Most participants were in Grade 7 (60%) and were females (54%). Regarding the SRHL intervention, 332 participants from 16 basic schools enrolled, and 245 from 13 schools completed it. Eighty-two percent (82%) of the participants were from public schools, and 18% from private schools. Sixty-four percent (64%) of the participants were females, 36% were males, and the mean age of participants was 14 years.

### **5.2.3 Summary of Key Findings from SRHL Needs Assessment.**

Under this objective, FGDs were organized to ascertain the scope of young adolescents' SRH knowledge. Data were organized under the six themes in the discussion guide: Perspective on the SRH concept, sources of SRH information, contraceptives and methods, predominant sexual knowledge, STIs and treatment, preferred SRH topics, and SRH goals. SRH as a concept was unknown to adolescents. There was an overreliance on informal sources for SRH information, and the available content was limited to personal hygiene, HIV, etiquette in personal friendship, and sexual maturation. There was generally a lack of knowledge of essential and core topics of SRH. The adolescents also had challenges with reading and comprehension of SRH materials available online and paper-based. The readability assessment showed that the materials had higher RGLs and would present adolescents with reading difficulties. Regarding comprehension of the existing SRH text materials, 50% of the participants were unable to cope with the language of the texts, and 21% found the texts too difficult to read and understand.

### **5.2.4 Summary of Details on the Restructured SRH Text Material**

Three SRH text materials were generated for the SRHL intervention. They include 1) a synthesis of existing text materials on SRH labeled "difficult text." 2) An easy-to-read SRH education material labeled "simplified text-only material." 3) The easy-to-read text that is enhanced with static pictures, referred to as "picture-enhanced text material." The last two materials had lower GRLs than the existing ones, with an FRE of 82.1, indicating that the restructured text was easy to read. The other readability indices also confirmed that an average student between grades 2-6 could read and understand the materials.

### **5.2.5 Summary of Findings on the Effectiveness of the Restructured Texts**

Three intervention groups (T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub>) and one control group were used. The T<sub>1</sub> group received the difficult text material, T<sub>2</sub> had the simplified text-only material, and T<sub>3</sub> received that picture-enhanced format. Though insignificant, the difficult text material improved functional ASRHL by 5.7 units over six weeks. The simplified text-only material significantly improved functional ASRHL by 12 units and the picture-enhanced text by 10 units over the same period. Regarding interactive ASRHL, all three SRH educational materials significantly improved SRHL by 10, 11, and 11 units, respectively, for T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub> participants.

### **5.3 Discussion of Findings**

#### **5.3.1 SRHL Needs of Young Adolescents in the Effutu Municipality**

Results of the FGDs generally revealed partial knowledge of SRH across the three schools and among participants. SRH was a strange concept for adolescents. Yet, knowledge of personal hygiene, pubertal changes or sexual maturation, HIV, and abstinence were commonplace. These topics are primarily taught in basic school, in subjects such as moral and religious education or other co-curricular activities such as girlchild education and the menstrual hygiene day celebration. The school system provides young adolescents with SRH information, but not comprehensive enough to meet the knowledge requirement of adolescents. There is a lack of knowledge in sex and reproduction, contraception, other STIs, menstruation, and traditional sources of contraceptives, a situation parallel with those presented in the ASRH literature of SSA. The existing literature stresses a lack of knowledge about these topic domains (Knopf et al., 2016; Kyilleh et al., 2018; Furry et al., 2019; Finlay et al., 2020). Young adolescents in the Effutu Municipality are far from the proposed target of ensuring that 90% of adolescents and young people know SRH services and rights by 2022 (GHS, 2016).

Although the adolescent health service policy 2016-2020 proposed to reach 90% of adolescents with information on health and health services by 2020, the results of this study suggest that adolescents in Effutu are cut off from it. There was constrained access to textual and other formats of educational materials. The universally reachable SRH information was the recommended integrated science textbook and other online materials accessed by a privileged few. The restricted access to safe and reliable sources of SRH information is confirmed by the predominant use of informal sources, such as peers, relatives, and older people. Dependence on informal sources of information seems widespread across SSA, as several studies have reported greater dependence of adolescents on this source of information (Masemola-Yende et al., 2015; Ibegbulam et al., 2018; Ivanova et al., 2019). Making adolescent-centered SRH educational materials for young adolescents in Ghana is essential to managing emotional challenges, such as strong sexual feelings and desires that characterize adolescence.

One danger with the informal source of SRH information is the potential inaccuracies that may accompany them. The responses show that the mass of adolescents, particularly females, know about unsafe abortion, unorthodox sources of contraceptives, and abuse of the oral contraceptive pill, "Postinor-2," an emergency contraceptive pill. Moreover, sources close to basic school management and responses from participants point to indiscriminate use of the postinor-2 and sexual activities among basic school pupils. This situation makes it dangerous to rely on informal sources of information and denies adolescents the opportunity to learn about sex and related risks, reproduction, and contraception. For instance, the abuse of emergency contraceptives among young adolescents has future consequences and is a beacon of the urgency of SRH education for young adolescents. A more structured approach to integrating comprehensive ASRH education as a co-curriculum is imperative in improving ASRH outcomes. Educating young adolescents on SRH will empower them to successfully navigate the adolescent period, which is usually saddled with the quest for adventure fueled by the proliferation of new media and peer pressure.

Two factors, namely, prejudice and stigma (Asampong et al., 2013; Hall et al., 2018), are identified in the literature as a feature that characterizes informal sources of SRH information and makes it an unreliable platform for socializing young adolescents into SRH-relevant matters. In this study, out of 145 pupils who evaluated the usefulness of the SRHL intervention, only 37 were guided by their parents to learn the SRH education material after school. This result emphasizes poor parental/guardian support for ASRHL, consistent with the literature that marks parental disapproval of SRH conversations with young adolescents. Parents believe such conversations predispose adolescents to sexual relationships (Asampong et al., 2013; Muhwezi et al., 2015).

The responses from the group discussions show that ASRH prejudice and stigma were substantial barriers to information. In this study, stigma was observed to have a gender dimension. The adolescent females expressed views on sexual relationships with much more difficulty and shyness than the males during the group discussions and the intervention. This observation expresses the deeply entrenched sexual stigma females suffer in Ghanaian society. The female adolescents' preference for easy-to-read SRH information to bypass the insults and hatred associated with seeking SRH information attests to the gendered nature of stigma in Ghanaian society. Congruent with the existing literature, the adolescents of SSA prefer voice calls and voice mail to other

channels of SRH information for ease of understanding and confidentiality (kinfaderin-Agarau et al., 2012). Confidential but unrestricted access to SRH information can help avoid stigma and improve literacy and knowledge. The prejudice against ASRH stressed by the participants corroborates the findings of Hall et al. (2018) on ASRH stigma in Ghana. Hall and his colleagues found that the Ghanaian community's values and attitudes are hostile to all shades of ASRH. Such attitudes limit conversations to 'safe' topics such as those included in the school curriculum of Ghana.

Although heads of the schools included in the intervention were keen on narrating the active sexual behaviors of in-school adolescents and resulting pregnancies to the researcher, they believed it was inappropriate to educate them on sexual matters and contraceptives. As expressed by one Head Teacher, *"Our school children are already spoilt, and you want to make their behavior worse by teaching them how to use a condom."* Some school authorities vehemently fought the intervention. In some schools, intervention participants were made to share the SRH lessons learned with their peers during the morning assembly. Yet, due to fear of being ostracized by the Head Teachers' group, they joined in resisting the intervention. The above-lived experience underscores the extent of the stigma against ASRH in Ghana and how it can contribute to adverse SRH outcomes in adolescents if not nipped in the bud. It would help if strategies for destigmatizing ASRH and garnering parental support for ASRH are considered for revising the Adolescent Health Service Policy and Strategy.

Adults' disapproval of ASRH was so intense that adolescents preferred to share SRH issues with peers than adults. A case in point is an expression by a female participant in the SRHL intervention. *"Madam, it isn't t like we don't want to talk. We like the topic but are quiet because we don't want this conversation with adults. They always scold us for having such talks. We talk very well when the young lady is taking us through the lessons."* This statement emphasizes the significant damage ASRH prejudice can cause to adolescent-adult relationships. Social prescriptions on ASRH conversation seem at variance with adolescents' preferences regarding SRH information. However, these rigid prohibitions would not deter young adolescents from seeking answers to their questions on sex and reproduction. Sexual desires are instinctive, and adolescents would want to explore such desires. Therefore, withholding sex-related information from adolescents makes it more

damaging and unhelpful. A more open and guided conversation on sex and reproduction is crucial in preventing adolescents from seeking and consuming unsafe and misleading information.

The contemporary adolescent is curious and wants to learn about the significant changes in adolescence and their implications for life. This earnest desire is reinforced by the attitude of the intervention participants learning the material with peers, the overwhelming likeness they indicated for the SRHL intervention, and the belief that such an intervention should be extended to all JHS pupils in the municipality. However, it is sad that those on the frontline of educating adolescents and supporting their empowerment for informed choices about sex, reproduction, and preventive behaviors instead judge them unfairly. ASRH stigma presents a significant hurdle to ASRHL in Ghana. A deliberate advocacy against the stigma is critical to improving ASRH outcomes in Ghana and SSA.

### **5.3.2 Readability and Comprehensibility Challenges with Existing SRH Texts Materials**

Reading and comprehension challenges with the linguistic characteristics of SRH information which may be within the adolescents' reach, were noted as a barrier to SRHL by adolescents. This bottleneck echoes the urgency to reconsider the readability and comprehension problems of texts provided by the educational system and the literacy skills of users. The ease with which young adolescents can read SRH educational materials within their reach depends on the readability of linguistic features of the text. In the FGDs, adolescents indicated reading and comprehension challenges with available text on SRH. The average reading ease scores based on the Flesch reading ease score and GFI suggest young adolescents will have reading difficulty with available online and paper-based SRH materials included in the analysis. In addition, the FKRGL confirms that it will require people with ten or more years of schooling to read them.

The literature on HEM's readability repeatedly reports higher readability levels of HEM from various health contexts (Williams et al., 2016; Delane et al., 2021; Szabó et al., 2021). Assessment of web-based HEM also reports RGL above the approved range (Prabhu et al., 2016; Delane et al., 2021). Ghana's policy on the acceptable range of readability for HEMs is unavailable or may be nonexistent. However, going by the US standard of 4<sup>th</sup> – 6<sup>th</sup> RGLs (Nielsen-Bohlman et al., 2004; CDC et al., 2010), the SRH educational materials assessed in this study are far above the accepted

range of RGL for HEMs, which suggests that most young adolescents in the Effutu Municipality and likely in Ghana were left behind if the health system and its agencies relied on such information for dissemination and education. The results further illuminate the possible gaps in the strategic objectives of Ghana's adolescent health service policy at the close of 2022.

The result of the cloze test corroborates that of the readability indices. It shows that 50% of young adolescents in grades seven and eight could not cope with the language of SRH information available online and paper-based. The cloze procedure was purposefully used to assess the young adolescents' ability to read and comprehend passage tokens from the materials included for readability assessment. Twenty-one percent of young adolescents would find the language too difficult to read and understand. The technical nature of the linguistic characteristics of text materials can result in frustration in reading and comprehension, even among the well-educated. The high readability and poor comprehension of the available SRH text make restructuring an inevitable exercise for improving linguistic access to ASRH information and literacy in Ghana. The results emphasize that the quality of available SRH text materials is unhelpful and may not promote independent reading and understanding among young adolescents. The present situation calls for educators' training to help adolescents understand health information or the need to restructure SRH materials to adolescent literacy skills. Materials restructuring is essential to promote privacy, encourage independent learning, and overcome ASRH stigma.

The Flesch reading ease score and the FKRGL use sentence length and the number of syllabi per word. The SMOG and the GFI also emphasize sentence length and the number of polysyllabic words in a passage to compute the readability statistics. The algorithms thus stress that the SRH materials have numerous polysyllabic words and longer sentences, capable of impeding reading comprehension. It is argued that the best indicator of a reader's comprehension of a text is their familiarity with the words it uses (Stahl, 2013). It is almost impossible for young adolescents and low-literate people to understand a text without knowing the meaning of most words used in the text. In this study, 29 words were classified as unfamiliar and difficult /incomprehensible to the adolescents and 14 as familiar but complex/incomprehensible. The words were identified from five different passages made up of 1,048 words. They appeared two or more times in the passages, making it difficult to calculate the precise SRH vocabulary size of the participants.

Nevertheless, the unfamiliarity and difficulty of the words suggest that the vocabulary of the young adolescents does not sufficiently match the word tokens used in existing SRH materials assessed in this study. The medical vocabulary size of the adolescents implies that materials designed should elaborate medical terms with local and familiar jargon to promote comprehension. Compared to the existing materials, most participants in the SRHL intervention strongly agreed that the restructured materials were easier to read and understand. Their responses intimate that the intentional use of familiar and simple words is a critical success factor for promoting reading and understanding when developing reading materials for young adolescents or low-literate people. This aspect of the results supports the principle of parsimony, which underscores using simple words to promote understanding.

It is difficult to compare the results of young adolescents' vocabulary size to the existing literature since there are limited studies on medical vocabulary knowledge. Existing studies date back to the 1970s–1990s. Although the studies found that patients have difficulty understanding medical words used in HEM and those used by nurses to educate patients (Cole,1979; Spees,1991), they do not inform us of the present state of medical vocabulary knowledge. This present study may be one of the few that assess adolescents' knowledge of SRH vocabulary. It is, therefore, difficult to tell the general situation among the adolescent population and the present status of knowledge of medical words used in HEM. The results, however, provide information on the SRH vocabulary size of most young adolescents and the potential comprehension challenges they stand to encounter if allowed to learn such materials without the support of an educator. Further studies on adolescents' readability, comprehension, and vocabulary knowledge about adolescent health educational materials are critical for the future design of materials.

#### **5.4 Effectiveness of the Simplified SRH Materials in Improving ASRHL**

The ASRHL intervention had two main groups: the control group (i.e., **T<sub>0</sub>**) and the intervention group, which had three arms (i.e., **T<sub>1</sub>**, **T<sub>2</sub>**, and **T<sub>3</sub>**). Among the intervention arm, the **T<sub>1</sub>** group received the difficult SRH text material, the **T<sub>2</sub>** group was given simplified SRH text material, and the **T<sub>3</sub>** received a picture-enhanced SRH text material. The descriptive statistics at baseline showed that all four groups had the majority of their participants falling within the inadequate functional literacy bracket, which brings to bear the problem of ASRHL in the Effutu Municipality of the

Central Region and, by extension, the young Ghanaian adolescent. While no participants made it to the adequate literacy bracket of the control group and those that used the difficult text material, 33% and 24% of participants who took the simplified and picture-enhanced text materials separately fell in the adequate literacy bracket at the end-line. More participants remained in the inadequate literacy category among those who took the difficult text material than the control group, indicating the existence of community or school characteristics affecting ASRHL. The literature identifies age and individual literacy skills as factors of recall of medical instructions and pictogram identification or recognition (Dowse & Ehlers, 2004). Likely factors responsible for the limited performance of the group that consumed the difficult text materials are discussed later in the chapter

Contrary to the functional SRHL results, the interactive SRHL's baseline output showed that some young adolescents had some level of decision-making skills before the intervention. A few participants in the control, T2, and T3 groups were adequately literate regarding decision-making skills. It is difficult to compare this aspect of the study's results with findings from the existing literature since it was not concerned with the factors of ASRHL. However, Ahinkorah et al. (2020) found that older adolescents had a higher decision-making capacity in a multi-national study. The authors also found that the capacity to make decisions varies across age and the number of years of education. Other factors of SRH decision-making were related to social norms, financial ability, and parental threats (Engelbert Bain et al., 2019). In this study, the group that received the difficult text materials was the worst performing in interactive literacy. However, it is difficult to tell which of the factors identified in the literature could account for the poor decision-making ability of the group at baseline.

The DID results show that all three intervention arms showed negative functional literacy at baseline, represented by the beta one coefficients, and are supportive of the descriptive statistics. The results imply a negative trend of functional and interactive SRHL in young adolescents of the Effutu Municipality before the intervention. This situation could result from the general challenge with access to SRH education materials for young adolescents, as revealed by the FGDs. The beta two of the three functional SRHL models shows that without the intervention, the young adolescent could have made some gains in functional literacy over the six weeks. It stands to reason that

access to the woefully inadequate SRH information does improve functional SRHL, though immaterial. The negative trend of functional SRHL lends credence to the poor knowledge of adolescents about important topic domains reported in the ASRH literature of SSA (Knopf et al., 2016 Kyilleh et al., 2018; Furry et al., 2019, Finlay et al., 2020).

The differences in effect size recorded by the three intervention arms are explained by differences in the effectiveness of the three SRH educational materials in improving ASRHL. The difficult text material did not record any material improvement in SRHL of young adolescents. When numeracy was removed from the model, the effect of the material was reduced further. It implies that available ASRH materials have a higher cognitive load than young adolescents' literacy skills. The existing materials may not improve literacy and knowledge if presented to adolescents without the support of SRH educators. In the group that used the simplified text-only materials, SRHL went up by far as opposed to what was achieved by the difficult text material. The result is similar to a psychoeducation intervention in Nigeria, which used a participatory approach to create materials on sexual health literacy and recorded improved sexual literacy (Ofole, 2022). The educational materials used in the present study followed a participatory approach to identify adolescents' SRHL needs and preferences and the cognitive processes that influence learning. The results accentuate the value of SRH education materials aligned with adolescents' literacy skills, characteristics, and preferences.

The simplified text-only material affected the adolescents' functional SRHL more than the picture-enhanced material. It means that public health practitioners and the educational system can improve the SRHL of young adolescents by making simplified SRH text material available to them. The lesser effect of the picture-enhanced text material in the functional SRHL than the simplified text-only material could be due to three main factors. 1) The pictures might have amused adolescents and thus served as distractors instead of modes of representation. 2) Some parents' and teachers' disapproval of the material might have constrained reading. 3) Using detailed pictures might have increased cognitive load rather than reduction. Studies have found that the level of abstraction in visuals and their degree of fidelity may affect recall and recognition, particularly among low-literate people (Ha'meen-Anttila et al.,2003; Zeng-Treitler et al.,2014). For instance, the numeracy bit of the functional SRHL was based on the menstrual cycle. A calendar was used

in the simplified text-only material, and the picture-enhanced version used a chart to explain the cycle. It may be that the chart was more abstract and unfamiliar. Also, the multiple colors that illustrate the safe and unsafe periods are 'additives' that might have increased cognitive load. Consequently, more time was required to master it than was allowed, which might have presented learning difficulties more than the calendar. As the '100,000' rule maintains, learning transfer in complex subject areas requires a more extended period and frequent practice (Ericsson et al., 1993). It is worth noting that the menstrual cycle chart used in the picture-enhanced text material is similar to the one in the "Amazing Girls' Guide to Menstruation." This booklet was developed under the auspices of the Ghana Education Services to educate girls on menstrual hygiene in basic schools. It seems that the booklet is unavailable to basic school pupils and that the content is unknown. Unsurprisingly, most female participants of the FGDs had poor knowledge of the menstrual cycle.

Nonetheless, picture-enhanced material effectively improved the ability to read and understand. When numeracy was excluded from the regression models, the ability to read and understand on the part of the participants receiving the picture-enhanced material exceeded that of the simplified text-only material by close to 6 units. This aspect of the results shows that pictures may work better with literacy than numeracy in SRH. The findings are similar to the results of some interventional studies in the literature. In Taiwan, for example, easy-to-read and picture-enhanced HEM improved OHL more than general text (Sun et al., 2021). Studies have found HEM enhanced with visuals as effective in improving recall in homecare and medication instructions in adults and children (Ha'meen-Anttila et al., 2003; Hill et al., 2016; Wolpin et al., 2016; Park & Zuniga, 2020).

The negative interactive SRHL of participants at baseline revealed by the DID regression model implies that most young adolescents in the municipality have deficient decision-making skills. Congruent with the descriptive or interactive SRHL of the T<sub>1</sub> group, the regression results showed that that group had a worse status of interactive literacy. Over time, the ability of young adolescents to make SRH decisions further deteriorates, as revealed by the negative coefficients of respective beta two coefficients of the three models. There were also immaterial differences in the effect of the three different educational materials on the young adolescents' interactive SRHL. The results imply that the young adolescents' ability to make SRH decisions is not so much tied to the format

for presenting the information but instead access to SRH information. However, their ability to read and understand largely depends on the information's format. Therefore, when presenting SRH information to young adolescents, the learning objectives should guide the choice of format. The overall success of the SRHL intervention is judged based on adolescents' SRHL at baseline and end-line. Almost all participants recorded negative literacy at baseline but greatly improved at the end-line, particularly those receiving picture-enhanced and simplified text-only materials.

Based on the results, it is clear that young adolescents' challenge to SRHL is access to information and the ability to read and understand it. Once information is provided in formats that promote easy reading and understanding, capacity will be created for decision-making. It also suggests that the vision of the adolescent health policy was apt, even though Ghana may be far behind in achieving it. In this situation, SRH education and literacy interventions would be valuable for equipping young adolescents with age-appropriate knowledge and decision-making skills.

From the multivariable regression analysis performed to determine the additional effect of the participants' characteristics on functional SRHL, the participants' learning or cognitive ability was very instrumental. Among the participants who consumed the difficult text material, learning ability contributed significantly (33.14) in improving literacy compared to those who used the simplified text-only material (1.13). The results suggest existing education materials (paper-based and online) could present a higher intrinsic cognitive load to young adolescents and the competency levels required to read and understand them. More cognitive resources may be needed to understand such educational materials, making it unprofitable for people with lower cognitive abilities. An experimental study from Taiwan that assessed the effectiveness of different oral health educational material formats found that general text yielded minimal improvement in OHL among low-literate older people than simplified formats (Sun et al., 2021). These two studies' outcomes support the proposition that difficult-to-read HEM is primarily unhelpful for low-literate people (Meppelink et al., 2015; Sun et al., 2021). The health literacy scholarship seems to have focused on the use of visuals and text rather than simplified text-only materials. Further studies are required to provide data to validate the effectiveness of simplified text-only materials in improving health literacy. Such data would facilitate informed choices on effective HEM options when conducting health education among low-literate people while minimizing cost.

Learning ability was also instrumental in predicting functional SRHL among participants who received the picture-enhanced text material. The results indicate that pictures may not necessarily lead to cognitive load reduction but may promote interpretational simplicity, particularly in SRH, where pictures of the sexual and reproductive organs and other behaviors are closer to visual experience. The health literacy literature, however, emphasizes the critical role of cognitive ability in improving recall and understanding when using picture-enhanced HEM (Ha'meen-Anttila et al., 2003; Van Beusekom et al., 2017; Houston et al., 2019). The studies show that picture-enhanced HEM works better among people with moderate to high literacy skills. The results also show that gender, school type, and place of residence are essential predictors of interactive SRHL in young adolescents but unrelated to intelligence level. This aspect of the results is inconsistent with the existing literature. Decision-making capacity is suggested to relate to age, contraceptive use intentions, and level of education (Anasi & Nwalo, 2012; Ahinkorah et al., 2020).

### **5.5 The Effectiveness of the SRH Education Materials and the Onset of Decay**

The differences between the means of the control and the difficult text material groups at the end-line and eight weeks post-end-line suggested a further improvement in the functional SRHL of the participants. It is usually expected that memory decay would have set in with time (eight weeks), and the mean functional SRHL score would have reduced. However, this was not the case. In the literature, mixed results are presented. Four weeks of recall follow-up in an intervention that used pictures to replace spoken medical instruction revealed a reduction in average recall (Houts et al., 2001).

Among people living with HIV, treatment adherence increased after one-month, two-month, and four-month follow-ups among those using pictograph-guided instructions than those using general counseling. Behavioral adherence strategies also increased in picture-guided instructions than those using general counseling (Kalichman et al., 2013). The present study's mean difference was insignificant for the control and the group that received the picture-enhanced materials. Improvement in functional literacy among the group receiving the difficult text could result from some happenings at the individual or community levels. It is also possible that some participants used their holiday period to learn about the SRH topics. Improvement in this group's functional literacy could result from a clash between learning for end-of-term exams and the end-line data

collection. According to Susic-Vasic et al. (2018), such interference leads to poor retrieval of lessons learned.

The group that used the simplified text-only material recorded a significant reduction in both functional and interactive SRHL. However, the situation differed for those receiving the picture-enhanced text material as no significant changes in functional and interactive health literacy were noted between the end-line and eight weeks post-end-line. In the simplified text-only material group, the onset of decay in literacy could be related to the passage of time/and or interference. The intervention ended close to the end of the trimester when basic school pupils were preparing for their examinations. Learning for the exams likely interfered with the SRH lessons, culminating in participants' poor consolidation and retrieval of what was learned (Susic-Vasic et al., 2018). The record of immaterial decay in the group that used the picture-enhanced text material underscores the value of pictures as cues for information retrieval. The pictures in the material could have facilitated participants' recall of the lessons each time they came across them, thereby retaining the memory of what was learned.

## **5.6 The Relevance of Findings to the Theoretical Literature**

In this section, the researcher discusses the relevance of the research findings to the theories underlying the study in two main dimensions. They are 1) Findings of the study that overlap with the theories. 2) Findings that disconnect or depart from the theories. I begin with the overlaps, followed by the disconnections.

### **5.6.1 Areas of Overlap with the Theories**

The findings of the study connect with several of the principles of the CLT and the CTML. The effect of the simplified text-only materials on the adolescents' functional SRHL supports cognitive load adjustment or management. It implies that reading and understanding will improve when the linguistic characteristics of SRH educational materials are aligned with learners' literacy skills or expertise levels using the principles espoused by the theories. The simplified text-only material significantly improved SRHL from a negative status to a positive status over six weeks than the difficult text material. It also suggests text restructuring as an effective cognitive load management strategy for improving SRHL among young adolescents. The study's findings supported the

modality and multimedia principles, particularly the effectiveness of the picture-enhanced text material in improving reading and understanding among young adolescents. This material made more gains than the simplified text-only material when numeracy was excluded from the model. SRH instructional designers should consider combining static pictures and simplified text to improve reading and understanding of age-appropriate SRH topics in young adolescents.

The effect of pictograph-enhanced text material on young adolescents' ability to read and understand also supports the tenets of realism that visual displays should match the mental model of the viewer. It may be difficult for less detailed visuals on SRH to match their referent, making detailed pictures more suitable. The difference in effect size between the simplified and picture-enhanced text materials on participants' ability to read and understand may result from using detailed pictures to enhance the simplified SRH text. Future design of multimedia SRH material for young adolescents may consider using detailed pictures instead of less detailed ones.

The limited impact of pictograph-enhanced text materials in learning the menstrual cycle supports the coherence principles, which stress the use of pictures with less fidelity and icons and diagrams closer to the visual experience of the learner. It is also consistent with the proposition of realism that nonrealistic representations with colors have a lesser effect on understanding. The menstrual cycle chart must have been unfamiliar to adolescents, and its multiple colors must have presented learning challenges. When employing charts and diagrams to explain SRH concepts and computations to young adolescents, instructional designers should use less complex and familiar icons and diagrams. Explaining complex and unfamiliar diagrams or charts to young adolescents over time would be valuable to promote understanding of the charts and diagrams, as proposed by the "100,000-hour rule" (Ericsson et al., 1993).

### **5.6.2 Areas of Disconnection with the Theories**

There is a paradox between CTML and the pictorial realism theories in ASRH learning. The CTML proposes that less detailed pictures reduce cognitive load. But using such pictures to illustrate natural objects, such as sex and reproductive organs and contraceptives, is pretty challenging. This drawback of the CTML makes realism a more helpful approach to learning specific topics in SRH. Yet, it may come with increased cognitive load, making their use counterproductive if not applied

to the relevant topic domain. The contradictions suggest that realistic and unrealistic pictures are helpful to SRH learning but depend on the topic domain where they are applied. Therefore, none of the two theories can apply in absolute terms. Detailed visuals or pictures help illustrate some concepts in SRH but require a relatively higher cognitive ability for processing.

The dissonance between realism and SRH learning in young adolescents is that the fidelity levels applied to visuals can moderate learning. Detailed visuals may fail to maximize their value when applied to sensitive domains, such as sexual activities, behavior, and reproduction. Such visuals could amuse and distract the young adolescent from the learning objective, leading to sub-optimal learning. Also, specific individuals, institutions, and cultures may resent detailed representations of SRH, particularly those that forbid ASRH, and their opposition to such pictures can intervene in the learning outcomes of picture-enhanced materials. The disconnections between CTML, the realism theory, and SRH learning in young adolescents suggest the existence of contextual factors that may moderate the effectiveness of pictures in some subject domains. However, the two theories do not account for such variables.

The individual principle of the CTML broadly proposes that some multimedia design principles are more relevant to low-experienced learners. Yet, the health literacy literature and the findings of this study suggest that multimedia instructions in health work better among adequate to highly literate individuals than low-literate people. For instance, the findings of this study suggest that individual learning or cognitive ability is critical when employing picture-enhanced text material to improve SRHL in young adolescents. However, it is less critical for simplified text-only material. Picture-enhanced materials may work best among young adolescents with higher learning abilities.

The results also show that cognitive load management, multimedia, and realism principles in ASRH learning are effective relative to learning objectives. The principles may be essential for improving understanding and retrieval of information and readability of text but inconsequential for improving SRH decision-making abilities of young adolescents. The study's findings suggest that all three SRH learning materials effectively improve the interactive SRHL of young.

adolescents, such that the difficult text material worked relatively better. It effectively improved interactive SRHL from a negative SRHL status baseline to a positive status end-line.

### 5.7 Synthesis of Key Research Findings with the Empirical Literature

**Table 5.7: Synthesis of Key Research Findings with the Empirical Literature**

<b>Research Objectives</b>	<b>Findings from the Research</b>	<b>Findings from the Empirical Literature</b>
Objective one SRHL needs	<ul style="list-style-type: none"> <li>▪ Scope of SRH knowledge among young adolescents.</li> <li>▪ SRH information access challenges at the sub-national level.</li> <li>▪ Young adolescents preferred SRH contents and SRH goals.</li> <li>▪ Readability levels of online and paper-based ASRH information or materials,</li> <li>▪ Young adolescents' comprehension of existing ASRH information or materials.</li> <li>▪ Young adolescents' SRH vocabulary knowledge.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adolescent-parent communication of SRH.</li> <li>▪ ASRH decision-making capacity.</li> <li>▪ ASRH knowledge and literacy.</li> <li>▪ Access and utilization of SRH services among adolescents,</li> <li>▪ Interventions for improving ASRH outcomes.</li> <li>▪ Adolescents' SRH behaviors. and access to information.</li> </ul>
Objective Two Restructured SRH Materials	<ul style="list-style-type: none"> <li>▪ Synthesis of existing ASRH education material</li> <li>▪ Adolescent-centered SRH educational materials – simplified text-only and picture-enhanced text materials.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Picture-enhanced health educational materials – Medical leaflets, pill cards, medicine labels, materials on heart failure and diabetic patients, HIV treatment adherence, medical screening, and the OHL manual.</li> <li>▪ Simplified text-only materials - psychoeducation manual and OHL manual.</li> </ul>

*Constructed by the researcher, 2023*



Continuation of Table 5.7:

Research Objectives	Findings from the Research	Findings from the Empirical Literature
Objective Three. Effectiveness of the restructured SRH educational material in improving ASRHL	<ul style="list-style-type: none"> <li>▪ Trends in functional and interactive ASRHL.</li> <li>▪ Difficult ASRH text material contributes little to functional SRHL</li> <li>▪ Simplified text-only materials contribute more to functional SRHL than picture-enhanced text materials.</li> <li>▪ Picture-enhanced text materials contribute more to reading and understanding than simplified text-only materials.</li> <li>▪ Difficult text materials, picture-enhanced materials, and simplified text-only materials contribute to improved interactive SRHL</li> <li>▪ Individuals’ characteristics - learning abilities and place of residence are essential predictors of functional and interactive SRHL. Where picture-enhanced and difficult text is used. Gender predicts improvements in interactive SRH, and where simplified text-only materials are used, place of residence predicts interactive SRHL.</li> <li>▪ Access to SRH educational materials among young adolescents can encourage independent reading and learning.</li> </ul>	<p>Simplified HEMs are effective in</p> <ul style="list-style-type: none"> <li>▪ Improving behavior – medication compliance and adherence strategy, enhanced self-care behavior, and self-efficacy.</li> <li>▪ Improving retrieval – recall of medical instruction in school-age children and adults.</li> <li>▪ Improving knowledge and literacy – OHL, health literacy, and sexual health literacy.</li> </ul>

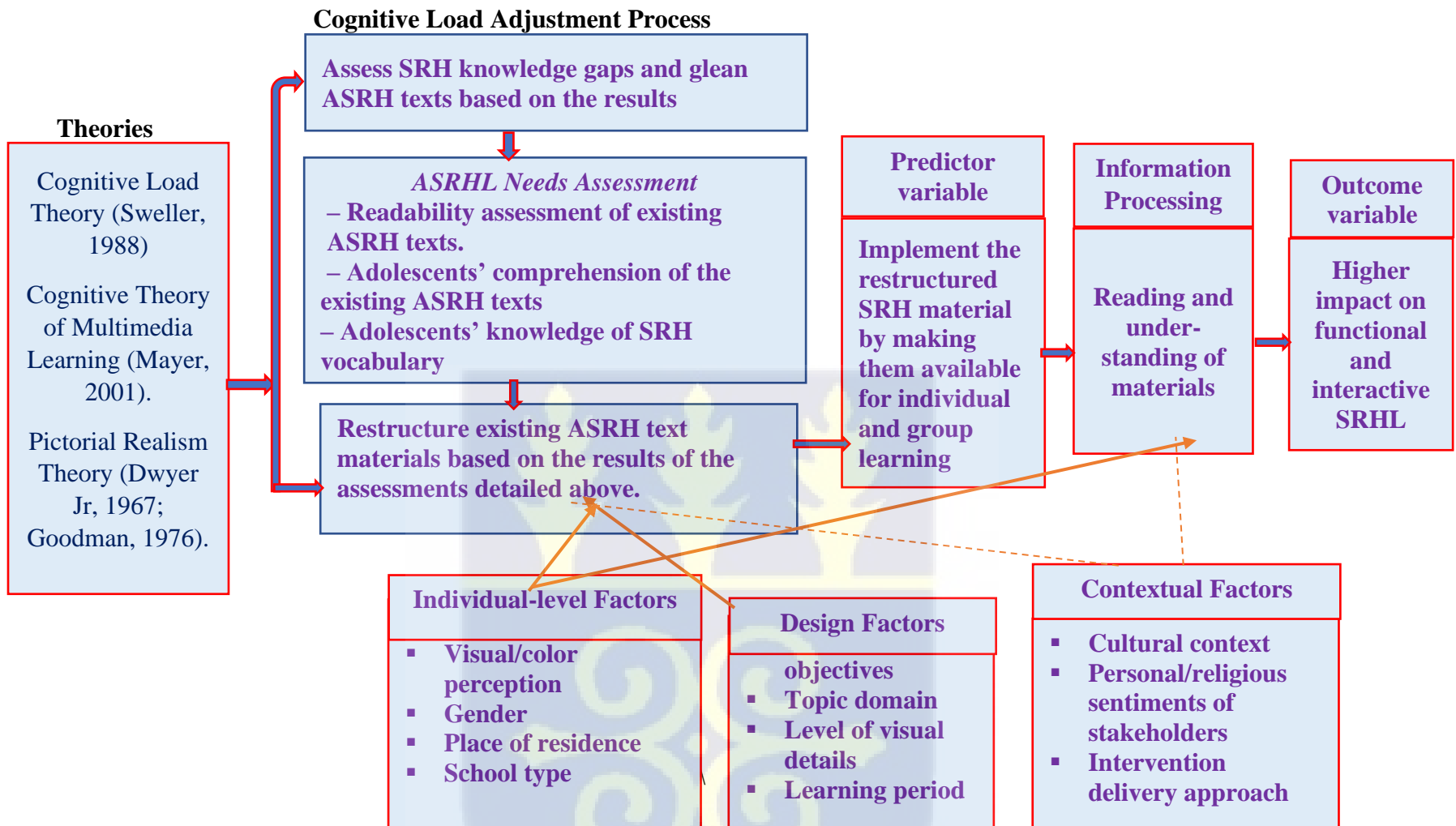
*Constructed by the researcher, 2023*

### 5.8 Review of Conceptual Framework with Study Findings

The conceptual framework used for the study is reviewed based on the study's findings. Figure 5.8 presents the revised conceptual framework for restructuring health education materials to improve adolescent SRHL. From the empirical findings, the framework proposes a cognitive load adjustment process that produces the predictor variable (the restructured SRH educational materials). Make the restructured materials available to participants for group and independent learning. Young adolescents can process the materials’ information through reading and

understanding. As noted earlier, information processing in the framework assumes the “black box” concept. Therefore, only the input and output behaviors are observable. The ability of young adolescents to read and understand the SRH educational materials is determined by their literacy scores (the outcome variable) after six weeks. Individual-level and design factors should be considered when restructuring existing SRH educational materials. The specific factors are outlined in the boxes labeled design and individual-level factors. These factors are also predictors of SRH literacy in adolescents. They are linked to the cognitive load adjustment process and information processing with reedy lines to emphasize their predictive effect. Context factors are also likely to intervene in the information processing to predict lower/higher SRH literacy. Therefore, when designing SRH educational materials, consideration should be given to the factors. The contextual factors are outlined in the box labeled ‘contextual factors.’ The broken lines indicate their likely intervening effect.





**Figure: 5.8: Revised Conceptual Framework Based on Empirical Findings**



### 5.9 Chapter Summary

This chapter discussed the findings of the study. It provides summaries of findings based on the research objectives and further discusses the findings of the research objectives by objectives. The relevance of the study's findings to the three theories that informed the study and areas of departure and consistency with the theories are clearly outlined in the chapter. Finally, a revision of the study's conceptual framework based on the findings of the study was also provided in the chapter.



## CHAPTER SIX

### 6.0 SUMMARY OF FINDINGS, RECOMMENDATION, AND CONCLUSIONS

#### 6.1 Chapter Introduction

This chapter summarizes the study's findings, beginning with the findings on the SRHL needs of young adolescents and those of the SRHL intervention. The contributions of the study to the empirical and theoretical literature are discussed. The chapter further outlines the study's contribution to the research methodology, health policy, and management. The limitations of the research, recommendations, and conclusions are also outlined together with areas of further research.

#### 6.2 Summary of Key Findings

The study assessed adolescents' SRHL needs to obtain baseline data to guide restructuring existing SRH materials into adolescent-centered educational materials. The purpose was to experiment with the educational materials and evaluate their effectiveness in improving ASRHL. The SRHL needs assessment to unearth elements valuable for formulating strategies for improving ASRH. The finding shows that young adolescents in the Effutu Municipality do not understand the concept of SRH. Although some young adolescents admitted to being in a sexual relationship, most adolescents have poor knowledge about sexuality and risky sexual behaviors, contraceptives and methods, and STIs. One major challenge to SRHL was the lack of access to SRH information and educational materials. School management, particularly head teachers, and some teachers are opposed to SRH education, and adolescents who seek such information are given negative labels. Young adolescents, especially females, suffer from prejudice and stigmatization related to SRH. The ability to read and understand existing educational materials was a barrier to SRHL among adolescents, as half of the participants found the language of the materials difficult to read and understand. They were also unfamiliar with medical terminologies used in the material. Existing educational materials had higher RGLs and lower reading ease levels.

Three SRH text materials were developed for the SRHL intervention. 1) Difficult text material, a synthesis of existing SRH text, gleaned based on knowledge gaps identified among young adolescents. 2) Simplified text-only material. 3) Picture-enhance text material. The last two are the

restructured SRH materials with lower RGL and reading ease levels. The materials were administered to three intervention groups (T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub>) and one control group. The T<sub>1</sub> group received the difficult text material, T<sub>2</sub> had the simplified text-only material, and T<sub>3</sub> received the picture-enhanced format. The simplified text-only material significantly improved functional SRHL compared to the picture-enhanced text material. Conversely, the latter significantly improved the ability to read and understand than the simplified text-only material. Functional literacy slightly improved among those who received the difficult text and was not significant. All three materials significantly improved interactive SRH literacy. Learning ability was a material predictor of functional SRHL among those receiving picture-enhanced text material and difficult text. Gender, school type, and place of residence were significant predictors of interactive literacy in those receiving the simplified text-only and picture-enhanced text materials. No material changes occurred in the functional literacy of participants who received the picture-enhanced text material and the control group eight weeks after the intervention. However, significant gains in function literacy happened among those who took the difficult text material, but a reduction was recorded among those receiving the simplified text-only material.

### **6.3 Contributions of the Research**

The study contributed to knowledge in several areas regarding originality, such as the context, empirical literature, theory, policy and practice, and new knowledge.

#### **6.3.1 Contribution to the Empirical Literature**

A considerable amount of evidence exists on ASRH in the SSA Region, including SRH interventional studies. Yet, there is a lack of studies on ASRHL in Ghana and SSA (Meherali et al., 2021; Ajayi et al., 2021). Existing studies have concentrated on ASRH knowledge, decision-making capacity, behavior, information access, and service utilization and barriers (Bain et al., 2019; Ahinkorah et al., 2020; Furry et al., 2019; Finlay et al., 2020; Kyilleh et al., 2018; Ibegbulam et al., 2018). Few studies exist on literacy challenges inherent in HEM, including text readability, comprehensibility, and medical vocabulary knowledge. Although Ghana's Adolescent Health Service Policy and Strategy (2016-20220) had the vision to promote access to quality health information and services, there is a paucity of ASRHL research to inform interventions for achieving the strategic objectives. This study contributes to the empirical literature within the

Ghanaian and Sub-Saharan African contexts. It provides new knowledge on the readability levels of existing SRH educational materials, their readability and comprehensibility from the perspective of young adolescents, and the topic domains that should be the focus of future educational interventions. It also provides knowledge on instructional designs and cost-effective formats for presenting ASRH information to effectively improve functional and interactive SRHL in young adolescents.

### **6.3.2 Contributions to the Theoretical Literature**

The study is informed by three theories: the CLT, the CTML, and the Pictorial Realism Theory. The first two theories explain how we can reduce irrelevant details of existing SRH educational materials that do not support reading, understanding, and the application of lessons to real-life situations. They also provide instructional design formats and predict conditions under which they can be effective. The third, Pictorial Realism Theory, was included to explore the impact of pictorial realism on SRH learning in young adolescents. The study focused on restructuring existing SRH educational materials into various instructional presentation formats (i.e., simplified text-only and picture-enhanced formats) and comparing them with the existing SRH educational materials to determine their effectiveness in improving ASRHL. The CLT and the CTML support SRH learning among adolescents. Presenting SRH educational materials in simplified text with pictures optimizes reading and understanding of SRH educational materials. However, the level of visual fidelity in promoting SRH learning is topic, learner, and context-specific, making the CTML and the Pictorial Realism Theory contradictory in one instance and complementary in another. Despite the inconsistencies between the CTML and Pictorial Realism Theory, all three theories provide a sound base for restructuring SRH text to improve education and learning.

### **6.3.3 Contributions to Methodology**

Although many studies (Wolpin et al., 2016; Beusekom et al., 2017; Houston et al., 2020; Sun et al., 2021) have employed different strategies to simplify health information text from diverse health contexts, scarcely do they address the science behind cognition and learning. For instance, only two of the 33 studies in the literature review were premised on human cognition, learning, and behavior theories. Most studies did not report on the cognitive principles and factors considered in the design of their HEM. This study contributes to SRH instructional design and learning by

providing exhaustive documentation of cognitive load alignment, text restructuring, and a participatory approach to an adolescent-centered instructional design predicated on tested and proven cognitive principles of learning instructional design. The methodological rigor lies in assessing adolescents' scope of knowledge of age-appropriate SRH topics, their cognitive abilities, the difficulty level of reachable SRH educational materials, and their comprehensibility. Other areas of rigor included the involvement of stakeholders, adolescents, and experts in the materials design and development. The study used a sequential mix-method to gather baseline data to provide a basis to restructure existing materials and used a participatory approach to design the SRH educational materials. The methods used data triangulation to improve the validity and trustworthiness of qualitative and quantitative data. While measures for assessing functional literacy in other health content abound, very little exists on SRHL (Vongxay et al., 2019). Also, very few measures exist for assessing high-order level health literacy, such as skills needed for daily decision-making (Altin et al., 2014). This study contributes to the measures for assessing functional and interactive SRHL in adolescents. The study employed a statistical technique that would help isolate the actual effect of the educational materials on young adolescents' SRHL skills. Most health literacy studies using a quasi-experimental design evaluated their intervention using multivariable regression, correlation coefficient, and paired sample means, which do not eliminate the effect of other contextual factors that could have contributed to the outcome (Houts et al., 2001; Price et al., 2007, Zeng-Treitler et al., 2008). The contributions from the study will help improve the methodological rigor of SRH instruction design and interventional studies.

#### **6.3.4 Contributions to Health Policy and Management**

The study's findings provide valuable knowledge for revising the Adolescent Health Service Policy and strategy. Regarding strategy, the results show that access to easy-to-read SRH educational materials among young adolescents will improve SRHL and knowledge. The literacy needs assessment indicates that people, particularly young adolescents, may read at a lower RGL than their years of schooling. The needs assessment emphasizes the need for the health system of Ghana to realign the RGLs of health information text to the literacy skills of the different groups in the population to promote effective health education and literacy. The literacy intervention also offers several lessons for improving ASRHL and knowledge. Existing SRH educational materials have linguistic characteristics that may pose reading and comprehension difficulties for young

adolescents, especially those in rural, peri-urban areas and slum communities of the country. It will be unprofitable to reproduce such materials or develop new ones with similar linguistic features for intervention and education among young adolescents from poor socioeconomic backgrounds. The study shows that easy-to-read SRH text material will make a cost-effective and socially acceptable educational material for improving SRHL literacy and knowledge at the school and community levels. Even though picture-enhanced material effectively improves reading, understanding, and recall, it may not be acceptable in Ghanaian communities. They can also act as a distraction to learning objectives, leading to sub-optimal learning.

#### **6.4 Research Limitations**

Although the research is extensive in scope and has varied findings, it is not without limitations. It must be noted, however, that the limitations do not affect the validity and trustworthiness of the findings. First, the study was limited to the Effutu Municipality of the Central Region and young in-school adolescents. Therefore, we can generalize the findings to young adolescents, not older adolescents. Second, the assessment of the effectiveness of educational materials developed for the intervention was limited to the ability to read, understand, and SRH decision-making skills, but not its impact on behavior. Thus, the material's effectiveness in improving adolescents' SRH behavior is unknown. Third, the withdrawal of schools from the intervention reduced the sample size, which may have implications for the effect size record. A larger sample size would likely have recorded a more considerable effect size than what was recorded by the study.

#### **6.5 Recommendations**

##### **6.5.1 Specific Recommendations**

The recommendations are based on the core findings, conclusions, and contributions to knowledge, policy, and practice. The recommendations are targeted at the overall system, adolescent health policy, and strategy. General recommendations are also proposed for the school system of Ghana.

##### ***Health System-Level:***

- i. A national health policy defining the RGL of health information texts for the general population is critical to improving health literacy, knowledge, and self-care among low-literate groups.

### ***Adolescent Health Service Policy Strategy***

Although the target of reaching 90% of adolescents in Ghana with health information and knowledge of SRH services by 2020 has expired, the following strategies are critical for achieving this target in a revised policy.

- i. Simplified text-only SRH/health educational materials have cost-effectiveness and wider acceptability for improving ASRHL than picture-enhanced ones and are recommended for use among in-school adolescents.
- ii. The GHS and relevant agencies should restructure or align existing SRH/health educational material to the literacy skills of young adolescents to promote reading, understanding, knowledge, and decision-making skills in adolescents. Where educational programs aim to improve decision-making skills, restructuring existing materials may be unnecessary.
- iii. Develop strategies for advocacy to reduce ASRH stigma and 'negative labeling' and garner the support of relevant stakeholders, particularly parents and teachers, for ASRH education.
- iv. Promote easy access and availability of easy-to-read text-based SRH educational materials among adolescents. Stakeholder engagement and involvement in developing picture-enhanced materials may help overcome its acceptability challenges.
- v. Integrate comprehensive SRH education as a co-curriculum for in-school adolescents to improve ASRHL and knowledge. This strategy will ensure that a more significant proportion of the adolescent population is reached with SRH information. It would help if trained young people outside of the school system were made to teach the lessons.
- vi. Embark on a vigorous SRH education and literacy intervention for parents and guardians to promote knowledge and acceptance of ASRH and foster adolescent-parent communication of SRH.

### ***Municipal Health Directorate***

- i. The Effutu Municipal Health Directorate should map out strategies for sensitizing parents and teachers on the need for ASRH education to win their support for educational programs.

- ii. The Effutu Municipal Health Directorate and the Education Service should jointly implement SRH educational interventions periodically to promote SRHL and knowledge of adolescents.
- iii. The Effutu Municipal Health Directorate and the Education Service should consider using trained peer educators for SRH education.
- iv. The two agencies should jointly ensure the availability of easy-to-read text-based SRH educational materials in schools and libraries for adolescents.

### **6.5.2 General Recommendation**

- i. The Educational Ministry should consider a policy on RGL of textbooks for the different levels of basic education to improve learning in basic schools.

### **6.6 Conclusion**

This study aimed to examine the SRHL needs of adolescents in the Effutu Municipality and restructure existing SRH educational materials to improve the SRHL of adolescents. The study shows that young adolescents in the Effutu Municipality have limited access to SRH educational materials and poor knowledge of critical SRH knowledge domains. Further, available educational materials likely to be within reach of adolescents have higher RGL and are incomprehensible to them primarily due to the use of complex medical vocabulary. After restructuring the existing educational materials using text simplification and picture enhancement, the ability to read and understand improved far above what could be achieved using the existing materials. The study also shows that picture-enhanced and simplified text-only SRH educational materials are valuable for improving ASRHL. The study's findings are consistent with the tenets of the CLT, CTML, and the pictorial realism theory. They demonstrate that restructuring SRH educational materials based on cognitive principles improves SRH learning. However, the principles of pictorial realism and the CTML contradict when applied to SRH learning. Though they offer functional principles for optimizing reading and understanding SRH information among adolescents, they present acceptability and distraction challenges.

The findings suggest several strategies for revising the adolescent Health Service Policy and Strategy. To achieve improved SRH knowledge in 90% of adolescents in Ghana, advocacy and

sensitization of relevant stakeholders, particularly parents, and teachers, to create a sense of urgency for destigmatization of ASRH is critical. There is a need to set an RGL threshold for health information for the general population. Existing SRH educational materials should be adjusted to the literacy skills of young adolescents and make them readily available and accessible. Picture-enhanced educational materials effectively improve reading and understanding of SRH, though they may present acceptability challenges when utilized in settings with similar sociocultural characteristics to the Effutu Municipality. For this reason, simplified text-only materials are a cost-effective option for providing SRH education through independent and group learning. The findings show that the existing SRH educational materials have similar effectiveness as the restructured ones in improving the SRH decision-making skills of young adolescents.

Some of the key outcomes of the study are that SRH text restructuring is an effective strategy for improving reading and understanding of SRH information among young adolescents. Access to restructured materials is an essential enabler of ASRHL. SRH instructional design, such as simplified text-only materials, would be cost-efficient for promoting SRHL in young adolescents, given the acceptability challenges that may come with picture-enhanced materials. However, the decision to restructure existing materials should be guided by the objective of SRH education. While text restructuring may not be necessary when the learning objective is to improve decision-making skills, such a text helps improve reading, understanding, and decision-making skills.

### **6.7 Suggestions for Future Research**

As acknowledged in the study limitation, data on the assessment of SRHL needs and the intervention were limited to the Effutu Municipality. Future research on a regional or national scale is critical to hone our understanding of the SRH knowledge and literacy challenges of young adolescents to guide future interventions for improving ASRHL. A study to replicate the SRHL intervention on a large scale will help reinforce the findings of the SRHL intervention to guide the choice of instructional design for improving ASRHL in the future. Future research to assess the cultural and contextual limitations of the theories used in the study on ASRH educational intervention is essential in choosing acceptable formats for presenting ASRH educational materials.

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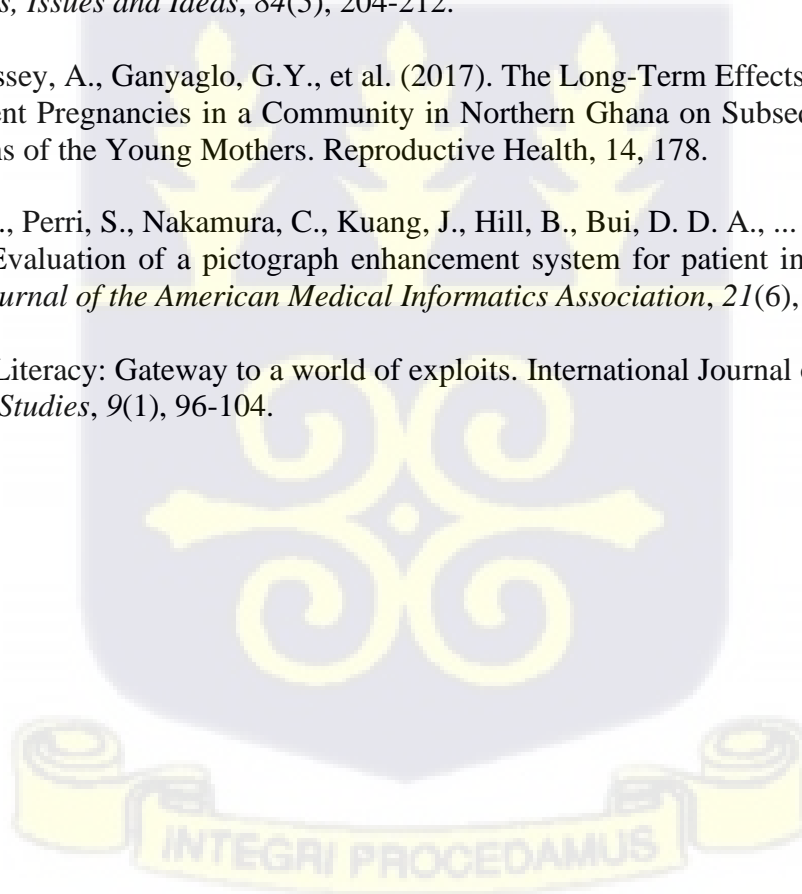
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**APPENDICES**

**Appendix A: Additional Results from the Statistical Analyses**

**Appendix A1: Multi-Collinearity of Independent Variables Likely to Affect Functional SRHL**

Independent Variables	T <sub>1</sub>				
	Age	School Type	Gender	Place of Residence	Learning Ability
Age	1.0000	N/A			
School type	N/A	N/A			
Gender	0.0815	N/A	1.0000		
Place of residence	-0.0543	N/A	0.3194	1.0000	
Learning ability	-0.1758	N/A	0.0476	0.1491	1.0000

Independent Variables	T <sub>2</sub>				
	Age	School Type	Gender	Place of Residence	Learning Ability
Age	1.0000				
School type	0.3276	1.0000			
Gender	-0.0211	0.1736	1.0000		
Place of residence	-0.2043	-0.8547	-0.1184	1.0000	
Learning ability	-0.0381	0.1857	0.2922	-0.1779	1.0000

Independent Variables	T <sub>3</sub>				
	Age	School Type	Gender	Place of Residence	Learning Ability
Age	1.0000				
School type	0.1425	1.0000			
Gender	-0.1232	-0.0054	1.0000		
Place of residence	-0.2206	0.0373	0.0506	1.0000	
Learning ability	-0.1668	-0.1132	-0.0380	-0.0031	1.0000

*Constructed by the researcher, 2023.*



**Appendix A2: Multi-Collinearity of Independent Variables Likely to Affect Interactive SRHL**

Independent Variables	T <sub>1</sub>				
	Age	School Type	Gender	Place of Residence	Learning Ability
Age	1.0000	N/A			
School type	N/A	N/A			
Gender	0.0815	N/A	1.0000		
Place of residence	-0.0543	N/A	0.3194	1.0000	
Learning ability	-0.1758	N/A	0.0476	0.1491	1.0000

Independent Variables	T <sub>2</sub>				
	Age	School type	Gender	Place of residence	Learning ability
Age	1.0000				
School type	0.3248	1.0000			
Gender	-0.0122	0.1730	1.0000		
Place of residence	-0.1937	-0.8399	-0.1129	1.0000	
Learning ability	-0.0915	0.1589	0.3538	-0.1544	1.0000

Independent Variables	T <sub>3</sub>				
	Age	School type	Gender	Place of residence	Learning ability
Age	1.0000				
School type	0.1425	1.0000			
Gender	-0.1232	-0.0054	1.0000		
Place of residence	-0.2206	0.0373	0.0506	1.0000	
Learning ability	-0.1668	-0.1132	-0.0380	-0.0031	1.0000

Constructed by the researcher, 2023.

**Appendix A3: Model Summaries for SRHL Intervention on Functional SRHL (Excluding Numeracy)**

T <sub>i</sub>	SS	DF	MS	F	F Prob	Adjusted R <sup>2</sup>
T <sub>1</sub>						
Model	5326.24	3	1775.41	8.84	0.0000	0.1144
Residual	35951.22	179	200.84			
T <sub>2</sub>						
Model	21261.73	3	7087.25	33.00	0.0000	0.24
Residual	63139.37	294	214.75			
T <sub>3</sub>						
Model	23225.87	3	36.11	0.0000		0.26
Residual	63033.10	294				

Constructed by the researcher, 2023.

**Appendix A4: DID Estimation of Function SRHL Intervention  
(Excluding Numeracy)**

SRHL	Coefficient	Stand. error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1</b>						
Outcome at baseline ( $\beta_1$ )	-10.37532	3.46	-3.00	0.003	-17.21	2.22
Gains over time less treat. ( $\beta_2$ )	6.964596	2.40	2.90	0.004	2.22	11.71
Intervention's effect ( $\beta_3$ )	4.39904	4.90	0.90	0.371	-5.27	14.07
Constant	49.55714	1.69	29.26	0.001	46.21	52.89
<b>Model 2</b>						
Outcome at baseline ( $\beta_1$ )	-1.767019	2.39	-0.74	0.461	-6.47	2.94
Gains over time less treat. ( $\beta_2$ )	6.964596	2.48	2.80	0.005	2.07	11.86
Intervention's effect ( $\beta_3$ )	14.10425	3.40	4.14	0.001	7.40	20.80
Constant	49.55714	1.75	28.29	0.001	46.11	53.00
<b>Model 3</b>						
Outcome at baseline ( $\beta_1$ )	0.2586466	2.43	0.11	0.915	-4.51	5.03
Gains over time less treat. ( $\beta_2$ )	0.2586466	2.43	0.11	0.915	-4.52	5.03
Intervention's effect ( $\beta_3$ )	19.91241	3.39	5.87	0.001	13.23	26.59
Constant	49.55714	1.75	28.32	0.001	46.11	53.00

*Constructed by the researcher, 2023.*



**Appendix A5: Model Summaries of Multivariable Analysis of Time-variant Characteristics and Functional SRHL**

Model 1 (T <sub>1</sub> )	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>F Prob</i>	<i>Adjusted R<sup>2</sup></i>
Model	5740.32	2	2870.163	101.56	0.0001	0.9055
Residual	536.95	19	28.26			
Model 1 (T <sub>2</sub> )						
Model	288.81	2	144.41	0.30	0.7445	0.0221
Residual	30694.22	63	487.21			
Model 1 (T <sub>3</sub> )						
Model	7117.82	2	3558.91	6.78	0.0020	0.1336
Residual	38301.13	73	524.67			

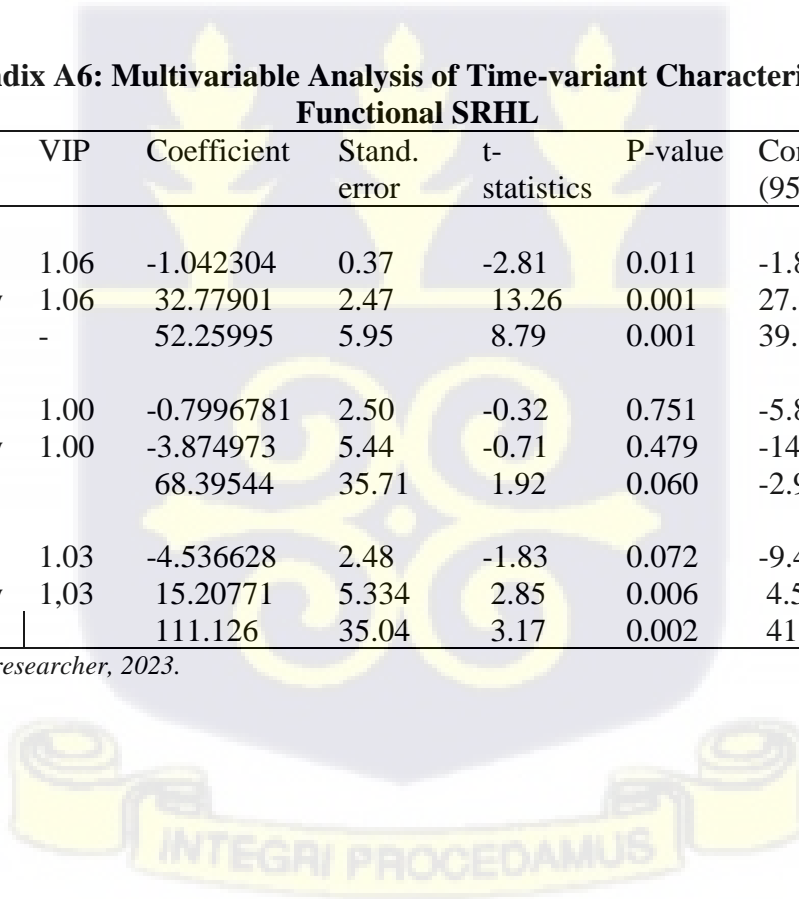
Constructed by the researcher, 2023.

*SS = sum of squares, DF = degree of freedom. T<sub>0</sub> = control group, T<sub>1</sub> = intervention group that received the difficult text, T<sub>2</sub> = intervention group that received the simplified text only, and T<sub>3</sub> = group that was given the pictograph enhanced text.*

**Appendix A6: Multivariable Analysis of Time-variant Characteristics and Functional SRHL**

Functional SRHL	VIP	Coefficient	Stand. error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1</b>							
Age	1.06	-1.042304	0.37	-2.81	0.011	-1.82	-0.26
Learning ability	1.06	32.77901	2.47	13.26	0.001	27.61	37.95
Constant	-	52.25995	5.95	8.79	0.001	39.81	64.71
<b>Model 2</b>							
Age	1.00	-0.7996781	2.50	-0.32	0.751	-5.80	4.21
Learning ability	1.00	-3.874973	5.44	-0.71	0.479	-14.75	6.99
Constant		68.39544	35.71	1.92	0.060	-2.96	139.75
<b>Model 3</b>							
Age	1.03	-4.536628	2.48	-1.83	0.072	-9.48	0.45
Learning ability	1.03	15.20771	5.334	2.85	0.006	4.57	25.84
Constant		111.126	35.04	3.17	0.002	41.29	180.95

Constructed by the researcher, 2023.



**Appendix A7: Model Summaries of Multivariate Analysis of Time-variant Characteristics and Interactive SRHL**

Model 1 (T <sub>1</sub> )	<i>SS</i>	<i>DF</i>	<i>MS</i>	<i>F</i>	<i>F Prob</i>	<i>Adjusted R<sup>2</sup></i>
Model	11.2361705	2	5.62	0.06	0.94	-0.09
Residual	1800.58201	19	94.76			
Model 1 (T <sub>2</sub> )						
Model	112.411358	2	56.21	0.11	0.89	-0.03
Residual	28841.0313	58	497.25			
Model 1 (T <sub>3</sub> )						
Model	235.302792	2	117.65	0.62	0.54	-0.01
Residual	12585.2479	66	190.68			

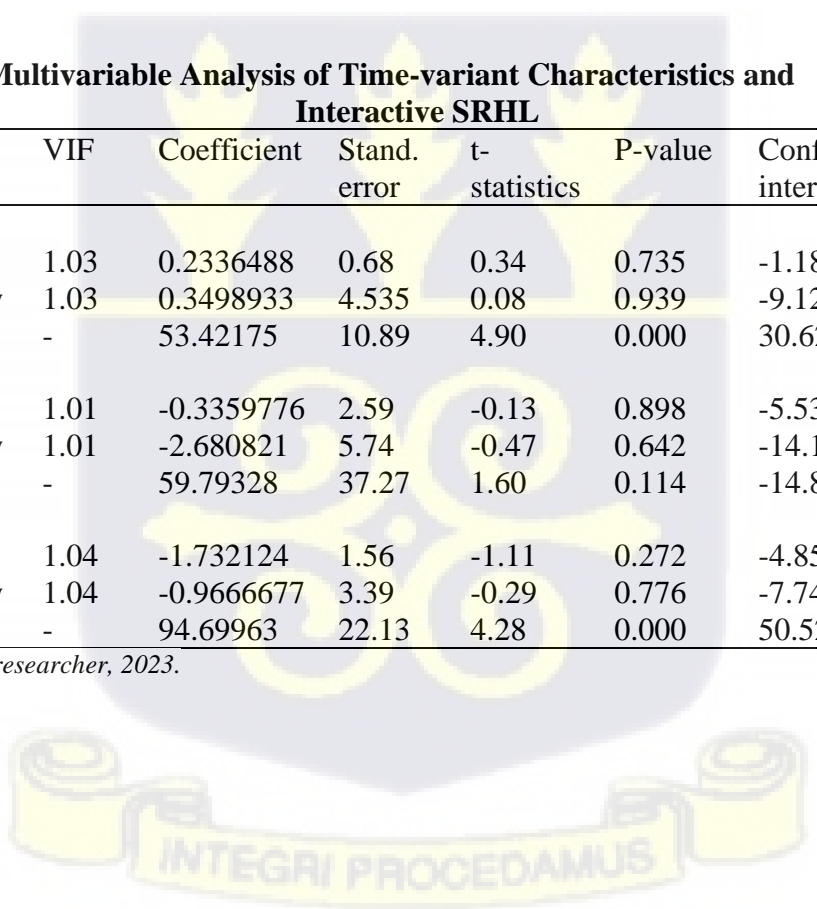
Constructed by the researcher, 2023.

*SS* = sum of squares, *DF* = degree of freedom. *T*<sub>0</sub> = control group, *T*<sub>1</sub> = intervention group that received the difficult text, *T*<sub>2</sub> = intervention group that received the simplified text only, and *T*<sub>3</sub> = group that was given the pictograph enhanced text.

**Appendix A8: Multivariable Analysis of Time-variant Characteristics and Interactive SRHL**

Functional SRHL	VIF	Coefficient	Stand. error	t-statistics	P-value	Confidence interval (95%)	
<b>Model 1</b>							
Age	1.03	0.2336488	0.68	0.34	0.735	-1.18	1.65
Learning ability	1.03	0.3498933	4.535	0.08	0.939	-9.12	9.82
Constant	-	53.42175	10.89	4.90	0.000	30.62	76.22
<b>Model 2</b>							
Age	1.01	-0.3359776	2.59	-0.13	0.898	-5.53	4.86
Learning ability	1.01	-2.680821	5.74	-0.47	0.642	-14.16	8.79
Constant	-	59.79328	37.27	1.60	0.114	-14.81	134.40
<b>Model 3</b>							
Age	1.04	-1.732124	1.56	-1.11	0.272	-4.85	1.38
Learning ability	1.04	-0.9666677	3.39	-0.29	0.776	-7.74	5.80
Constant	-	94.69963	22.13	4.28	0.000	50.52	138.88

Constructed by the researcher, 2023.



**Appendix A9: Medical Terminologies and Suggested Local Jargon**

<b>Medical Terminology</b>	<b>Suggested local Jargons</b>
Infection	Illness/sickness
Symptoms	signs
Ovaries	Egg-making organ
Fertilize	meet
Menstrual cycle	Menses cycle
Ovulation	Egg-releasing period
Contraception	Pregnancy prevention
Sperm and semen	‘Juice’
Hormone	Body chemical
Uterus	womb
Endometrium	Womb Lining
Gonorrhea	Gono
Chlamydia	Chlam
Trichomoniasis	Tricho
Vaginal yeast	White
Photographic	Pono

*Constructed by the researcher, 2023*



## Appendix B: Research Instruments

### Appendix B1: Test of Functional Sexual and Reproductive Health Literacy (TFSRHL) FORM I

#### Background Information

Please check (✓) and write as suitable in the boxes or blank spaces provided.

Participant I/D: .....

Age .....

Gender: Male [ ]. Female [ ].

School Type: Private [ ]. Public: [ ].

BSL: 7 [ ]. BSL 8 [ ].

Where do you live? .....

#### Parents' Information

Mother's level of education: No education [ ]. Basic [ ]. Secondary [ ]. Tertiary [ ].

Father's level of education: No education [ ]. Basic [ ]. Secondary [ ]. Tertiary [ ].

Is your father working? Yes [ ]. No. [ ]. Type of work: Paid work [ ]. Self-employed [ ].

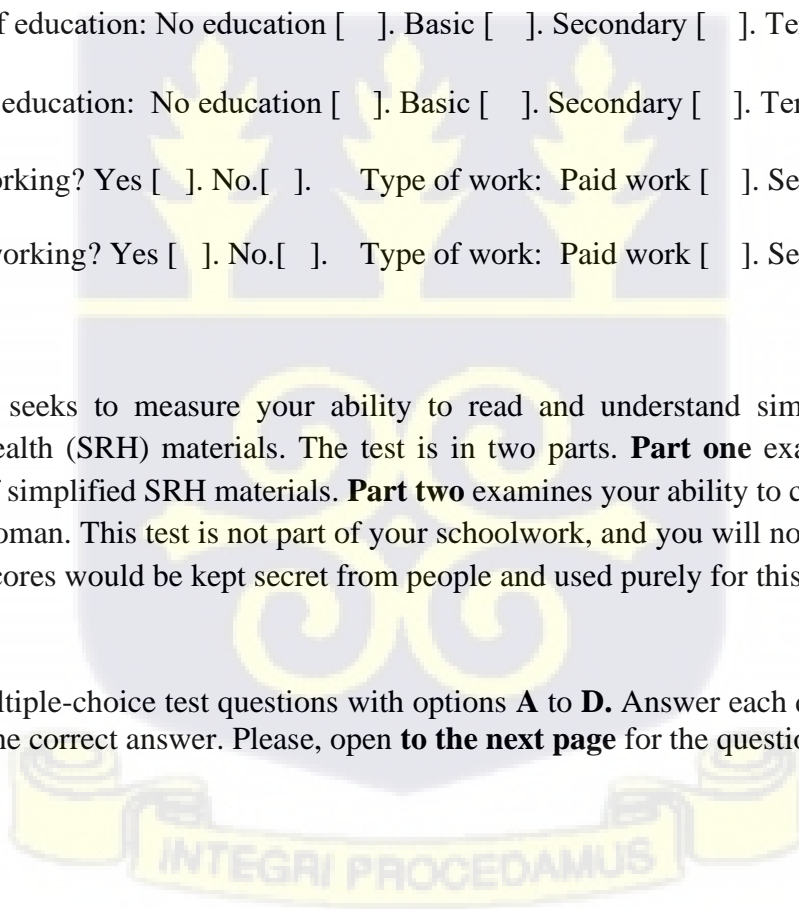
Is your mother working? Yes [ ]. No. [ ]. Type of work: Paid work [ ]. Self-employed [ ].

#### Instruction

This instrument seeks to measure your ability to read and understand simplified Sexual and Reproductive Health (SRH) materials. The test is in two parts. **Part one** examines reading and understanding of simplified SRH materials. **Part two** examines your ability to calculate the menses cycle of a girl/woman. This test is not part of your schoolwork, and you will not be graded on your answers. Your scores would be kept secret from people and used purely for this research.

#### Part One

There are 30 multiple-choice test questions with options **A** to **D**. Answer each question by circling the alphabet of the correct answer. Please, open **to the next page** for the questions.



1. An STI germ causes gonorrhoea \_\_\_\_\_.
  - A. swelling
  - B. infection
  - C. incision
  - D. itching
  
2. If you have sex through \_\_\_\_\_ of someone who has gonorrhoea, you can also be infected.
  - A. the anus
  - B. the back
  - C. the buttocks
  - D. between the thighs
  
3. The \_\_\_\_\_ germ can live only in wet places of the body.
  - A. chlamydia
  - B. gonorrhoea
  - C. syphilis
  - D. vaginal yeast
  
4. Girls with gonorrhoea will have a burning feeling when \_\_\_\_\_ and pains during sex.
  - A. bending
  - B. bathing
  - C. urinating
  - D. shitting
  
5. A pregnant girl/woman living with gonorrhoea can pass it on to her baby \_\_\_\_\_.
  - A. when pregnant and eating
  - B. during pregnancy and sex
  - C. during pregnancy and childbirth
  - D. during sex and childbirth
  
6. The period where a boy/girl changes and moves from a child into an adult is called \_\_\_\_\_.
  - A. adult years
  - B. youthful years
  - C. teenage years
  - D. young years
  
7. The period between 10 and 14 years is called \_\_\_\_\_.
  - A. teenage years
  - B. early years
  - C. young teenage years
  - D. young years

8. Changes at puberty take place in the mind and \_\_\_\_\_.
- A. the head
  - B. your feelings
  - C. your spirit
  - D. your soul
9. At age eight or more, the bodies of boys/girls begin to produce body chemicals called \_\_\_\_\_ fluids
- A. hormones
  - B. hymens
  - C. blood cells
10. At puberty, young teens begin to have sexual feelings because of \_\_\_\_\_ production.
- A. cells
  - B. fluids
  - C. hormones
  - D. hymens
11. Vaginal yeast is not part of the list of STIs because the germ already lives in the \_\_\_\_\_ of females.
- A. Buttocks
  - B. Anus
  - C. Vagina
  - D. womb
12. Most girls get vaginal yeast during their first time of \_\_\_\_\_.
- A. sexual life
  - B. sexual feelings
  - C. sexual attachment
  - D. sexual act
13. Girls can also get vaginal yeast from using infected panties and \_\_\_\_\_.
- A. sponges
  - B. washbasins
  - C. WCs/toilets
  - D. door handles
14. Vaginal yeast can infect your throat if you have oral sex with a boy/girl who has \_\_\_\_\_ infection.
- A. eye
  - B. nose
  - C. chest
  - D. yeast

15. A girl who has a yeast infection would have burning feelings in the vagina each time she \_\_\_\_\_.

- A. sweats
- B. have their menses
- C. have discharges
- D. urinates

16. Forced and unwanted sex may take \_\_\_\_\_ forms

- A. two
- B. three
- C. four
- D. five

17. Sexual abuse happens when a male/female forces someone below age \_\_\_\_\_ into having sex.

- A. 22
- B. 20
- C. 18
- D. 16

18. To avoid rape, report anyone touching your \_\_\_\_\_ to your parents/caregivers.

- A. body parts
- B. private parts
- C. bony parts
- D. main parts

19. Rape happens when a male/female forces someone aged \_\_\_\_\_ into having sex.

- A. 16 and below
- B. 16 or more
- C. 15 and below
- D. 15 or less

20. The laws of Ghana do not accept \_\_\_\_\_ because both are wrongdoings

- A. rape and petting
- B. petting and abuse
- C. rape and sexual abuse
- D. sexual abuse and fingering

21. The right thing to do when you are raped is to tell your parents/caregivers without\_\_\_\_\_.
- A. making time
  - B. going to the hospital
  - C. seeking for help
  - D. wasting time
22. Children of \_\_\_\_\_may not go to school and may grow to become poor
- A. young teens
  - B. young men
  - C. young women
  - D. the youth
23. The simplest way to prevent pregnancy and some STIs is \_\_\_\_\_.
- A. abstinence
  - B. fingering each other
  - C. masturbating each other
  - D. outercourse
24. Girls who get pregnant at an early age may not be able to \_\_\_\_\_ the baby on their own.
- A. deliver
  - B. save
  - C. love
  - D. leave
25. A girl may drop out of school because of early sex and \_\_\_\_\_.
- A. growth
  - B. masturbation
  - C. pregnancy
  - D. weaning
26. If a young teen chooses \_\_\_\_\_, he/she may be able to finish school on time.
- A. not to have fun
  - B. not to go to fairs
  - C. not have sex
  - D. not to have friends
27. At age eight or more, girls start to produce eggs, which die between \_\_\_\_\_hours.
- A. 10 and 24
  - B. 12 and 24
  - C. 16 and 26
  - D. 18 and 28

28. The egg dies and moves to the \_\_\_\_\_ if it does not meet with a sperm  
 A. cervix  
 B. vagina  
 C. womb  
 D. tube
29. The womb uses blood to wash the egg and the \_\_\_\_\_ away.  
 A. cervix  
 B. lining  
 C. tubes  
 D. ovaries
30. A girl/woman's cycle may happen between \_\_\_\_\_ days, with 28 days being regular.  
 A. 22 and 34  
 B. 24 and 36  
 C. 26 and 40  
 D. 28 and 42

**Numeracy Test**

**Instructions**

There are eight multiple-choice test items with options **A** to **D**. Use the information in the calendar below to do your calculation and answer the questions that follow by circling the alphabets of the correct answers.

January 2022							February 2022						
Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.
					1	2		1	2	3	4	5	6
3	4	5	6	7	8	9	7	8	9	10	11	12	13
10	11	12	13	14	15	16	14	15	16	17	18	19	20
17	18	19	20	21	22	23	21	22	23	24	25	26	27
24	25	26	27	28	29	30	28						
31													

1. Assuming a girl/woman has a 28-day cycle and her last menses started on January 10, 2022. Between which of the following days is she likely to ovulate? between .....
- A. 17<sup>th</sup> and 20<sup>th</sup> January 2022  
 B. 17<sup>th</sup> and 21<sup>st</sup> January 2022  
 C. 21<sup>st</sup> and 23<sup>rd</sup> January 2022.  
 D. 22<sup>nd</sup> and 24<sup>th</sup> January 2022

2. Based on your answer to question 1, What should be the date of her next menses?.....
  - A. February 6, 2022
  - B. February 8, 2022
  - C. February 10, 2022
  - D. February 12, 2022
  
3. Based on your answer to question 1, which of the days in January 2022 is her expected safe period after ovulation?
  - A. 18<sup>th</sup> and 31<sup>st</sup> January 2022
  - B. 21<sup>st</sup> and 31<sup>st</sup> January 2022
  - C. 25<sup>th</sup> and 31<sup>st</sup> January 2022
  - D. 27<sup>th</sup> and 31<sup>st</sup> January 2022
  
4. What are her expected days of ovulation in February 2022?
  - A. 12<sup>th</sup> to 17<sup>th</sup> February 2022
  - B. 17<sup>th</sup> to 19<sup>th</sup> February 2022
  - C. 18<sup>th</sup> to 20<sup>th</sup> February 2022
  - D. 19<sup>th</sup> to 22<sup>nd</sup> February 2022
  
5. What is her unsafe period in February 2022?
  - A. 17<sup>th</sup> –20<sup>th</sup> February 2022
  - B. 16<sup>th</sup> – 21<sup>st</sup> February 2022
  - C. 15<sup>th</sup> – 20<sup>th</sup> February 2022
  - D. 13<sup>th</sup> –20<sup>th</sup> February 2022



**Appendix B2: Decision-making Skills in Sexual and Reproductive Health (DSSRH)  
FORM I**

**Index Number:** .....

**Instruction**

This test presents a scenario and ten multiple-choice questions with options **A** to **H**. Each question has more than one answer. You are to **read the scenario below** and answer the following questions by circling the correct answers' alphabets. This test is not part of your schoolwork, and you will not be graded on your answers. Your scores would be kept secret from your schoolmates. Your score will be used purely for research purposes.

**Scenario**

Ama, Kofi, Araba, and Kwame are young teens facing problems common to most teenagers of their age. Ama is a 14-year-old Junior High School (JHS) girl. She is in JHS 2. She has had most of the changes in the body that girls have at puberty, including menses. Ama feels it is too early for her to have menses. Her menses cycle is 28 days. She had her last menses on 25<sup>th</sup> May 2021. Some days later, Ama started having vaginal itching, and her vagina became reddish. She also had whitish fluid coming from her vagina. Ama thinks she has a yeast (white) infection.

Araba is in JHS 2 and has begun menses but knows little about STIs and childbearing matters. She is in the same class as Kofi, her friend. On the evening of 6<sup>th</sup> June 2021, Araba and Kofi attended a party organized for the final year students at her school. At the party, Araba and Kofi went outside and sat in a very quiet place in the dark, where no one could see them. They began kissing and touching each other's private parts. After some time, they had sex and went back to the party venue. At 8:00 pm, the party ended, and Araba and Kofi left for their homes. Their school went on vacation on 10<sup>th</sup> June 2021. Araba was expecting to have her menses between 20<sup>th</sup> and 27<sup>th</sup> June 2021. It is 27<sup>th</sup> July 2021, and Araba is yet to have her menses. She is worried and wants to know what is wrong with her.

Kwame is 13 years old. He is Kofi's friend. Kwame is worried about having wet dreams and erection early in the morning. He is innocent and has very little knowledge of physical changes at puberty and sexual issues. Yet, Kwame is not happy asking his caregivers about it. He has many questions on his mind and is looking for someone to help him.

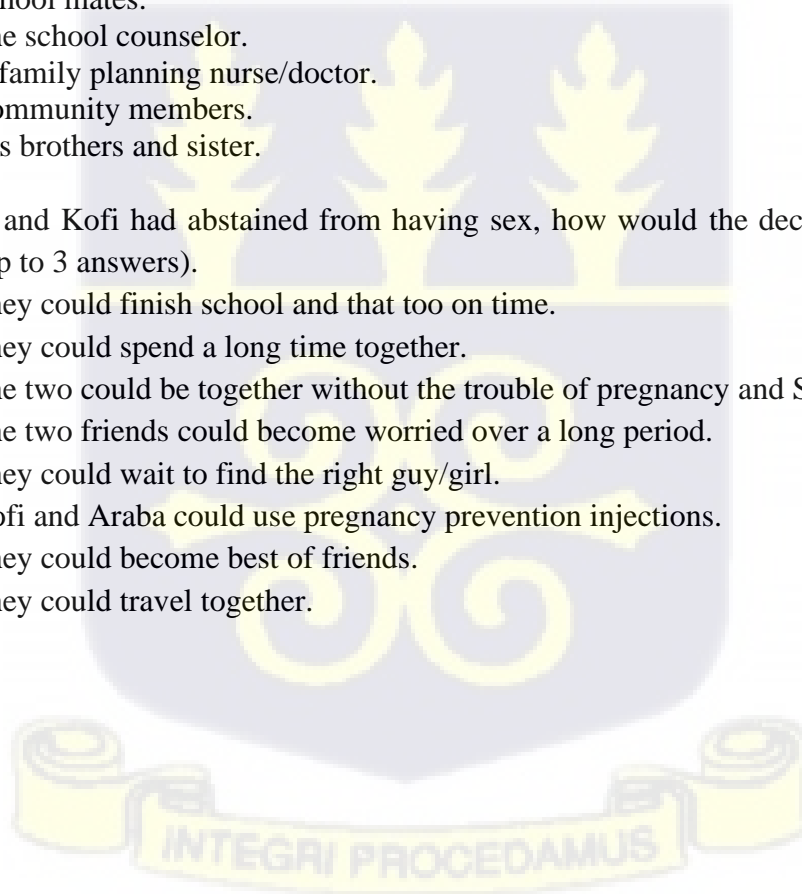
**Turn to the next page** and answer the questions that follow by **circling the correct answer's alphabet**.

1. Why was it not fit for Araba and Kofi to sit where no one could see them? (Select up to 3)
  - A. It was not fit because they had to leave the party venue early.
  - B. It was not fit because Kofi and Araba are of the opposite sex and can get attracted.
  - C. It was not fit because they are from the same school.
  - D. It was not fit because the two are friends.
  - E. It was not fit because if a boy and girl are alone in a quiet place, they can fall into the temptation to have sex.
  - F. It was not fit because the party could have ended without them.
  - G. It was not fit because if Kofi had bad manners, he could rape Araba.
  - H. It was not fit because Kofi and Araba had to be at the party venue.
  
2. If Araba is pregnant, what could she and Kofi have done to avoid the pregnancy? (Select up to 3 answers).
  - A. The two could have avoided sitting together in the dark place alone.
  - B. Araba could have washed her vagina with urine after having sex.
  - C. Araba should have agreed to have sex two days before ovulation.
  - D. Kofi and Araba could have held each other's hands without touching their private parts.
  - E. They could have used the vagina sex method to prevent pregnancy.
  - F. Araba should have taken the emergency pill 72 hours before having unsafe sex.
  - G. They could have used a condom to prevent pregnancy.
  - H. Araba should have told her parent about it.
  
3. How did Ama get the infection if she indeed has a yeast infection? (Select up to 3 answers).
  - A. Ama could have had the infection naturally.
  - B. Ama's infection could be the cause of gonorrhoea.
  - C. Ama should tell her parent/caregivers about the signs she has.
  - D. Her infection could be the cause of a stomach problem.
  - E. Ama did not wash her vagina with a ginger solution.
  - F. It is also possible that Ama does not keep her panties clean
  - G. She could be having waist problems.
  - H. Ama could have had the infection from a dirty toilet she used.



4. What can Ama do to protect herself from having STIs? Ama should ..... (Select up to 3 answers).
- A. Keep herself from having sex.
  - B. Have oral sex only.
  - C. Have anal sex only.
  - D. If Ama cannot avoid having sex, she should use a condom any time she has sex.
  - E. Wash her vagina with urine after having sex.
  - F. Avoid having sex with different boys/men.
  - G. Use the withdrawal method with her boyfriend anytime they have sex.
  - H. Use an emergency pill after having sex.
5. What are the other signs of puberty Ama could have in addition to menses?..... (Select up to 4 answers).
- A. Her breast should be developing.
  - B. She should have delayed ovulation.
  - C. Her voice should remain unchanged.
  - D. She should have hairs in her pubic areas.
  - E. Ama's hips should become broad.
  - F. She should have dry skin and wrinkles.
  - G. She should have whitish eyeballs.
  - H. Ama should have oily skin.
6. What could be the reasons for the delays in Araba's menses? (Select up to 3 answers).
- A. Araba could be pregnant.
  - B. She could be having a small lining in her womb.
  - C. Araba could be having pains in the lower part of her stomach.
  - D. Araba could be eating poorly.
  - E. Araba has no illness.
  - F. Araba could be sleeping too often.
  - G. She could be doing lots of exercises
  - H. It is usual for girls to miss their menses
7. What are the other signs of puberty Kwame should have in addition to the wet dreams? ..... (Select up to 3 answers).
- A. Kwame should develop muscles in the legs and arms.
  - B. He should have bigger lips and eyes.
  - C. He should also have a broad shoulder and chest.
  - D. Kwame may develop long legs and hands.
  - E. He may have a body odor.
  - F. Kwame should have keloids on his face.
  - G. Kwame can also develop big breasts and body shapes.
  - H. He should have big eyes and a mouth.

8. Why would you say Ama has reached the correct stage in life to begin menses? (Select up to 2 answers).
- A. Menses can begin as early as eight years.
  - B. Ama is at the right age to start menses.
  - C. Ama is tall and fat.
  - D. By age 13, few girls would have had their first menses.
  - E. Ama is a spoiled child.
  - F. Ama has excess blood.
  - G. Ama developed teeth early when she was a child.
  - H. It does not look like Ama is 14 years old.
9. Which people can better advise Kwame about the changes he sees in his body? (Select up to 3 answers).
- A. Kwame's best friends.
  - B. The school girlchild educator.
  - C. Website operators.
  - D. School mates.
  - E. The school counselor.
  - F. A family planning nurse/doctor.
  - G. Community members.
  - H. His brothers and sister.
10. If Araba and Kofi had abstained from having sex, how would the decision benefit them? (Select up to 3 answers).
- A. They could finish school and that too on time.
  - B. They could spend a long time together.
  - C. The two could be together without the trouble of pregnancy and STIs.
  - D. The two friends could become worried over a long period.
  - E. They could wait to find the right guy/girl.
  - F. Kofi and Araba could use pregnancy prevention injections.
  - G. They could become best of friends.
  - H. They could travel together.



**Appendix B3: Test of Functional Sexual and Reproductive Health Literacy (TFSRHL)  
Form II**

**Participant I/D:** ..... **Screening Score**.....

**Instruction**

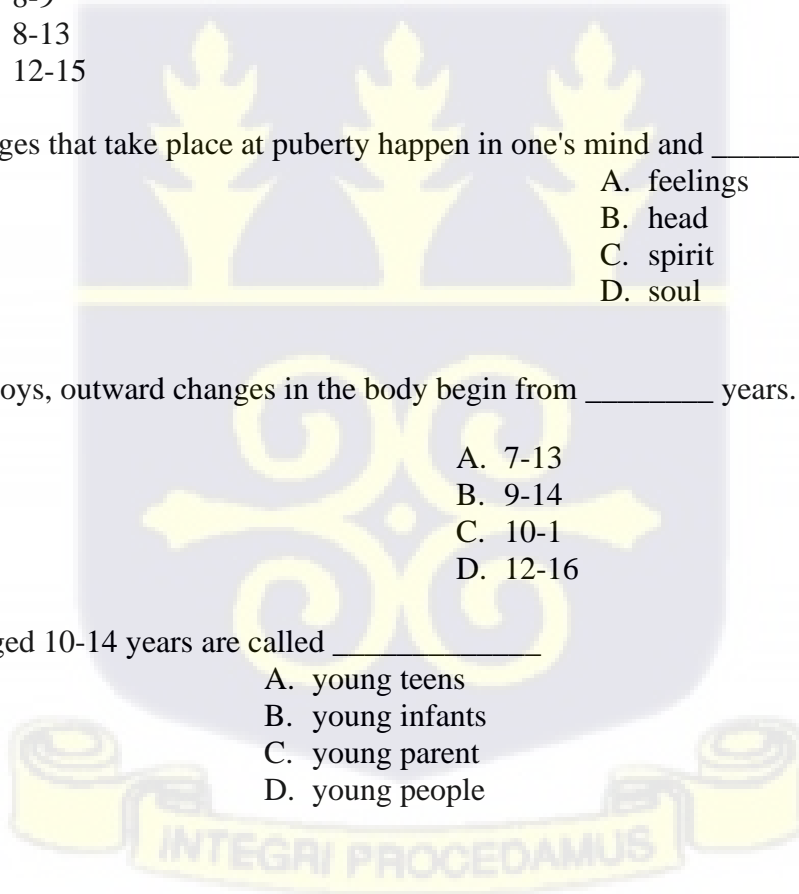
This instrument measures your ability to read and understand simplified Sexual and Reproductive Health (SRH) materials. The test is in two parts. **Part, one** examines reading and understanding of SRH materials. **Part two** examines your ability to calculate the menses cycle of a girl/woman. This test is not part of your schoolwork, and you will not be graded on your answers. Your scores would be kept secret from people and used purely for this research.

**Part One**

There are 30 multiple-choice test questions with options **A** to **D**. Answer each question by circling the alphabet of the correct answer.

1. The wet places of the body are places where the \_\_\_\_\_ germ likes to live.  
Achlamydia  
gonorrhoea  
syphilis  
vagina yeast
2. The eye, the throat, and the vagina are the wet places of the \_\_\_\_\_.  
A. belly  
B. body  
C. buttocks  
D. backbone
3. If a person has sex with someone living with gonorrhoea without a \_\_\_\_\_, they can get the gonorrhoea illness.  
A. a pill  
B. a regular pill  
C. a condom  
D. an IUD
4. You can also get gonorrhoea by having sex through \_\_\_\_\_ of someone living with gonorrhoea.  
A. the anus  
B. the back  
C. the buttocks  
D. between the thighs

5. Pregnant girls/women who are living with gonorrhoea can infect their babies with gonorrhoea \_\_\_\_\_ and childbirth.
- A. during menses
  - B. when eating
  - C. during pregnancy
  - D. when bleeding
6. A boy/girl changes from a child into an adult at a period called \_\_\_\_\_.
- A. adulthood
  - B. infancy
  - C. motherhood
  - D. puberty
7. From age, \_\_\_\_\_ girls will begin to see outward changes in their bodies.
- A. 7-10
  - B. 8-9
  - C. 8-13
  - D. 12-15
8. The changes that take place at puberty happen in one's mind and \_\_\_\_\_.
- A. feelings
  - B. head
  - C. spirit
  - D. soul
9. Among boys, outward changes in the body begin from \_\_\_\_\_ years.
- A. 7-13
  - B. 9-14
  - C. 10-1
  - D. 12-16
10. People aged 10-14 years are called \_\_\_\_\_
- A. young teens
  - B. young infants
  - C. young parent
  - D. young people



11. At first \_\_\_\_\_, most girls get vaginal yeast.
- A. sexual life
  - B. sexual feelings
  - C. sexual involvement
  - D. sexual act
12. The use of infected panties and \_\_\_\_\_ are also places where girls can get a yeast (white) infection.
- A. sponge
  - B. washbasins
  - C. WCs/toilets
  - D. door handles
13. Burning feelings in the vagina each time a girl \_\_\_\_\_ is a sign that she has a vaginal yeast (white) illness.
- A. sweats
  - B. have their menses
  - C. have discharges
  - D. urinates
14. When the vaginal yeast germ grows more than it is needed, it becomes \_\_\_\_\_ vagina.
- A. illness to the
  - B. stains in the
  - C. rough in the
  - D. wellness to the
15. Yeast infection is not one of the STIs because the germ already lives in the body of \_\_\_\_\_.
- A. people
  - B. males
  - C. females
  - D. women
16. Sexual abuse (defilement) and rape are \_\_\_\_\_.
- A. dangers
  - B. faultless
  - C. mistakes
  - D. wrongdoings
17. A rapist is someone who forces others into \_\_\_\_\_.
- A. holding hands
  - B. kissing
  - C. hugging
  - D. having sex

18. If a male/female forces someone below age 16 into having sex, it is called \_\_\_\_\_.
- A. Sexual abuse (defilement)
  - B. bruises
  - C. involvement
  - D. harassment
19. When a male/female forces someone age 16 or more into having sex, it is called\_\_\_\_\_.
- A. Sexual abuse (defilement)
  - B. casual sex
  - C. rape
  - D. wrong sex
20. There are \_\_\_\_\_ forms of forced and unwanted sex.
- A. two
  - B. three
  - C. four
  - D. five
21. Early sex and pregnancy can make a girl -----
- A. Grow poorly
  - B. have their menses early
  - C. dropout of school
  - D. learn the wrong trade
22. Pregnancy at an early age can make it hard for a girl to \_\_\_\_\_ a baby on her own.
- A. deliver
  - B. know
  - C. love
  - D. leave
23. Pregnancy cannot take place if a boy and a girl do not\_\_\_\_\_.
- A. kiss each other
  - B. masturbate each other
  - C. engage in a sex act
  - D. massage each other
24. Avoiding every kind of sexual activity means \_\_\_\_\_.
- A. saying no to masturbation
  - B. saying yes to kisses
  - C. saying no to sex
  - D. saying yes to cuddling

25. Pregnancy at an early age may lead to \_\_\_\_\_ either during pregnancy or at the time of birth.

- A. death
- B. laziness
- C. sadness
- D. vomiting

26. A girl/woman's menses cycle may change between \_\_\_\_\_ days.

- A. 22 and 34
- B. 24 and 38
- C. 26 and 40
- D. 28 and 42

27. Girls aged eight or more produce an egg every month, which dies between \_\_\_\_\_ hours.

- A. 10 and 24
- B. 12 and 24
- C. 16 and 26
- D. 18 and 28

28. The womb grows \_\_\_\_\_ each month.

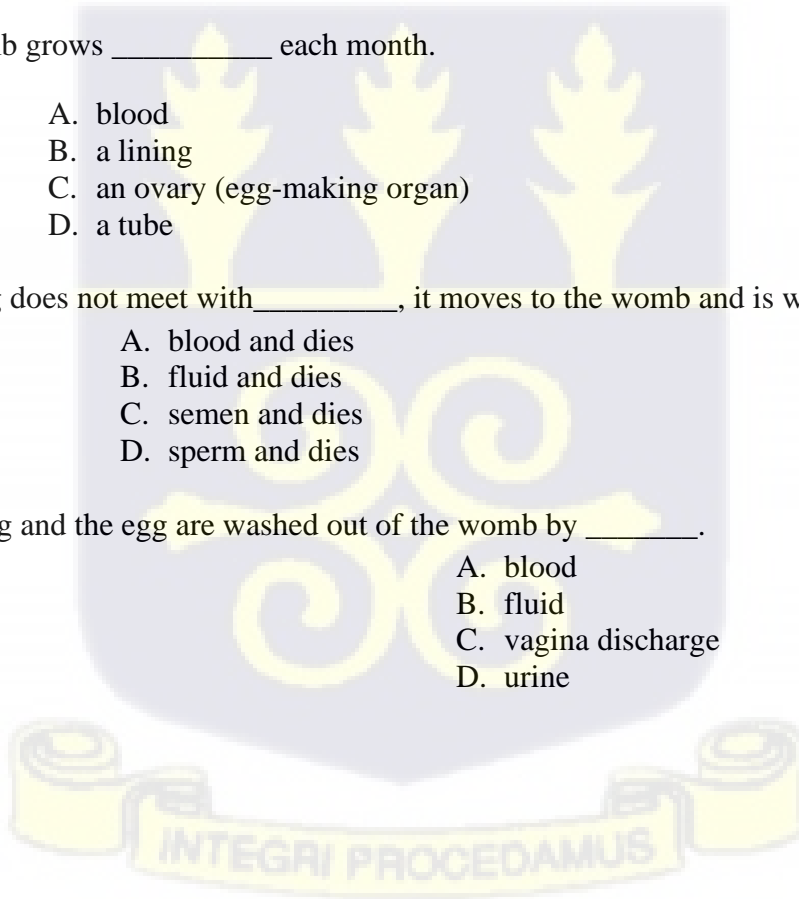
- A. blood
- B. a lining
- C. an ovary (egg-making organ)
- D. a tube

29. If the egg does not meet with \_\_\_\_\_, it moves to the womb and is washed away.

- A. blood and dies
- B. fluid and dies
- C. semen and dies
- D. sperm and dies

30. The lining and the egg are washed out of the womb by \_\_\_\_\_.

- A. blood
- B. fluid
- C. vagina discharge
- D. urine



**Numeracy Test**

**Instructions**

There are five multiple-choice test items with options **A** to **D**. Use the information in the calendar below to calculate and answer the questions by circling the correct answer's alphabet.

January 2022							February 2022						
Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.
					1	2		1	2	3	4	5	6
3	4	5	6	7	8	9	7	8	9	10	11	12	13
10	11	12	13	14	15	16	14	15	16	17	18	19	20
17	18	19	20	21	22	23	21	22	23	24	25	26	27
24	25	26	27	28	29	30	28						
31													

- Assuming a girl/woman has a 28-day cycle, her last menses started on January 10, 2022. Between which of the following days is she likely to ovulate? between .....

  - 17<sup>th</sup> and 20<sup>th</sup> January 2022
  - 17<sup>th</sup> and 21<sup>st</sup> January 2022
  - 21<sup>st</sup> and 23<sup>rd</sup> January 2022.
  - 22<sup>nd</sup> and 24<sup>th</sup> January 2022

- Based on your answer to question 1, What should be the date of her next menses?.....

  - February 6, 2022
  - February 8, 2022
  - February 10, 2022
  - February 12, 2022

- Based on your answer to question 1, which of the days in January 2022 is her expected safe period after ovulation?

  - 18<sup>th</sup> and 31<sup>st</sup> January 2022
  - 21<sup>st</sup> and 31<sup>st</sup> January 2022
  - 25<sup>th</sup> and 31<sup>st</sup> January 2022
  - 27<sup>th</sup> and 31<sup>st</sup> January 2022

- What are her expected days of ovulation in February 2022?

  - 12<sup>th</sup> to 17<sup>th</sup> February 2022
  - 17<sup>th</sup> to 19<sup>th</sup> February 2022
  - 18<sup>th</sup> to 20<sup>th</sup> February 2022
  - 19<sup>th</sup> to 22<sup>nd</sup> February 2022

5. What is her unsafe period in February 2022?
- A. 17<sup>th</sup> –20<sup>th</sup> February 2022
  - B. 16<sup>th</sup> – 21<sup>st</sup> February 2022
  - C. 15<sup>th</sup> – 20<sup>th</sup> February 2022
  - D. 13<sup>th</sup> –20<sup>th</sup> February 2022



**AppendixB4: Decision-making Skills in Sexual and Reproductive Health (DSSRH)  
Form II**

**Index Number:**.....

**Instruction**

This test presents a scenario and ten multiple-choice questions with options **A** to **H**. Each question has more than one answer. You must **read the scenario below** and answer the following questions by circling the correct alphabet. This test is not part of your schoolwork, and your answers will not be graded. Your score would be kept secret from your schoolmates. Your score will be used purely for research purposes.

**Scenario**

Esi is a 14-year-old teenager with similar problems as Atto, Abeku, and Mansa. She is in the second year of Junior High School (JHS two). Like all other young teens, she has started having menses but feels it is too early for her to start menses. Esi has a 28-day cycle. Some days after her last menses, which began on 25<sup>th</sup> May 2020, Esi started to itch in the vagina. She found some whitish fluid coming from her vagina. Also, her vagina became reddish. Esi thinks she has a yeast (white) infection.

Mansa is the same age as Esi. She is in JHS two. Even though she has started menses, she has little knowledge of STIs and childbearing matters. Mansa is in the same class as Abeku, her best friend. Mansa and Abeku attended a party organized for the final year students of her school on 6<sup>th</sup> June 2021. While at the party, the two friends went outside and sat in a quiet place in the dark, where no one could see them. They began touching each other's private parts and kissed each other. The two friends fell into sexual temptation and had sex. They both went back to the party venue sometime later. Mansa and Abeku left for their homes after the party ended around 8:00 pm. Their school went on vacation on 10<sup>th</sup> June 2021. Mansa waited for her menses between 20<sup>th</sup> June and 27<sup>th</sup> July 2021, when the school had gone on vacation. Mansa got worried about delays in her menses. She wanted to know why she had not had her menses from 20<sup>th</sup> June to 27<sup>th</sup> July 2021.

Like most young teens, Atto is 13 years old and not yet mature. He has very little knowledge of physical changes at puberty and childbearing issues. Atto has been having wet dreams and early morning erection. He worries about his body's outward changes but is unwilling to talk to his caregivers. He has many questions on his mind and is looking for someone to help him understand why those changes are happening in his body.

**Turn to the next page** and answer the questions that **follow by circling the correct answer's alphabet.**

1. Is it fit for Mansa and Abeku to sit where no one could see them?  
(Select up to 3 answers)
  - A. No, it is not fit because there is very little time for the party.
  - B. No, it is not fit because Abeku and Mansa are the opposite sex and can get attracted.
  - C. Yes, it is fit because Abeku and Mansa are from the same school.
  - D. Yes, it is fit because the two are friends.
  - E. No, it is not fit because they can be tempted to have sex.
  - F. No, it is not fit because the party could have ended without them.
  - G. No, it is not fit. If Abeku has bad manners, he can rape Mansa
  - H. No, it is not fit because they had to be in the party venue.
  
2. If Mansa is pregnant, what could the two friends have done to avoid the pregnancy? (Select up to 3 answers).
  - A. The two could have avoided sitting together in the dark place alone.
  - B. Mansa could have washed her vagina with urine after having sex.
  - C. Mansa could have agreed to have sex two days before ovulation.
  - D. Abeku and Mansa could have held each other's hands without touching their private parts.
  - E. They could have used the vagina sex method to prevent pregnancy.
  - F. Mansa could have taken the emergency contraceptive (EC) pill 72 hours before having unsafe sex.
  - G. They could have used a condom to prevent pregnancy.
  - H. Mansa could have told her parent about it.
  
3. If Esi had a yeast (white) infection, how could she have had it? (Select up to 3 answers).
  - A. Esi could have had the infection naturally.
  - B. Esi's infection could be the cause of gonorrhoea (gono).
  - C. Esi should tell her parent/caregivers about the signs she has.
  - D. Her infection could be the cause of a stomach problem.
  - E. Esi did not wash her vagina with a ginger solution.
  - F. It is also possible that Esi does not keep her panties clean
  - G. She could be having waist problems.
  - H. She could also have a yeast infection from a dirty toilet she used.



4. How can Esi protect herself from having STIs in the future? Esi should ..... (Select up to 3 answers).
- A. Say no to all forms of sexual activities.
  - B. Have oral sex only.
  - C. Have anal sex only.
  - D. If Esi cannot avoid having sex, she should use a condom whenever she has sex.
  - E. Wash her vagina with urine after having sex.
  - F. Esi should not have more than one boyfriend.
  - G. Use the withdrawal method anytime she has sex with a boy/man.
  - H. Use emergency contraceptives after having sex.
5. Apart from menses, what other signs of puberty should Esi be having? (Select up to 4 answers).
- A. Esi's breast should begin to grow.
  - B. She should have delayed ovulation.
  - C. Her voice should remain unchanged.
  - D. Esi should grow hairs in her armpit and pubic areas.
  - E. Esi's hips should be getting broader.
  - F. She should have dry skin and wrinkles.
  - G. She should have a whitish eye.
  - H. Esi should start having oily skin.
6. Why has Mansa not had her menses? (Select up to 3 answers).
- A. Mansa may be pregnant.
  - B. She could be having a small lining in her womb.
  - C. Mansa could be having pains in the lower part of her stomach.
  - D. Mansa could be eating poorly.
  - E. She has no illness at all.
  - F. Mansa could be sleeping too often.
  - G. She could be doing lots of exercises.
  - H. It is usual for girls to miss their menses
7. Apart from wet dreams, what other outward signs of puberty would Atto have? (Select up to 3 answers).
- A. Atto would have muscles in the legs and arms.
  - B. He would have bigger lips and eyes.
  - C. Atto would also have broad shoulders and chest.
  - D. Atto may develop long legs and hands.
  - E. He may have a body odor.
  - F. Atto would have keloids on his face.
  - G. Atto can also develop big breasts and body shape.
  - H. He would have big eyes and a mouth.

8. If Atto wants to understand more about puberty, which of the following people can better educate him? (Select up to 3 answers).
- A. Atto's best friends.
  - B. The school girlchild educator.
  - C. Website operators.
  - D. School mates.
  - E. The school counselor.
  - F. A family planning nurse/doctor.
  - G. Community members.
  - H. His brothers and sisters.
9. Why is it not too early for Esi to start having menses? It is not early because..... (select up to 2 answers).
- A. Menses can begin as early as eight years.
  - B. Esi is tall and fat.
  - C. By age 13, few girls would have had their first menses.
  - D. Esi is a spoiled child.
  - E. Esi has excess blood.
  - F. Esi is 14 years old and has passed the age of first menses.
  - G. Esi developed teeth early when she was a child.
  - H. It does not look like Esi is 14 years old.
10. What could Mansa and Abeku have gained if they had said no to sex? (Select up to 4 answers).
- A. They could finish school and that too on time.
  - B. They could have spent a long time together.
  - C. Mansa and Abeku could have avoided pregnancy and STIs.
  - D. The two friends could have become worried over a long period.
  - E. They could have waited to find the right guy/girl.
  - F. Abeku and Mansa could have used pregnancy prevention injections.
  - G. They could have become best of friends.
  - H. They could have had time to learn a trade.



**Appendix B5: Participants' Appraisal Questionnaire**

Participant I/D: .....

1. Were you able to read all the lessons in the house? Yes [ ]. No [ ].
2. Which of the following were you able to do?
3. I was unable to learn the SRH after school [ ]. I learned SRH lessons with friends after school [ ]. I learned SRH lessons with my parents' support after school. [ ].
4. Did you take part in all the reading and questions sessions? Yes [ ]. No [ ].

***Participants' Views on Lessons Delivery***

For the list of questions in the table, please, tick (√) as suitable.

<b>Perception Lessons Delivery</b>	Strongly agreed	Agreed	Not sure	disagree	Strongly disagree
The learning material was easy to read.					
The material was easy to understand.					
All lessons taught followed the time allowed.					
I was able to speak openly during the lessons.					
I had time to share my thoughts in all the lessons.					
The teacher answered all my questions.					
I could easily share my views with my schoolmates.					
I did not feel shy during the lessons.					
The lessons were helpful to my daily life.					
Other JHS school pupils should be taught SRH lessons.					

	Very much	Much	Not sure	Not much	Not At all
Overall, how did you like the lessons you have learned					



4. Possible symptoms of HIV include \_\_\_\_\_ and \_\_\_\_\_.
- |                       |                   |
|-----------------------|-------------------|
| a. sore throat        | a. dizziness      |
| b. redness of the eye | b. fever          |
| c. burns              | c. pimples        |
| d. bald head          | d. blurred vision |
5. When people with HIV don't get \_\_\_\_\_, they typically progress through three \_\_\_\_\_.
- |               |            |
|---------------|------------|
| a. tested     | a. streams |
| b. threatened | b. stems   |
| c. treatment  | c. stages  |
| d. trained    | d. states  |
6. Syphilis is a sexually transmitted \_\_\_\_\_.
- |                |
|----------------|
| a. information |
| b. intention   |
| c. infection   |
| d. relation    |
7. Syphilis can be passed on through sex without \_\_\_\_\_.
- |            |
|------------|
| a. condom  |
| b. pill    |
| c. implant |
| d. IUD     |
8. A person can pass on syphilis even if they don't have any \_\_\_\_\_.
- |             |
|-------------|
| a. smell    |
| b. symptoms |
| c. idea     |
| d. answer   |
9. Syphilis causes infectious \_\_\_\_\_ or \_\_\_\_\_.
- |            |            |
|------------|------------|
| a. scenes  | a. range   |
| b. sores   | b. pains   |
| c. scores  | c. rashes  |
| d. schemes | d. sneezes |
10. Emergency contraceptive pill is a \_\_\_\_\_ contraception.
- |                 |
|-----------------|
| a. single range |
| b. simple dose  |
| c. simple use   |
| d. single dose  |

11. Emergency contraception helps to prevent a \_\_\_\_\_ after \_\_\_\_\_ sex.
- |                 |                |
|-----------------|----------------|
| a. Pregnancy    | a. unknown     |
| b. Illness      | b. unprotected |
| c. Bleeding     | c. unrushed    |
| d. menstruation | d. unnatural   |

12. This involves taking only one tablet of a particular \_\_\_\_\_.
- |               |
|---------------|
| a. grade      |
| b. hormone    |
| c. immunity   |
| d. grade-rage |

13. Emergency contraception does not \_\_\_\_\_ you from sexually transmitted \_\_\_\_\_.
- |            |               |
|------------|---------------|
| a. Provide | a. implants   |
| b. prove   | b. instances  |
| c. protect | c. inmates    |
| d. pass    | d. infections |

14. Emergency contraception will only work for \_\_\_\_\_ that occurred in the previous \_\_\_\_\_.
- |             |              |
|-------------|--------------|
| a. bleeding | a. two days  |
| b. sex      | b. five days |
| c. signs    | c. six days  |
| d. blisters | d. 8 days    |

15. Chlamydia is caused by a \_\_\_\_\_ called Chlamydia trachomatis.
- |               |
|---------------|
| a. bacteria   |
| b. plasmodium |
| c. virus      |
| d. fungi      |

16. You can get chlamydia during \_\_\_\_\_ or vaginal sex with someone who has the \_\_\_\_\_.
- |            |                 |
|------------|-----------------|
| a. moral   | a. information  |
| b. oral    | b. inflammation |
| c. vital   | c. infection    |
| c. minimal | d. inception    |

17. Chlamydia is more common in young people, especially young \_\_\_\_\_.
- |           |
|-----------|
| a. men    |
| b. masons |
| c. minds  |
| d. women  |

18. Chlamydia doesn't usually cause any\_\_\_\_\_.
- a. symptoms
  - b. sounds
  - c. smells
  - d. scents
19. If you do have symptoms, they may not appear until several\_\_\_\_\_.
- a. signs
  - b. thought
  - c. weeks
  - d. scenes
20. Copper IUD can prevent \_\_\_\_\_for up to 10 years after insertion.
- a. menstruation
  - b. respiration
  - c. pregnancy
  - d. transpiration
21. It can be used in premenopausal women of all \_\_\_\_\_.
- a. ages
  - b. lives
  - c. times
  - d. height
22. Copper IUD eliminates the need to interrupt sex for\_\_\_\_\_.
- a. conception
  - b. conversation
  - c. contraception
  - d. interruption
23. Copper IUD isn't appropriate for\_\_\_\_\_.
- a. everyday
  - b. everyone
  - c. everything
  - d. everywhere
24. Copper IUD doesn't offer protection from sexually\_\_\_\_\_infections
- a. Transferable
  - b. trespassing
  - c. transactional
  - d. transmitted

25. Abstinence is safe, effective, and freeways to\_\_\_\_\_pregnancy.
- prevent
  - protect
  - prove
  - promote
26. Abstinence is the only 100% \_\_\_\_\_way to avoid pregnancy.
- formal
  - affective
  - effective
  - directive
27. Abstinence can be a way to avoid the risks that come with\_\_\_\_\_.
- cuddling
  - kisses
  - smooching
  - sex
28. Abstinence can also help you focus on other things in your\_\_\_\_\_.
- life
  - learning
  - relationship
  - family
29. Outercourse let you and your\_\_\_\_\_give each other sexual pleasure without causing\_\_\_\_\_.
- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>parent</li><li>aunt</li><li>partner</li><li>peers</li></ol> | <ol style="list-style-type: none"><li>problems</li><li>pregnancy</li><li>pressure</li><li>panic</li></ol> |
|---|---|
30. About once a month, the\_\_\_\_\_grows a new lining to get ready for a fertilize egg.
- union
  - ovary
  - uterus
  - unit
31. When there is no fertilized egg to start a pregnancy, the uterus sheds its\_\_\_\_\_.
- life
  - lining
  - length
  - loop
32. The menstrual cycle is from Day 1 of \_\_\_\_\_to Day 1 of the next time of\_\_\_\_\_.
- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>cycle</li><li>senses</li><li>bleeding</li><li>ovulation</li></ol> | <ol style="list-style-type: none"><li>ovulation</li><li>cycle</li><li>senses</li><li>bleeding</li></ol> |
|---|---|

33. Girls usually start having \_\_\_\_\_ periods between the ages of 11 and 14.
- menstrual
  - menopausal
  - ovulation
  - respiration
34. Women in their 40s and teens may have cycles that are longer or \_\_\_\_\_ a lot.
- changes
  - continuous
  - stops
  - hangs
35. Ovulation is when the ovary \_\_\_\_\_ an egg so it can be fertilized by a \_\_\_\_\_.
- |  |  |
|--|--|
| <ol style="list-style-type: none"><li>relies</li><li>removes</li><li>releases</li><li>realigns</li></ol> | <ol style="list-style-type: none"><li>spam</li><li>spark</li><li>spine</li><li>sperm</li></ol> |
|--|--|
36. A man's sperm can live for \_\_\_\_\_ days in a woman's reproductive \_\_\_\_\_.
- |   |  |
|---|--|
| <ol style="list-style-type: none"><li>1 to 2</li><li>1 to 3</li><li>3 to 4</li><li>3 to 5</li></ol> | <ol style="list-style-type: none"><li>arrangement</li><li>cervix</li><li>organ</li><li>ovule</li></ol> |
|---|--|
37. A woman's egg lives for just 12 to 24 hours after \_\_\_\_\_.
- Menstruation
  - Ovulation
  - Outercourse
  - Sex
38. At different times in a woman's life, ovulation may or may not \_\_\_\_\_.
- happen
  - move
  - run
  - sink
39. Each woman's cycle length may be \_\_\_\_\_.
- arranged
  - continuous
  - divided
  - different

**Appendix B7: General Numeracy and Literacy Test**

**NUMERACY AND LITERACY SCREENING TEST**

**Sociodemographic Information**

I/D..... Age ..... BS Level.....

Gender: Male [ ]. Female [ ]. Religion: Christianity [ ]. Islam [ ]. Others [ ]

Mother's level of education. No education [ ]. Basic [ ]. Secondary [ ]. Tertiary [ ].

Father's level of education. No education [ ]. Basic [ ]. Secondary [ ]. Tertiary [ ].

Which of the following people do you live with? Grandparent [ ]. Other relatives [ ]. both parents [ ]. One parents [ ]. Step-mother/step-father [ ].

How often do you absent yourself from school? Once in a week [ ]. Twice in a week [ ]. Three or more days in a week [ ]. None at all [ ].

What work do you do after school? Selling [ ]. House work [ ]. Care for other siblings [ ]. None at all [ ].

Do you get textbooks in school? Yes, all of them [ ]. Yes, some of them [ ]. No, none of them [ ].

How often do your teachers come to class? Always [ ]. Sometimes [ ]. Never [ ].

Do you learn after school? Always [ ]. Sometimes [ ]. Never [ ].

Do you have books at home for studies? Yes [ ]. No [ ].

Are your other siblings in school? Yes [ ]. No. [ ].

**Instructions**

This test is in two sections. Section A require test takers to read a short passage and answer five multiple-choice questions based on the passage. Section B has five multiple-choice questions on basic mathematics. It is not part of your schoolwork, and you will not be graded on your answers. Your scores would be kept secret from people and would be used purely for this research.

Read the passage carefully and answer the questions that follow by circling the alphabet of the correct answer.

## Section A

### Passage

Grandpa is over 100 years and still healthy. At his age, his eyesight is as clear as a child's and his memory as equally sharp. We have always wondered what has kept him going all these years. "I have a secret theory of life," is the reply he gives to anyone who asks.

Grandpa's secret theory is, after all, quite simple when he explains it. He talks of a joyful attitude to life. He says that joy begets happiness and the desire to encourage others. He never walks anyone away who needs help, even though Grandpa can never be described as rich.

Grandpa believes that we see ourselves in a mirror, so do others see us. The mirror **reflects** what a person is. So if we are wicked, people will see us as wicked and if we are not honest, we will not suspect of others being liars.

One part of Grandpa's secret theory that he holds dearest is his love for truth. He thinks that truth enables one to live a life free of stress and worries. "Let your nay be nay," he says, whenever he finds one of us telling a lie in order to avoid trouble. He believes that if we tell lies, we will have to create more lies to cover them. On the other hand, truth never changes. Grandpa never ends his explanation without rolling his eyes happily and advising us to be true to ourselves so that we can't be false to others.

1. What does the mirror do? It .....
  - a. reveals a person's worth
  - b. reveals what a person is
  - c. shadows a person's real life
  - d. shows the colour of a person
  
2. Identify Grandpa's secret theories? Grandpa's secret theory is.....
  - a. joy and Love for life
  - b. joyful attitude to life
  - c. truth and joy of life
  - d. right and love for joy
  
3. What does Grandpa believe in? He believes that.....
  - a. the mirror is the guide to seeing others
  - b. we see ourselves and others in a mirror
  - c. others see us the same way we see ourselves in a mirror
  - d. we see ourselves and the mirror
  
4. How does the truth liberate us? It .....
  - a. helps us to cover our lies
  - b. frees us from the worries and stress of lies
  - c. frees us from right and fears of lies
  - d. helps us to express ourselves in all situations

5. What is the meaning of the saying “Let your nay be nay?” It means let.....
- a. your name be named
  - b. your yes be no
  - c. your yes be yes
  - d. your yes and name stand out

## Section B

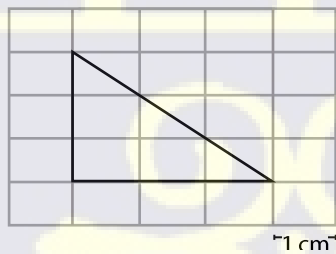
### NUMERACY

#### Instructions

Answer the questions that follow by circling the alphabet of the correct answer.

1. **Araba** is 24 years old. She is **F** years older than **Mansa**. Which of the following represents **Mansa’s** age?
- a.  $24 - F$
  - b.  $F + 24$
  - c.  $F - 24$
  - d.  $24 \times F$

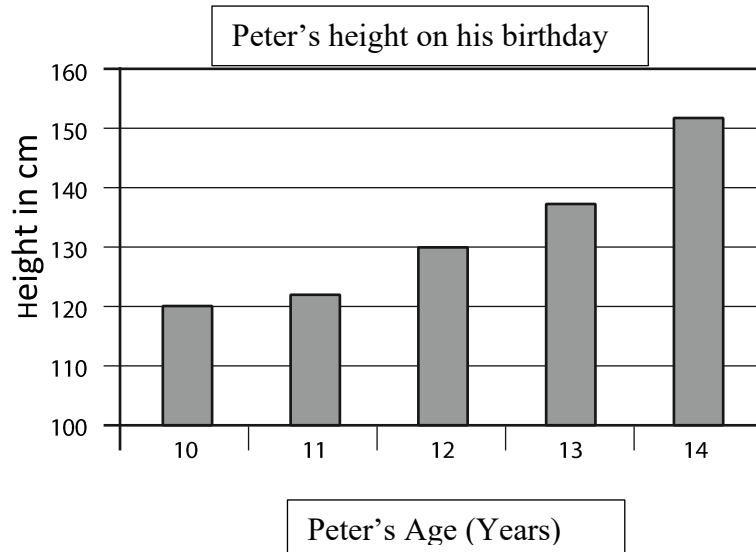
2.



The triangle is on a centimeter grid. What is its area?

- a. 4.5 square centimeter
- b. 6 square centimeter
- c. 9 square centimeter
- d. 9.5 square centimeter

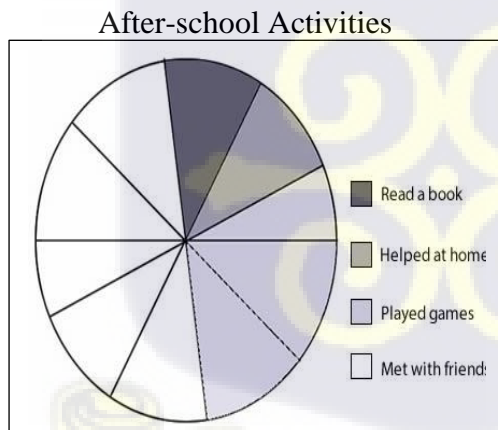
3.



Between which ages did peter's height increase most?

- a. 10 and 11
- b. 11 and 12
- c. 12 and 13
- d. 13 and 14

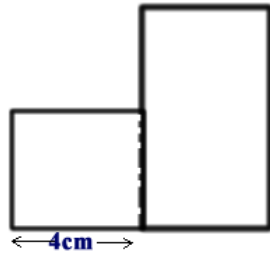
4. This pie chart shows what some students did after school. The chart is divided into 10 equal sections.



20 students read books. How many met with friends?

- a. 40
- b. 60
- c. 80
- d. 100

5. This shape consists of a square and a rectangle. The width of the rectangle is the same as the width of the square. The length of the rectangle is twice as long as the width. Find the perimeter of the shape.



- a. 28 cm
- b. 32 cm
- c. 38 cm
- d. 40 cm



## **Appendix B8: Vocabulary Knowledge Assessment Passage**

There are five (5) different passages in this paper. They cover the menstrual cycle, syphilis, Emergency contraceptive, Ovulation, and Copper IUD. You are to read quietly and underline the words you think are hard to pronounce and understand.

### **Menstrual Cycle**

The menstrual cycle is the series of changes a woman's body goes through to prepare for a pregnancy. About once a month, the uterus grows a new lining (endometrium) to get ready for a fertilize egg. When there is no fertilized egg to start a pregnancy, the uterus sheds its lining. This is the monthly menstrual bleeding (also called menstrual period) that women have from their early teen years until menopause, around age 50. The menstrual cycle is from Day 1 of bleeding to Day 1 of the next time of bleeding. Although the average cycle is 28 days, it is normal to have a cycle that is shorter or longer. Girls usually start having menstrual periods between the ages of 11 and 14. Women usually start to have fewer periods between ages 39 and 51. Women in their 40s and teens may have cycles that are longer or change a lot. If you are a teen, your cycles should even out with time. If you are nearing menopause, your cycles will probably get longer and then will stop. Talk to your doctor if you notice any big change in your cycle. It's especially important to check with your doctor if you have three or more menstrual periods that last longer than 7 days or are very heavy. Also call if you have bleeding between your periods or pelvic pain that is not from your period.

### **Syphilis**

Syphilis is a Sexually Transmitted Infection (STI). Syphilis can be passed on through sex without a condom, sharing needles and injecting equipment and from mother-to-child during pregnancy. Syphilis is not passed on through sharing food, hugging or using the same toilet as a person with syphilis. Syphilis is most commonly passed on through vaginal or oral sex without a condom or dental dam, with someone who has syphilis. A person can pass on syphilis even if they don't have any symptoms. Syphilis causes infectious sores or rashes. Contact with these sores and rashes is the main way that syphilis is passed on. This means the infection can be passed on through genital contact or sex, even if you don't ejaculate.

### **How do I prevent syphilis being passed on through sex?**

Using condoms and dental dams correctly and consistently for sex is the best way to prevent syphilis being passed on. Make sure that you use a new condom each time and remember that the condom or dental dam must cover sores or rashes or you won't be protected. Syphilis can also be passed on by sharing sex toys. To reduce your risk of syphilis, avoid sharing your sex toys or make sure that they are washed and covered with a new condom between each use.

### **Emergency Contraception (EC)**

Emergency contraception pill is a single dose contraception that helps to prevent a pregnancy when taken up to five days after unprotected sex. It works by preventing or delaying the release of an egg from the ovaries. This involves taking only one tablet of a particular hormone. This is sometimes called 'the morning after pill' or 'Plan B'. Emergency contraception offers the following advantages as a short-term method of contraception:

- It is safe for almost all women
- Using emergency contraception does not affect long term fertility
- It does not cause an abortion
- You can use emergency contraception at any time in your menstrual cycle

Here are a few quick facts you should consider:

- It will only work for sex that occurred in the previous five days
- It is not recommended as a regular method of contraception
- Unlike condoms, it does not protect you from sexually transmitted infections (STIs)
- It may have some side effects, such as bleeding, nausea and fatigue.

### **Ovulation**

Ovulation is when the ovary releases an egg so it can be fertilized by a sperm in order to make a baby. A woman is most likely to get pregnant if she has sex without birth control in the three days before and up to the day of Ovulation (since the sperm are already in place and ready to fertilize the egg as soon as it is released). A man's sperm can live for 3 to 5 days in a woman's reproductive organs, but a woman's egg lives for just 12 to 24 hours after Ovulation. Each woman's cycle length may be different, and the time between Ovulation and when the next period starts can be anywhere from one week (7 days) to more than 2 weeks (19 days). At different times in a woman's life, Ovulation may or may not happen.

- Women who are pregnant do not ovulate.
- Women who are breastfeeding may or may not ovulate. Women who are breastfeeding should talk to their doctor about birth control methods if they do not want to get pregnant.

- During perimenopause, the transition to menopause, you may not ovulate every month.
- After menopause you do not ovulate.

### **How do I know if I'm ovulating?**

A few days before you ovulate, your vaginal mucus or discharge changes and becomes more slippery and clear.

### **Copper IUD**

Copper IUD can provide long-term birth control (contraception). It's sometimes referred to as a non-hormonal IUD option. It is a T-shaped plastic frame that's inserted into the uterus. Copper wire coiled around the device produces an inflammatory reaction that is toxic to sperm and eggs (ova), preventing pregnancy. It can prevent pregnancy for up to 10 years after insertion. Copper IUD can be used in premenopausal women of all ages, including teenagers.

Among various benefits, Copper IUD:

- Eliminates the need to interrupt sex for contraception
- Can remain in place for up to 10 years
- Can be removed at any time
- Can be used while breast-feeding
- Doesn't carry the risk of side effects, such as blood clots, related to hormonal birth control methods
- Can be used for emergency contraception if inserted within five days after unprotected sex

Para Gard isn't appropriate for everyone. Your health care provider may discourage use of Para Gard if you:

- Have uterine abnormalities — such as large fibroids — that interfere with the placement or retention of Para Gard
- Have a pelvic infection, such as pelvic inflammatory disease
- Have uterine or cervical cancer
- Have unexplained vaginal bleeding
- Are allergic to any component of Para Gard



**Appendix B9: Scope of Knowledge of Sexual and Reproductive Health  
- Focus Group Discussion Questions**

Question for the focus group discussion is divided into 10 sub-headings, each constituting a concept in sexual and reproductive health. Each sub-heading seeks to understanding young adolescents' knowledge of the concept and how they construct meaning about the concept.

**Sexual and Reproductive Health Information (SRH)**

1. What is sexual and reproductive health?
2. Do you have access to SRH information?
3. On which concepts in SRH do you look for information
4. Where do you normally get this information?
5. Which of the sources has information you consider safe for your use?

**SRH Information Access and Challenges**

1. Do you have challenges reading SRH information?
2. Do you have difficulty understanding the information you receive?
3. Which of the information sources do you have difficulty with their presentation?
4. What about information from the net?
5. Have you tried getting information from the net?
6. Which websites do you often access for SRH information?
7. Which of the websites do you know offer safe SRH information?
8. Do have challenges accessing information from the internet?
9. What are some of the challenges?

**Contraceptives and Methods**

1. What do you know about safe contraceptives and other methods?
2. Would you like to learn about safe contraceptives and other methods?
3. What would you like to learn about safe contraceptive and methods?
4. Do you know where to get safe contraceptives?
5. Would you like to know these?

**Personal Relationships and Risky Sexual Behaviors**

1. Are you in a sexual relationship?
2. Do you know that sexual behaviors can be risky?
3. Can you list any risky sexual behaviors?
4. Would you like to tell how you can avoid these?

**Sexually Transmitted Infections (STIs)**

1. Have you heard about STIs?
2. What do you know about them?
3. Would like to learn more about them?

4. What do you know about the following?
  - a. HIV/AIDS
  - b. Perineal rashes
  - c. Vaginal discharge
  - d. Pain in urination
5. What symptoms or signs do you know?
6. Where can you find treatment?

## **Reproduction and Related Issues**

### **Signs of Sexual Maturation**

1. Do you know about physical changes in puberty?
2. What do you know about physical changes in puberty?
3. What do you make of the following?
  - Wet dreams
  - Voice changes
  - Development of pubic hairs
  - Enlargement of the sex organ
  - Body shape
  - Sexual excitement
  - Swollen lymph nodes

### **The Menstrual Cycle**

1. Do you have knowledge about your menstrual cycle?
2. Can you tell your safe and unsafe period?
3. Are you aware of the signs of pregnancy?
4. What about stages of pregnancy?
5. What would you do if you realize you are pregnant but do not want the pregnancy?

### **SRH Services Utilization**

1. Where can you get help for the following?
  - a. STI diagnosis and treatment
  - b. HIV testing and counseling
  - c. Counseling and treatment after rape and sexual assault

### **Sexual and Reproductive Health Decision Making**

1. In your relationship, are you able to make decision regarding the following?
  - a. Abstinence from sex
  - b. To tell your partner to use a condom
  - c. Able to use a condom
  - d. Decide not to have a baby
2. Do you know it is dangerous to have a baby at your age?
3. What are the dangers of getting pregnant at your age?
4. Which of the following is your sexual goal?
  - a. Abstinence
  - b. Safe sex
  - c. Abortion
  - d. Others



**Appendix C: SEXUAL AND REPRODUCTIVE HEALTH EDUCATIONAL MATERIAL**  
**Appendix C1: Simplified Text-Only Material**

**ADOLESCENT-CENTERED SEXUAL AND REPRODUCTIVE HEALTH  
EDUCATIONAL MATERIAL: SIMPLIFIED TEXT-ONLY**



**Sexual and Reproductive Health Literacy Intervention Manual**  
**By: Jacqueline Nkrumah**

## Table of Content

Table of content.....	i
Purpose and objectives and objectives Introduction.....	ii
<b>LESSON ONE</b> .....	1
Puberty .....	1
The Menses Cycle .....	3
<b>LESSON TWO</b> .....	5
Sexual Activities .....	5
Same-sex Sexual Practice .....	8
Rape .....	11
<b>LESSON THREE</b> .....	12
Friendships .....	12
<b>LESSON FOUR</b> .....	14
Abstinence/No Sex .....	14
Benefits of Saying No to Sex .....	15
Support to Overcome Sexual Desires .....	17
<b>LESSON FIVE</b> .....	19
<b>SEXUALLY TRANSMITTED INFECTIONS(STIs)</b> .....	19
Syphilis .....	19
Gonorrhoea .....	21
Yeast Infection .....	22
Chlamydia .....	23
Trichomoniasis .....	24
<b>HIV/AIDS</b> .....	25
<b>LESSON SIX</b> .....	27
Ways to avoid STIs and Pregnancy .....	27
Condom .....	27
Ways to avoid Pregnancy .....	28
Long-Term Ways to avoid Pregnancy .....	28
Short-Term Ways to avoid Pregnancy .....	29
<b>SUMMARY</b> .....	30

## **Purpose and Objectives**

This resource aims to present teens' Sexual and Reproductive Health (SRH) information in an easy-to-read format for low-literate young teens to better their SRH literacy. Teenagers need the correct information offered in easy-to-read and clear writing. Such material would help them make the right choices regarding their reproductive and sexual lives.

It is hoped that the young adolescent will be able to:

1. read and understand the SRH topics in this material
2. better their SRH knowledge
3. make informed choices to better their SRH lives

## **Introduction**

SRH refers to a person's ability to feel well in their body and mind while also being able to relate well with others in all matters linked to the reproductive organs. It also means that adults/grownups can have pleasant and safe sex. They can have children and choose if they want to have them, when to have them, and how many children they would like.

But young teens are not mature enough to have sex. They are not grown enough to make babies. Also, young teens cannot choose between safe and unsafe sex. So, they can fall ill or die if they choose to have sex and bear children. They will be unable to reach the state where they can feel well in the body and mind. In this case, early sex and childbirth will lead to poor SRH in young teens.

## **LESSON ONE**

### **PUBERTAL CHANGES**

**Puberty** is part of **teenage years**. It is a stage where a boy/girl changes and moves from a child into an adult but has not fully matured into an adult. Girls begin to see outward changes in their bodies by the age of 8 -13 years. Boys start to see changes in their bodies by 9 – 14 years. A person in the teenage years is called a teenager, a teen, or an adolescent.

The teenage years are divided into two. They are:

1. Young teenage years. It is the period between 10 and 14 years. A person in the young teenage years is called a young teen/adolescent.
2. Old teenage years. It is the period between 15 and 19 years. A person in the old teenage years is called an old teen/adolescent.

#### **Where do Changes at Puberty Take Place?**

Changes at puberty take place:

1. **In the mind**
2. **In the physical body**
3. **In the way you feel**

#### **Causes of Changes at Puberty?**

Changes at puberty happen because at age 8 or more, the body begins to produce body chemicals called hormones.

The hormones will make you to:

1. Have sexual feelings.
2. Want to look good.

3. Want to take risks.
4. Want to look good.
5. Feel like attacking those who disagree with you.
6. Feel like attacking those who disagree with you.

### **Outward Changes in the Body of Boys**

Boys would mostly see the following changes:

1. Muscles in legs and arms.
2. Broad shoulders and chest.
3. Longer and bigger penis.
4. Wet dreams when sleeping.

### **Outward Changes in the Body of Girls**

Girls usually undergo the following changes:

1. Breast growth
2. Broad hips/Body shape
3. Vaginal discharge (fluid)
4. Menses/period

### **Outward Changes in both Boys and Girls**

The following Changes usually take place in the bodies of boys and girls.

1. Oily skin
2. Pimples on face
3. Hair in pubic areas
4. Voice changes
5. Changes in feelings
6. Sweat and body odor

## **The Menstrual /Menses Cycle**

Let's look at one of the main changes in a girl's life, **menses or period**. Menses is the monthly blood flow in a girl/woman's life. Girls begin to produce ova (eggs) at age eight or more. The child-bearing organ that make the eggs are two. They are called ovaries (egg-making organs). Each month, an egg grows inside one ovary and lives between 12 and 24 hours. The womb also makes a lining rich in blood to receive the egg if it meets with a sperm (locally called juice among boys). The egg then moves to the womb within two weeks to grow into a baby. If not, the egg will die, move from the ovary to the womb, and the womb will wash it away with the lining.

The womb uses blood to wash away the lining and the egg. This process is called menses/period. It usually lasts between 5 and 7 days. The washing of the egg and the lining month by month is called the menses cycle. It is counted from the first day of a girl/woman's last menses to the start of the next menses. Usually, the menses cycle is 28 days long. But the length of the menses cycle may change as a girl grows. A girl/woman's menses may occur every 21 to 35 days.

### **Why Does the Menses Cycle Change?**

Several things can change the timing of a girl/woman's menses cycle. They are:

1. Pregnancy

2. Poor eating habit. E.g., eating food poor in nutrients.
3. More exercise
4. Medications
5. Age (at age 45 or more, a woman will begin to have changes in their menses cycle and later stop menstruating).
6. Sickesses/Illnesses

### **Ovulation /Egg-releasing Period**

Egg-releasing period (ovulation) is when the ovaries release the eggs. It usually takes place between 12 and 14 days, counting from the first day of the last menses. A boy/man's sperm can live in the ovaries for 3 to 5 days. Because sperm can stay longer in the ovaries before it dies, a girl/woman should not have unsafe sex four days before and up to the day of ovulation. If not, the sperm may meet with the egg for the girl/woman to get pregnant. Having sex on the 16<sup>th</sup> day of the last menses to the start of the next menses would not lead to pregnancy. The period between the 16<sup>th</sup> day of a girl's menses and the first seven days of the next menses is called the 'safe period'.

**How can I  
Calculate  
the  
Ovulation  
Period?**

Ovulation can be defined using a calendar or a chart. First, you must note down the first day of your menses. The date will help you to do the counting. As such, day one is the first day of your menses. Let's look at an example using Ama's menses cycle.

## February 2022

Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.
	<b>1</b> day 1 of menses	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>7</b>	<b>8</b> caution	<b>9</b> caution	<b>10</b> caution	<b>11</b> caution	<b>12</b> No sex	<b>13</b> No Sex
<b>14</b> No Sex	<b>15</b> No Sex	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>
<b>28</b>						

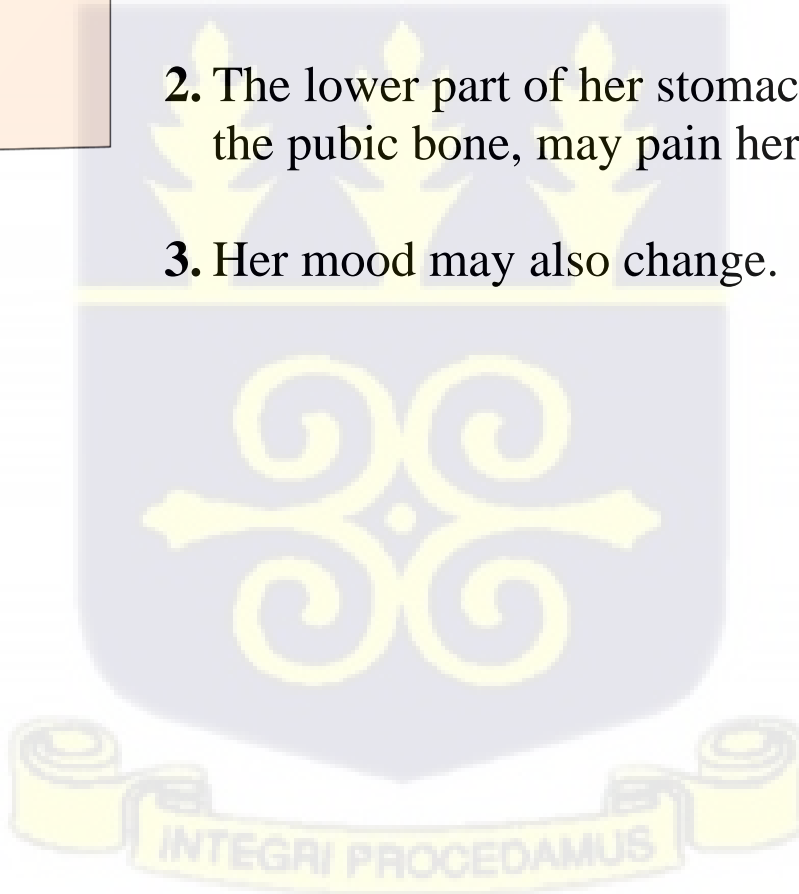
The ovulation period can be defined using a calendar or a chart. First, you must note down the first day of your menses. The date will help you to do the counting. Day one is the first day of your menses. Using a chart, let's look at an example of Ama's menses cycle.

From the above calendar, Ama has a 28-day cycle. she had her last menses on February 1, 2022. Her menses began on February 1 and ended on February 7, 2022. So, February 1 is day one of Ama's menses cycle. Day ten of her cycle would be February 10, 2022. Her ovulation period will fall between 12<sup>th</sup> and 14<sup>th</sup> February 2022. The 8<sup>th</sup> to 11<sup>th</sup> February has a yellow color. It means Ama should be cautious not to have unsafe sex. 12<sup>th</sup> to 14<sup>th</sup> February has a red color, meaning an unsafe period. Ama will become pregnant if she has unsafe sex between the 12<sup>th</sup> and 14<sup>th</sup> of February 2022.

Ama's unsafe period will likely end by her cycle's 14<sup>th</sup> or 15<sup>th</sup> day. February 15 also has a yellow color. It is a day of caution for Ama. She may get pregnant should she have unsafe sex on this day.

**How would a girl/woman know she is Ovulating?**

1. A few days after menses, a girl/woman will see slippery/slimy clear fluid from the cervix area.
2. The lower part of her stomach, close to the pubic bone, may pain her.
3. Her mood may also change.



## LESSON TWO SEXUAL ACTIVITIES

The term **Sex** may mean different things. In one setting, sex may tell gender. That is male and female, or a boy and girl. Sex may also refer to sexual intercourse (a sex act). In this lesson, sex stands for a sex act.

A sex act (known as sleeping with someone in the local language) is an act of **Lovemaking** between male and female adults or man and wife. It is also an act of childbearing. Boys and girls of your age do not understand much about Love. So, if you go into a personal friendship to have sex, it is only for **Lust** and not **Love**.

### Types and Forms of Sexual Activities

Sexual activities can be grouped into two. They are:

1. Outercourse
2. The sex act

### What is Outercourse?

Outercourse includes acts such as:

1. Cuddling
2. Kissing
3. Rubbing against each other with cloths on.
4. Masturbating each other or fingering.

The acts named above usually happen between male and female adults or man and wife.

## What is a Sex Act?

A sex act involves pushing the male's penis into the vagina of a female. Also, a sex act may take different forms. They are:

1. **Vaginal sex/intercourse** (sex through the vagina) It involves pushing the penis or anything that looks like the penis into the female's vagina.
2. **Anal sex/intercourse** (sex through the anus). It also involves pushing the penis or anything that looks like the penis into the anus of another person.
3. **Oral Sex** (sex through the mouth). It happens when a female puts a male's penis into her mouth or when a male licks any part of the female sex organ.

All the sex acts named above are not safe. They increase the spread of Sexually Transmitted Infections (STIs) and unwanted pregnancies.

### Risks in Sexual Activities

Risks in sexual activities can be grouped into three. They are:

1. No-Risk activities
2. Low-Risk activities
3. High-Risk activities

Let's look at them in order.

#### 1. No-risk Sexual Activities

No-risk activities are:

- A. Hugging
- B. Holding of hands

For example, Araba and Kofi are friends who learn and play together without engaging in sexual activities. Araba and Kofi can hold hands and hug each other without falling into sexual health risks.

## 2. Low-risk Sexual Activities

Low-risk sexual activities include:

- A. Kissing
- B. Massaging each other with cloths on.
- C. Massaging each other.

These kinds of sexual activities are a bit risky. They can lead to a sex act and the spread of STIs.

## 3. High-risk Sexual Activities

High-risk sexual activities are the main cause of STIs and teen pregnancy. They include:

- A. Having sex without a condom.
- B. Having sex with more than one boy or girl.
- C. Having sex for money.
- D. Having sex through the anus.
- E. Having sex with someone who uses hard drugs.

### Same-Sex Sexual Practices

Another sexual activity you must **beware** of as young teens is same-sex sexual practices. This sexual practice refers to all the sexual activities talked about earlier **in this Lesson**, except that it happens between people of the same sex.

Same-sex sexual practices may include:

1. Men engaged in anal sex or outercourse with other men or boys. It may also involve boys having anal sex or outercourse with other boys (Gay practice)
2. Women engaged in vaginal sex or outercourse with other women or girls. It also involves girls having vaginal sex or outercourse with other girls (Lesbianism).

**Do the people of Ghana Accept Same-sex Sexual Relations?**

No, it is against their moral values. All the groups in Ghana believe it is against the will of God and the lesser gods.

1. Christians do not welcome the practices.
2. Muslims do not accept it.
3. Other religions in Ghana do not go with it.

Another reason why the people of Ghana do not welcome the practice is that it comes with many problems. Among them are:

1. **It separates people from their families and neighbors.**  
Friends and families in Ghana do not accept people who go into same-sex sexual affairs.

**2. Same-sex sexual practice promotes STIs.** People who engage in same-sex sexual activities suffer from all forms of STIs.

**3. Same-sex sexual practice causes serious sicknesses.** People who go into same-sex sexual relationship suffer from many sicknesses. Some of them are:

**A.** Hepatitis A and B.

**B.** Sickness of the intestines and anus arising from STIs.

**C.** Swollen penis and cervical cancer.

**D.** Bleeding of the anus and cancer of the cervix.

**E.** Weakness of the anal lining leading to leaking of feces.



## RAPE AND DEFILEMENT

Rape is forced and unwanted sex. Forced and unwanted sex may include:

- 1. Defilement/sexual abuse.** Abuse happens when a male/female forces someone below age 16 into having sex. Sexual abuse also happens when a person engages in sexual relationship with someone below 16 years.
- 2. Rape.** Rape happens when a male/female forces someone age 16 or more into having sex.

Rape and sexual abuse are wrongdoings. The laws of Ghana do not accept them. A person who rapes another is called a rapist.

**What  
Should I do  
to Avoid  
Rape?**

**Avoid the following:**

- 1. Do not** be alone with the opposite sex.
- 2. Avoid** petting the opposite sex.
- 3. Report** anyone touching your private part to your parents/guardian. Your private parts include those body parts listed on page 13.

**What is the  
Right Thing  
to do if I am  
Raped?**

- 1. Protect yourself** by telling your parents/guardian without wasting time.
- 2. Do not** pay attention to the threats of the rapist.
- 3. Let your parents/guardian** report the matter to the police and send you to the hospital.

Your parent can also get help from the **Orange Support Center**. They can dial the helpline: **0800-111-222**.

## LESSON THREE

### FRIENDSHIP

Young boys and girls make a lot of friends. You can make friends with schoolmates, those in your house, and your community. Let's look at how you may keep such friendships.

#### **Do's and Don'ts**

Keeping rules in your friendship would help you keep **good morals** and avoid sexual feelings that may lead to **early sexual activities**.

#### **DO**

Friends should help each other and make each other feel good about themselves. You can do the following for your friends:

1. Help your friends when they are going through bad times.
2. If a friend needs someone to talk to, listen to them.
3. Include your friends in the good things you do.
4. Stand by your friends at all times.
5. Respect and accept your friends for who they are.
6. Avoid people who will put you in danger or make you feel unsafe.
7. Avoid people who will put you down or make you feel worthless.

## **Don'ts**

1. Don't hide to leave the house to meet a friend. **Tell** your parents/guardian wherever you are going.
1. **Do** not be alone with a male/female friend.
2. **Do** not touch the private parts of your male/female friend when playing together. Report those who do that to your parents/guardian.

**Which Parts  
of the Body  
are Private?**

The private parts of a boy/girl are:

1. The breast
2. Lips
3. Thigh
4. Buttocks
5. Vagina
6. Penis



## **LESSON FOUR ABSTINENCE**

Abstinence (saying no to sexual activities) is the simplest way to prevent pregnancy and some STIs. If a boy and a girl do not have sex, pregnancy cannot occur. Saying no to sex means avoiding all the sexual activities we have learned. For example, Abena and Kwame want to use their time to learn and pass all their exams. So, they have decided not to have sex until they have finished university or learned a trade. Their decision means doing away with all the sexual activities we learned in lesson two. If Abena and Kwame do not stand by their choice, they will fall into many risks. Let's look at some of the risks early sex may bring your way.

### **Early sex will get you Pregnant and Affect your Health.**

1. Girls who get pregnant at an early age can die during pregnancy or at the time of birth.
2. Others may not be able to deliver the baby on their own. Such girls will have to deliver through operation.
3. Boys/girls who have early sex may get STIs.

**You should know** that some STIs like HIV, hepatitis B, and hepatitis C do not spread through sex alone. You can get them through some other means. See lesson 5 for more on STIs.

### **Early Pregnancy will Affect your Future.**

1. A girl who gets pregnant early may drop out of school.
2. A boy/girl may not be able to learn a trade due to early sex and pregnancy. They would become poor and would not be able to take care of themselves and the baby.
3. Children of young teens may not go to school. They may grow up to become poor.

### **Early pregnancy Brings Shame to Families.**

1. Your peers may laugh and tease you.
2. Your parents would feel ashamed of you. Their friends would mock them. They would be called “bad parents.”
3. In many cases, boys/men who get girls pregnant leave them to suffer alone. So, girls, be wise.

### **Benefits of Saying no to Sex**

If you choose not to have sex, you would be able to:

1. Follow your faith.
2. Fully finish school on time.
3. Learn a trade.
4. Follow the good guidance of your parents.
5. Wait to find the right guy/girl.
6. Be with a guy/girl without the troubles of early sex.

**Tips to  
Overcome  
your Sexual  
Feelings.**

**Follow the Tips below:**

- 1. Think** about what can happen to you if you follow your sexual feelings.
- 2. Avoid** watching porn pictures and videos (locally called porno). Not all porn videos and pictures are real.
- 3. Be careful** with the use of social media.
- 4. Pray** always if you believe in prayer.
- 5. Choose** your friends wisely.

**You should** also **direct** your sexual feelings to do something gainful, such as:

- 1. Playing** musical instruments
- 2. Learning** a trade
- 3. Playing** football, etc.



## Support to Overcome Sexual Desires

It is natural for a young boy/girl to have sexual feelings. You will feel this way because at puberty your body starts to make hormones that makes you feel for sex. If you have trouble overcoming your desire, you may ask the following **people for advice**.

1. A Family Planning Nurse
2. The Girl Child Educator
3. The School Counselors

If you want to know more about puberty, how to say no to sex, and STIs, check out the following sources for more help.

1. The internet
2. Books.
3. Magazines

You can also check social media handles for some advice. The social media handle may include:

1. Facebook
2. YouTube

You can also get guidance from the websites of **Groups** that give advice and guidance to teens, such as:

1. Planned Parenthood Association of Ghana (PPAG)
2. KidsHealth
3. Young Men's Health
4. SafeTeens
5. Other helpful websites

**How do I Tell  
the Website I  
have Visited  
has Safe  
Advice and  
Guidance?**

There are two basic checks you can make about safe websites. They are:

1. The URL addresses
2. The padlock signs

All websites have URL addresses that begin with 'http.' safe websites that give safe advice have URL addresses in this form

- 'https' or a padlock sign followed by 'https'. See the example below:

<https://www.thesaurus.com>



## Common STIs

- Chlamydia (Chlam)
- Syphilis
- Gonorrhoea (Gono)
- Yeast infection (Whites)
- Trichomoniasis (Trich)
- HIV/AIDS

## LESSON FIVE SEXUALLY TRANSMITTED INFECTIONS (STIs)

### What is STI?

STIs means Sexually Transmitted Infections. STIs are sicknesses/illnesses that usually spread through unsafe sexual acts. We shall look at a few of them.

### Syphilis

An STI germ causes syphilis. You can get syphilis by having oral, anal, and vaginal sex without a condom. Usually, syphilis spreads through contact with a syphilis sore. It is hard for someone to see the sore. So those who have syphilis may not know they have it until they test for it.

You can also get syphilis in the following ways:

1. Sharing injection needles.
2. A girl/woman living with syphilis can pass it on to her baby at birth and during pregnancy.

**How do I  
Know I have  
Syphilis?**

Not all people will show symptoms (signs) of syphilis. Yet, others may show the signs below.

1. Girls/women may have sores around and inside the vagina.
2. Boys/men may have sores on their penis.

Also, these signs may show some weeks later.

- A. Feeling of illness
- B. Fever
- C. Headache
- D. Rashes on palms, hands, and feet
- E. Weight loss

**When and  
how can I  
Test for  
Syphilis?**

If you have the habit of engaging in sex acts with boys/men or girls/women with many girlfriends/boyfriends, you need to test often to know whether you have syphilis. Check at least every two months.

**How is  
Syphilis  
Treated?**

If you feel/see the signs of Syphilis, do the following:

1. Tell your parents/guardian about the signs you have.
2. Let your parents/guardian take you to the hospital for treatment.

## **Gonorrhoea (Gono)**

Gonorrhoea (locally called gono) is an infection (illness) caused by an STI germ. You can get gonorrhoea by having sex with someone who has it without a condom. You can also get it if you have anal sex with someone who has gonorrhoea. The gonorrhoea germ can live only in wet places in the body. The wet areas may include the eye, the throat, and the vagina. If any of the wet places in your body come into contact with other body parts carrying the gonorrhoea germ, you can get the illness. A pregnant girl/woman living with gonorrhoea can pass it on to her baby at birth and during pregnancy. The danger is that you can easily get the illness.

### **How do I Know I have Gonorrhoea?**

The following signs will show in your body within 14 days of having gonorrhoea.

- 1. Sore throat (gonorrhoea in the throat).**
- 2. Pain, anal discharge and bleeding (gonorrhoea in the anus).**
- 3. Redness, itching, or discharge of the eyes (gonorrhoea in the eye).**
- 4. Girls will feel pain in the lower part of their stomach. They will have vaginal discharge, and boys will also see yellowish-green discharge from their penis**
- 5. Girls will have a burning feeling when urinating and pains during sex.**
- 6. Boys will have burning feelings when urinating and pain and swelling in one of their testicles.**

There is a treatment for gonorrhoea. So, when you see signs of the illness, follow the tips for treating syphilis.

## Vaginal Yeast Infection

Vaginal yeast (also known as White) is an illness caused by the germ called **Candida**. Vaginal yeast is not part of the list of STIs. The germ already lives in the vagina of females. But when it grows more than is needed, it becomes illness to the vagina. Vaginal yeast also infect many girls during their first sexual act. Boys/men can also be carriers of the candida germ. Girls can also get the yeast germ by using panties and WCs/toilets stained by the candida germ. The candida germ can live in the throat if a person engages in oral sex with another who has the illness.

### How do I know I have Vaginal Yeast Illness?

The following signs will show:

1. Girls will itch in the vagina and the vulva. They would have burning feelings in the vagina each time they urinate. The vagina will become reddish. Rashes may also grow on the tip of the vagina.
2. Girls will see odorless and cheese-like fluids coming out of the vagina.
3. More fluids may also come out of the vagina.

### How do I Treat the Vaginal Yeast Illness?

1. Tell your parents/guardian about it.  
They can buy you medicine from the pharmacy or take you to see a doctor.
2. If you have signs of vaginal yeast after using medicines from the pharmacy, you will have to see a doctor.

## Chlamydia Infection

Chlamydia (chlam, as you may want to call it) is an illness caused by an STI germ. You can get the germ by having vaginal sex without a condom. You can also get chlamydia when you have sex through the anus of someone with the illness. You can have chlamydia germ in your throat if you have oral sex with someone with the illness. The sad thing is that you do not feel or see any sign when you get chlamydia.

### How do I Know I have Chlamydia?

Very few people show signs when they have chlamydia. The signs of the illness will show three weeks after getting the germ.

1. Girls will discharge water-like fluid, which smells bad from the vagina.
2. Boys will see milky fluid coming from the penis. They will feel pains in their testis.
3. Both boys and girls will have burning feelings when urinating.

### How is Chlamydia Treated?

1. You will only know you have the illness when you **test** for it.
2. To test for it, you must **tell your parents/caregivers** to take you to see a doctor.

It would help if you **told the doctor** clearly about the signs to give you the proper test and treatment.

## Trichomoniasis

Trichomoniasis (Tricho, as you may want to call it.) is an illness caused by the STI germ called **Trichomonas**. It infects the urine tube (urethra) and the penis. Trichomoniasis also infects the vagina and the vulva but not the other parts of the body. People who have the illness may not show or feel any signs. But the following signs may show in others:

1. Girls who have trichomoniasis will see yellow or green color fluid in their vagina. The fluid usually smells bad.
2. Both boys and girls may feel pains when urinating
3. Girls may bleed after having sex.
4. Boys may also itch and have penis discharge. They may have pains after having sex.

### How Does Trichomoniasis Spread?

1. You can easily get trichomoniasis if you have the habit of having sex with more than one boy/man or one girl/woman.
2. Also, you can get trichomoniasis by having sex with someone who has the illness without a condom.

### How is This Illness Treated?

There is a treatment for this illness. When you have signs of the illness, follow the tips provided for treating syphilis.

## HIV/AIDS

HIV is caused by a germ called Human Immunodeficiency Virus (HIV). This virus attacks the body's defense against illness. If you do not treat HIV, it will worsen and turn into Acquired Immunodeficiency Syndrome (AIDS). HIV has no treatment. Once a person gets HIV, it will remain with them for life. The good news is that those with HIV can live with it for a long time. You can take medicines to stop the HIV germ from harming you. The medication can make an HIV person live a healthy life and reduce the spread of HIV.

### How does HIV Spread?

1. HIV spreads through blood, semen and sperm cells (Juice), vagina fluid, and breast milk.
2. You can have HIV when you have vaginal sex or anal sex with an HIV person without a condom.
3. You can have HIV when you share needles, syringes, or toothbrushes with others who have HIV.
4. Women/girls can pass it on to their babies during pregnancy and childbirth.

**How do I  
know I have  
HIV?**

The following signs will show in people who have HIV.

1. Fever
2. Sore throat
3. Night sweat

4. Tiredness
5. Headache
6. Diarrhea
7. Mouth sores

### **How to Live with HIV?**

Some people may feel the signs of HIV 2-4 weeks after getting the HIV germ. Others will show signs months after having the germ. The signs of HIV may last for a few days or many days. When you feel or see the signs, it does not mean you have HIV. You can know you have HIV by testing for HIV.

You can live with HIV by getting HIV medicines from the hospital. You can also take preventive medicine just after you have contacted the blood of an HIV person through rape, needle prick, etc.

You can stop the spread of HIV.

1. Tell your parents/caregivers and boyfriend/girlfriend you have HIV.
2. Pregnant women who have HIV **must** seek care from the hospital. Seeking care during pregnancy will prevent your baby from getting HIV.

## LESSON SIX

### WAYS TO AVOID STIS AND PREGNANCY

Some young people may not be able to check their sexual feelings. If after seeking advice and guidance, you cannot control your sexual desires. You can practice safe sex. It means the use of condoms and other methods of preventing pregnancy. Let's consider condoms.

### CONDOM

A condom is a soft rubber-like material. It is worn on the penis or inserted in the vagina before sex. A condom helps prevent STIs and pregnancy. Yet, you should know that condoms are not always reliable. It can tear during sex if it is expired. **There are male and female** condoms. You can get a condom from any drug store or a family planning center.

#### How to keep and Use a Condom?

To keep and use a condom safely, follow the tips below.

1. Do not keep a condom in your pocket or purse. The condom can get warm and tear.
2. Do not use oils and creams to oil the vagina. Instead, use vagina gel to avoid dryness of the vagina.

You can follow the steps below to wear a condom.

1. Always use latex condoms.
2. Read the pack of a condom anytime you buy it.
3. Check for expiry date.
4. Check to make sure there is no tear on the condom.
5. Females should hold the outside of a female condom at closed end. Press sides of inner ring together with fingers and insert into vagina.

6. The longest finger should then be used to push the ring as far into the vagina.
7. Some of the condom will hang and be show outside of the vagina. Make sure that the penis is inside the condom and not between the condom and the vaginal wall
8. Males should place a male condom over the tip of the penis. Grip the end of the condom and move it down over the length of the erect penis
9. Slide the male condom off the penis, keeping the semen inside. Since condoms can clog the toilet if they are flushed, tie it off or put in a plastic bag and throw it into a bin.
10. Do not keep a used condom for reuse. Instead, put on a new condom for the next round of sex.

### **Other Ways to Prevent Pregnancy**

You can get the items from the family planning or family health units in hospitals, health centers, clinics, and adolescent corners. You can also get it from workplaces like PPAG and Marie Stopes clinics in Ghana. There are long-term and short-term ways to avoid pregnancy. Let's look at them.

### **Long-Term Ways to Avoid Pregnancy**

Among girls/women, there are ways to avoid pregnancy over a very long period. They include:

1. Implant
2. Intrauterine Devices (IUDs)

## **Implant**

The implant is a plastic rod that looks like a matchstick. The implant is inserted under the skin of the upper arm. Once inserted, it can remain in the upper arm for between 3 and 5 years. The implant does not prevent STIs.

## **IUDs**

IUDs are womb devices. They are placed in a girl/woman's womb to stop her from getting pregnant. There are hormonal and copper IUDs. When placed in the womb, it can remain there for 5 to 10 years. It can be removed anytime the girl/woman wants to get pregnant.

## **Short-term Ways to Avoid Pregnancy**

The short-term ways are oral medicines and injections used in a short time to avoid pregnancy. They include:

1. The Injection – you can take the injection every three months.
2. The Emergency Pills– you can take this pill within three days or 72 hours after having sex. Do not use this pill every time you have sex. You can use it only when sex happens by accident.
3. The Regular Daily Pill. There are many kinds of daily pills. To make it work; you have to take one pill daily. It is used in the following ways based on the type:
  1. Once every day for 21days.
  2. Once every day for 28 days.
  3. Once every day for 90 days.

You can talk to a family planning nurse to know which pill will be helpful to you. Remember that all the short-term ways to avoid pregnancy do not prevent STIs.

### **The Withdrawal Method**

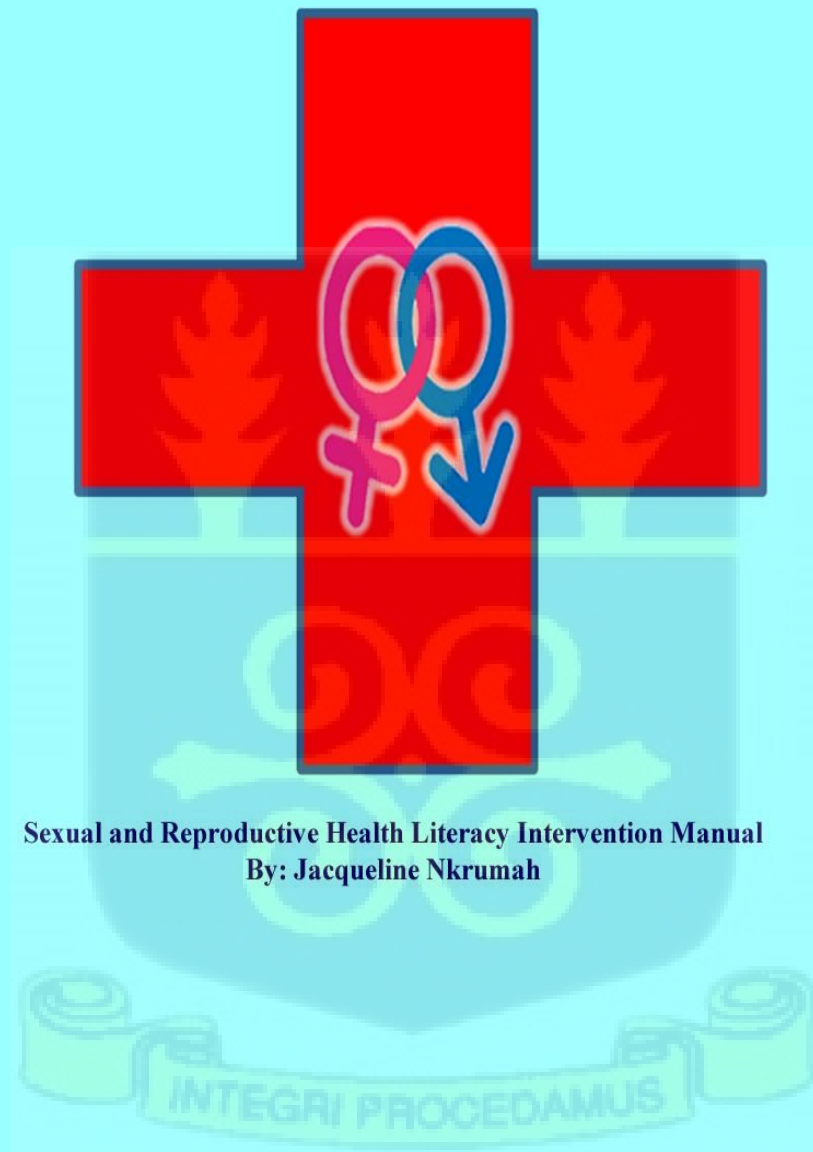
Withdrawal is one of the ways to avoid pregnancy. The penis is removed from the vagina and away from the female sex organ before the semen is released. If some of the semen drop on the vulva and has sperms, they can make their way into the vagina for the girl/woman to get pregnant. The withdrawal method does not always prevent pregnancy because it is hard to pull out the penis before semen. In many cases, some small amount of sperm will get into the vagina when the penis is pulled out, which may bring about pregnancy. You should know that this method does not prevent STIs.

### **Summary**

I believe you now have a good understanding of yourselves as young teens. You understand the changes in your body and what you need to do. You have also learned about sexual activities and the dangers involved in sexual activities, including STIs. You are also encouraged to say no to sexual activities. However, for those who want to have sex no matter what, you can practice safe sex by using a condom. You may also use any methods for preventing pregnancy learned in lesson six.

**Appendix C2: Difficult Text Material**

**ADOLESCENT-CENTERED SEXUAL AND REPRODUCTIVE HEALTH  
EDUCATIONAL MATERIAL: DIFFICULT TEXT**



**Sexual and Reproductive Health Literacy Intervention Manual  
By: Jacqueline Nkrumah**

## Table of Content

Table of content .....	i
Purpose and objectives and objectives Introduction .....	ii
<b>LESSON ONE</b> .....	1
Puberty .....	1
Menstruation .....	1
<b>LESSON TWO</b> .....	4
Sexual Activities .....	4
Rape .....	7
<b>LESSON THREE</b> .....	9
Friendships .....	9
<b>LESSON FOUR</b> .....	10
Abstinence .....	10
Benefits of Abstinence .....	10
<b>LESSON FIVE</b> .....	11
<b>SEXUALLY TRANSMITTED INFECTIONS(STIs)</b> .....	11
Syphilis .....	11
Gonorrhoea .....	13
Yeast Infection .....	14
Chlamydia .....	16
Trichomoniasis .....	18
HIV/AIDS .....	19
<b>LESSON SIX</b> .....	21
Ways to avoid STIs and Pregnancy .....	21
Condom .....	21
Ways to avoid Pregnancy .....	23
Long-Term Ways to avoid Pregnancy .....	23
Short-Term Ways to avoid Pregnancy .....	25
<b>SUMMARY</b> .....	36

## **Purpose and Objectives**

This resource aims to present teens' Sexual and Reproductive Health (SRH) information synthesized from already existing ones..

It is hoped that the young adolescent will be able to:

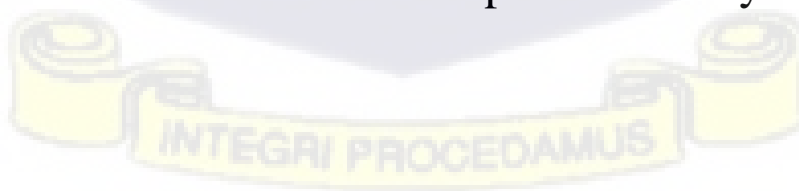
1. read and understand the SRH topics in this material
2. better their SRH knowledge
3. make informed choices to better their SRH lives

## **Introduction**

SRH refers to a person's ability to feel well in their body and mind while also being able to relate well with others in all matters linked to the reproductive organs. It also means that adults/grownups can have pleasant and safe sex. They can have children and choose if they want to have them, when to have them, and how many children they would like.

But young teens are not mature enough to have sex. They are not grown enough to make babies. Also, young teens cannot choose between safe and unsafe sex. So, they can fall ill or die if they choose to have sex and bear children. They will be unable to reach the state where they can feel well in the body and mind. In this case, early sex and childbirth will lead to poor SRH in young teens.

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## **LESSON ONE PUBERTAL CHANGES**

Girls typically start puberty between the ages of 8 and 13, and guys normally start puberty between ages 9 and 14. However, the exact time that pubertal changes occur varies for each individual.

### **Signs of puberty in Boys and Girls**

- Development and enlargement of breast
- Growth spurt
- Growth of pubic hair around private parts
- Voice becomes slither
- Menstruation
- Ovulation

### **Similarities in puberty between boys and girls**

- Pubic hair growth,
- The development of acne,
- Growth spurts.

### **Diffrence in puberty between boys and girls**

- Girls get period
- Vaginal discharge in girls

### **Menstruation**

When a girl reaches puberty, her ovaries (small egg-containing organs that are located on both sides of the uterus) make hormones that cause menstrual periods. The pituitary gland releases chemical messengers called gonadotropins that “tell” the ovaries to produce estrogen and to release a mature egg once a month.

This egg travels towards the uterus. If the egg isn't fertilized by a sperm, the thick bloody lining that builds up in the uterus passes out of the body through the vagina as blood (a "period" or "menstrual period") two weeks later. This whole process is called menstruation. It is monthly bleeding, often called your "period." During the monthly menstrual cycle, the uterus lining builds up to prepare for pregnancy. If you do not get pregnant, estrogen and progesterone hormone levels begin falling. Very low levels of estrogen and progesterone tell your body to begin menstruation.

A menstrual cycle begins with the first day of your period, or menstruation and starts over again when the next period begins. Throughout a monthly menstrual cycle, your body makes different amounts of chemicals called hormones to prepare for pregnancy. These changing hormone levels can cause menstrual symptoms. Menstrual cycles often change as a woman gets older. A normal cycle lasts between 24 and 38 days.

### **How Long is a Typical Menstrual Cycle?**

The typical menstrual cycle is 28 days long, but each woman is different. Also, a woman's menstrual cycle length might be different from month-to-month. Your periods are still "regular" if they usually come every 24 to 38 days. This means that the time from the first day of your last period up to the start of your next period is at least 24 days but not more than 38 days. Some women's periods are so regular that they can predict the day and time that their periods will start. Other women are regular but can only predict the start of their period within a few days. Each woman's cycle length may be different, and the time

## Ovulation

Ovulation is when the ovary releases an egg so it can be fertilized by a sperm in order to make a baby. A woman is most likely to get pregnant if she has sex without birth control in the three days before and up to the day of ovulation (since the sperm are already in place and ready to fertilize the egg as soon as it is released). A man's sperm can live for 3 to 5 days in a woman's reproductive organs, but a woman's egg lives for just 12 to 24 hours after ovulation.

At different times in a woman's life, ovulation may or may not happen. Some instances include:

- Women who are pregnant do not ovulate.
- Women who are breastfeeding may or may not ovulate.
- During perimenopause, the transition to menopause, you may not ovulate every month.
- After menopause you do not ovulate.



## LESSON TWO

### SEXUAL ACTIVITIES

One misconception about sexual intercourse is that it is the hallmark, or definition, of 'having had sex'. That is to say, if you have not had 'sexual intercourse', then you have not 'had sex'. Mutual masturbation and petting aren't 'having sex'; oral sex isn't 'having sex' – but then, therein lies the misperception. Sex and sexuality are not distinct and separate acts. Having sex includes much, much more than sexual intercourse. Having sex include:

1. Petting
2. Mutual Masturbation
3. Oral Sex
4. Anal Intercourse
5. Outercourse

**Sex can be classified into two main types, namely:**

1. **Outercourse**
2. **Sexual intercourse**

#### ***Outercourse***

To some writers, outercourse is where two people place their genitals together, as though they were about to have intercourse, and proceed to rub back and forth in a sort of "simulated" sexual intercourse. It is very similar to sexual intercourse, except that there is no actual penetration of the penis into the vagina. However, the definition of outercourse varies, the activities that count as outercourse all depend on who's practicing it.

Outercourse might include any of the following:

1. Kissing
2. **Massage**
3. **Mutual masturbation**

## **Sexual Intercourse**

Sexual intercourse is the act of placing the male penis into the female vagina, sometimes for sexual pleasure only, sometimes only to create life, and many times, for both purposes.

*Sex may also take the following forms:*

### **1. Oral Sex**

*Oral sex* on a **female** is when one person uses their lips, mouth and tongue on and around the vulva, the labia, the clitoris and inside the vagina or when one person uses their lips, mouth and tongue on and around the penis and scrotum.

### **2. Anal Sex/Intercourse**

Anal intercourse is where the anus of one partner is penetrated by the other partner with either a real or fake penis. It can occur between a male and a female; between two males; and even between two females using a dildo, vibrator or other artificial penis.

## **Risks Associated with Sexual Activity**

There are a number of sexual practices that present no or low risk and high-risk for sexually transmitted infections. These include the following:

### **NO RISK**

**No-risk sexual behaviors include:**

- 1. Holding of hands**
- 2. Hugging**
- 3. Massaging**

### **Low-Risk Sexual Behavior**

Low-risk sexual behavior includes touching and rubbing each other's genitals with your hands, kissing and massaging each other. These activities are considered low risk because many sexually transmitted infections including HIV cannot be transmitted in this way. However, oral herpes is easily transmitted during kissing. Genital warts and trichomonas can be passed from one person to another by moving your hands from one person's genitals to another. Crabs can move from one person to another during any close contact.

### **High-risk sex**

High-risk sexual behavior puts people at risk for sexually transmitted infections (STIs), unplanned pregnancy, and being in a sexual relationship before being mature enough to know what makes a healthy relationship. Teens and young adults are at higher risk than adults. Examples of high-risk sexual behavior include:

1. Unprotected intercourse without male or female condom use.
2. Unprotected mouth-to-genital contact.
3. Starting sexual activity at a young age. The younger people are when they start having sex, the greater their risk of getting genital herpes.
4. Having multiple sex partners.
5. Having a high-risk partner (one who has multiple sex partners or other risk factors).
6. Having unprotected anal sex or a partner who does.
7. Having sex with a partner who injects or has ever injected drugs.
8. Sex trade work.

## **Rape**

Rape, sometimes also called sexual assault, can happen to both men and women of any age. A rapist uses actual force or violence – or the threat of it – to take control over another human being. Some rapists use drugs to take away a person's ability to fight back. Rape is a crime, whether the person committing it is a stranger, a date, an acquaintance, or a family member.

### **What Should I Do?**

What's the right thing to do if you've been raped?

Take care of yourself in the best way **for you**. For some people, that means reporting the crime immediately and fighting to see the rapist brought to justice. For others it means seeking medical or emotional care without reporting the rape as a crime. Every person is different. There are three things that everyone who has been raped should do, though:

1. Know that the rape wasn't your fault.
2. Seek medical care.
3. Deal with your feelings.

### **It's Not Your Fault**

Whatever happened, it wasn't your fault. No one has the right to have sex with you against your will. The blame for a rape lies solely with the rapist. Sometimes a rapist will try to exert even more power by making the person who's been raped feel like it was actually his or her fault. A rapist may say stuff like, "You asked for it" or "You wanted it." This is just another way for the rapist to take control. The truth is that what a person wears, what a person says, or how a person acts is never a justification for rape. Most people who are raped know their rapists. That can sometimes lead the person who's been raped to try to protect the perpetrator. Make protecting yourself your priority. Don't worry about protecting the person who raped you. Do whatever helps you to feel safe

### **Seek Medical Care**

The first thing someone who has been raped needs to do is see a medical doctor. Most medical centers and hospital emergency departments have doctors and counselors who have been trained to take care of someone who has been raped. It's important to get medical care because a doctor will need to check you for sexually transmitted diseases (STDs) and internal injuries.

### **Dealing With Feelings**

Rape isn't just physically damaging; it can be emotionally traumatic as well. The right emotional attention, care, and support can help a person begin the healing process and prevent lingering problems later on. Someone who has been raped might feel a lot of things: angry, degraded, frightened, numb, or confused. It's also normal for someone who has been raped to feel ashamed or embarrassed. Some people withdraw from friends and family. Others don't want to be alone. It may be hard to concentrate in school or to participate in everyday activities.

Sometimes it may feel like you'll never get over the trauma of the rape. The best way to work through them is with professional help. Your parent can call this helpline: **0800-111-222**. This number will link you to the Orange Support Center. The Ghana police and UNFPA Ghana set up this center to help people who are raped or abused by others.



## **LESSON THREE FRIENDSHIP**

Friends are unlike anyone else in your life. They are different from your family and your peers at school/college. Friends are people you have chosen to have in your life, and they have chosen you. They can be there to celebrate your successes and help you cope when we are feeling down. Here are our Do's and Don'ts of Friendship!

### **Do!**

Friends are people who should support you, and make you feel good about yourself. They should:

1. Support you when you are facing challenges
2. Listen to you if you need to chat
3. Include you in activities and outings
4. Stick up for you
5. Respect you, appreciate your uniqueness and never ask you change who you are

### **Don'ts!**

Friends should be people that help you to achieve and be the best that you can be. They should never:

1. Put you down or make you feel worthless
2. Make fun of you or aspects of your life
3. Put you in danger or make you feel unsafe
4. Always take things from you, never giving you anything in return
5. Aren't happy for you when good things happen



## **LESSON FOUR ABSTINENCE**

### **What is Abstinence?**

Abstinence is the simplest form of birth control. If two people don't have sex, sperm can't fertilize an egg and there's no possibility of pregnancy. Other forms of birth control depend on barriers that prevent the sperm from reaching the egg (such as condom). With abstinence, no barriers or pills are needed. A person doesn't have to be a virgin to practice abstinence. Sometimes, someone who has been having sex decides to stop doing so. A person who has been having sex can still choose abstinence to prevent pregnancy and sexually transmitted diseases (STDs) in the future.

Complete abstinence is the only way to guarantee protection against STDs. This means avoiding all types of intimate genital contact. Someone practicing complete abstinence does not have any type of intimate sexual contact, including oral sex. So there is no risk of getting an STD.

### **How Well Does Abstinence Work?**

Abstinence is the only form of birth control that always prevents pregnancy. Practicing abstinence ensures that a girl will not become pregnant because there is no chance for sperm to fertilize an egg. Many other birth control methods have high rates of success if used properly, but they can fail occasionally.

### **Benefit of Abstinence**

#### **People who choose abstinence are able to:**

1. Wait until they feel ready for a sexual relationship
2. Wait to find the right partner
3. Enjoy their partner's company without having to deal with a sexual relationship
4. Focus on school, their job, or hobbies
5. Follow their personal, moral, or religious beliefs and values

## **LESSON FIVE**

### **SEXUALLY TRANSMITTED INFECTIONS (STIS)**

Sexually Transmitted Infections (STIs) are infections that spread through sex (vaginal, oral, or anal). Some STIs can spread through close contact with the genitals or body fluids. (Genitals are the sexual or reproductive organs that are on the outside of the body.). Let's consider a few of the STIs. They include

1. Syphilis
2. Gonorrhea
3. Yeast Infection
4. Chlamydia
5. Trichomoniasis

#### **Syphilis**

Syphilis is a sexually transmitted infection caused by a spirochete (a very small organism). It can affect the entire body and needs to be treated with antibiotics early to avoid serious problems. Syphilis is passed from person to person through direct contact with the syphilis sore or moist rash. It is usually passed through sexual contact, including vaginal, anal, and oral sex. Pregnant individuals with syphilis can pass it on to their babies before birth. Anyone having unprotected sexual contact with an infected person can get syphilis. Having more than one sexual partner increases your risk.

#### **What are the symptoms of syphilis?**

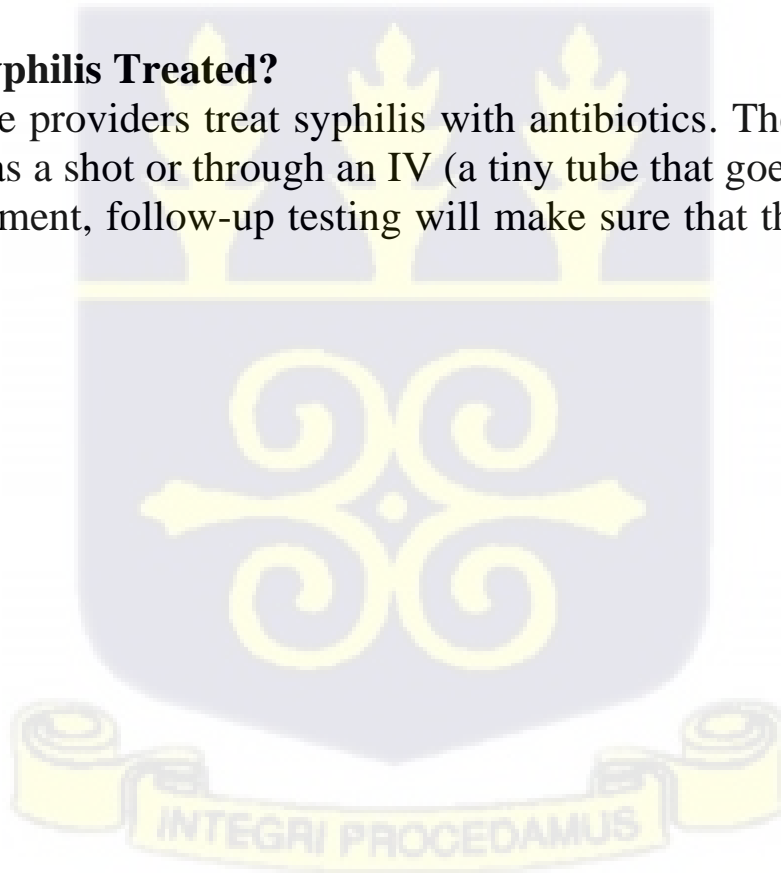
You can have syphilis without any symptoms and still pass it on to others. Early symptoms are very similar to those of many other diseases. Some of the symptoms include:

1. A painless sore (called a chancre- "shan-ker") may show up at the area where the germ first entered the body, usually on the penis, anus, vulva, mouth, lips, or hand.

2. During this stage, you may have flu-like symptoms 3 weeks to 6 months after infection. At this time, you can also get a rash. The rash usually heals within 2-6 weeks and can go away without treatment. The second stage can also include:
- A. Fever
  - B. Headache
  - C. Sore throat
  - D. Swollen lymph glands
  - E. Patchy hair loss
  - F. Muscle aches
  - G. Mucous spots or sores in the mouth
  - H. Tiredness
  - I. Lumps or warts in warm, moist areas

### **How Is Syphilis Treated?**

Health care providers treat syphilis with antibiotics. These medicines are given as a shot or through an IV (a tiny tube that goes into a vein). After treatment, follow-up testing will make sure that the infection is cured.



## **GONORRHEA**

Have you heard of “the clap,” or “a dose,” or “a drip”? These are all names for gonorrhea. Gonorrhea is a common sexually transmitted infection, or STI, caused by bacteria. If you are having unprotected sexual contact (penis, vagina, mouth, or anus) with another person, you may be at risk. Anyone having unprotected sexual contact with someone infected with gonorrhea can get gonorrhea.

### **How is gonorrhea spread?**

Gonorrhea is spread through sex—oral, anal, and vaginal. Women are more likely to catch gonorrhea from men than men are from women. Gonorrhea is highly contagious between male sexual partners. Although less likely, women can also acquire gonorrhea from female sexual partners. Gonorrhea can also be passed to the eye by a hand or other body part carrying infected fluids.

### **What are the symptoms of gonorrhea?**

You may not have any symptoms if you have gonorrhea. If you do have symptoms, they usually appear within 1-14 days after becoming infected. It's important to know you can still pass gonorrhea on to others whether or not you have symptoms. Possible symptoms of gonorrhea in guys include:

1. Milky white, yellow, or green discharge from the penis
2. A burning feeling when peeing
3. Pain and swelling in one testicle

Symptoms of gonorrhea in girls include:

1. Vaginal discharge
2. A burning feeling when peeing
3. Pain with intercourse
4. Pain in the lower abdomen or pelvis

### **Is there a cure for gonorrhoea?**

YES. Gonorrhoea infection is treated with antibiotics prescribed by your health care provider. Your health care provider can diagnose gonorrhoea by testing a urine sample or a swab of the affected area (penis, vagina, cervix, anus, throat, and/or eye).

## **YEAST INFECTION**

A vaginal yeast infection is a fungal infection that causes irritation, discharge and intense itchiness of the vagina and the vulva — the tissues at the vaginal opening. Also called vaginal candidiasis, vaginal yeast infection affects up to 3 out of 4 women at some point in their lifetimes. Many women experience at least two episodes. A vaginal yeast infection isn't considered a sexually transmitted infection.

The fungus candida albicans is responsible for most vaginal yeast infections. Your vagina naturally contains a balanced mix of yeast, including candida, and bacteria. An overgrowth of candida or penetration of the fungus into deeper vaginal cell layers causes the signs and symptoms of a yeast infection. But, there's an increased risk of vaginal yeast infection at the time of first regular sexual activity. There's also some evidence that infections may be linked to mouth to genital contact (oral-genital sex).

### **Symptoms**

Yeast infection symptoms can range from mild to moderate. They include:

Itching and irritation in the vagina and vulva.

1. A burning sensation, especially during intercourse or while urinating

2. Redness and swelling of the vulva
3. Vaginal pain and soreness
4. Vaginal rash
5. Thick, white, odor-free vaginal discharge with a cottage cheese appearance
6. Watery vaginal discharge

Medications can effectively treat vaginal yeast infections. Make an appointment with your doctor if:

1. This is the first time you've had yeast infection symptoms
2. You're not sure whether you have a yeast infection
3. Your symptoms aren't relieved after treating with over-the-counter antifungal vaginal creams or suppositories
4. You develop other symptoms



## Chlamydia

Chlamydia is one of the most common sexually transmitted infections (STIs). Chlamydia can infect the penis, specifically the urethra, anus  
vagina, cervix and the fallopian tubes

Chlamydia is spread from person-to-person during unprotected sex. It can be passed through vaginal, anal, and oral sex.. It can also be passed to the eye by a hand or other body part moistened with infected secretions. If a pregnant person has chlamydia they can pass chlamydia to their baby during delivery. Chlamydia cannot spread through kissing, toilet seats, bed linens, doorknobs, swim-ming pools, hot tubs, bathtubs, silverware, or sharing clothes.

### **What are the Symptoms of Chlamydia?**

If symptoms happen, they usually start anywhere from 1-3 weeks after becoming infected. People without symptoms can still have complications from the infection and pass it to sexual contacts.

Symptoms of chlamydia can include:

1. A clear or milky discharge from the penis
2. A burning feeling when urinating
3. The need to urinate more than usual
4. Swollen or painful testicles
5. Pain, itching, bleeding, and/or mucus discharge of the rectum (for chlamydia in the anus)
6. Redness, itching, and/or discharges of the eyes (for chlamydia in the eyes)
7. Vaginal discharge
8. Bleeding between menstrual periods

If it's not treated, chlamydia can lead to:

1. Pelvic inflammatory disease (PID) in females, which can damage the reproductive system, making it hard or impossible for a woman to get pregnant later on.
2. In males, swelling in the testicles and tubes at the back of the testicles, possibly preventing a man from fathering kids later on joint problems.
3. Babies born to infected mothers can get eye infections and pneumonia from chlamydia. It may also make it more likely for your baby to be born too early.

### **Can Chlamydia Be Prevented?**

The only way to prevent chlamydia and other STIs is not to have sex (oral, vaginal, or anal). If someone decides to have sex, using a latex condom every time can prevent most STIs.

### **How Will I Know I Have Chlamydia?**

Laboratory tests can diagnose chlamydia. Your healthcare provider may ask you to provide a urine sample for testing, or they might use (or ask you to use) a cotton swab to get a vaginal sample.



## **Trichomoniasis**

Trichomoniasis is a sexually transmitted infection (STI). It occurs in teens and adults and affects both. Trichomoniasis is an infection caused by a single-cell parasite called *Trichomonas vaginalis*. The parasite is spread through sexual intercourse, so it's an STI. The parasite most commonly infects the urethra (the tube that carries urine from the bladder to outside the body) and penis. It can also infect the vulva or vagina. It is uncommon for the parasite to infect other parts of the body, such as hands, mouth, or anus. Most people with trichomoniasis do not have symptoms, so they may not get treated and may spread the infection to their partners without even knowing it.

### **Who is a risk for Trichomoniasis?**

During sex, the parasite is transferred from one person to another. The parasite can be passed on from penis to vagina, vagina to penis, or vagina to vagina. Similar to other STIs, a person's risk of trichomoniasis is higher if:

1. They do not use a condom or dental dam with sexual contact(s).
2. They have multiple sexual contacts.
3. Their sexual contact(s) have more than one sexual contact.

### **What are some Signs/Symptoms of Trichomoniasis?**

Most people with trichomoniasis have no symptoms. Females may develop symptoms including:

1. Vaginal fluid that smells bad and is greenish or yellowish
2. Genital itching, burning, redness, or soreness
3. Pain when they pee or have sex
4. The need to pee more often
5. Bleeding after sex

Men with trichomoniasis may have:

1. Itching or irritation inside their penis
2. A thin white discharge from the penis
3. Pain when they pee or have sex
4. The need to pee more often

### **How will I know I have Trichomoniasis?**

Doctors can diagnose trichomoniasis by taking a sample of pee or fluid from your genitals and looking at it under a microscope to spot the parasite. Sometimes, they might need to do a test called a culture. This is when they store the sample for several days so the parasite can grow and be easier to find under a microscope.

## **HIV**

HIV (Human Immunodeficiency Virus) is a virus that attacks the body's immune system. If HIV is not treated it can lead to AIDS (Acquired Immune Deficiency Syndrome). There is currently no effective cure. Once people get HIV, they have it for life. But with proper medical care, HIV can be controlled. People with HIV who get effectively treated can live long, healthy lives and protect their partners.

### **How do I know I have HIV**

The only way to know for sure whether you have it is to get tested, knowing your HIV status. Help you to make healthy decisions to prevent getting or transmitting HIV.

### **What are the Symptoms of HIV**

1. Fatigue
2. Chills
3. Rash
4. Night sweats
5. Muscle aches
6. Sore throat
7. Swollen lymph nodes and mouth ulcers

### **How is HIV passed from one person to another?**

Most people who get HIV get it through vaginal or anal sex, or sharing needles, syringes, or other drug injection equipment. The following are other modes of spread of HIV:

1. You can get HIV if you have anal sex with someone who has HIV without using protection (like condoms or medicine to treat or prevent HIV). Anal sex is the riskiest type of sex for getting or transmitting HIV
2. HIV can be transferred from a mother to her baby during pregnancy, birth or breastfeeding. Mother-child transmission is the most common way children get HIV.
3. You are at high risk of getting HIV if you share needles, syringes or other drug injection equipment (for example cookers) with someone who has HIV.

### **What should I do if I think I have HIV or AIDS?**

If you think you are infected with HIV or have been exposed to someone whom you suspect or know to be HIV positive, or if you have symptoms, get tested and make an appointment with your health care provider right away. The earlier you get tested the sooner you can start taking medications to control the virus. Getting tested early can slow down the progress of the HIV infection and may even prevent you from getting AIDS.



## LESSON SIX CONTRACEPTIVES

There are various contraceptive methods. In this lesson, we will consider a few of them beginning with condom.

### **What's a Condom and How Does it Work?**

Condoms are small, thin pouches that cover your penis during sex and collect semen (cum). Condoms prevent pregnancy by stopping sperm from getting into the vagina, so sperm can't meet up with an egg. Some types of condoms also help prevent STDs. There are 3 types of condoms: latex condoms, plastic (nonlatex) condoms, and lambskin (animal skin) condoms. There are female and male condoms.

### **How Do I Use a Condom?**

Roll the condom on when your penis is erect (hard), but **BEFORE** it touches your partner's mouth or genital area (vulva, vagina, anus, buttocks, and upper thighs) — and wear it the whole time you're having sex. This helps protect you from STDs that are transmitted through skin-to-skin touching. It also prevents contact with pre-ejaculate (pre-cum), which can have STD germs and may rarely contain sperm that can cause pregnancy.

### **How To Keep Condoms**

- 1. Condoms last a long time, but you should always check the expiration date** printed on the wrapper or box. Open condoms carefully so you don't damage them — don't use your teeth or scissors.
- 2. Taking good care of your condoms and using them correctly every single time you have sex is key.**
- 3. Store your condoms in a cool, dry place away from any sharp**

4. Don't keep them in your pocket, car, or bathroom for long periods of time (over 1 month), because excessive heat and moisture can damage condoms over time.
5. You should be able to feel a little air bubble when you squeeze the wrapper. If a condom is torn, dry, stiff, or sticky, throw it away.
6. Since you have to use a new condom every time you have sex or get a new erection, it's a good idea to keep a supply around.
7. Have condoms nearby before things start heating up, so they're easy to grab without interrupting the action.

### **How Do I Use a Female Condom?**

1. There are several types of female condoms available in the market. Generally they come with an inner and outer ring.
2. The inner ring is squeezed together and inserted into the vagina while the woman is in a squatting or lying position with her legs spread. The longest finger should then be used to push the ring as far into the vagina as possible.
3. Some of the condom will hang and be visible outside of the vagina.
4. Before sex, hold the edges of the condom against the outside of your opening when the man enters to ensure the condom does not get pushed inside during the sex act.
5. Also make sure that the penis is inside the condom and not between the condom and the vaginal wall.

### **How Do I Use a Male Condom?**

1. Open the condom packet with your hands, not your teeth, and open it carefully so you don't tear the condom.
2. Choose a condom with a reservoir tip to catch semen after ejaculation. Lightly pinch the top of the condom and place it at the top of your (or your partner's) penis. This gets rid of trapped air, which can cause a condom to burst.
3. Roll the condom down until it's completely rolled out — if it's inside out, throw it away and start over with a new condom.
4. Remove the condom immediately after ejaculation, before the penis softens. You or your partner should hold the condom at the base of the penis (the part nearest the guy's body) while he pulls out to prevent the condom from slipping off.
5. Slide the condom off the penis, keeping the semen inside. Since condoms can clog the toilet if they are flushed, tie it off or put in a plastic bag and throw it into a bin.

### **Long-Term Contraceptive Methods**

There are a variety of long-term contraceptive method. However, the Implant and Intrauterine Device (IUD) are the commonest in Ghana.

#### **Implant**

The contraceptive implant works by slowly releasing a hormone (progestin) in your blood. The hormone stops the body from releasing an egg each month. The hormone also makes it harder for the man's sperm to get into the womb. Once in place, you don't need to think about it or do anything until it needs replacing, which can be up to either 3 or 5 years depending on the type of implant you are using.

## **Intrauterine Device (IUD)**

There are two main types of IUDs, namely copper IUD and hormonal IUD. Both IUDs do not prevent STIs. Let's consider them in turns in page 23.

### **Copper IUD**

Copper IUD is an intrauterine device (IUD) that can provide long-term birth control (contraception). It's sometimes referred to as a no hormonal IUD option. Copper IUD is a T-shaped plastic frame that's inserted into the uterus. Copper wire coiled around the device produces an inflammatory reaction that is toxic to sperm and eggs (ova), preventing pregnancy. It can prevent pregnancy for up to 10 years after insertion. Copper IUD offers effective, long-term contraception. It can be used in premenopausal women of all ages, including teenagers.

### **Hormonal IUD**

The hormonal IUD releases a tiny amount of the hormone progestin into your body over several years. Progestin is very similar to the hormone progesterone that our bodies make naturally. The hormones in the IUD help prevent pregnancy, and can also help with painful or heavy periods while you're using it. Hormonal IUDs prevent pregnancy by keeping sperm cells away from your eggs. If sperm can't make it to an egg, pregnancy can't happen. There are different types of hormonal IUDs. Hormonal IUDs last for 3 – 10 years depending on the type.

### **Short-Term Contraceptive Methods**

Short-term contraceptive methods are mostly pills and injectables. Short-term methods do not prevent STIs. Among others, short-term methods include:

1. Injectables
2. Emergency pills
3. Regular pills
4. The withdrawal method

#### **Contraceptive Injectable**

A contraceptive injectable contains a hormone that is injected into the body to stop the release of eggs. Injectable are a very effective method of contraception when used correctly. To continue being effective, you must make sure to return for an injection every 2-3 months, otherwise you risk the chance of becoming pregnant.

#### **Emergency Contraceptive Pills**

Emergency contraceptive pill (ECP) are also known as the "morning-after pill," or Plan B. ECP are most effective when taken within 72 hours (3 days) after having barrier-free sex. ECP stop or delay ovulation or prevent fertilization of an egg by affecting the cervical mucus or the ability of sperm to bind to the egg. It does not have to be taken the next morning. You can get ECP in advance for use in case of an emergency. However, like any contraceptive method, these pills are not 100 per cent effective, and can be less effective for people who have a greater body mass index.

#### **The Regular Pill**

The pill is taken at about the same time every day; there are lots of different options. It can take up to 7 days before the injection starts to work if you have not previously used a contraceptive injectable. You can use a condom for those 7 days. Major perks include:

1. Effective
2. Convenient
3. ...
4. ...

### **Withdrawal or Pull-Out Method**

Withdrawal (also called “pull out” method) is when the male withdraws his penis completely from the woman’s vagina before he ejaculates (releases many sperm all at once). Withdrawal is a risky method of contraception because it’s not easy to prevent ejaculation in the vagina- it takes a lot of practice and a great deal of self-control. Also, the fluid that is released from the penis before ejaculation can contain sperm from a previous ejaculation.

### **Summary**

I believe you now have a good understanding of yourselves as young teens. You understand the changes in your body and what you need to do. You have also learned about sexual activities and the dangers involved in sexual activities, including STIs. You are also encouraged to say no to sexual activities. However, for those who want to have sex no matter what, you can practice safe sex by using a condom. You may also use any of the methods for preventing pregnancy learned in lesson six.



**Appendix C3: Picture-enhanced Text Material**

**ADOLESCENT-CENTERED SEXUAL AND REPRODUCTIVE HEALTH  
EDUCATIONAL MATERIAL: PICTURE-ENHANCED TEXT**



**Sexual and Reproductive Health Literacy Intervention Manual  
By: Jacqueline Nkrumah**

**INTEGRI PROCEDAMUS**

## Table of Content

Table of content.....	i
Purpose, objectives, and Introduction.....	ii
<b>LESSON ONE</b> .....	1
Puberty .....	1
The Menses Cycle .....	7
<b>LESSON TWO</b> .....	13
Sexual Activities .....	13
Same-sex Sexual Practice .....	20
Rape/Defilement .....	23
<b>LESSON THREE</b> .....	25
Friendships .....	25
<b>LESSON FOUR</b> .....	28
Abstinence/No Sex .....	28
Benefits of Saying No to Sex .....	33
Support to Overcome Sexual Desires .....	31
<b>LESSON FIVE</b> .....	36
Sexually Transmitted Infections(STIs).....	36
Syphilis .....	37
Gonorrhea .....	40
Yeast Infection .....	43
Chlamydia .....	44
Trichomoniasis .....	47
HIV/AIDS .....	49
<b>LESSON SIX</b> .....	53
Ways to avoid STIs and Pregnancy .....	53
Condom .....	54
Ways to avoid Pregnancy .....	56
Long-Term Ways to avoid Pregnancy .....	56
Short-Term Ways to avoid Pregnancy .....	57
<b>SUMMARY</b> .....	59

## **Purpose and Objectives**

This resource aims to present teens' Sexual and Reproductive Health (SRH) information in an easy-to-read format for low-literate young teens to better their SRH literacy. Teenagers need the correct information offered in easy-to-read and clear writing. Such material would help them make the right choices regarding their reproductive and sexual lives.

It is hoped that the young adolescent will be able to:

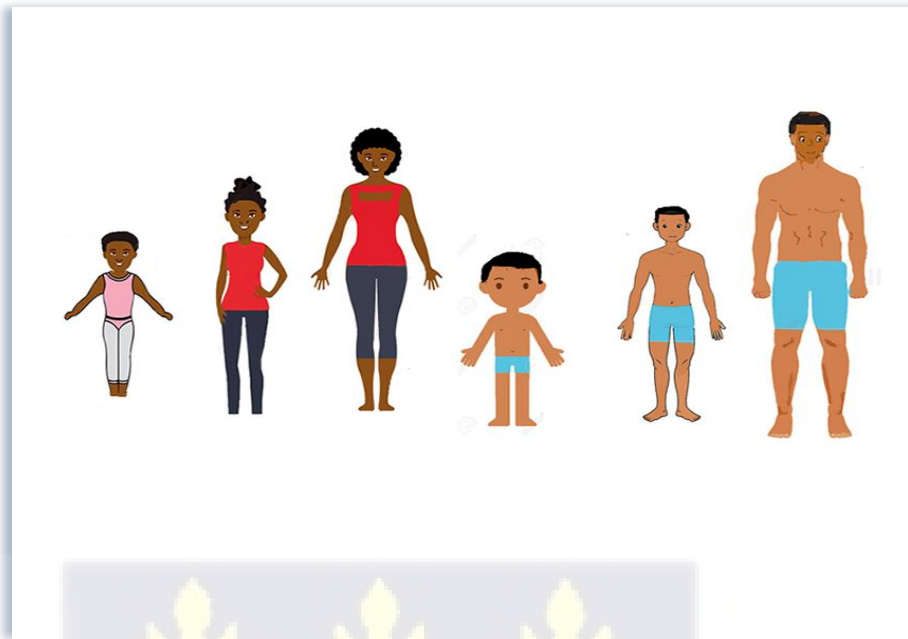
4. read and understand the SRH topics in this material
5. better their SRH knowledge
6. make informed choices to better their SRH lives

## **Introduction**

SRH refers to a person's ability to feel well in their body and mind while also being able to relate well with others in all matters linked to the reproductive organs. It also means that adults/grownups can have pleasant and safe sex. They can have children and choose if they want to have them, when to have them, and how many children they would like.

But young teens are not mature enough to have sex. They are not grown enough to make babies. Also, young teens cannot choose between safe and unsafe sex. So, they can fall ill or die if they choose to have sex and bear children. They will be unable to reach the state where they can feel well in the body and mind. In this case, early sex and childbirth will lead to poor SRH in young teens.

## LESSON ONE PUBERTAL CHANGES



**Puberty** is part of the **teenage years**. It is a stage where a boy/girl changes and moves from a child into a young adult but has not fully matured. Girls begin to see outward changes in their bodies by the age of 8 -13 years. Boys start to see changes in their bodies by 9 – 14 years. A person in the teenage years is called a teenager, a teen, or an adolescent.

The teenage years are divided into two. They are:

- 3. Young teenage years.** It is the period between 10 and 14 years. A person in the young teenage years is called a young teen.
- 4. Old teenage years.** It is the period between 15 and 19 years. A person in the old teenage years is called an old teen.

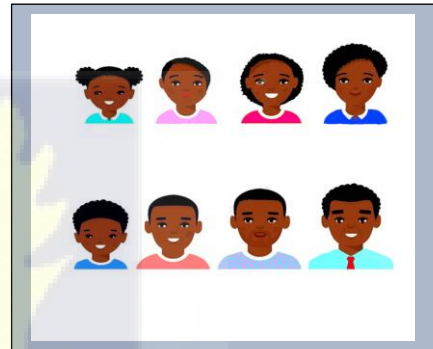
## Where do Changes at Puberty Take Place?

Changes at puberty take place:

1. In the mind.



2. In the physical body.



3. In the way you feel.

## Causes of Changes at Puberty?

Changes at puberty happen because at age 8 or more, the body begins to produce body chemicals called hormones.

The hormones will make you to:

1. Have sexual feelings.

2. Want to look good.

3. Want to take risks.
4. Want to do things on your own.
5. Want not to be controlled.
6. Disrespect people who are older than you.

Feel like attacking those who disagree with you.

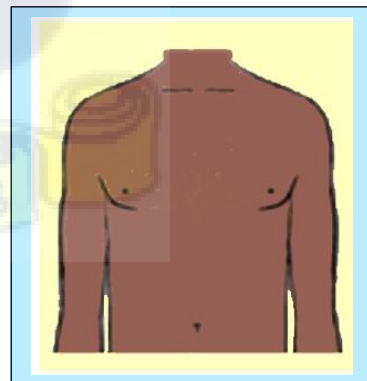
### **Changes in the body of boys**

Boys would mostly see the following changes:

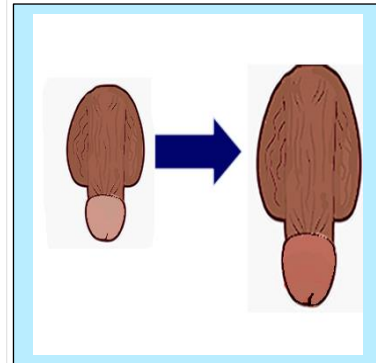
5. Muscles in legs and arms.



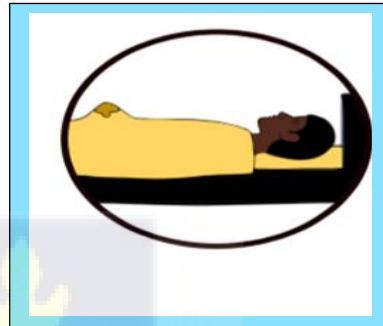
6. Broad shoulders and chest.



7. Longer and bigger penis.



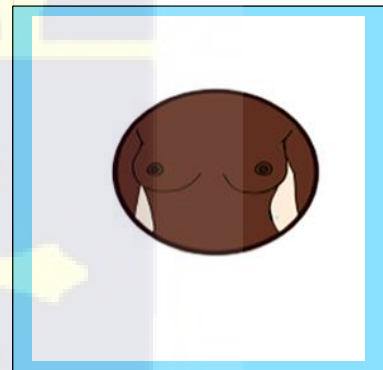
8. Wet dreams when sleeping.



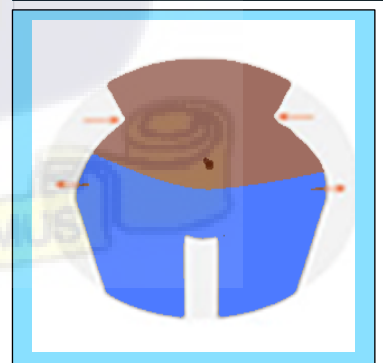
### **Changes in the body of Girls**

Girls usually undergo the following changes:

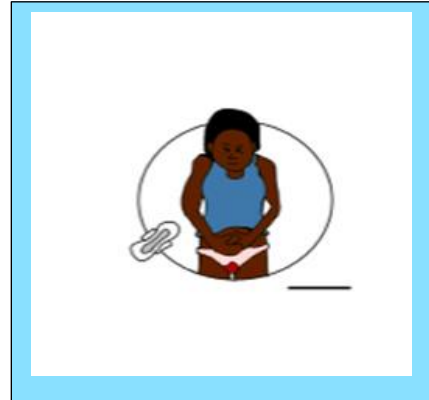
5. Breast growth



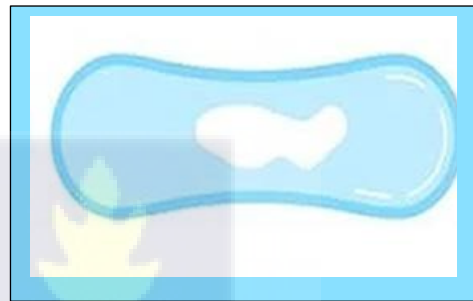
6. Broad hips/ Body shape



## 7. Menses/period



## 4. Vaginal discharge (fluid)



## Changes in both Boys and Girls

The following Changes usually take place in the bodies of both boys and girls.

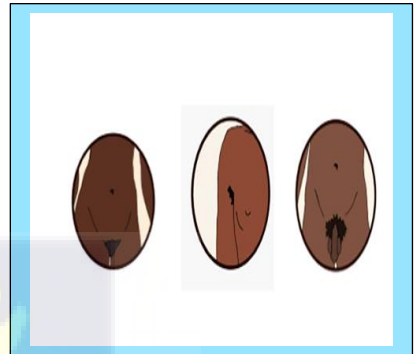
### 1. Oily skin



2. Pimples on face



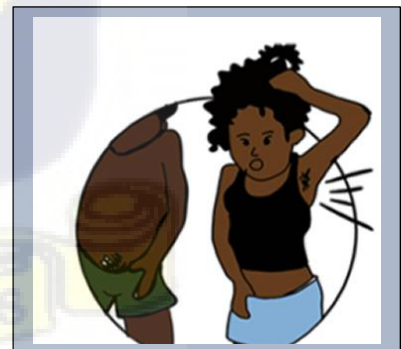
3. Hair in pubic areas



4. Voice changes

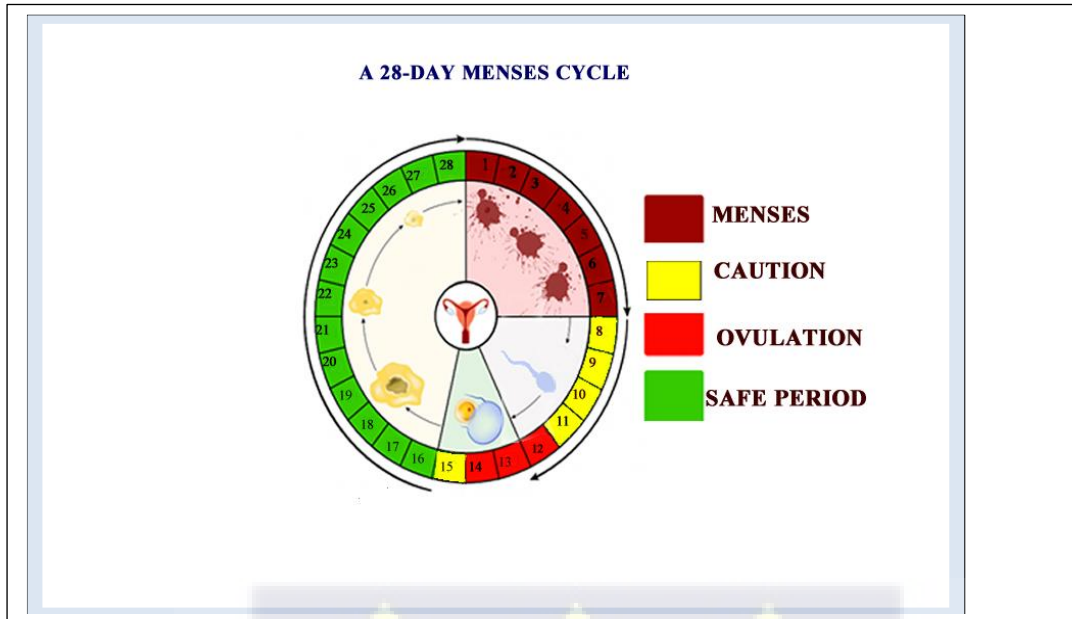


5. Sweat and body odor



6. Changes in the way you feel

## The Menstrual/Menses Cycle



Let's look at one of the main changes in a girl's life, **menses or period**. Menses is the monthly blood flow in a girl/woman's life. Girls begin to produce ova (eggs) at age eight or more. The reproductive organ that make the eggs are two. They are called ovaries (egg-making organs). Each month, an egg grows inside one ovary and lives between 12 and 24 hours. The womb also makes a lining rich in blood to receive the egg if it meets with a sperm (locally called juice among boys).

The egg then moves to the womb within two weeks to grow into a baby. If not, the egg will die, move from the ovary to the womb, and the womb will wash it away with the lining. The womb uses blood to wash away the lining and the egg. This process is called menses/period. It usually lasts between 5 and 7 days. The washing of the egg and the lining month by month is called the menses cycle.

It is counted from the first day of a girl/woman's last menses to the start of the next menses. Usually, the menses cycle is 28 days long. But the length of the menses cycle may change as a girl grows. A girl/woman's menses may occur every 21 to 35 days.

### Why Does the Menses Cycle Change?

Several things can change the timing of a girl/woman's menses cycle. They are:

#### 1. Pregnancy



#### 2. More exercise



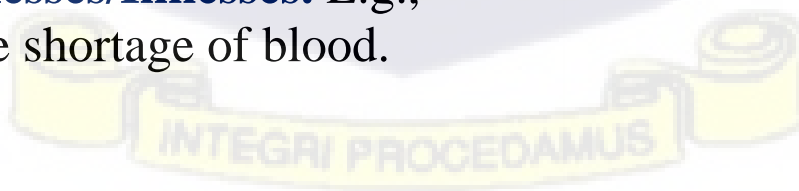
#### 4. Medicines



**3.** Age (at age 45 or more, a woman will begin to have changes in their menses cycle and later stop menstruating).



**4. Sickesses/Illnesses.** E.g., severe shortage of blood.



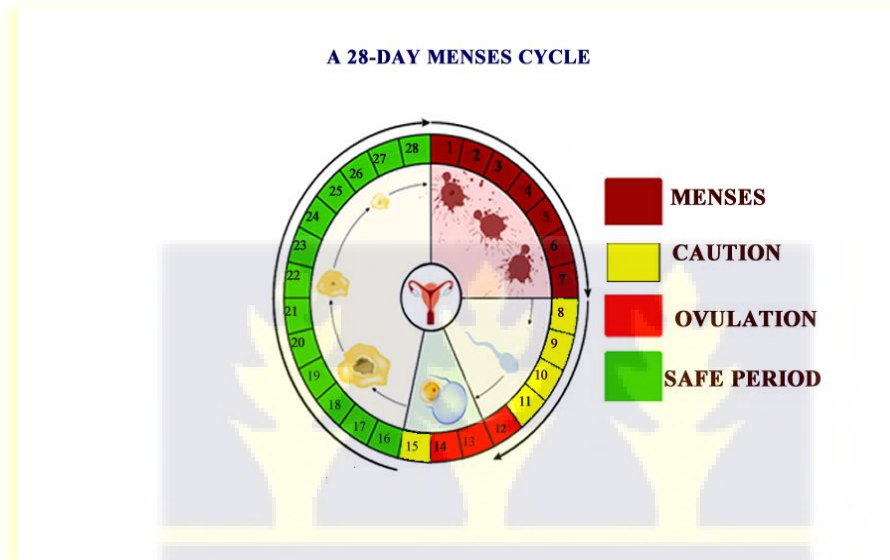
## Ovulation /Egg-releasing Period



Egg-releasing period (ovulation) is when the ovaries release the eggs. It usually takes place between 12 and 14 days, counting from the first day of the last menses. A boy/man's sperm can live in the ovaries for 3 to 5 days. Because sperm can stay longer in the ovaries before it dies, a girl/woman should not have unsafe sex four days before and up to the day of ovulation. If not, the sperm may meet with the egg for the girl/woman to get pregnant. Having sex on the 16<sup>th</sup> day of the last menses to the start of the next menses would not lead to pregnancy. The period between the 16<sup>th</sup> day of a girl's menses and the first seven days of the next menses is called the 'safe period.'

## How Can I Calculate the Ovulation Period?

The ovulation period can be defined using a calendar or a chart. First, you must note down the first day of your menses. The date will help you to do the counting. Day one is the first day of your menses. Using a chart, let's look at an example of Ama's menses cycle.



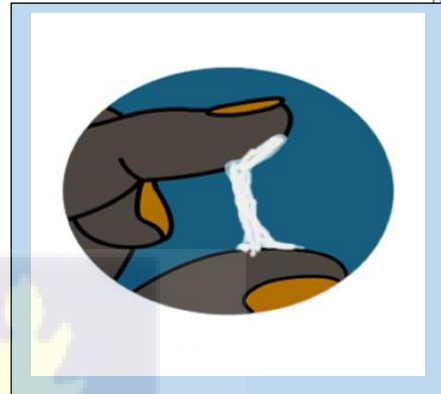
From the above chart, Ama has a 28-day cycle. she had her last menses on February 1, 2022. Her menses began on February 1 and ended on February 7, 2022. That is the portion shaded in a ruby-red color. So, February 1 is day one of Ama's menses cycle. Day ten of her cycle would be February 10, 2022. Her ovulation period will fall between 12<sup>th</sup> and 14<sup>th</sup> February 2022.

The 8<sup>th</sup> to 11<sup>th</sup> February has a yellow color. It means Ama should be cautious not to have unsafe sex. 12<sup>th</sup> to 14<sup>th</sup> February has a red color, meaning an unsafe period. Ama may become pregnant if she has unsafe sex between the 12<sup>th</sup> and 14<sup>th</sup> of February 2022.

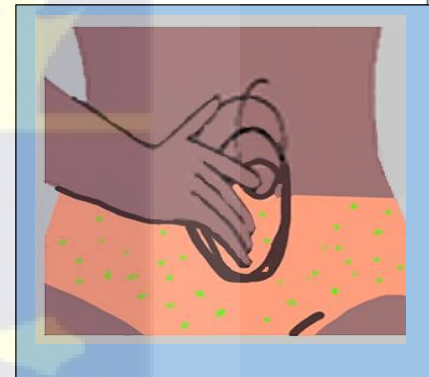
Ama's unsafe period will likely end by her cycle's 14<sup>th</sup> or 15<sup>th</sup> day. February 15 also has a yellow color. It is a day of caution for Ama. She may get pregnant should she have unsafe sex on this day.

### **How would a girl/woman know she is Ovulating?**

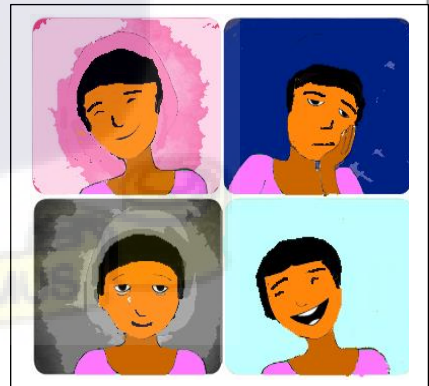
1. A few days after menses, a girl/woman will see slippery/slimy clear fluid from the cervix area.



2. The lower part of her stomach, close to the pubic bone, may pain her.

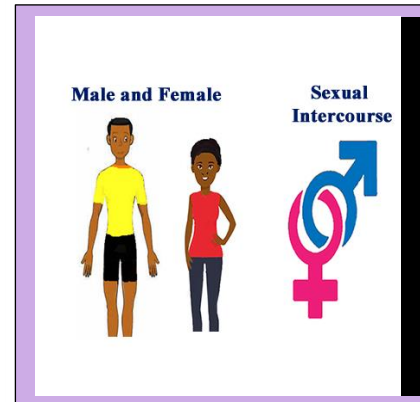


3. Her mood may also change.



## LESSON TWO SEXUAL ACTIVITIES AND SEXUAL RISK BEHAVIOUR

The term **Sex** may mean different things. In one setting, sex may tell gender. That is male and female, or a boy and girl. Sex may also refer to sexual intercourse (a sex act). In this lesson, sex stands for a sex act.



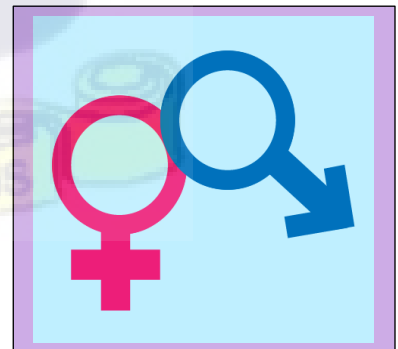
A sex act (known as sleeping with someone in the local language) is an act of **Lovemaking** between male and female adults or man and wife. It is also an act of childbearing. Boys and girls of your age do not understand much about Love. So, if you go into a personal friendship to have sex, it is only for **Lust** and not **Love**.



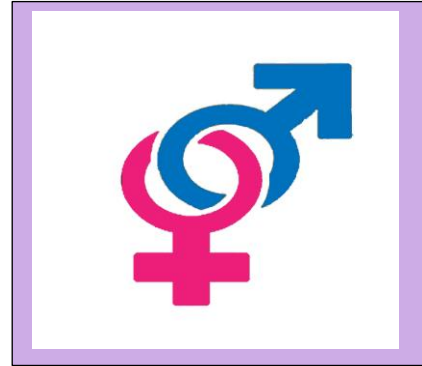
### Types and Forms of Sexual Activities

Sexual activities can be grouped into two. They are:

3. Outercourse



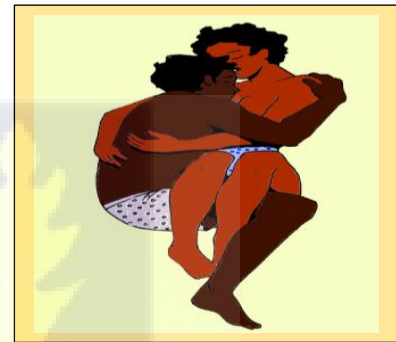
4. A sex act



### What is Outercourse?

Outercourse includes acts such as:

5. Cuddling



6. Kissing



7. Rubbing against each other with cloths on.



8. Masturbating each other or fingering.



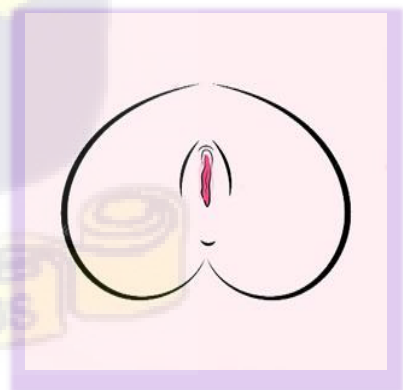
The acts named above usually happen between male and female adult or man and wife.

### What is a Sex Act?

A sex act involves pushing the male's penis into the vagina of a female. Also, a sex act may take different forms. They are:



1. **Vaginal sex/intercourse** (sex through the vagina) It involves pushing the penis or anything that looks like the penis into the female's vagina



**2. Anal sex/intercourse** (sex through the anus). It also involves pushing the penis or anything that looks like the penis into the anus of another person.



**3. Oral Sex** (sex through the mouth). It happens when a female puts a male's penis into her mouth or when a male licks any part of the female sex organ.



Oral and anal sex are not safe. They increase the spread of Sexually Transmitted Infections (STIs). Also, vaginal sex without a condom may lead to unwanted pregnancy and STIs.



## Risks in Sexual Activities

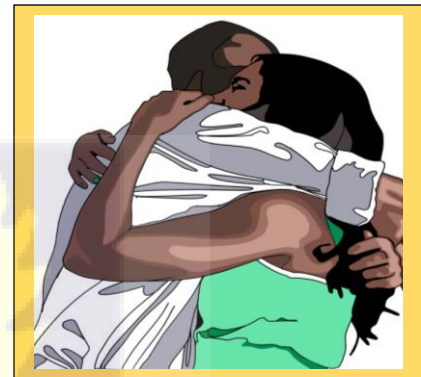
Risks in sexual activities can be grouped into three. They are:

### 4. No-Risk Activities



No-risk activities may include:

#### A. Hugging



#### B. Holding of hands



For example, Araba and Kofi are friends who learn and play together without engaging in sexual activities. Araba and Kofi can hold hands and hug each other without falling into sexual health risks.

## 5. Low-Risk Activity



Low-risk sexual activities may include:

- A. Kissing
- B. Massaging each other with cloths on.
- C. Masturbating each other.

These kinds of sexual activities are a bit risky. They can lead to a sex act and the spread of STIs.

## 3. High-Risk Activities

High-risk sexual activities are the main cause of STIs and unwanted pregnancy. They include:

- A. Having sex without a condom.



**B.** Having sex with more than one boy or girl.



**C.** Having sex for money



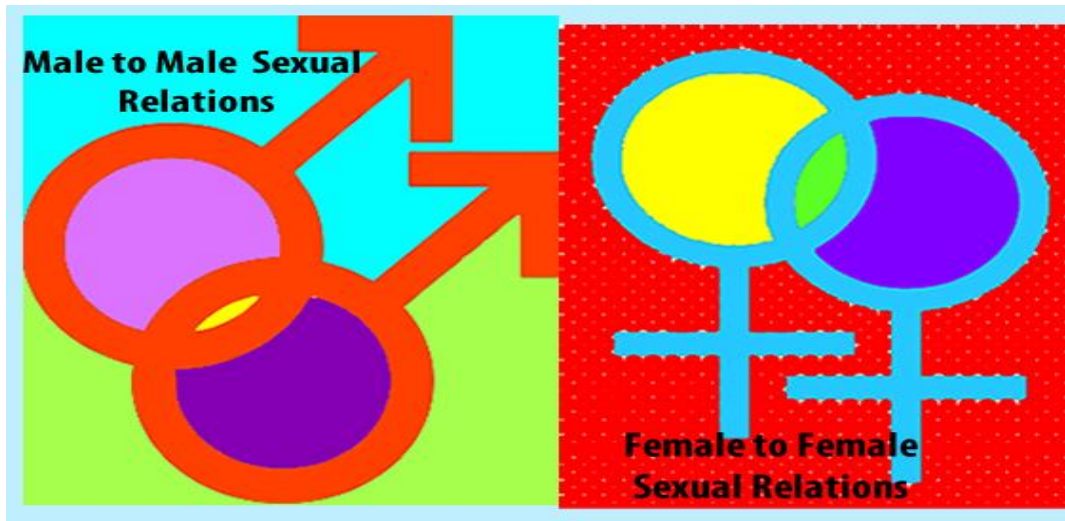
**D.** Having sex through the anus



**E.** Having sex with someone who uses hard drugs.



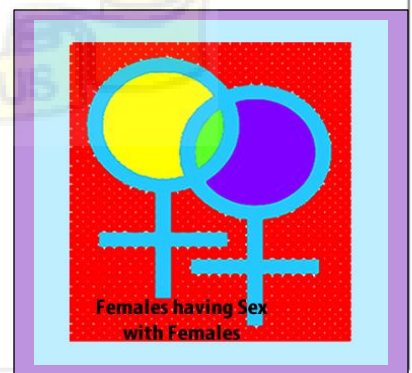
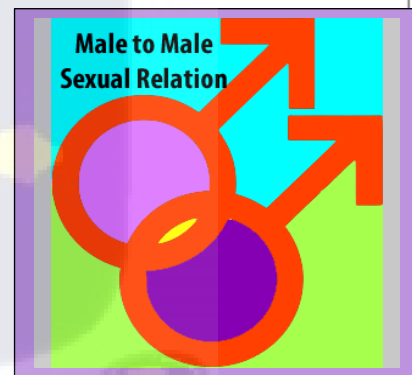
## Same-Sex Sexual Practices



### Same-Sex Sexual Practices

Another sexual activity you must **beware** of as young teens is same-sex sexual practices. This sexual practice refers to all the sexual activities talked about earlier **in this Lesson**, except that it happens between people of the same sex. It may include:

3. Men engaged in anal sex or outercourse with other men or boys. It may also involve boys having anal sex or outercourse with other boys (Gay practice).
4. Women engaged in vaginal sex or outercourse with other women or girls. It also involves girls having vaginal sex or outercourse with other girls (Lesbianism)



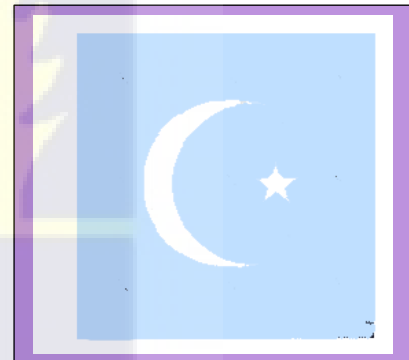
## **Do the People of Ghana Accept Same-sex Sexual Relations?**

No, it is against their moral values. All the groups in Ghana believe it is against the will of God and the lesser gods.

**4.** Christians do not welcome the practice.



**5.** Muslims do not accept it.



**6.** Other religions in Ghana do not go with it.



Another reason why the people of Ghana do not welcome the practice is that it comes with many problems. Among them are those mentioned in page 22.

**1. Same-sex sexual practice separates people from their families and neighbors.**

Friends and families in Ghana do not accept people who go into same-sex sexual relations.

**2. The practice promotes STIs.** People who engage in same-sex sexual activities suffer from all forms of STIs.

**3. Same-sex sexual practice causes serious sicknesses.**

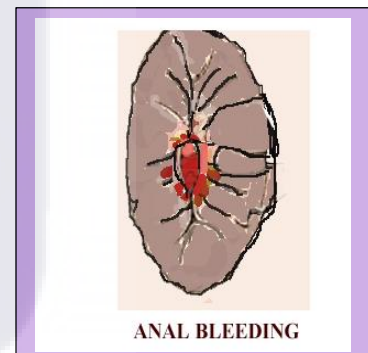
People who go into same-sex sexual relationship suffer from many sicknesses. Some of them are:

**F.** Hepatitis A and B.

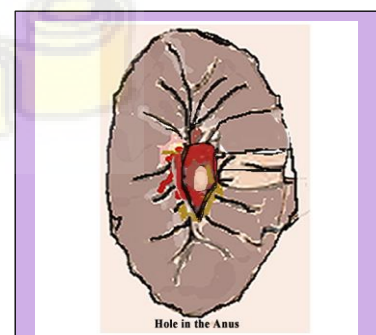
**G.** Sickness of the intestines and anus rising from STIs

**H.** Swollen penis and cancer of the cervix

**I.** Bleeding of the anus and cancer of the anus.



**J.** Weakness of the anal lining leading to leaking of feces



## RAPE AND DEFILEMENT



Rape is forced and unwanted sex. Forced and unwanted sex may include:

- 3. Sexual abuse/defilement.** Abuse happens when a male/female forces someone below age 16 into having sex. Sexual abuse also happen when a person goes into sexual relationship with someone below 16 years.
- 4. Rape.** Rape happens when a male/female forces someone age 16 or more into having sex. Rape or abuse are wrongdoings. The laws of Ghana do not accept them. A person who rapes another is called a rapist.

### What Should I do to Avoid Rape?

- 4. Do not** be alone with the opposite sex.
- 5. Avoid** petting the opposite sex.
- 6. Report** anyone touching your private part to your parents/guardian. Your private parts include those body parts listed in lesson three.



## What is the Right Thing to do if I am Raped?

**4. Protect yourself** by telling your parents/guardian without wasting time.



**5. Do not** pay attention to the threats of the rapist.

**6. Let** your parents/guardian report the Matter to the police and send you to the hospital.



Your parent can also get help from the **Orange Support Center**.

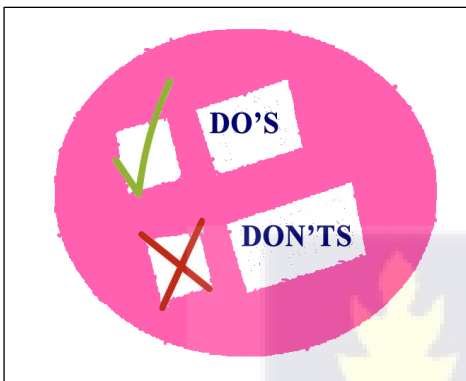
They can dial the helpline:

**0800-111-222.**



## LESSON THREE FRIENDSHIP

Young boys and girls make a lot of friends. You can make friends with schoolmates, those in your house, and your community. Let's look at how you may keep such friendships.



Keeping rules in your friendship would help you keep **good morals** and avoid sexual feelings that may lead to **early sexual activities**.

### DO

Friends should help each other and make each other feel good about themselves. You can do the following for your friends:

8. Help your friends when they are going through bad times.
9. If a friend needs someone to talk to, listen to them.
10. Include your friends in the good things you do.
11. Stand by your friends at all times.
12. Respect and accept your friends for who they are.
13. Avoid people who will put you in danger or make you feel unsafe.
14. Avoid people who will put you down or make you feel worthless.

## Don'ts

2. Don't hide to leave the house to meet a friend. **Tell** your parents/guardian wherever you are going.

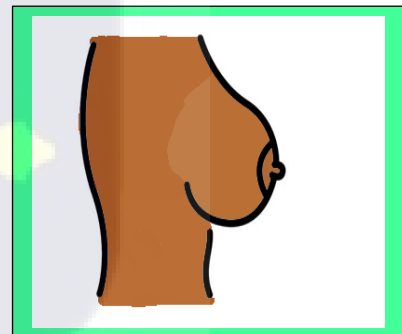


2. **Do** not be alone with a male/female friend.
3. **Do** not touch the private parts of your male/female friend when playing together. Report those who do that to your parents/guardian

### Which Parts of the Body are Private?

The private parts of a boy/girl are:

7. Breast



8. Lips



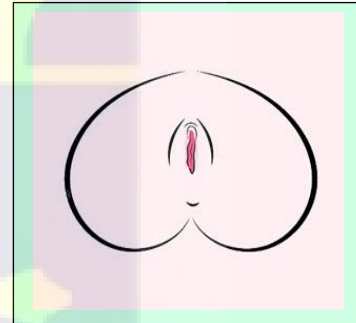
**9. Thigh**



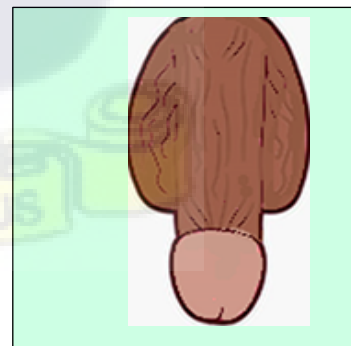
**10. Buttocks**



**11. Vagina**



**12. Penis**



## LESSON FOUR



Abstinence (saying no to sexual activities) is the simplest way to prevent pregnancy and some STIs. If a boy and a girl do not have sex, pregnancy cannot occur. Saying no to sex means avoiding all the sexual activities we have learned. For example, Abena and Kwame want to use their time to learn and pass all their exams. So, they have decided not to have sex until they have finished university or learned a trade. Their decision means doing away with all the sexual activities we learned in lesson two. If Abena and Kwame do not stand by their choice, they will fall into many risks. Let's look at some of the risks early sex may bring your way.

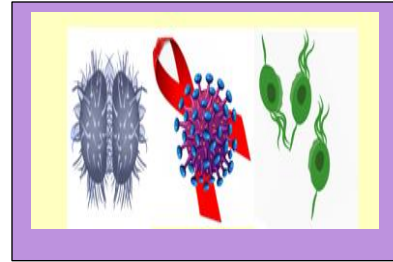
### **Early sex will get you pregnant and or affect your health.**

4. Girls who get pregnant at an early age can die during pregnancy or at the time of birth.
5. Others may not be able to deliver the baby on their own. Such girls will have to deliver through operation.



Child Birth Operation

6. Boys/girls who have early sex may get STIs.



**You should know** that some STIs like HIV, hepatitis B, and hepatitis C do not spread through sex alone. You can get them through some other means. See lesson 5 for more on STIs.

### **Early Pregnancy will Affect your Future.**

4. A girl who gets pregnant early may drop out of school.



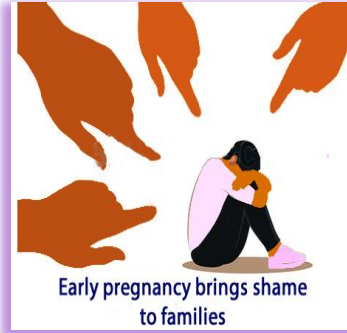
5. A boy/girl may not be able to learn a trade due to early sex and pregnancy. They would become poor and would not be able to take care of themselves and the baby.



6. Children of young teens may not go to school. They may grow up to become poor.

## Early Pregnancy Brings Shame to Families.

1. Your peers may laugh and tease you. Your parents would feel ashamed of you. Their friends would mock them. They would be called ‘bad parents.’



2. In many cases, boys/men who get girls pregnant leave them to suffer alone. So, girls, be wise.



## Benefits of Saying no to Sex

If you choose not to have sex, you would be able to:

1. Follow your faith.

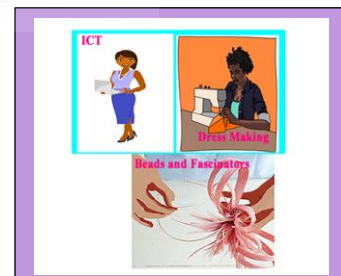
Follow your faith



2. Fully finish school on time.



3. Learn a trade.



4. Follow the good guidance of your parents.



5. Wait to find the right guy/girl.

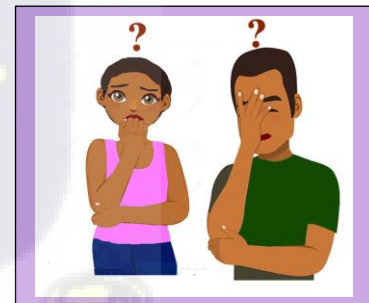


6. Be with a guy/girl without the troubles of early sex.

### Tips to Overcome your Sexual Feelings.

#### Follow the Tips below:

6. **Think** about what can happen to you if you follow your sexual feelings.



7. Avoid watching porn pictures and videos (locally called porno). Not all porn videos and pictures are real.



3. Be careful with the use of social media.



4. Pray always if you believe in prayer.



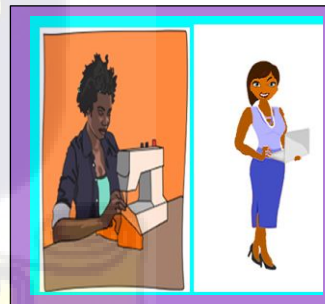
5. Choose your friends wisely.

Direct your sexual desires to do something better, such as:

4. Playing musical instruments



5. Learning a trade



6. Playing football, etc.



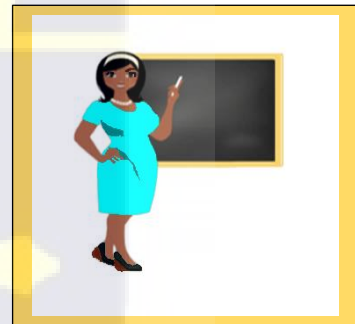
## Support to Overcome Sexual Desires

It is natural for a young boy/girl to have sexual feelings. You will feel this way because at puberty your body starts to make hormones that makes you feel for sex. If you have trouble overcoming your desire, you may ask the following people for advice.

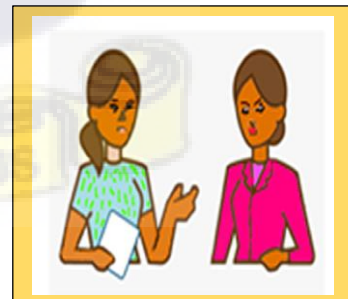
1. A Family Planning Nurse



2. The Girl Child Educator



3. The School Counselors

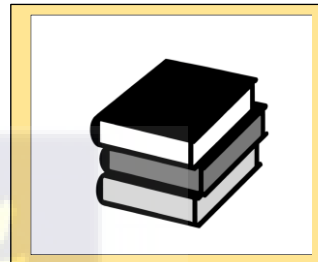


If you want to know more about puberty, how to say no to sex, and STIs, check out the following sources for more help.

4. The internet



5. Books



6. Magazines



7. Leaflets



You can also check social media handles for some help. The social media handle may include:

3. Facebook



## 4. YouTube



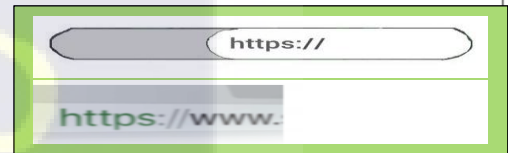
You can also get guidance from the websites of **Groups** that give advice and guidance to teens, such as:

6. Planned Parenthood Association of Ghana (PPAG)
7. Teens Health
8. Young Men's Health
9. Safe Teens
10. Other helpful websites

### **How do I Tell the Website I have Visited Gives Safe Advice and Guidance?**

There are two basic checks you can make about safe websites. They are:

1. The URL addresses



2. The padlock signs



All websites have URL addresses that begin with 'http.' safe websites that give safe advice have URL addresses in this form: 'https' or padlock followed by 'https'.



## LESSON FIVE SEXUALLY TRANSMITTED INFECTIONS (STIs)

STIs means Sexually Transmitted Infections. STIs are sicknesses/illnesses that usually spread through unsafe sexual acts. We shall look at a few of them.



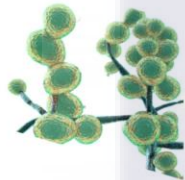
CHLAMYDIA



SYPHILIS



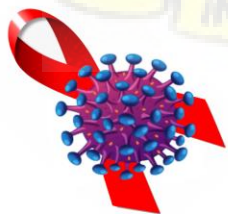
GONORRHEA



YEAST INFECTION



TRICHOMONIASIS



HIV/AIDS

## Syphilis



## Syphilis

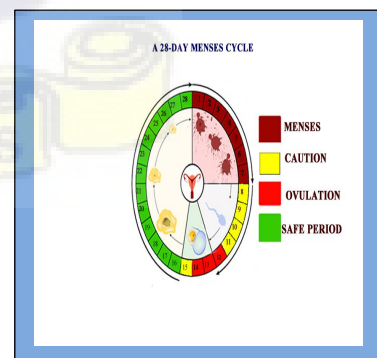
An STI bacterial (germ) causes syphilis. You can get syphilis by having oral, anal, and vaginal sex without a condom. Usually, syphilis spreads through contact with a syphilis sore. It is hard for someone to see the sore. So those who have syphilis may not know they have it until they test for it.

You can also get syphilis in the following ways:

1. Sharing injection needles.



2. A girl/woman living with syphilis can pass it on to her baby at birth and during pregnancy.



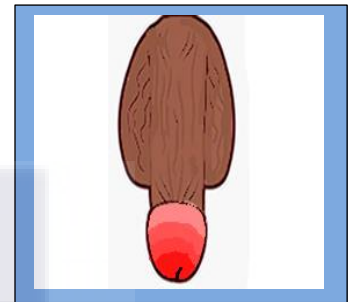
## How do I Know I have Syphilis?

Not all people will show symptom (signs) of syphilis. Yet, others may show the signs below.

1. Girls/women may have sores around and inside the vagina.



2. Boys/men may have sores around their penis.



The signs below may also show three weeks after a person has had syphilis.



**Feeling ill**  
**Fever**  
**Headache**  
**Weight loss**  
**Rashes on palms,**  
**hands and feet.**

### **When and how can I test for syphilis?**

If you have the habit of engaging in sex acts with boys/men or girls/women with many girlfriends/boyfriends, you need to test often to know whether you have syphilis. Check at least every two months.



### **How is Syphilis Treated?**

If you feel/see the signs of Syphilis, do the following:

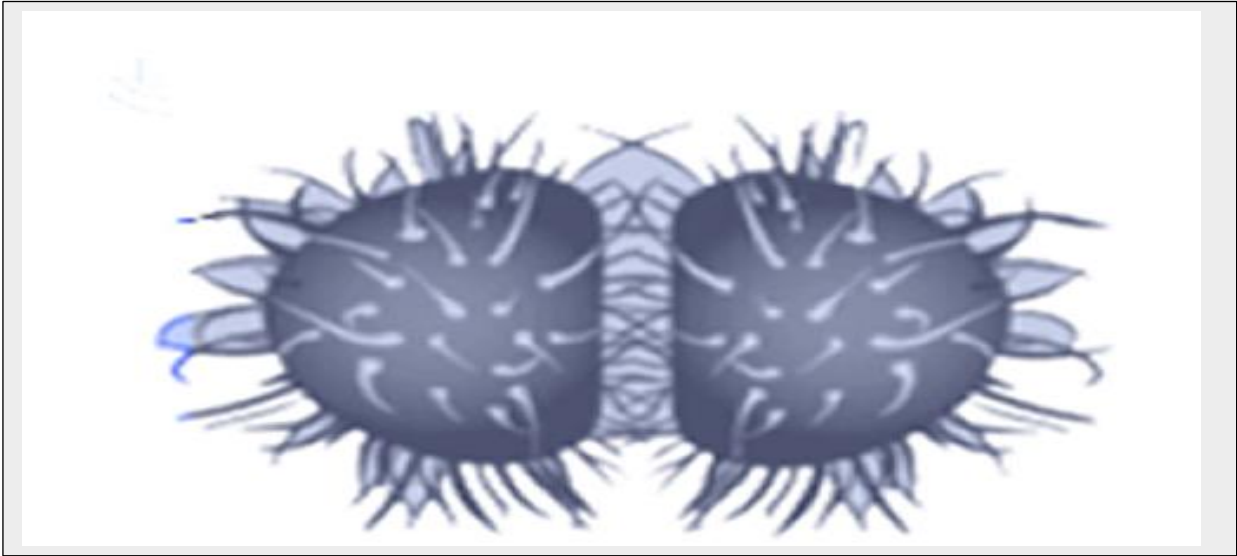
3. Tell your parents/guardian about the signs you have.



4. Let your parents/guardian take you to the hospital for treatment.



## Gonorrhoea



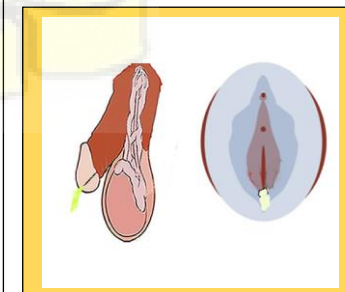
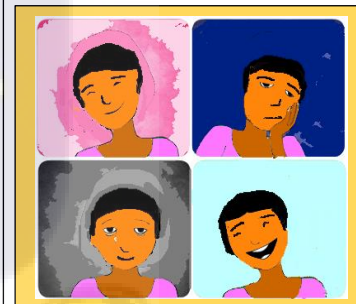
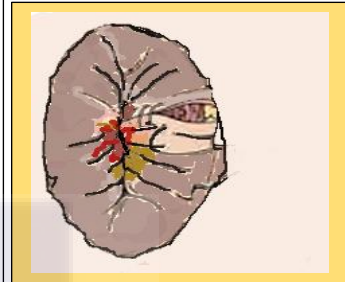
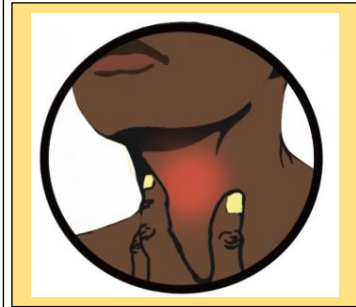
Gonorrhoea (locally called gono) is an infection (illness) caused by an STI germ. You can get gonorrhoea by having sex with someone who has the illness without a condom. You can also get it if you have anal sex with someone who has gonorrhoea. The gonorrhoea germ can live only in wet places in the body. The wet areas may include the eye, the throat, and the vagina.

If any of the wet places in your body come into contact with other body parts carrying the gonorrhoea germ, you can get the illness. A pregnant girl/woman living with gonorrhoea can pass it on to her baby at birth and during pregnancy. The danger is that you can easily get the illness.

## How do I know I have gonorrhoea?

The following signs will show in your body within 14 days of having gonorrhoea.

1. Sore throat (gonorrhoea in the throat).
2. Pain, anal discharge and bleeding (gonorrhoea in the anus).
3. Redness, itching, or discharge of the eyes (gonorrhoea in the eye).
4. Girls will feel pain in the lower part of their stomach.
5. Girls will have vaginal discharge, and boys will also see yellow or green color discharge from their penis



6. Girls will have pains during sex, and boys will feel pain and swelling in one of their testicles.

6. Girls will have a burning feeling when urinating.

7. Boys will have burning feelings when urinating.

### How is Gonorrhoea Treated?

There is a treatment for gonorrhoea. So, when you see signs of the illness, follow the tips for treating syphilis.

1. First, talk to your parents/guardian about it

2. Ask them to take you to see a doctor for testing and treatment.

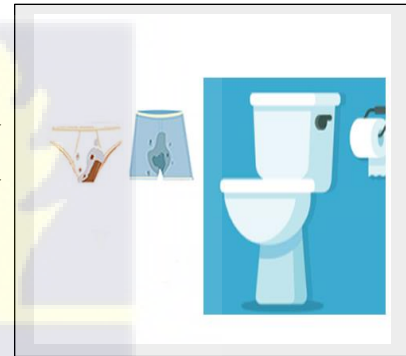


## Vaginal Yeast Infection

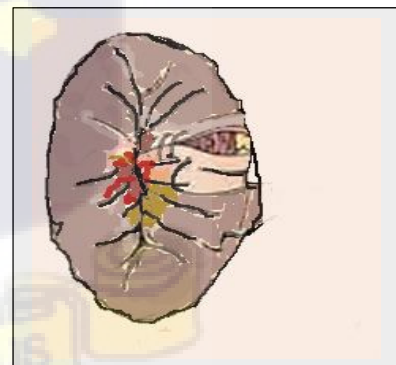
Vaginal yeast (also known as White) is an illness caused by the germ called **Candida**. Vaginal yeast is not part of the list of STIs. The germ already lives in the vagina of females. But when it grows more than is needed, it becomes illness to the vagina. Vaginal yeast also infect many girls during their first sexual act. Boys/men can also be carriers of the candida germ.



Girls can also get the vaginal yeast by using panties and WCs/toilets stained by the candida germ.



The candida germ can live in the throat if a person engages in oral sex with another who has the illness.



## How do I Know I have the Vaginal Yeast Illness (White)?

The following signs will show:

### SIGNS OF WHITE

**Vaginal itching**

**Burning feelings  
in the vagina**

**Redness of  
the vagina**

**Vaginal rashes**

**Odorless and  
Cheese-like  
fluid from the vagina**

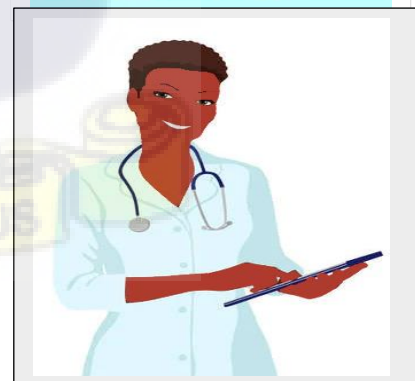
**More vaginal fluid**



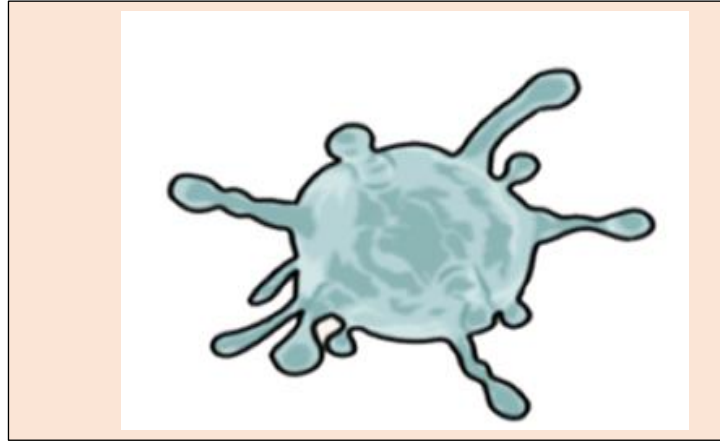
### Illness?

1. Tell your parents/guardian about it. They can buy you medicine from the pharmacy.

2. If you have signs of vaginal yeast after using medicines from the pharmacy, you will have to see a doctor.



## Chlamydia Infection

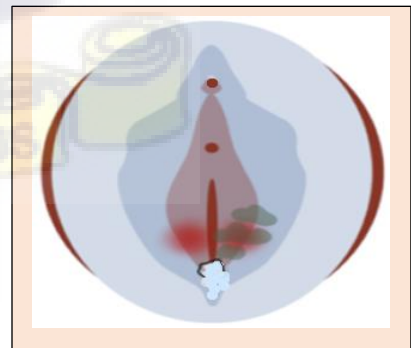


Chlamydia (Chlam, as you may want to call it) is an illness caused by an STI germ. You can get the germ by having vaginal sex without a condom. You can also get chlamydia when you have sex through the anus of someone living with the illness. The chlamydia germ can also live in your throat if you have oral sex with someone who has the illness. The sad thing is that you do not feel or see any sign when you get chlamydia.

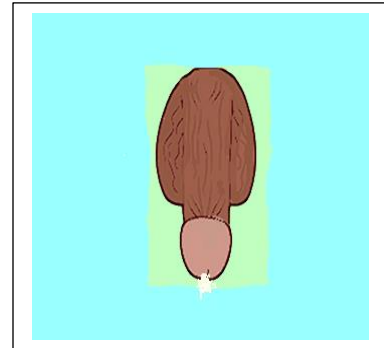
### How do I Know I have Chlamydia?

Very few people show signs when they have chlamydia. The signs of the illness will show three weeks after getting the germ.

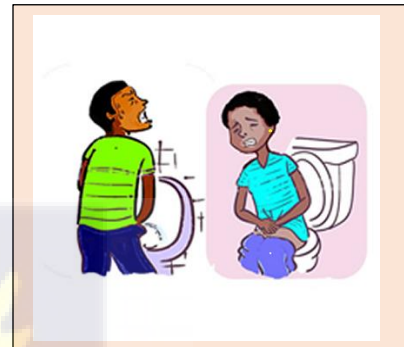
1. Girls will have water-like fluid, which has a bad smell from the vagina.



2. Boys will see milky fluid coming from the penis. They will feel pains in their testis too.



3. Both boys and girls will have burning feelings when urinating.



### How is Chlamydia Treated?

3. You will only know you have the illness when you **test** for it.

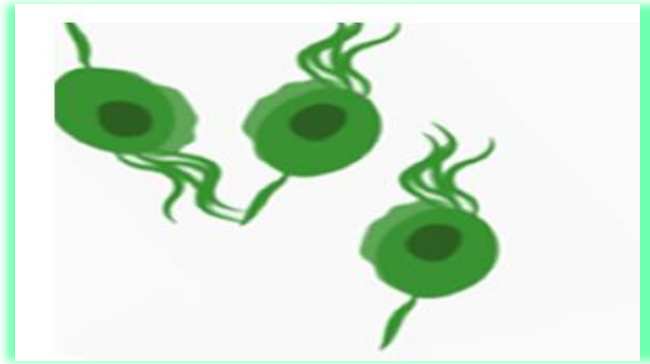


4. To test for it, you must **tell your parents/guardian** to take you to see a doctor.



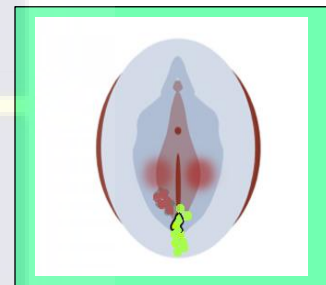
It would help if you **told the doctor** clearly about the signs to give you the proper test and treatment.

## Trichomoniasis



Trichomoniasis (Tricho, as you may want to call it.) is an illness caused by the STI germ called **Trichomoniasis**. It affects the urine tube (urethra) and the penis. Trichomoniasis also infects the vagina and the vulva but not the other parts of the body. People who have the illness may not show or feel any signs. But the following signs may show in others:

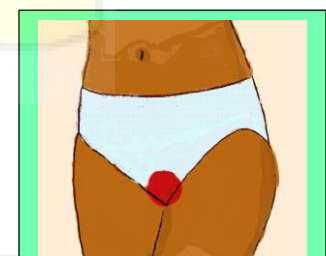
**9.** Girls who have trichomoniasis will see yellow or green color fluid in their vagina. The fluid usually smells bad.



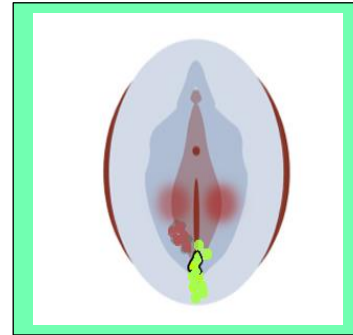
**10.** Both boys and girls may feel pains when urinating.



**11.** Girls may bleed after having sex.

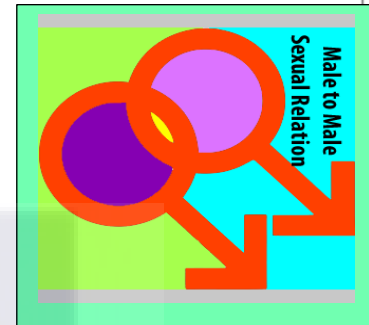


- 12.** Boys may also itch and have penis discharge. They may have pains after having sex.



### How Does Trichomoniasis Spread?

- 5.** You can easily get the illness if you have the habit of having sex with more than one boy/man or one girl/woman.



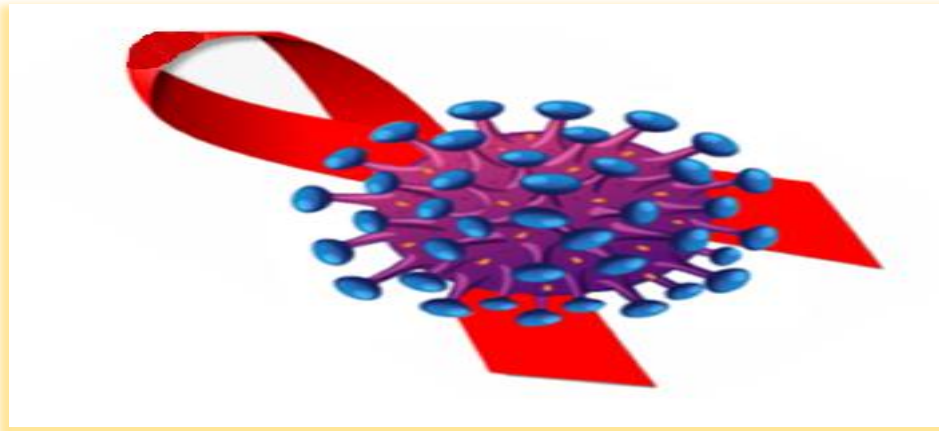
- 6.** Also, you can get trichomoniasis by having sex with someone who has the illness without a condom.



### How is this Illness Treated?

There is a treatment for this illness. When you have signs of the illness, follow the tips provided for treating syphilis or the other STIs.

## HIV/AIDS

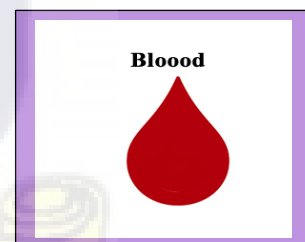


HIV is caused by a germ called Human Immunodeficiency Virus (HIV). This virus affects the body's defense against illness. If you do not treat HIV, it worsens and becomes Acquired Immunodeficiency Syndrome (AIDS). HIV has no cure. Once a person gets HIV, it will remain with them for life. The good news is that those with HIV can live with it for a long time. You can take medicines to stop the HIV germ from harming you. The medication can make an HIV person live a healthy life and reduce the spread of HIV.

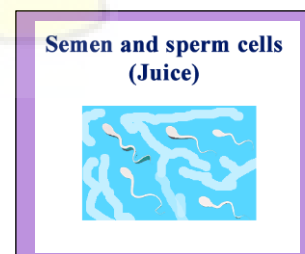
### How does HIV Spread?

5. HIV spreads through:

A. Blood



B. Semen and sperm cells (locally called Juice)



C. Vagina fluid



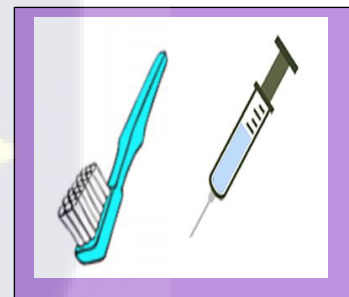
D. Breast milk.



2. You can have HIV when you have vaginal or anal sex with an HIV person without a condom.



3. You can have HIV when you share needles, syringes, or toothbrushes with others who have HIV.



4. Women/girls living with HIV can pass it on to their babies during pregnancy and childbirth.



## How do I know I have HIV?

The following signs will show in people who have HIV.



## How to Live with HIV?

Some people may feel the signs of HIV 2-4 weeks after getting the HIV germ. Others will show signs months after having the germ. The signs of HIV may last for a few days or many days. When you feel or see the signs, it does not mean you have HIV. You can know you have HIV by testing for HIV.



You can live with HIV by getting HIV medications from the hospital.

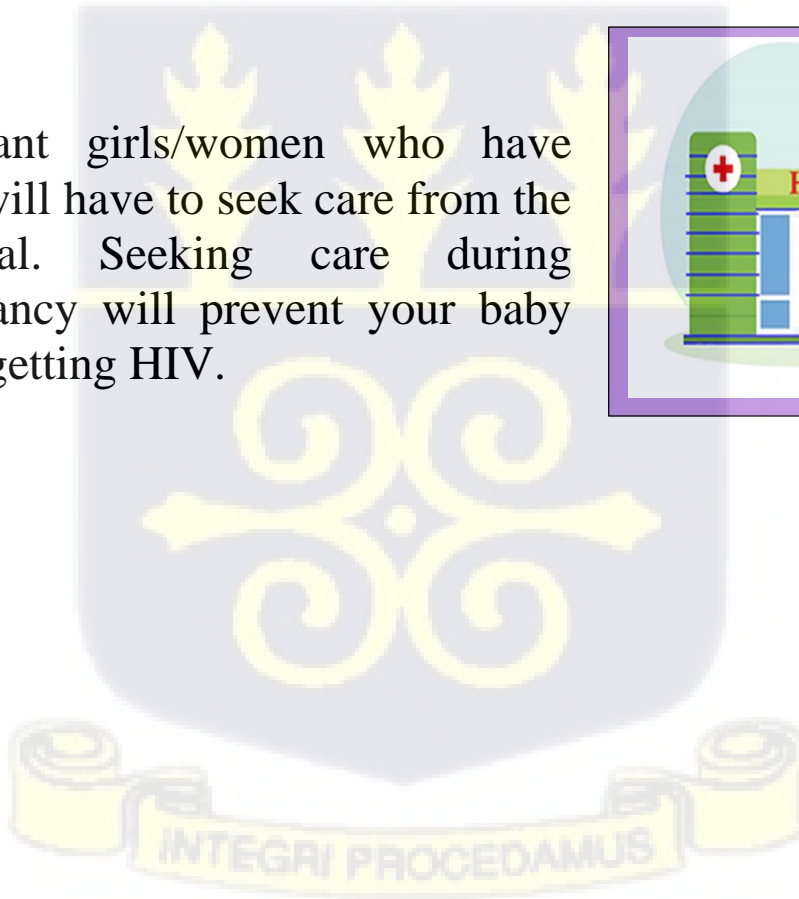


You can stop the spread of HIV.

3. Tell your parents/guardian and boyfriend/girlfriend you have HIV.



4. Pregnant girls/women who have HIV will have to seek care from the hospital. Seeking care during pregnancy will prevent your baby from getting HIV.



## LESSON SIX WAYS TO AVOID STIS AND PREGNANCY

Some young people may not be able to check their sexual feelings. If after seeking advice and guidance, you cannot control your sexual desires, you can practice safe sex. It means the use of condoms and other ways of avoiding pregnancy. The pictures below represents the many ways by which you can avoid pregnancy and STIs. Let's consider them one after the other in the pages that follow.



## Condom

A condom is a soft rubber-like material. It is worn on the penis or inserted in the vagina before sex. A condom helps prevent STIs and pregnancy. Yet, you should know that condoms are not always reliable. It can tear during sex if it is expired. **There are male and female condoms.** You can get a condom from any drug store , a pharmacy, or a family planning center.

To keep and use a condom safely, follow the tips below.

3. Do not keep a condom in your pocket or purse. The condom can get warm and tear during a sex act.



4. Do not use oils and creams to oil the vagina.



5. Instead, use vagina gel to avoid dryness of the vagina.



You can follow the steps below anytime you want to wear the male condom.



Females should hold the outside of a female condom at closed end. Press sides of inner ring together with fingers and insert into vagina.

The longest finger should then be used to push the ring as far into the vagina. Some of the condom will hang and show outside of the vagina. Make sure that the penis is inside the condom and not between the condom and the



Do not keep a used condom for reuse. Instead, put on a new condom for the next round of sex.

## Other Ways to Prevent Pregnancy

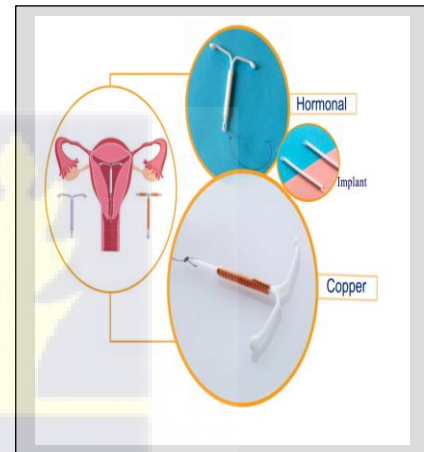
You can get the items for preventing pregnancy from the family planning or family health units in hospitals, health centers, clinics, and adolescent corners. You can also get it from workplaces like PPAG and Marie Stopes clinics in Ghana. There are long-term and short-term ways to avoid pregnancy. Let's look at them.

### Long-Term Ways to Avoid Pregnancy

Among girls/women, there are ways to avoid pregnancy over a very long period. They include:

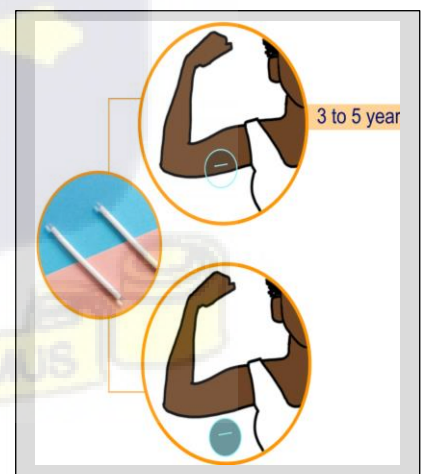
3. Implant

4. Intrauterine Devices (IUDs)



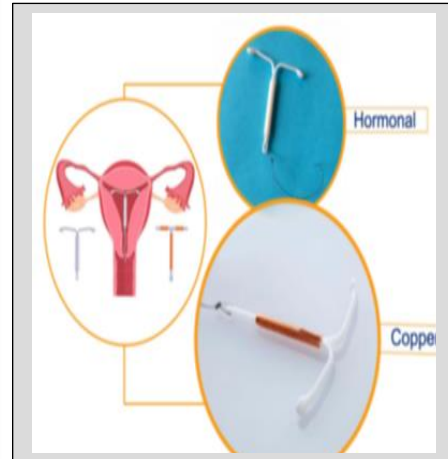
### Implant

The implant is a plastic rod that looks like a matchstick. The implant is inserted under the skin of the upper arm. Once inserted, it can remain in the upper arm between 3 and 5 years. The implant does not prevent STIs.



## IUDs

IUDs are womb devices. They are placed in a girl/woman's womb to stop her from getting pregnant. There are hormonal and copper IUDs. When placed in the womb, it can remain there for 5 to 10 years. It can be removed anytime the girl/woman wants to get pregnant.



You should know that IUDs do not prevent STIs.

## Short-term Ways to Avoid Pregnancy

They are oral medicines and injections used in a short time to avoid pregnancy. They include:

4. The Emergency Pills– you can take this pill within three days or 72 hours after having sex. Do not use this pill every time you have sex. You can use it only when sex happens by accident.



## 2. The Regular Daily Pill.

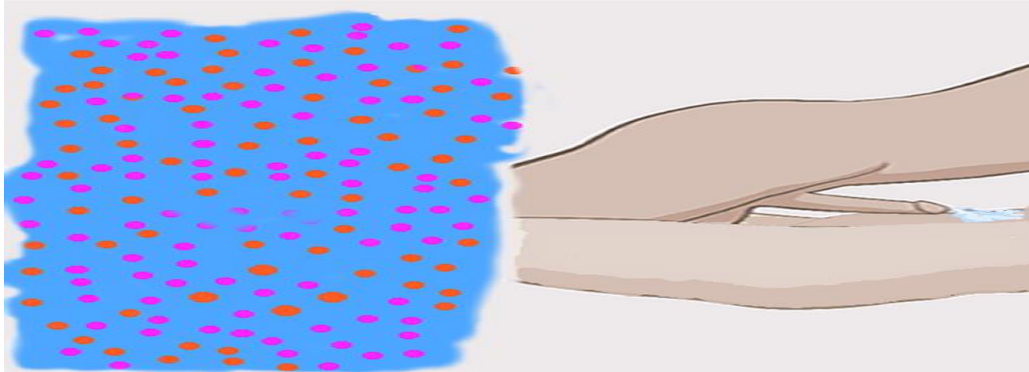


There are many kinds of daily pill. To make it work; you have to take one pill daily. It is used in the following ways based on the type:

- Once every day for 21 days.
- Once every day for 28 days.
- Once every day for 90 days.

Please talk to a family planning nurse or a doctor to know which pill to take. Remember that all the long and short-term ways to avoid pregnancy do not prevent STIs.

## The Withdrawal



Withdrawal is one of the ways to avoid pregnancy. The penis is removed from the vagina and away from the female sex organ before the semen and sperm is released. If some semen drop on the vulva and has sperms, it can enter the vagina for the girl/woman to get pregnant. The withdrawal method does not always prevent pregnancy because it is hard to pull out the penis before the semen comes out. In many cases, some small amount of sperm will get into the vagina when the penis is pulled out, which may bring about pregnancy. You should know that this method does not prevent STIs.

### Summary

I believe you now have a good understanding of yourselves as young teens. You understand the changes in your body and what you need to do. You have also learned about sexual activities and the dangers involved in sexual activities, including STIs. You are also encouraged to say no to sexual activities. However, for those who want to have sex no matter what, you can practice safe sex by using a condom. You may also use any of the methods for preventing pregnancy learned in lesson six.

**APPENDIX D: SUPPORTING DOCUMENTS ON ETHICAL CONSIDERATIONS**

**Appendix D1: Ethics Approval Letter**

**GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE**

*In case of reply the number and date of this Letter should be quoted.*

My Ref: GHS/RDD/ERC/Admin/App 01/2022  
Your Ref. No.



Year Health Our Concern

Research & Development Division  
Ghana Health Service  
P. O. Box MB 190  
Accra  
Digital Address: GA-050-3303  
Mob: +233-50-3539896  
Tel: +233-302-681109  
Fax + 233-302-685424  
Email: [ethics.research@ghsmaail.org](mailto:ethics.research@ghsmaail.org)  
25<sup>th</sup> November 2021

Jacqueline Nkrumah  
University of Ghana Business School  
Department of Public Administration and Health Services Management  
Box 75, Legon,- Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	<b>GHS-ERC: 006/10/21</b>
Study Title	Restructuring Health Education Material to Improve Sexual and Reproductive Health Literacy of Adolescents in the Effutu Municipality of the Central Region of Ghana
Approval Date	25 <sup>th</sup> November, 2021
Expiry Date	24 <sup>th</sup> November, 2022
GHS-ERC Decision	<b>Approved</b>

**This approval requires the following from the Principal Investigator**

- Submission of a yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

**You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19**

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.


Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....*C. Bannerman*.....  
Dr. Cynthia Bannerman  
(GHS-ERC Chairperson)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

**Appendix D2: Letter of Introduction from the Municipal Education Service**

**GHANA EDUCATION SERVICE**

  
REPUBLIC OF GHANA

MUNICIPAL EDUCATION OFFICE  
POST OFFICE BOX 54  
WINNEBA  
TEL: 03323 22075  
Email: [effutumunicipal@ges.gov.gh](mailto:effutumunicipal@ges.gov.gh)

In case of reply the number and Date of this letter should be quoted

My Ref. NO:GES/CR/EMEOW/LC.80/VOL.5/62  
Your Ref. No:.....

DATE: 15<sup>TH</sup> SEPTEMBER, 2021


**INTRODUCTORY LETTER**

We acknowledge receipt of your letter dated 7<sup>th</sup> September, 2021 introducing a student who would like to conduct a research in the Municipality.

Permission has been granted to Ms. Jacqueline Nkrumah, a PhD Health Policy and Management student of the University of Ghana Business School, Legon to conduct a research in the Effutu Municipality from October, 2021 to August, 2022.

Ms. Jacqueline Nkrumah is undertaking a research on the topic: *"Restructuring Health Education Material to Improve the Sexual and Reproductive Health literacy of Adolescents in the Effutu Municipality of the Central Region of Ghana"*.

Teachers should assist her gather the relevant data for the research while ensuring that her presence does not disrupt teaching and learning in the schools.

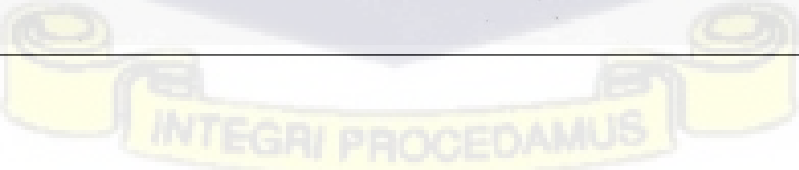
  
MABEL JUDITH MICAH (MRS)  
MUNICIPAL DIRECTOR OF EDUCATION  
EFFUTU-WINNEBA

PROF. AARON A. ABUOSI  
UNIVERSITY OF GHANA BUSINESS SCHOOL  
UNIVERSITY OF GHANA  
LEGON, ACCRA

✓ MS. JAQUELINE NKRUMAH  
UNIVERSITY OF GHANA BUSINESS SCHOOL  
UNIVERSITY OF GHANA  
LEGON, ACCRA

cc: All SISOs  
Effutu Municipal, Winneba  
Municipal Girls Educ. Officer  
Effutu Municipal, Winneba  
Mun. Guidance & Counselling Officer  
Effutu Municipal, Winneba  
Basic School Coordinator  
Effutu Municipal, Winneba

VIM



### Appendix D3: Participant Information Sheet and Consent Form – Parents/Guardians

#### PARTICIPANTS INFORMATION SHEET (Participant's Parents/Guardians)

**Study Title:** Restructuring health education material to improve sexual and reproductive health Literacy of adolescents in the Effutu Municipality of the Central Region of Ghana.

Good day! My name is Jacqueline Nkrumah, and the principal investigator of this study. I am a Ph.D. candidate from the University of Ghana Business School and a lecturer in the University of Education, Box 25, mobile: 233(0)242507293, email: [jnkrumah@uew.edu.gh](mailto:jnkrumah@uew.edu.gh) [acquiankrumah@mail.com](mailto:acquiankrumah@mail.com)

#### Background of Research

“Restructuring health education material to improve sexual and reproductive health Literacy of adolescents in the Effutu Municipality of the Central Region of Ghana.” is a research work in partial fulfillment of the requirement for a Ph.D. Program. The research is an interventional study to evaluate the effectiveness of text-based and pictograph SRH instructional materials in improving SRHL of young adolescents in the Effutu Municipality.

#### Nature of Research

The research is led by Jacqueline Nkrumah (The Principal Investigator), who would assess SRHL gaps and validate SRH instructional materials through an FGD among JHS three students. Using two different instructional design formats, the investigator would provide interventional education to adolescents aged 12-15 years in JHS one and two on SRH. The effectiveness of the instruction would be assessed to determine its impact on the SRHL of young adolescents. The evaluation responses would contribute to the knowledge of SRH, improved decision-making capacity, and SRH behavior of adolescents. It would inform policymakers of the effectiveness of text-based and picture-based formats in improving SRHL of young adolescents.

#### Participants Involvement

I kindly invited parents to encourage ward/child in JHS 1 and 2 to participate in this research. If you accept this request, your ward/child may be required to participate in a FGD to validate instructional materials for the educational intervention or take part in a two-hour SRH education, which would take place two days a week for eight weeks. The FGD would last between 45 minutes to 1 hour. The education would be provided by trained research assistants and the principal investigator. Before the teaching, I would screen your ward/child for good vision. The study would collect baseline data from your ward/child using four main test

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS-ERC  
Period: 25/11/21 to 24/11/22  
Sign: [Signature] Date: 13/12/21  
Name: Diana Abena Apeah  
GHC-ERC Administrator

***Voluntary Participation and Right to Leave the Research***

The participation of your ward/child in this study is strictly voluntary, and you can get them to withdraw at any time of the FGD or the intervention. In this regard, you are required to choose to allow your ward/child to participate in this research or refuse to them from joining the study altogether.

***Outcome and Feedback***

The study will be used purely for academic purposes and publications. Findings will also be disseminated to the Municipal health directorate, in conferences, and among relevant stakeholders.

***Funding Information***

The principal investigator provides funding for the research.

***Conflict of Interest***

No one else except the researcher will have access to data from the study. However, because the study's findings would be published, other researchers may apply to the principal investigator to access the data for academic and other purposes.

***Provision of Information and Consent for Participation***

If you agree to allow your ward/child to participate in this research after reading the above information, you would be required to provide consent by signing the consent form that follows. You will have a copy of the information sheet and consent form.

***Permission to Record Interview***

1. Do I have your permission to record the focus group discussion with your ward/child?

Yes [ ]. No [ ].

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS-ERC  
Period: 25/11/21 to 27/11/21  
Sign: Ghana P. 13/12/21  
Name: Ghana Abena Apatu  
GHC-ERC Administrator



**Contacts for Additional Information**

If you have any questions or clarifications on the research, you may contact:

**Jacqueline Nkrumah (Ph.D. Candidate)**

The University of Education Winneba, Faculty of Science Education, Department of Health Administration and Education. P.O. Box 25, Winneba. Tel. +233242507293

Email: [jnkrumah@uew.edu.gh](mailto:jnkrumah@uew.edu.gh) or [acquiankrumah@mail.com](mailto:acquiankrumah@mail.com)

For questions and clarifications on ethical issues, you may contact:

**The Administrator (Nana Abena Apatu)**

Ghana Health Service Ethics Review Committee

Research Division

Ghana Health Service – Accra

Mobile: 0503539896

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS-ERC  
Period: 25/11/21 to 21/11/22  
Sign: Nana Abena Apatu  
Name: Nana Abena Apatu  
GHC-ERC Administrator



**Consent Form**

***Participant's parent/Caregiver – Statement and Signature***

I certify that I have read/have been well informed of the purpose, benefits, risks, and procedures related to this study in the English language/Fante. I have had my questions and clarification about the research answered to my satisfaction. I, therefore, agree to allow my ward to participate as a volunteer.

\_\_\_\_\_ **Date**

\_\_\_\_\_ **Signature**

***Interpreter (in the case of those who cannot read and write) Statement and Signature***

I certify that I have read the participant information, understood the purpose, benefits, risks, and procedures related to this research, and explained same to the entire understanding of the participant's parent/guardian in his/her native language/Fante. He/she has agreed to allow his/her ward/child to participate as a volunteer.

\_\_\_\_\_ **Date**

\_\_\_\_\_ **Signature**

***Witness (in the case of those who cannot read and write) Statement and Signature***

I certify that the Interpreter has well explained the purpose, benefits, risks, and procedures related to this study in the native language of the parent/guardian. He/she was allowed to have any questions and clarification about the research answered to his/her satisfaction. I, therefore, bear witness to his/her agreement to permit his/her ward/child to participate as a volunteer.

\_\_\_\_\_ **Date**

\_\_\_\_\_ **Signature**

***Investigators Statement and Signature***

I certify that I have provided adequate information about the research, its purpose, risk, benefits, procedures for data collection, and the rights of participants involved in the study.

\_\_\_\_\_ **Date**

\_\_\_\_\_ **Signature**

This is to Certify that this Study's Inform Consent

Form Has Been Approved by GHS-ERC

Period: 25/11/21 to 27/11/22

Signature: Hans Akpan Apefa

Name: Hans Akpan Apefa  
GHS-ERC Administrator

## Appendix D4: Participants Information Sheet and Consent Form – School Management

### PARTICIPANTS INFORMATION (School Management)

**Study Title:** Restructuring health education material to improve sexual and reproductive health literacy of adolescents in the Effutu Municipality of the Central Region of Ghana.

Good day! My name is Jacqueline Nkrumah. I am the principal investigator of this study. I am a Ph.D. candidate from the University of Ghana Business School and a lecturer in the University of Education, Box 25, mobile: 233(0)242507293, email: [jnkrumah@uew.edu.gh](mailto:jnkrumah@uew.edu.gh) [acquiankrumah@mail.com](mailto:acquiankrumah@mail.com)

### Background of Research

“Restructuring health education material to improve the sexual and reproductive health literacy of adolescents in the Effutu Municipality of the Central Region of Ghana.”, is a research work in partial fulfillment of the requirement for a Ph.D. Program. The research is an interventional study to evaluate the effectiveness of text-based and pictograph SRH instructional materials in improving SRHL of young adolescents in the Effutu Municipality.

### Nature of Research

The research is led by Jacqueline Nkrumah (The Principal Investigator), who would be validating SRH instructional materials through an FGD using JHS one and two students. Using two different instructional design formats, the investigator would provide interventional education to adolescents aged 12-15 years in JHS 1 and 2 on SRH. The effectiveness of the instruction would be assessed to determine its impact on the SRHL of young adolescents. The evaluation responses would contribute to the knowledge of SRH, improved decision-making capacity, and SRH behavior of adolescents. It would inform policymakers of the effectiveness of text-based and picture-based formats in improving SRHL of young adolescents.

### Involvement of School Management

I kindly invite management and teachers in this school to encourage adolescents in JHS 1 and 2 to participate in this research. If you accept this request, your pupil may be required to participate in a FGD to validate instructional materials for the educational intervention or take part in a two-hour SRH education, which would take place two days in a week for eight weeks. The FGD would last between 45 minutes to 1 hour. On the flip side, the SRH education would be done by trained research assistants and the principal investigator. Before the intervention, I would screen students for good vision. Baseline and end-line data would be collected, and a follow-up data collection at one month. If you do not wish to allow your pupil to participate in

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS – ERG  
Period: 25/11/21 to 24/11/21  
Date: 12/12/21  
Name: Hava Abena Apetu  
GHC-ERC Administrator

1

any aspect of the FGD, the intervention, and the assessment, you may say so. The educational intervention would occur on your school premises and would involve no one else but those who would agree to participate in the research. You are free to make your pupil opt-out of the educational intervention and test administration at any time if you are not comfortable with the education or are no longer interested in the study.

#### **Possible Risks and Discomforts**

The research does not anticipate any risk during and after the intervention period.

#### **Benefits**

The research presents no direct benefit to individual participants. However, the study will identify SRHL gaps, improve on SRHL and the behavior of young adolescents. The investigation would establish the effectiveness of text-based and pictograph instructional materials in improving SRHL of adolescents in the Ghanaian context. It would also provide validated test instruments for assessing the SRHL of adolescents.

#### **Compensation**

The study does not intend to compensate participants, except that students who would participate in the educational intervention would receive snacks at every meeting.

#### **Confidentiality**

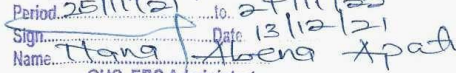
Field test instruments would be fully protected. Responses would not include participants' names. However, some other individuals or institutions under strict confidentiality may access the research records. They may sometimes look at the research records for data verification, accurate data analysis, and report writing.

#### **Voluntary Participation and Right to Leave the Research**

The participation of students in this study is strictly voluntary, and you can get them to withdraw at any time during the intervention. You will therefore be required to choose to allow your pupil to participate in this research or to refuse to join the study altogether.

#### **Outcome and Feedback**

Data from the study is required for academic purposes and publications. Findings will also be disseminated to the Municipal health directorate, in conferences, and among relevant stakeholders.

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS-ERC  
Period: 25/11/21 to 27/11/21  
Sign:  Date: 13/12/21  
Name: Hana Abena Apanu  
GHC-ERC Administrator

**Funding Information**

The principal investigator provides funding for the research

**Conflict of Interest**

No one else except the researcher will have access to data from the study. However, because the study's findings would be published, other researchers may apply to the principal investigator to access the data for academic and other purposes.

**Provision of Information and Consent for Participation**

If you agree to allow your pupil to participate in this research after reading the above information on the study, you would be required to provide consent by signing the consent form that follows. You will be given a copy of the information sheet and consent form.

**Permission to Record Interview**

1. Do I have your permission to record the focus group discussion with your pupil?

Yes [  ]. No [  ].

**Contacts for Additional Information**

If you have any questions or clarifications on the research, you may contact:

**Jacqueline Nkrumah (Ph.D. Candidate)**

The University of Education, Winneba, Faculty of Science Education, Department of Health Administration and Education. P.O. Box 25, Winneba. Tel. +233242507293  
Email: [jnkrumah@uew.edu.gh](mailto:jnkrumah@uew.edu.gh) or [acquiankrumah@mail.com](mailto:acquiankrumah@mail.com)

For questions and clarifications on ethical issues, you may contact:

**The Administrator (Nana Abena Apatu)**

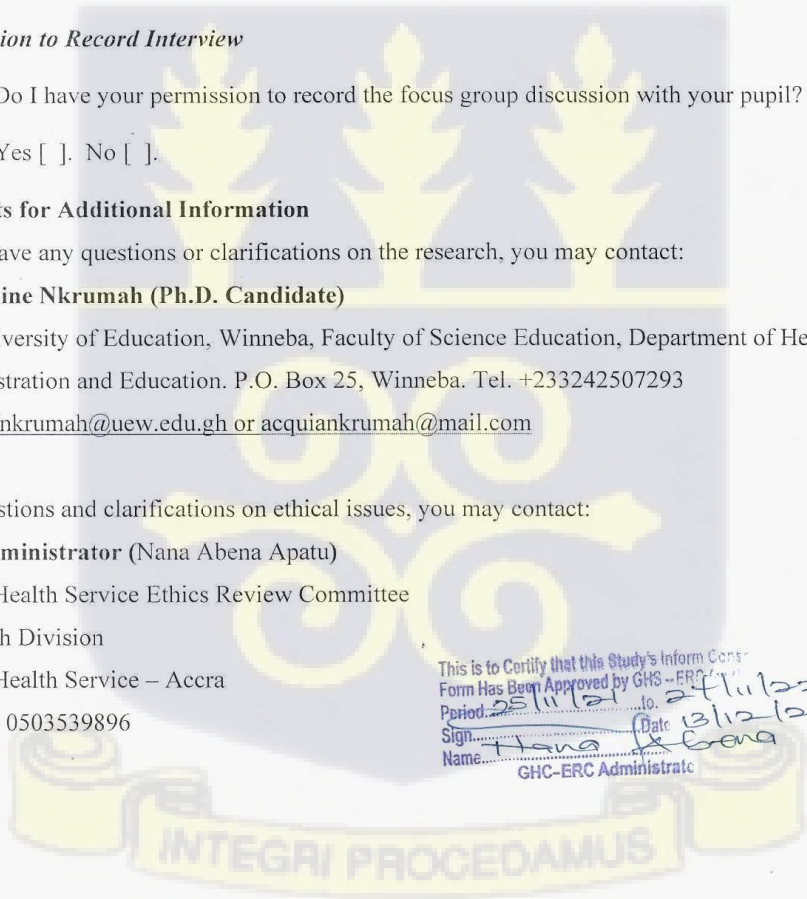
Ghana Health Service Ethics Review Committee

Research Division

Ghana Health Service – Accra

Mobile: 0503539896

This is to Certify that this Study's Inform Consent Form Has Been Approved by GHS-ERC  
Period: 25/11/21 to 27/11/21  
Sign: Nana Abena Apatu (Date: 23/12/21)  
Name: Nana Abena Apatu  
GHC-ERC Administrator



**Consent Form**

***Participant (School Management) Statement and Signature***

I certify that we (school management) have read the purpose, benefits, risks, and procedures related to this research. The management of this school's questions and clarifications about the research is answered to their satisfaction. I, therefore, agree to allow our pupils to participate in this research.

\_\_\_\_\_

Date

\_\_\_\_\_

Signature

***Investigators Statement and Signature***

I certify that I have provided adequate information about the research, its purpose, risk, benefits, the procedure for data collection, and the rights of participants and participating institutions involved in the study.

\_\_\_\_\_

Date

\_\_\_\_\_

Signature

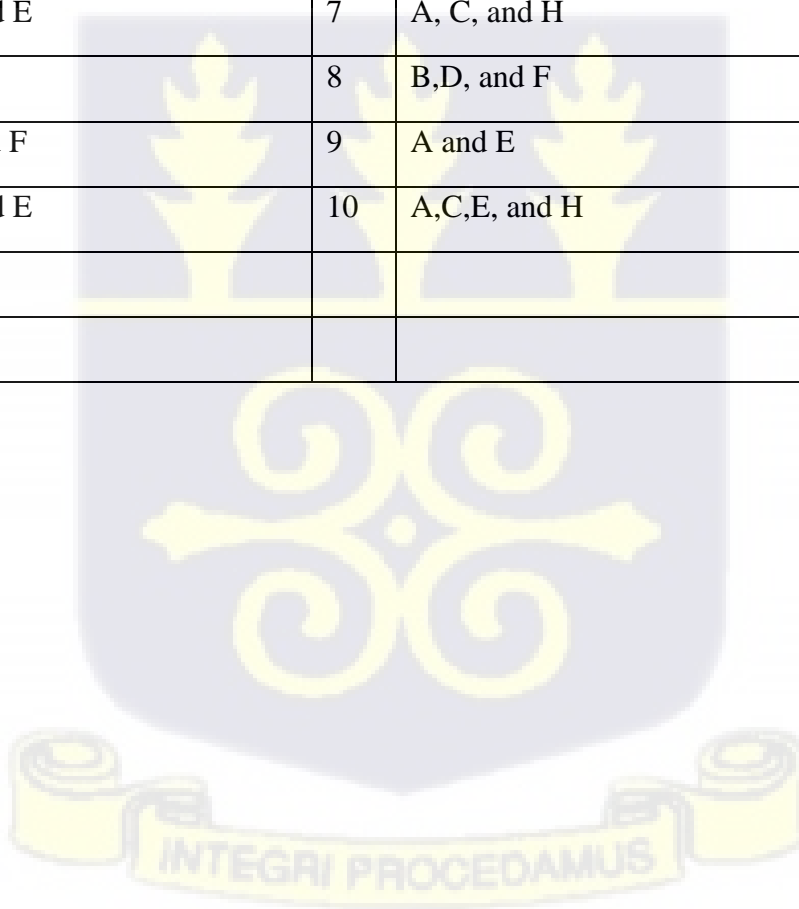
This is to Certify that this Study's Inform Conser  
Form Has Been Approved by GHC-ERC for the  
Period 25/11/21 to 24/11/22  
Sign: \_\_\_\_\_ Date: 25/11/21  
Name: Hana Egbena Apatu  
GHC-ERC Administrative



**APPENDIX E: MARKING SCHEMES**

**Appendix E1: Marking Scheme Test of Decision-Making in Sexual and Reproductive Health, Forms I And II**

TD-SRH – FORM I		TD-SRH – FORM II	
1	B,E, and G	1	B, F, and H
2	A,D, and G	2	C, E, and G
3	A,F, and H	3	A, D, and G
4	A,D, and F	4	A, E, and H
5	A,D,E, and H	5	A,C, E, and H
6	A, D, and G	6	A, B, and E
7	A,C, and E	7	A, C, and H
8	A and B	8	B,D, and F
9	B, E, and F	9	A and E
10	A, C, and E	10	A,C,E, and H

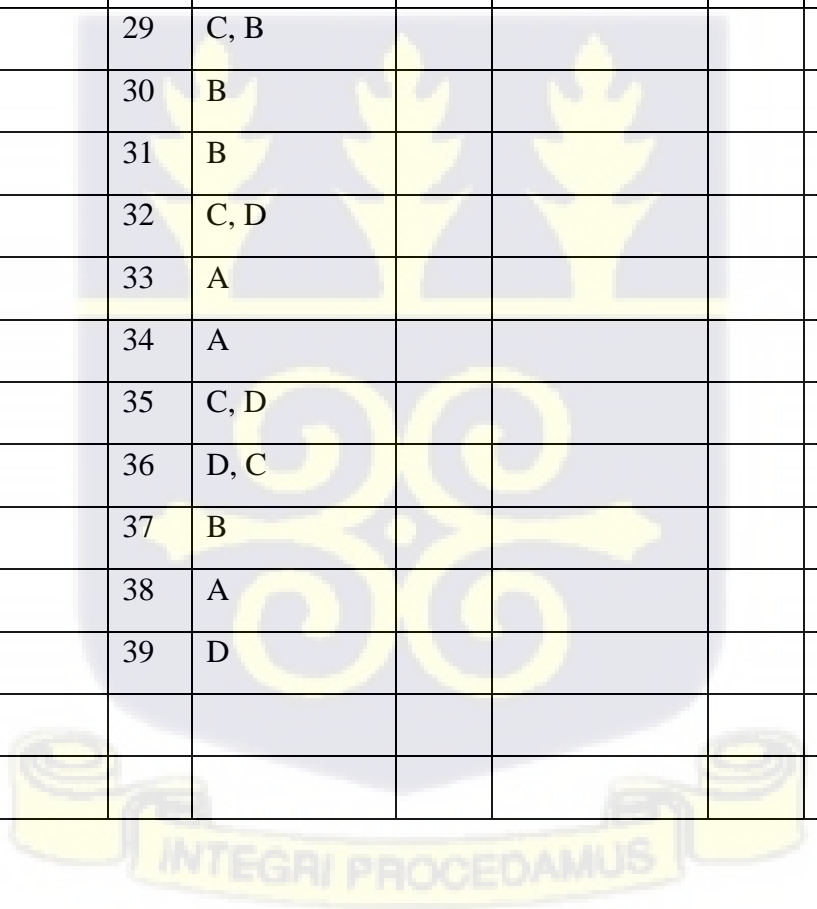


**Appendix E2: Marking Scheme on Test of Functional Literacy in Sexual and Reproductive Health - Forms I And II**

TOFL-SRH – Form I				TOFL-SRH – Form II			
1	B	16	A	1	B	16	D
2	A	17	D	2	B	17	D
3	B	18	B	3	C	18	A
4	C	19	B	4	A	19	C
5	D	20	C	5	C	20	A
6	C	21	D	6	D	21	C
7	C	22	A	7	C	22	A
8	<b>B</b>	23	D	8	A	23	C
9	B	24	A	9	B	24	C
10	C	25	C	10	A	25	A
11	C	26	C	11	D	26	<b>B</b>
12	D	27	B	12	C	27	B
13	C	28	C	13	D	28	B
14	D	29	B	14	A	29	D
15	D	30	B	15	C	30	A
<b>Numeracy Test</b>							
1	C						
2	A						
3	C						
4	B						
5	D						

**Appendix E3: Marking Scheme on The Cloze Test**

1	B, A	21	A				
2	C	22	C				
3	C, D	23	B				
4	A, B	24	D				
5	A, C	25	A				
6	C	26	C				
7	A	27	D				
8	<b>B</b>	28	A				
9	B, C	29	C, B				
10	D	30	B				
11	A, B	31	B				
12	B	32	C, D				
13	C, D	33	A				
14	B, A	34	A				
15	A	35	C, D				
16	B, C	36	D, C				
17	A	37	B				
18	A	38	A				
19	C	39	D				
20	C						



**Appendix E4: Marking Scheme on General Literacy and Numeracy Screening Test**

<b>Literacy</b>		<b>Numeracy</b>	
1	B	1	A
2	B	2	A
3	C	3	D
4	B	4	C
5	C	5	B

