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Nutritional Status of Children on Complementary Feeding in Bosomtwe-Atwima-Kwanwoma District of Ghana

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Abstract: The study sought to assess the nutritional status of children on complementary feeding in relation to the practice adopted. Purposive sampling method was used in selecting respondents for the study since the work technically cover children on complementary feeding and their mothers. A sample size of 100 mothers and their children was selected which ensured that the characteristics to be studied in the population were fairly distributed. With respect to complementary feeding practices, the study revealed that the ages at which mothers introduced their children to complementary food ranges from as early as five weeks to as late as eleven months. Mothers observe hygienic practices like washing of utensils with soap and sponge before use, use of clean water and washing hands with soap before meal preparation and feeding the children. Majority of mothers (90%) personally feed their children and 84% still breast-feed their children. It was further revealed that majority of mothers (46%) do not give their children snacks with the remaining (54%) giving snacks like biscuits, pastries, banana, pawpaw and oranges to their children. The study revealed that although the health personnel are few, they were doing their best under difficult conditions such as low educational levels of the mothers, reflected in non-compliance with complementary feeding practices taught and financial constraints. These have contributed to the poor nutritional status (33% underweight, 10% wasted, 14% stunted) of most children on complementary feeding in both hospitals. Therefore, there is an urgent need to address these issues in order to make the program a success. Furthermore, regular workshops should be organized for the health personnel on the program in order to up-grade their knowledge and be abreast with current nutrition information.

Key words: Child nutrition, complementary feeding practice, mothers, micronutrient deficiency

INTRODUCTION

People eat particular foods to satisfy hunger or for pleasure. They therefore select foods on the basis of these, but not the body's metabolic requirements. However, eating food does more than just satisfying hunger, for it is said that, "you are what you eat". This means that growth and development depend on the types of food eaten. This is because Proteins, Vitamins, Carbohydrates, Minerals and Fats and Oils that one needs for growth and development are found in the food one eats (Calton, 2010).

According to Mann and Truswell (2012), adequate food and sound nutrition are essential to good health, crucial for human survival, key factors in prevention and recovery from illness, pre-requisites for improving the quality of life and fundamental needs for all members of society.

The most visible evidence of good nutrition is a taller, stronger, healthier child who learn more in school and become productive happy adult, who participate in society (WHO, 1999). Inadequate dietary intake or taking the wrong kinds of food could result in malnutrition. Malnutrition is a clinical diagnosis that is characterized by growth failure in children. Currently, the single leading cause of the global burden of under-nutrition is childhood and maternal under-nutrition. Globally, more than one third of under-five deaths are attributable to under-nutrition (WHO, 2003).

The importance of nutrition as a foundation for healthy development is more often than not, underestimated. Poor nutrition leads to ill-health and ill-health causes further deterioration in nutritional status. These effects are most dramatically observed in infants and young children, who bear the brunt of malnutrition and suffer the highest risk of disability and death associated with it. In 2001, 50% to 70% of the burden of diarrhoeal diseases, measles, malaria and lower respiratory infections was attributable to malnutrition (WHO, 2003). Protein energy malnutrition (PEM) is a major health and nutrition problem. It leads not only to childhood mortality and morbidity but also to permanent impairment of physical and mental growth of those who survive (Krishnan *et al*., 2012).

Lancet and Saadeh (2003), highlighted the importance of addressing childhood malnutrition as a prerequisite for achieving internationally agreed goals to reduce malnutrition and child mortality. The child is most vulnerable to nutritional deficiencies during the period of the mothers' pregnancy and continues until the age of two (Sengupta *et al*., 2010). So nutrition during child's first two

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years of life is a critical window of opportunity to prevent under-nutrition when nutrition interventions offer children the best chance to survive and reach optimal growth. (Priyanka *et al*., 2016).

Malnutrition, a widespread problem with devastating consequences, destroys immune systems and worsens illnesses. It kills, maims, cripples and blinds on a massive scale worldwide (WHO, 1999). It is a factor in about half the deaths in children under five years. Malnourished children who survive have diminished learning capacity and lower productivity in adulthood (WHO, 1999).

Malnutrition does not need to be severe to pose a threat to survival. This is because according to WHO report (2000), worldwide, fewer than 20% deaths associated with childhood malnutrition involve severe malnutrition; more than 80% involve only mild or moderate malnutrition. Although the immediate cause of death in mild and moderately malnourished children may be pneumonia or diarrhea, many children would not die if they were well nourished (WHO, 1999). Well-fed children get ill sometimes but usually recover on their own; malnourished children get ill frequently and die more often. The need to pay due attention to infant and child nutrition cannot be over emphasized (Megan and Brewis, 2009; Ooms *et al*., 2013).

Malnutrition is usually the result of a number of factors that interact in a way that leaves people vulnerable-many factors contribute to the vulnerability of children in the complementary feeding period. Complementary foods are often of low nutritional quality. They are often given in insufficient amounts and if given too early or too frequently, they displace breast milk. If given too late it also adversely, affects the nutritional status of the child, as a child fed only on breast milk will start falling off the Road to Health at about eight months. Gastric capacity limits the amount of food that a young child can consume during each meal. Repeated infections reduce appetite and increase the risk of mortality (James *et al*., 2013).

Malnutrition is the underlying cause of half the deaths of under five years of age. It weakens the immune system and makes illness worse. Most of the damage from malnutrition is already done by the second year of the child's life.

The second half of an infant's first year of life is an especially vulnerable time the period of complementary feeding-because infants are learning to eat other foods in addition to breast milk. If nutrition intake is inadequate, the consequences persist throughout life. Even mild and moderate malnutrition has severe consequences. World Health Organization (2000) reports that each year more than twelve million children die before reaching the age of five. Malnutrition contributes to more than half of all these childhood deaths. Malnutrition affects one out of every three preschool age children living in developing countries. This disturbing, yet preventable, state of affair causes untold suffering and given its wide scale, presents a major obstacle to the development process of the affected countries. According to Fabricio and Yolanda (2009), Child mortality has been a problem in developing countries for many years. This calls for community based growth monitoring program for the prevention of child mortality.

The future of a nation depends largely on the health of its people. For the young generation to grow well, their nutritional status from birth needs critical consideration, because malnourished children under the age of two have smaller brains than normal children (Adibo, 1999). This means that they usually grow up to become less intelligent adults, less likely to get good jobs and so less able to provide for their own children. This again implies that the malnourished children of today will not only have a lower quality of life themselves; they will pass this on to the children of tomorrow. Therefore, improving the physical and cognitive development of children in lower-income communities will have far-reaching effects throughout the less-developed world (Oyepeju *et al*., 2016).

"No loud emergency, no famine, no drought, no flood has ever killed 250,000 children in a week. Yet that is what a silent emergency is doing now-every week". And the chief killers in this silent emergency are pneumonia, diarrhea, measles, malaria and Malnurition (Lankester, 2000).

Nutritional requirements/needs

Energy: Energy needs are determined primarily by body size and composition, physical activity and rate of growth. Infants have a high basal metabolic rate due to the large proportion of metabolically active tissue and the large loss of body heat over a relatively great surface area. In the second half of the first year the growth rate slows, but the level of activity increases as the child starts to crawl and then learns to walk around the age of one year. The energy requirements for children is up to four times greater than that of the adult, when expressed per unit of body weight. This emphasizes the special need for adequate energy and explains why a short fall of energy may have such serious consequences for growth (Frankle and Owen, 1978).

Proteins: The role of proteins in infants is almost entirely to support growth. The infant requires more protein per unit weigh than the adult and has a particular requirement for the essential amino acids histamine and taurine adequate amounts of feed should be provided to allow the protein to be used for growth, rather than to meet energy needs. Excessive amounts of protein are undesirable and may be harmful to the infant, as they increase the amount of waste material to be excreted in the urine and might result in dehydration. In addition, immature kidneys cannot adequately filter high molecular weight proteins.

Fats: Fat should comprise 30-50% of an infant's energy intake and above this level it may be digested poorly. In breast milk, fats supply 50% of the energy. Fats are an

important part of an infant's diet, because of their energy density, that is, they provide a substantial amount of energy in a relatively small volume. The essential fatty acids found in milk are important for the development of the brain, vascular systems and retina in early months.

Carbohydrates: Predominantly in the form of lactose, it supplies 40% of the energy in the young child's diet. Lactose yields glucose and galactose on digestion, the latter is essential in the development of the brain and nervous system. Undigested lactose is fermented in the digestive tract to lactic acid and lowers the pH and this is beneficial as many of the pathogenic organism that can cause gastroenteritis do not thrive in an acidic environment. They can also digest and utilize sucrose, but their ability to digest starch is limited.

Minerals: Babies require a wide range of minerals in their diet. These include calcium, phosphorus and magnesium for bone development, iron and copper for red blood cell formation, zinc for cell division and growth together with other trace elements. The iron contents present at birth has usually been used up in red blood cell formation by 4-6 months and an additional source of iron is needed at this stage. The Lancet series on child survival gives high visibility to underweight and micronutrient deficiency as underlying causes of childhood deaths (Lancet and Saadeh, 2003).

Iodine deficiency remains a major public health problem (WHO, 2003). One-third of the world's population (2 billion people) in fifty-four countries still has inadequate iodine. Iodine deficiency continues to be world's single greatest cause of preventable brain damage in children.

Fluid: Because of their relatively small total body water content, babies have a vital need for fluids. Their small body weight/surface area ratio makes them susceptible to dehydration, for example, in hot weather and illness. As an absolute minimum, the normal infant requires daily between seventy-five hundred milliliters of fluid per kilogram body weight and should be provided with 150% ml/kg. To ensure that all needs are met. Under normal circumstances this amount of fluid is provided by the breast milk and no additional water is required. The infant loses water through the skin and respiratory tract, through sweating and urine and faces. The volume of urine produced is dependent on the fluid intake and on the amount of solutes to be excreted (Jian *et al*., 2015).

Adult kidneys initially lack this ability. Thus feeding a diet with a high solute load, in particular with high protein and sodium contents results in increased water loss via the kidney. Under normal circumstances fluid intake should be sufficient to cope with this, however difficulties may arise if a baby is given over concentrated feed like unmodified cow, s milk, amounts of feed are very small due to illness, there is fluid loss via other routes (vomiting, diarrhea, sweating) and when solids are given at a very young age. In each of these cases, additional water should be given to avoid dehydration.

Problems associated with micronutrient deficiency: Micro nutrition has been recognized not only to be widespread, but also, if uncorrected, to cause serious health, development and economic problems. More than two billion people worldwide are affected by this problem (ACC/SCN, 1997) In addition children in developing countries are prone to infection, including chronic infection with a variety of parasites. Deficiencies of iron, iodine and vitamin A are considered important global health problem, due to both widespread prevalence and the potential for such nutritional deficits to create serious health problems (World Bank Report, 1994; Sanghvi, 2007).

The most widespread nutrition problem in the world is anemia, affecting an estimated 2.15 billion people globally, with women and children affected the most. As much as 90% of anemia cases result directly from a deficiency of iron (Stoltzfus, 2001).

In children anemia has been shown to affect both physical and cognitive development. It produces pronounced lethargy with a decreased physical capacity for activity, which in children results in less time spent playing or exploring.

Iodine deficiency, the single most preventable cause of mental retardation in the world, is another critical public health issue. Approximately 40% of the world's population lives in areas where the risk of iodine deficiency disorder, (IDD), is significant, IDD causes neurologic abnormalities and impairment, with cognitive effects that range from mild motor or cognitive deficits to severe congenital or developmental retardation (Delange *et al*., 1994; Oyepeju *et al*., 2016). According to Ghana's Demogaphic and Health Survey (2014) Overall, 5 percent of children are wasted and less than 1 percent are severely wasted, representing a decrease from the figures reported in 2008 (9 and 2%, respectively) (GDHS, 1998).

Problem statement: From the age of six months onwards, when breast milk alone is no longer sufficient to meet all nutritional requirements, infants enter a particularly vulnerable period of complementary feeding, during which they make a gradual transition to eating ordinary foods. The incidence of malnutrition rises sharply during the period from 6 to 18 months of age in most countries and the deficits acquired at this age are difficult to compensate for later childhood. Complementary foods of an adequate macro and micronutrients density are needed for optimal growth development after six months of age when breast milk can no longer fully satisfy infant nutritional requirements, for example, breast milk is relatively deficient in iron and the infant's store of iron is sufficient only until about six months of age hence the

need for complementary feeding. Adequate nutrition and health during the early years of life is fundamental for the prevention of malnutrition and ensure child survival. It is during infancy and early childhood that irreversible faltering in linear growth and cognitive deficits associated with anaemia occur. Poor nutrition during this critical formative year has both immediate and long-team consequences. Immediate consequences include significant morbidity and mortality and delayed physical and mental development. Long term consequences include impaired intellectual performance, work capacity and reproductive capacity and increased risk of chronic diseases. As Ghana's Demographic and Health Survey 2014 has indicated, frequent research will create awareness and intervention strategies to help reduce child mortality and morbidity. These call for constant research to identify the problem of malnutrition early enough to avoid both the long and short term consequences. Hence the importance of this study.

The researchers have the following objective to guide the study:

1: To determine the socio-economic background of the mothers doing complementary feeding
2: To determine the nutritional status of children on complementary feeding in relation to the practice adopted

Hence the researchers seek answers to the following questions:

1: What is the socio-economic background of the mothers doing complementary feeding?
2: What is the degree of compliance or otherwise of mothers to the complementary feeding information?
3: How is the nutritional status of the children on complementary feeding like?

MATERIALS AND METHODS

Profile of bosomtwe-atwima-kwanwoma location and size: The Bosomtwe District, is located in the central part of the Ashanti Region and lies within Latitudes 6°24' South and 6°43' North and Longitudes 1°15' East and 1°46' West. It is bounded in the north by Kumasi Metropolitan Assembly, in the east by Ejisu-Juaben Municipal, the south by Bekwai Municipal and Bosome-Freho District and in the west by Atwima- Kwanwoma District. The District has a land size of 422.5 sq km with a population density of 222.3 persons per sq km. The District has 66 communities, which have been zoned into three area councils namely, Jachie, Kuntanase and Boneso.

Demographic characteristics: The population of the Bosomtwe District is 93,910. This represents nearly two percent of the population in Ashanti Region. The District's population density is 222.3 persons per sq. km. which is higher than the Regional density of 196 persons per sq. km. The District's population is primarily rural (69.8%).

The age structure of the District follows the national pattern which reflects a youthful population. Children less than 5 years constitute 14.4% of the total population and those less than 15 (0-14 years) represent 40.6%. The elderly population (65 years and over) constitute only 4.8% of the population. The dependent population constitutes 45.4% which is higher than the Regional average of 42.0%. The age and sex structure show a high percentage of males than females in the age groups from 0-14 years but a higher percentage of females than males for all the other age cohorts except for 40-44 age group where males outnumber females.

Fertility is quite high in the District and child bearing goes on through-out the entire reproductive period (15-49 years). General Fertility Rate is 109.4 per 1000 women, Crude Birth Rate is 27.6 per 1000 population and Total Fertility Rate is 3.5 per woman in the Bosomtwe District.

Almost half of the District's population consists of migrants (44.9%). The migrant population is made up of 65.8% born elsewhere in Ashanti region, 32.8% born in other regions outside Ashanti Region and 1.3% born outside Ghana.

The proportion of mortality in the population is highest among the age group 0-4 years (27.0%), followed by 70 years and older age group (19.0%).

Social characteristics: There are 22,895 households in the District, with an average household size of 4 persons slightly lower than the regional average of 4.1 persons. Within the household structure, 30.4% is made up of the nuclear household. Another 16.7% is the extended family and 17.8% forms the single parent extended family household. The high proportion of the single parent extended households may be due to the incidence of separated, divorced or widowed.

The proportion of persons 12 years and older married is 38.0%, while the proportion of never married is 39.9% in the District at the time of the Census. However, a higher percentage of males (47.7%) than females (33.1%) have never married.

The results show that 70.7% of the population 11 years and older are literate in English and a Ghanaian language, while 13.9% are literate in English only. An overwhelming majority (96.4%) of the population in the District are Ghanaians by birth.

Economic characteristics: The economically active (15 years and older) population of the District is 73.2% which is higher than the Regional average of 69.4%. On the other hand, the economically not active population is 26.8% which is lower than the Regional average of 30.6%. Of the economically active population, 92.5% are employed and 7.5% are unemployed with majority of the employed population in the private informal sector.

Information communication technology: In general, the percentage of people 12 years and older, having mobile phones is relatively high in the District. Out of the total population of 93,910 in the Bosomtwe District, 62,792 representing (51.4%) have mobile phones. The proportion of males having mobile phones (52.5%) is higher than females (47.5%). Only 3.9% use internet facility which is lower than the Regional average of 8.9 percent. Also only 4.4% of the households own desktop and laptop computers which is lower than the Regional average of 9.3%.

Disability: In the District, 2,755 (2.9%) of the total population has some form of disabilities. This is higher than the Regional average of 2.6%. There are generally more male PWDs than females. Visual or sight (44.4%) disability form the majority in the District, followed by physical (29.5%) while hearing disability forms 13.5%. PWDs that live in the rural areas (3.2%) are higher than those in the urban areas (2.3%). Rural development programs must, therefore, take into account the proportion of PWDs living in rural communities. The PWDs employed in the District is 50.8%, unemployed is made up of only 3.5%, while the economically not active PWDs in the District is 45.7%.

Agricultural activity: Households in the District engaged in agricultural activities computed form 48.0% which is relatively higher than the Ashanti Regional average of 36.6%. Proportion of agricultural activities by households in the rural areas of the District is 85.7%, while the urban areas constitute 14.3%. A higher proportion of households are engaged in crop farming (97.6%) compared to livestock rearing (17.2%) and tree planting (0.3%).

Housing conditions: There are 15,525 houses in the Bosomtwe District and 22,895 households. Most of the houses are owned by household members. The average household per house is 1.5, lower than the National (1.6) and Regional Fig. 2, while the average household size for urban areas is 3.9 and rural areas is 4.1. Population per house is 5.9 in the District. Most (51.1%) of the population live in compound houses and very low proportions of persons live in kiosks (0.3%), tents (0.1%) and uncompleted buildings (3.8%).

Ownership of dwelling units in the District mainly comprises a household member (44.0%), other private individual (27.0%) and a relative who is not a household member (26.0%). Metal sheet (96.5%) is the main roofing materials used in the District. For floors and walls, concrete/cement blocks is the main building material used. It is 77.9% for the floor and 73.2% for walls.

The main source of water for households in the District is bore-hole/pump/tube well (54.1%) and electricity (69.5%) is the main source of lighting for houses in both urban and rural 70 localities. The findings indicate that wood (43.3%); charcoal (34.7%) and gas (13.8%) are the three main sources of cooking fuel in the District.

Public toilet (48.1%) is the main toilet facility for most households in the District, especially in the rural areas (53.0%). Also, proportion of households without toilet facilities and they use the bush and open spaces is only 5.6 percent. Shared separate bathroom in the same house (42.5%) is the main bathing facility in the District: urban (48.4%) and rural (39.8%). The main means of solid waste disposal in the District is public dump in open space (65.9%).

Data collection techniques and tools: Anthropometric data collection measurements were taken using Harpenden infantometer and portable electronic scales. Recumbent length was measured with the infantometer copy of UNICEF prototype, (range 30-110 cm for portable use, with digit counter readings precise to 1 mm) the young children were held by their mothers to foster a sense of security for the baby. In measuring the recumbent length, diapers were removed because they made it difficult to hold the baby's legs together and straighten them. The child's head was positioned so that the crown touched the headboard to help position the child's head; the children were measured lying down (supine). Gentle pressure was applied to the knees to straighten the legs. To take the measurement, the footboard was positioned against the child's feet with the soles flat on the electronic scale.

Study population: The sample comprised 100 mothers-and-child pairs. Mothers aged 15 to 44 years and above and then children aged 6 months to 24 months, as well as health personnel engaged in the implementation of the complementary feeding program, were involved in the study. The age cut off point was influenced by the fact that the recommended age for complementary feeding should start after exclusively breast-feeding a child for six months of age and children are supposed to be breast-fed for at least two years.

Study variables: Variables are categorized into dependent and independent ones. Dependent Variable: Nutritional status of the children.

Independent variable: Level of education, level of income, knowledge in nutrition of the mother etc.

Sampling: Purposive sampling method was used in selecting respondents for the study since the work technically cover children on complementary feeding and their mothers. A sample size of 100 mothers and their children was selected which ensured that the characteristics to be studied in the population were fairly distributed.

Data analysis: The data was analyzed based on the stated objectives using the Microsoft epi-info software (2002 windows version). Where appropriate, results were presented as frequencies, tables, histograms, pie charts. Anthropometric data obtained from the children was transformed into weight-for-age (W/A), height/length (H/A) and W/H parameters. The levels of wasting (indicator for current or short term malnutrition), stunting (indicator for chronic or long term under nutrition) and underweight (indicator for both chronic and acute under nutrition) were obtained based on Z-score values that are less than two standard deviations (-2SD) and three standard deviations (-3SD) below the median of the CDC/NCHS/WHO reference population. Children whose height-for-age indexes are less than two standard deviations or three standard deviations below the median are described as moderately or severely wasted. Furthermore, children whose weight-for-age indexes are less than two or three standard deviations below the median are described as moderately or severely underweight, respectively.

RESULTS AND DISCUSSION

Socio-demographic information: The socio-demographic information about the respondents is presented on Table 1.

Figure 1 on the type of foods usually given the children, investigation revealed that this ranges from liquid to semi-solid and solid foods. As many as 73% of respondents give corn dough porridge to their children, 10% give weanimix, 16% give other foods like lactogen, cerelac, fufu, banku and soup with only 1% giving ablemanu porridge or tom brown porridge.

Investigations revealed that 28% of the children were underweight for their age, their weight-for-age were below minus two standard deviations (-2SD) from the median of the reference population and 5% were severely underweight, they were below minus three standard deviations (-3SD). 46% were below minus one standard deviation (-1SD) and 21% had normal weight.

Figure 3 that 10% of the children were wasted, their weight-for-height were below minus two standard deviations (-2SD), 39% were below minus one standard deviation (-1SD) and the remaining 51% had normal heights in relation to their weights.

Investigation revealed that 10% of the children were stunted, their height (length) for age were below minus two standard deviations (-2SD) from the median of the reference population, 4% were severely stunted, they were below minus three standard deviations (-3SD). 46% had heights below minus one standard deviation (-1SD) and the remaining 40% had normal heights in relation to their ages.

The study revealed that the ages of respondents range between 15 years and 44 years, with 2% even above 44 years. This shows that the reproductive age of the

Table 2: Socio-demographic information on respondents

Characteristics	No. of 100 respondents	Percent (%)
Age: 15-19	11	11
20-24	35	35
25-29	25	25
30-34	16	16
35-39	8	8
40-44	3	3
Above 44	2	2
Total	100	100
Marital status		
Single	6	6
Married	88	88
Divorced	3	3
Widowed	3	3
Total	100	100
Educational level		
No formal education	12	12
Primary	28	28
Middle/JSS	57	57
Secondary	3	3
Total	100	100
Ethnicity		
Akan	93	93
Ewe	1	1
Ga	1	1
Northerners	5	5
Total	100	100
Religion		
Christianity	96	96
Islam	1	1
Traditional	3	3
Total	100	100
Occupation		
Unemployed	24	24
Trading	27	27
Farming	34	34
Teaching	2	2
Artisans	13	13
Total	100	100
Income		
Less than 100.00	2	14.3
Less than 200.00	3	21.4
More than 200.00	9	64.3
Total	14	100

Age: The cream of respondents fell within the 20-29 years bracket, which accounted for 60%

Marital status: Among the 100 respondents interviewed, 88% were married and 6% were single

Educational level: The findings revealed that 57% of the respondents had education up to the middle level with 28% having up to primary level. 12% did not attend school

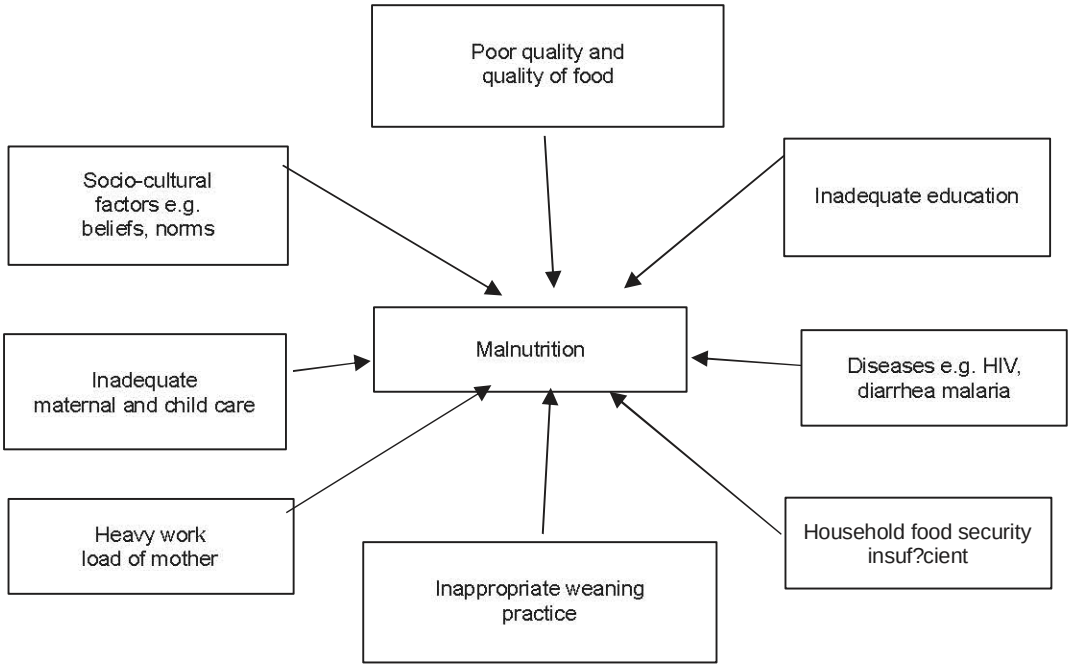
Ethnicity: As many as 93% of the respondents were Akans and 5% were Northerners

Religion: out of the hundred respondents, 96% were Christians with 3% being traditionalists

Occupation: 24% were unemployed, 34% were farmers, 27% were traders with 13% being artisans

Income: 14% of the respondents earn regular income. Among these 64.3% earn more than GH¢200.00 a month, 21.4% earn less than GH¢200.00 and the remaining 14% earn less than GH ¢100.00

From the income analysis above, it is clear that mothers can barely take good care of their children without additional support



Sources: Researchers' model, 2015

Conceptual framework

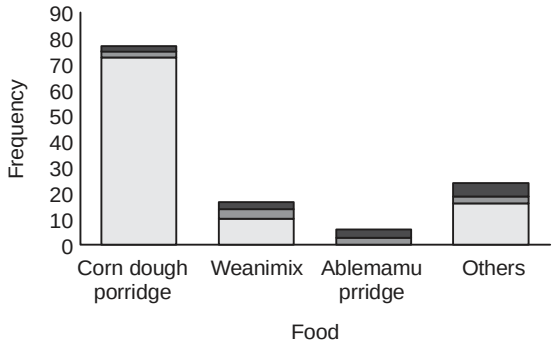


Fig. 1: Type of food Mothers usually give to their children (Source: Anthors Field Work, 2015)

Ghanaian woman could be quite long indicating that the Ghanaian woman is very fertile.

The study revealed that as many as 88% of respondents are married, 6% are single and 3% each being widowed and divorced, respectively. This confirms the Ghana Demographic and Health Survey (1998), report that over half of Ghanaian women of reproductive age are married and the widowed and divorced are much on the lower side, they constitute 2 and 5%, respectively.

The research brought to light that as many as 88% of the respondents have attended school. The highest educational attainment is a secondary level and primary is the lowest level. 12% did not have any formal education. This is not in accordance with the report of the 2000 Population and Housing Census of the country which reported that majority of the people, 43.4%, have not attained any education, with only 4.2% being in the preschool level taking into consideration the population of the under-five, which is about 14.7% of the total population. It also stressed that the rather large proportion of the population, 18.6%, that attained primary as the highest level is not encouraging since the effects of education do not begin to manifest until beyond the basic level.

The research also revealed that 12% of the respondents did not attend school and as many as 28% had primary education as their highest level. This finding confirms the assertion by Kofi Annan (2003), the Secretary General of the United Nations, that in most countries, girls are the most disadvantaged when it comes to school, for, millions of young girls never attend school at all, millions more never complete their education and countless numbers never receive the quality education that is their right. It was further revealed that only 3% of the respondents in the study had secondary education. This finding again confirms what the Ghana Demographic and Health Survey (1998), stated that many rural female residents do not have secondary education. Research also shows that one's level of education is important as it has influence on his or her values, way of life and even eating habits. As much as possible, ignorance as to what the body needs in order to function properly, that is, nutritive value of food, basic hygienic practices to observe in order to render food safe for human consumption, is reduced when a person attains a certain level of education. Annan (2003) supports

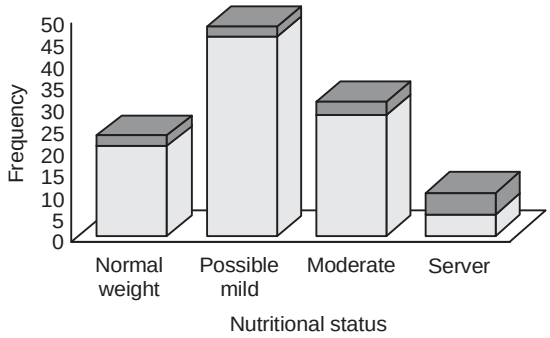


Fig. 2: Distribution of children by height for age (Z-Score) (Source: Authors field work, 2015)

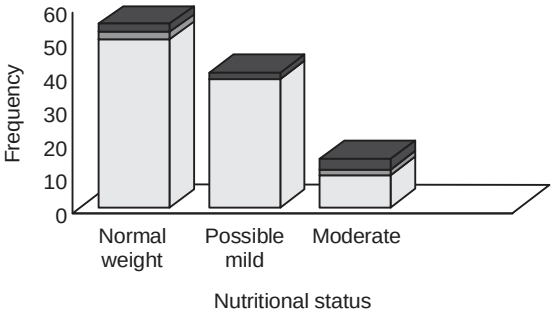


Fig. 3: Distribution of children by weight-for height (Z-Score) (Source: Authors field work, 2015)

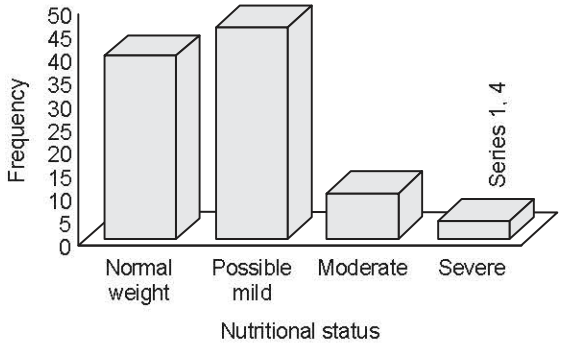


Fig. 4: Distribution of children by height for age (Source: Author's field work, 2015)

this view and asserts that educated women have better knowledge about health care practices, use of health services during pregnancy and birth and improved nutrition.

The research revealed that Christianity, Islam and Traditional religion are the dominant religious groupings in the area of study. Those who profess the Christian faith are in majority, 96%, with 3 and 1% professing Traditional and Islam religions, respectively. This confirms the report by Ghana Statistical Service (2014), that three main religious groupings are present in Ghana, these are, Christianity happens to be the dominant religion with over two-thirds, (68.8%) of the population claiming affiliation to the Christian faith, followed by Islam with 15.9% and Traditional religion with 8.5% adherents (GDHS, 1998). The report further states that apart from the Northern Region where Islam is dominant (56.2%) Christianity is reported as the dominant religion in all the other regions. The report stresses further that the proportion of females professing the Christian faith (70.5%) is larger than males (67.1%). This implies that sensitization on issues of national interest such as HIV/AIDS awareness creation, mass immunization exercises and other health education and promotion campaigns could be carried out effectively in our churches and mosques where the cream of society meet periodically to worship.

The research brought to the fore, that majority (34%) of the respondents are farmers, traders (27%), artisans (13%) and teachers (2%). A sizeable percentage, 24%, are unemployed. This confirms the report by Ghana Statistical Service (2002), that nationally, agriculture and related work, is one of the four major occupations, it employs 49.2% of the population with about 33% women in that sector. It continues further that agricultural work is more common among women in the rural areas and that work in agriculture is inversely related to education. For more than one in two women, (54%) with no education work in agriculture compared with 2% of women with secondary or higher levels of education. It is further reported that self-employment is relatively more common among less educated women, for, 83 percent of women with primary education are self-employed compared to 50% of women with secondary or higher education. This is confirmed by the results from this study, 27% are traders and 13% are artisans.

The research revealed that the income levels of the respondents were nothing to write home about. The unemployed who form 24% of the respondents earn nothing at all. Majority (86%) earn irregular income from their farming and trading activities. Since farm produce is seasonal, a farmer's income derived from the sale of crops may be high at one time of the year if the harvest is good. If the harvest is poor, he may have little or no income. Similarly, a trader could have fluctuating incomes; some earn less than one hundred cedis. Most of the respondents spend much of their incomes on food.

Nutritional status of the children: The study revealed that 46% are mildly underweight, 28%, moderately underweight and 5%, severely underweight. This supports G.D.H.S., (2014) report that in Ghana, the time between four months and twenty-one months of age is a vulnerable period because the proportion of children underweight rises quickly to approximately thirty-seven percent around that period. As such the period from four to twenty-one months is the age when serious efforts should be devoted to reducing child malnutrition. The report further stressed that underweight status is indicative of children who suffer

from chronic or acute malnutrition, or both and may be influenced by both short and long-term determinant of malnutrition. Underweight is often used as a general indicator of a population's health status, thus suggesting that the study population have poor health status.

The results showed that 39% are mildly wasted, 10% are moderately wasted. This situation supports the Ghana Demographic and Health Survey (1998, 2014) report that in Ghana the proportion of children wasted rises sharply between three months and twelve months of age, when it reaches twenty-two percent. The report further stressed that wasting represents the failure to receive adequate nutrition currently, or may be the result of recent episodes of illness. This suggests that the study population lack adequate nutrition and also taken ill recently.

The study revealed that 46% are mildly stunted, 10%, moderately stunted and 4%, severely stunted. This confirms the report by G.D.H.S., (1998, 2014) which stated that the proportion of children stunted increases between seven months and twenty-three months of age, at which time it peaks at 35%. It stressed that this is the period where cumulative effects of stunting result in damaging effects on the child. Stunting of child's growth may be the result of a failure to receive adequate nutrition over a long period of time or of the effects of recurrent or chronic illness. It therefore represents a measure of the outcome of under nutrition in a population over a long period, thus suggesting that the study populations are undernourished or malnourished.

Conclusion: The study revealed that majority of mothers, (88%) were married. Most (57%) of the mothers had completed Middle/JSS level whilst 3% had secondary education.

Also majority of mothers (65%) had little knowledge in complementary feeding. It was however observed that 93% of them attend child welfare clinics regularly to have their children's growth monitored and also immunized.

The results revealed that mothers have easy access to the clinics, the services are affordable and there is cordial relationship between the health staff and the mothers. The health staff give mothers education in nutrition, check the nutritional status of all the children brought to the clinic and refer mothers with malnourished children to the Nutrition Rehabilitation Centre at St. Michael's Hospital, Pramso.

With respect to complementary feeding practices the study revealed that the ages at which mothers introduced their children to complementary food rages from as early as five-weeks to as late eleven months.

Recommendation

a: Adequate Frequency of foods with correct nutritional balance should be adhered to by mothers
b: Sufficient Amounts of foods at each feed should be given
c: Use of foods to increase nutrient Density in the diet
d: Ensuring that the food is utilized after it is eaten, for example, by reducing infections from contaminated foods, should be drummed home to caregivers or mothers

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