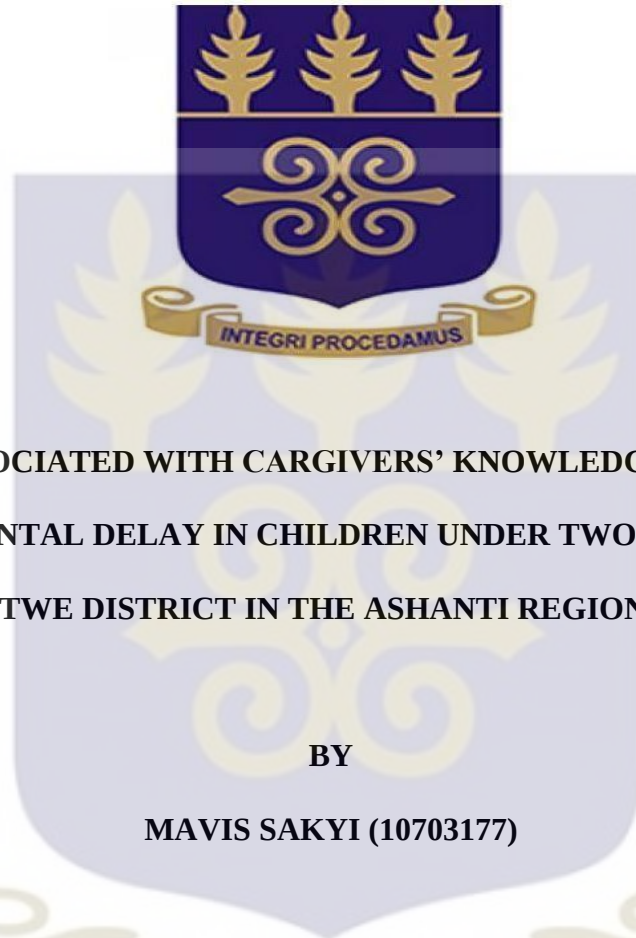


**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



**FACTORS ASSOCIATED WITH CARGIVERS' KNOWLEDGE OF PHYSICAL
DEVELOPMENTAL DELAY IN CHILDREN UNDER TWO YEARS IN THE
BOSOMTWE DISTRICT IN THE ASHANTI REGION, GHANA**

BY

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF
MASTER OF PUBLIC HEALTH DEGREE (MPH)**

NOVEMBER, 2019

DECLARATION

I, Mavis Sakyi, do hereby declare that, apart from references made to the work done in relation to this subject area which have been duly acknowledged, this work was independently done by me under supervision. I further declare that this work has not been submitted for the award of any degree in this University or elsewhere.

.....
Dr Mavis Sakyi (MPH student)

.....
Date

.....
Dr Bismark Sarfo (Supervisor)

.....
Date

DEDICATION

I dedicate this work to the strong women in my life: my mother, grandmother and aunt. You inspire me to keep moving forward, standing out and excelling.

ACKNOWLEDGEMENT

I would like to thank my Lord and Saviour Jesus Christ for his overwhelming love towards me.

To the entire staff and clients of St Michael's Hospital, Jackie Pramso, I say a big thank you for the assistance and contribution to this study.

To my supervisor, Dr Bismark Sarfo, thank you for your extraordinary patience and guidance.

I would also like to thank my family and friends for their immense support, special mention to my husband Dr Emmanuel Aryee, for your continual undying support, you are a blessing.

God bless you all.

ABSTRACT

Background: Early childhood development forms the cornerstone of human development. There are four fields of childhood development. The gross motor, vision and fine motor form the physical component of development. Parental knowledge of childhood development has been associated with more effective parenting strategies and better child outcomes. Maternal knowledge of gross motor development also affects the patience of the mother with normal development; helps them provide appropriate stimulation and playing environments, and affects the recognition of developmental disabilities in young children. Little is known about the level of knowledge of developmental milestones among Caregivers in Ghana. This study assessed the factors associated with Caregivers' knowledge on developmental milestones and developmental delay in children under two years.

Method: In a descriptive cross-sectional study, a total of 395 Caregivers with children under the age of 2 were interviewed using a self-administered questionnaire at the Child Health clinic of the St. Michael's Hospital in Bosomtwe District in the Ashanti region of Ghana. Data collected were entered using EpiData software version 3.1 and then exported to Stata 15 for analysis. Pearson's Chi square test was used to test association between factors and the level of knowledge demonstrated and logistic regression models were used to assess significant predictors of high level of knowledge on developmental milestones in children under two years.

Results: The general prevalence of knowledge on gross motor milestone in children under 2 years in the study population was 58.5%. The least level of knowledge on developmental milestones for children under two was demonstrated in early, less obvious milestones such as attaining neck control (49.5%) and sitting without support (54.75%). The major source of information on developmental milestones among respondents was from family (25.8%), closely followed by

previous experience (23.9%), $p\text{-value} < 0.05$. Only 40.8% of the respondents had received any formal health education on developmental milestones. Significant predictors of good knowledge of developmental milestones in this study were occupation (AOR: 1.48; 95% CI: 1.230-5.415), marital status (AOR: 1.39; 95% CI: 1.100- 6.073), parity (AOR: 1.780; 95% CI: 1.121-4.253) and ease of access of health education (AOR: 2.310; 95% CI: 1.587-3.112). No significant association was found with age of respondents, sex, educational status, household income or religion.

Conclusion: There was a fair level of awareness (58.5%) of developmental milestones among caregivers in this study. Significant predictors of developmental milestones in this study included the marital status of the respondents, respondents with fewer number of children (1 to 2 children), occupation (health profession) and ease of access to health centers. No significant association was found with caregiver's age, sex, educational status or wealth index.

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LIST OF ABBREVIATIONS

CKCDI-	Caregiver Knowledge of Child Development Inventory
CPMR-	Centre for Plant Medicine Research
CLCD-	Centre for Learning and Childhood Development
CDI-	Centre for Development Intervention
DSM-	Diagnostic and Statistical Manual
GBD-	Global Burden of Disease
GHS-	Ghana Health Service
LMIC-	Low and Middle Income Countries
PHC-	Population and Housing census
SSA-	Sub-Saharan Africa
TV-	Television
RTHB-	Road to Health Book
UNICEF-	United Nations Children Education Fund
WHO-	World health Organization
YLD-	Years lived with Disability

CHAPTER ONE

INTRODUCTION

1.1 Background

Developmental delay is defined as a significant retardation in the process of a child's development from age 0 to 8 years. Normal development and attainment of certain abilities in children has been observed to fall within certain age ranges termed as developmental milestone. Developmental delay is red-flagged when a child is unable to achieve developmental milestones set according to the child's age. Although development may vary from one child to the next based on a myriad of factors, the average time most children achieve these milestones differ only slightly. The knowledge of developmental milestone is thus a useful tool to assess and monitor overall child well-being and growth. Developmental milestone is categorized into 4 functional domains that can be assessed objectively. These are the motor (gross and fine motor skills), speech or communication skills, vision and hearing skills and social skills.

Motor control involves coordination of both small and large muscle groups in the body, such as moving the upper and lower limbs consciously and deliberately. Motor control involves balance and stability with movement which include neck control, sitting, standing, walking, kicking, throwing, catching and galloping (Ghassabian et al., 2016). Similar to the other developmental domains, gross motor skill of a child is progressive, and involves moving the large muscles in a phased pattern; for instance, movement at six to eight months which involves creeping on all fours, which then proceeds to the infant pulling to stand, subsequently "cruising" while holding on to an

erect object, walking while holding an adult's hand, and ultimately walking and running independently (Murray, Jones, Kuh, & Richards, 2007).

The other developmental domains such as speech/communication skills involves the developing of cognitive or thinking abilities and the building of vocabulary to communicate thought processes; while the vision and hearing skills which is the child's ability to see and hear. These indicate the growing of neuronal pathways associated with sight and hearing. This is important in influencing social skills or activity. The social development of children involves learning to interact with other people. Children begin to form relationships with individuals present around them right after birth, but the process of learning to communicate, share, and interact with these individuals often takes many years to develop and refine.

It is known that there is about 100 billion brain cells present at birth; brain development and essential neural linkages and connections progressively develop from birth and in early childhood (Bhandari et al., 2004). The rapid development of these neuronal pathways in the brain leads to maturation across the four domains of developmental milestones in children. These neural pathways and developmental milestones are known to be influenced by genetic and environmental factors.

The state of early child development measured throughout the world offers a yardstick by which society can measure its overall success (Global Research on Developmental Disabilities Collaborators et al., 2018). Since early child development forms the cornerstone of every human development, the effects of poor physical and intellectual development in children under five years has recently come under discussion.

Globally, 52.9million children under 5 years of age (54% male) had developmental delay or disabilities (Olusanya et al., 2018). According to this same study, about ninety-five (95%) of the children with developmental delay and disabilities were noted to be living in low and middle-income countries (LMIC). These accounted for 13.3% of the 29.3 million years lived with disability. Between year 1990 and 2018, childhood mortality rates in children under 5 years have been halved but no congruous boost have been seen in non-fatal health outcomes in children with developmental delay worldwide (Global Research on Developmental Disabilities Collaborators et al., 2018).

1.2 Problem Statement

Although the burden of delay in development in children under 5 years has decreased in some Western countries, the numbers are greatly increased in Sub-Saharan Africa (71.3%), North Africa and the Middle East (Olusanya et al., 2018). This suggests that the prevalence of developmental delay in children under 5years has not significantly improved since 1990, uncovering the need to determine factors stagnating the physical and intellectual development potential of children in formative years.

Never has there been a more pressing time to determine factors affecting the development of children under 5 years such as now. Some countries working hand in hand with WHO and UNICEF have instituted a developmental surveillance system during routine pediatric visits to actively examine for developmental delay and educate care givers on childhood development (American Health Organization & Health Organization, n.d.). Countries with an ongoing active developmental surveillance include Canada and Germany. The surveillance system documents the

number of children under 5 with developmental delay and follows up on intervention strategies for these children.

In Ghana, there is no such organized developmental surveillance system ongoing which is key to understanding the burden of developmental delay in children. Assessing and boosting caregivers' knowledge on developmental milestones offers the best efforts towards early recognition and presentation for management of developmental delay in early childhood. Timely recognition of tardiness in development in childhood remains critical due to amenable nature of some causes of developmental delay. Besides early identification of developmental delay by caregivers; appropriate health seeking behavior may well serve the needed step in putting in the necessary intervention to mitigate the curable and or manageable causes of developmental delay.

Studies have found that developmental delay can be due to a myriad of factors such as malnutrition, congenital illness such as congenital heart disease, chronic infection such as HIV and Tuberculosis as well as a poor nurturing environment for child's physical and intellectual growth. There are also some genetic underpinnings of developmental delay such as due to chromosomal abnormalities or mutations. Retardation in development may be a symptom of medical and genetic conditions such as Down's syndrome.

The Road to Health Book (RTHB) used in most Child Welfare Clinics in Ghana has some information on childhood developmental milestones. This information was revised and put in pictorial form in the RTHB but remains poorly discussed at antenatal clinics and the Child Welfare Clinics, leaving most caregivers to speculate or resort to information received from family and friends on this crucial subject matter. Caregivers, who know the gross motor developmental milestones, have their own perceptions of what delayed development is. This has led to impatience with normal development, lack of stimulatory childhood activities, inappropriate playing

environments and delayed recognition of developmental disabilities in young children (Huang, O'Brien Caughy, Genevro, & Miller, 2005).

This study thus seeks to assess caregivers' knowledge of these developmental milestones, investigate factors influencing this knowledge and evaluating the attitude of caregivers to developmental delays in children under two years in Bosomtwe district in the Ashanti region.

1.3 Rationale of Study

Limited data exists on the link between caregivers' knowledge on childhood physical development and identification of the physical developmental delay in children under five in Sub-Saharan Africa despite the burden of disease in this region.

Caregivers' knowledge of various domains of development in early childhood has been associated with more efficient and interactive parenting approach and better childhood outcomes. Caregivers' knowledge related to the physical (gross motor) development in children under two years thus ought to be examined so appropriate, culture-specific and comprehensive learning programme can be implemented for caregivers to allow prompt recognition and management of developmental delays in children under 2 years.

1.4 Objective of the Study:

To determine the factors associated with Caregivers' Knowledge on Physical (gross motor) developmental milestones and developmental delay in children under 2 years.

1.5 Specific Objectives:

- 1 To assess the level of knowledge of caregivers on gross motor developmental milestones in children under two years.
- 2 To determine the various sources of Caregivers knowledge on gross motor developmental milestones in children under two years
- 3 To determine the factors associated with Caregivers' knowledge on gross motor developmental milestones in children under two years
- 4 To evaluate how Caregivers respond to gross motor developmental delay in children under two years

1.6 Conceptual framework

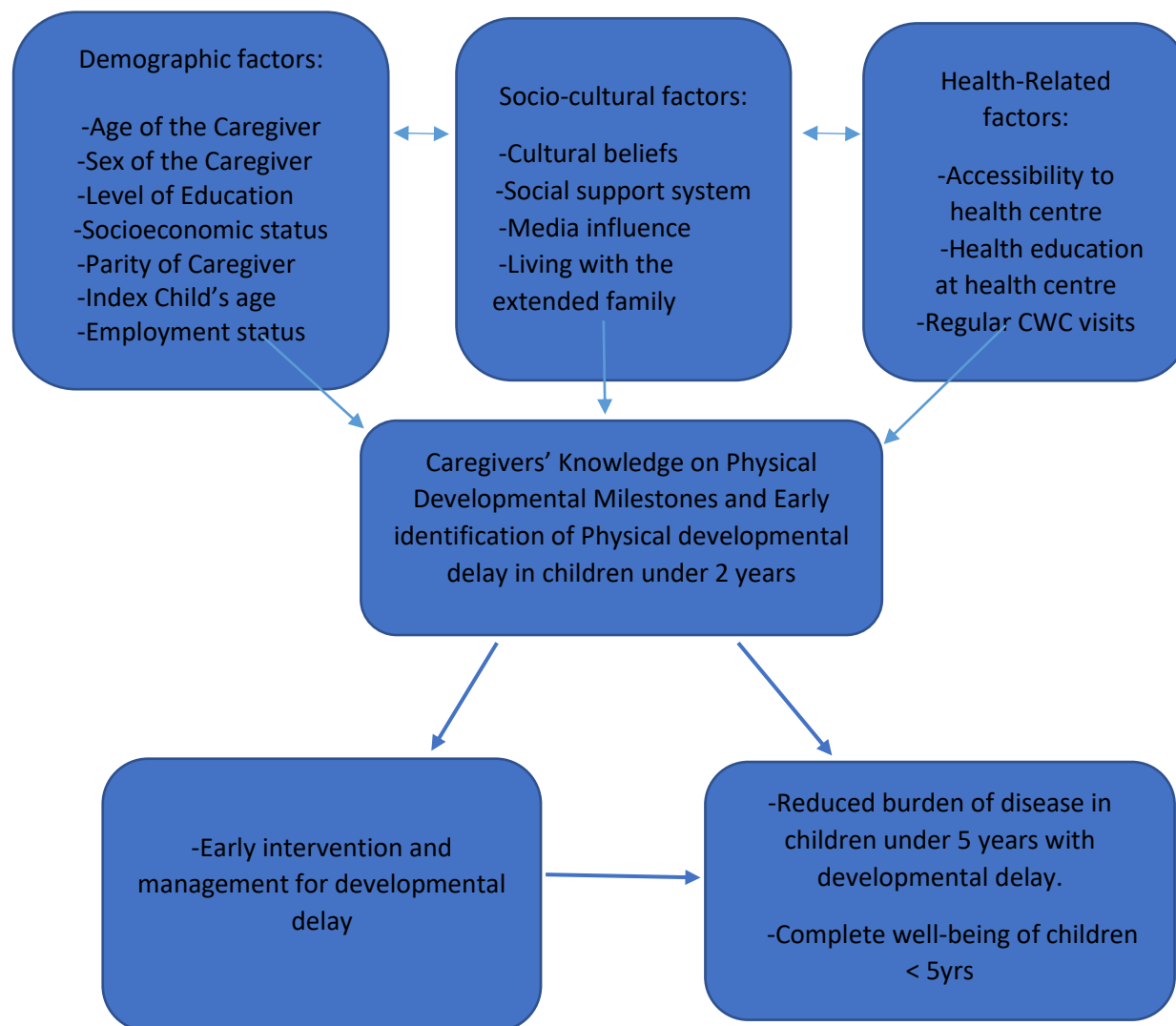


Fig 1.1 Conceptual framework on factors influencing Caregivers Knowledge on Developmental delay in children under 2 years:

The factors associated with caregivers' knowledge of developmental milestones and developmental delay in early childhood are categorized into demographic factors, socio-cultural factors and health-related factors. Demographic factors increase caregivers' knowledge of developmental delay and this includes increasing age of the caregiver, high educational status of the caregiver, increasing parity, high socio-economic status and younger age of the caregivers'

index child. Socio-cultural factors such as healthy cultural beliefs, good social support system and residence with the extended family may also increase the caregivers' level of knowledge of developmental delays. Health-related factors such as easily accessible health care, regular Child Welfare clinic visits and comprehensive education on developmental milestones of early childhood may also increase caregivers' knowledge on these developmental milestones (Fig 1.1). Increased Caregivers' knowledge may translate into timely of developmental delays in children and provision of appropriate, stimulatory environment for early childhood growth and development.

CHAPTER TWO

LITERATURE REVIEW

The path of childhood development has been said to be a journey of discovery that is clear only in retrospect, and this journey is rarely a straight line(*Pakistan pediatric journal*, n.d.). There are four fields of childhood development. Every child goes through phases of growth overtly and covertly. These fields of development are: the gross motor development; fine motor development (these two making up physical development of childhood); hearing, speech and language development; social, emotional and behavioral development. Several factors have been studied to influence these phases of development in early childhood. Prominent among the factors associated with early childhood development patterns includes: genetic factors, socio-cultural factors and environmental factors such as parental interaction and stimulatory environment for development in early childhood (Fayaz & Goonawardane, 2017; Huang et al., 2005; Reich, 2005a).

2.1 Maternal level of knowledge of child development

Caregivers awareness of early childhood milestones has been found crucial to early childhood development (Wemakor, Garti, Azongo, Garti, & Atosona, 2018). This study along with other studies done assessed the degree of knowledge most parents have regarding typical child development and the role of parental knowledge in gauging developmental milestones for early recognition of developmental delay (Rikhy et al., 2010; van der Linde, Swanepoel, Glascoe, Louw, & Vinck, 2015).

A study conducted in Turkey showed that mothers studied had inadequate knowledge of the timing for cognitive and physical development of infants occurred. These mothers were also unaware of the appropriate age to begin to provide simple opportunities that stimulate development in early

childhood (Ertem et al., 2007a). Over sixty-seven (67.7%) percent of the mothers in this study did not know that the child's brain begins to develop in utero; 64.7% did not know when they should let children sit with support; 11% did not know when children begin to walk alone with good coordination, making this gross motor milestone the only item correctly answered by most mothers. More than 50% of mothers believed that most developmental skills and activities occur at later than normative ages. It was also evident in this study that significant proportion of mothers (more than 60%) did not know that basic functions such as vision, speech, social smiling and overall neural growth start off early in life; thus requiring frequent interaction as early as in utero to help these develop well (Ertem et al., 2007a).

2.2 Effect of maternal knowledge of child development

In developed countries, development surveillance and developmental screening are performed during office visits and maintenance visits to assess development of the children under five years. In Ghana, and some other developing countries, there are no instituted surveillance and evaluation systems for childhood development. Hence, the early recognition of developmental delay is largely dependent on the mother's knowledge of the young child's development to identify disorders of development. Clinicians as well, often rely on mothers' knowledge about the health and development of their children for decision making, counseling and referrals (Brothers, Glascoe, & Robertshaw, 2008).

Studies in Western countries have well established the fact that what caregiver know about the development of their infants and young children has important implications (Bornstein, Cote, Haynes, Hahn, & Park, 2010; Goonawardana & Fayaz, n.d.-a; Reich, 2005b; Zhang et al., 2018). This knowledge of child development affects how child rearing and the nature of environments provided. Inappropriate environments or toys for children has devastating effects such as injuries,

which are the leading cause of death for children after their first birthday (Brothers et al., 2008). As children begin to walk and move about, with their new-found sense of freedom and movement, toddlers can move quickly and accidents can happen in a matter of seconds (Brothers et al., 2008). About 10 percent of children in the UK die each year as a result of falling from balconies, windows and stairs with unintentional childhood injuries contributing to about 40% of child mortality in 2007 (Peden et al., 2008).

A supportive and stimulating home environments are associated with advanced infant motor development (Golding, Emmett, Iles-Caven, Steer, & Lingam, 2014). Inadequate knowledge of child development affects how they play with their children. The most efficient play in early childhood has been found to involve provide interesting and exciting environments like pretend play at home as well as frequent visits to playgrounds, children's gyms, and/or other community facilities designed just for children. Parents follow the child's lead and take turns at play. Parents who also encourage children to talk about the details of the activities completed and places have been noticed to achieve better cognitive outcomes in their children. This is corroborated by research that has shown that high knowledge of child development and provision of stimulatory environment for children leads to better developmental outcomes (Huang et al., 2005; Reich, 2005a).

Some studies indicate that inadequate knowledge among caregivers may also lead to over estimation of infant ability, with many women endorsing abilities beyond babies' developmental capability (Murray et al., 2007; Reich, 2005a; World Health Organization, 2010). On average, these studies indicated that some women overestimated development by 3 months or more.

Recognizing these lapses in knowledge and characteristics associated with knowledge deficits enable tailored educational interventions for caregivers to achieve better childhood outcomes.

2.3 Factors affecting gross motor development

Typical individual differences in motor ability are common and depend in part on the child's weight and build. However, after the infant period, typical individual differences are strongly affected by opportunities to practice, observe, and be instructed on specific movements (Hamadani, Tofail, Cole, & Grantham-McGregor, 2013). Lower motor coordination results in difficulties with movement speed, accuracy and trade-off in complex tasks such as climbing staircases.

In the Multi-center Study conducted in Ghana, India, Norway, Oman and the United States funded by the World Health Organization (WHO), indistinct differences were noticed between countries investigated and in the different sexes in attainment of key motor milestones (Bhandari et al., 2004).

Several factors have been found associated with the level of caregivers' knowledge on developmental milestones. The level of mothers' education and the parity are two socio-demographic factors that were significantly related to maternal knowledge of child development evident in a study done in Sri Lanka (Goonawardana & Fayaz, n.d.-a). Mothers who had higher levels of education and had fewer children had higher scores on the Caregiver Knowledge of Child Development Inventory (CKCDI) done.

Other factors which have been identified as associated with maternal knowledge on developmental milestones included maternal age, age of index child as well as wealth index of the household (Bornstein et al., 2010; Facchini, Martin, & Downing, 2016; Zhang et al., 2018).

2.4 Assessment tools for developmental milestones in childhood:

The Child Development Inventory (CKCDI) instrument identifies awareness of caregivers of basic developmental skills in early childhood and assess timing of the provision of interactive approaches for developmental stimulation ("Caregiver Knowledge of Child Development

Inventory,” n.d.). The CKCDI was developed after an extensive review of existing instruments on measuring maternal knowledge of child development. The CKCDI is similar to ‘Care for Development’; an intervention that the WHO is promoting worldwide and can be used in conjunction with this intervention (Peyre et al., 2017).

The CDI targets to provide an efficient approach to boost the nurturing of young children across government healthcare settings with significant resource constraints and is designed to be used during health care visits for children aged 2 and below are seen routinely in the clinics. The Care for Development intervention provides a health developmental surveillance tool which equips and educates healthcare workers on how to carry out an in-depth assessment to investigate how the caregiver interacts with their child as well as to provide the caregiver with age appropriate stimulatory environment. This tool has been shown to be an efficient support system for caregivers in addressing gaps in knowledge and boosting attempts at an interactive atmosphere for infants and toddlers (Ertem et al., 2007a). The usefulness of the CDI tool was evident in an implementation research study in which the number of families received the CDI counseling during a routine pediatric clinic attendance, then again 1 month after the intervention; these were then reassessed and showed significantly higher scores of measurement on environmental assessments for optimal Home Observation Childhood development Measurement; these families had more age appropriate play things and more available literature for the children than the comparison group that received standard health care only (Facchini et al., 2016).

These assessment tools are currently not actively in use in Ghana and there is no method of assessing empirically the development of a child other than maternal knowledge of child development. There is also limited resources on maternal or caregivers knowledge on developmental milestones in children under 5 conducted in developing countries and as well as

limited data on the timing caregivers provide stimulatory environment for the cognitive development of their children in the Sub-region mothers.

If an active surveillance system approach is instituted instead of the existing passive approach through the introduction of screening tools and interventions, this may be the needed first step in combating and boosting care for children with the developmental delay in the country. This step may be fraught with a myriad of challenges due to the low literacy level and the outrageously high patient to doctor ratio in Ghana but if pragmatic steps are put in place, active surveillance can be instituted. A modified evaluation system can be considered as part of a routine check during Child Welfare clinics visit and immunization visits. This study thus seeks to assess the gap in knowledge on developmental milestones, the level of knowledge on gross motor developmental milestones and the attitude of caregivers towards gross motor developmental delay when perceived in their children under age two years.

2.5 Factors influencing developmental milestones and developmental delay in Africa:

Limited studies exist on developmental milestones and developmental delay in Africa. The number of children under 5 years at risk of suboptimal development in Low and Middle Income Countries is likely to exceed 350 million (about three in every children), even without inclusion of all known disabilities in GBD 2016 (Global Research on Developmental Disabilities Collaborators et al., 2018). The absence of any systematic attention to developmental disabilities has had greatest effect in Sub-Saharan Africa, where the number of affected children increased by more than 70% between 1990 and 2016, despite the overall decrease in prevalence globally (Facchini et al., 2016). Studies done in South Africa indicate a myriad of factors influencing knowledge on developmental milestones in children under five such as the age of the mother, educational status, occupation of the mother, household income and socio-economic status (Reich, 2005b). These factors are

corroborated by studies done around the world (American Health Organization & Health Organization, n.d.; Bornstein et al., 2010; Lansdown et al., 1996; Zhang et al., 2018). Further study is required to assess gaps in knowledge of caregivers on developmental milestones in children under in Sub-Saharan Africa and Africa as a whole.

CHAPTER THREE

METHODOLOGY

3.1 Study Design:

This study was a descriptive, cross-sectional study conducted at St Michael's Hospital in the Bosomtwe District in Ashanti region of Ghana.

3.2 Study Area:

The Bosomtwe District is one of the 254 Metropolitan, Municipal and District Assemblies in Ghana and forms one of the forty three districts in the Ashanti region with Kuntanase as its administrative Capital. The District is located in the central portion of the Ashanti region and has a land size of 422 square kilometers. It lies within latitude 6° 43' north and longitude 1° 46' West showing Bosomtwe District in the National and Regional Context. The District is bounded on the north by Kumasi Metropolitan Assembly, in the east by Ejisu Municipal, the South by the Bekwai Municipal and Bosomtwe District in the West by Atwima Kwanwoma District.

3.3 Study Population:

The population of the Bosomtwe district according to the 2010 Population and Housing Census stands at 93910 with 44793 males and, 49117 females. About 73.2% of the population aged 15years and older are economically active. Of the employed population, about 35.6% are engaged as skilled agricultural, forestry and fishery workers, 23.6% in service and sales, 17.5% in craft and related trade and 5.0% are engaged as managers, professionals and technicians.

3.3.1 Health Institutions:

The health delivery system in the district is made up of sixteen public and private health institutions which include 3 hospitals, 3 health centres, 7 clinics, 5 maternity homes, 4 Community Health Planning Service (CHPS) Compound and 1 Midwifery Training Institution. The District also has 52 outreach points where reproductive and child services are rendered.

3.4 Pretesting of the study

The study tool was pretested on 20 respondents from the Bosomtwe community to examine for the reliability and ease of use of the questionnaire. Pretesting also assessed the quality of the questions, time needed to fill the questionnaire and language suitability and ease of translation to the local dialect. Questionnaire included socio-demographic characteristics of respondents, source of knowledge on developmental milestones as well as assessment of the knowledge and attitude of respondents towards developmental milestones in children under 2 years. A few questions in the questionnaire were modified after pretesting to improve the quality of answers from the respondents. The questionnaire was sufficiently expressed in the local dialect of the community (Twi) and all ambiguity in the statements or questions in the structured questionnaire clarified before the full scale administration of the structured questionnaire and data collection.

3.5 Sample size determination

Based on a study done in Sri Lanka in 2017, where the prevalence of knowledge on developmental milestones among mothers was 63%; a minimum sample size of 395 was derived using the Cochran's formula:

$$n = \frac{Z_{\alpha/2}^2 P (1-P)}{d^2} \quad \text{where}$$

$$Z_{\alpha/2} = 1.96 \quad P = 63\% \quad d = 5\%$$

Estimated 10% non-response rate; total sample size of 395 required.

3.6 Study sampling:

This study was a quantitative study for which an adapted, structured questionnaire was used to collect quantitative data. The study was a facility-based study and the St Michael's Hospital, Jackie Pramso was used as the health facility to sample Caregivers for the study. Eligible Caregivers visiting the Child Welfare Clinic, Antenatal Clinic and paediatric clinic were sampled and the purpose of the study was explained to them by a member of the research team. A participant information sheet was given or read (and explained in Twi to clients who cannot read). Participants were guaranteed that any information obtained from them was anonymous and confidential. Eligible caregivers who refused to take part in the study were omitted from the study; those who consented to participate in the study were allowed to withdraw from the study at any point in time without detriment to subsequent medical care to the caregivers or their children. After participation was accepted, a signed consent form was obtained from the participant. Witnessed consent was obtained when a participant was not able to read the information sheet and thumbprints accepted when necessary. A total of 395 participants were sampled altogether based on 63% estimated prevalence rate using the Cochran formula. The estimated sample was sampled using a systematic

random sampling method to select participants who visited the health facility during the period of the study. The total log in of number of clients-child pair attending the Child Welfare System, routine hospital visit as well as clients visiting the antenatal clinic in the preceding months were assessed to establish the average number of clients expected daily during the study period. A target of 20 clients was set per day and this number determined the Nth number used in the systematic random sampling when this number was used to divide the average attendance in the hospital per day. On a day when 60 average clients were expected, a simple random sampling of numbers 1 to 3 was done to indicate the first random client to be interviewed. If for instance, the number 3 was picked from the simple random sampling, then every third client seen during the visit was interviewed. Those who refused participation or had previously been interviewed were skipped.

3.7 Data Analysis and Management

Data collected was entered using EpiData software version 3.1 and exported to Stata 14 for analysis. Data was cleaned and validated to ensure data quality before analysis. Frequencies were generated for categorical variables while continuous variables such as age was recoded and re-categorized. Descriptive statistics were presented in tabular and graphical forms (pie charts and bar charts). Pearson chi test was used to test significant association between proportions and p-values < 0.05 was considered statistically significant. Binary and multivariate logistic regressions were performed to identify factors associated with the high level of knowledge of developmental delays in children under two years. The regression model was expressed in odds ratio and 95% Confidence Interval.

3.7 Scoring systems used in the study:

There were 6 items on motor milestones in children under 2 years graded from 2 to 0; a score of 2 for accurate response (correct), score of 1 for deviation of plus or minus 2 months from the expected correct response and 0 being an incorrect response or no knowledge on developmental milestones in children under 2 years. The score was cumulated with the total scoring graded as:

- 7-12 – high level of knowledge
- 0 to 6 – low level of knowledge

3.8 Exclusion and Inclusion Criteria:

The inclusion criteria were all Caregivers who visit the health facility during the study period who consent to participate in the study. The exclusion criteria were all caregivers visiting the St Michael's Hospital during the study period who refuse to participate in the study as well as those who omitted due to language barrier (non-Twi or English speaking respondents).

3.9 Ethical consideration/issues

Ethical approval was obtained from the Ethical Review Committee of the Ghana Health Service (GHS) before commencement of the study; approval number received was **GHS-ERC015/01/19**. The participants were informed about the general nature of the study with freedom to decline participation with no consequences to them or their children, and were assured of confidentiality of study. Informed consent were then signed and the record stored. The data will be kept for 5 years. This study was self-sponsored and there was no conflict of interest.

3.10 Safety Considerations:

Confidentiality and anonymity of the participants were strictly maintained. Completed forms and charts were stored in secured cabinets with password protected access systems. All consent forms were kept securely under lock and key and only accessible to the research staff and Ethics Review Committee.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of Caregivers

Overall, four hundred (400) respondents were interviewed (Table 1). Out of 409 respondents who were eligible to participate in the study, nine did not consent to participate giving a response rate of 97.8%. From the study (Table 1), majority of respondents (51%; 204 out of 400) were aged between 30-39 years with the mean age of 32 years, 81% (324 out of 400) were female, 75% (299 out of 400) were married and 35% (141 out of 400) had completed Junior High school education. Significant socio-demographic characteristics associated with good knowledge on developmental milestones among caregivers included the age and parity of the Caregiver, the occupation and marital status of Caregivers and ease of access to health education.

Table 1. Socio-demographic characteristics of Respondents and its association with knowledge

Characteristic	N%	p-value	Characteristic	N%	p-value
Age			Occupation		
11 to 19 years	6 (1.50)		Unemployed	48(12.00)	
20 to 29 years	145(36.25)		Artisan	95(23.75)	
30 to 39 years	204(51.00)		Trader	131(32.75)	
40 to 49 years	33(8.25)	0.005**	Civil servant	68(17.00)	0.008**
50 to 59 years	8(2.00)		Academician	10(2.50)	
60 to 69 years	2(0.50)		Health worker	48(12.00)	
70 to 79 years	2(0.50)				
Sex			Household Income		
Female	324(81.00)		<200	47(11.75)	
Male	76(19.00)	0.249	200-499	183(45.75)	
			500-1999	127(31.75)	
			2000-5000	18(4.50)	0.277
			>5000	11(2.75)	
Marital Status			Religion		
Single	88(22.00)		Christian	344(86.00)	
Married	299(74.75)		Muslims	48(12.00)	0.640
Cohabiting	1(0.25)	0.029*			
Divorced	2(0.50)				

widow	4(1.00)		Atheist	2(1.50)	
			Others	6(1.50)	
Educational Status			Parity		
No formal	22(5.50)		No children	28(7.00)	
Primary	28(7.00)		1 to 2 children	207(51.75)	
Junior High School	141(35.25)	0.835	3 to 4 children	121(30.25)	0.023
Senior High School	79(19.75)		5 to 7 children	401(10.00)	
Tertiary	130(32.50)		8 or more children	4(1.00)	

4.2 Ever heard of developmental milestones in children under 2 years

Out of the total number of caregivers interviewed, 384(96%) had ever heard of developmental milestones (Figure 2). From the study, only 66.75% of the 384 caregivers who has ever heard of developmental milestones had received some form of information (formal or informal) on the various stages of development in children under 2 years of age.

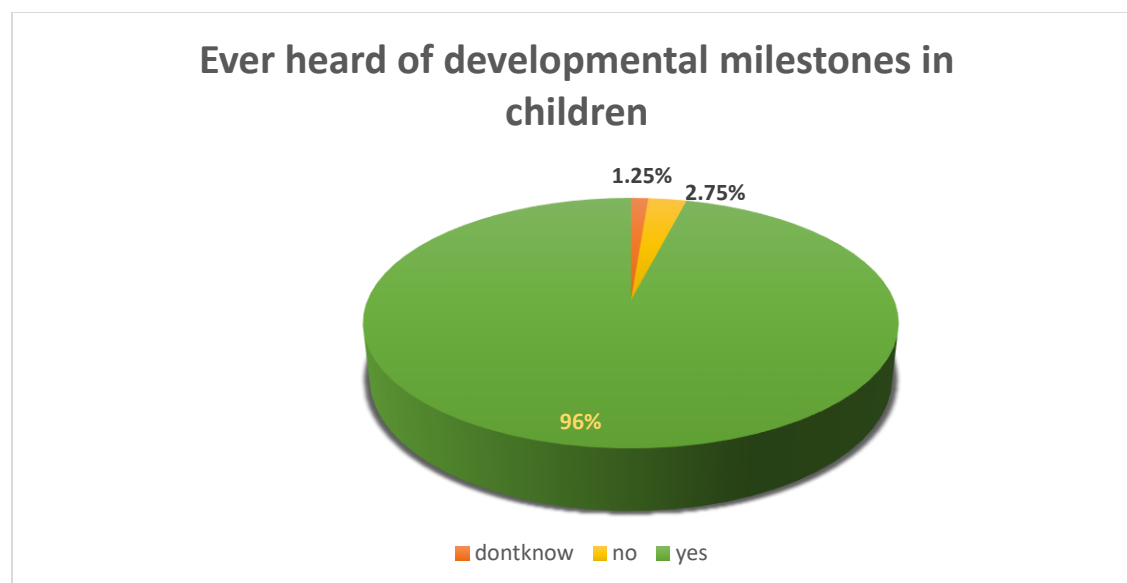


Figure 1- Response to ever hearing about developmental milestones in children under 2 years among respondents

4.3 Sources of Caregivers' knowledge on developmental milestones in children under 2

The source of caregivers' knowledge was significantly associated with the level of knowledge demonstrated (p-value: 0.011). Only 108 (40.8%) of respondents had received formal health education on developmental milestones; such education was noted to be received during antenatal care (4.9%), child welfare clinic (20.0%) and routine paediatric hospital visits (15.8%). Rest of respondents had informal education on developmental milestones: family and friends (25.3%), books including Road to Health Book (23.8%), electronic media such as social media, TV and radio (10.2%).

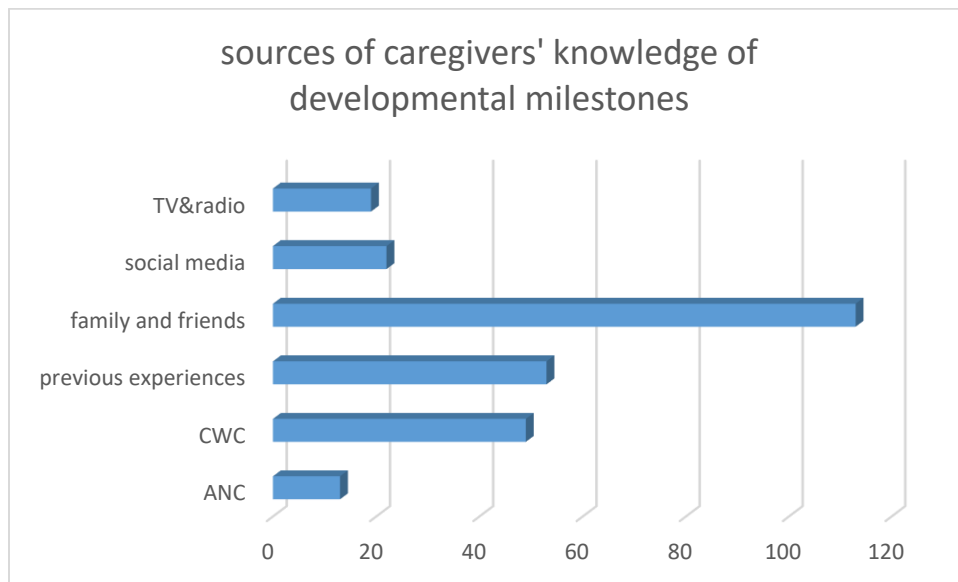


Figure 2: Sources of caregivers' knowledge on developmental milestones in children under 2 years

4.4 Prevalence of Caregivers' knowledge on various developmental milestones in children under 2 years

The general prevalence of knowledge among Caregivers' interviewed was about 58.5%(234 out of 400); two hundred and thirty-four answered three or more out of five questions correctly on the gross motor development milestones of children under 2 years. Respondents were most knowledgeable about walking

milestone; with about 72% responding correctly. Least knowledge was demonstrated in timelines for early developmental milestones- neck control, sitting without support and waving- 49.5%, 54.75% and 52.75% respectively. From table 1, most knowledge was significantly demonstrated by respondents within 30-39 year group category, married respondents, respondents with ease of access to health information and among health workers. No significant association was found between the level of knowledge and sex of the respondent, educational status, parity, religion or household income using Pearson's Chi square analysis.

Table 2- Level of knowledge on various developmental milestone among respondents

Milestone	good level of knowledge	low level of knowledge
neck control	198(49.50)	202(50.50)
sitting without support	219(54.75)	181(40.25)
standing	254(63.50)	146(36.50)
walking	288(72.00)	112(28.00)
waving	211(52.75)	189(47.25)
total knowledge	234(58.50)	166(41.50)

4.5 Response to Cognitive function and its dependence on early childhood experience

Twenty- three percent (23%) of respondents were unaware of the impact of early child experiences in later cognitive development and function. Despite extensive research and recommendation of introduction of the safe, age appropriate items and playful interaction by age 4 to 5 months, most respondents (61%) indicated active safe items and interactive games after 9 months and above.

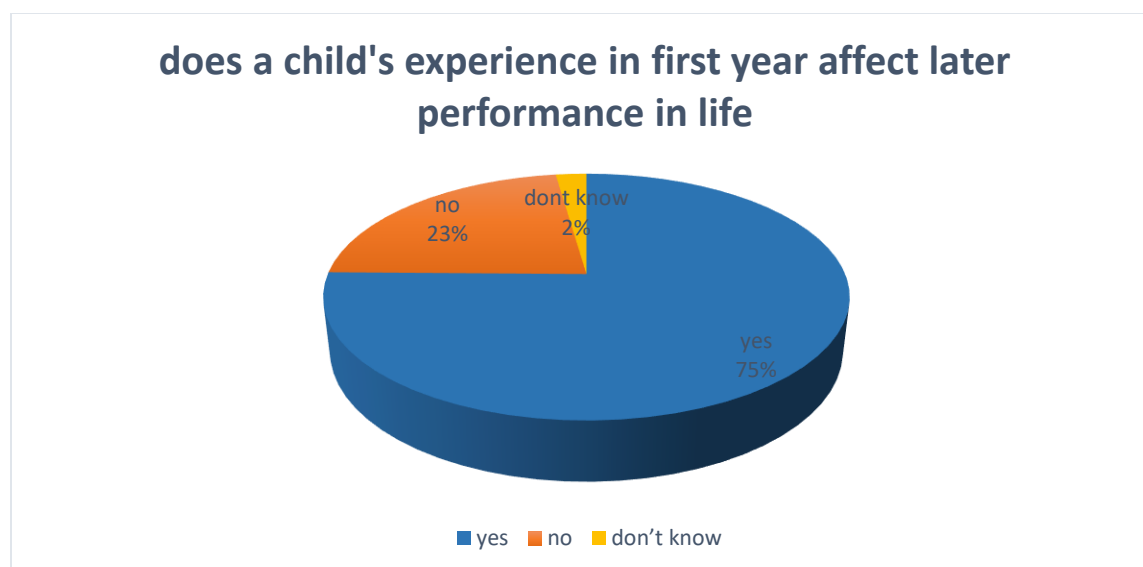


Figure 3: Response to childhood experience in the first year influencing later cognitive function

4.6 Predictors of high level of knowledge among Caregivers

Logistic regression analysis found that the most important predictors of high scores on knowledge of physical developmental milestones among children under 2 years included marital status, occupation, parity and access to health information. Married respondents (aOR-1.39, 95% CI-0.126-6.073), health workers (aOR- 1.48, 95% CI-0.082-1.868) and Caregivers with 1 to 2 children (aOR- 1.780, 95% CI- 1.121-4.253) had increased likelihood of obtaining high scores on knowledge of physical development milestones. Respondents who had ease of access to health centers had a 2 fold likelihood of having higher scores of knowledge on developmental milestones (aOR- 2.310, 95% CI- 1.587-3.112) from Table 3 below.

Table 3- Logistic Regression analysis of the level of knowledge and various characteristics of respondents

	Univariate analysis		Multivariate analysis	
	cOR (95% CI)	p-value	aOR (95% CI)	p-value
age				
11 to 19 years	1.00	0.095	1.00	0.083

20 to 29 years	1.20(0.369-3.887)		0.733(0.146-3.688)	
30 to 39 years	1.87(0.583-6.022)		1.552(0.331-7.280)	
40 to 49 years	0.94(0.251-3.529)		1.162(0.215-6.300)	
sex				
female	1.00		1.00	
male	1.492(1.195-1.864)	0.251	0.588(3.149-1.098)	0.333
marital status				
single	0.304(0.030-3.040)		0.180(0.011-2.958)	
married	1.557(0.057-5.415)	0.043*	1.394(0.126-6.073)	0.025*
divorced	0.167(0.010-2.821)		0.110(0.004-3.254)	
cohabiting	1.00		1.00	
educational status				
no formal education	1.00		1.00	
primary	0.61(0.267-1.373)	0.710	0.384(0.145-1.020)	0.384
jhs	0.969(0.393-2.390)		0.674(0.236-1.926)	
shs	1.39(0.791-2.451)		1.406(0.736-2.690)	
tertiary	1.38(0.848-2.245)		1.68(0.567-2.718)	
occupation				
unemployed	1.00		1.00	
trader	0.82(0.202-3.321)	0.008*	0.192(0.028-1.331)	0.005*
artisan	0.33(0.079-1.336)		0.060(0.008-0.434)	
civil servant	0.54(0.129-2.279)		0.123(0.019-0.787)	
health worker	1.60(1.138-2.607)		1.48(0.082-1.868)	
religion				
Christian	1.00		1.00	
Muslim	1.100(0.593-2.036)	0.58	1.11(0.560-2.226)	0.384
Traditionalist	0.720(0.143-3.619)		0.726(0.117-4.487)	
parity				
No children	1.00		1.00	
1 to 2 children	1.50(1.142-2.360)	0.026*	1.780(1.121-4.253)	0.009*
3 to 5 children	0.771(0.446-1.332)		0.882(0.467-1.668)	
6 or more children	0.616(0.125-3.163)		0.331(0.146-0.753)	
household income				
less than 200 cedis	0.298(0.085-1.040)		0.607(0.123-2.995)	
200 to 499 cedis	0.385(0.121-1.214)		0.448(0.114-1.753)	
500 to 1999 cedis	0.400(0.124-1.280)	0.94	0.485(0.133-1.770)	0.94
2000 to 5000 cedis	0.343(0.067-1.743)		0.552(0.093-3.275)	
more than 5000 cedis	1.00		1.00	
access to health information				
yes	1.561(1.122-2.850)	0.012*	2.310(1.587-3.112)	0.025*
no	1.00		1.00	

* - <0.05

** - <0.01

*** - <0.001

4.7 Attitude of Caregivers towards developmental delay

4.7.1 Timing for action for suspected delay

Caregivers were asked to indicate the time during which they would take action for any suspected developmental milestone. This was assessed through the various stages of childhood development. Perceived age for action refers to the age recommended for seeking intervention for a suspected delay in growth; earlier than the recommended age and later than the recommended age for action using the recommended age for seeking action for suspected delay is also indicated in table 4 below. Majority of respondents (at least 50%) correctly stated the appropriate age for seeking care for suspected growth delay for sitting without support, standing to cruise and walking. The perceived age for achieving neck control and waving was severely underestimated by caregivers (table 5). Significant proportion of respondents indicated later than recommended age for seeking care for various milestones-neck control (147 out of 400), sitting without support (152 out of 400) and waving (198 out of 400). This would indicate a delayed recognition of gross motor development retardation of the child. Respondents generally had good knowledge on the appropriate age for standing to cruise and walking milestones (76.25% and 72.75% respectively) from Table 4 below.

Table 4- timing various caregivers would seek care for suspected developmental delay

	earlier than perceived	perceived age for action	later than perceived	don't know
milestone	N(%)	N(%)	N(%)	N(%)
neck control	23(5.75)	188(47.00)	147(36.75)	42(10.50)
sitting without support	18(4.50)	212(53.00)	152(38.00)	18(4.50)
standing to cruise	15(3.75)	305(76.25)	60(15.00)	20(5.00)
walking	44(11.00)	291(72.75)	62(5.50)	3(0.75)
waving	22(5.50)	160(40.00)	198(49.50)	20(5.00)

4.7.2 Health seeking behaviour for Suspected Developmental delay

Majority of respondents (>80%) from table 5 below indicated seeking care at a clinic or hospital on suspicion of gross motor developmental delay in their children. The proportions may however be inflated due to socially accepted responses as this was a facility based study.

Table 5- health seeking behaviour for developmental delay

	Neck control (N%)	Sitting without support (N%)	Walking (N%)	Standing (N%)
Clinic/hospital	335(83.75)	342(85.50)	353(88.25)	350(87.00)
Herbal centre	36(9.00)	35(8.75)	35(8.75)	38(9.50)
Prayer camp	3(0.75)	16(4.00)	9(2.25)	9(2.25)
Don't know	7(1.75)	7(1.75)	3(0.75)	3(0.75)

CHAPTER FIVE

DISCUSSION

5.1 Socio-Demographic Characteristics

A high proportion of respondents had received some formal education of at least primary school education. Most of the caregivers interviewed (81% of the respondents) were female as in the Ghanaian culture, women are the primary caretakers of children and hence spend more time with the children. The low male involvement in childbearing and childrearing was evident as only 19% of respondents were male. It is however noteworthy that, adjusting for confounding, there was no significant association between female sex and the high score on developmental milestone in this study unlike in other studies done where maternal age, educational status and other factors such as residence with extended family correlated with high level of knowledge on developmental milestones (Ertem et al., 2007a; Fayaz & Goonawardane, 2017; Ghassabian et al., 2016; Reich, 2005b)

Predominant among respondents were individuals aged between 30 and 39 years with a mean age of 32 years; Majority of the caregivers (299 out of 400; 74.75%) were married with significant increased level of knowledge on developmental milestones. This may indicate increased likelihood of partner support being favorable for raising the children, provision of necessary stimulation and environment and recognition of developmental delays.

5.2 General knowledge and awareness of developmental milestones

Even though majority of the mothers (96.5%) had ever heard of gross motor developmental milestones after birth (knowledge), only about 66.5% of the respondents had received good education on the subject and well aware of these milestones (awareness). Unlike in well-resourced countries where most information among Caregivers was sourced from a doctor or paediatrician,

only 40.8% of the respondent had access to formal health information from the child welfare clinic, antenatal clinic or a routine hospital visit (Ertem et al., 2007a; Fayaz & Goonawardane, 2017; Huang et al., 2005; Rikhy et al., 2010). The major source of knowledge among caregivers in this study was from informal experiences with friends, family and electronic media. This finding was similar to other studies in countries like Ghana with a high doctor-patient ratio, thus health information is sourced from friends, family and other informal health structures (Ertem et al., 2007a; van der Linde et al., 2015). The source of knowledge in this study was found statistically significant for the level of accurate knowledge on developmental milestones as higher likelihood of accurate response was obtained from those who received information from the formal health sector such as antenatal, postnatal or child welfare clinics.

5.3 Awareness of gross motor development

Overall, 41.5% of respondents (50.5% for neck control, 40.25% for sitting, 36.50% for standing, 28.0% for walking and 47.25% for waving) did not know the appropriate ages for gross motor developmental milestones of children. More accurate awareness of milestones was indicated for the more obvious milestones such as standing and walking. Standing and walking appear later in the motor development proving that, the later the milestone, the more obvious it is and the more appreciated it is. This has negative implications for efforts geared towards very early identification of developmental delay as important yet subtle gross motor developments occurring much earlier in childhood are overlooked and delays missed. Gross motor development is the most obvious among all the other fields of development indicating subtle development in the other domains like cognitive and language may even less obvious and hence more delays in cognitive. Social or language skills may be missed. This finding was corroborated in literature as studies done in Sri Lanka and Albertan, Canada had caregivers identifying later developmental milestones more

accurately than the earlier milestones such as neck control (Goonawardana & Fayaz, n.d.-b; Rikhy et al., 2010) The level of awareness on the timing of early gross milestones in this study was also generally lower than recorded in previous studies. A study done in Turkey noted 64.7% of respondents with low level of awareness on timing of neck control as compared to the 49.5% noted in this study (Ertem et al., 2007b)

Perceived ages for the various developmental milestones noted for most respondents appeared to be later than the normative ones as was seen in prior studies done where more than 50% of mothers believed that most milestones occurs later than the generally recommended milestone-age expectation. An estimated 18.6% (29% for neck control, 18% for sitting 12% for standing, 10% for walking and 15% for waving) of respondents indicated an earlier perceived age for gross motor development than the normative age range. This proportion indicates an impatience of caregivers with normal gross motor development of their children.

5.4 Caregivers' response to developmental delay

More than 8% of respondents said they would resort to herbal preparations for late development (average of 5% for neck control, 9% for sitting and 11.5% for walking). Since the respondents were interviewed at the hospital, it's likely that this statistic is underestimated due to the provision of socially acceptable answers.

6.5 Factors associated with caregivers knowledge of gross motor development

6.5.1 Caregivers' Occupation and level of awareness

Knowledge of appropriate age for gross motor development appears to increase significantly among health workers such as nurses, doctors, physician assistant, pharmacist and lab technicians. There was a two-fold likelihood of higher score among health workers than the other categories of

labor (adjusted odds ratio- 1.48, 95% CI-1.082-1.868). This is similar done in other studies as health workers are generally better informed on developmental milestones in early childhood than the non-health professionals (Fayaz, Cse, & Mc, 2016; Tamis-LeMonda, Chen, & Bornstein, 1998).

5.5.2 Caregivers' marital status and level of awareness

Accuracy of awareness on the appropriate age for normal gross motor development appeared to be significantly associated with marital status of the caregivers with married respondents having 1.5 times likelihood of higher scores on gross motor developmental milestones of children under 2 years (adjusted odds ratio: 1.39, 95% CI-0.126-6.073). Male partner involvement has been found to provide a florid environment for the maintenance of health-related goals in the home (Bornstein et al., 2010; Facchini et al., 2016). This fact was reinforced as married respondents had comparatively higher scores on developmental milestones in early childhood.

5.5.3 Number of children and level of awareness

It was evident that the number of children a caregiver had was significantly associated with the level of awareness of gross motor development of children under 2 years. Respondents with 1 or 2 children had higher likelihood of scoring higher on the assessment than those with no children or more children (adjusted odds ratio- AOR- 1.780, 95% CI- 1.121-4.253). This was consistent with a study which showed that the number of children were a significant socio-demographic factor that was related to maternal knowledge of child development. Mothers with fewer children had higher scores on the CKCDI (American Health Organization & Health Organization, n.d.; Ertem et al., 2007c)

5.5.4 Other socio-demographic factors and level of awareness

Unlike previous studies done, there was no evidence of significant association of caregivers' knowledge with age of the caregiver, sex, educational status and wealth index/household income. (Fayaz & Goonawardane, 2017; Ghassabian et al., 2016; Goonawardana & Fayaz, n.d.-b)

5.6 Attitude of caregivers towards suspected developmental delay

Although more than 50% of respondents indicated the appropriate age for seeking care for suspected growth delay; a significant proportion of respondents indicated later than recommended age for seeking care for various milestones-neck control (36.75%; 147 out of 400), sitting without support (38%; 152 out of 400) and waving (49.5%; 198 out of 400). This portends a low level of suspicion for suspected developmental delay in early childhood and poorer outcomes for these children. These proportions were relatively higher than other studies done (Ghassabian et al., 2016; Reich, 2005b; van der Linde et al., 2015).

Notwithstanding the significant knowledge of later than normative age recommended for seeking care for suspected developmental delay, majority of Caregivers (more than 85%) understood the need to seek appropriate at the health facility or hospital.

The study thus highlights the importance to equip caregivers with good health education on developmental milestones to aid the early recognition of suspected developmental delay.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATION

From the study, there was a fair level of awareness (58.5%) of developmental milestones among caregivers in the Bosomtwe District. The lowest level of awareness was demonstrated in the knowledge of early developmental milestones such as neck control and sitting without support; indicating a possible missed window of opportunity for early recognition and prompt management or support for suspected developmental delay in early childhood.

Significant predictors of developmental milestones in this study included the marital status of the respondents, respondents with fewer number of children (1 to 2 children), health related profession and ease of access to health centers. No significant association was found with caregiver's age, sex, educational status or wealth index.

Despite the limited knowledge, it was evident that Caregivers understood the need to seek appropriate help for suspected developmental delay at the health facility/hospital.

RECOMMENDATION

Based on the findings from this study, it is recommended that:

- Health education at various childhood immunization clinics, antenatal clinics and general clinics to be intensified by implementing policies and active monitoring by the Ministry of Health to highlight key developmental milestones in children under 5.
- Introduction of a developmental assessment and screening tool during immunization clinic visits by the Ministry of Health would be useful in active surveillance of developmental milestones. Caregivers especially mothers, should be educated to note down the timing of

noticing key developmental milestones in their children which can then be reported during immunization and other routine pediatric visits.

- Prompt presentation for suspected developmental delay in children should be widely encouraged among caregivers visiting every health center or facility in Ghana. This can be taken up by health professionals in all facets of health care- private, public and quasi-governmental facilities in Ghana.
- More affordable and accessible structures (facilities) should be put in place to appropriately attend to children with developmental delay (special needs) especially in the Ashanti region of Ghana. This ought to be up by the government of Ghana to ensure quality health care of all children especially those with those with developmental milestones.

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APPENDIX

PARTICIPANT INFORMATION SHEET

Title of study- Factors influencing Caregivers' Knowledge on Physical Developmental Delay in Children under 2 years in Bosomtwe District, Kumasi.

Introduction: This is a study being conducted by Dr. Mavis Sakyi, a Masters' in Public Health student at the University of Ghana, School of Public Health.

Background and purpose of research- Developmental delay is defined a significant retardation in the process of child development from age 0 to 8 years. Developmental delay is suspected when a child is unable to achieve developmental milestones set according to the child's age. Early identification of any developmental delay by caregivers and appropriate health seeking behavior is needed to reduce the burden of developmental delay in Ghana. This is a study which is focused on the understanding factors influencing caregivers' knowledge on physical developmental delay of children under 2 years.

Nature of research: It aims to find out what caregivers such as mothers, father, guardians, health care givers know about the various stages of physical growth of children under 2 years, whether they can identify delays in physical development in children under 2 years and what factors affect their knowledge of the child's development. A total of 400 participants from the Bosomtwe District will be recruited in the study. This is a not an experimental study.

Participants' involvement- This study is for a period of 8 weeks. Participants will be interviewed using a structured questionnaire on the study after the purpose of study is thoroughly explained and informed consent is given. The interview will last a period of 20-30mins. Questions to be asked will range from the personal demographic information (without names), stages of physical growth of children under 2 years and how participants respond to delays in development in children.

Potential Risk: The potential risk of this study is loss of time used during this interview.

Benefits: There is no direct benefit of the study to participants in the short term. In the long term, however, findings from this study will inform programmes to educate Caregivers on developmental milestones in children to allow for early identification of developmental delay.

Costs- There will be no costs incurred to clients or the investigator as clients visiting the health facility for medical care for their children will be interviewed.

Compensation- There will be no compensation for participation in this study.

Confidentiality: Names of participants will not be required as part of the study. Completed forms and charts will be stored in secured cabinets with password protected access systems. All consent forms will be kept securely under lock and key and only accessible to the research staff and Ethics Review Committee.

Voluntary participation/withdrawal: Participation is voluntary and participants have the right to withdraw from the study any time without penalty and without having to give any reasons.

Outcome and Feedback: Information from the study will be useful in developing educational programmes for Caregivers on developmental delay in children. Feedback information will be communicated through educational programmes that will be instituted.

Funding information: This study is self-funded by the Principal investigator.

Conflict of Interest: There is no conflict of interest; information from this study is solely for the Principal Investigator and will be forwarded to the University Of Ghana, School Of Public Health as part of my dissertation.

Please note that a copy of this Information sheet will be given to you after it has been signed or thumb-printed to take home.

For further clarification about participation in this study, please contact

Dr Mavis Sakyi (Principal Investigator)
University of Ghana, School of Public Health
Telephone number-0201400092
Email-mavis.sakyi29@yahoo.com

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

Mrs. Hannah Frimpong
Ghana Health Service
Ethics Committee Administrator
Telephone number- 0507041223

CONSENT FORM (LITERATES)

1. Participants' statement and signature:

I acknowledge that I have read the purpose and contents of the Participants Information Sheet and satisfactorily explained to me in a language I understand (English ☐/Twi ☐). I fully understand the contents and any potential implications as well as my right to change my mind (that is, withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or Initials of Participant: ID code:

Participant's Signature:

Date:

2. Statement and Signature of Investigator:

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name:

Signature:

Date:

CONSENT FORM (NON-LITERATES)

1. Participants' statement and signature:

I acknowledge that I have had the purpose and contents of the Participants Information Sheet read and satisfactorily explained to me in a language I understand (English ☐/Twi ☐/Ga ☐). I fully understand the contents and any potential implications as well as my right to change my mind (that is, withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or Initials of Participant: ID code:

Participant's Signature:or Thumbprint.....Mark

Date:

2. Interpreter's statement:

I interpreted the purpose and contents of the Participants information Sheet to the above named participant to the best of my ability in (Twi ☐/Ga ☐) language to his/her proper understanding.

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

Name of interpreter:

Signature of interpreter: Date:

Contact Details:

3. Statement of Witness:

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to participant in the language he/she understood (English ☐/Twi ☐ / Ga ☐)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name of witness:

Signature:Or Thumbprint: Mark:

Date:

4. Statement and Signature of Investigator:

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name:

Signature:

Date:

QUESTIONNAIRE

ID NUMBER-

INTRODUCTION-

This questionnaire is to assist in assessing the level of knowledge of physical (gross motor) developmental milestones among mothers with children under two years in the Kumasi Metropolitan Assembly.

This questionnaire is solely for the purpose of data collection and any information provided will be strictly used for academic purposes only and kept confidential

Please tick the most appropriate and write when necessary within the space provided

SECTION A: SOCIO- DEMOGRAPHICS

Age:years (as at last birthday)

Sex: Male ☐ Female ☐

Marital Status: ☐ Married ☐ Single ☐ Divorced ☐ Widow ☐ cohabiting

Occupation.....

Educational background: ☐ No formal education ☐ Non-formal education ☐ Middle school

☐ Primary school ☐ JHS ☐ SHS ☐ Tertiary

Religion: ☐ Christian ☐ Moslem ☐ pagan ☐ atheist ☐ other (specify).....

Number of children.....

Monthly household income: ☐ <200cedis ☐ 200- 499cedis ☐ 500- 2000cedis ☐ >2000- 5000 cedis ☐ >5000cedis

SECTION B: SOURCE OF KNOWLEDGE ON DEVELOPMENTAL MILESTONES

1. Have you ever heard of developmental milestone in a young child?

☐ Yes ☐ No ☐ I don't know

1b. If yes, where did you hear about developmental milestones?

☐ Television or radio ☐ Social media (Facebook, Instagram) ☐ Books/magazines

☐ Routine hospital visit ☐ Child Welfare visit (weighing) ☐ Antenatal visit

☐ From family and friends

SECTION C: GENERAL KNOWLEDGE OF PHYSICAL DEVELOPMENTAL MILESTONES

2. Do children go through stages of development?

☐ Yes ☐ No ☐ I don't know

3. Do children go through development with movement?

☐ Yes ☐ No ☐ I don't know

4. Does a child's experience in the first year of life influence later school performance?

☐ Yes ☐ No ☐ I don't know

5. How often do you take your child to visit the hospital in a year

☐ weekly ☐ twice a month ☐ once a month ☐ every 3 months ☐ twice a year

☐ yearly ☐ never ☐ not often

6. How close is the nearest health facility that takes of your children

☐ within 15mins drive ☐ between 30mins and 1hr ☐ 1 to 2 hours drive ☐ more than 2 hours drive

KNOWLEDGE OF GROSS MOTOR DEVELOPMENT OF AN INFANT

7. When do children gain neck control?

☐ At birth ☐ within the first month ☐ between 2 to 4 months of age ☐ between 5 to 8 months of age ☐ between 9 months to a year ☐ after 1 year ☐ I don't know
☐ other (specify).....

8. When do children begin to sit without support?

☐ At birth ☐ within the first month ☐ between 2 to 4 months of age ☐ between 5 to 7 months of age ☐ between 9 months to 1 year ☐ after 1 year ☐ I don't know
☐ other (specify).....

9. When do children begin to pull to stand holding on to objects around them?

☐ between 3 to 5 months ☐ between 6 and 7 months ☐ between 8 and 9 months ☐ between 10 and 15 months ☐ after 1 year 3 months ☐ I don't know ☐ other (specify).....

10. When do children begin to walk alone and with good coordination?

☐ between 3 and 7 months ☐ between 8 and 9 months ☐ between 10 to 15 months ☐ 15-18 months ☐ I don't know ☐ other (specify).....

11. When do children begin to wave bye-bye?

☐ between 6 to 9 months of age ☐ from 10 to 12 months ☐ after 1 year to 2 years ☐ After 2 years ☐ I don't know ☐ other (specify).....

12. When should mothers/caregivers give their children safe items to play with?

☐ between 2 to 3 months ☐ between 4 to 5 months ☐ between 6 to 9 months ☐ after 1 year ☐ I don't know ☐ other (specify)

SECTION D: CAREGIVERS' DEFINITION AND RESPONSE TO DELAYED GROSS MOTOR DEVELOPMENT WITHIN THE FIRST TWO YEARS OF LIFE

13. When will you start taking action if your child has not gained neck control?

☐ before 3 months ☐ between 3 and 5 months ☐ between 6 months and a year ☐ after one year ☐ I don't know

14. What action will you take in the above?

☐ I will administer herbal preparation (oral, enema, topical) ☐ I will take the child to a clinic or hospital ☐ I will take the child to a prayer camp ☐ I don't know
☐ other (specify).....

15. When will you start taking action if your child cannot sit by himself?

☐ Between 2 and 4 months ☐ between 5 and 7 months ☐ between 8 and 12 months ☐ after 1 year ☐ I don't know

16. What action will you take in the above?

☐ I will administer herbal preparation (oral, enema, topical) ☐ I will take the child to a clinic or hospital ☐ I will take the child to a prayer camp ☐ I don't know
☐ other (specify).....

17. When will you start taking action if your child cannot walk without help?

☐ between 6 months to 1 year ☐ between 1 to 1.5 years ☐ after 1.5 years to 2 years ☐ after 2 years ☐ I don't know ☐ other (specify).....

18. What action will you take in the above?

☐ I will administer herbal preparation (oral, enema, topical) ☐ I will take the child to a clinic or hospital ☐ I will take the child to a prayer camp ☐ I don't know
☐ other (specify).....

19. Do you know of any institution or facility in Ghana which supports or takes care of children with delayed achievement of developmental milestones?

☐ Yes ☐ No ☐ I don't know

19b. If yes, please state where

Thank you for your participation