PREVALENCE AND CORRELATES OF DEVELOPMENTAL DELAY AMONG UNDER-FIVE CHILDREN IN TWO RURAL COMMUNITIES OF OTA, OGUN STATE, NIGERIA

BY

CHRISTIANAH DAMILOLA, OGUNTOYINBO

B.Sc. Child Development (Abeokuta)

(MATRIC NO: 180433)

A PROJECT SUBMITTED TO THE CENTRE FOR CHILD AND ADOLESCENT MENTAL

HEALTH, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN CHILD AND ADOLESCENT MENTAL HEALTH OF THE

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

JULY, 2015

DECLARATION

This dissertation is submitted in partial fulfillment for the award of Master of Science Degree in Child and Adolescent Mental Health, University of Ibadan.

I hereby declare that this study has not been presented to any other University for the award of Master of Science Degree nor has it been submitted elsewhere for publication.

………………………………………………………………………………..

Christianah Damilola **OGUNTOYINBO**

CERTIFICATION

We certify that this work was carried out under our supervision by Miss Christianah Damilola Oguntoyinbo in the Centre for Child and Adolescent Mental Health, University of Ibadan.

....

Supervisor

Dr. A.E. Orimadegun

M.B;B.S, M.Sc. Epidemiology (Ibadan), M.Sc. Clinical Trials (London), FWACP

Senior Research Fellow and Consultant Pediatrician, Institute of Child Health,

College of Medicine,

University of Ibadan, Nigeria.

....

Co-Supervisor

Dr. Inyang Takon

MBBS, MPH , M.Sc. Comm Paeds (London), M.Sc. Clinical Neuropsychiatry (Birmingham), MRCPH, FRCPCH, FWACP.

Consultant Paediatrician, Department of Paediatrics.

East and North Hertfordshire NHS Trust, Queen Elizabeth II Hospital

Welwyn Garden City, Hertfordshire, United Kingdom.

AL7 4HQ

DEDICATION

This dissertation is dedicated to God Almighty, My Strong tower and to all under-five children in developing countries especially my country-Nigeria.

ACKNOWLEDGEMENTS

My sincere appreciation goes to God Almighty, the awesome one, whose grace saw me through the period of this programme. Achievement of this work would not have been possible if not for your sufficient grace, favour and mercy.

I would like to immensely thank my Supervisors, Dr. A.E. Orimadegun for his great supervision and guidance throughout the period of this research and writing of this dissertation despite his tight schedule. I salute the advice, corrections and the great works done sir. And also to my able Dr. inyang Takon, who despite the distance, made herself available and accessible for me and guided me through the research. I appreciate the entire efforts ma and value the corrections.

Am sincerely grateful to the management and staff of the Centre for Child and Adolescent Mental Health for their encouragement and support during the course of this programme. Most especially the Director, Prof. O.O. Omigbodun, I appreciate the advice and support provided at various stages of this project. I am also grateful to all other lecturers at the department for their help and tutelage during my programme.

To my adorable, caring, supportive mirror of life and my precious-priceless gold, Mr. & Mrs. Olufemi Oguntoyinbo who supported me to this very level and believed in me. I can never forget the role you both played in your "Damiscocoa's" life, I cherish and adore you. And my siblings-Dare, Dan, Dayo, Dara, Manuel and Eliz. I say am glad to be part of that lovely family. I cannot but also appreciate the efforts of the passionate love of my life- Olufemi Temidayomi, who stood by me all through the way.

My heartfelt thanks go to all my colleagues, with whom I passed through thick and thin, your undaunted spirit, has been a form of encouragement to me. Most especially my dear friend, Mrs.Elizabeth Fadumiyo-Akinyemi , my lovely Mother of life who was a darling moma to me all through my stay in Ibadan- Mrs. Funmilayo Adeyanju and also Olakunlemi, Adeola, Koroma and Dr. Lasisi for your support during the period of this course. I love you all.

TABLE OF CONTENTS

CHAPTER THREE

CHAPTER FOUR

CHAPTER FIVE

Samples of Ages & Stages Questionnaire (4 and 60 months)

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADHD	Attention Deficit Hyperactivity Disorder
ASQ	Ages & Stages Questionnaire
BSD-III	Bayley Scales Of Infant And Toddler Development, Third Edition
CDC	Centre For Disease Control And Prevention
DD	Developmental Delay
DDST	Denver Developmental Screening Tools.
DSI	Developmental Screening Inventory
HIV	Human Immunodeficiency Virus
ICMR	Indian Council Of Medical Research
IQ	Intelligence Quotient
LAMI	Low And Middle Income Countries
LGA	Local Government Area
MDAT	The Malawi Developmental Assessment Tool
MDG	Millennium Development Goal
PEDS	Parents' Evaluation Of Developmental Status
PHC	Primary Health Care
SES	Socioeconomic Status
WHO	World Health Organization

ABSTRACT

Developmental Delay (DD), which connotes failure to attain language, motor and social skills as well as personal adaptation expected for age, is a growing major public health concern and could be a vital impediment to attainment of optimal potentials in children. The need for early detection and administration of appropriate interventions underscores the importance of screening children at every opportunity. However, data on burden and potential factors associated with Developmental delay which are essential for health policy and planning are scarce in Nigeria. Therefore, this study was carried out to determine the prevalence and correlates of developmental delays among children under-five in two rural communities of Ota, Ogun State, Nigeria.

In this cross sectional study, cluster sampling method was adopted to select 420 under-five year old children in two communities, Lusada and Ketu Adie-Owe in Ota, Ogun state, Nigeria. A structured interviewer-administered questionnaire containing sections on demographic characteristics, socio-economic status and also, items adapted from "Ages and Stages Questionnaire (ASQ)" were used to collect data from mothers/caregivers. Observation of child's activities and physical examination were also carried out. Children were classified into two groups: "isolated developmental delay" (defined as having delays in only one domain) and "global developmental delay" (defined as those who had delay in two or more domains). Data for 417 children, with complete information, were summarized using descriptive statistics and Chi square was used to test associations among developmental delays, socio-demographic characteristics and ASQ scores in each domain of development. Level of statistical significance was set at $p = 0.05$.

Of the 417 children, 48.2% were males and 51.8% were females. The mean age of the children was 19.7±14.7 months. Majority (43%) of the mothers were in the age range 20-29 years. A good number (52.1%) of the mothers were from the Yoruba ethnic group and 49.2% were petty traders. A total of 110 (26.4%) children had one or more types developmental delays in various domains. The prevalence of isolated developmental delay and global developmental delay was 19.9% and 6.5%, respectively. In this study, prevalence was determined by delay in atleast one

domain of the Ages and Stages Questionnaire which was 26.4%. There was no significant association between developmental delay and maternal age, maternal age at conception, education, ethnicity/tribe and marital status.

There exists a high burden of developmental delay among under-five children in the study area and no socio-demographic characteristics could be convincingly attributed to children at risk. There is the need to conduct further research to elucidate factors that may potentially be used to design appropriate interventions.

Keywords: Child Development, Rural population, Socio-demographic factor, Early Intervention, Under-fives.

Word Count: 437

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Child development refers to the biological, psychological and emotional changes that occur in human beings between birth and the end of adolescence, as the individual progresses from dependency to increasing autonomy Davies (2004). The process of development involves qualitative and quantitative changes with acquisition of a variety of competence for functioning optimally within a social milieu. It is characterised by specific behaviours or physical skills as the child grows and develops. These behaviours or physical skills are known as "Developmental milestones". Developmental delay is said to occur if the child does not reach developmental milestones at the expected age (Simeonsson and Sharp, 1992). Developmental delay is then a term used for children who lack developmental features and skills in the language, motor and social/personal adaptation developmental areas that would be expected of children of their age (Peter et al., 1998).

Human development is a complex phenomenon. It comprises of physical development, intellectual development, personality and social development. Child health and development form part of the core components of the millennium development goals set by the United Nations Member States to be achieved by the year 2015. However, this laudable goal can only be fully achieved with due consideration of health surveillance of pre-school age children.

Five key domains of development are recognized for children less than five years of age namely: gross motor skills, fine motor skills, communication skills, cognition skills and social/personal

activities (National Infant & Toddler Child Care Initiative, 2010). These are expected changes in skill developments that a child must pass through at predictable periods and in a predictable manner. A child may be affected in one or more of these domains during growth and development which underscores the importance of proper developmental screening (Poon et al., 2010).

Prevention of disabilities in infants is often beset with problems including non-detection or late identification of delayed development. A survey conducted in the United State of America revealed that about 16% of children are affected by various disabilities caused by speech and language delay, learning disabilities and emotional/ behavioral problems. However, only 30% of such children were identified before school entrance age (Earls and Hay, 2006).

The importance of early child development on all dimensions of individual wellbeing in later stages of life has been well documented in developed countries. On average, developmental delays during early childhood are associated with poorer schooling outcomes, lower incomes, and substantially higher risks of ill health during adult life Currie (2000). An estimated 200 million children in sub-Saharan Africa and Southeast Asia are assumed to remain below their developmental potential today Boivin, (2002). While it is generally presumed that one of the principal drivers of delayed child development is in utero and early childhood health (Boivin et al., 2007; John et al., 2008), causal evidence is still limited and particularly lacking in the context of infectious diseases in developing countries.

Early identification and timely intervention in populations with established risks can improve the functional capacities of these children Majnemer (1998); (Meliegy and Sabbagh, 2004)).

Unfortunately, clinicians frequently postpone the referral of these children to early interventional services, and moreover, experienced clinicians have demonstrated difficulties in the identification of children with mild Developmental delays who are eligible for early intervention (Campell et al., 2002; Rydz et al., 2006).

Though a number of studies relating to child development have been conducted in Africa and Nigeria, many of them were carried out in school and hospital based settings and may not be representative of the magnitude of the problem in the community. Given the importance of early detection of delayed child development, this study set to determine the prevalence and correlates of developmental delays among under- five children in a rural community-based setting, in Nigeria using the Ages and Stages Questionnaire (ASQ).

1.2 STATEMENT OF THE PROBLEM

Worldwide, neurological disorders account for about 20% of the burden of diseases, and most of these disorders occur in the subtropical region where preventable causes are very prominent (Burton and Allen, 2003). A delay in growth and development can be traced back to the prenatal period. The main cause of developmental disabilities is often unknown, but biological factors, complications of pregnancy, and environmental factors are often implicated (Singh et al., 2002; Persha and Rao, 2003).

According to the World Health Organization (WHO), about 5% of the world's children 14 years of age and under have a moderate to severe developmental disability, and up to 15% of children less than 5 years of age have a developmental disorder WHO (2008), Due to the numerous problems involved with having a child afflicted by developmental delay, early diagnosis and

timely referral are very important and can benefit children with developmental disabilities and their families (Lin et al, 2009). Thus, monitoring child development and screening to detect such problems at each child visit is very important. Concern should be shown to tackle the challenges of childhood developmental disorders especially in resource-poor settings like Nigeria.

In the developed countries, there is a general consensus regarding the importance of monitoring children's development through systematic screening Radecki (2011). Developmental screening is a globally adopted measure by which children at various set ages (2 to 60 months) are routinely assessed to detect those at high risk for significant unsuspected deviation from normal. The screening forms part of the key components in preventive care of children with a view to facilitate early identification and referral of the affected infants and children who need early intervention.

In Nigeria, the need to optimize the development of children and that of those with developmental disorders has been largely ignored. Although the government is signatory to the MDGs and has also adopted the Child Rights Act (2003) but enough is not being done to promote the growth and development of children.

It is desirable for national and local surveys to be done to determine the exact burden of the situation so that specific strategies can be put in place to address the needs for optimal development in children. This is especially important where utilization of health facilities for preventive services is very low. Since Promotion of Mental Health is one of the components of the Primary Health Care System in Nigeria, can we strengthen this level of health care so as to detect and refer affected children early?

In Nigeria, the Nigeria's Child Rights Act of 2003 states, among others, that *every child has a right to survival and development*. It defined *free, compulsory basic education* as the *right of every child* and charged government with the responsibility of providing this. Furthermore, it pleaded with governments, guardians and institutions to endeavour to provide for the child, the best attainable state of health. These rights can only be attained when the myriads of children with different degrees of developmental disorders are identified and a system of support provided to ensure they attain their optimal developmental potentials. A country's future human resource development is determined on the basis of the developmental indices like infant mortality, morbidity, prevalence of disability, living conditions and education of children, especially the under-fives. If developmental delays are detected too late, opportunities for early intervention may be missed.

1.3 AIM

The aim of this study was to determine the prevalence and correlates of developmental delays among under-five children in two rural communities of Ota, Ogun State, Nigeria.

1.4 SPECIFIC OBJECTIVES

1. To determine the prevalence of age-specific developmental delays among children under-five years old.

2. To describe the spectrum of prevalent developmental delays common among under 5-year-old children.

3. To identify socio-demographic characteristics associated with developmental delays.

1.5 RESEARCH QUESTIONS

This study has therefore provided answers to the following questions:

1. What is the prevalence of developmental delays among under- five years children in Ota?

2. What types of developmental delays are common among under-five children in Ota?

3. What socio-demographic characteristic interrelates with developmental delays among under- five children in Ota?

1.6 OPERATIONAL DEFINITION OF TERMS AND VARIABLES

Prevalence: Is the proportion of a population found to have a condition (typically a disease or a risk factor). It is arrived at by comparing the number of people found to have the condition with the total number of people studied.

Correlates: A mutual relationship or connection, in which one thing affects or depends on another.

Child development: All areas of development including cognitive, language, emotional, behavioral, social, fine and gross motor.

Developmental milestone: Is a transition process in which a child attains certain developmental features and skills in the language, cognitive, motor and social/personal, adaptation developmental areas at an expected age

Developmental delay: Is a term used for children who lack developmental features and skills in all developmental areas that would be expected of children of their age**.**

Domains: These are developmental skill areas that are usually evaluated during developmental assessment/ screening. The five domains assessed using the Ages and Stages Questionnaire are Communication, Gross motor, Fine motor, Personal- Social and Problem- solving.

Under-five: Children less than five years old.

Rural community   Remote area that lack most basic social amenities.

Source: (http://www.oup.com: Oxford English dictionary, 5th Edition, 1999)

CHAPTER TWO

LITERATURE REVIEW

2.1 CHILD DEVELOPMENT

Child Development refers to the biological, psychological, and emotional changes that occur in human beings between birth and the end of adolescence, as the individual progresses from dependency to increasing autonomy. It is a continuous process with a predictable sequence yet having a unique course for every child. It does not progress at the same rate and each stage is affected by the preceding types of development. Because these developmental changes may be strongly influenced by genetic factors and events during prenatal life, genetics and prenatal development are usually included as part of the study of child development.

Related terms include developmental psychology, referring to development throughout the lifespan, and pediatrics, the branch of medicine relating to the care of children. Developmental change may occur as a result of genetically-controlled processes known as maturation (Toga et al., 2006) or as a result of environmental factors and learning, but most commonly involves an interaction between the two. It may also occur as a result of human nature and our ability to learn from our environment.

Establishing the concept of child development is no simple task. It varies according to the theoretical framework to be adopted and the aspects to be addressed. For the pediatrician, there is the classical definition of (Marcondes et al., 1991) who says that "development is the growing capacity of the individual to perform increasingly complex functions." The pediatric neurologist, on the other hand, will focus on maturation of the central nervous system; the psychologist, on

cognitive aspects, intelligence, adaptation, and the ability to relate to the environment; and the psychoanalyst, on relationships with others and development of the psyche.

For (Mussen et al., 2001) development is defined as "systematic, long-lasting changes in physical and neurological, cognitive, and behavioral structures." The fundamental basis of development is about discovering how and why the human organism grows and changes throughout life.

There are various definitions of periods in a child's development, since each period is a continuum with individual differences regarding start and ending. Some age-related development periods and examples of defined intervals are: Newborn (ages 0–4 weeks); Infant (ages 4 weeks – 1 year); Toddler (ages 1–3 years); Preschooler (ages 4–6 years); School-aged child (ages 6–13 years); Adolescent (ages 13–19) (Kail and Robert, 2011). However, organizations like Zero to Three and the World Association for Infant Mental Health use the term infant as a broad category, including children from birth to age 3.

Study of child development had been the curiosity of man since the end of 18th century. The first detailed record of development of a child was published by (Tiedemann, 1787) in Germany. Almost a century later, (Charles Darwin, 1872) published a detailed account of the development of his own child up to 18 years of age. He described the cephalocaudal sequence and the continuous developmental process in a child.

In another study by (Stern and Kuhlman, 1912), they suggested that the child's relative status could be indicated by a ratio between his mental age and his chronological age – the Intelligence Quotient (IQ). Arnold, (1925) established norms of development in a series of children

(Marchese, 1995). In (1933), Bayley established norms for cognitive development on a large number of children. Ruth Griffiths (1954), published the Denver Study based on a sample of 1000 children for developmental assessment.

Promoting child development through parental training, among other factors, promotes excellent rates of child development Vilaça (2012). Parents play a large role in a child's life, socialization, and development. Having multiple parents can add stability to the child's life and therefore encourage healthy development. Another influential factor in a child's development is the quality of their care. Child care programs present a critical opportunity for the promotion of child development.

The optimal development of children is considered vital to society and so it is important to understand the social, cognitive, emotional, and educational development of children. Increased research and interest in this field has resulted in new theories and strategies, with specific regard to practice that promotes development within the school system. In addition there are also some theories that seek to describe a sequence of states that compose child development.

In this context, we should consider educational institutions in the discussion of child development. (Maia and Williams, 2005) Studies showed that infants enter these environments with approximately 3 months old and remain there most of the day (Baltieri et al, 2010). It should be remembered that the child is placed in an environment that is supposed to promote development, provided that the institution is well structured and can provide the right incentives and qualified educators. However, if the institution fails to provide timely and appropriate experiences, it may contribute to impaired child development (Baltieri et al., 2010; Santos et al.,

2009). It is important then, to seek certification of school environments that promote a healthy development.

2.2 IMPORTANCE OF THE EARLY YEARS

The importance of the early years in human development is neither a new nor a Western concept; nor is it, in fact, a concept that is foreign to medical sciences. The works of Avicenna (980–1037), a Persian physician who is considered the father of modern medicine, and Darwin (1809–1882) the founder of the theory of evolution, demonstrate that the concept of early childhood development has occupied the minds of physicians, philosophers, scientists and caregivers for hundreds of years.

According to Avicenna, the early years are the most important stage in the life of an individual: "the infant is exposed to problems and difficulties soon after birth and in the early stages of childhood and these influence his psychology and temperament, and hence his moral and ethical development". Darwin, on the other hand, kept detailed records of the development of his son, providing one of the first systematic studies of child development Darwin (1877). A large body of scientific research has been conducted since these early attempts to understand study and explain child development.

In addition to the bio-ecological model, two other theoretical concepts – attachment theory and the concept of "the motherhood constellation" – provide guidance on how clinicians can support child development. Attachment theory, developed by Bowlby (1978), suggests that a stable, responsive, nurturing primary relationship enables the child to regulate his or her emotions and

develop a secure base from which to explore, learn and form relationships with others. Attachment theory implies that interventions in primary care should address the "caregiver–child" dyad and support parents in helping their infants develop secure attachment. Research in developmental psychology and child psychiatry has shown that a secure attachment to a primary caregiver is associated with healthy emotional and cognitive functioning in later life (Boris et al., 2000). Recent research on children raised in orphanages supports the importance of early relationships and stimulating environments during the early years of life, showing that the cognitive outcome of abandoned children brought up in institutions was markedly below that of abandoned children placed in institutions but then moved to foster care (Nelson et al., 2007).

"The motherhood constellation" is a theoretical construct developed by Stern (1998), a pioneer in infant development and mental health. He refers to the birth of a child and the early years as a specific era of emotional development for the mother. The pregnancy and the birth of the baby change her mental organization, so that her primary preoccupations become keeping the infant alive and protected, caring for the baby so that he or she will become "her" baby and not just any baby (enabling attachment), and creating a supportive, psychologically "holding" environment that supports her mothering. Stern calls this construct "the motherhood constellation". In the past few decades, new imaging techniques have provided further information on the development of the human brain. Dynamic brain-imaging technology has demonstrated that the full complement of neurons is formed before the third trimester of pregnancy, but that the connections or synapses between these neurons largely develop after birth. This synaptogenesis, and the later "pruning" processes that occur in the developing brain, are constructed to a large degree in the early years

within the caregiving environment. The quality of the everyday actions of the parents smiling, talking, cuddling, singing, and responding to the infant, shapes the circuitry of the developing brain (Shore, 1997; Hannon, 2003).

2.3 DEVELOPMENTAL MILESTONES AND DELAYS

As a child grows and develops, he learns different skills, such as taking a first step, smiling for the first time, or waving goodbye. These skills are known as developmental milestones. There is normal variation around what age children will achieve a specific developmental milestone.

Developmental delay refers to a child who is not achieving milestones within the age range of that normal variability. Most often, at least initially, it is difficult or impossible to determine whether the delay is a marker of a long-term issue with development or learning (i.e. known as a disability) or whether the child will 'catch-up' and be 'typical' in their development and learning. There are five main groups of skills that make up the developmental milestones. A child may have a developmental delay in one or more of these areas:

- **Gross motor**: using large groups of muscles to sit, stand, walk, run, etc., keeping balance and changing positions.

- **Fine motor**: using hands and fingers to be able to eat, draw, dress, play, write and do many other things.

- **Language**: speaking, using body language and gestures, communicating and understanding what others say.

- **Cognitive**: Thinking skills including learning, understanding, problem-solving, reasoning and remembering.

- **Social**: Interacting with others, having relationships with family, friends, and teachers, cooperating and responding to the feelings of others. (Kail and Robert, 2011)

Milestones are changes in specific physical and mental abilities (such as walking and understanding language) that mark the end of one developmental period and the beginning of another (Center for Disease Control and Prevention, CDC). For stage theories, milestones indicate a stage transition. Studies of the accomplishment of many developmental tasks have established typical chronological ages associated with developmental milestones. However, there is considerable variation in the achievement of milestones, even between children with developmental trajectories within the typical range. Some milestones are more variable than others; for example, receptive speech indicators do not show much variation among children with typical hearing, but expressive speech milestones can be quite variable.

A common concern in child development is developmental delay involving a delay in an age-specific ability for important developmental milestones Berk (2006). Prevention of and early intervention in developmental delay are significant topics in the study of child development. Developmental delays should be diagnosed by comparison with characteristic variability of a milestone, not with respect to average age at achievement. An example of a milestone would be eye-hand coordination, which includes a child's increasing ability to manipulate objects in a coordinated manner. Increased knowledge of age-specific milestones allows parents and others to keep track of appropriate development.

Usually, there is an age range of several months where a child is expected to learn these new skills. If the normal age range for walking is 9 to 15 months, and a child still isn't walking by 20 months, this would be considered a developmental delay (2 standard deviations below the mean). A delay in one area of development may be accompanied by a delay in another area. For example, if there is a difficulty in speech and language, a delay in other areas such as social or cognitive development may coexist (Prosser and Le Couteur, 1997).

It is important to identify developmental delays early so that treatment can minimize the effects of the problem. Parents who have concerns about their child's development should consult the child's physician, who, in turn, might make a referral to a developmental pediatrician, developmental psychologist or pediatric neurologist. The consultant can evaluate the child and recommend treatments and therapies that might benefit the child. (Source: www.firstsigns.org/delays).

2.3.1 *Diagnosis of Developmental Delay*

Developmental delay can be difficult to diagnose. There are two types of tests that can be done, developmental screening and developmental evaluation. Doctors, nurses and specialists use developmental screening to tell if children are learning basic skills when they should, or if they might have problems. Your child's doctor may ask you questions or talk and play with your child during an exam to see how he or she learns, speaks, behaves and moves. Since there is no lab or blood test to tell if your child may have a delay, the developmental screening will help tell if your child needs to see a specialist. (Parker and Zuckerman, 1995)

A diagnosis cannot be made simply by using a screening test. If the results of a screening test suggest a child may have a developmental delay, the child should be referred for a developmental evaluation (Long, 1996).

A developmental evaluation is an in-depth assessment of a child's skills and should be administered by a highly trained professional, such as a developmental psychologist; developmental paediatrician or paediatric neurologist. If the delays are suspected in only one area, the child might be referred to a specialist in that area such as a physical or occupational therapist or speech and language pathologist. In some cases, the child's development may be assessed by the communities' early intervention program. If a delay is confirmed, the child will then be referred to one of the above specialists to try and sort out why the child is delayed (Long, 1996). The results of a developmental evaluation are used to determine if the child is in need of further diagnostic tests, early intervention services and/or a treatment plan.

There are a variety of screening and evaluation tools for professionals to use. Early intervention treatments and therapies have the highest success rates when they are provided to children as early as possible in their development. Parents of children with concerns for developmental delay are encouraged to have their child evaluated by a clinician in a timely manner. (Rydz et. al., 2005)

Table 2.1 Developmental Milestone Table

The milestones in this section were developed by the My Child without Limits Advisory Committee and the Center for Disease Control and Prevention (CDC)

2 months	4 months	6 months
• Turns heads toward bright colors and lights • Recognize bottle or breast • Respond to their parent's voice • Makes cooing sounds • Brings hands together • Wiggles and kicks with arms and legs • Lifts head when on stomach • Becomes quiet in response to sound, especially to speech	• Makes sounds with expression as if trying to talk • Attempts to imitate sounds when engaged in vocal play with parent • Follows moving objects with their eyes from side to side • Holds head steady • Pushes down on legs when feet are on a hard surface • Recognize familiar people and things at a distance • Lets you know if they are happy or sad	• Shows some response when named is called • Turns toward the source of sounds • Reaches for objects and picks them up • Plays with their feet when laying on back • Helps hold the bottle during feeding • Knows familiar faces and begins to know if someone is a stranger • Attempts to imitate speech sounds • Rolls over

Source: Center for Disease Control and Prevention (CDC)

9 months	1 year	18 Months
- Has favourite toys	- Get to a sitting position	- Likes to push and pull objects
• Shows some ability to understand the word "no"	• Stand briefly without support	• Says at least six words
• Uses fingers to point at things	• Imitate adults using a cup or telephone	• Follows simple directions
• May be afraid of strangers	• Play peek-a-boo and patty cake	• Pulls off shoes, socks and mittens
• Can sit without support	• Wave bye-bye	• Can point to a picture that you name in a book
• Crawls	• Puts objects in a container	• Feeds themselves
• Copy sounds and gestures of others	• Makes "ma-ma" or "da-da" sounds	• Makes marks on paper with crayons
		• Walks without help
		• Walks backwards
		• Points to things they want and tries to use words to ask for things

2 years	3 years	4 years
• Creates and uses two word phrases • Says more words that you can easily count • Recognizes familiar pictures • Kicks a ball forward • Feed themselves with a spoon to feed themselves (not necessarily neatly) • Demands a lot of your attention • When playing with a book, turns pages, although may turn two or three pages together • Identifies central body parts such as belly, eyes, ears and nose by pointing • Shows affection	• Throws a ball overhand • Rides a tricycle • Can put on their shoes • Opens doors in the home • When playing with a book, can turn one page at a time • Plays with other children for a few minutes • Repeats common rhymes • Able to use small sentences when speaking • Name at least one color correctly	• Sometimes uses five to six word sentences when talking • Throws a ball overhand • Understand the concept of counting and may know a few numbers (e.g understands 'you can only have one') • Attempts to draw a person resulting in a drawing with at least two body parts • Recalls and is able to tell parts of stories • Begin to have a clearer sense of time • Understand the concepts of "same" and "different" • Has imagination and shows fantasy elements in play (e.g may be afraid of "monsters", may like to dress up)

5 years	**Remember**
• Sometimes uses five to six word sentences when talking • Fantasy play • Understands gender (e.g knows they are a boy or girl, knows mommy is a girl and daddy is a boy) • Can count 10 or more objects • Tells longer stories • Says name and address (if taught address) • Hops, somersaults, swings, climbs • Attempts to draw a person has a two dimensional body (e.g a circle instead of a stick for a body) • Can print some letters (if taught) • Can dress and undress without help • Use fork, spoon and (sometimes) a table knife	The developmental milestones here will give you a general idea of the changes you can expect. If your child is not meeting the milestones for his or her age, or if you think there could be a problem with the way your child plays, learns, speaks, or acts, talk to your child's doctor and share your concerns. Don't wait.

Source: Center for Disease Control and Prevention (CDC)

2.4 PREVALENCE OF DEVELOPMENTAL DELAYS

According to the World Health Organization, about 5% of children world-wide of 14- year-old and under have a moderate to severe developmental disability, and up to 15% of children under 5-year-old are developmentally delayed.

About 10 percent of all infants, toddlers, and preschool children are classified as developmentally delayed (U.S. Department of Education, 1995). Possible causes for developmental delays are numerous

The World Health Organization (WHO) estimates that 10% of the people in any country have some type of impairment. In Latin America, with an estimated population of 930,690,000 inhabitants in 2009, there are approximately 93 million people including children with some type of developmental disorder. For example, (Halpern et al., 2000) when they assessed 1,363 infants under 12 months of age selected randomly from a cohort of 5,304 born in the hospitals of Pelotas, Brazil, in 1993 found that 463 (34%) were at risk for delayed development. (Figueiras et al., 2001) assessing 82 children under the age of 2 on Combu Island, Pará, Brazil found 37% to be at risk for developmental problems.

Prevalence of developmental delay ranges from 3.5% to 10% of the general population in various studies (Lewis and Judith, 1994; William, 1994; Nair and Radhakrishnan, 2004; Louise et al, 2002; Rydz et al, 2005). A study on two year neurological outcome on low birth weight infants showed functional disabilities in 26.7% of cases and suggested that the factors associated with functional disability included neonatal illness, poor weight gain and re – hospitalization. (Were and Bwibo, 2006).

According to (Séraphin et al., 2013) the prevalence of developmental delay at the child neurology clinic in their study in Cameroun (51.7%) was higher than 34.5% of (Adebamia et al., 2011) study in Nigeria. (Ajediran et al., 2013) in Ghana also showed result that 44.6% of the children screened had one form of DD or the other and the highest number (12.4%) was found in personal/social interaction also, their findings demonstrate that an appreciable number of the screened children had various developmental delays.

Another study also found that 8% of all pre-school children from birth to 6 years had developmental problems and showed delay in one or more developmental domains Tervo, (2003). Similarly, a related report from Central Region of Ghana indicated that 1.8% of disabilities were found among 2556 sampled Children who were less than 15 years (Biritwum et al., 2001).

Table 2.2 Epidemiology of Developmental Difficulties

Country (author, year)	Number	Age (years)	Prevalence (%)	Definition of developmental difficulty used in study
Brazil (Anselmi et al., 2004)	624	2–3	24	Behavioural problem
Senegal (Diop et al., 1982)	545	5–15	17	Emotional/mental health problem
Nigeria (Abiodun, 1993)	500	5–15	15	Psychiatric morbidity
India (Srinath et al., 2005)	2 064	0–16	12.5	ICD-10 diagnosis of mental or psychiatric disorder
United Arab Emirates (Eapen, Zoubeidi & Yunis, 2004)	694	2–3	10	Language delays
Israel (Bendel et al., 1989)	9 854	2–3	8.9	Developmental delay/disability
Saudi Arabia (Al-Hazmy, Al Sweilan & Al-Moussa, 2004)	60 630	0–16	6.3	Disability
Pakistan (Yaqoob et al., 2004)	1 476	12	6.2	Mild mental retardation
China (Sun et al., 2003)	78 000	0-7	5.6	Vision, mental, hearing, language, psychiatric and motor
Saudi Arabia (Milaat et al., 2001)	3 733	0–15	3.7	Wide range of disability
Ethiopia (Ashenafi et al., 2001)	1 477	0–15	3.5	Mental/behavioural problem

Source: National Council on Children With Disabilities, 2006

2.5 CORRELATES/ ASSOCIATED FACTORS OF DEVELOPMENTAL PROBLEMS IN CHILDREN

Developmental delay was associated with pregnancy and birth complications, poor maternal education, poor nutrition, family history of developmental problems, and major traumatic life events, as well as behavioral problems in children.

About 10 percent of all infants, toddlers, and preschool children are classified as developmentally delayed (U.S. Department of Education, 1995). Possible causes for developmental delays are numerous. They are categorized as genetic influences inherited from biological parents and environmental influences, including accidents, exposure to toxins, illnesses, and cultural disadvantages such as being raised in poor living conditions. Delays based on genetic influences are estimated to account for about 15 to 25 percent of developmental disorders. About 75 to 85 percent of these cases are linked to effects of the environment or the reasons for developmental delays remain unknown Bee, (1995).

Factors that affect physiological causes may be referred to as biological causes. Biological factors may be based on environmental or genetic influences. Infections, lead poisoning, head injuries, and prenatal exposure to toxins are a few of the many possible environmental effects that may result in physiological abnormalities. Inherited disorders such as metabolic conditions or syndromes (e.g., fragile-X) are examples of genetic factors that contribute to biological changes.

Although causes for developmental delays often are not clearly determined and every child has a unique pattern of delay, certain characteristics are associated with particular disabilities. To help prevent developmental delays from occurring, it is first necessary to develop an understanding of factors that place children at risk.

While children from all socioeconomic groups of society are known to have developmental delays, some children appear to be more vulnerable than others Kendall, (1996). Children who live in environments believed to lower the likelihood of reaching maximum levels of development are often referred to as at risk or high risk. These children have a higher than normal probability of having a developmental delay. Although there is no single set of indicators identifying children as being at risk for a developmental delay, there are several situations or characteristics that suggest children are at risk (Ramey and Campbell, 1984).

Prenatal factors, conditions that occur during pregnancy such as Rh incompatibility (blood incompatibility), viral infections, toxaemia (toxic substances in the blood), and exposure to drugs may place children at risk.

Perinatal factors, conditions that occur during the birth process, including labour and delivery, may also contribute to abnormal development. Prolonged labours lasting more than twenty-four hours or difficult labours may lead to head injuries or lack of oxygen for the child. In addition, children with low birth weight and who are born prematurely, after less than thirty-seven weeks in the womb, are also considered to be at risk for developmental delay (Thurman and Widerstrom, 1990)

After birth, a number of medical complications or postnatal factors may place a child at risk. One postnatal factor is maternal deprivation. It occurs when mothers or mother figures behave in an emotionally unresponsive fashion toward their children. In the case of maternal deprivation, children often receive very limited stimulation. Sensory stimulation is crucial for optimal development of the infant.

A mother who does not appear to respond to her child's cries or smiles is one example of unresponsive behaviour that may affect the level of infant stimulation. This type of response is more likely to occur after an unwanted pregnancy, when the mother has a serious or chronic illness, or while the mother is addicted to alcohol or other drugs (Evrand and Scola, 1990). It is also likely to occur when an infant has a disability that lowers the child's level of responsiveness, which in turn leads to the adults being less responsive.

Many environmental conditions believed to contribute to developmental delays are related to the socioeconomic status (SES) of children's families (Wachs and Gruen, 1982). That is, children from lower SES families are believed to be more vulnerable or more at risk than other children. This risk status may occur because low SES mothers often lack adequate prenatal care and are more likely to give birth to low birth weight children. Children with exceptionally low birth weight tend to have lower intelligence quotient (IQ) scores when evaluated later in life. Low birth weight is also related to higher rates of seizures, mental retardation, cerebral palsy, and deafness Bennett (1984).

Children from low SES families are also less likely to have adequate medical care, including lack of immunizations, and may be malnourished. Lead poisoning which is linked to mental

retardation and learning disabilities is more likely to be found in the homes of low SES families. These children are also more likely at risk because of the increased likelihood of having family members with histories of diabetes, muscular dystrophy, epilepsy, or hearing problems. Children from low SES backgrounds are more likely to be exposed to drugs, alcohol, and human immunodeficiency virus (HIV) prenatally, which also places them at risk (Herbst and Baird, 1983).

Many children classified as developmentally delayed come from diverse cultural backgrounds and may be exposed to bilingual home environments (Hakuta and Garcia, 1989). Often, it is difficult to provide a nonbiased assessment of children from diverse backgrounds. This may be because it is difficult to find professionals who speak English as well as the language most often spoken in the child's home. Research indicates that children from varied cultures may be labelled as developmentally delayed, even when they are not, based on aptitude tests that are often biased against children from minority cultures (Capron and Duyme, 1989).

It is often difficult to separate effects of multiculturalism from effects of poverty. A disproportionate number of culturally diverse children live in poverty. The National Council on Disability (1993) reported that 53 percent of African American families and 40 percent of Latino families live in poverty. This is in contrast to this organization's estimate that about 22 percent of all American children live in poverty.

There are many factors that place children at risk of developmental delays. The goal of early intervention programs is to help prevent delays from occurring by providing proper nutrition, medical care, and healthy learning environments. Data from several infant and preschool

intervention programs suggest that these programs are one of the most successful ways to compensate for the effects of poverty on children's later development (Campbell and Ramey, 1991).

2.6 MOTHERS KNOWLEDGE OF YOUNG CHILDREN'S DEVELOPMENT IN DEVELOPING COUNTRIES.

Increased knowledge of the developmental stages and milestones for infants and young children enhances a parent's ability to foster realistic, age-appropriate expectations for behavior and has important implications for how parents can support their child's development with positive interactions, using developmentally-appropriate discipline practices, and providing cognitively stimulating environments. Research shows that mothers with more knowledge of child development are more likely to provide developmental stimulation to their children and that their children in turn have better developmental outcomes (Goodnow, 1988; Miller, 1988; Dichtelmiller et al., 1992; Ertem et al., 2007). Moreover, clinicians may rely on a parent's knowledge about the health and development of their children for decision making, counseling and referrals (Glascoe and Dworkin, 1995). Increased knowledge of a child's developmental milestones can lead to early detection of developmental delays and health issues.

A previous study has similarly reported that higher education among the parents had a positive effect on child development (Hediger et al., 2002). Also, several studies have associated low parental educational levels and poverty with poor cognitive development of their children. (I-Chun Chen et al., 2004) reported that parents play an important role in detecting children with speech, motor and behavioural disorders and concluded that parental concern about speech and

motor delays produced a significant positive predictive value for the development of the child. (Ajediran et al., 2013) in Ghana showed that there were significant associations between the level of education attained by the mothers, duration of gestation of the children and the gross motor.

2.7 DEVELOPMENTAL SCREENING AND ASSESMENT TOOLS FOR YOUNG CHILDREN IN LOW AND MDDLE INCOME COUNTRIES (LAMIC)

Instruments that help clinicians to detect developmental difficulties are core components of developmental monitoring, and have evolved in two areas in recent years (Blair & Hall, 2006; Council on Children with Disabilities, 2006; Dworkin, 1989; Gilliam, Meisels & Mayes, 2005; Glascoe, 2005; Meisels & Fenichel, 1996; Meisels& Atkins-Burnet, 2000; Msall, 2005; Rydz et al., 2005). First, language, social-emotional, cognitive and behavioural development and functional capacity have become essential components of instruments. Second, the importance of caregiver–clinician communication and partnership has been reflected in the methods used for developmental monitoring. Based on the family-centred care initiative in child health, illness and advances in early intervention, models in which a parent watches while a clinician "tests" the child have moved to models in which a caregiver and clinician use instruments to "talk" about the child's development and build a joint understanding (Gilliam et al., 2005; Glascoe, 2005; Meisels and Fenichel, 1996; Meisels and Atkins-Burnet, 2000).

Many instruments that ask caregivers about their concerns regarding their child's development or whether their child has achieved certain developmental milestones have been shown to have

appropriate psychometric properties as screening tools and are now recommended in many high-income countries (Council on Children with Disabilities, 2006; Meisels and Atkins-Burnet, 2000). In the USA, the implementation of developmental monitoring and the early detection of developmental difficulties have been effective only when standardized instruments and protocols were used (Bethell et al., 2004; Council on Children with Disabilities, 2006; Meisels and Atkins-Burnet, 2000; Sand et al., 2005; Sices et al., 2004; Zuckerman, 2004b). The American Academy of Pediatrics (AAP), therefore, currently recommends that standardized instruments be used (Council on Children with Disabilities, 2006).

In LAMI countries, the lack of appropriate instruments may be a major barrier to monitoring child development (Engle et al., 2007; Murray & Lopez, 1994; Sonnander, 2000). Studies suggest that caregivers (Ertem et al., 2007; de Lourdes Drachler et al., 2005; Li et al., 2000) and health care providers (Bhatia & Joseph, 2000; Ertem et al., 2007; Figueiras et al., 2003; Kalra, Seth & Sapra, 2005; Lian et al., 2003; Lopez et al., 2000; Mathur et al., 1995; Wirz et al., 2005) in LAMI countries may not have sufficient knowledge about early childhood development and that, therefore, the need for instruments in the monitoring process is even greater than in high-income countries. Some instruments do exist to assess developmental difficulties – for example the "Ten Questions Questionnaire," (Durkin, Hasan & Hasan 1995; Mung'ala-Odera et al., 2004; Thorburn et al., 1992) the "ACCESS portfolio of materials" (Wirz et al., 2005) and the "Disability Screening Schedule" (Chopra, Verma & Seetharaman, 1999; Gupta & Patel, 1991; Mung'ala-Odera & Newton, 2007) do exist. The Ten Questions Questionnaire has proven valuable in many studies in identifying severe disability in older children, but does not aim to

provide a framework for monitoring child development. Furthermore, it has been found to be limited in scope (Trani, 2009).

The Denver Developmental Screening Test (DDST) (Frankenburg & Dodds, 1967) and the revised version, Denver II (Frankenburg et al., 1992), have been adapted in many countries. This test, however, has the disadvantage of relying on the testing of the child, and requires equipment to elicit a child's skills. It does not provide a description of the child's functioning and does not have a component that can be used for planning interventions. The training does not incorporate the importance of developing partnerships with caregivers. Furthermore, the Denver test has recently lost popularity in the United States as a result of research demonstrating inadequate sensitivity, specificity and accuracy (Glascoe et al., 1992; Glascoe, 2001).

Alternatives to the Denver test have been examined in a few LAMI countries. India has a relative wealth of research on instruments for developmental screening (Vazir et al., 1994a, 1994b) and a number of instruments have emerged. For example, the Woodside Screening Technique, which is used in India was developed in the United Kingdom (Gupta & Patel, 1991). The authors also compared the Woodside Screening Technique to the DDST and reported superior sensitivity (83%) and specificity (88%) and comparable over-referral and under-referral rates. The Baroda Developmental Screening Test was developed by choosing 31 mental and 22 motor items from the Baroda norms (Phatak et al., 1991). The Trivandrum Developmental Screening Chart, which is also derived from the Baroda norms, has 17 items (Nair et al., 1991). Unfortunately, both instruments were validated against the DDST, which itself has only moderate validity in com-

parison with gold standard measures that involve in- depth developmental assessment techniques (Glascoe et al., 1992). Vazir et al. (1994) developed a screening test battery for assessment of psychosocial development. This instrument, known as the Indian Council of Medical Research (ICMR) Developmental Screening Scale, was standardized on a large sample of over 13 000 urban and rural children in three regions of India. All of these instruments rely on child testing as well as caregiver reports of achievement of milestones, and are important contributions to developmental monitoring in the health system in India.

In Nigeria, a Developmental Screening Inventory (DSI) has been developed for children aged 0–30 months and a validity study has been conducted in comparison with the Bayley Scales of Infant Development. The validity study was its standardization for use in our environment (Aina and Morakinyo, 2001, 2005). An instrument referred to as the Comprehensive Developmental Inventory for Infants and Toddlers has been developed in China (Province of Taiwan). Data on reliability are limited, and no data are available on the validity of the instrument compared with standard diagnostic assessments. Also, the benefits of its use within health systems have not been demonstrated (Liao & Pan, 2005; Liao et al., 2005). All of the above instruments rely on child testing methods.

Table 2.3 Summary of Previous African Studies that assessed Children for Developmental Problems using Various Developmental and Assessment Screening Tools

S/N	Authors, year and country of study	Study aim/objective	Study design	One or two most important findings	Study weakness	Conclusion/ Outcome
1	Séraphin Nguefack, et al., 2013 (Cameroun)	To determine the prevalence, socio-demographic profile, aetiologies, and the clinical presentation of developmental delay in children less than 6-year-old at the child neurology unit in a university-affiliated hospital in Yaounde	Cross-sectional descriptive study	This study reveals that the hospital prevalence of developmental delay (DD) was 7.0% but In the child neurology unit the prevalence was estimated at 51.7% In the present study,hypoxic ischemic encephalopathy was the main aetiology of developmental	The main limitation of this study is that of memory bias. Some mothers forgot some of the pertinent events in the perinatal period or might have given inaccurate information on some events.	Developmental delay is a major health problem in paediatric neurology in Cameroon in children between 5 and 72 months. Thus prevention of perinatal risk factors and the proper management of neonates at risk need to be reinforced.

				delay.		
2	Ajediran et al., 2013 (Ghana)	To screen the children under five years of age for developmental delay in a rural Welfare Clinic with special consideration to their socio-demographic risk factors.	Cross-sectional study	The results showed that 44.6% of the children screened had one form of DD or the other and the highest number (12.4%) was found in personal/social interaction There were significant associations between the level of education attained by the mothers, duration of gestation of the children and the gross motor domain.	The one-shot assessment of the children could also be a significant factor that could affect the outcome of the screening procedure	Our findings demonstrate that an appreciable number of the screened children had various developmental delays.
3	Ghislain K.	To provide tools to assess infant	A cross-	The infant's gender, home	In this setting,	This study provides evidence

	Koura ,et al 2013 (Benin republic)	motor and cognitive development and to screen for poor infant development in a semi-rural setting in a French-speaking, low-income African country.	sectional study	environment, and maternal education were the most important predictors of poor cognitive development Home environment and family wealth were also significantly associated with motor development.	pediatricians and neurologists are not available	of the feasibility and usefulness of tools for developmental assessment and screening to be used in a semi-rural area in Africa.
4	Günther Fink, et al ,2013 (Zambia)	To assess the associations between early childhood exposure to malaria and pre-school development.	A cohort study	There are associations between early childhood exposure to malaria and some, but not in all domains of children's pre-school	None	The results of this study suggest that exposure to the disease is not only a threat to children's survival as extensively documented in the literature, but may also undermine

				development.		their cognitive development.
5	Jennifer Jelsma, et al 2011(South Africa)	to explore if children in institutionalised settings performed better or worse in terms of gross motor function than their counterparts in foster care. A secondary objective was to compare the performance of children with HIV in these two settings with those of children who were HIV negative.	A longitudinal study	Twenty-one children were infected with HIV and were significantly delayed compared to their healthy counterparts. HIV status and place of residence emerged as a predictor of total motor quotient (TMQ) with children in residential care performing better than their counterparts in foster care.	The sample size was smaller than planned but there were still significant differences noted between groups and settings.	The assumption that foster homes provide a better alternative to institutions may not be correct in a resource poor community and needs to be examined further.
6	Daynia E Ballot	To determine developmental outcome in a	A Cohort study	Almost one third of patients were considered	Transport and hospital strikes also	VLBW infants in this setting are a high risk group of

	et al 2012 (South Africa)	cohort of Very Low Birth Weight infants at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), and to determine factors associated with poor outcome		to be "at risk", with a BSID 111 score between 70 and 85, indicating that this is a high risk group of children likely to have long term developmental problems who warrant ongoing monitoring and intervention. PVL: Cystic periventricular leukomalacia was associated with poor cognitive, motor and language function.	resulted in the loss to follow up of some patients. Five patients returned to follow up on the incorrect day when a physiothera pist was unavailable, so did not have a Bayley assessment	patients likely to have learning and other difficulties at school going age and warrant long-term follow up.
7	Lowic k S ,et al 2012 (South Africa)	To determine the extent of neurodevelopme ntal delay in stable HIV-	Cross-sectiona l study	Mental handicap (overall GQ < 70) was evident in	none	Intervention strategies which optimize early cognitive development for

| | | infected preschool children (aged five to six years) receiving ART and compare it to an apparently healthy (unconfirmed HIV-status) group of preschool children | | 46.7% of children in the HIV-infected group compared to 10% in the comparison group.

There was a 7.88-fold increased likelihood of severe delay in the HIV infected group. | | all children in the area need to be urgently considered. |
|---|---|---|---|---|---|---|
| 8 | Fergus on G & Jelsma J 2009 (South Africa) | To determine the motor performance of a group of HIV infected children in Cape Town, South Africa. | A cross-sectiona l study | The prevalence of significant motor delay was 66.7% in the HIV infected sample compared with 5.7% in the age-matched sample

A significant number of healthy children | None | There is a need to provide stimulation and treatment to the large number of children who are developmentally delayed as a result of HIV infection, including those uninfected children in the community who are at risk |

				also displayed delayed performance.		owing to their socio-economic status.
9	Rebecc a J Stoltzf us et al 2001 (Zanzi bar)	To measure the effects of iron supplementation and anthelmintic treatment on iron status, anaemia, growth, morbidity, and development of children aged 6-59 months.	Rando mized controll ed study	Anaemia in the study children was prevalent and more severe than that reported in any published study with similar objectives of which we are aware Iron supplementation improved motor and language development of preschool children	none	Our results highlight that in African communities in which malaria is endemic there are severely anaemic children who are not detected by the current healthcare system and who seem to be at considerable risk of poor development.
10	Meliss a Gladst one et al 2010	To create a culturally appropriate developmental assessment	Case control study	The tool was reliable, sensitive and specific (it correctly	none	A culturally relevant developmental assessment tool, the MDAT, has

	(Mala wi)	tool,—the Malawi Developmental Assessment Tool (MDAT)		identified most children who were developing normally; that is, it did not give false-positive results) We have found that the MDAT can identify the developmental delay present in a subgroup of children with malnutrition.		been created for use in African settings and shows good reliability, validity, and sensitivity for identification of children with neurodisabilities.
11	Jenna Hutchi ngs & Joanne Pottert on 2013 (Zimba bwe)	To determine the difference in anthropometry and development (cognition; receptive and expressive language; and fine and gross motor) of HIV-exposed *infected* infants	cross-sectiona l study	This finding is different from other studies which found greater delay in expressive language in children with HIV infection	The BSID-III has not been normed or validated on Zimbabwea n children. Severity of HIV disease could not be obtained for mothers and	This study demonstrates that infants who are HIV-exposed and HIV-infected are at risk of developmental delay and impaired growth

		(HEI) with that of HIV-exposed but *uninfected* infants (HEU).			HEI infants due to the lack of data on immunological and virological markers.	
12	Joanne Pottert on et al 2008 (South Africa)	To determine the extent and prevalence of neurodevelopme ntal delay in a group of HIV-positive children in Soweto, South Africa, as well as to determine what factors were predictive of neurodevelopme ntal delay.	longitu dinal, random ized controll ed trial	Half the children had severely delayed mental development and almost three-quarters had severely delayed motor development. Poverty and poor socioeconomic status of families of HIV-infected children may well be additional Developmental	None	There is a great need to investigate intervention options for young children with HIV and developmental delay.

				risk factors.		
13	Amina Abubakar, et al 2009 (Kenya)	To investigate markers of risk status that can be easily monitored in resource limited settings for the identification of children in need of early developmental intervention	A cross sectional study	Maternal schooling and gravidity, and child's stunting were found to predict the rate of developmental achievements	None	Slow rates of developmental achievement can be predicted using these easy to administer measures and the strongest relationship with risk was based on a combination of all measures.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 STUDY DESIGN

This study adopted a cross sectional study design to examine the prevalence and correlates of developmental delays among under-five children in the study area

3.2 STUDY AREA AND SETTING

Ogun State is a state in south-western Nigeria which was created in 1976. It borders Lagos State to the south, Oyo and Osun states to the north, Ondo to the east and the Republic of Benin to the west. Abeokuta is the capital and largest city in the state. The state is the *Gateway state* of Nigeria

Other cities and towns in the Ogun State are Ijebu Ode, Sagamu, Ijebu Igbo, Ilaro, Ayetoro and Ota. According to National Population Census 2006, Ogun State has a population of 3,751,140 people. It has 20 local governments.

Ado-odo /Ota is one of the 20 local government areas of Ogun State, it came to existence on May 19, 1989. Ado-odo/Ota borders on metropolitan Lagos. The local government is the second largest in the state and it's headquarter is Ota

Ota (alternatively spelled Otta) is a town in Ogun State, Nigeria. It has an area of 878km square and a population of 526,565 at the 2006 census. Ota is the capital of the Ado-Odo/Ota Local Government Area. Historically, Ota is the capital of the Awori Yoruba ethnic group.

The indigenes are predominantly Yoruba of the Awori dialect group. They trace their ancestry down from Ile-Ife and consider Iganmode as their patriarch. Other Aworis are located in the neighbouring Lagos State.

Traditionally, Ota only had a few schools, and all were sponsored by various Christian religious organizations. The Muslim community responded by establishing a school operated by the Ansar-Ud-Deen Society. State schools began to be established in the late 1970s, and there are now several private schools in the area. Iganmode Grammar School is the oldest, founded in 1960. The main occupation of Ota residents is trading and farming.

3.3 STUDY POPULATION

The study population consisted of apparently healthy male and female children under -5 years of age from two rural communities i.e. Lusada and Ketu Adie-owe in Ota, Ogun State.

Inclusion Criteria: Children under five years of age whose parents gave written informed consent to the study.

Exclusion Criteria: Children older than five years old.

3.4 SAMPLE SIZE

The study was carried out using 420, apparently healthy under 5-years-old children in selected streets within two communities.

Therefore, the sample size for the participants was determined using the formula:

n= Z^2 P (1-P)/d^2

Where n = sample size,

Z = Z statistic for a level of confidence, (1.96 for 95%)

P = expected prevalence or proportion

d = precision (5%, d = 0.05)

Thus, the minimum sample size (N) proposed for this study =

$\dfrac{1.96^2 *0.5 (1\text{-}0.5)}{(0.05)^2}$ = 385.

Adjusting for an anticipated non-response rate of 10%, the minimum sample size will be 385/ (100 – 10%) = 420

3.5 SAMPLING TECHNIQUES

This study adopted a cluster sampling method of 420 under-five year old children in two communities, which are Lusada and Ketu Adie-Owe in Ota, Ogun state. The sampling unit were households with at least one under-five child and the primary source of information were the mothers of the children. The sampling techniques involved three stages in which: Stage one, Ado-Odo/ Ota was divided into 16 clusters based on geo-political wards present in the Local government area. Two out of the sixteen wards were randomly selected using a simple random sampling method. Stage two involved random selection of two out of the villages present in the ward. One village each from the two wards selected. In stage three, one randomly selected streets in the villages and lastly, one selected mothers who met the inclusion criteria for the study after they had given written informed consent. i.e, mothers having at least one under-five year old

child which implied that some mothers had up to three under-5 children, some mothers had two under-5 children and some mothers had just one under-five child.

3.6 RESEARCH INSTRUMENTS

• Socio-demographic Questionnaire: The instrument was a structured questionnaire designed by the researcher to elicit responses from the respondent concerning the child's (age, gender) and the mother's (age, age of conception, educational level, marital status, socio-economic status and occupation).

• The Ages and Stages Questionnaire (ASQ): This was also used to screen the children in this study using interview, observation, and examination techniques. This test consists of 21questionnaires at ages 2, 4, 6, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24,27, 30, 33, 36, 42, 48, 54, and 60 months. It is composed of 21 sets of questionnaires covering age range 2 to 60 months.

For instance, the 2 month questionnaire is defined as (1 month 0 days through 2 months 30 days). The questionnaire covers the five key developmental areas namely; gross motor skills, fine motor skills, communication skills, problem solving/cognition skills and social/personal interaction (Squires and Bricker, 1999). Each set is composed of 30 items; 6 in each domain. Responses to items in all the domains are scored as follows: "YES" response (10 points), "SOMETIMES" response (5 points) and "NOT YET" response (0 point). The maximum score in each domain is 60 points. In any set of the questionnaire, a child must be referred for further assessment if his/her scores fall short of a given cut-off point for any developmental domain (Squires and Bricker, 1999). The tool is applicable as researcher-administered and self-administered assessment form which I have been trained to administer.

3.7 VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE

The ASQ is a parent/caregiver completed screening tool with excellent psychometric properties that has been successfully used with a variety of populations (Ajediran, Jonathan and Louisa, 2013); (Dionne, Squires, Leclerc, Péloquin and McKinnon, 2006); (Heo, Squires and Yovanoff, 2008); (Janson and Squires, 2004). Survey results (Bricker, Macy, Squires and Marks, 2013) indicate that it is user-friendly, that parents/caregivers generally enjoy completing it and that they find the results helpful.

Data instruments were pre-tested in Ijanikin area of Lagos state. The items in the researcher's structured questionnaire were adapted from previous published studies. The Ages and Stages Questionnaire has been used in various studies of development in Ghana and many African countries (Ajediran, Jonathan and Louisa, 2013). It was discussed in a review at a proposal seminar presentation at the Centre for Child and Adolescent Mental Health, University of Ibadan which I was told to assess its validity.

Forty-two mothers were involved in the pre-test and face validity was done. The pre-test of the questionnaire was carried out to ensure that the words used are known, and that participants are familiar with the phrases. The questionnaire was also translated into the local language (Yoruba) and back translated to English to ensure correctness of the information and ease of respondents understanding.

Reliability was determined by subjecting it to measures of internal consistency using the Cronbach Alpha Co-efficient Analysis. The result was 0.71 which implied that no item compromised consistence meaning the instrument was reliable.

3.8 DATA COLLECTION

While on the research field, consent was obtained from each mother of the index child. The researcher visited respondents at their various places of residence. The subjects and the subject's mother were present, the Socio-demographic Questionnaire and the Ages and Stages Questionnaire were administered by the researcher. The data instruments used was to assess and classify developmental delay using the Ages & Stages Questionnaire (ASQ) and also the well structured questionnaire designed by the researcher was to elicit responses from the respondent on socio-demographic data i.e. Data concerning the child (age, gender), the mother (age, age at conception, level of maternal educational education, socioeconomic status, marital status and occupation e. t. c) were obtained.

Most of the interviews were done at the balcony of each house while some were done in huts behind houses which they used as kitchen. Each interview for a child took about 25mins administering both questionnaires but was lesser for a mother having two or three children because the socio-demographic questionnaire cut across the children except for the "Age at conception of index child" question which was different for the children. Mothers were being asked questions relating to them and their children while the index child was been observed. After the interview, Completed questionnaires were numbered serially and collated. The total number of mothers interviewed were three hundred and seven (307) and the children were four

hundred and seventeen (417) because 218 mothers had only one under-five child, Sixty-eight (68) mothers had two under-five children and twenty-one (21) mothers had three under-five children.

Two research assistants were trained by me on the questionnaire and interview techniques. One of the research assistants was an undergraduate and the other research assistant was a graduate who could read, write, speak and understand both English and the local language (Yoruba). They also administered the questionnaires to mothers.

3.9 DATA MANAGEMENT AND STATISTICAL ANALYSIS

Data was entered and analyzed using the Statistical Package for the Social Sciences version 16.0 software (SPSS Inc, Chicago, IL, USA). The main outcome variables were scores in each developmental domain which are communication, gross motor, fine motor, problem-solving and personal-social. The independent variables are Mother's age, age at conception, religion, tribe, educational status, occupation, marital status, family type, husband's wife number, wives position, number of children.

The Chi-square test was used to determine the associations of developmental delays and socio-demographic characteristics (independent variables) with ASQ scores (dependent variables) in each domain of development. All the variables were summarised using descriptive statistics after which Chi-square test was utilised for cross-tabulations for testing strength of the association. Strengths of association were also determined by using 95% level of confidence. A p-value less than 0.05 was accepted as being statistically significant (two-tailed analysis).

3.10 ETHICAL CONSIDERATION

Approval for the study was obtained from the Ogun State Ministry of Health- Department of Planning, Research and Statistics before commencement of the study. Participation in the study was completely voluntary as written informed consent was obtained from the parents/guardians. There was no invasive procedure which could cause injury or harm, only observations and interviews were conducted. The informed consent form stated explicitly the right of the participants to refuse to give consent or withdraw from the study at any point and that she can decline to the entire statement answer.

The parents/ caregivers were informed of their children's scores and were counseled on the need for follow-up care as advice would be given to attend the nearest children's centers' for review by pediatrician or doctor.

CHAPTER FOUR

RESULTS

4.1 Characteristics of the sampled children and their housing and living condition

Overall, a total of four hundred and twenty (420) under-five children were screened in this study out of which data for four hundred and seventeen (417) were valid for analysis. There were 201(48.2%) males and 216 (51.8%) females. The mean age of the sampled under-five children was 19.68±14.72months.

One hundred and seventy five children (42%) were less than 12 months of age, one hundred and twenty-nine children (30.9%) were between 13 to 24months, seventy-one children (17%) were between 25 to 36months, sixteen children (3.8%) were between 37 to 48months and twenty-six children (6.2%) were between 49 and 60 months.

All (100%) of the children's main sources of drinking water with their families were from public tap, majority (83.2%) also drink from protected well, some (25.2%) drank from protected stream and everyone (100%) drank from rain water when there is rainfall. Most (65.2%) of the children lived and slept in a single room with 1-5 other family members.

CHILD'S GENDER
■ male
■ female

51.80%   48.20%
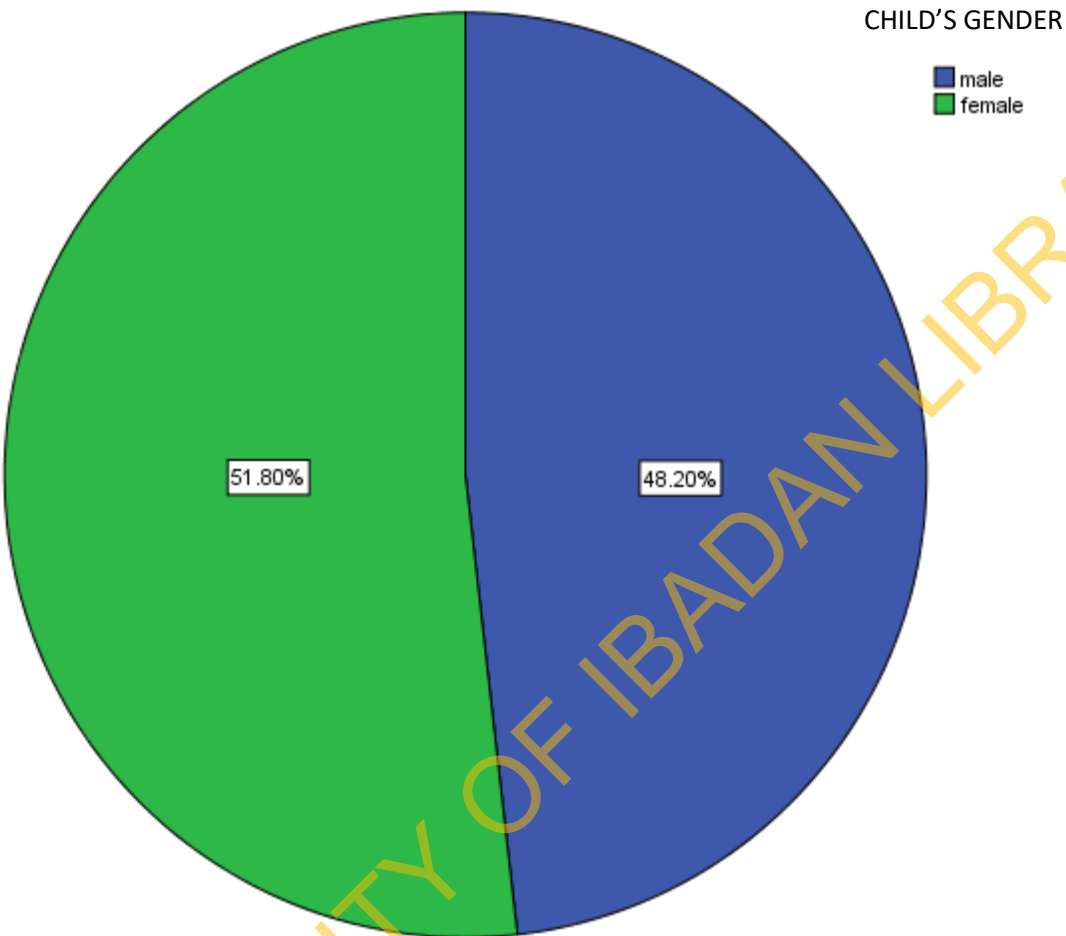
Figure 4.1 Distribution of sampled under-five children by gender
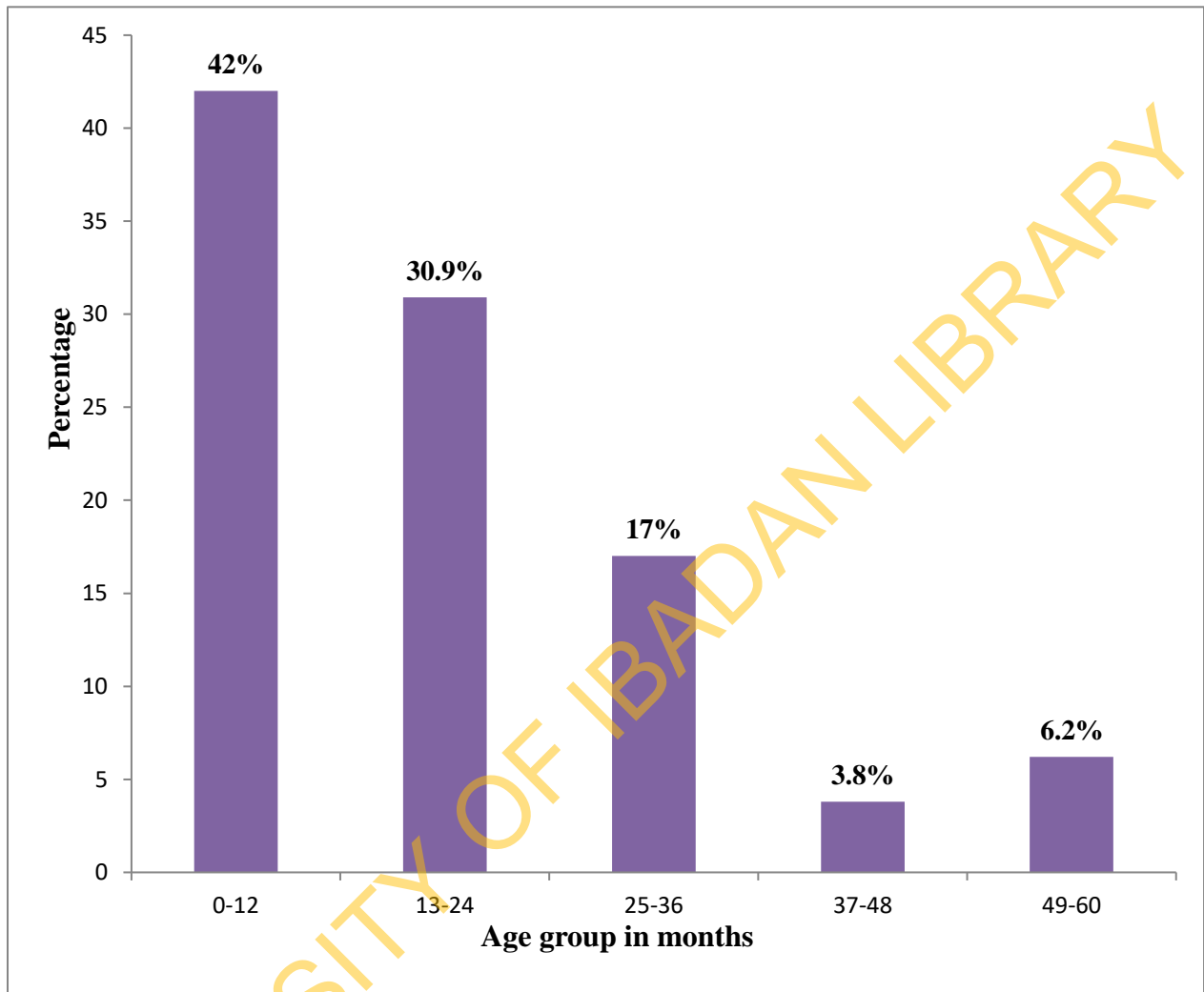
Figure 4.2: Distribution of Under-five children by age group

Table 4.1 Living Conditions of the Sampled Children and their Mothers.

Characteristics	Frequency	Percentage %
Sources of drinking water		
Public tap/standpipe	417	100
Protected well	347	83.2
Unprotected well	70	16.8
Water from spring	105	25.2
Rain water	417	100
Toilet facilities		
Water Cistern	85	20.3
Pit latrine	333	79.7

4.2 Prevalence of Developmental Delay among the Sampled Children

A total of 110 (26.4%) of the children had one form or more developmental delay in various domains of the Ages and Stages Questionnaires. In this study, Developmental delay was categorized into two groups, children having delays in only one domain were classified as having an "isolated developmental delay" while those who had delay in two or more domain were classified as having "global developmental delay".

Isolated delay occurred in eighty-three children. The prevalence of isolated delays was therefore (19.9%). The number of children with global developmental delay (delay in 2 or more domains of development) was twenty-seven (6.5%) (Fig4.3). This study determined the overall prevalence of developmental delay by using those who had delay in at least one domain. Therefore the prevalence of developmental delays in the two rural communities used in Ota was 26.4%.
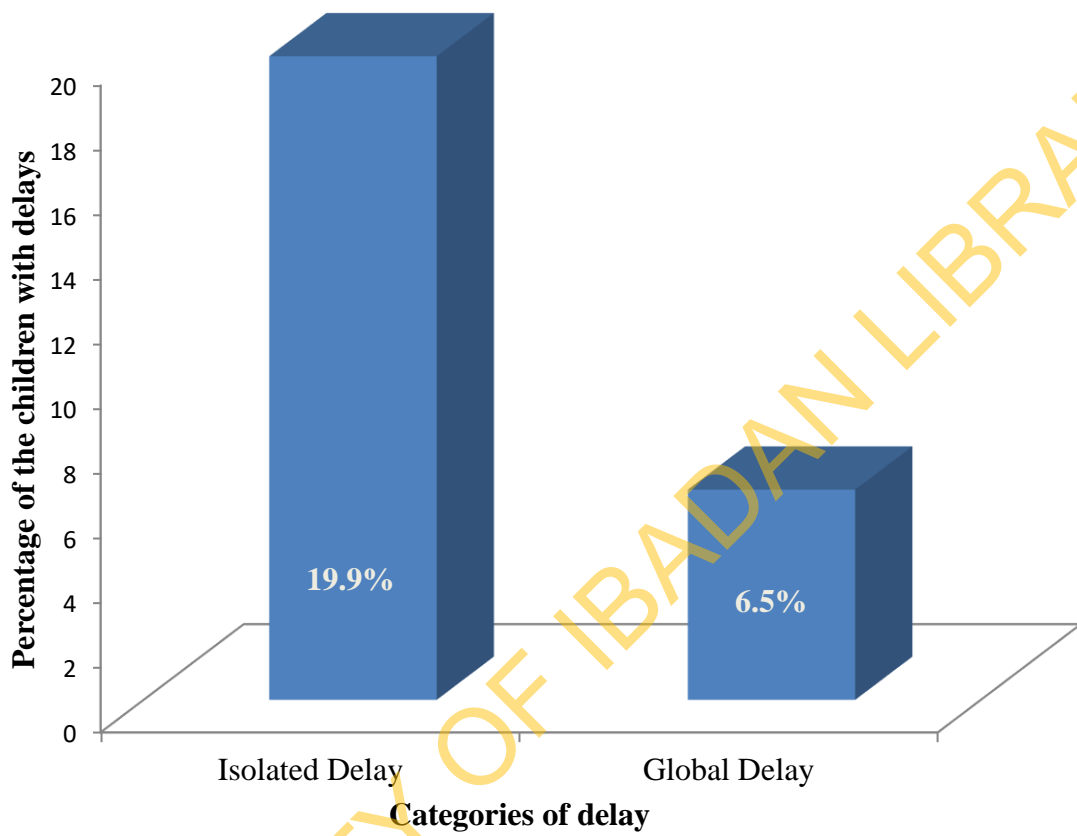
Figure 4.3: Distribution of Under-five children by Classification of Developmental delay

4.3 Spectrum of Delay in Developmental Domains among the Sampled Children

The mean age of the under-five children was 19.68 ±14.72months. The mean score for each domain of development of the under-five children are 40.78±10.6 scores for communication, 44.34±8.4 scores for gross motor, 42.77±8.8scores for fine motors, 42.08±8.7 scores for problem-solving and 41.86±8.4 scores for personal-social.

Forty-five (10.8%) of the children had developmental delay in problem-solving domain, Forty (9.4%) in fine motor, thirty-five (8.4%) had delay in communication, thirty-one (7.4%) in gross motor and thirty-eight (9.1%) were delayed in personal-social interaction (Figure 4.4).

Developmental delay was most common in the problem-solving skills domain.
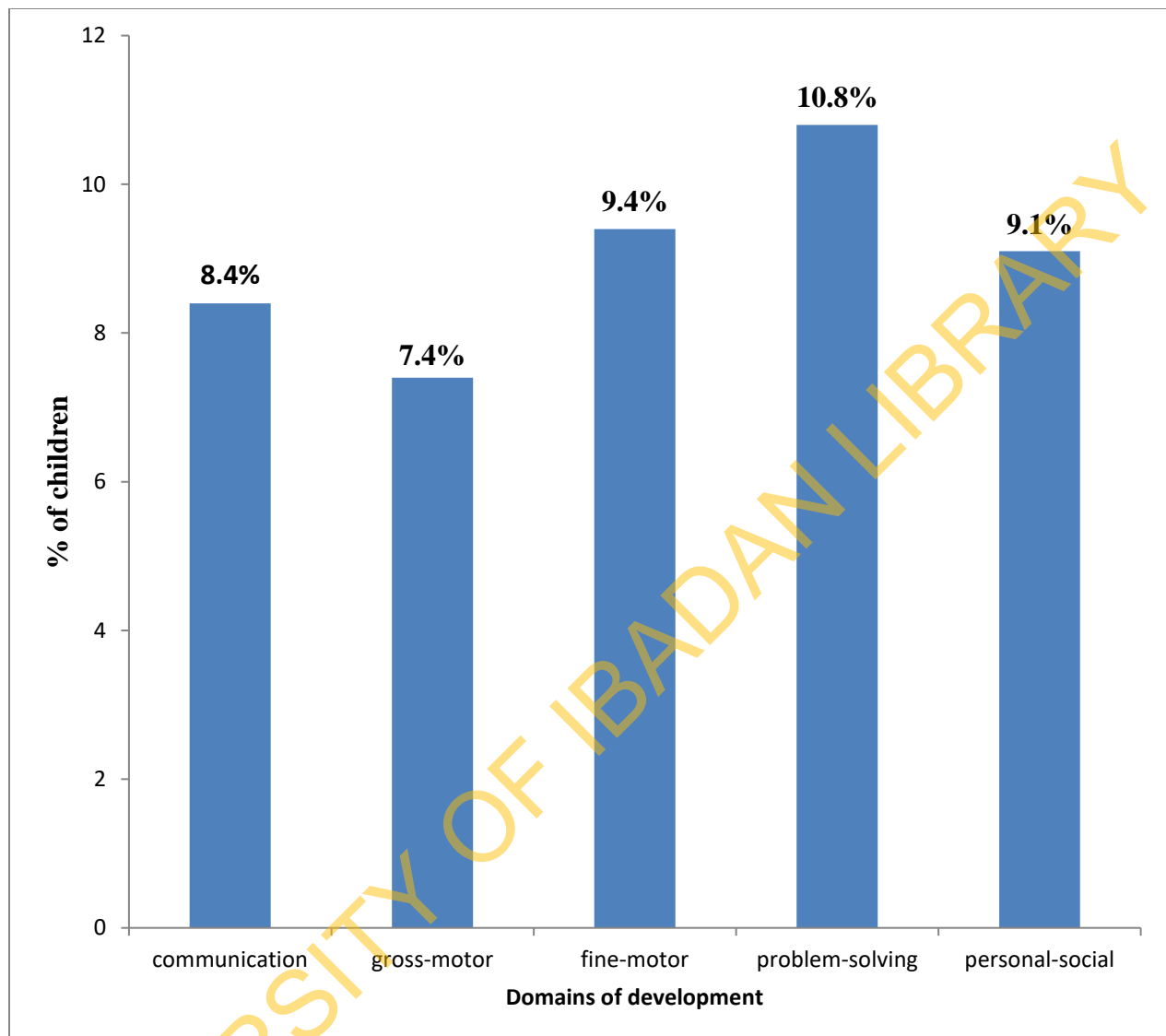
Figure 4:4 Distribution of Under-fives by spectrum of developmental delay

4.4 Socio-demographic Characteristics of the Mothers

Respondents' socio-demographic characteristics are represented in (Table 4.2). Mothers of under-5 children were the respondents in this study. A total of three hundred and seven (307) mothers participated in the study. The age of respondents ranged between 15 years and 50 years, and Majority of the mothers were in the age range 20-29years (n=132; 43.0%) and the least represented were those above 40 years (n=34; 11.0%). The mean age at conception of the index child was 24.01±7.7 years. The age of respondent at conception of the index child ranged from 11 to 45 years. A larger proportion (n=184; 59.9%) of the respondents were Christians and the Muslims were (n=119; 38.8%). Most of the mothers were from the Yoruba ethnic group (n=160; 52.1%) and Egede and Ogu (Foreigners) ethnic group (n=98; 32%). One hundred and fifty-one (49.2%) of the mothers were petty traders. One hundred and forty-seven (47.9%) mothers were married, eighty-two (26.7%) were single, thirty-five (11.4%) were divorced, thirty-seven (12.1%) were separated and six (1.9%) were widows. Ninety-eight (31.9%) of the mothers had no formal education.

Table 4.2 Socio-Demographic Distributions of Mothers

Maternal Characteristics	Frequency	Percentage (%)
Age (in years)		
<20	57	18.6
20-29	132	43.0
30-39	84	27.4
40 and Above	34	11.0
Age at conception (in years)		
{11-20}	149	35.7
{21-30}	183	43.8
{31-40}	69	16.5
41 and above	17	4.0
Level of Education		
No formal education	98	31.9
Primary School	156	50.8
Secondary School	53	17.3
Occupation		
Public servant	1	0.3
Artisans	85	27.7
Petty trader	151	49.2
Unemployed/full house-wife	70	22.8
Marital status		
Not married	82	26.7
Married	147	47.9
Divorced	35	11.4
Separated	37	12.1
Widow	6	1.9
Ethnicity/Tribe		
Yoruba	160	52.1
Hausa	20	6.5
Igbo	29	9.4
Other tribes	98	32.0
Religion		
Islam	119	38.8
Christianity	184	59.9
Traditional	4	1.3

4.5 Profile of Mothers by Family and Home Structure

Table 4.1 shows the home conditions of mothers and their families. Table 4.3 shows that, A good number (n=178; 58%) of the mothers had monogamous homes, one hundred and twenty-four (40.4%) had polygamous homes and five (1.6%) were polyandrous. Majority (n=201; 65.5%) of the women's husbands had only one wife. A larger proportion (n=236; 76.8%) were either the only wife or first wife of their husbands. 83 (27%) of the mothers had a child, 100 (32.6%) had two children, 67 (21.8%) had three children, 31 (10.1%) had four children, 19 (6.2%) had five children and 7 (2.3%) of the mothers had six children.

Table 4.3: Distribution of Mothers by Family and Home Structure

Maternal Characteristics	Frequency	Percentage (%)
Family type		
Monogamy	178	58.0
Polygamy	124	40.4
Polyandry	5	1.6
Number of wives husband has		
1	201	65.5
2	67	21.8
3	34	11.1
4	4	1.3
5	1	0.3
Mother's position among husband's wives		
1	236	76.9
2	56	18.2
3	15	4.9
Number of Children		
1	83	27.0
2	100	32.6
3	67	21.8
4	31	10.1
5	19	6.2
6	7	2.3

4.6 Association between Mothers' Socio-demographic profile and Isolated Developmental Delay.

Table 4.4 shows the association between mothers' socio-demographic profile and isolated delays. There was no statistically significant association between mothers' age, age at conception, level of education, occupation, marital status, tribe/ ethnicity and isolated delays. Children of mothers less than 30 years of age had 20.5% of isolated developmental delay compared to mothers older than 30 years of age who had 18.8%. Mothers from the Yoruba tribe had 22.5% of children with isolated developmental delay compared with non-Yoruba mothers who had 17.1% of children with isolated developmental delay.

Table 4.4 Association between Mothers Socio-demographic Characteristics and Isolated Developmental Delay

Characteristics	Isolated Developmental Delay		χ^2	p-value
	Yes	**No**		
	N= 83	N= 334		
Maternal age (years)				
• < 30	53 (20.5%)	204 (79.4%)	0.217	.0.641
• ≥ 30	30 (18.8%)	130 (81.3%)		
Maternal age at conception				
• < 30	62 (19.4%)	257 (80.6%)	0.187	0.666
• ≥ 30	21 (21.4%)	77 (78.6%)		
Child sex				
• Male	40 (20.0%)	160 (80.0%)	0.002	0.962
• Female	43 (19.8%)	174 (80.2%)		
Ethnicity/Tribes				
• Yoruba	49 (22.5%)	169 (77.5%)	1.897	0.168
• Non-Yoruba	54 (17.1%)	165 (82.9%)		
Mothers' level of education				
• No formal Education	26 (19.5%)	107 (80.5%)	0.015	0.901
• Primary school or more	57 (20.1%))	227 (79.9%))		
Marital Status				
• Single parents	20 (17.5%)	94 (82.5%)	0.548	0.459
• Married parents	63 (20.8%)	240 (79.2%))		

4.7 Association between Mothers' Socio-demographic profile and Global Developmental Delays.

Table 4.4 shows the association between mothers' socio-demographic profile and global developmental delay. There was no statistically significant association between mothers' age, age at conception, level of education, occupation, marital status, tribe/ ethnicity and global delays. Children of mothers less than 30 years of age had 5.8% of Global developmental delay. Mothers from the Yoruba tribe had (5.0) % of children with Global developmental delay. Children whose mothers were atleast primary school certificate holders had 7.0% of Global developmental delay compared with children of mothers with no formal education at all who had 5.3% of global developmental delay.

Table 4.5 Association between Mothers Socio-demographic Characteristics and Global Developmental Delay

Characteristics	Global Developmental Delay		χ^2	p-value
	Yes N= 27	No N=390		
Maternal age (years)				
• < 30	15 (5.8%)	242 (94.2%)	0.451	0.502
• ≥ 30	12 (7.5%)	148 (92.5%)		
Maternal age at conception				
• < 30	23 (7.2%)	296 (92.8%)	1.212	0.271
• ≥ 30	4 (4.1%)	94 (95.9%)		
Child sex				
• Male	16 (8.0%)	184 (92.0%)	1.476	0.224
• Female	11 (5.1%)	206 (94.9%)		
Ethnicity/Tribes				
• Yoruba	11 (5.0%)	207 (95.0%)	1.540	0.215
• Non-Yoruba	16 (8.0%)	183 (92.0%)		
Mothers' level of education				
• No formal Education	7 (5.3%)	126 (94.7%)	0.473	0.491
• Primary school or more	20 (7.0%)	264 (93.0%)		
Marital Status				
• Single parents	9 (7.9%)	105 (92.1%)	0.522	0.470
• Married parents	18 (5.9%)	285 (94.1%)		

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This study is one of the first to address prevalence of developmental delay in Nigeria among under-five Children living in a rural area of the country and to consider the socio-demographic factors that may be associated with developmental delay. This study showed that under-five children in the two rural communities of Ado-odo /Ota LGA had high prevalence of developmental delays. The participants in this study were mothers of under-five children whose age ranged from 14 to 50 years. Their children i.e., the under-fives who also participated and were observed during the course of each screening. There were more females than males in the group studied.

This is possible because statistics of under-5 mortality rate by sex in 2012 amounted to 129 males to 118 females according to (Unicef, 2013). Infant mortality rate summing as 74.09 deaths/1000 live birth also having males as 79.02 deaths/1000 live births and females as 68.87 deaths/ 1000 live birth (Nigeria demographic profile, 2014). A study also done by Osita et., al (2015) also found under-five females more than males due to the mortality rate which found under-5 mortality rate to be 46.1% for females and 53.9% for males during a survey. According to (WHO), nearly one million children aged under 5 years die in Nigeria annually and more than 60% of this death occur between 1 and 59 months of life. The current Under-5 mortality rate of 128 deaths / 1000 live births reported by the National Demographic Health Survey implies that approximately one in every 8 children under five years old in Nigeria dies before having a fifth birthday in which males are mostly of more ratio. Hence, this could be a possible reason for a greater proportion of females to males in this study.

Most mothers were less than 30 years of age at conception. Majority of the mothers had primary school education and petty trading was the commonest occupation among the group studied. Most of the mothers had a monogamous home, the sources of drinking water for the mothers with the family members were from wells, public boreholes, and rainfall. The mothers were mostly of the Yoruba ethnicity reflecting the major tribe of the inhabitants of the study area. Also, the Egede from Benue, (Nigeria) and Ogu tribe (Togo) made a good number in the study area which may be due to closeness to the Benin Republic and Nigeria border. A good number of the mothers had monogamous homes. Majority of the under-five mother's husbands had one wife. A larger proportion were either the only wife or first wife of their husbands. Eighty-three (27%) of the mothers had one child, one hundred (32.6%) had two children, sixty-seven (21.8%) had three children, thirty-one (10.1%) had four children, nineteen (6.2%) had five children whilst, seven (2.3%) of the mothers had six children. Most of the mothers lived in a single room apartment with 1-5 family members; the pit latrine was the most used toilet facility which is an indicator for low socio-economic status of the mothers.

5.1 Prevalence of Developmental Delay among the Sampled Children

In this study, a total of 110 (26.4%) of the children had one form of or more developmental delay in various domains of the Ages and Stages Questionnaires. This study is therefore contrary to findings by (Ajediran et al., 2013) in Ghana which showed that 44.6% of the children screened had one form of developmental delay or the other. Another study also found that 8% of all pre-school children from birth to 6 years had developmental problems and showed delay in one or more developmental domains Tervo, (2003) which is also contrary to this study.

The prevalence of global developmental delays in the two rural communities used in Ota was 6.5%. This finding could be understood from the fact that prevalence was determined by delays in atleast one domain of the Ages and Stages Questionnaire which was 26.4%. Global developmental delay is described as occurring when there is significant delay in two or more developmental domains (gross motor, fine motor, cognition, speech/language, and personal/social). This term is used for younger children (typically less than 5 years). It is denoted by performance in at least two standard deviations below the mean of age appropriate, standardised norm referenced developmental testing. (Shevell et al., 2003). This study is slightly similar to (Valsamma Eapen et al., 2006) which showed that 8.4% had global developmental delay.

Global delay prevalence is estimated to be 1–3% of children aged less than 5 years which therefore is contrary to this study, which showed a greater prevalence. These findings are similar to the findings in studies of (Lewis & Judith, 1994; William (CTF), 1994; Nair and Radhakrishnan, 2004; Louise et al, 2002; Rydz et al, 2005) that found prevalence of developmental delay ranges from 3.5% to 10% of the general population but the prevalence is not clarified as to if it was estimated by the isolated delay (delay in only one domain) or the global delay (delays in two or more domains). Similar to these findings, is the study of Seraphin et al (2013) in Cameroun where the study reveals that the hospital prevalence of developmental delay (DD) was 7.0% but In the child neurology unit the prevalence was estimated at 51.7% which was higher than 34.5% of (Adebami et al., 2011) study in Nigeria. The various prevalences may also be due to the study setting as various studies had assessed developmental delay in hospitals, schools, clinics, rural community, institutionalized homes etc.

5.2 Spectrum of delay in developmental domain

The highest spectrum (10.5%) of developmental delay was in the problem-solving skills in this finding which was contrary to (Ajediran et al., 2013) in Ghana which showed result that the highest number (12.4%) was found in personal/social interaction conducted in a rural welfare clinic and also different from (Seraphin et al., 2013) study in Cameroun which reveals delay in motor developmental domain as (90.2%) followed by the language developmental domain as (34.0%) and the social/personal developmental domain as (29.4%) been conducted in a Child neurology unit of a Gynaeco-Obstetric and Paediatric Hospital. This study suggests that these differences may be as a result of various settings the researches was conducted.

Another study in Zimbabwe (Jenna and Joanne, 2013) looked at Developmental delay in HIV-exposed infants in Harare using (HIV)-exposed *infected* (HEI) infants and HIV-exposed but *uninfected* (HEU) infants. The HEI group showed that 64.29% had cognitive delay, 60.71% had language delay and 53.57% had motor delay, all of which were significantly different from the development of the HEU group for all domains.

The disparity in the group of children used though under-fives i.e., HIV-infected ones, HIV exposed ones, growth retarded ones, orphans and children with neurological disorders, and the different screening tools used in various studies makes it difficult to compare the findings from studies like the Ages and Stages Questionnaire (ASQ) Squires and Bricker (1999), The Malawi Developmental Assessment Tool (MDAT) Melissa et al 2010, Bayley Scales of Infant and Toddler Development, Third Edition (BSID-III) Bayley (2006), Denver Developmental

Screening Tools (DDST) Frankenburg (1992), Developmental Screening Inventory (DSI), Parents' Evaluation of Developmental Status (PEDS) etc.

5.3 Association between Mothers' socio-demographic profile and Developmental Delays.

Mothers' age, age at conception, level of education, occupation, ethnicity had no association with isolated delay. A combination of Mothers' age, age at conception, level of education, occupation, ethnicity also showed no statistically significant correlation with global developmental delay, as evidenced by non-significant p values. Contrary to this study, a previous study had reported that higher education among the parents had a positive effect on child development (Hediger et al., 2002).

This finding is also contrary to (Wachs and Gruen, 1982) study which showed that many environmental conditions believed to contribute to developmental delays are related to the socioeconomic status (SES) of children's families. That is, children from lower SES families are believed to be more vulnerable or more at risk than other children. This study has shown that there isn't necessarily a direct link between socioeconomic status in the family and developmental delay in the child. There are other factors within the family dynamics that would need to be considered. While children from all socioeconomic groups of society are known to have developmental delays, some children appear to be more vulnerable than others Kendall, (1996). Children who live in environments believed to lower the likelihood of reaching maximum levels of development are often referred to as at risk or high risk**.**

In this study, most of the mothers in the communities used were married and had monogamous homes which may make them have more time to interact and provide stimulation for their children. In a study by Valsamma Eapen et. al (2006) global developmental delay was found to be associated with pregnancy and birth complications, poor maternal education, family history of developmental problems, and major traumatic life events, as well as behavioral problems in children. This study also connotes that developmental delay may be more of genetic influence, pre-natal, peri natal and postnatal factors which this study did not explore due to time frame for the research work. Children of mothers less than 30 years of age had a higher percentage (20.5%) of isolated developmental delay compared to children whose mother are greater than 30 years (18.8%). The answer to this may be that socio-demographic characteristic is not equivalent to developmental performance or functionality in a child, and thus more factors should be considered as necessary for more potent outcome.

CONCLUSION

Child development depends on the synergistic effects of environment, nutrition, responsive stimulation, and social structures that work to nurture proper child development. Prompt multidisciplinary intervention, as well as, timely identification of children with developmental delays is required to ensure that these children are able to reach their maximum developmental potential.

This study was conducted on 420 apparently healthy under-five in two communities of Ota, Ogun State, Nigeria. The results of this study highlight the prevalence of developmental delay in

26.4% of apparently healthy children as early as one month of age by using a simple screening tool i.e. The Ages and Stages Questionnaire. A high percentage of children in this study presented with developmental delay, that is 110 (26.4%) of the children had one form or more developmental delay in various domains of the Ages and Stages Questionnaires, 27 (6.5%) had global developmental delay and 83(19.9%) had isolated delay. If one can diagnose developmental delay in early stages of development, the early intervention can reduce long term disability. Developmental screening to detect developmental delay should be an integral part of services offered to children in their early years. There is a great need to investigate intervention options for young children with developmental delay. The prevalence in this study was high even in a population of apparently healthy children who had been assumed to be normal.

There exists a high burden of developmental delay among under-five children in the study area and no socio-demographic characteristics could be convincingly attributed to children at risk. There is the need to conduct further research to elucidate factors that may potentially be used to design appropriate interventions.

LIMITATION OF THE STUDY

Studies had been done on developmental problems especially in schools, hospital, clinics, institutional homes and few in rural communities. This study therefore provided insight as to the prevalence of developmental delays in rural communities of Ota, Nigeria. However, a few factors may limit the findings.

Reasonable proportions of the mothers were Togolese and Egun who had to interpret some questions asked, to their Children in their own language for them i.e. the children, to understand better.

There were some tasks in the questionnaire some children wouldn't carry out which their mothers would say was due to the presence of a third party. The researcher could't tell if the information was accurate or not.

RECOMMENDATION

1) There is a need to introduce early developmental screening amongst the early childhood programmes such as immunisations. This study has shown a high prevalence of global developmental delay in children under-five and a high prevalence of isolated developmental delay.

2) Community workers can be trained on how to use simple developmental screening tools to identify at risk children in preschool period to help initiate early intervention and there could be simple training for the parents on early intervention.

3) There is need to improve awareness of the importance of child development and factors that can influence the child's development amongst rural and urban communities. This can be through health education programmes within the community.

4) There is a crucial need for government policies to be developed to address early screening for developmental delay in Nigerian Children.

5) There is a need for further studies to determine prevalence of developmental delay in preschool children in Nigeria. There is lack of clarity in current prevalence studies regarding whether prevalence measured refers to isolated/global delay. This information is important to enable clear comparison of prevalence figures across the different populations. There will need to be clarity on what aspect of developmental delay is being measured.

6) There should be intervention programmes for children who are identified as having developmental delays from the screening programmes.

7) Early childhood assessment is a very crucial area to explore especially if the goals of Universal Primary Education of the Millennium Development Goals must be achieved. Therefore, all stakeholders and professionals involved in the total assessment of a child should make ethical, appropriate, valid, and reliable assessment a vital part of all early childhood programmes.

.

REFERENCES

Accardo PJ, Whitman BY, Behr SK, Farrell A, Magenis E, Morrow-Gorton J: 2003. Dictionary of developmental disabilities terminology. 2nd edition. Baltimore, MD: Paul H. Brookes Publishing Co.

Adebami O.J., Onigbinde O.M., Joel-Medewase V., Oyedeji A.G. and Afolabi A.A. 2011 Neurological disorders among children in Osogbo, southwestern Nigeria. Journal of Pediatric Neurology, 9, 341-345.

Aina OF, Morakinyo O (2001) The validation of Developmental Screening Inventory (DSI) on Nigerian children. J Trop Pediatr. 47(6):323–328.

Aina OF, Morakinyo O (2005) Normative data on mental and motor development in Nigerian children. West Afr J Med. 24(2):151–156.

Ajediran I Bello, Jonathan NA Quartey and Louisa A Appiah : Screening for developmental delay among children attending a rural community welfare clinic in Ghana. BMC Pediatrics 2013, 13:119.

Baltieri L, Santos DC, Gibim NC, Souza CT, Batistela AC, Tolocka E. Motor performance of infants attending the nurseries of public day care centers. Rev Paul Pediatr 2010;28:283-289.

Bayley N. (2006). Bayley scales of infant and toddler development–third edition. San Antonio TX: The Psychological Corporation.

Bethell C, Reuland CH, Halfon N, Schor EL et al. (2004) Measuring the quality of preventive and developmental services for young children: national estimates and patterns of clinicians' performance. Pediatrics. 113 (suppl 6):S1973–S1983.

Biritwum RB, Devers JP, Ofosu-Amoah C, Amarfo-Essah: Prevalence of children with disabilities in Cenral Region, Ghana. West Afr J. Medicne 201, 20(3):249-255.].

Blair M, Hall D (2006) From health surveillance to health promotion: the changing focus in preventive children's services. Arch Dis Child. 91:730–735.

Boivin M, Bangirana P, Byarugaba J, Opoka RO, Idro R, Jurek AM, John CC. Cognitive impairment after cerebral malaria in children: a prospective study. Pediatrics. 2007;119:e360–e366. doi: 10.1542/peds.2006-2027.

Boivin M. Effects of early cerebral malaria on cognitive ability in Senegalese children. J Dev Behav Pediatr. 2002;23:353–364.

Boris NW, Wheeler EE, Heller SS, Zeanah CH et al. (2000) Attachment and developmental psychopathology. Psychiatry. 63(1):75–84.

Bowlby J (1978) Attachment theory and its therapeutic implications. Adolesc Psychiatry. 6:5–33.

Bricker D, Macy M, Squires J, Marks K: Developmental screening in your community. An integrated approach for connecting children with services. Baltimore: Paul H. Brookes Publishing Co; 2013.

Burton K.J. and Allen S. (2003) A review of neurological disorders presenting at a paediatric neurology clinic and response to anticonvulsant therapy in Gambian children. Annals of Tropical Paediatrics, 23, 139-143.

Campell F.A., Ramey C.T., Pungello E., Sparling J and Miller-Johnson S. (2002) Early childhood education: Young adult outcomes from the abecedarian project. Applied Developmental Science, 6, 42-57.

Chen I.C., Lee H.C., Yeh G.C., Lai C.H. and Chen S.C. (2004) The relationship between parental concerns and professional assessment in developmental delay in infants and children: A hospital-based study. Journal of the Chinese Medical Association, 67, 239-244.

Chopra G, Verma IC, Seetharaman P (1999) Development and assessment of a screening test for detecting childhood disabilities. Indian J Pediatr. 66(3):331–335.

Council on Children With Disabilities (2006) Section on Developmental Behavioral Pediatrics, Bright Futures Steering Committee, and Medical Home Initiatives for Children With Special Needs Project Advisory Committee. Identifying infants and young children with developmental disorders in the medical home: an algorithm for developmental surveillance and screening. Pediatrics. 118:405–420.

Currie J. In: Handbook of Health Economics Volume 1B. Culyer A, Newhouse J, editor. North Holland; 2000. Child health in developed countries.

Darwin C (1877) A biographical sketch of an infant. A quarterly review of psychology and philosophy. Mind. 2: 285–294.

Davies D (2004). Child Development: A Practitioner's Guide. New York, NY: Guilford Press.

De Lourdes Drachler M, De Castro Aerts DG, De Souza RM, De Crvalho LJ, Giugliani EJ and Marshall T (2005) Social inequalities in maternal opinion of child development in southern Brazil. Acta Paediatr. 94(8):1006–1008.

Dichtelmiller M., Meisels S. J., Plunkett J. W., Bozynski M. E., Claflin, C. and Mangelsdorf S.C. (1992) The relationship of parental knowledge to the development of extremely low birth weight infants. Journal of Early Intervention, 16, 210–220.

Dionne C, Squires J, Leclerc D, Péloquin J, McKinnon S: Cross-cultural comparison of a French Canadian and US developmental screening test. Dev Disabil Bull 2006, 34(1–2):43-56.

Dunlap: An Introduction to Early Childhood Special Education, 1997 edition, p. 51-53.

Durkin MS, Hasan ZM, Hasan KZ (1995) The ten questions screen for childhood disabilities: Its uses and limitations in Pakistan. J Epidemiol Community Health. 49:431–436.

Dworkin PH (1989) British and American recommendations for developmental monitoring: the role of surveillance. Pediatrics. 84(6):1000–1010.

Earls MF, Hay SS: Setting the stage for success: implementation of developmental and behavioural screening and surveillance in p0rimary care practice-the North Carolina Assuring Better Child Health and Development (ABCD) project. Pediatr 2006, 118(1):e183-e188.

Engle PL, Black MM, Behrman JR, Cabral de Mello M, Gertler PJ, Kapiriri L, Martorell R, Young ME. (2007) Strategies to avoid the loss of developmental potential in more than 200 million children in the developing world. Lancet. 369:229–242.

Ertem I.O., Atay G., Dogan D.G., Bayhan A., Bingoler B.E., Goc C.G., Ozbas S., Haznedaroglu D and Isikli S. (2007). Mother's Knowledge of Young Child Development in a Developing Country. Child Care health and development, 33, 6, 728-737.

Figueiras AC et al. (2003) Evaluation of practices and knowledge among primary health care professionals in relation to child development surveillance. Cad Saude Publica. 19(6):1691–1699.

Frankenburg WK, Doods J, Archer P, Shapiro H, Bresnick B (1992) The Denver II: a major revision and restandardization of the Denver Developmental Screening Test. Pediatrics. 89:91– 97.

Frankenburg WK, Dodds JB (1967) The Denver developmental screening test. J Pediatr. 71(2):181–191.

Gilliam WS, Meisels SJ, Mayes LC (2005) Screening and surveillance in early intervention systems. In: Guralnick MJ, ed. The developmental systems approach to early intervention. Baltimore, MD: Paul H. Brookes: 73 –98.

Glascoe FP (2001) Are overreferrals on developmental screening tests really a problem? Arch Pediatr Adolesc Med. 155(1):54–59.

Glascoe FP (2005) Screening for developmental and behavioral problems. Ment Retard Dev Disabil Res Rev. 11:173–179.

Glascoe FP, Bryne KE, Ashford LG, Johnson KL, Chang B and Strickland B (1992). Accuracy of the Denver-II in developmental screening. Pediatrics. 89(6 pt 2):1221–1225.

Glascoe, FP. and Dworkin, P. H. (1995) The role of parents in the detection of developmental and behavioral problems. Pediatrics, 95, 829–836.

Goodnow JJ. (1988) Parents' ideas, actions and feelings: models and methods from developmental and social psychology. Child Development, 59, 286–320.

Gupta R, Patel NV (1991) Trial of a screening technique of the developmental assessment of infants and young children (6 weeks–2 years). Indian Pediatr. 28(8):859–867.

Halpern R, Giugliani ER, Victora CG, Barros FC, Horta BL. Risk factors for suspicion of developmental delays at 12 months for age. J Pediatr (Rio J) 2000;76:421-428

Hannon P (2003) Developmental neuroscience implications for early childhood intervention and education. Current Paediatrics. 13: 58–63.

Hediger ML, Overpeck MD, Ruan WJ, Troendle JF: Birthweight and gestational age effects on motor and social development**.** Paediatr and Perinatal Epidemiol 2002, 16(1)**:**33-46.

Heo KH, Squires J, Yovanoff P: Cross-cultural adaptation of a pre-school screening instrument: comparison of Korean and US populations. J Intell Disabil Res 2008, 52(3)**:**195-206.

htpp://www.firstsigns.org/delays_disorder/delays_disorders.htm.Developmental and Behavioural Disorders.

htpp://www.oup.com: Oxford English Dictionary. 5th edition. Oxford University Press Inc; 1999.

Janson H, Squires J: Parent-completed developmental screening in a Norwegian population sample: a comparison with US normative data. Acta Paediatrica 2004, 93(11)**:**1525-1529.

Jenna Hutchings and Joanne Potterson (2013) Developmental delay in HIV-exposed infants in Harare, Zimbabwe.

John CC, Bangirana P, Byarugaba J, Opoka RO, Idro R, Jurek AM, Wu B, Boivin MJ. Cerebral malaria in children is associated with long-term cognitive impairment. Pediatrics. 2008.

Kail, Robert V (2011). Children and Their Development (6th Edition) (Mydevelopmentlab Series). Englewood Cliffs, N.J: Prentice Hall.

Kalra V, Seth R, Sapra S (2005) Autism-experiences in a tertiary care hospital. Indian J Pediatr. 72:227–230.

Lewis R F, Judith S P: Infant or young child with developmental delay. The New England Journal of Medicine, 1994;330(7):478-483.

Li Y, Liu J, Liu F, Guo G, Anme T and Ushijima H (2000). Maternal child rearing behaviors and correlates in rural minority areas of Yunnan, China. J Dev Behav Pediatr. 21:114–122.

Lian WB, Ho SK, Yeo CL and Ho LY. (2003) General practitioners' knowledge on childhood developmental and behavioural disorders. Singapore Med J. 44(8):397–403.

Liao HF, Wang TM, Yao G and Lee WT (2005) Concurrent validity of the Comprehensive Developmental Inventory for Infants and Toddlers with the Bayley Scales of Infant Development-II in preterm infants. J Formos Med Assoc. 104(10):731–737.

Liao HF, Pan YL (2005) Test–retest and inter-rater reliability for the Comprehensive Developmental Inventory for Infants and Toddlers diagnostic and screening tests. Early Hum Dev. 81(11):927–937.

Lin JD, Yen CF, Wu JL, Kang SW. The administrative population report on children with developmental delays in Taiwan, 2003 through 2007. Res Dev Disabil. 2009; 30: 353_358.

Long HL: Guidelines for referral. A Handbook of developmental disabilities: Ressources for interdisciplinary care. Edited by Kurtz LA, Dowrick PW, Levy SE, Batshow ML. Gaithersburg: Aspen Publication; 1996:27-28.

López SC, Lara MG, Amighetti LD. (2000) Parenting and physical punishment: primary care interventions in Latin America. Rev Panam Salud Publica. 8(4):257–267.

Louise H, Alison S, Jon D, Paul G: Evidence based case Reviews: Invatigation of children with "Developmental Delay". Western Journal of Medicine, 2002;176 (1): 29- 33.

Maia JM, Williams LC. Risk and protective factors for child development. Temas Psicol 2005;13:91-103.

Majnemer A. (1998) Benefits of early intervention for children with developmental disabilities. Seminars in Pediatric Neurology, 5, 62-69.

Mathur GP, Kumar R, Mathur S, Singh YD, Kushwaka KP. (1995) Detection and prevention of childhood disability with the help of Anganwadi workers. Indian Pediatr. 32 (7):773–777.

Meisels SJ, Atkins-Burnett S (2000) The elements of early childhood assessment. In: Shonkoff JP, Meisels SJ, eds. Handbook of early childhood intervention. New York, Cambridge University Press: 231–257.

Meisels SJ, Fenichel ES, eds. (1996) New visions for the developmental assessment of infants and young children. Washington, DC: Zero to Three/National Center for Infants, Toddlers, and Families Publications.

Meliegy E.E. and Sabbagh H.E. (2004) Etiologies of developmental delay in Egyptian children. International Journal of Child Neuropsychiatry, 1, 29-40.

Msall ME (2005) Measuring functional skills in preschool children at risk for neurodevelopmental disabilities. Ment Retard and Dev Disabil Res Rev. 11 (3): 263–273.

Mung'ala-Odera V, Meehan R, Njuguna P, Mturi N, Alcock K, Carter JA (2004) Validity and reliability of the 'Ten Questions' questionnaire for detecting moderate to severe neurological impairment in children aged 6–9 years in rural Kenya. Neuroepidemiology. 23:67–72.

Mung'ala-Odera V, Newton CR (2007) Identifying children with neurological impairment and disability in resource-poor countries. Child Care Health Dev. 33:249–256. Original Text.

Murray C, Lopez AD (1994) Quantifying disability: data, methods and results. Bull World Health Organ. 71:481–494.

Nair MK , Babu George, Elsie Philips (1991) Trivandrum Developmental Screening Chart. Indian Pediatr. 28(8):869–872.

Nair MKC, Radhakrishnan S: Early childhood development in deprived Urban settlement. Indian Pediatrics, 2004;41(3):227-237.

National Infant and Toddler Child Care Initiative: Infant/Toddler development, screening and assessment, Federal Child Care Bureau. 2010, 8-9.

Nelson CA 3rd, Zeanah CH, Fox NA, Marshall PJ, Smyke AT, Guthrie D (2007) Cognitive recovery in socially deprived young children: the Bucharest Early Intervention Project. Science. 318(5858):1937–1940.

Parker S and Zucker B(eds) Behavioural and Developmental Paediatrics. A handbook for Primary Care. 1995.

Persha A.J. and Rao V.R. (2003) Early intervention a service model; early intervention to IUGR children at risk for developmental delays Secumderabad: National institute for the mentally handicapped 2003. Manovikasnaga, India.

Peter, M.C., Keibe, D.A. and Palmer, F.B. (1998) Classification of developmental delays. Seminars in Pediatric Neurology, 5, 2-14.

Phatak P, Dhapre M, Pandit A (1991) A study of Baroda Development Screening Test for infants. Indian Pediatr. 28(8):843–849.

Poon JK, La Rossa AC, Pai GS: Developmental delay: timely identification and assessment. Indian paediatr 2010, 47:415.

Prosser J, Le Couteur A: Autism and the Pervasive developmental disorders. Current Paediatrics 1997;7: 158-162.

Rydz D, Shevell MI, Majnemer A, Oskoui M (2005): Developmental screening. J Child Neurol. 20(1):4–21.

Rydz, D., Srour, M., Oskoui, M., et al. (2006) Screening for developmental delay in the setting of a community pediatric clinic: A prospective assessement of parent-report auestionnaires. Pediatrics, 118, 1178-1186.

Sand N, Silverstein M, Glascoe F, Gupta V, Tonniges T, Connor K (2005) Pediatricians' reported practices regarding developmental screening: do guidelines work? Do they help? Pediatrics. 116 (6):174–179.

Santos DC, Tolocka RE, Carvalho J, Heringer LR, Almeida CM, Miquelote AF. Gross motor performance and its association with neonatal and familial factors and day care exposure among children up to three years old. Rev Bras Fisioter 2009;13:173-179.

Shevell MI, Ashwal S, Donley D, et al. Practice Parameter: Evaluation of the child with global developmental delay: Report of the quality standards subcommittee of the American

Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology 2003; 60:367–80.

Shore R (1997) Rethinking the brain: new insights into early development. New York: Families and Work Institute.

Sices L, Berkson G, Bodfish JW ,Breese GR, Cataldo MF. (2004) How do primary care physicians manage children with possible developmental delays? A national survey with an experimental design. Pediatrics. 113:274–282.

Simeonsson RJ, Sharp MC: Developmental delays. In Primary paediatric care. 2nd edition. Edited by Hoekelman RA, Friedman SB, Nelson NM, Seidel HM. St. Louis: Mosby-Year Book; 867:70-1992.

Singh H., Nizamie A., Jahan M., Jagadheesan K. and Nizamie S.H. (2002) Profiles of individuals with mental retardation in Ranchi: A community study. Indian Journal of Clinical Psychology, 29, 178-185.

Sonnander K (2000) Early identification of children with developmental disabilities. Acta Paediatric. (Suppl) 89(434):17–23.

Stern D (1998) Mothers' emotional needs. Pediatrics. 102:1250–1252.

Squires J, Bricker D (1999). Ages and Stages Questionnaire (ASQ-3). Paul H Brookes Publishing Co.

Tervo R: Identifying patterns of developmental delay can help diagnose neurodevelopmental disorders. A pediatr persp 2003, 12 (3):1.

Toga AW, Thompson PM, Sowell ER; Thompson; Sowell (2006). "Mapping brain maturation" Trends Neuroscience 29 (3): 148–159.

Trani JF (2009) Screening children for disability. Lancet. 374(9704):1806–1807.

Vazir S, Lansdown R, Naidu A, Vidyasagar P, Vinodini R (1994a) A comparison of Indian and American Scales of Child Development. Journal of the Indian Academy of Applied Psychology. 20: 175–181.

Vazir S, Lansdown R, Naidu A, Vidyasagar P, Vinodini R (1994b) Screening test battery for assessment of psychosocial development. Indian Pediatrics. 31: 1465–1475.

Valsamma E, T Zoubeidi, F Yunis, AK Gururaj (2006) Prevalence and psychosocial correlates of global developmental delay in 3-year-old children in the United Arab Emirates.

Vilaça S. (2012). Desenvolvimento infantil e capacitação materna como resultado da aplicação do Programa de Empowerment Parental para o desenvolvimento infantil (PEPDI). (doctoral), University of Minho.

Were FN, Bwibo N O: Two year neurological outcome of very low birth weight infant. East African Medical Journal, 2006;83 (5): 243- 249.

William F: Well-baby care in the first 2 year of life. In: Canadian Task Force on Preventive Health Care, 1994.

Wirz S, Edwards K, Flower J, Yousafzai A (2005) Field testing of the ACCESS materials: a portfolio of materials to assist health workers to identify children with disabilities and offer simple advice to mothers. Int J Rehabil Res. 28 (4):293–302.

World Health Organization (2008) The global burden of disease. World Health Organization Press, Geneva.

APPENDIX 1

Map of Ogun State and Indication of Ado-odo/ Ota Local Goverment Area
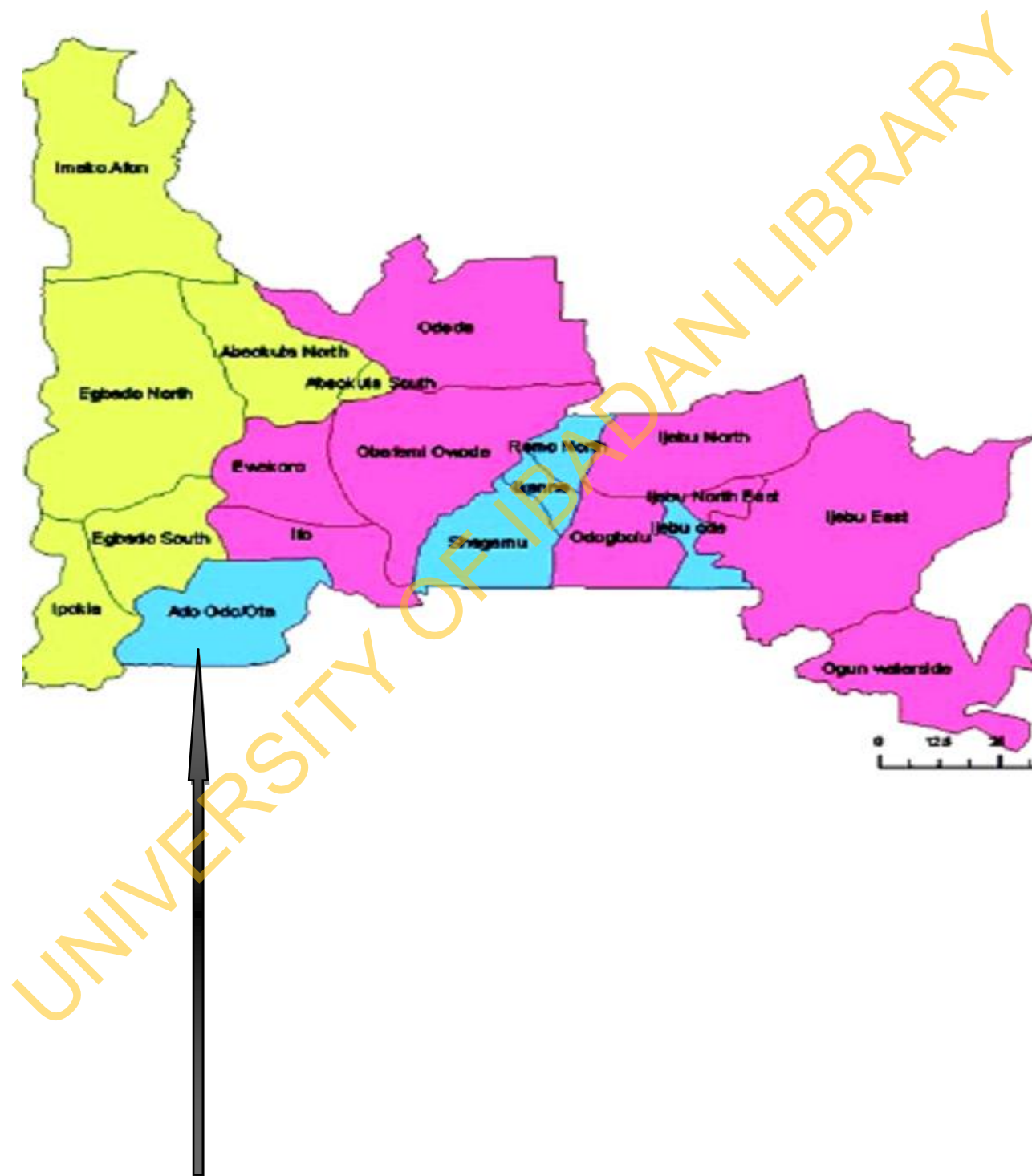
APPENDIX 2 (a)

INFORMED CONSENT

My name is Oguntoyinbo Damilola, I am a post graduate student of the Centre for Child and Adolescent Mental Health, University of Ibadan. I will be interviewing parents and observing Children in order to determine the prevalence of developmental delays among under five year old children. I will need to ask you some questions, which you may find difficult to answer but please note that the confidentiality of your answers will be maintained.

You will be given a questionnaire and your name will not be written on the questionnaire so that your name will not be linked with any information you give. The information you and other people give will be used to make recommendation to policy makers and health care workers to find a solution to developmental problems. A questionnaire will be given to you which has some questions. Your honest answers to the questions will help to better indentify and intervene early on children with developmental problems.

Note that you have the right to withdraw at any given time if you choose to. I will greatly appreciate your help in responding to the survey and taking part in the study.

Consent: Now that the study has been well explained to me and I fully understand the content of the procedure, I will be willing to take part in the study.

…………………………………………..   …………………………………

   Name & Signature of the participant   **Interview Date**

IWE-IGBAYANDA LOWO OLUKOPA

Oruko mi ni Oguntoyinbo Damilola. Mo je olukeko agba ni ile ikose eto ilera opolo fun omode at odo, fasiti ti ilu Ibadan. Nwo ma foro wa obi lenu wo ati wiwo awon omo lati le mo iye itankale ati ibatan idaduro idagbasoke larin awon omode odun marun sile ni agbegbe meji ni ota, ipinle ogun. Nwo nilo lati bi o ni awon ibeere kan ti o ti le ri ni sisoro lati dahun. Sugbon mo fi da o loju pe idahun re yo di bibo.

A o fun o ni iwe-ibere , a o si ni ko oruko re si ki oruko re ma ba tona si iroyin ti o ba fun wa. Irohin ti iwo ati awon eniyan toku fun wa ni a o lo lati se eto fun ijoba ati onise eto ilera lati wa ojutu si isoro idagbasoke. A o fun o ni Iwe-ibeere ti oni awon ibeere kokan. Idahun tooto re si ibeere wonyi ma se iranwo lati tun tete damo ati mojuto awon omo to ni iidaduro ninu idagbasoke.

Mo dajupe oni ase lati faseyin ni igbakugba bi oba hun o. now dupe iranwo re bi o ba kopa ninu ise yi.

GBIGBA LATI KOPA: Nisiyi ti a ti salaye daradara fun mi ti mo si ni oye re yekeke, mo gba lati kopa ninu eto na.

………………………………………….. …………………………………

   Oruko ati apeere idanimo olukopa   **Ojo**

APPENDIX 3

ETHICAL APPROVAL LETTER

UNIVERSITY OF IBADAN, IBADAN

CENTRE FOR CHILD AND ADOLESCENT MENTAL HEALTH

RESEARCH QUESTIONNAIRE

PREVALENCE AND CORRELATES OF DEVELOPMENTAL DELAYS AMONG UNDER-FIVE CHILDREN IN TWO COMMUNITIES OF OTA, OGUN STATE, NIGERIA.

Dear respondent,

I am a student of the above named institution conducting a research on the topic above. I promise that all information supplied will be treated as confidential and utilized for the purpose of this research, hence no name is required.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

A) **Age:** (1) less than 20years   (2) 20-29years   (3) 30- 39years   (4) 40 and above

B) **Age at Conception:** _____

C) Which of these best describe your religious belief?

1) Islam   2) Christianity 3) Traditional 4) Other faith (write here): _____

D) **Ethnicity/ Tribe:** Yoruba (1);   Hausa (2);   Igbo (3);   other tribes (4)   (write please):

_____

E) **Which of these best describe your educational status?** (write code for each)

University graduate and equivalents = (5)

Post-Secondary certificate, not University = (4)

Secondary School or grade II certificate = (3)

Modern 3 and Primary 6 certificate = (2)

No formal education = (1)   Others (Please write): _____

F) **Which of these best describe your occupation?** (Write code for each)

Senior public servant, professional, manager, contractor, large scale trader = (1)

Intermediate grade, public servant, senior school teachers = (2)

Junior school teacher, driver, artisan = (3)

Petty trader, labourer, messenger, similar grades = (4)

Unemployed, fulltime house wife, student, subsistence farmer = (5)

Others (Please, write) _____

G) **Which of these best describe your marital Status?** (Mark correct answer)

Not yet married = 1   Married = 2;   Divorced = 3   Separated = 4   Widowed = 5

H) **Family type:** (1) Monogamy   (2) Polygamy   (3) Polyandry   (4) Others

I) **How many wives does your husband have?** (Please, write 1, 2, 3, .e.t.c)_____

J) **What position are you among your husband wives?** (Please, write 1, 2, 3, .e.t.c)_____

K) **How many children do you have?** (Please, write 1, 2, 3,.e.t.c) _____

SECTION B: HOME STRUCTURE

L) Which of these correctly describe the main source of drinking water for those living in your house (I mean your family)? (Please, mark Yes or No for each of the options below)

	YES	NO
1. Piped Water		
a. Public tap/standpipe		
b. Tube well or borehole		
2. Dug Well		
a. Protected well		
b. Unprotected well		
3. Water From Spring/ Stream		
4. Rainwater		

Please, write other sources of water in your house: _____

M) What kind of toilet facility or facilities do members of your household usually use?

	YES	NO
1. Water Cistern		
2. Pit latrine		

Please, write other type of toilet you use in your house: _____

N) How many rooms are occupied by your family members, including rooms for sleeping? _____

<div align="center">**APPENDIX 4 (b) Yoruba Version**</div>

<div align="center">UNIVERSITY OF IBADAN, IBADAN</div>

<div align="center">CENTRE FOR CHILD AND ADOLESCENT MENTAL HEALTH</div>

<div align="center">**IYE-ITANKALE ATI IBATAN IDADURO IDAGBASOKE LARIN AWON OMODE ODUN MARUN SILE NI AGBEGBE MEJI NI OTA, IPINLE OGUN.**</div>

Olukopa owon,

Mo je omo ile-eko ile-iwe ti akoruko re soke ti o nse iwadi lori **"Iye-itankale ati ibatan idaduro idagbasoke larin awon omode odun marun sile**." Mo seleri pe gbogbo ohun ti o ba fun mi ni nwo lo laiso fun enikeni, ti nwo si lo fun ero ise yi, nitorina ako nilo oruko kokan.

IPIN A: IBEERE NIPA RE

A) **Ojo ori:** (1) kere si odun 20 (2) Odun 20-29 (3) Odun 30- 39 (4) 40 ati jubelo

B) **Ojo ori nigba iloyun :** _____

C) **Ewo ninu wonyi lo juwe esin re?**

1) Imale 2) Onigbagbo 3) Abalaye 4) Igbagbo miran (ko sihin): _____

D) **Iru eniyan/ Eya re:** Yoruba (1);   Hausa (2);   Igbo (3);   Eya miran (4) Jowo ko sihin):

_____

E) **Ewo ninu wonyi lo juwe ipo ikeko re daradara?** (Lo ena fun ikokan)

Olugboye ile-eko giga fasiti ati ibamu re = (5)

Iwe-eri eyin ile-eko giga, ti ki nse fasiti = (4)

Ile eko giga tabi iwe-eri grade II = (3)

Iwe-eri iwe mefa = (2)

Kosi eko ile-iwe rara = (1)   Omiran (Jowo, ko) : _____

F) **Ewo ninu wonyi lo juwe ise re daradara?** (Lo ena fun ikokan)

Osise ijoba agba, ogbontarigi, oga ile-ise, agbesefunni, onisowo nla = (1)

Ipo to tele, osise ijoba, oluko agba ile-eko = (2)

Oluko kekere ile-eko, awako, onise-owo = (3)

Onisowo kekeke, osise, omo-iranse, ipo ti o bamu = (4)   Omiran (Jowo, ko) _____

Alainiselowo , iyawole kikun, omo ile-iwe, agbe ohun jije = (5)

G) **Ewo ninu wonyi ni o juwe ipo igbeyawo re dadara?** (Yan idahun to se dede)

Nko ti gbeyawo=   Mo ti gbeyawo =   Mo ti ko sile =   Ti ya soto=   Opo =

  1   2;   3   4   5

H) **Iru ebi:** (1) alayakan-oko kan   (2) alaya meji-oko kan   (3) alaya kan-oko pupo (4) Omiran

I) **Aya melo ni oko re ni?** (Jowo, ko 1, 2, 3, ati bebelo) ⎯⎯⎯⎯⎯

J) **Ipo wo ni o je larin awon iyawo oko re ?** (Jowo, ko 1, 2, 3, ati bebelo)⎯⎯⎯⎯

K) **Omo melo ni o bi?** (Jowo, ko 1, 2, 3, ati bebelo) ⎯⎯⎯⎯⎯⎯

IPIN B: IBEERE NIPA ETO ILE RE

L) Ewo ninu wonyi ni o le juwe ibi isun pataki omi mumu awon ti won gbe ile re. (ani ebi re)?

    (Jowo, yan "beeni" tabi "beeko" fun ikokan ninu wonyi nisale)

	BEENI	BEEKO
1. Omi ero		
a. Omi ero ijoba		
b. Omi ero lati inu ile		
2. Kanga ta gbe		
a. Kanga ta dabobo		
b. Kanga ta ko dabobo		
3. Omi to nsun/ omi riru		
4. Omi ojo		

Jowo, ko orisun omi miran ninu ile re: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

M) Iru ona iyagbe wo ni awon ara ile re maa n lo?

	BEENI	BEEKO
1. Ile-igbe olomi		
2. Salanga		

Jowo , ko ile-igbe omiran ti e nlo ninu ile yin: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

N) Iyara melo ni molebi nlosi, pelu iyara fun oru? (Jowo ko 1, 2, 3, ati bebelo) ⎯⎯⎯⎯⎯⎯⎯