UNIVERSITY OF GHANA

THE LANGUAGE SKILLS AND COMMUNICATION STRATEGIES USED BY CHILDREN (5-11 YEARS) WITH A MODERATE TO PROFOUND SENSORINEURAL HEARING LOSS, IN ACCRA, GHANA.

ADELAIDE EMMA GYAMERA

(10303771)

A RESEARCH DISSERTATION SUBMITTED TO THE

SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES, COLLEGE OF HEALTH SCIENCES,

UNIVERSITY OF GHANA

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE MASTER OF SCIENCE IN SPEECH AND LANGUAGE THERAPY

JULY 2018

DECLARATION

I **ADELAIDE EMMA GYAMERA** do hereby declare that this dissertation which is being submitted in fulfilment of the requirements for the Master of Science degree in Speech and Language Therapy is the result of my own research performed under supervision, and that except where otherwise other sources are acknowledged and duly referenced, this work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

I hereby give permission for the Department of Audiology, Speech and Language Therapy to seek dissemination/publication of the dissertation in any appropriate format. Authorship in such circumstances to be jointly held between me as the first author and the research supervisors as subsequent authors.

Signed ……..... Date……

(ADELAIDE EMMA GYAMERA (10303771)

Signed …… Date……

NANA AKUA VICTORIA OWUSU

(Primary Supervisor)

Signed ……..……. Date……..

Dr. NEAL BOAFO

(Secondary Supervisor)

Signed …… Date……

(Head of Department)

DEDICATION

This work is dedicated to God Almighty; Your love in time past, forbids me to think you will leave me at last in trouble to sink. And to my dear mother Theresa and husband Y.K., here is to you! You both are the wind beneath my sails. Aunty Ewurakua, we made it! This too shall pass.

ACKNOWLEDGEMENT

Firstly, I would like to acknowledge the almighty God for his immense grace towards this project. Secondly to my supervisors, Nana Akua Victoria Owusu and Dr Neal Boafo for their incalculable intellectual contributions and patience throughout the thesis process. I would also like to thank Dr. Anim Sampong, Ms. Karen Wylie, Dr. Munyane Mophosho, Ms. Josephine O. Bampoe and Mr. Clement Amponsah for all their immense contributions towards this research and academic journey.

Thank you, Mandy Budge, for believing in me. To the Audiology Department of Korle Bu Teaching Hospital, especially Jemima Fynn and Gertrude, thank you for everything. To Roger Akuffo and Madam Rita of Hearing Aids Supply and Services (HASS), Perfect and Becky of Speech and Hearing Centre (SHC) and Farouk of Multikids Inclusive Academy

A special thanks to all the parents who availed themselves and their children as willing participants for this study.

And finally, to my family and friends, your care, encouragement and support physically and financially has been really appreciated. To my husband, YK, thanks for always believing in me and being the best research buddy ever.

TABLE OF CONTENTS

DECLARATION i
DEDICATION ii
ACKNOWLEDGEMENT iii
TABLE OF CONTENTS iv
LIST OF TABLES viii
LIST OF FIGURES ix
LIST OF ABBREVIATION x
ABSTRACT xi
CHAPTER ONE 1
INTRODUCTION 1
1.1 BACKGROUND 1
1.2 PROBLEM STATEMENT 2
1.3 SIGNIFICANCE OF THE STUDY 3
1.4 AIM 4
1.5 OBJECTIVES 4
CHAPTER TWO 6
LITERATURE REVIEW 6
2.1 INTRODUCTION 6
2.2 COMMUNICATION 6
2.2.1 Language and Speech 6
2.2.2 Communication Development Milestones 9
2.3 HEARING 10
2.3.1 Anatomy of the Ear 11
2.3.3 Hearing Loss / Impairment 12
2.3.4 Impact of Hearing Loss on Children's Language Development 13
2.3.5 Impact of Hearing Loss on Children's Social Interaction 15
2.3.6 Impact of Hearing Loss on Children's Cognitive Development 17
2.3.7 Impact of Hearing Loss on Children's Learning 18
2.4 AURAL AND ORAL REHABILITATION APPROACHES AND OPTIONS 18
2.5 REVIEW OF RELATED STUDIES 23
CHAPTER THREE 27

METHODOLOGY 27
3.1 INTRODUCTION 27
3.2 STUDY DESIGN 27
3.3 STUDY SITES 28
3.4 TARGET POPULATION 29
3.4.1 Inclusion criteria 29
3.4.2 Exclusion criteria 30
3.5 SAMPLING TECHNIQUE AND SAMPLE SIZE 30
3.6 PROCEDURE FOR DATA COLLECTION 31
3.7 MATERIALS OR INSTRUMENTS FOR DATA COLLECTION ....**Error! Bookmark not defined.**
Audio and video recorder of a Tecno mobile phone housing a 32g memory card was used to collect audio and visual data. 34
3.8 DATA ANALYSIS 34
3.8.1 Analysis of Questionnaires 34
3.8.2 Analysis of video of parent child Jenga game. 34
3.9 DATA MANAGEMENT PLAN AND ETHICAL CONSIDERATIONS ..... **Error! Bookmark not defined.**
3.9.3 Trustworthiness 36
CHAPTER FOUR 40
DATA ANALYSIS AND PRESENTATION 40
4.1 INTRODUCTION 40
4.2 PARTICIPANT A 41
4.2.1 Communication Strategies Used for Expression 41
4.2.2 Strategies Required to Aid Understanding of Information 41
4.2.3 Clarity of Spoken Language 41
4.2.4 Observation Notes of Researcher 42
4.2.5 Language Analysis 42
4.2.6 Summary 43
4.3 PARTICIPANT B 44
4.3.1 Communication Strategies Used for Expression 44
4.3.2 Strategies Required to Aid Understanding of Information 44
4.3.3 Clarity of Spoken Language 44
4.3.4 Observation Notes of Researcher 45
4.3.5 Language Analysis 45

4.3.6 Summary 45
4.4 PARTICIPANT C 46
4.4.1 Communication Strategies Used for Expression 46
4.4.2 Strategies Required to Aid Understanding of Information 46
4.4.3 Clarity of Spoken Language 47
4.4.4 Language Analysis 47
4.4.5 Observation Notes of Researcher 48
4.4.6 Summary 48
4.5 PARTICIPANT D 49
4.5.1 Communication Strategies Used for Expression 49
4.5.2 Strategies Required to Aid Understanding of Information 49
4.5.3 Clarity of Spoken Language 49
4.5.4 Language Analysis 50
4.5.5 Observation Notes of Researcher 50
4.5.6 Summary 51
4.6 PARTICIPANT E 51
4.6.1 Communication Strategies Used for Expression 51
4.6.2 Strategies Required to Aid Understanding of Information 51
4.6.3 Clarity of Spoken Language 52
4.6.4 Language Analysis 52
4.6.5 Observation Notes of Researcher 52
4.6.6 Summary 53
4.7 PARTICIPANT F 54
4.7.1 Communication Strategies Used for Expression 54
4.7.2 Strategies Required to Aid Understanding of Information 54
4.7.3 Clarity of Spoken Language 54
4.7.4 Language Analysis 55
4.7.5 Observation Notes of Researcher 55
4.7.6 Summary 56
4.8 COMPARATIVE ANALYSIS 56
4.8.1 Language levels across participants 57
4.8.2 Gesture use and Intelligibility across participants 57
4.8.3 Parental Impressions of Hearing Amplification and Communication Rehabilitation 58
CHAPTER FIVE 59

DISCUSSION 59
5.1 INTRODUCTION 59
5.2 MEAN LENGTH OF UTTERANCE AND QUALITY OF LANGUAGE OF THE CHILDREN 59
5.3 WHAT COMPENSATION STRATEGIES DO CHILDREN WITH HEARING IMPAIRMENT USING HEARING AIDS NEED TO SUPPORT THEIR UNDERSTANDING OF INFORMATION. 61
CHAPTER SIX 65
CONCLUSIONS AND RECOMMENDATIONS 65
6.1 INTRODUCTION 65
6.2 CONCLUSIONS 65
6.3 LIMITATIONS OF THE STUDY ..... **Error! Bookmark not defined.**
6.4 RECOMMENDATIONS 65
REFERENCES 67
APPENDICES 75
APPENDIX A 75
INFORMED CONSENT FORM 75
APPENDIX B 77
QUESTIONNAIRE 77

LIST OF TABLES

Table 2.1: Degree of hearing loss 13

Table 2.2: Biographical data of participants 40

LIST OF FIGURES

Fig 2.1: Communication Development Milestones Source: Chatterjee, 2011 10

Figure 2.2: The Human Ear 12

Figure 2.3: Pitch (Cycles Per Second) 16

Figure 2.4: Styles of Hearing Aids. 20

Figure 3.1: Brown's stages of morphological and syntactic development. Source: Bowen (1998). 36

LIST OF ABBREVIATION

ASHA:	American Speech-Language-Hearing Association
AVT	Auditory Verbal Therapy/Therapist
CDC	Centres for Disease Control and Prevention
CELF	Clinical Evaluation of Language Fundamentals
dB	decibel
GSS	Ghana Statistical Service
HI	Hearing Impairment
HL	Hearing Loss
MLU	Mean Length of Utterance
MLUm	Mean Length of Utterance morphemes
NIH	National Institute Health
NIDCD	National Institute on Deafness and other Communication Disorders
PPVT	Peabody Picture Vocabulary Test
SLT	Speech and Language Therapy/Therapist
WHO	World Health Organization
ENG	English

ABSTRACT

Background: Children with Hearing Loss are susceptible to language, social and literacy difficulties. Diagnosis time and (Re)habilitation methods available in developed countries are not same in sub Saharan Africa and Ghana to be precise. Data and studies on language development and hearing impairment and rehabilitation resources are very limited.

Aim: This study aimed to explore the language levels and communication strategies of children with hearing impairment who use hearing aids and some amount of speech therapy.

Methods: A population of 6 children with hearing impairment using hearing aids and one parent each were sampled. Photo elicitation task, Jenga game and questionnaires were used to collect language sample, use and need for gestures, and parents' impressions respectively. Language samples were analysed for Browns stages, social pragmatic skills and Mean Length of Utterances. Parent child games were scored for amount of gestures and strategies used and needed by child. Content analysis was used to analyse the parent's responses.

Results: A significant delay across a spectrum in the language skills of all participants. Strategies to understand information were varied and they required minimum to moderate. Mean Length of Utterance results were inconsistent due to unintelligible speech and insufficient utterances. Use of gestures was normal and there was no relationship between degree of HL and children's deficits.

Conclusions: Late diagnosis and rehabilitation in Ghana leaves a gap in children's language and education that will not likely be bridged throughout their lives. First language and cultural influences may be responsible as well. Neonatal screening recommended.

Keywords: hearing loss, language, communication, speech, delay.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Hearing Impairment (HI), sometimes referred to as Hearing Loss (HL) is one of the most common disabilities, across the globe (WHO et al., 2007). The World Health Organization (WHO) has described HL as an inability to hear at thresholds of twenty-five decibels (25dB) or less; and has estimated that about four hundred and sixty-six million (466 million), that is, about 5% of the world's population have a hearing loss. Thirty-four (34) million of these estimated figures are children (WHO 2018). These numbers are highest in south Asia, Asia pacific and sub Saharan Africa. Estimates by the WHO in 2018, suggest that the number of people with hearing loss will increase to over nine hundred million by the year 2050.

Untreated HL results in global financial costs that are estimated to be around seven hundred and fifty billion international dollars. (WHO 2018). In both adults and children, some of the outcomes of hearing impairment include a reduced ability in communication skills, difficulties in socialization, economic and social disadvantages and stigmatization (Mathers et al, 2000).

Sub-Saharan Africa has an estimated 6.8 million children and thirty (30) million adults with hearing impairment. "Seely et al (1995) reported a 9.1% prevalence of HL among children in Sierra Leone, presenting with mild or greater HL. The prevalence was 9% in the five to fifteen (5-15) years age group, while 4.1% prevalence was being reported in Swaziland for children of the same age group (Olusanya and Newton, 2007; Swanepoel et al., 2009). In Kenya, Gambia and Tanzania, about 2.5 to 3.5/1000 children suffer from severe to profound HL. In South Africa, infant HL is the commonest congenital sensory birth defect with a prevalence of four to six infants per thousand live births, while about 7.5% of school children suffer from

varying degrees of HL" (Acquah, 2015 p. 4). All these results are consistent with findings from Mulwafu et al, (2016) and Stevens et al (2011) that prevalence rates are higher in Sub-Saharan Africa as compared to developed countries.

In Ghana, studies conducted on hearing impairment are limited. The 2012 population census report revealed that, of the seven hundred and thirty-seven thousand, seven hundred and forty-three (737, 743) persons of the population living with disability, 0.4%, constituting one hundred and ten thousand, six hundred and twenty-five (110,625) of them had a hearing impairment (Ghana Statistical Service 2012). Amedofu et al (1997), have also studied the causes and prevalence of hearing impairment in school-going children and preschool children. They discovered that congenital sensorineural hearing loss had the highest incidence rates, thereby calling for primary preventive measures.

Acquah (2015 p 6), discovered that "in Ghana, data available at the tertiary teaching hospital (Korle Bu Teaching Hospital) suggests a steady increase in paediatric cases of HL. In 2010, a total number of one thousand, one hundred and five (1,105) children reported to the Hearing Assessment Centre for audiometric assessment. In 2011, this number increased by 51.95% resulting in a total of one thousand, six hundred and seventy-nine (1, 679) cases. The Centre again recorded a total of 1,907 (72.58%) and 2,028 cases (83.53%) in 2012 and 2013 respectively. The records available at the Centre showed that most of these cases were presented late and parents had no information on the condition and its causes"

1.2 PROBLEM STATEMENT

In their study on the causes and prevalence of HI in school-going children and preschool children, Amedofu et al, (1997) have suggested primary preventive measures be put in place. Anecdotal evidence from various audiologists in Accra suggested that, in the absence of new-

born hearing screening, hearing impairments are detected quite late, hence late aural habilitation options for these children. Some also were reported to not be in a capacity to afford the cost of habilitation. The need to investigate and proceed with a study of this nature is of essence to provide initial data in aid of the country's consideration towards supporting people with communication difficulties and hearing impairment.

After an extensive review of literature on the subject, it has been identified that there are scarce studies that outline the language, social, cognitive and developmental impacts that hearing impairment has on children in Ghana, a country that has most of its citizens being at least bilingual. Bilingualism is a common phenomenon in Ghana because, English is the official language and is used and taught in schools and so most Ghanaian children have a local dialect as their first language. This study explored whether children with hearing impairment using hearing aids have adequate language skills for their age and whether they relied on any particular strategies to help them communicate.

1.3 SIGNIFICANCE OF THE STUDY

The study is important because it provides preliminary information on the effects of HI on language in Ghanaian children with hearing aids, as well as help provide evidence to plan health promotion and public health intervention campaigns. It will help raise awareness on alternative means of communication for people in Ghana. Sustainable Development Goals 3 (good health and well-being), 4 (quality education) and 10 (reduced inequalities) are all some of the improvements that rehabilitation for hearing loss targets. Research in this area provides information that helps to pursue the agenda of the above listed SDGs and respond to the call of action for a better future for all. The outcome of this study will also add to the scarce body

of knowledge relating to issues on language development and HI in Ghana, West Africa and in Sub-Saharan Africa.

1.4 AIM

This study aimed to explore the language levels and communication strategies of children with hearing impairment who use hearing aids.

1.5 OBJECTIVES

The following specific objectives were used to achieve the aims of this study:

1. To explore the Mean Length of Utterance (MLU) and quality of language sample elicited from the children with HL using hearing aids.
2. To explore any compensation strategies used and required by children with HL using hearing aids to support their understanding of information.
3. To explore if and how often, children with HI using hearing aids rely on gestures to express themselves.

1.6 RESEARCH QUESTIONS

What are the language levels and communication strategies of children with hearing loss who use hearing aids and are exposed to some amount of therapy?

- What is the quality of language and MLU of children with hearing loss, who use hearing aids?
- What compensation strategies do children with hearing impairment using hearing aids need to support their understanding of information?

- How frequently do children with hearing loss who use hearing aids use gestures in expressing themselves.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explores and reviews relevant literature on hearing impairment (HI), rehabilitation and development of speech and language in children.

2.2 COMMUNICATION

Communication is the very essence of life. It is the conduit that connects organisms to one another. Meyer, (as cited in Hans and Hans, 2014, p.2), quoted communication as "the intercourse by words, letters and messages". It is the train that keeps the world habitable by facilitating the sharing of ideas, thoughts, feelings and many others. (Ojomo, 2004). The concept of communication can be defined as a process of carrying information that has intended meaning from an individual, entity or group to another, mostly done using semiotic rules and signs that are mutually understood (Harper, 2013). Communication is the mother umbrella under which all forms of interaction between organisms occur. Communication can be used in various aspects of life; education, professions, relationships, business and trading, service provision and many other aspects. Without which unimaginable chaos occurs and exists.

2.2.1 Language and Speech

For communication to be accomplished, a tool known as language is utilized. Language is the vehicle that keeps the art and process of communication going. Owens (2016), defined language as "a socially shared code or conventional system for representing concepts through the use of arbitrary symbols and rule-governed combinations of those symbols". This means

that language involves speaking, writing and gestures constructed in a systematic way, which is accepted and understood by all users. Language is made up of two main modes, verbal and non-verbal. All forms of language fall under these two main categories. All means of expression that involves any or all the different tools, except the oral use of words will be termed as non-verbal language. This includes, body language, tone, pitch, signs, gestures, among others.

Various theories have tried to examine the concept of speech and language acquisition with many of the theorists proposing diverse views as to how children learn to talk or speak a particular language.

One of such theories is that of Noam Chomsky, which emphasizes the importance of biological component of language and speech acquisition (Sparrow, 2005). The theory falls under the Nativist Linguistic Theories. The main assumption behind the theory is that language is attributed to evolution and the creation of various neural networks that are available to the child at birth (Graven & Hagler, 2007). The theory posits that the brain has a component that assists in language acquisition called the Language Acquisition Device (LAD); and according to Chomsky, this device has pre-installed a universal grammar database that assist them when they are acquiring language (Olusanya, Neuwmann & Sanders, 2014). This database allows the child to be able to pick up any language that they are exposed to and this can be done easily.

According to WHO (2008), the theory posits that the LAD is active within a specified period of time and allows the child to learn language within this period of time. As maintained by Sparrow (2005), this has led to the development of the concept of 'Critical Period'. Olusanya et al. (2014), opined that evidence of this has been seen in consistent research, with all the results showing that children have the most capacity and cognitive resources that support

language acquisition easily and quickly, as compared to later years of their lives. This has been observed across different cultures. In addition, research has shown that children who are deaf and not exposed to any language within the critical period create their own language, using the universal grammar framework (Elzouki, 2012). This explains the concept that when a child is deaf or is partially deaf within the 'Critical Period', he or she will have issues acquiring a language or being able to speak, though the child acquires his or her own language, it will not be possible for him or her to use this language in communicating effectively.

Contrarily, some researchers and psychologists have argued that language is not a biological construct and is environmental or contextual in nature (Thompson-Schill, Ramscar & Chrysikou, 2009). These researchers argue that a child's ability to learn a language lies within the environment in which they exist, and not based on a biological innate quality. In reacting to that, Elzouki (2012) stated that the environment plays a role but not a major contributing factor for language acquisition, but rather the biological components are what matter. Also, the theory shows that the environment supports the child's development of language but there is no need for any formal tuition to be given (Hauser, Chomsky & Fitch, 2002).

In light of this nature-nurture debate and the premise that speech is unique to only humans (Scott-Philips & Blythe, 2013; Wardhaugh, 1993), opposing responses suggest that parrots, apes and even dolphins can use some amount of verbal language when taught (Goldman, 2012). Being able to speak by being taught does not necessarily make animals capable of speech, because studies on feral children have shown that despite being with animals for so long, these children had no form of speech and only used sounds and animal communication (Essays UK, 2013). It could be argued that it is because the animals and feral children were not exposed to speech. If being exposed to speech was a criterion for animals to speak, then household pets like cats, dogs and rabbits should be capable of speaking. The discussion then currently stands that language exists among all organisms, but even though some animals can

be taught to speak in a functional way, what makes human verbal language unique is the infinite abilities it presents for its use. (Goldman, 2012).

2.2.2 Communication Development Milestones

According to Olusanya et al. (2014), there exists various milestones that are major determinants of language development. "As indicated in the theory by Penfield and Wilder (1959), and advanced by Lenneburg (1967), there exists a 'Critical Period' within which a person can acquire language in an enabling environment, after which language acquisition is relatively harder and requires more input. The theory states that the first few years of a child's life is when this open window exists." (Khatri, 2012).

This period is considered the period within which the brain develops and matures and is very critical and important for the child to be exposed to an environment that is rich with visual and auditory stimuli. Sparrow (2005), has shown that children crying for attention, smiling in recognition of faces and others, are considered important milestones in communication development and this is a major period of recognizing how to use sound in the environment. By the age of six months, children can recognize basic sounds that exist in their native language. These are important milestones that need to be observed by parents in order to observe keenly their children's ability to acquire language and speech. A table elaborating further on the communication development milestones is outlined in Figure 2.1.

Figure 2.1: Communication Development Milestones

Communication & Language Development Milestones 2-24 months		
Milestone	Average Age of Attainment (months)	Developmental Implications
Smiles in response to face/voice	1.5	More active social participation
Babbles	6	Experimentation with sound
Inhibits to "no"	7	Response to tone
Follows one step command when said with gesture	7	Response to gesture
Follows one step verbal command when said without gesture	10	Verbal receptive language
Monosyllabic- mama/dada	10	Expressive language
Points to object	10	Interactive communication
Speaks first real word	12	Beginning of labeling
Speaks 4-6 words	15	Learns names of object and people
Speaks 10-15 words	18	Learns names of object and people
Makes 2 words sentences	19	Grammatization, 50+ words vocabulary

Source: Chatterjee, 2011.

2.3 HEARING

The basic premise for speech or verbal language is the ability to perceive it auditorily, through the sense of hearing. Speech and hearing is one of the main modalities used in communication among humans. Speech (verbal language) is possible because of the sense of hearing. The ability to perceive and detect sound vibrations in the air or immediate surroundings through the ear is known as hearing.

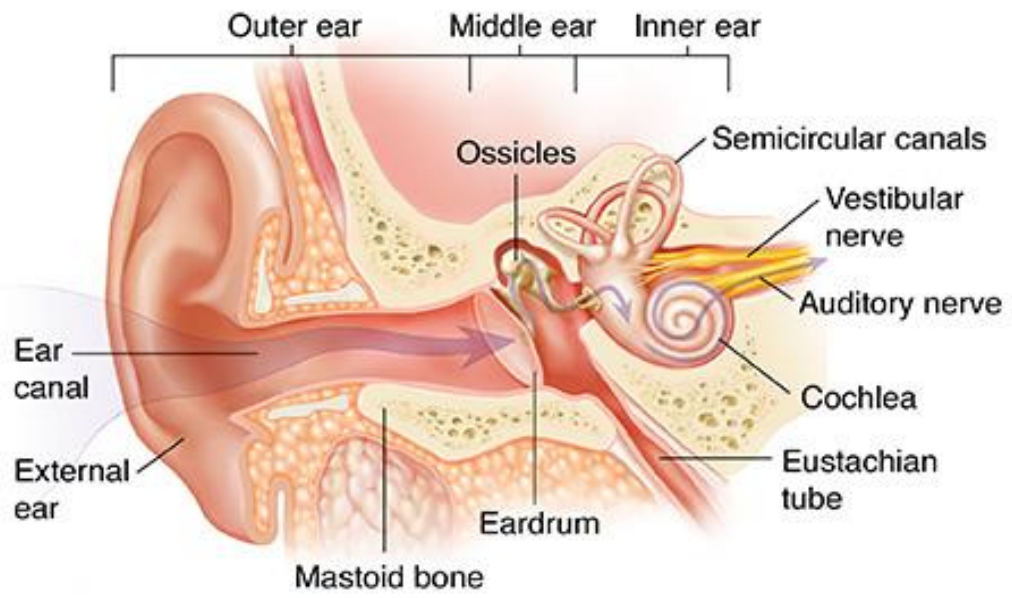
2.3.1 Anatomy of the Ear

The ear is the organ responsible for hearing. It consists of three main parts; the outer, the middle and the inner ear. The outer ear starts with the pinna, which is the external part that is visible and ends on one side of the eardrum. The middle ear consists of the ear drum and the three ossicles: malleus, incus and stapes, and the eustachian tube. The inner ear houses the cochlear, the most important part of the whole ear, which converts the mechanical sound energy into electrical impulses that travel along the nerves as impulses into the brain. The inner ear also houses the semi-circular canals and the vestibule.

2.3.2 Importance of Hearing

Hearing is very essential in life apart from its basic role of aiding verbal interaction and communication between people. Hearing warns us of potential danger when walking on a busy street or perceiving sirens and alarm bells which warn us of imminent dangers, as well as perceiving the shouts or calls for help of people, who may be in trouble, and many other benefits (Bellman and Symfon, 2017). Hearing helps us to stay connected with others through telephone calls, group activities and social events, including staying abreast with information and occurrences around the world through radios, podcasts and other auditory technologies available through hearing.

Figure 2.2: The Human Ear Source



Source: www.medcor.com

In children, hearing is very essential in the development of their language, cognition, social interaction and literacy skills (Oticon 2016). Thomspson-Schill et al. (2009) asserted that in the daily interaction of human beings in a social environment, there is a consistent need for the use of various auditory functions that support the gathering of information. It should be noted that human beings receive information from the society and environment in which they exist, and this information is processed for better understanding and interaction with the environment.

2.3.3 Hearing Loss / Impairment

Hearing Impairment (HI) can be described as a partial or total loss of the ability to hear, and it is mostly a permanent condition characterized by a loss of hearing greater than twenty-five decibels (25dB) in adults and greater than fifteen decibels (15dB) in children (Shipley andMcAfee, 2015). Hearing Impairment may be mild, moderate, moderately-severe, severe or profound based on the severity of the loss. It can be unilateral or bilateral, that is, affecting

one or both ears respectively, also symmetrical or asymmetrical. Hearing Impairment can be conductive, sensorineural or mixed. When sound is not conducted well through a disordered outer or middle ear, the result is a conductive hearing loss. In sensorineural hearing loss, the organ in the inner ear called cochlea, may not be functioning as well as they should. When structures of both the conductive mechanism and the sensorineural mechanism are disordered, the result is a mixed hearing loss (Stach, 2010).

Table 2.1: Degree of Hearing Loss

HEARING LEVELS (DB)	SEVERITY OF LOSS
-10 to 15	Normal hearing
16 to 25	Slight hearing loss
26 to 40	Mild hearing loss
41 to 55	Moderate hearing loss
56 to 70	Moderately severe hearing loss
71 to 90	Severe hearing loss
90+	Profound hearing loss

Source: Shipley and McAfee (2015).

2.3.4 Impact of Hearing Loss on Children's Language Development

Being exposed to sounds and words right from pregnancy and birth, helps children to understand and speak. A child with hearing loss is likely to miss out on all or most of these sounds and can encounter problems with speaking, reading, and social interaction. The earlier

hearing loss occurs in a child's life, the more serious the 99on the child's development. (American Speech and Hearing Association [ASHA], 2015). "There are four major ways in which a hearing loss affects children:

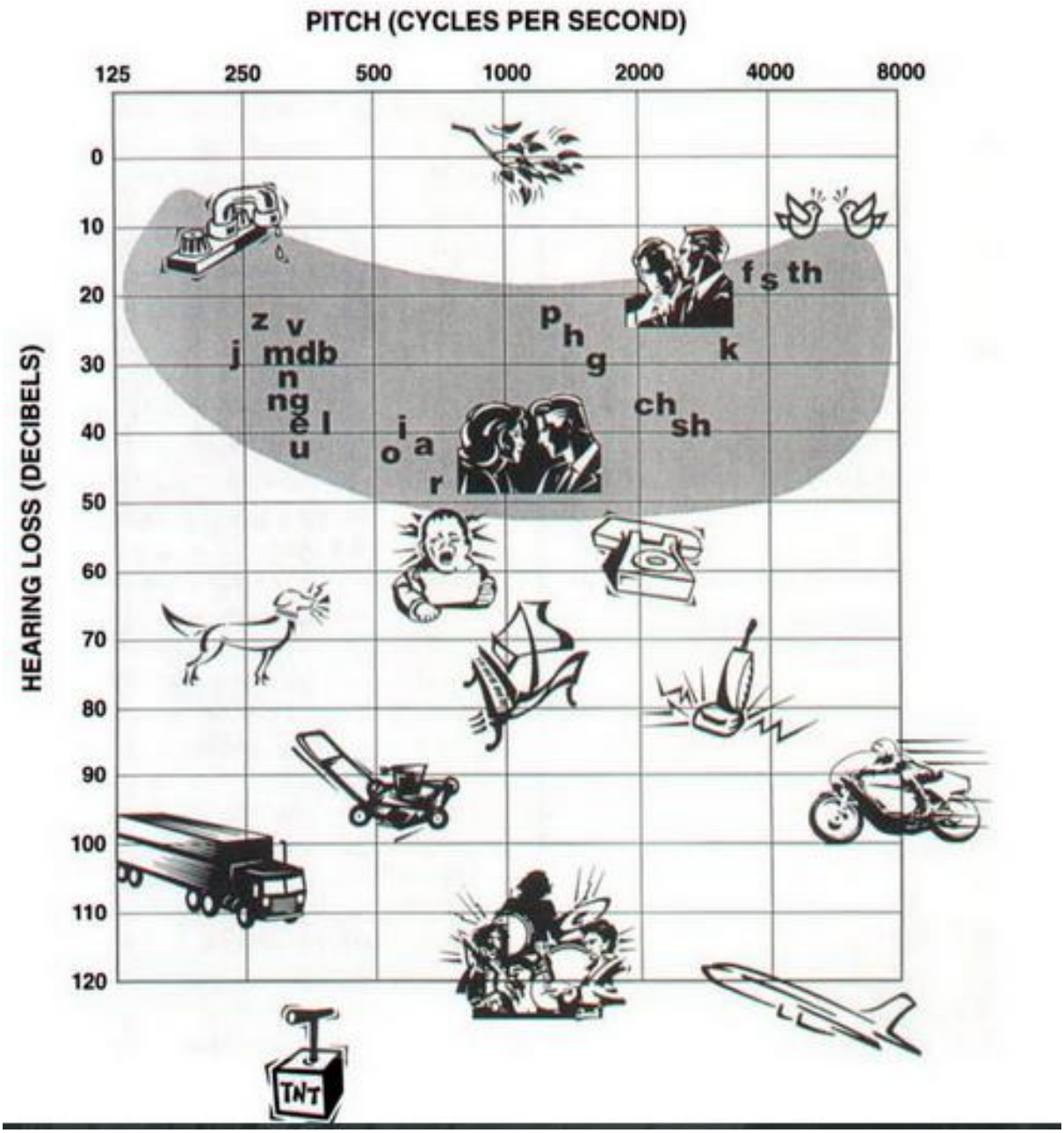
1. It causes delay in the development of receptive and expressive communication skills (speech and language).
2. The language deficit causes learning problems that result in reduced academic achievement.
3. Communication difficulties often lead to social isolation and poor self-regard.
4. It may have an impact on vocational choices (ASHA, 2015; Wake, 2005; Blamey et al, 2001).

Hearing impairment results in difficulties and inabilities to perceive some or all sounds. This will mean a consistent missing out on some sounds, resulting in difficulties with hearing themselves, and an inability to decipher any deficits in speech. All these will affect the feedback loop that facilitates clear and intelligible speech. This results in language and speech delays including disorders in children and a difficulty with social interaction. Fig. 2.3 explains this by showing what frequencies various sounds are heard. Based on this table, it is easy to map out what specific difficulties children may have based on their degree of loss. These frequencies and their associated sounds, when mapped out resemble a banana shaped diagram and is nicknamed the speech banana. Mitchel and Karchmer (2004); discovered that 90% of hearing-impaired children are born to hearing parents. It is essential to know that, few families will resort to sign language for their hearing-impaired child if both parents or even one has normal hearing (Mitchel & Karchmer, 2005).

2.3.5 Impact of Hearing Loss on Children's Social Interaction

Thompson-Schill et al. (2009) asserted that in the daily interaction of human beings in a social environment, there has consistently been the need for the use of various auditory functions that support the gathering of information. It should be noted that human beings receive information from the society and the environment in which they exist, and such information is processed for better understanding and interaction with the environment. In the situation where an individual is unable to hear the sounds and noise from the environment, he or she is unable to effectively partake in the necessary reception and cognitive processing of spoken language regarding social issues and interactions (Worral & Hickson, 2003). This extensively affects the ability of children developing social skills which includes ability to communicate effectively, listening to others communicating and the ability to process what has been communicated (Elzouki, 2012).

Figure 2.3: Pitch (Cycles Per Second)



Source: Northern and Downs (2002).

This shows that when children are impaired in hearing, they have issues with social skills, as they cannot interact in social situations and are unable to relate to what others are communicating. This leads to children often feeling isolated and unhappy in social situations

such as play groups and peer activities. In essence, social interaction deficits were noticed to be higher in children who have partial hearing impairment than those with profound hearing loss (Olusanya et al. 2014). Children with a hearing impairment are usually unhappy and feel isolated because they do not feel like they have any friends since they find it hard to talk and to play with others. The fear of stigma heightens these emotions too ASHA (2017).

2.3.6 Impact of Hearing Loss on Children's Cognitive Development

As indicated above, children need to interact with their environment; and in doing so they harness the ability of their brains (Oishi & Schact, 2011). With the consistent processing of auditory stimuli from the environment, children are exposed to more information processing activities and learning takes place. However, when children have a hearing impairment, they have a decline in hearing (Davies, 2012). Research conducted by the Johns Hopkins University revealed that cognitive decline was about 30% to 40% for children who had issues with adequate hearing (Goine & Hagler, 2007). The authors explained that when children hear sound and capture it as a form of language it is the most active form of cognitive activities that are practiced by children, hence forming the basis of cognitive development.

A study conducted by Lauwerier, Lenclave and Bailly (2003); found out that there was no decline for children with hearing impairment and no hearing problems on cognitive capabilities. The study indicated that though children cannot hear information coming from their environment, they can see and feel and still have another sensory organ function. These facilitate the processing of information from the environment, hence the child can still engage in various cognitive activities.

2.3.7 Impact of Hearing Loss on Children's Learning

ASHA (2017), outlines the impact of hearing loss on school performance as "Children with hearing loss have trouble in school. Reading and math may be the hardest for them. Some facts about hearing loss and school success include:

- Children with mild to moderate hearing loss may fall one to four grade levels behind without help.
- Children with more severe hearing loss may not learn past the third- or fourth-grade level. School support will help them do better.
- Children with hearing loss do not do as well as children with normal hearing. The gap between them grows over time."

2.4 AURAL AND ORAL REHABILITATION APPROACHES AND OPTIONS

In children, habilitation is a more apt term to use for the provision of hearing support, because rehabilitation usually refers to the restoration of something that pre-existed and was lost. Aural (re)habilitation refers to the comprehensive process of identifying, diagnosing and providing alternative or supplementary devices and therapies that are available for persons with a hearing loss to learn to listen and communicate.

Although aural (re)habilitation may require a multidisciplinary approach, audiologists are the main professionals who assess and evaluate the hearing of children and adults with a hearing loss. An audiologist is a professional who evaluates, diagnoses and treats hearing and balance disorders (ASHA, 2011). It is important to note that, the job of an audiologist is not limited to performing hearing tests. It encompasses a wide range of services that include;

- Evaluation and treatment of hearing disorders
- Counsel and support clients with custom fitting of hearing aids and other assistive technology
- Evaluate and treat balance disorders
- Refer clients to other professionals like the speech and language therapist, the otorhinolaryngologist among others.
- Events and campaigns to help prevent hearing loss that results from noise and many others.

Aural / Oral (re)habilitation in children is usually a seamless process that is mainly handled by the audiologist and the Speech and Language Therapist (SLT). The SLT is an allied health professional who provides treatment, support and care for adults and children who have communication and swallowing difficulties. Aural / Oral (re)habilitation is influenced by many factors, some of which include;

- The preferred mode of communication of the child and the family
- The age of onset of hearing loss and the child's age at evaluation and diagnosis
- The type, level and severity of hearing loss
- The age of intervention

Aural / Oral (re)habilitation includes management and training in auditory perception. This involves the provision of hearing aids and other assistive listening devices. A hearing aid is a device used to improve hearing by amplifying sound to an audible level for a person with hearing loss or hearing impairment (National Institute on Deafness and other Communication Disorders [NIDCD], 2017). Hearing aids are battery powered and are small enough to be worn in or behind the ear. The basic components of a hearing aid include microphone, amplifier,

receiver and power source. (NIDCD, 2017). It is imperative to know that hearing aids do not cure hearing loss but rather serve as an amplifier for incoming sound to aid hearing.

Hearing aids can be analogue or digital, although today an overwhelming majority of the devices on the market are digital and are available in different styles such as; behind-the-ear (BTE), mini BTE, in-the-ear (ITE), in-the-canal (ITC) and completely-in-canal (CIC). Wearing hearing aids is usually recommended for both ears because it helps to localize which direction sound is coming from, makes sound as natural as possible and helps wearers to understand what others are saying to them.

Figure 2.4: Styles of Hearing Aids.

Source: NIDCD (2017).

Another option for auditory rehabilitation is the cochlear implant. It is an electronic device that is surgically implanted to provide a sense of sound to a person with a severe to profound hearing loss. Unlike a hearing aid, a cochlear implant does not amplify sound. Instead, "they bypass damaged portions of the ear and directly stimulate the auditory nerve. Signals generated by the implant are sent by way of the auditory nerve to the brain, which recognizes the signals as sound" (NIDCD, 2017). Hearing through a cochlear implant is not the same as normal hearing and requires some learning, mostly through Auditory Verbal Therapy (AVT; discussed below) and speech and language therapy. It is also important to note that cochlear implants do not cure hearing loss but provide an opportunity for persons with a hearing loss to perceive sound. (NIDCD, 2017).

The communication aspect of Aural / Oral (re)habilitation includes training and intervention in preferred mode of communication. The main communication options available to children with a hearing loss include;

1. **Sign language**: It is a manual and systematic form of communication that is made up of gestures, hand movements, facial expressions and some finger spelled alphabets. Sign language also known as Signed Language can either be used as a supplement for spoken language or in isolation as a sole means of communication. Each country has a peculiar set of symbols that make up sign language, and sometimes different dialects in the various sub-groups. Signed language is usually named after the country; therefore, examples include Ghanaian Sign Language, Japanese Sign Language, American Sign Language *et cetera*. As a communication option in aural (re)habilitation, sign language can be used alone or as one part of a total communication approach. It is a visual input system and a manual output system.

2. **Auditory Verbal** communication: this is a form of communication that focuses on achieving verbal language by harnessing the residual hearing of the child. It requires Auditory Verbal Therapy, which is "a specialized type of therapy designed to teach a child to use the hearing provided by a hearing aid or a cochlear implant for understanding speech and learning to talk. The child is taught to develop hearing as an active sense so that listening becomes automatic and the child seeks out sounds in life. Hearing and active listening become an integral part of communication, recreation, socialization, education, and work" (Stith, 2016).
3. **Total communication**: It is an approach of communication that involves different communication approaches all used together by a child with a hearing loss, as their mode of communication. Total communication may include sign language or keyword signing, cued speech, lip reading, auditory, verbal and written means. A child or the parents of a child with a hearing loss may decide to choose all or a combination of the various approaches that they prefer. The total communication is a combination of manual, visual, verbal and auditory inputs and outputs.

Supplementary options that usually accompanies some of the main ones and are not used in isolation include;

- **Speech reading** (also known as Lip reading) is a visual input form of communication that requires a person to watch the lips and facial movements of the speaker to understand what is said. Lip reading can be used as a foundation or supplement for other communication approaches. Lip reading cannot be used in isolation as a communication means (Centers for Disease Control and Prevention [CDC], 2014).
- "**Cued articulation or cued speech**: It is a visual communication system that uses eight handshapes in four different placements near the face in combination with the

mouth movements of speech to make the sounds of spoken language look different from each other" (National Cued Speech Association, n.d). Cued articulation is rarely used in isolation but mostly with other communication approaches.

In summary, HL may have varied impact on children in terms of social development, communication skills, cognitive development and literacy skills. (Re)habilitation of the auditory system involves hearing aids to amplify sound. Cochlear implants are another source of auditory (re)habilitation that involves a surgically implanted device that digitizes sound and sends it through the auditory nerve, directly to the brain. Communication (re)habilitation involves many approaches. In Ghana, the options available are quite limited due to a lack of various intervention professionals. Some of these limited options include Ghanaian Sign Language, auditory verbal approach, and total communication approach. In the 2007 position statement, the Joint Committee on Infant Hearing suggests that, all hearing and communication rehabilitation options must be presented to the family of the child in an unbiased manner. A well-informed family and expected outcomes help direct the decision-making process. (Joint Committee on Infant Hearing, 2007).

2.5 REVIEW OF RELATED STUDIES

This section explores literature by various scholars globally on the variables, impact and other factors associated with hearing impairment, amplification and speech and language development in children.

Kennedy et al (2006), in their study on "Language ability after Early Detection of Permanent Childhood Hearing Impairment" identified that, although better language development was

associated with early identification of hearing loss, speech measures did not differ significantly between the early identified and the later identified groups.

Mitchel and Karchmer (2004), discovered that 90% of children with a hearing impairment are born to hearing parents. It is essential to know that few families will resort to sign language for their child with hearing impairment, if either or both parents have normal hearing. The family is more likely to choose a communication approach that requires verbal output (Mitchel & Karchmer, 2005).

Most, Shina-August and Meilijison (2010), discovered that in the comparison of children with HL (using hearing aids and those using cochlear implants) and their peers with normal hearing, no child with HL could appropriately continue or add on to an initiated topic by the researcher.

Soares et al (2010), studied 42 children, 21 with a hearing impairment and 21 with normal hearing. They discovered that, children with hearing impairment were not on the same level as their normal hearing peers in aspects of language such as understanding, form and use.

Amemiya, Goulart and Chiari (2013), compared 42 children with hearing loss and normal hearing between the ages of five and eleven on their use of nouns and verbs in oral communication. They discovered that the presence of hearing loss in a child did not make them different from their hearing peers in the use of nouns and verbs.

In 1999, Yoshinaga-Itano identified all-round benefits of early intervention for children with a hearing loss. Early intervention namely; early identification and early treatment. She published that early identification, followed immediately by equally early intervention options in no more than two months, was significantly related to improved speech production, better language and social and emotional well-being. This was regardless of the communication approach being used; whether auditory/oral approach or sign language. With the reverse being true for later identified children.

Moeller (2000), found results similar to that of Yoshinaga-Itano in her study on the impact of early intervention on the language of children with a HL. Moeller and Yoshinaga both discovered that, parental involvement in the rehabilitation of their children had a positive correlation with the success of their children's intervention.

Spencer (1993) studied two groups of mother child dyads. One group of both mother and child with normal hearing and the other group with both child and mother with hearing loss. Parent child interactions were videotaped and analysed, and it was identified that, the HI mother child dyad used more gestures and tactile communication than the normal hearing mother child dyad. Both groups used the same amount of vocal expressions and children in both groups did not differ in their amount of gesture use.

Gilani, Roditi and Bhattacharrya, (2017) studied grade repetition and parents' perception of hearing loss in the United States and found that parents' perception of HL regarding their children was related to an increase in poor grades and class repetition in school. Even though they had been screened and cleared for hearing impairment as new-borns.

Mayne et al (1998) examined the factors responsible for the differences in the expressive language of children with hl. In two studies involving a total of 315 children, they assessed the toddlers and discovered that, variations in expressive language of children with hearing loss were subject to factors like ae, age of hearing loss identification, cognitive capacity and presence of other comorbidities.

Wake et al (2005) studied the language outcomes of 80 children with hearing loss using hearing aids between the ages of 7-8years in Victoria, Australia. All confounding variables were controlled, and language measured using the Clinical Evaluation of Language Fundamentals (CELF) and Peabody Picture Vocabulary Test (PPVT). Results from their study

indicated that poor language outcomes were highly correlated to degree of hearing loss and not age of diagnosis of hearing loss.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter describes in detail the methods and techniques used in attaining the objectives of the study titled; The Language Skills and Communication Strategies Used by Children with a Moderate to Profound Hearing Loss in Accra, Ghana. These include the research design used, study sites, target population, sample and sampling methods, data collection and management procedures, data analysis tools, ethical considerations and integrity of the study.

3.2 STUDY DESIGN

In this study, a qualitative exploratory multiple case study design was adopted. The study did an in-depth investigation of 6 children with a hearing loss, using hearing aids and their parents. Language samples, parents' perspective in interviews, demographic and educational information were gathered within 3 months at three study sites and findings from the data was used to answer to research questions of the study.

A qualitative research is a scientific form of study that involves observation and recording of non-quantitative data in an environment that is natural to the participant. This type of study is focused on describing situations, ascribing meaning to them, identifying beliefs, impressions and experiences. Qualitative researches are founded on a holistic view of phenomenon; it is based on the beliefs that every reality has multiple facets where the person and the experience cannot be segregated, investigation is also ethically bound, and all applicability are confined by time and context (Burns and Grove 2007).

In a qualitative study, the researcher aside spearheading the study, also plays the role of a data collection tool because observing, interpreting and ascribing meaning to information perceived is a crucial part of the study that cannot be emphasized enough. This also means that the researcher's personal biases can influence the lens with which the information is collected and interpreted (Sutton and Zubin, 2015).

The case study method, as "defined by Robert Yin, is an empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 1984, p. 23)." (as cited in Soy, 1997).

An exploratory qualitative study is carried out when little is known about a phenomenon, a situation or a problem (Polit and Beck, 2008). It is usually carried out to establish definitions, identify order of importance regarding an issue and improve the final design of the chosen study. Data analysis in qualitative study runs concurrently, therefore it allows for adjustment of the instrument during the process of data collection when a deficiency or inaccuracy of function is identified. This makes the design elastic and flexible to use and possible for any valuable information that emerges in the course of the data collection that will enrich the study and make it more meaningful to be incorporated in the study process (Polit, Beck and Hungler, 2001). The researcher in a qualitative study can go back to the participant for clarification or more information when it becomes necessary thereby promoting prolonged contact with the participant as well as the setting which in turn could promote trustworthiness of the study.

3.3 STUDY SITES

The present study was conducted in Accra, the capital city of the Greater Accra Region of Ghana, West Africa with an estimated population of about 4.6 million. (GSS, 2016). The Accra

Metropolis is located on Longitude 05°35'N and on Latitude 00°06'W, it covers an area of 173sq km. As a capital city, Accra is cosmopolitan in nature and accommodates people from all walks of life and from various parts of the country. This provides the opportunity to sample participants with differing characteristics such as socioeconomic background, ethnic and language affiliation, educational and professional backgrounds and many others. The specific sites used for the research were the Hearing Assessment Centre (HAC) of the Korle-Bu Teaching Hospital, Hearing Aid Supply and Services (HASS), and the Speech and Hearing Centre (SHC). Participants with hearing impairment were recruited from these centres. The HAC serves a population of over 4 million living in Greater Accra Region and all other patients who are referred from other regional hospitals for hearing assessment (Nyarko, 2013). The SHC and HASS are private establishments that provide audiological services and speech and language (re)habilitation services for children and adults in Accra. They also receive limited referrals from other parts of the country.

3.4 TARGET POPULATION

The study population in a research is the entire set of persons or elements who meet the sampling criteria of the study. In the current study, all children developing normally without any disabilities or delays, between the ages of 5-11 years with a hearing loss between 55dB-90dB and no other comorbidities living in the Accra metropolis formed the target population.

3.4.1 Inclusion criteria

1. Both monolingual and bilingual children were included in the study because most Ghanaian children learn English in school as a second language and sometimes as a first language and because MLU norms are available in English.

2. Children who had a hearing loss, using either one or two hearing aids and receiving speech and language therapy aged between 5 and 11 years because the study wanted to see how much rehabilitation had been helpful in language development.
3. Children with hearing loss who have both parents with normal hearing because having hearing parents mostly means an oral communication approach rather than manual communication.

3.4.2 Exclusion criteria

1. Children with comorbid conditions such as language delay, Down syndrome, articulation difficulties and any kind of communication and intellectual disability that is not solely as a result of speech impairment. This was so that, language differences could not be attributed to other variables but the hearing loss.
2. Children who relied on sign language as their only mode of communication because the study was focused on oral communication development.
3. Children with a unilateral hearing loss. They were excluded because the impact of unilateral hearing loss is mostly compensated for by the better ear.
4. Parents who are deaf and (or) used sign language as their means of communication because according to Mitchel and Karchmer (2005), hearing parents are more likely to use a verbal approach rather than a manual communication approach with their children.

3.5 SAMPLING TECHNIQUE AND SAMPLE SIZE

The purposive sampling technique of the non-probability sampling was used to select the study sites and the children for the case study. The purposive sampling is used when a researcher intentionally selects participants and sites because they possess the characteristics the

researcher is after, which will otherwise not be prudent to sample from the overall population in order to better understand a particular phenomenon (Creswell, 2012). Thus, this sampling technique is most appropriate for the current study because of the objectives.

A sample size of 6 children with a hearing impairment using hearing aids were used for the case study because a small sample size is an ideal number for a case study of this nature. A case study could either look at a single case or multiple cases (Soy, 1997). The participants were between the ages of 5 and 11 years, with moderate to profound hearing loss (55dB-80dB), fitted with hearing aids. They were sampled from the databases of HAC, HASS and SHC with a hearing loss diagnosis. This severity of hearing loss was chosen because it is quite high and cannot easily be compensated for by children, unlike mild hearing loss. Children fitted with a hearing aid were selected for the study because the severity of their loss exceeds (55dB and above) exceeds the dBs used in regular conversation (about 55dB) and may not perceive much auditory stimuli without hearing aids.

Ages 5-11 were selected because they fall under the category of children in speech and language therapy services and are expected to be using adult like language such as a slightly complex use and manipulation of language. This means their speech and language can be quantified unlike infants and toddlers. They also did not fall into the adolescent category. They should at this age, have met all or most of their communication milestones in the absence of any other disability.

3.6 PROCEDURE AND MATERIALS FOR DATA COLLECTION

Permission to carry out the study was requested from the Hearing Assessment Centre, Korle Bu Teaching Hospital, and the Speech and Hearing Centre (SHC). Informed consent and assent was obtained from parents and children before enrolment into the study (see Appendix

A). Methods and objectives of the study and the process of assessment were completely clarified to participants. Information collected from participants were kept confidential; that is, names of participants were not used in the data analysis and they were replaced with IDs. The IDs generated were only managed by the author and research supervisors. The study did not pose any threat to the participants and their families and participation was strictly voluntary. Participants were compensated for transportation fares since they had to travel to any of the 3 study sites for data collection (SHC, Korle Bu SLT clinic and MultiKids Academy therapy centre).

All 6 participants were informally assessed for language samples in English language. The first protocol was the picture elicitation task. It is an activity that originated from anthropology and sociology but can be modified to other disciplines. The idea behind it, is to get an individual to express their views and ideas in their own words. In this study, the picture elicitation task was used to collect language and speech sample of the participants. This happened between the researcher and the child and usually started after an ice breaker game of bubbles. Children were shown 5 pictures (see appendix C), one at a time and asked, any or all of three questions (what's this? What's happening in this picture? Tell me what you see.). When a child missed out on some pictures, cues and guided questions included; what else can you see? Can you tell me more about colours? Once a child had finished talking, the researcher asked whether they were finished and could move on to the next photo and waited for a verbal confirmation from the child.

The next protocol was a Jenga game. The researcher explained the rules to the parent present, away from, the child, and asked to explain the rules of the game to the child before beginning to play. The researcher video recorded the interaction between parent and child from start to end of the game. This was meant to capture the amount of gestures, cues and prompts, eye

contact, parent-child dynamics and repetitions used for child to understand the instructions and concept.

Parents were engaged in a brief discussion before the study with the researcher. The discussion was open ended and semi-structured around the child and the family's coping and adjustment with the child. A 9-question questionnaire was also given to each parent to fill to provide demographic data and the parents' perspective on their child's language abilities and phone calls were also placed to parents to further enquire on communication strategies, general language and service provision experiences.

The following instruments were used to collect data from the participants.

Questionnaire. A 9-point closed ended questionnaire was given to each parent to complete. It contained questions and a 5-point Likert scale (1 for not at all and 5 for always or constantly), meant to measure parent's perceptions of their child's understanding, strategy use and speech clarity with the parents themselves and with other unfamiliar persons (See appendix B). The questionnaire was used as a data gathering tool to avoid ambiguity, to get the parents quantifiable impressions of their children's various strategies. Its limitations include the restriction it places on the amount of information participants can provide and this was made up for with follow up phone calls.

Jenga game

It is a block building game that requires a lot of dexterity, hand to eye co-ordination and team work. It was chosen as the tool for the parent child interaction because the game is not familiar to the average Ghanaian family. The researcher had to explain the rules to the parent, who in turn had to explain the rules to the child without so many support strategies initially, and if that did not work, then went ahead to use as much as required.

Tablet to display pictures for the elicitation task.

An iPad housed the 5 pictures (see appendix C) for the photo elicitation task all arranged in the same order for each child to see and discuss. This protocol was to elicit language sample from the child to be used for language analysis and calculate MLU.

Audio and video recorder

Audio and video recorder of a Tecno mobile phone housing a 32g memory card was used to collect audio and visual data.

3.7 DATA ANALYSIS

3.8.1 Analysis of Questionnaires

Parent questionnaires and recorded phone calls were transcribed as well as child's language sample. They were then analysed using the deductive content analysis. Content analysis is the systematic reading of a body of texts, images, and symbolic matter, not necessarily from an author's or user's perspective" (Krippendorff, 2004). It provides an amenable approach that can allow inferences to be made from any set of data by examining patterns in a manner that is systematic and can be replicated. In this study, patterns were generated from the questionnaires, and chats and follow up phone calls were also transcribed, and similar patterns and trends generated and grouped into categories for parallel analysis. The categories were then grouped into three main ones based on their frequency of occurring through all the cases with other sub categories also arising. Comparative analysis was done for categories that were specific to a fraction of the participants or all the participants.

3.8.2 Analysis of video of parent child Jenga game.

Parent-child game was video recorded and analysed to investigate the parent child dynamics and the use of gestures and other strategies between parent and child in communication. This

was analysed by researcher noting down how many times information had to be repeated or how many times gestures were used by parent and child and the reasons for this. It was then described on a spectrum of minimum, moderate and high for each participant.

3.8.3 Analysis of language sample

Language samples of children were analysed for MLUm and a structural analysis using the Brown's stages of syntactic and morphological development was done. Brown's stages were developed by Roger Brown as a framework within which an expressive language development path in English language could be understood and anticipated, mostly based on MLU. See Fig 3.1. "A structural analysis does not include a measure of a child's development in the area of the clarity of pronunciation of speech sounds. Such an analysis is done in addition to a structural analysis, and comprises, among other components, a phonetic assessment of the speech sounds a child can produce, and a phonological assessment of the way those sounds are organised into speech patterns" (Bowen, 1998).

A language analysis checklist for other aspects of language such as social pragmatic skills, grammar structure and knowledge of some concepts was also used to analyse language sample.

3.8.4 Parallel and comparative analysis

Final analysis involved a parallel analysis case by case for each participant. This involved fully describing all findings from analysis, any subtle information that made each participant unique and any information gathered from the data that explained why the language of each child was at where it was. A comparative analysis was also done by generating patterns and factors that were specific to some or all of the participants. These included differences and similarities between the cases or any of the cases that were similar, noting some variables that could be influential like the researcher's presence and own biases.

Figure 3.1: Brown's stages of morphological and syntactic development.

Brown's Stage	Age in Months	Mean MLUm	MLUm Range	Morphological Structure	Examples
Stage I	**12-26**	**1.75**	**1.0-2.0**	**Stage I Sentence Types**	**see above**
Stage II	**27-30**	**2.25**	**2.00-2.5**		
1				Present progressive (-ing)	it **going**
2				in	**in** box
3				on	**on** box
4				s-plurals (regular plurals)	my cars
Stage III	**31-34**	**2.75**	**2.5-3.0**		
5				Irregular past tense	me **fell** down
6				's possessive	man's book
7				Uncontractible copula (the full form of the verb to be when it is the only verb in a sentence)	**Is it** Alison? Yes, **it is**. **Was it** Alison? Yes, **it was**.
Stage IV	**35-40**	**3.5**	**3.0-3.75**		
8				Articles	**A** ball on **the** book.
9				Regular past tense	She **jumped**.
10				Third person regular, present tense	The puppy **chews** it. Jason **likes** you.
Stage V	**41-46+**	**4.0**	**3.75-4.5**		
11				Third person irregular	She **does**. He **has**.
12				Uncontractible auxiliary (the full form of the verb 'to be' when it is an auxiliary verb in a sentence)	**Are they** swimming? **Were you** hungry? I'm not laughing; **she is**. **She was** laughing; not me.
13				Contractible copula (the shortened form of the verb 'to be' when it is the only verb in a sentence)	**She's** ready. **They're** here. **Daddy's** got tomatoes. My **dog's** lost his collar.
14				Contractible auxiliary (the shortened form of the verb 'to be' when it is an auxiliary verb in a sentence)	**They're** coming. **He's** going. **I'm** opening it up. **We're** hiding. **It's** freezing.

Source: Bowen (1998).

3.9 Trustworthiness

Trustworthiness of a study is qualitative version of validity and reliability in quantitative studies. It refers to the extent to which a qualitative study is said to have a diligent procedure and worthy results that can be trusted. (Babbie and Mouton, 2001). Trustworthiness is of

crucial concern in a study and begins right at the planning stages of the research to guide the process every step of the way. Lincoln and Guba, (1985) and Creswell, (1998, 2009) suggested 4 constructs as an appropriate way of evaluating the trustworthiness of a qualitative study. These are:

1. **Credibility**

   This refers to the process of ensuring that the study is actually measuring or testing the actual variables it intended to measure. In this study, triangulation and respondent validation were used to ensure credibility. Triangulation of data involved asking the same questions of the various participants and using different data sources (observation, video and audio data and field notes) to answer the research questions. Respondent validation was achieved by taking raw and analysed data back to the participants to review for accuracy and representativeness.

2. **Transferability**

   This refers to the extent to which findings from one study can be applied to a different context. Because this construct is not a very ideal option in qualitative studies, varied opinions are expressed on it. In this study, the controlled data collection site, specific closed ended questionnaires and concrete description of the participants and procedure for the study can help ensure transferability to some degree.

3. **Dependability**

   This refers to the ability of the study to yield similar results if repeated with the same methods and participants under different circumstances over time. Some of the steps taken to ensure dependability includes detailed description of the procedures of the study and the rationales, including participants, sampling methods and inclusion and exclusion criteria.

4. **Conformability**

This refers to the objectivity of the study and how much it follows a systematic procedure of a scientific study. In this research, the researcher declared her own possible biases that may have influenced the study. A research inclined person not related to the study was involved in a second transcription and development of patterns and data compared to that of the researcher. The two supervisors of the current study consistently reviewed the study from proposal, through implementation to report writing. Constructive suggestions and inputs were made by them and other researchers read through the scripts as well and inputs were made.

3.9.1 limitations of the study

Because this is a qualitative study, researchers background in the knowledge of communication needs could have been an influence on the analysis and interpretation of the data. although a second person who is research inclined but not part of the study was invited to analyse and derive patterns from the data and he arrived at similar findings, with mostly synonyms being the differences. Two research supervisors were also reading and critiquing the study each stage to minimize the possibility of bias as much as possible. On the other hand, the presence of the researcher during the data collection stage could have influenced the parents or children in a way, although ice breaker games were made available for children and rapport was built with parents long before the meeting day.

New environment for children: The data collection sites were clinical in nature and not familiar to the children. They were used for the purpose of uniformity and to control noise and to overcome distance barriers that financial constraints posed.

English as a second language. For some of these children and even parents, English is the only language they know. For others, English is a second language and any of these may have

influenced the study in a way. Ghanaian languages are tonal in nature and volume, pitch and tone could impact the content of information received by a child with a hearing loss.

One or 2 aids and varied degrees of loss could be a factor. The number of aids, time of diagnosis and years of amplification were all over a year old but were not uniform in all subjects, because some had 3 years of amplification, others had less and these are variables that could impact the performance of some of these participants.

Finally, reliability of parent's responses was fully dependent on their honesty as there was no mechanism to check for the truth in responses.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 INTRODUCTION

This chapter is dedicated to the analysis of the data obtained from the participants. Due to the nature of the study, parent's responses were analysed qualitatively. Questionnaire patterns were analysed for similarities and categories. Recorded phone calls were transcribed verbatim and analysed for new and existing categories. Three main categories were realized from the data among a few sub categories and themes. The major themes generated include "Communication Strategies used for Expression**",** "Strategies Required to aid understanding of information" and "Clarity of spoken language"**.** Children's language samples were analysed for MLUm, Morphology, Syntax and social pragmatic skills. The results present parallel data analysis for each participant and further comparative analysis of common trends and differences identified between the participants.

Table 2.2: Biographical data of participants

ID	Child's Age	Child's Gender	Languages Spoken	Degree of loss in dB	Parent's Occupation	Gender of parent	L1/Home language
A	8	Female	Twi/Eng	60-85	Teacher	Female	Eng
B	5	Female	Eng/Twi	55-70	PR Manager	Female	Twi
C	5	Female	Eng	60-90	Comm. Asst	Male	Eng
D	6	Female	Twi/Eng	60-70	Caterer	Female	Twi
E	6	Male	Eng/Twi	60-85	Administrator	Female	Twi
F	10	Female	Ga/Twi/Eng	50-70	Teacher	Female	Twi

4.2 PARTICIPANT A

Age: 8 Years

Gender: Female

Parents Interview

4.2.1 Communication Strategies Used for Expression

Child 'A' used a minimal amount of gestures in expression and was mostly well understood. She only used them when her intended message was not being understood by someone. She usually took a while to warm up to strangers, which may mean that she uses low voice volume, leading to her having to repeat herself several times.

"She don't use the gestures much moom (code switch to Twi meaning 'really'), she don't use it much"

Mother of child 'A'

4.2.2 Strategies Required to Aid Understanding of Information

Child 'A' is very active and quite a talkative in her familiar settings. She maintains good eye contact and reads lips of communication partners to aid understanding of information, especially strangers or people outside of the immediate family. Mother also reported that if information exchange between child and a partner was not a novel concept or idea, then the strategies needed to aid child's understanding were very minimal and the reverse was true. These strategies included speaking loudly, simplifying language or using few words, and modelling.

4.2.3 Clarity of Spoken Language

Mother reports that she is very intelligible in her spoken language. She says a vast improvement in her speech has occurred over the years. Child A is one year behind academically because of her hearing loss and language difficulties. She spent a longer period

in preschool than usual because of teachers lack of knowledge on how to help her. She further reports that child 'A' has drastically improved in both understanding and expression after about 3 years of bilateral hearing amplification and minimal speech and language therapy.

"She's supposed to be in class 3 at 8years" (currently in class 2)

"They kept her long in the preschool because in the beginning the talking was not coming"

"Oh, she has improved. She has improved. It wasn't like it was formerly"

Mother of child 'A'

4.2.4 Observation Notes of Researcher

Parent and child dynamic was friendly and cordial. Child barely used any gestures in her expressions and was mostly intelligible, although slightly nasal and making errors on some consonants. The researcher requested her to repeat herself a lot because she was not very audible. She also did not initiate any interaction except to request more bubbles during the icebreaker game. Child A did not seem to understand some instructions but did not ask for clarifications. Researcher had to accompany interaction with some hand gestures to help child A understand the information being given. She used long sentences, mostly 6 or more words per sentence in description of the photos in the elicitation task. She had an ability to think in the abstract sense, beyond what was portrayed in the picture but somehow related to it.

"the boy was put it down and the woman take the tyre to the house"

"the brother he say warm mine again before he eat all"

Child 'A'

4.2.5 Language Analysis

Analysis from investigating into the language of child A resulted in the following. From 49 utterances generated from the photo elicitation task, the MLUm was 11.22. A structural

analysis of the language sample showed that, child A had achieved all of browns stages of language development. In her utterances, grammatical markers like present progressive endings (-ing), prepositions (in and on), use of plurals (–s) as is characteristic of stages I and II of Brown's language development stages were noted. The presence of regular and irregular past tense, 's possessives, articles, third person regular and irregular present tense, and the various forms of the 'to be' verb shortened were all typical of the stage III-V of brown's stages which are expected to be developed before age 5 years. Further analysis of child A's language sample revealed an inconsistent use of subjective pronouns, especially gender pronouns. Had difficulties understanding some WH questions like why, who and when but could fairly answer what and where. She consistently used conjunction words like 'and' and then'. Her sentence structure was quite poor but she had a good command over the use of named objects, action words and a limited use of adjectives. For pragmatics, she took turns, jointly attended on a task and demonstrated good eye contact. She did not initiate conversations and did not speak unless it was required of her.

4.2.6 Summary

From the various data gathered on participant 'A' mother-child dyad, at 8 years, the child's use of gestures was no different from what a hearing child will use. She is intelligible to most people and does not rely much on gestures unless it is very necessary. Her language sample shows delayed skills not below the age of 5 years. Her sentences are fairly long and not too complex. Her grammar is not appropriate enough as would be expected of an 8-year-old (Hello, 2011). She repeats information constantly and says one thing in different ways, hence the high MLUm score. Her language delay will be estimated to be moderate and no more than 2 years. Family is not seeking rehabilitation options for communication and are happy with the progress made over the years.

4.3 PARTICIPANT B

AGE: 5 Years

GENDER: Female

Parents Interview

4.3.1 Communication Strategies Used for Expression

Mother reports that Child B vocalizes a lot accompanied by a moderate amount of gestures, voice inflections, hand leading and facial expressions. Mother does not believe that she truly has a grasp on the importance of the gestures and strategies she uses in communicating. She asserts that these strategies are present when she interacts with both familiar and unfamiliar people.

4.3.2 Strategies Required to Aid Understanding of Information

Mother reported that child B required and depended on various augmentative strategies to understand information and verbal interaction with others. These strategies ranged from repeated information, simplified language, gestures, modelling and high volume.

4.3.3 Clarity of Spoken Language

Mother reported that child B was not at all clear and intelligible to the family, teachers, classmates and others. Child B was very open to interacting with strangers but gave up if they did not understand her. She further revealed that child B is in the same class as her twin, the appropriate class she is meant to be in for the sake of keeping her occupied and not for her academic proficiency. She wears a single hearing aid and has never had speech and language therapy. Mother reports that, the hearing aid is left in the school premises and the child's teacher is responsible for getting her to wear it each school day. After school and weekends, the child does not have any access to amplification

"When the aid is at home, we forget to put it on her, so we gave it to her school teacher and she makes sure she wears it"

Mother of child 'B'

4.3.4 Observation Notes of Researcher

Parent and child interaction was very cordial. Child B used moderate amount of gestures in her expressions and was barely intelligible. The researcher asked about the elicitation photos and what it was, but she did not seem to be aware of the request being made of her most times. She made attempts to initiate interaction by tapping her mother or researcher to get their attention and followed with some pointing, body movements and lots of vocalizations. Compensation strategies employed by researcher did not seem to aid understanding for Child B much. She thrived under praise and took a while to get instructions, accompanied by constant prompts.

4.3.5 Language Analysis

Analysis from investigating into the language of child B resulted in the following. 0 utterances were generated from the photo elicitation task because her speech was too unintelligible to transcribe for any language analysis, hence MLUm could not be calculated. Structural analysis of the language sample could not be completed so the focus was more on her pragmatic language and the intent behind her communication support strategies if any. Child B demonstrated good turn taking skills, good eye contact and appropriate joint attention skills. There were many attempts to initiate interaction by tapping mother or researcher and pointing at something while vocalizing.

4.3.6 Summary

From the various data gathered on the participant 'B' mother-child dyad, at 5 years, the child is using a moderate amount of gestures to express herself but depends on other informal

augmentative strategies more than a child with no HL might. She is very unintelligible to most people and a language sample could not be transcribed. Data from the three sources (mother, researcher and language assessment) imply that child B has quite severe delayed language. The degree of loss may not be the only factor but others could include the lack of oral rehabilitation, inconsistency with amplification and others. (Hello, 2011). Mother did not report any difficulties with seeking speech and language therapy because she had not yet sought the service. She did not know the need for therapy in her child's language.

4.4 PARTICIPANT C

Age: 5 Years

Gender: Female

Parents Interview

4.4.1 Communication Strategies Used for Expression

Child C uses quite an average amount of gestures in her expression, coupled with keywords. With her familiar people, she will hand lead, tap the person, point, gesture and vocalize to express herself. Father reports that she is insistent with gestures when her message is not understood. Father said he enrolled her in the auditory/oral route less than two years ago, after he persisted to get that for her against all suggestions to let her use manual communication or sign language.

4.4.2 Strategies Required to Aid Understanding of Information

Father reported that information exchange between child and a partner required constant AACs. These strategies included repeating information many times, breaking information down into small bits and accompanying them with gestures and being in close proximity with

her during communication. She maintains good eye contact during interaction, follows gaze of communication partner and reads body language and mannerisms as well as lips to make sense of what is being told her. She also repeats some words in an attempt to test the meaning.

4.4.3 Clarity of Spoken Language

She is not easily understood by strangers but because she does not usually initiate interaction and can answer 'I'm fine' quite clearly, it is tricky for people to realize her language difficulties, but with father and immediate family members, she uses keywords to express her needs and make requests. Beyond the requests, conversations with her are not always intelligible, except occasional words that can be picked up, reports father.

She is currently in between schools because father does not think all the previous schools understand her communication needs enough to support her, but rather want to impose sign language on child C. Child C is friendly even with new children but not easily with unfamiliar adults.

Child C has been on an inconsistent bilateral amplification for about 2 years. She mostly has one hearing aid on and one damaged or awaiting renewal. Father also asserted that she has weekly speech therapy sessions ongoing for blocks of 6 weeks at a time and is very happy with the language progress made within a short time. Father is making plans to get cochlear implant for child C.

4.4.4 Language Analysis

Analysis from investigating into the language of child C resulted in the following: 0 utterances were generated from the photo elicitation task because her speech was not intelligible enough to transcribe for any language analysis. MLUm could not be calculated and structural analysis of the language sample could not be completed so her pragmatic skills and the intent behind her communication support strategies were analysed. Child C demonstrated good turn taking

skills, maintained good eye contact during all interactions and jointly attended to activities. There were many attempts to initiate interaction by tapping father or researcher and pointing at something while vocalizing.

4.4.5 Observation Notes of Researcher

Parent and child dynamic was quite friendly but with limits. Child C used moderate amount of gestures in her expressions and was barely intelligible except for when she used keywords that were familiar. The researcher had to repeat herself several times because she was quite self-driven and inclined to doing her own thing rather than listen to instructions. She made attempts to initiate interaction by tapping the parent or researcher to get their attention and followed with some pointing, body movements and lots of vocalizations. She enjoyed verbal rewards and needed constant repetition and modelling to get instructions, accompanied by constant prompts.

4.4.6 Summary

From the various data gathered on the participant 'C' father-child dyad, at 5 years, the child is using a very moderate amount of gestures slightly higher than a child with no HL. She is not very intelligible but can mostly send her message across between keywords and signs. Her language could not be analysed because the sample was mostly unintelligible. She had good social skills and repeated a lot after her father and the researcher. Her language levels could not be ascertained but can be estimated as being severely delayed, with not more than 50 words in her vocabulary. This is mostly pegged for language of children between 12-18 months old (Chatterjee, 2017).

4.5 PARTICIPANT D

Age: 6 Years

Gender: Female

Parents Interview

4.5.1 Communication Strategies Used for Expression

Mother reported that child D used minimal gestures and other non-verbal cues when expressing herself, either with familiar people or strangers. She is not limited in her interactions at all and her peers seem to understand her without any limitations, reported mother.

4.5.2 Strategies Required to Aid Understanding of Information

Mother reported that information exchange between child and a partner required no or little AACs. Occasionally, if something was hard for her to understand, she pointed and gestured a lot to make her point. Sometimes trying to create a picture of what she means. She keeps eye contact but does not read lips or rely heavily on any strategies of communication partners to aid understanding of information for both familiar people and strangers.

4.5.3 Clarity of Spoken Language

Mother reported that child D was pretty intelligible to all her peers at school, home and at church. She also reported that child D was always clear and intelligible to the family, teachers, classmates and sometimes to strangers. Child D used a small amount of gestures. She was very open to interacting with strangers and mum reports that strangers seemed to understand her very well.

Child D has repeated pre-school 3 times and is currently in class one. Mum is convinced that it's because previous school was not helpful with her communication needs. Mother said child is very good in arts and maths but not English and other subjects.

Child D has had about 3 years of bilateral amplification. Speech therapy has been defaulted for about a year because mother said it requires too much effort to get to the clinic and she does not see the benefit of the sessions as being very yielding.

4.5.4 Language Analysis

Analysis from investigating into the language of child D resulted in the following: 0 utterances were realised from the photo elicitation task because her speech was not intelligible enough for a satisfactory language analysis. MLUm could not be calculated. Structural analysis of the language sample could not be completed so the focus was more on her pragmatic language and the intent behind her communication support strategies if any. Child D demonstrated good turn taking skills, good eye contact and appropriate joint attention skills. There were many attempts to initiate interaction by tapping mother or researcher and pointing at something while vocalizing.

4.5.5 Observation Notes of Researcher

Parent and child dynamic was warm and cordial. Child D used minimal amount of gestures in her expressions and was also very unintelligible. The researcher requested her to repeat herself a lot but she did not seem to always be aware of the request being made of her most times. because she was not very audible in volume. She initiated interaction a few times by tapping the parent or researcher to get their attention and followed with some pointing and much vocalization. Compensation strategies employed by researcher did not seem to aid understanding for Child D. She did not always wait to hear instructions before initiating the activities and required multiple prompts and repetitions on one instruction.

4.5.6 Summary

From the varied data gathered on the participant 'D' mother-child dyad, at 6 years, the child is not using a very large amount of gestures than the average child with normal hearing. She is reported to be intelligible to most people but was barely intelligible during assessment and observation. Her language indicates quite a severe delay which cannot be placed at any particular age. Family has defaulted on speech therapy because they do not think it benefits the child and requires too much effort to get to the sessions.

4.6 PARTICIPANT E

Age: 6

Gender: Male

Parents Interview

4.6.1 Communication Strategies Used for Expression

Mother reports that child E is friendly and sociable with his friends and siblings and other known faces. He uses minimum amount of gestures to express himself and sometimes taps or points to further emphasize his point.

O, I can send him around the house without much gestures, even when I am not near him.

Mother of child 'E'

4.6.2 Strategies Required to Aid Understanding of Information

He observes gestures of communication partners occasionally to aid understanding of information but generally has no problem with understanding. In information exchange between child and a partner, both novel and familiar concepts were quite easily understood by

child with a moderate need for augmentative strategies like raised volume and some amount of repetition.

4.6.3 Clarity of Spoken Language

Mother reported that child E was fairly clear and intelligible to the family and others in his expressive communication. Apart from a few consonants he had difficulties with, he was fairly easy to understand. He was quite a shy boy and took a while to warm up to strangers, and this sometimes led him to use a low voice volume making him inaudible.

4.6.4 Language Analysis

Analysis from investigating into the language of child E resulted in the following. From 26 utterances generated from the photo elicitation task, the MLUm was 8.3. A structural analysis of the language sample showed that, child E had achieved all of Browns stages of language development. In his utterances, grammatical markers like present progressive endings (-ing), prepositions (in and on), use of plurals (–s) were present, as is characteristic of stage I and II. The presence of regular and irregular past tense, ‘s possessives, articles, third person regular and irregular present tense, and the various forms of the ‘to be’ verb shortened were all typical of the stage III-V of brown’s stages which are expected to be developed before age 5 years. Further analysis of child E’s language sample revealed an appropriate use of subjective pronouns. He answered all ‘WH’ questions quite well. He used conjunction words like ‘and’ and ‘then’. He also had an appropriate use of verbs and nouns and adjectives. For pragmatics, he was able to take turns, joint attend on a task and demonstrate good eye contact. He initiated interaction with his mother but not the researcher.

4.6.5 Observation Notes of Researcher

Parent and child dynamic was friendly and cordial. Child used minimal gestures in his expressions and was intelligible, except on some plosives. The researcher requested him to

repeat himself sometimes because he was not very audible in volume due to shyness. He did not initiate an interaction with the researcher except to request more bubbles during the icebreaker game, but initiated an interaction with his mother. He understood all instructions given him with a minimum amount of strategies. He used simple sentences in description of the photos in the elicitation task.

'Mama is wearing a red dress'

'Two boys are playing with tire'

Child 'E'

4.6.6 Summary

From the several data gathered on the participant 'E' mother-child dyad, at 6 years, the child is not using a very large amount of gestures than the regular child. He is intelligible to most people and does not rely much on gestures unless it is very necessary. His language sample shows age appropriate language skills. His sentences are about 4-5 words long and could be as a result of unfamiliarity of researcher. His grammar is quite appropriate although slightly delayed than is expected of a 6-year-old. Family is grateful and happy with the impact hearing aids and speech therapy has made in his language development.

4.7 PARTICIPANT F

Age: 10

Gender: Female

Parents Interview

4.7.1 Communication Strategies Used for Expression

Mother reports that child F uses a minimal amount of gestures and body movements in expressing herself. Hand movements and voice inflections are some of the strategies she uses discreetly to augment her intended message.

4.7.2 Strategies Required to Aid Understanding of Information

Child F follows the gaze of partners during interaction and sometimes lip reads to make sense of information being shared with her. She always needs to be in close proximity with the speaker before hearing what is said and may require constant repetition. Her frustration from not clearly hearing sometimes leads her to not ask for clarifications but do what she assumed to have heard. Mother reports that this applies to both familiar and unfamiliar people.

"She is always asking her sibling, what did mama say, what did mama say?"

Mother of child F

4.7.3 Clarity of Spoken Language

Mother reports that child F is a very fast talker and fairly intelligible when she speaks although not always easy to understand, especially by strangers because of the articulation difficulties on some consonants /f/, /p/, /d/, /b/. Mother further revealed that child F is a very friendly and helpful girl but is limited in some of the activities she would like to participate in because people make fun of her speech. She is quite a talker with her siblings and parents but not so much with novel settings.

Child F is in class 4. The appropriate class she is expected to be in. Child has drastically improved in both understanding and expression after about 4 years of unilateral aiding in the better ear. Speech and language therapy has been defaulted for a very long time. Mother could not remember how long it has been.

4.7.4 Language Analysis

Analysis from investigating into the language of child F resulted in the following. From 35 utterances generated from the photo elicitation task, the MLUm was 9.3. A structural analysis of the language sample showed that, child F had achieved all of Browns stages of language development in her utterances. Grammatical markers like present progressive endings ('-ing'), prepositions (in and on), use of plurals (–s) as is characteristic of stage I and II were present in her language. Regular and irregular past tense, possessives, articles, third person regular and irregular present tense, and various forms of the 'to be' verb shortened were all identified in her language and is typical of the stage III-V of brown's stages which are expected to be developed before age 5 years. Further analysis of child F's language sample revealed a good command and use of subjective pronouns. She understood 'WH' questions. She appropriately used conjunction words ('and' and then') and had a good command over the use of nouns, verbs and adjectives. For pragmatics, she was able to take turns, jointly attend on a task and demonstrate good eye contact. She did not initiate conversations with the researcher but did so with the mother.

4.7.5 Observation Notes of Researcher

Parent and child dynamic was friendly and cordial. Child used more pointing than any other gestures. Information had to be spoken louder for her to hear and understand or researcher had to stand close to the aided ear, which was also the better ear. She was very bright and had seemingly age appropriate language. She was witty and liked to occasionally include abstract thoughts on the pictures shown her. She could also identify certain minor details in the pictures

shown her. She was moderately easy to understand with or without gestures but was not always intelligible. Instructions from the researcher were not accompanied by much gesture but raised volume and some amount of repetition.

'You have to wash your hands before you eat'

'There is five people and four boy and the mother'

Child 'F'

4.7.6 Summary

From the various data gathered on the participant 'F' mother-child dyad, at 10 years, the child is not using a very large amount of gestures than the regular child. She is not very intelligible to most people and does not rely much on gestures unless it is very necessary. Her language sample shows delayed skills not below the age of 5 years. Her sentences are fairly long and not too complex. Her grammar is relatively appropriate but slightly delayed than is expected of a 10-year-old. Her hearing difficulties require that people repeat themselves so much with her, and to avoid this, she tries to perform what she hears on the first attempt which is not always accurate.

4.8 COMPARATIVE ANALYSIS

This section is a review of similarities and differences between the various groups in terms of age, gender, length of amplification, duration of oral rehabilitation if any, language quality etc. All 6 children in the study had been using hearing aids for over a year and the child with the longest period of amplification had been aided for 4+ years.

4.8.1 Language levels across participants

Among all the 6 children, in spite of all other variables, there existed some developmental gaps in their language. This is better described as a continuum or spectrum as there were those who had a very mild language delay and those who had really severe language delay. Specific areas such as syntax, grammar, morphology and others could not be identified as the exact difficulty running through for all participants and characterizing their language delay. The same for articulation and intelligibility, where there was a wide range from mild through to severely unintelligible. Some of the children were too unintelligible to sample any language from them.

4.8.2 Gesture use and Intelligibility across participants

On the average, gesture use among the 6 participants to aid their expressive language was relatively low and not as much as would have been expected. The children used some gestures but only as a part of total communication and not really as an alternative or supplement for expressive language.

Between the two 5-year-old participants, both were on the higher end of unintelligibility. Although they both had unilateral hearing aids fitted for the same duration, the child who was getting speech and language therapy was slightly better in language and could express her herself with keywords and was just a little bit more intelligible than the child without speech therapy. However, the slight differences between these two children cannot be attributed to only the speech therapy but other variables like sociocultural differences, schools and experience of the teachers with hearing impairment, parental efforts and resilience, parent knowledge of rehabilitation impact, degree of loss and many others.

The two 6-year olds, male and female both had no less than 3 years of hearing amplification. The male had weekly speech therapy to work on his articulation and the female had defaulted

speech therapy after attending for a while. The boy was very intelligible, except on a few consonants while the girl was barely intelligible to the researcher. Mothers information was contrary to observed intelligibility as she asserted that, the child was easily heard and understood by all.

The 10 and 8-year-old participants had slightly better language skills than the younger children. Clarity was also slightly better in the 8 and 10-year olds than the 6-year olds and 5-year olds. Degree of loss did not necessarily result in better skills in clarity, gesture use and strategies for understanding because, some children with a better degree of loss in the group had poorer skills (Child B).

4.8.3 Parental Impressions of Hearing Amplification and Communication Rehabilitation

Regarding parental impressions on the impact of the hearing aids, 5 felt their children had improved so much after being aided and those with unilateral aids for the children reported that financial constraints was definitely the reason for the inability to get 2 hearing aids. For speech and language therapy, two parents were extremely happy with the services and its impact on their children they observed. They also expressed the intentions to increase the number of sessions per week if the therapists were available, regardless of the cost, although they would also appreciate affordability if it was available. Two parents knew about the services but asserted that they did not think their children needed it. One parent was vaguely aware of the profession but had never been told that her child needed it and was neither aware of its use or value on her child's life. One parent was aware of speech therapy and had started with her child initially but had defaulted because she did not see the value and impact of the sessions. She reported that it required waking up at dawn to set off for the clinic, staying in a long queue until it was their turn, and all the therapist did was 'chat with the parent and child and send them away with homework and expected to report after about a month and a half'.

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

This section is dedicated to the discussion of the study which was based on the research questions of the study. The research questions include;

1. What is the quality of language and MLU of children with hearing loss, who use hearing aids?
2. What compensation strategies do children with hearing impairment using hearing aids need to support their understanding of information?
3. How frequently do children with hearing loss who use hearing aids use gestures in expressing themselves.

5.2 MEAN LENGTH OF UTTERANCE AND QUALITY OF LANGUAGE OF THE CHILDREN

Language for all six participants was characterized by some level of developmental delay as expected. All the children were not where they were expected to be in terms of language, although the gap ranged from very minimal delay to a severe delay, depending on which participant. Three participants had very unintelligible speech that, no language sample could be obtained for analysis. These three had to be analysed based on their social and pragmatic skills. These results were similar to that of Kennedy et al (2006) that, although better language development was associated with early identification of hearing loss, speech measures did not differ significantly between the early identified and the later identified groups. However,

Yoshinaga-Itano (2003) in her study on "Predictors for successful outcomes in children with significant hearing loss" identified that, development of speech and other social-emotional factors were associated with language development. In this regard, the three participants with poor speech clarity had a moderate amount of social pragmatics skills and were delayed significantly in others. Apart from the hearing loss, deficits in the social pragmatic skills for these children could be attributed to different factors like, shyness that may inhibit certain behaviours or cultural influences that does not permit certain things in children (e.g.: not speaking to adults until spoken to).

The other three children whose language could be sampled and analysed exhibited delays in their language skills. Their MLUm figures were not very conclusive as some of them did not make enough utterances (50-100) to calculate a reliable MLUm. These findings are in line with that of Yoshinaga-Itano et al, (2006) on the positive impact early identification and intervention had on language development in children with hearing loss and the adverse effects of late identification. Sentence structure, grammatical errors, some concepts including colours and a few others were some of the specific elements of delay the participants had, conforming to the study by Soares et al, (2010) that HL was responsible for deficits in the various aspects of children's language such as content, form and use.

Verbs and nouns knowledge and usage were not necessarily of any difficulties although some of them mixed up some gender pronouns and this was similar to findings by Amemiya et al (2013). All six participants had a moderate grasp on social pragmatic skills with some delayed skills not observed or reported on by parents such as initiating and maintaining an interaction (also possibly influenced by culture). This finding supports research by Most, Shina-August and Meilijison (2010); Moeller (2000).

Aside the Hearing Loss and late diagnosis and amplification, these findings could also be attributed to cultural and linguistic influences of first or local language; especially the tonal nature of the various Ghanaian languages which could impact content of information based on the pitch and tone. English is a second language for most Ghanaian children, because it is mostly learned in school, after children are exposed to their mother tongue or local language as the first. Some parents reinforce spoken English at home. In this instance, proficiency may not always be best as compared to the original English speaking children. Concepts like gender pronouns, specific names for some objects like shorts, shirts and others are not present in some of the local languages, especially Twi, which may be the reason why such errors were realized in the language sample of the children. Some deficits observed in pragmatic skills such as not initiating a topic for conversation could be of cultural influences. In Ghana, it is disrespectful to speak to an adult when not spoken to and to look directly in the eyes when speaking to an adult.

5.3 WHAT COMPENSATION STRATEGIES DO CHILDREN WITH HEARING IMPAIRMENT USING HEARING AIDS NEED TO SUPPORT THEIR UNDERSTANDING OF INFORMATION.

All the children under study needed various support strategies to understand information presented to them. These strategies included gestures, pointing, communication partners being on the same eye level, speaking louder, repeating information, using simple language, facial expression, lip reading and others. Each child required no less than one and at least two of these strategies at any point in time to aid understanding. It was also identified that, frequency of strategies required ranged from a continuum of mild to moderate to aid their understanding of information. The number and extent of strategies needed by child to aid understanding was dependent on factors such as;

- the communication partner, either familiar or stranger.
- The information being presented also decided how many of these strategies were in use at any point in time. Complex information versus simple information, familiar information versus novel information.
- The severity of the child's loss versus communication deficits and level of amplification. One child with severe loss required constant repetition and loud auditory input because she had on one aid and could not always hear well.
- Proximity of the communication partner determined sometimes, what strategies and how much of it a child needed to understand information.

Need for strategies for some of the children were more related to hearing difficulties and were not necessarily related to their level of understanding. Examples include repetition and raised volume as strategies for some children because they did not hear, and not necessarily because they did not understand the information. For the rest of the children, a standardized measure of their understanding was not performed and findings for their need for strategies could be attributed to other factors like shyness, English as a second language and others.

A sub theme that came up in the study indicated that, because identification and diagnosis happened quite late, most of the children did not get any support in the early years. Even after diagnosis and amplification, most mainstream teachers are not versed in teaching children with a HL, leaving these children with a big educational gap, characterized by class repetitions. This is supported by the study done by Gilani, Roditi and Bhattacharrya, (2017).

Another observation under this study objective was that, some of the parents used communication strategies like gestures even when the children did not seem to need it. This was evident in many scenarios when the children were not looking at the parents but could execute the instructions given to them.

5.4 HOW FREQUENTLY DO CHILDREN WITH HEARING LOSS WHO USE HEARING AIDS USE GESTURES IN EXPRESSING THEMSELVES

On this research question, the findings revealed that, children with a hearing loss using hearing aids, used a minimal to moderate amount of gestures to accompany their expressive language. Because they used oral communication, the participants were not very dependent on gesture to accompany their expressions, even if they were unintelligible. They used it as a regular part of communication like most children and even adults do, occasionally emphasizing their emotions and supplementing their expressions. These findings were in contrast to the expected outcomes for a higher amount of gesture use to aid their expressions. The study findings conformed to findings from Spencer's study (1993) on the Communication Behaviours of Infants with Hearing Loss and their Mothers. On the other hand, when their points were not being made or understood, children with a hearing loss resorted to using a greater amount of gestures to augment their words and vocalizations. Apart from the limited use of gestures, other non-verbal cues were a significant part of the expressions of children under this study. These included, voice inflections, facial expressions, change in body language and speech rate. This concluded that, the hearing loss was not in any way a reason why children will use more gestures than the average child with normal hearing.

5.5 FAMILY IMPRESSIONS OF AURAL/ORAL REHABILITATION

5 out of the 6 parents were very happy with the progress made in child's life after amplification. They mentioned that it was costly but the changes observed in their wards before and after the use of the hearing aids, they thought it a worthy investment.

Few of the parents were very committed to oral rehabilitation. Some had defaulted, others had never been for a session and did not even know the value of speech and language therapy in

their child's life. There were 2 parents who were very religious in keeping to speech therapy appointments and testified to how helpful it has been for their children.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter summarizes the study findings and recommendations for future studies. It also highlights on certain limitations of the study. This study used various measures to ensure trustworthiness of the results by ensuring uniformity with the site of data collection, data gathering tools and process, triangulation and others to avoid confounding results and research errors. Unfortunately, somethings were beyond control and will therefore be stated as limitations to the study.

6.2 CONCLUSIONS

In conclusion, the research questions were answered. It was identified that late diagnosis and interventions resulted in delayed language skills and the need for various strategies to understand information. Use of gesture and hearing loss were not related and language and cultural influences affected language skills.

6.4 RECOMMENDATIONS

This research initially set off to do a comparative study of children with HL and their peers with normal hearing based on the methodology of a study by Soares et al (2010). However, sampling 21 children with HL was quite difficult and the numbers could not be attained because a lot of hearing losses were diagnosed very late, and intervention was limited to a small percentage of the population. Many children who were given hearing aids were no longer

using them. Some had been sent to schools for the deaf and were using manual communication full time because the parents were not seeing any progress with the hearing aids. Others also because they could not afford to replace the hearing aids when they malfunctioned.

New-born hearing screening is recommended for all hospitals across the country, especially the regional and specialist hospitals so that HL can be identified and diagnosed early for better outcomes.

A study recommendation for future researchers to identify the reasons why parents and children resorted to manual communication after initial trial of aural rehabilitation.

Every family with a child with hearing loss and a possibility of getting fitted with hearing aids must be told about speech and language therapy services and its important contribution to the development of the child's communication.

Possible subsidy for audiological services and speech and language therapy services in the National Health Insurance Scheme for parents to afford and seek the services.

REFERENCES

Acquah, R. A. (2015). Prevalence and Risk Factors of Hearing Loss among Pediatric Patients at a Tertiary Teaching Hospital in Accra (*Unpublished MSc dissertation, University of Ghana*).

Adadey, M. W., Awandare, G., Amedofu, K. G. & Wonkam, A. (2017). Public health burden of hearing impairment and the promise of genomics and environmental research: A case study in Ghana, Africa. *Journal of Integrative Biology,* 21(11): 638- 646.

Amedofu, G. K., Brobby, G. W., and Ocansey, G. (1997). The causes and prevalence of pre-school deafness in Ghana. *African journal of health sciences*, *4*(1), 29-32.

Amemiya, E. E., Goulart, B. N. G., & Chiari, B. M. (2013). Use of nouns and verbs in the oral narrative of individuals with hearing impairment and normal hearing between 5 and 11 years of age. *Sao Paulo Medical Journal*, *131*(5), 289-295.

Babbie, E., and Mouton, J. (2001). Qualitative data analysis. *The Practice of Social Research, South Africa Edition*, 489-516.

Bellman & Symfon, 2007., Your hearing matters: why hearing is important. https://bellman.com/en/your-hearing/facts-about-hearing/

Biritwum, R. B., Devres, J. I., Ofosu-Amaah, S., Marfo, C., Essah, E. R. (2001). Prevalence of children with disabilities in central region, Ghana. *West Africa Journal of Medicine*: 20: 249–255.

Blamey, P. J., Sarant, J. Z., Paatsch, L. E., Barry, J. G., Bow, C. P., Wales, R. J., ... and Tooher, R. (2001). Relationships among speech perception, production, language, hearing loss,

and age in children with impaired hearing. *Journal of Speech, Language, and Hearing Research*, *44*(2), 264-285

Bowen, C. (1998). Brown's Stages of Syntactic and Morphological Development. Retrieved from www.speech-language-therapy.com/index.php?option=com_content&view=article&id=33

Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

CDC (2017). Hearing loss in children. Retrieved from http://www.cdc.gov

Chia, E. M., Wang, J. J., Rochtchina, E., Cumming, R. R., Newall, P., and Mitchell, P. (2007). Hearing impairment and health-related quality of life: The Blue Mountains Hearing Study. *Ear and hearing*, *28*(2), 187-195.

Creswell, J. W. (2012). Educational research. *Planning, conducting, and evaluating quantitative and qualitative research*.

Crowe, Kathryn et al. (2013). "Multilingual Children with Hearing Loss: Factors Contributing to Language Use at Home and in Early Education." *Child language teaching and therapy* 29.1 111–129. *PMC*. Web. 24 Nov. 2017.

Davies, A. (2012). Nativism. *The Encyclopedia of Applied Linguistics,* 2(2): 241- 251.

Economics, A. (2006). Listen Hear! The economic impact and cost of hearing loss in Australia. *Report for The Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation and Victorian Deaf Society*.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., and Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE open*, *4*(1), 2158244014522633.

Elzouki, A. Y. (2012). *Textbook of clinical prediatrics.* Berlin, BN: Springer.

Ghana Statistical Service (2012). Population and Housing Census. Summary of final results. Accra, Ghana Statistical Service. Retrieved from http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf

Gilani, S., Roditi, R., and Bhattacharyya, N. (2017). Grade repetition and parents' perception of hearing loss: An analysis of data from children in the United States. *The Laryngoscope*, *127*(3), 741-745.

Goines, L. & Hagler, L. (2007). Noise pollution: A modern plague. *Southern Medical Journal*, 100(2): 287- 294.

Goines, L., and Hagler, L. (2007). Noise pollution: a modern plague. *Southern Medical Journal-Birmingham Alabama-*, *100*(3), 287.

Graven, S. N. & Browne, J. V (2008). Auditory development in the fetus and infant. *Newborn and Infant Nursing Reviews,* 8(4): 12- 16.

Hauser M. D, Chomsky N, Fitch, W. T. (2002). The faculty of language: what is it, who has it, and how did it evolve? *Science*, 298 (5598): 1569–79

Hauser, M. D., Chomsky, N., and Fitch, W. T. (2002). The faculty of language: What is it, who has it, and how did it evolve?. *science*, *298*(5598), 1569-1579.

Hedeager, U. (2012). Is language unique to the human species?. Retrieved from http://www.columbia.edu/~rmk7/HC/HC_Readings/AnimalComm.pdf

Heuser Hearing Institute, (2017). The Connection Between Hearing and Speech Development Lousville. Retrieved 25 November 2017, from https://thehearinginstitute.org/connection-hearing-speech-development/

Krippendorff, K. (2004). Reliability in content analysis: Some common misconceptions and recommendations. *Human communication research*, *30*(3), 411-433.

Lauwerier, L., de Chouly, D. L. M., and Bailly, D. (2003). Hearing impairment and cognitive development. *Archives de pediatrie: organe officiel de la Societe francaise de pediatrie*, *10*(2), 140.

Leedy, P. D., and Ormrod, J. E. (2010). What is research. *practical research: planning and design*.

Lincoln, Y. S., and Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Sage.

Mathers, C., Smith, A., and Concha, M. (2000). *Global burden of hearing loss in the year 2000* (Vol. 18).

Mayer, C. (2007). What really matters in the early literacy development of deaf children. *The Journal of Deaf Studies and Deaf Education*, *12*(4), 411-431.

Mayne, A. M., Yoshinaga-Itano, C., Sedey, A. L., and Carey, A. (1998). Expressive vocabulary development of infants and toddlers who are deaf or hard of hearing. *The Volta Review*.

McLaughlin, M. R. (2011). Speech and language delay in children. *American family physician*, *83*(10).

Mitchell, R. E. and Karchmer, M. A. (2005). Parental Hearing Status and Signing among Deaf and Hard of Hearing Students. *Sign Language Studies* 5(2), 231-244. Gallaudet University Press. Retrieved November 22, 2017, from Project MUSE database.

Mitchell, R. E., and Karchmer, M. A. (2005). Parental Hearing Status and Signing among Deaf and Hard of Hearing Students. *Sign Language Studies*, *5*(2), 231-244. doi:10.1353/sls.2005.0004

Moeller, M. P. (2000). Early intervention and language development in children who are deaf and hard of hearing. *Pediatrics*, *106*(3), e43-e43.

Most, T., Shina-August, E., and Meilijson, S. (2010). Pragmatic abilities of children with hearing loss using cochlear implants or hearing aids compared to hearing children. *Journal of Deaf Studies and Deaf Education*, *15*(4), 422-437.

Mouton, J., and Babbie, E. (2001). The practice of social research. *Cape Town: Wadsworth Publishing Company*, 871-890.

Mulwafu, W., Kuper, H. & Ensink, J. H. Prevalence and causes of hearing impairment in Africa. *Tropical Medicine & International Health*, 2(2):121- 132.

Munhall, P. L. (2001). Ethical considerations in qualitative research. *P. Munhall (Ed.), Nursing research: A qualitative perspective*, 537-549.

National Institute on Deafness and other Communication Disorders. Quick Statistics About Hearing. (2017). 25 November 2017, from https://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing

Northern, J. L., and Downs, M. P. (2002). *Hearing in children*. Lippincott Williams and Wilkins.

Oishi, N. & Schacht, J. (June 2011). Emerging treatments for noise-induced hearing loss. *Expert opinion on emerging drugs*, 16 (2): 235–45.

Ojomo, O. W. (2004). Communication: theory and practice. *Language, Communication and Study Skills*, 77-95.

Olusanya, B. O., Neumann, K. J. & Saunders, J. E. (2014). The global burden of disabling hearing impairment: A call to action. *Bulletin of the World Health Organization*, 92(5): 367- 373.

Oticon, 2016. Your hearing; the importance of sound. Retrieved from https://www.oticon.com/your-hearing/children-with-hearing-loss/why-childrens-hearing-is-important

Oticon. (2017). Why hearing is important for children's development. Retrieved 15 November 2017, from https://www.oticon.com/your-hearing/children-with-hearing-loss/why-childrens-hearing-is-important

Owens Jr, R. E. (2016). Language Development: An Introduction| Edition: 9. *Instructor*.

Pipp-Siegel, S., Sedey, A., VanLeeuwen, A., and Yoshinaga-Itano, C. (2003). Mastery Motivation and Expressive Language in Young Children With Hearing Loss. *Journal of Deaf Studies and Deaf Education*, *8*(2), 133-145. Retrieved from http://www.jstor.org/stable/42658647

Polit, D. F., and Beck, C. T. (2008). Is there gender bias in nursing research?. *Research in nursing and health*, *31*(5), 417-427.

Polit, D. F., Beck, C. T., and Hungler, B. P. (2001). Evaluating measurements and data quality. *Essentials of Nursing Research: Methods, Appraisal, and Utilization*, 301-24.

Renuka Anup Chatterjee, (2011). Language Development in Children Components, Requirements and Milestones. Child health explanation. Retrieved from http://www.childhealth-explanation.com/language-development-pg2.html

Schacter, D. L. (2011). *Psychology Second Edition*, 41 Madison Avenue, New York, NY 10010.

Scott-Phillips, T. C., and Blythe, R. A. (2013). Why is combinatorial communication rare in the natural world, and why is language an exception to this trend?. *Journal of the Royal Society Interface*, *10*(88), 20130520.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information*, *22*(2), 63-75.

Shipley, K. G., and McAfee, J. G. (2015). *Assessment in speech-language pathology: A resource manual*. Nelson Education.

Soares, A. D., Goulart, B. N. G. D., and Chiari, B. M. (2010). Narrative competence among hearing-impaired and normal-hearing children: analytical cross-sectional study. *Sao Paulo Medical Journal*, *128*(5), 284-288.

Soy, Susan K. (1997). The case study as a research method. *Unpublished paper*, University of Texas at Austin

Sparrow, R. (2005). Defending deaf culture: The case of cochlear implants. *The Journal of Political Philosophy,* 13(2): 3- 5.

Spencer, P. E. (1993). The expressive communication of hearing mothers and deaf infants. *American Annals of the Deaf,* 275-283.

Stach, B. A. (2010). *Clinical audiology: An introduction (2nd ed.)*. New York. Delmar,Cengage Learning.

Stevens G, Flaxman S, Brunskill E, Mascarentas M, Mathers CD, Finucane M. (2011). Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries. *European Journal of Public Health* (23), 146–152.

Stith, J., (2016). What is Auditory-Verbal Therapy?. A parent packet. Retrieved from http://www.rchsd.org/documents/2014/04/what-is-auditory-verbal-therapy-cochlear-implant.pdf

Sutton, J., and Austin, Z. (2015). Qualitative research: data collection, analysis, and management. *The Canadian journal of hospital pharmacy*, *68*(3), 226.

Thompson-Schill, S. L., Ramscar, M., & Chrysikou, E. G. (2009). Cognition without control: When a little frontal lobe goes a long way. *Current directions in psychological science*, *18*(5), 259-263.

Wake, M., Poulakis, Z., Hughes, E. K., Carey-Sargeant, C., and Rickards, F. W. (2005). Hearing impairment: A population study of age at diagnosis, severity, and language outcomes at 7–8 years. *Archives of Disease in Childhood*, *90*(3), 238-244.

WHO (2008). The global burden of disease: 2004 update. Geneva, Switzerland: World health Organizaiton.

WHO (2018). Deafness and Hearing loss. Retrieved from http://www.who.int.

Worrall, L. & Hickson, L. M. (2003). Communication activity limitations. Clifton Park, NY: Delmar Learning.

Yoshinaga-Itano, C. (1999). Benefits of early intervention for children with hearing loss. *Otolaryngologic Clinics of North America*, *32*(6), 1089-1102.

Yoshinaga-Itano, C. (2003). From screening to early identification and intervention: Discovering predictors to successful outcomes for children with significant hearing loss. *Journal of deaf studies and deaf education*, *8*(1), 11-30.

APPENDICES

APPENDIX A

INFORMED CONSENT FORM

I, **Adelaide Emma Gyamera**, am conducting a study that will be comparing the language skills of children with hearing impairment and their peers with typical hearing. I am a final year student offering MSc. Speech and Language Therapy with the School of Biomedical and Allied Health Sciences, College of Health Sciences, University of Ghana, Korle Bu.

The focus of this proposed study is to find out the kind of impact that hearing impairment has on the language skills of Ghanaian children. You and your ward, participating in this study will be audio and video recorded for your responses. A questionnaire will be provided for your account on your Childs language.

The information you provide will not be harmful to you in anyway. Privacy and confidentiality is assured, and your data will not be made available to anyone but the researcher. If this study is published in any journal, you and your ward will not be identified by name.

There is no risk involved in this study. A little amount of your time and that of your child is what will be required.

Participation is voluntary, without any cost and you are free to withdraw at any point without any consequences. The researcher will be available and willing to answer any further questions about the research now or during the study.

CONSENT

I agree that the research project named above has been explained to my satisfaction and I agree to partake in this study. By signing this form, I agree to avail myself and my child for this study and to receive a copy of this consent form for my records.

NAME OF RESEARCHER …….

DATE ……. SIGNATURE ……

NAME OF PARTICIPANT ……

SIGNATURE/THUMBPRINT …… DATE ……

MOBILE NUMBER …….

APPENDIX B

QUESTIONNAIRE

Particpant's ID **Age of Child:**

Gender of child: **Languages spoken:**

Area of Residence: **Parents Occupation:**

1. Does your child maintain eye contact when talking to you and others?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

2. Does your child use gestures when communicating with you or others?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

3. Are you able to hear your child clearly when he or she speaks to you?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

4. Are others able to hear your child clearly when he or she speaks to them?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

5. Are you able to understand your child when he or she speaks to u?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

6. Are others able to understand your child when he or she speaks to them?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

7. Do you repeat yourself a lot when talking to your child?

1. Not at all 2. Barely 3. Fairly 4. Quite a lot 5. Constantly

8. Do people have to repeat themselves when talking to your child?

1. Not at all 2. Barely 3. Fairly 4. Quite well 5. Excellently

9. How loudly do you have to speak when talking to your child?

1. Not at all 2. Barely 3. Fairly loud 4. Quite loud 5. Very loud

COMMENTS: ……..

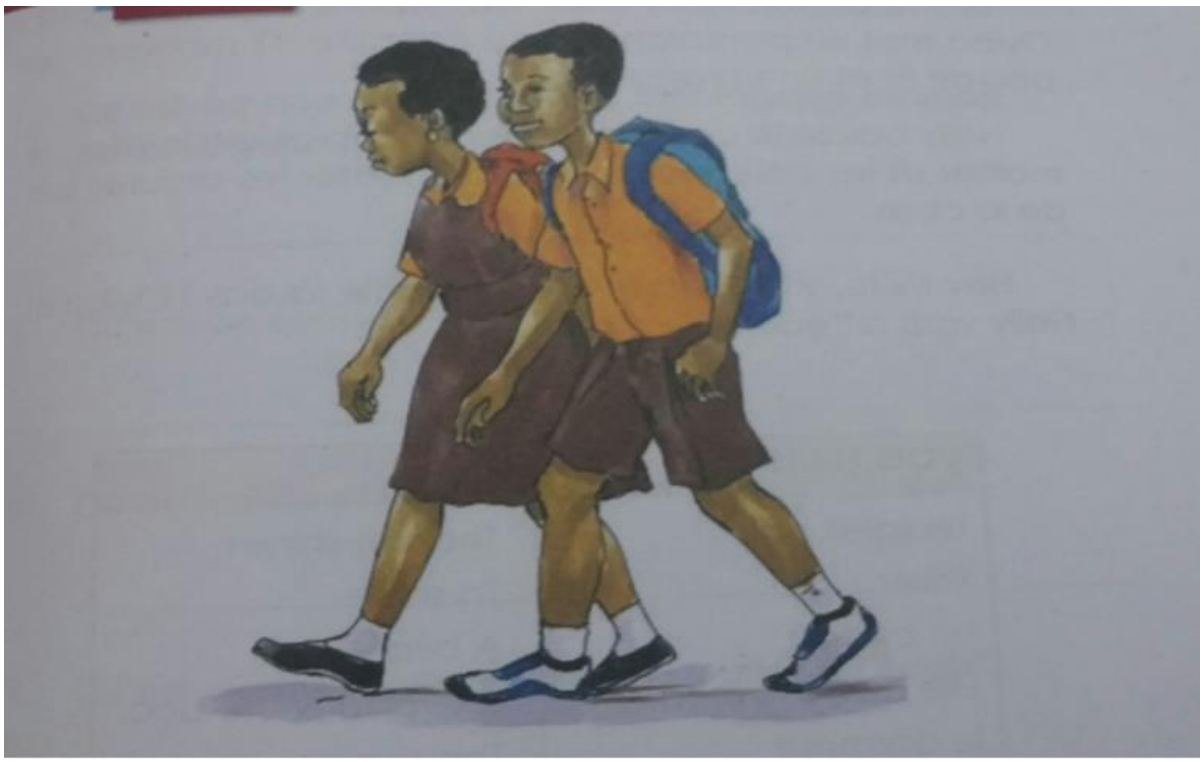
……...

……

……

APPENDIX C

PHOTOS FOR ELICITATION TASK



APPENDIX D

UNIVERSITY OF GHANA
SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES

30th January, 2018.

Ref. No.

Ms. Adelaide Emma Gyamera
Dept. of Audiology, Speech and Language Therapy
SBAHS,
Korle-Bu.

Dear Ms. Adelaide Emma Gyamera,

ETHICS CLEARANCE

Ethics Identification Number: SBAHS – ASLT/10303771/SA/2017-2018.

Following a meeting of the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences held on Tuesday 30th January, 2018. I write on behalf of the Committee to approve your research proposal as follows:

TITLE OF RESEARCH PROPOSAL: EXPLORING THE LANGUAGE SKILLS AND COMMUNICATION STRATEGIES USED BY CHILDREN (5-11 YEARS) WITH A MODERATE TO PROFOUND (55Db-90dB) HEARING LOSS WHO USE HEARING AIDS, IN ACCRA, GHANA.

This approval requires that you submit three-monthly review reports of the protocol to the Committee and a final full review to the Committee on completion of the research. The Committee may observe the procedures and records of the research during and after implementation.

Please note that any significant modification of the research must be submitted to the Committee for review and approval before its implementation.

You are required to report all serious adverse events related to this research to the Committee within seven (7) days verbally and fourteen (14) days in writing.

As part of the review process, it is the Committee's duty to review the ethical aspects of any manuscript that may be produced from this research. You will therefore, be required to furnish the Committee with any manuscript for publication.

This reviewed report is valid till 31st. August, 2018.

Please always quote the ethical identification number in all future correspondence in relation to this protocol.

Thank you.

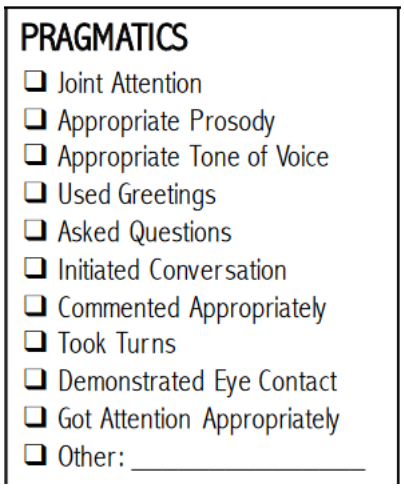
Yours sincerely,

Dr. S. D. Amanquah
(Chairman, Ethics and Protocol Review Committee)

Cc: Dean
Head, Dept. of Audiology, Speech and Language Therapy
School Officer

COLLEGE OF HEALTH SCIENCES
P. O. Box KB 143, Korle Bu, Accra, Ghana.
• Telephone: +233 (0) 302 687 975 • Email: sbahs@chs.ug.edu.gh • Website: www.chs.ug.edu.gh

APPENDIX E



Source: www.speechymusings.com

APPENDIX F

SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES COLLEGE OF HEALTH SCIENCES, UNIVERSITY OF GHANA

Title of research: The Language Skills and Communication Strategies Used By Children (5-11 Years) With A Moderate To Profound Hearing Loss, In Accra, Ghana.

Researcher: Adelaide Emma Gyamera

Mobile number: 0275122606

PARTICPANT CODE	**AGE**	**GENDER**	**DEGREE OF HL**
	MLU	**UNDERSTANDING**	**GESTURES**
OBSERVATION SCORES			
TASK SCORES			
QUESTIONNAIRE SCORES			
COMMENTS			