

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



**MEDICATION LITERACY AMONG PATIENTS ATTENDING THE FOCOS
ORTHOPAEDIC HOSPITAL, PANTANG, GHANA**

BY

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MASTER OF PUBLIC HEALTH DEGREE**

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DECLARATION

I hereby declare that besides references which have been duly acknowledged, this dissertation is the product of my research and to the best of my knowledge has not been submitted for award of any degree in this institution and other universities elsewhere.

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DEDICATION

To Naana, Dad, Mom, Ekua, Paa Kwesi and Dr. Daniel Brefo for spurring me on to greater heights with their prayers and support.

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I am extremely thankful to the Almighty God without whom this work would have been impossible.

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LIST OF ABBREVIATIONS

FOCOS	- Foundation of Orthopaedic and Complex Spine
JHS	-Junior High School
SHS	-Senior High School
NHIS	-National Health Insurance Scheme
n.d	-non dated
OPD	-Out Patient Department
SD	-Standard Deviation
WHO	-World Health Organization

ABSTRACT

Introduction: Medication literacy is the degree to which individuals can acquire, understand, disclose, calculate and process information that is specific to their medication to make informed medication and health related decisions in order to use their medications cautiously and adequately. A low level of medication literacy puts the patient at risk of complications such as medication errors which leads to morbidity and mortality. Medication literacy influences patients adherence to their medications, patients who understand why, how and when to take their medications are more likely to take their medications as ordered by their physician. Medication literacy ensures medication safety.

Objective: The main objective of the study was to assess the level of medication literacy among patients.

Method: A quantitative cross sectional study was undertaken with 190 patients who visited the OPD at FOCOS Orthopaedic Hospital. A questionnaire was used to collect data to assess patients' level of medication literacy. Descriptive statistics was used to ascertain the sociodemographic characteristics of the patients. Chi square test was employed to determine associations between sociodemographic factors and medication literacy.

Results: Thirty six of the participants (19%) had a low level of medication literacy whereas 105 (55%) and 49 (26%) had medium and high levels of medication literacy respectively. Fifty one (26.8%) of the participants had a little knowledge on the side effects of their medications, a higher percentage however did not know what to do when they experienced side effects from their medications (41.1%) and the drugs or substances that interact with their medications (50.5%). This study found significant associations between education ($p=0.001$), income levels ($p=0.000$), employment status ($p=0.000$) and medication literacy.

Conclusion: This study has shown that almost 1/5th of the patients attending FOCOS Orthopaedic Hospital had a low level of medication literacy. A higher percentage of patients did not know the side effects of their medications, what to do when they occurred and the drug–drug interaction. Education, income level and employment status significantly influenced medication literacy.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

According to Pouliot (n.d.), medication literacy is the degree to which individuals can acquire, understand, disclose, calculate and process information that is specific to their medication to make informed medication and health related decisions in order to use their medications cautiously and adequately, regardless of the method by which the content is delivered (e.g. written, oral, visual).

Medication literacy is a concept that defines health literacy in the context of medication use. Poor understanding of medication instructions can cause adverse drug events. For individuals to use their medications appropriately, they need to read their medication labels and all associated medical information. It is also appropriate that patients know what actions to take when they miss a dose or experience side effects (Pouliot et al., 2018).

Most medicines rely on a good comprehension by the patient on how to take or use them effectively and safely. Medication literacy is aimed at empowering everyone who takes medication to be able to make informed decisions concerning their medication and health, processing instructions pertaining to their medication and acquiring further information about their medication. Individuals should be in the position to act upon patient-specific instructions and aware that they can ask for reassessment of their current medications. They should also be able to calculate the prescribed dose of their medication (Pouliot, n.d.).

Medication knowledge is the patients' comprehension of information on their medication which includes the name, indication and precautions (Qin et al., 2015).

Medication adherence is the degree to which a person's conduct in relation to taking medication is consistent with agreed recommendations from a health care provider. It involves the voluntary, effective and mutual participation of the patient and the health care provider to produce therapeutic results. An average of 50% of patients with chronic diseases do not adhere to their medications (WHO 2003 report).

A key component in enhancing patient care is the safe and productive use of medications. Adverse occurrences in healthcare process are mostly caused by medicines. It has also been ascertained that adherence with long term therapies is approximately 50%. Patient's medication literacy as a prime concern in clinical practice is one recommended strategy to decrease non-adherence. In a study that was conducted, it appeared that 22% of patients had not stocked their orders and 21% had challenges comprehending the goal of their medications. In another study conducted among a group of comparatively well-educated hospitalized patients who were provided at least 1 new medication, 14% were not aware that a new medication had been given and 36% did not have any knowledge of the name and the goal of the medicine 1 to 2 weeks after they were discharged. (Hammouda, 2012).

Knowledge on the name and purpose of medication is essential to using medications judiciously (Raynor, 2008).

1.2 Problem statement

At some point in their life every individual around the world takes medicines to prevent or treat illness. Medications are becoming increasingly complex. There is an increase in variety and number of medications. Drugs with the same action and formulation but with different trade names are being manufactured. People living with chronic disease are taking multiple medications for better treatment (WHO, 2011).

Nevertheless, medicines sometimes cause grave harm if taken wrongly, monitored inadequately or as a consequence of an error, mishap or communication problems. Medication use is associated with morbidity and mortality rates that are so high that it is considered to be a pertinent public health issue. In Spain, the prevalence of emergency department visits caused by negative outcomes related to medicine is 35.7%. Seventy three to eighty one percent of these outcomes are considered to be preventable. Many factors contribute to the occurrence of these preventable events associated with medication use and patient medication knowledge has been found to be one of them (Mpharm Romero-Sanchez et al., 2016).

In the USA alone, medication-related errors cause at least one death every day and injure almost 1.3 million people annually. It is estimated that related adverse events of similar rates occur in low and middle income countries as well as high income countries. However, in low and middle income countries the effect of these adverse events is doubled in relation to the number of years of healthy life that is lost. Most countries also lack good data. The value associated with medication errors has been globally estimated at USD 42 billion each year or nearly 1% of total global health expenditure (WHO news release, 29/03/17).

Zero or low medication literacy levels cause medication related errors, morbidity and mortality. In Sub Saharan Africa including Ghana there is very little research on medication literacy among patients.

Medication errors place an enormous and unnecessary strain on health budgets. WHO therefore put in place a global initiative to minimize serious and preventable medication associated harm in all countries by 50% over the next 5 years. The aim of the Global Patient Safety Challenge on Medication Safety initiated by WHO lays out ways to improve medicines that are prescribed,

distributed and consumed. It also aims at increasing awareness about the dangers associated with the incorrect use of medications among patients (WHO news release, 29/03/17).

This study aims to highlight the importance of medication literacy and help bridge the knowledge gap.

1.3 Justification

Almost every adult takes medication at least once in their lifetime. Those with chronic conditions have to take medicines to manage their condition for their entire lifetime. A patient's confidence in their medication is greatly associated with their knowledge on what their medication is for, when and how it should be taken (Coyne et al., 2017). Studies have been conducted in several countries on medication literacy among patients with specific disease conditions (Zhong et al., 2016).

However there is very little research on medication literacy in this country. This study therefore seeks to provide knowledge on medication literacy. Considering the importance of medication literacy from literature, it is essential that as a country we ascertain local relevant figures regarding medication literacy among patients. This study can also serve as a baseline for health policies and strategies in relation to medication use. Apart from these, this study will also serve as hypothesis generation for future studies.

1.4 Conceptual framework

As illustrated in Figure 1, the conceptual framework generally describes the factors associated with medication literacy. A patient's age, sex, educational and income levels may influence their level of medication literacy. A higher level of education, young age or high income levels may contribute to a high level of medication literacy. These factors may affect it either directly or in association with other factors such as disease condition, duration of the disease condition and the

number of medications a patient is taking. An older patient may have had the disease condition for longer and may be taking more medications. These factors can also influence their level of medication literacy. A patient's level of medication literacy may also influence how they adhere to their medications.

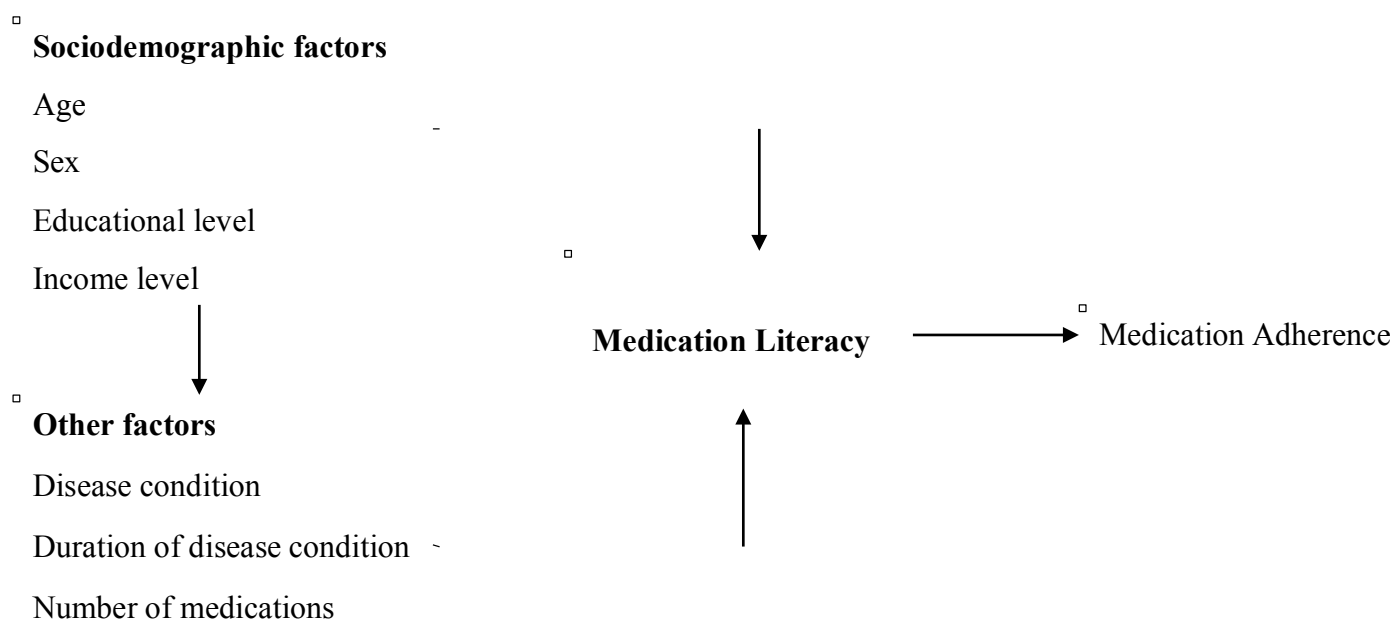


Figure 1: Conceptual framework of medication literacy

1.5 Research Questions

1. What is the overall level of medication literacy of patients at FOCOS Orthopaedic Hospital?
2. What is the level of medication literacy by dimensions and items among patients at FOCOS Orthopaedic Hospital?
3. What are the factors associated with medication literacy?

1.6 Objectives

General objective:

To assess the level of medication literacy among patients attending the FOCOS Orthopaedic Hospital.

Specific Objectives:

1. To determine the level of medication literacy among patients attending the FOCOS Orthopaedic Hospital in June 2019.
2. To describe medication literacy by dimensions and items among patients attending the FOCOS Orthopaedic Hospital in June 2019.
3. To determine the factors associated with medication literacy among patients attending the FOCOS Orthopaedic Hospital in June 2019.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Determining medication literacy levels

According to Annie Pouliot (Delphi study conducted with experts about medication literacy), information required for excellent and safe medication use include medication name, posology, the period to take medication (accompanying food or not), indication, side effects and contraindications, drug and food interactions, directions when a dose is defaulted and how to store medications.

A study by Mpharm Romero-Sanchez et al., (2016) to determine medication knowledge among adult patients used a questionnaire comprising 11 open ended questions inquired by a pharmacist. Measurement of knowledge was divided into 4 dimensions; indication and treatment goal, process of medication use (dosage, regularity, period of treatment and the mode of administration), problems of safety presented from medication use(contraindications, interactions, side effects). A score of -1 to 2 was designated for each response to a question in accordance with the Spanish medicines handbook. A score of -1 was accorded a patient if their response was incorrect, 0 for if they did not answer, 1 if the answer was incomplete and 2 if the answer was correct. An overall patient medication knowledge (PMK) was then calculated and classified; a PMK score of 0 represented no medication knowledge, 0.60 -1.26 represented insufficient medication knowledge, 1.27-1.60 sufficient medication knowledge and 1.61-2 optimal medication knowledge. A total of 5234 patients (71.9%) had deficient medication knowledge. However out of this 71.9%, 65.7% had no medication knowledge and 6.2% had insufficient knowledge. Adequate medication knowledge was observed in only 28%; 14% had sufficient knowledge and 14% had optimal medication knowledge.

Measurement of knowledge was conducted in another study using a validated questionnaire.

Measurement was based on knowing the indication, side effects and correct technique for storage, posology, prescription status, identification of medication and procedure to follow for dosage omission. Calculation of measures was based on literature from previous studies. A score of 0 or 1 was designated for negative and positive answers respectively. A score was obtained for each measure in percentages. Patients who answered 5 questions positively (71.4%) were considered to have sufficient knowledge. The global medication knowledge however was 67.51% (Najjar et al., 2015).

A cross sectional study in Jordan interviewed 902 patients on medications they were currently taking to assess association between patients' knowledge on their medications for their chronic diseases and how they take them. A revised version of the McPherson index was used to assess knowledge. They were asked to provide information on the name of the medication they were taking, indications, side effects and actions to take for dosage omission. A patient was considered to have medication knowledge if they answered all the questions. The correct answers were used to make an assessment for the overall medication knowledge score which was calculated out of 7 for each. Only 1.4% of the sample population answered all the medication knowledge questions correctly. The median medication knowledge score of 4 obtained, a score ≥ 4 was considered high and <4 was low. Based on this classification, patients with a high medication knowledge score represented 62.3 % of the population while 37.7 % had a low medication knowledge score (Awwad et al., 2015).

2.2 Medication Literacy by Dimensions and Items

A study in China based on a cohort of 153 patients discharged with acute coronary syndrome concluded that their level of medication literacy was insufficient. More than 20% did not have adequate knowledge on the types of drugs and the number of times they needed to take their drugs, more than 30% did not know the name and dosage of the drugs they were taking and 75% did not have adequate knowledge on the side effects of the drugs (Zhong et al., 2016).

According to Fredericksen et al., (2018), a study conducted in the United States of America which involved 57 participants with multiple chronic conditions from 6 primary care clinics revealed that 30% of patients could not mention at least one of the medications they were taking and 19% did not have any knowledge of the goal of their medications. This raised concerns, as it had been identified that hypertensive patients who were solely dependent on visual recognition of their medications were associated with inadequate adherence.

In Nigeria a study which involved 152 people living with diabetes revealed that only 31.5% of the participants knew the names of their drugs, 36.8% named some of their drugs, 69.1% knew the dosage of their drugs and 21.7% knew the side effects of the drugs (Jackson et al., 2015).

For each of the knowledge measures scored in the study conducted by Najjar et al., (2015), knowledge of correct technique for storage, dosage and identification of drugs was 92.24%, 90.71% and 80.55% respectively. Knowledge on procedure to follow for dosage omission and naming one side effect of their medication was also 42.24% and 16.87% respectively. The score on knowledge on correct technique for storage was the highest and that of naming one side effect was the lowest.

In the study conducted by Mpharm Romero-Sanchez et al., (2016) to determine medication knowledge among adult patients, only 12.6% had knowledge on contraindications and 15.3% had knowledge on side effects. Knowledge on the posology was 74.5% and that of indications was 7.05%.

2.3 Factors associated with medication literacy

Higher level of education, female gender, higher monthly income and increment in age are associated with medication knowledge. Females had more knowledge about medications than the males. Those aged between 35 and 44 years also had more knowledge than the other age groups. Participants with higher monthly income and level of education were more knowledgeable (Dawood et al., 2017).

In a study conducted in Saudi Arabia, medication knowledge was shown to correlate directly to the patients' level of education. Among the hundred patients approached to participate in the study, only 90 were willing to participate. Their educational level with regard to medication knowledge was associated significantly with four aspects of medication knowledge: medications' indications, dosage, side effects and medication recognition. Participants were divided into 3 groups: less than 40 years (22.2%), 40-59years (34.4%) and 60 years and above (43.3%). Their level of education was also divided into 3 categories: no education (65.6%), below high school (23.3%) and high school and above (11.1%). Patients who had no education revealed sufficient medication knowledge represented 35.8% compared to the more educated groups who represented 90% and 90.5% respectively. For knowledge on the indications of their medications, 47.5% of the patients with no education showed sufficient knowledge compared to 80% and 81% for the more educated groups respectively. However 56.9% of the group with no education had sufficient knowledge on medication dosages, compared to 76.2% and 80% of the other more educated groups respectively.

In the case of knowledge on side effects of their medications, 13.6% of the non-educated exhibited sufficient knowledge compared to 38.1% and 70% of the two other educated groups respectively. These results showed that the higher the patients' level of education, the better their knowledge about their medication.

Okuyan et al., (2013) conducted a study to determine the association between insufficient medication knowledge and patients' reports of medication adherence. Participants were 18 years old and above and had taken oral medications once daily, continuously for three months. Each patient's level of medication knowledge was assessed using an adapted questionnaire and their medication adherence was evaluated using the Morisky Medication Adherence Scale. Out of the 765 participants, 58% reported adherence to their medication and 64.5% asserted excellent knowledge of their medication. It concluded that an improvement in a patient's medication knowledge would positively influence their medication adherence.

Najjar et al., (2015) found a higher level of medication knowledge among participants who were males (70.5%), had a tertiary level of education (75.87%), were employed (73.57%) and those who received a high income (66.31%).

CHAPTER THREE

3.0 METHOD

3.1 Study Design

This was a quantitative study and a cross sectional method was employed to determine the levels of medication literacy and medication adherence.

3.2 Study Area

This study was undertaken at the Foundation of Orthopaedic and Complex Spine (FOCOS) Hospital which was established by Professor Oheneba Boachie-Adjei. It is a non-profit organization built in 2012 in the capital city of Accra, Ghana. It is an ultra-modern 70 bed specialty facility that delivers orthopaedic and medical care to adult and pediatric patients in this country and beyond.

FOCOS is located in Pantang West under the jurisdiction of the Ga East Municipal and is in the Abokobi-Madina constituency of Ghana. The FOCOS Hospital specializes in complex spine and joint replacement surgeries and fully certified to operate both out-patient and in-patient departments. The facility also provides laboratory, radiology, nutrition and dietetics and physiotherapy services. In addition to surgical services, the facility also provides medical services offered by an in-house family physician and his team. The OPD which was where this study took place is the first point of call for all patients who want to access the facility. It is opened from 8am to 8pm from Monday to Friday. Various doctors with different specialties offer their services at the OPD on their clinic days. Emergencies that are rushed to the facility are also catered for at the OPD in the Urgent Care unit.

3.3 Study Population

The study population consisted of adult patients who visited the Out-Patient Department. This included new patients who were visiting for the first time through referrals or walk-ins and old patients who were coming for review.

Inclusion Criteria:

All adult patients aged 18 and above who were currently taking medication or had taken medication in the last six months.

Exclusion Criteria

Adult patients aged 18 and above who were currently taking medication or had taken medication in the last six months but were unwilling to participate.

3.4 Sample Size Calculation

The sample size was calculated using the Yamane (1967) formula. From the OPD records an average of 300 adult patients visited the FOCOS Hospital on OPD basis each month. Three hundred adult patients (N) was therefore used to calculate for the sample size.

$$n = \frac{N}{1 + N(e)^2}$$

Where n = sample size

N = population size

e = margin of error

$$\frac{300}{1+300(0.05)^2} = 172$$

Adding 10% of this figure to make up for non-responses, the sample size obtained was 189 patients. However, 190 patients participated in the study.

3.5 Sampling Methods

Patients who came into the OPD for review or had first time appointments through referrals from another facility and walk ins were approached whiles they were waiting to have their vital signs checked by the OPD nurses or whiles waiting their turn to see the doctor. Consecutive sampling was used. All adult patients were asked if they were taking medications or had taken medication in the last 6months to confirm that they satisfied the inclusion criteria. Once confirmed and having obtained patients consent, they were interviewed.

3.6 Study Variables

The outcome variable in this study was medication literacy and the independent variables were level of medication literacy by dimensions and items and factors associated with medication literacy.

Level of medication literacy by dimensions and items: This consisted of dimensions chosen by patients' for each medication literacy item.

Factors associated with medication literacy: This included sociodemographic characteristics such as age, sex and the highest educational level. Other factors included disease condition for which the patient was taking or had taken medication and the duration they had taken the medication.

3.7 Data collection techniques and instruments

Structured questionnaires were used for data collection. The questionnaire consisted of both open and closed ended questions and was divided into three sections. The first part captured patients' background information which included sociodemographic factors as well as other factors that

may influence medication literacy levels. The second and third parts had questions that assessed patients' medication literacy and medication adherence respectively. The questions on medication literacy were obtained from a Delphi study conducted with experts about medication literacy (Pouliot, n.d.) and the Morisky Medication Adherence Scale was adapted for the questions on medication adherence but not in its entirety.

3.8 Quality control and Data processing

Appropriate measures were put in place to ensure that data collected was accurate. These included training of research assistants, pretesting the questionnaire and checking questionnaires at the end of each day for completeness. Research assistants were trained on the questionnaire and how to obtain consent from participants. All completed questionnaires were kept under lock and key to prevent access to unauthorized persons. Data collected was entered on a daily basis into Microsoft Excel (2013).

3.9 Data Analysis

Descriptive analysis was used to analyse categorical variables which were perceived as frequency with percentages whereas quantitative variables were expressed as mean with their SD. Bivariate analysis was used to determine the relationship between two variables. For analysis of associations with sociodemographic factors, chi squared test with Fisher's exact was employed. Association between medication literacy and medication adherence was assessed using the Fisher's exact test. Analysis was done using Stata 15.

3.9.1 Determining level of medication literacy and medication adherence

A five dimension Likert scale was used, in which patients either rated the statements that sought to assess their level of medication literacy and medication adherence under the following dimensions 1 'not at all' 2 'a little' 3 'moderate' 4 'much' and 5 'very much'. The medication literacy

and medication adherence scores were calculated by adding the dimension chosen by the patient for each statement and multiplying the number of statements. The statements for assessing medication literacy and medication adherence were 9 and 6 respectively. Hence, the lowest score for medication literacy was 9 and the highest was 45. For medication adherence the lowest score was 6 and the highest 30. The score was then classified into low, moderate and high level of medication literacy and medication adherence with their corresponding ranges using the tertile descriptive statistic as shown in tables 1 and 2.

Table 1: Overall level of medication literacy

Level	Range
Low	9-21
Medium	22-33
High	34-45

Table 2: Overall level of medication adherence

Level	Range
Low	6-14
Medium	15-22
High	23-30

3.9.2 Level of Medication Literacy by Dimensions and Items

Nine items were used to measure the overall level of medication literacy; name of medication, taking medication with or without food, treatment goal, when to take medication, side effects, what to do about side effects, drug-drug interactions, instructions for dose omission and medication storage. For each of these items, patients either chose one of these dimensions; 1 'not at all' 2 'a little' 3 'moderate' 4 'much' and 5 'very much'. The number of participants who chose any one of these dimensions for each item was used to assess the level of medication literacy by dimensions and items.

3.10 Ethical Considerations

Ethical approval was sought from the Ghana Health Service Ethical Review Committee. Approval was also sought from the management of FOCOS Orthopaedic Hospital. Participants in the study were informed of the background, purpose and nature of the research. They were not exposed to any risk or harm. The only inconvenience was the time they spent in filling the questionnaires. It was made known to them that even though they may not benefit directly from the study, the findings of the study would provide current information on medication literacy and that would help improve the health of the public. They were assured of strict confidentiality, anonymity and privacy. They were also informed that their participation was completely voluntary and they were free to withdraw their participation at any stage without giving any reason with no consequences on health care provision. A written consent form was sought from those who wanted to participate. Respondents were allowed to ask any questions they had about the study. Only the principal investigator had access to the filled questionnaires which were kept under lock and key. Participants in the study did not incur any costs. There was no conflict of interest.

This study was self-funded in partial fulfillment for a Masters of Public Health Degree from the University of Ghana.

CHAPTER FOUR

4.0 RESULTS

4.1 Background characteristics of respondents

A total of 190 participants were interviewed. These consisted of 78 males (41.1%) and 112 (58.9%) females (Table 3). The mean age for men was 44.0 with a SD of ± 2.0 and 45.4 with a SD of ± 1.67 for the women. The minimum and maximum ages recorded in this study was 18 and 80 years respectively. The ages of participants was divided into 3 groups; young adults (18-35years), middle aged adults (36-55years) and older adults (56 and above). The modal age group was the young adults representing 38.4% of the study population. The level of education of the participants were as follows; no formal education (5.8%), primary (5.3%), middle/JHS (16.3%), SHS/vocational (28.4%) and tertiary (44.2%). Majority of the participants were NHIS beneficiaries (70%). Participants who were employed represented 63.7%. From Table 3, 42.1% and 14.7% of the participants received an income of less than GHS 1000 and more than GHS 2000 respectively.

Table 3: Background characteristics

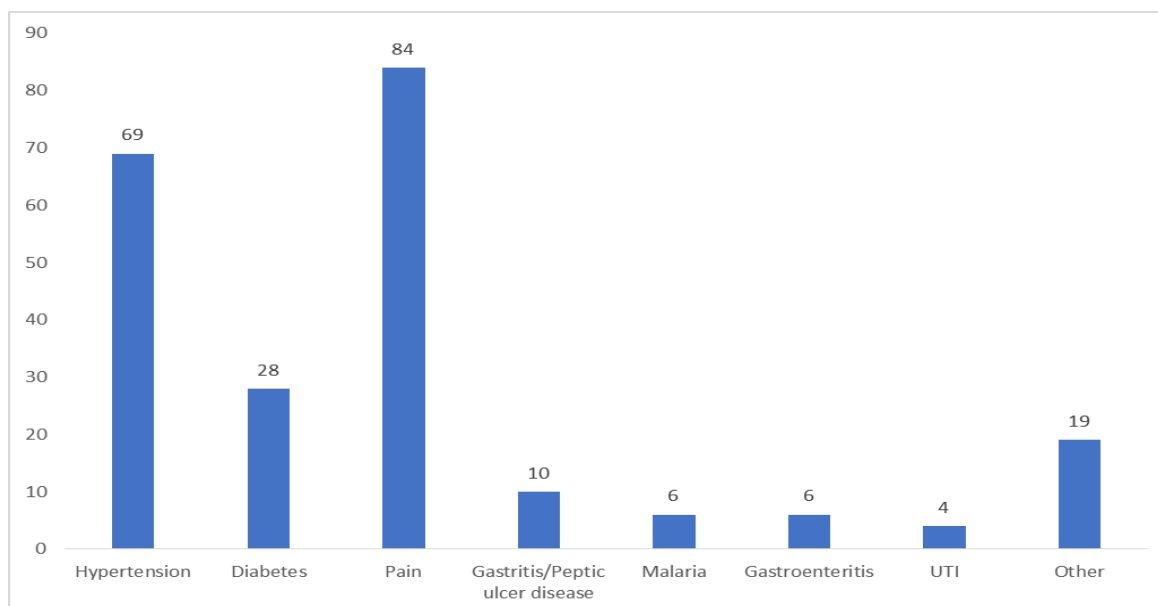
Variable	Number N=190	Percent
Sex		
Male	78	41.1
Female	112	58.9
Age		
18 to 35	73	38.4
36 to 55	61	32.1
Above 55	56	29.5
Education		
No formal education	11	5.8
Primary	10	5.3
Middle/JHS	31	16.3
SHS/Technical	54	28.4
Tertiary	84	44.2
NHIS		
Beneficiary	133	70.0
Non-Beneficiary	57	30.0
Income level		
< GHS 1000	80	42.1
GHS 1000-2000	82	43.2
Above GHS 2000	28	14.7
Employment		
Formally employed	59	31.1
Informally employed	62	32.6
Unemployed	24	12.6
Student	18	9.5
Retiree	27	14.2

4.2 Characteristics of medications of respondents

According to Table 4, thirty seven (19.47%) were taking only one medication whereas 80.5% were taking 2 or more. Of the participants 96 (50.5%) had taken medication for 6 months or less and 64(33.7%) had taken medication for more than 24 months. On the average participants were on 2.8 medications daily (± 1.5), ranging from 1 to 8 medications. These medications in general, had been taken for 174.1 (± 285.6) weeks and had cost an average of GHS235.8 (± 207.84).

Table 4: Characteristics of medications

Variable	Number (N=190)	Percent
Number of medication		
1	37	19.5
2 - 4	122	64.2
≥5	31	16.3
Duration of Medication Usage		
0.5 to 6 months	96	50.5
7 to 12 months	18	9.5
13 to 24 months	12	6.3
>24	64	33.7
Cost of Medications		
Less than 200 cedis	112	58.9
200-500 cedis	47	24.7
500 cedis and above	31	16.3

**Figure 2: Presenting disease conditions**

According to Figure 2, majority of the patients (84) were taking pain medications, 69 of them were taking medications for hypertension and 28 of them were taking medication for diabetes.

4.3 Overall Level of medication literacy

Thirty six of the participants (19%) had a low level of medication literacy whereas 105 (55%) and 49 (26%) had medium and high levels of medication literacy respectively.

□

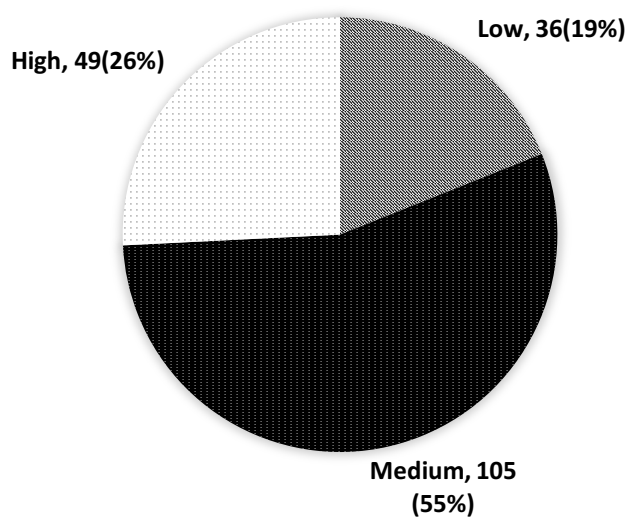


Figure 3: Proportions of levels of medication literacy

4.4 Overall Level of medication adherence

None of the participants had a low level of medication adherence, 169 (89%) and 21 (11%) had medium and high levels of medication adherence.

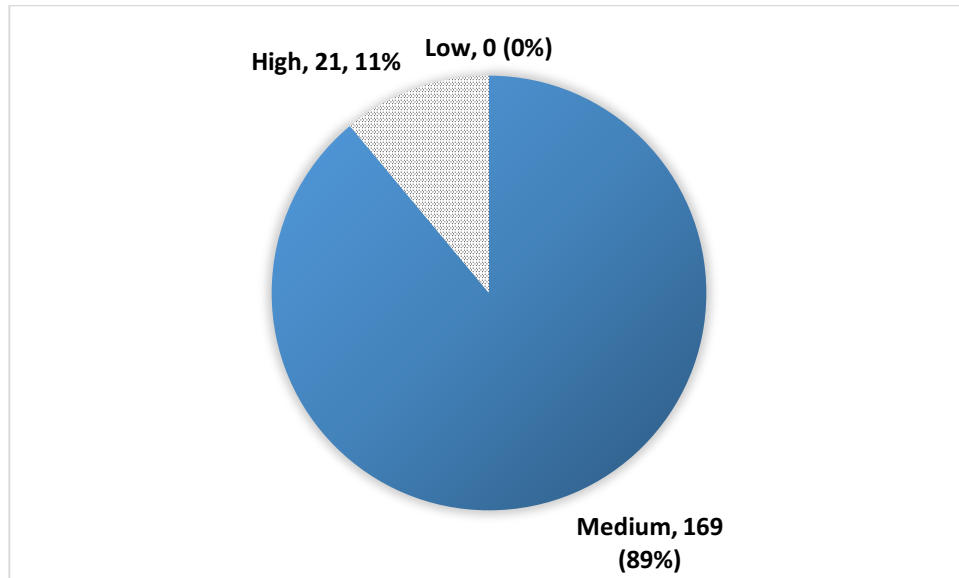


Figure 4: Proportions of levels of medication adherence

4.5 Level of Medication Literacy by Dimensions and Items

According to Table 5, a greater percentage of patients (44.7%) knew the names of the medications they were taking as well as when to take their medications (46.8%). Although 26.8% of the participants had a little knowledge on the side effects of their medications, a higher percentage however did not know what to do when they experienced side effects from their medications (41.1%) and the drugs or substances that interact with their medications (50.5%). When they missed a dose, 25.8% did not know the instructions to follow.

Table 5: Medication Literacy by Dimensions and Item

Medication Literacy Item	Dimensions				
	Not at all	A little	Moderate	Much	Very much
Names	22(11.6%)	21(11.1%)	25(13.2%)	37(19.5%)	85(44.7%)
Take with or without food	13(6.8%)	26(13.7%)	30(15.8)	45(23.7%)	76(40.0%)
Treatment goal	2(1.1%)	23(12.1%)	47(24.7%)	55(29.0%)	63(33.2%)
When to take medication	2(1.1%)	6(3.2%)	21(11.1%)	72(37.9%)	89(46.8%)
Side effects	41(21.6%)	51(26.8%)	46(24.2%)	29(15.3%)	23(12.1%)
What to do about side effects	78(41.1%)	38(20.0%)	31(16.3%)	25(13.2%)	18(9.5%)
Drug interactions	96(50.5%)	34(17.9%)	33(17.4%)	18(9.5%)	9(4.7%)
Instructions for dose omission	49(25.8%)	37(19.5%)	34(17.9%)	41(21.6%)	29(15.3%)
Medication storage	15(7.9%)	15(7.9%)	36(19.0%)	57(30.0%)	67(35.3%)

4.6 Association between sociodemographic status and medication literacy

The results from Table 6 showed a high level of medication literacy among female participants as compared to the male participants. Older adults (56 years and above) were also more knowledgeable as compared to the other age groups. Participants with a higher level of education had a high level of medication literacy as compared to those who had lower levels of education. Those who were employed and those who earned between GHS 1000 and 2000 also had a high level of medication literacy as compared to those who were unemployed or retired.

The study found significant associations between education ($p=0.001$), income levels ($p=0.00$), employment status ($p=0.00$) and medication literacy. There was no association between medication literacy and a participant's age and sex ($p>0.05$).

Table 6: Sociodemographic factors associated with medication literacy

Variable	Low Literacy N=36(%)	Medium Literacy N=105(%)	High Literacy N=49(%)	<i>P-value</i>	<i>Chi-Square</i>(χ^2)
Sex					
Male	11(5.8)	46(24.2)	21(11.1)	0.362	2.0349
Female	25(13.2)	59(31.1)	28(14.7)		
Age Group					
Young adults	9(4.7)	48(25.3)	16(8.42)	0.164	6.5157
Middle aged adults	13(6.8)	32(16.8)	16(8.42)		
Older adults	14(7.4)	25(13.2)	17(8.95)		
Education Level					
No Education	7(3.7)	3(1.6)	1(0.5)	0.001	61.8163
Primary	7(3.7)	3(1.6)	0(0.0)		
Middle/JHS/	8(4.2)	21(11.1)	2(1.1)		
SSS/Vocational	11(5.8)	34(17.9)	9(4.7)		
Tertiary	3(1.6)	44(23.2)	37(19.5)		
Income level					
< GHS 1000	27(14.2)	40(21.1)	13(6.8)	0.00	25.2659
GHS 1000-2000	8(4.2)	51(26.8)	23(12.1)		
Above GHS 2000	1(0.5)	14(7.4)	13(6.8)		
Employment Status					
Employed	19(10)	72(37.9)	30(15.8)	0.00	35.9497
Unemployed	13(6.8)	9(4.7)	2(1.1)		
Student	0(0.00)	13(6.8)	5(2.6)		
Retiree	4(2.11)	11(5.79)	12(6.32)		

4.7 Association between medication adherence and medication literacy

From Table 7, there was no association between medication adherence and medication literacy ($p=0.837$). A medium level of medication literacy was observed among those with a high level of medication adherence.

Table 7: Association between medication literacy and medication adherence

Variable	Low Level Medication Literacy N=36(%)	Medium Level Medication Literacy N=105(%)	High Level Medication Literacy N=49(%)	<i>P-value</i>
Level of adherence				
Medium	33(17.4)	93(48.9)	43(22.6)	0.904
High	3(1.6)	12(6.3)	6(3.2)	

4.8 Factors associated with medication literacy

As shown in Table 8, those with primary, JHS, SHS and tertiary levels of education had less odds of having unsatisfactory level of medication literacy as compared to those without any formal education. However the odds of having unsatisfactory level of medication literacy if a participant had some primary education was 8 times higher as compared to those who had no formal education, (OR: 8.00, 95%CI: (0.80-81.02), P: 0.078). The odds of having unsatisfactory level of medication literacy was also less among those who earned GHS 1000-2000 (OR: 0.28, 95%CI: (0.09-0.82), P: 0.020) and above GHS 2000 as compared to those who earned less than GHS 1000(OR: 0.10, 95%CI: (0.01-1.08), P: 0.057) .There was less odds of having unsatisfactory level of medication literacy if one was formally employed as compared to the other categories under employment status, (OR: 0.47, 95%CI: (0.12-1.90), P: 0.108).

Table 8: Factors associated with level of medication literacy

Dependent variable: Level of medication literacy (0”satisfactory” 1”unsatisfactory”)

	OR	P	95% CI
Education			
No formal education		Ref	
Primary	8.00	0.078	(0.80 - 81.02)
Middle/JHS	0.51	0.420	(0.10 - 2.61)
SHS/Technical	0.40	0.253	(0.08 – 1.92)
Tertiary	0.06	0.007	(0.01 - 0.47)
Income			
< GHS 1000		Ref	
GHS 1000-2000	0.28	0.020	(0.09 - 0.82)
Above GHS 2000	0.10	0.057	(0.01 – 1.08)
Employment			
Formally employed		Ref	
Informally employed	0.47	0.108	(0.12 – 1.90)
Unemployed	1.32	0.788	(0.27 – 6.39)
Student	1	-	-
Retiree	0.95	0.95	(0.19 – 4.64)

CHAPTER FIVE

5.0 DISCUSSION

The objectives of this study were to determine the level of medication literacy, the pattern of medication literacy and the factors associated with medication literacy among patients at the FOCOS Orthopaedic Hospital.

The study showed that 19% of the patients had a low level of medication literacy whereas 55% and 26% had medium and high levels of medication literacy respectively. Those who had a little knowledge on the side effects of their medications represented 26.8%, a higher percentage however did not know what to do when they experienced side effects from their medications (41.1%) and the drugs or substances that interact with their medications (50.5%). When they missed a dose, 25.8% did not know the instructions to follow. The study also found that medication literacy was associated with education, income levels and employment status.

5.1 Background characteristics

The study consisted of 78 males (41.1%) and 112 (58.9%) females. The young adults represented 38.4% of the study population. Thirty seven (19.47%) were taking only one medication whereas 80.5% were taking 2 or more. Some level of education had been received by participants (94.21%) with the majority receiving tertiary education (44.2%). Of the participants 96 (50.5%) had taken medication for 6 months or less and 33.7% had taken medication for more than 24 months. On the average participants were on 2.8 medications daily (± 1.5), ranging from 1 to 8 medications. These medications in general, had been taken for 174.1 weeks and cost an average of GHS235.8. Majority of the participants in this study in (84) were taking pain medications.

5.2 Overall level of medication literacy

In this study, 19% of the participants had a low level whereas 55% had a medium (adequate) level and 26% had a high level of medication literacy. In a study conducted by Mpharm Romero-Sanchez et al., (2016) however, 65.7% had no medication knowledge, 28% had adequate knowledge and 6.2% had insufficient knowledge. Those who had no medication knowledge (65.7%) and insufficient knowledge (6.2%) represent a low level of medication literacy (70.9%). More than half of the participants therefore had a low level of medication literacy which is 51.9% more than those who had a low level of medication literacy in this study. In another study by Awwad et al., (2015). Sixty two point three percent (62.3 %) patients had a high medication knowledge score represented of the population while 37.7% had a low medication knowledge score. There was therefore a low prevalence of low medication literacy in this study as compared to both studies, which could have been because majority of the participants in this study did not have a high level (tertiary) of education.

5.3 Level of Medication Literacy by Dimensions and Items

By assessing each medication literacy statement in this study, it was revealed that only 11.6% knew the names of their medications and 1.1% did not know when to take their medications. A similar study however reported more than 20% did not know when to take their drugs and more than 30% did not know the name of their medications (Zhong et al., 2016). With regards to knowledge on the side effects of their medications, 21.6% of the participants had no knowledge. This was also considerably low in other studies conducted by Jackson et al., (2015) and Mpharm Romero-Sanchez et al., (2016) where 21.7% and 15.3% respectively knew the side effects of their medications. (41.1%) and the drugs or substances that interact with their medications (50.5%). When they missed a dose, 25.8% did not know the instructions to follow as compared to the

42.24% of the participants who did not know what to do when they missed a dose according to a study by Najjar et al., (2015). This study also revealed that 41.1% did not know what to do when they experienced side effects from a medication.

These results are similar to other studies that have been conducted.

5.4 Factors associated with medication literacy

A high level of medication literacy was found among female participants, older adults, participants who had a high level of education and earned a high (GHS 1000-2000) income in this study. These associations might be due to the fact that females are more concerned about what they ingest as compared to males and also older adults might be more interested in the knowledge of their medications as compared to young and middle aged adults. Najjar et al., (2015) similarly found a higher level of medication knowledge among participants who had a tertiary level of education (75.87%), were employed (73.57%) and those who received a high income (66.31%). However the males in the study had a lower level of medication knowledge as compared to the females. However, no significant differences were recorded for the other participant characteristics.

Results from a similar study was consistent with this study. Higher level of education, female gender, higher monthly income and increment in age were associated with medication knowledge. Females in this study had more knowledge about medications than the males. Those aged between 35 and 44 years also had more knowledge than the other age groups. Participants with higher monthly income and level of education were more knowledgeable. (Dawood et al., 2017)

In this study, there was no association between medication adherence and medication literacy unlike in a study by Okuyan et al., (2013) in which 58% reported adherence to their medication regimen and 64.5% professed optimal knowledge of their medication. It concluded that an

improvement in a patient's medication knowledge would positively influence their medication adherence.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study has shown that almost 1/5th of the patients attending FOCOS Orthopaedic Hospital had a low level of medication literacy. A higher percentage of patients did not know the side effects of their medications, what to do when those side effects occurred and the drug –drug interaction. Education, income level and employment status significantly influenced medication literacy.

6.2 Recommendations

The following recommendations are made from this study:

1. Implementation of educational strategies on medication use in all health facilities by the Ministry of Health.
2. Prescribers and pharmacists should communicate to patients the side effects of medications and what actions to take when they occur since most of them do not read the leaflets in the package.
3. Further studies should be conducted using qualitative methods to find out from patients the necessary steps to put in place to improve medication literacy.

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APPENDICES

Appendix 1: Participants' Information Sheet and Consent Form

Project Title: Medication Literacy among Patients Attending FOCOS Orthopaedic Hospital, Pantang, Ghana

Introduction: I am **ABA SAM ESSEL**, a student of the Department of Epidemiology and Disease Control in the School of Public Health, University of Ghana, Legon pursuing a Master of Public Health Degree Programme. My number is 0502066792 and my email address is sabessel12@gmail.com.

Background and Purpose of research: Medication literacy is the degree to which individuals can obtain, understand, communicate, process information about their medication to make informed medication and health related decisions in order to safely and effectively use their medications. Over the years, I have noticed that most patients have challenges with disclosing information about the medication(s) they take. Presently there is very little research on medication literacy and its importance in this country.

Nature of research

This study seeks to assess medication literacy levels among patients here in FOCOS Orthopaedic Hospital. The study is a cross sectional design and will take into consideration only adults aged thirty (30) years and above. A total of a hundred and eighty nine participants will be needed for the study.

Participants' Involvement: Your participation would be appreciated to achieve the objectives of this study. You would be asked questions on your sociodemographic factors as well as your knowledge on the medications you take and other information relevant to the study. Please answer

questions carefully and sincerely to the best of your knowledge. Filling the questionnaire will take about 10 to 15 minutes.

Potential Risks

The potential risk associated with this study is the loss of time in filling out questionnaires.

Benefits

The findings of the study will provide current information on medication literacy and this will help improve the health of the public.

Costs: Participating in this study will not incur any costs.

Compensation: There will be no monetary or material compensation for the study.

Confidentiality

All information given will be kept confidential and used for the research purpose only.

All responses obtained would be kept confidential. Forms for each participant would be kept under lock and key. The electronic data would be locked with a password which would be known to the principal investigator to prevent access to unauthorized people.

Voluntary Participation or Withdrawal

Participation in this survey is completely voluntary and you are free to withdraw your participation at any stage of this study without giving any reason. There would be no consequences on health care provision.

Outcome and Feedback

Findings and recommendations would be available at the School of Public Health.

Funding Information

This study is self-funded.

Sharing of participants information/Data

Names are not required for this study. Participants' data and information is solely for the principal investigator and will be kept under lock and key.

Provision of Information and Consents for Participants

A copy of the information sheet and consent form will be given to you after it has been signed or thumb-printed to keep.

Thank you

For further clarification about participating in this study, please do not hesitate to contact:

RESEARCHER'S CONTACT

Aba Sam Essel

Department of Epidemiology and Disease Control

School of Public Health

University of Ghana, Legon

Email: sabessel12@gmail.com

Telephone: 0502066792

For further clarification about ethical issues and rights as a participant of this study, please contact

ETHICAL REVIEW ADMINISTRATOR

Mrs. Hannah Frimpong

Ethical Review Committee Secretariat

Ghana Health Service

Adabraka.

Telephone: 0507041223

CONSENT FORM

PARTICIPANT'S STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and satisfactorily explained in a language I understand (*English/Twi/Ga*). I fully understand the contents and any potential implications as well as my right to change to my mind (i.e. withdraw from the research) even after I have signed this form. I have been given a chance to ask questions concerning this study and questions have also been answered to my satisfaction.

I voluntarily agree to be part of this research.

Initials of Participant ID Code

Participant's Signature.....OR Thumbprint.....OR Mark..... (Please specify)

Date:

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the above named participant to the best of my ability in the (*English /Twi /Ga*) language to his/her understanding.

All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter.....

Signature of Interpreter..... Date

Appendix 2: Questionnaire

UNIVERSITY OF GHANA
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

This questionnaire is developed to assess the level of medication literacy among patients attending the Out Patient Department of FOCOS Orthopaedic Hospital.

FORM NUMBER									
DATE OF INTERVIEW									
CODE OF INTERVIEWER									
SECTION A: BACKGROUND INFORMATION									
									Code
1	What is your sex 1. Male 2. Female							sex	
2	What is your age in years (i.e. age at last birthday)?							age	
3	What is the highest level of school you attended? 1. No education 2. Primary 3. Middle/JSS/JHS 4. SSS/SHS/Secondary/Vocational/Technical 5. Tertiary							educ	
4	What is the level of your income? 1. 500 and below 2. 1000 – 2000 3. 2000 and above							levinc	
	What is your employment status? 1. Formally employed 2. Informally employed								

5	3. Unemployed 4. Student/Apprentice 5. Retiree		empstat
6	Are you an NHIS beneficiary? 1. Yes 2. No		nhisben
7	Have you taken any medication in the last 6 months or currently taking any?		med6orcurr
8	What condition are you being managed for? 1. Hypertension 2. Diabetes 3. Pain 4. Other		cond
9	How many medications are you on?		meds
10	For how long have you been on your medication?		durmed
11	How much does it cost you to get your medication per month? 1. Less than 200 cedis 2. 200-500 cedis 3. 500 cedis and above		cosmed

SECTION B : MEDICATION LITERACY			
<i>Please, rate the following statements concerning MEDICATION LITERACY from “not at all” to ‘very much” depending on how it applies to you.</i>			
12	I know the names of all the medications that I take 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		nomed
13	I know whether or not my medications should be taken with food 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		medfood

14	I know the treatment outcome or goal for all the medications that I take 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		trtgoal
15	I know when to take my medication 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		tomed
16	I know the possible side-effects of all my medications 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		semed
17	I know what to do when I get those side effects from my medications 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		dosemed
18	I know the drugs and substances that interact with the medications that I take. 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		dsinmed
19	I know the instructions to follow when I miss a dose 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		inmdose
20	I know how my medications should be stored 1. Not at all 2. A little 3. Moderate 4. Much 5. Very much		stomed

SECTION C : MEDICATION ADHERENCE			
Please, rate the following statements concerning MEDICATION ADHERENCE from “never” to ‘always’ depending on how it applies to you.			
21	I forget to take my medication 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		fomed
22	I take my medication at the right time 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		rtmed
23	I take my medication in the prescribed dose 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		prmed
24	I stop taking my medication when the symptoms seem to have resolved 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		smed
25	I take some unprescribed alternative herbal medications in addition to my medication 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		hma
26	I return to my doctor for review of my medication at the scheduled time 1. Never 2. Rarely 3. Sometimes 4. Often 5. Always		remed