

**KNOWLEDGE, ATTITUDE AND ADOPTION OF APPROPRIATE FEEDING
PRACTICES BY MOTHERS AND ANTHROPOMETRIC INDICES OF THEIR
CHILDREN IN AGUATA LOCAL GOVERNMENT AREA OF ANAMBRA
STATE, NIGERIA.**

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DEDICATION

This work is dedicated to Almighty God, for his infinite mercy upon me.

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ABSTRACT

This study was designed to assess the knowledge, attitude and adoption of appropriate infant feeding practices of mothers and the anthropometric indices of their children. Three hundred and seventy three mothers who attended infant welfare clinics at the three health settings (General hospital Ekwulobia, Primary health care Ekwulobia, and Primary health care Akpo) all in Aguata L.G.A were involved in the study. The study evaluated the nutritional status of the infants in relation to their anthropometric indices. Also infant feeding practices of mothers in the locality was

assessed. A validated semi-structured questionnaire by experts at the Department of Home Science, Nutrition and Dietetics, University of Nigeria, Nsukka was used to elicit information on socio-economic characteristics of the mothers and their children. Results showed that age of the mothers involved in the study ranged from less than 20 years to 41 years and above. The mothers were mostly civil servants (29.50%), traders (29.30%), skilled workers (16.90%), housewives (16.60%) and unskilled workers (9.40%). Household size of 3-4 members dominated (38.90%) of population studied. On the average, 67.74% of the mothers had correct knowledge of infant feeding guidelines which means that mothers were knowledgeable on the infant feeding guidelines. Most mothers (67.60%) received information on breastfeeding through the midwives and nurses where they attended antenatal clinic. A total of (47.70%) of the mothers ever adopted exclusive breastfeeding for different periods of time. A total of (43.40%) stopped breastfeeding their babies after 12 months of age followed by (21.70%) who stopped breastfeeding after 15 months of age of the child. Only 19.30% and 13.90% stopped breastfeeding their babies after 9 months and 6 months of age respectively. Anthropometric indices (length and weight) were used to assess the nutritional status of the children. The boys were taller and heavier than the girls in all age groups except age 19-24 months. A total of 22.62% of males and 21.26% of the females were stunted. About 7.54% of the males and 14.37% of the females were wasted. A total of 12.06% males and 7.4% females were undernourished. There was positive and significant ($r = 0.7714$; $P < 0.0001$) correlation between age and weight of the children as well as their length and age ($r = 0.7937$; $P < 0.0001$). Breastfeeding was the predominant infant feeding method among the mothers. There was no significant ($P > 0.05$) difference between the weight and length of children fed breast milk only and those fed breast milk plus formula; breast milk and other foods. There was a significant ($P < 0.05$) difference in the length and weight of males and females, within 0-6 months of age while there was no significant ($P > 0.05$) difference in their weight and body mass index (BMI). For those within 7-12 months of age there was no significant ($P > 0.05$) difference in their length, while there was significant ($P < 0.05$) difference in their weight and BMI.

CHAPTER ONE

1.0

INTRODUCTION

Infant feeding comprises breastfeeding and complementary feeding (Ashworth and King, 1994). Appropriate infant feeding is the cornerstone for child's development. The first two years outside the womb is crucial. It is a period of intensive growth and brain development of an individual. The nutrient requirement of the child is high per unit body weight because of the rapid growth rate (Ene-obong, 2001). The adverse effect of poor feeding will lead to impairment of cognitive development.

Breastmilk is natural and meets the nutritional needs of the infant in the first six months of life if exclusively given. This was why WHO/UNICEF (1990) advocated that breastfeeding should exclusively be given for six months of life. Human milk is the right food for the young infant and provides all the energy and nutrients that the infant needs for the first six months of life and upto one-third during the second year of life (de Andraca, *et al.*, 1998).

Breastfeeding is a unique process that provides ideal nutrition for infants and contributes to their healthy growth and development. It has a unique biological and emotional influence on both the mother and the child (WHO/UNICEF, 1990). Armstrong (1995) also stated that it is an unequalled way of providing food for the healthy growth and development of infant.

Breastfeeding has overwhelming advantage everywhere in the world, but especially in developing countries, where hygiene is poor and some cannot afford to buy sufficient formula. Most mothers have no basic education to be able to use formula properly if affordable (Jelliffe and Patrice, 1991). Breastfeeding is the most ancient method of child spacing provided the child is taking breastmilk as required for the day, it causes the menstrual period to stop (lactation amenorrhoea). Kennedy and Visiness (1992); Dada, Akesode, *et al.*, (2002) reported that breastmilk helps to space children and reduce the risk of ovarian and breast cancer (Lancet, 2002). Breastmilk also increases family and national resources (WHO, 2004). Breastfeeding stimulates bonding between the child and the mother and psychosocial development. It leads to improved nutritional and physical growth, reduced susceptibility to common childhood infections and better resistance to cope with them (Health Canada, 2004). Improve health outcome in infants have long lasting effects throughout lifespan including increased performance and productivity (WHO, 2004). Optimum breastfeeding prevents both under nutrition as well as over-nutrition and provides protection from obesity related diseases.

A review of evidences have shown that on a population basis, exclusive breastfeeding for the first six months of life is the optimal way of feeding infants (Health Canada, 2004). Thereafter,

infant should receive complementary foods with continued breastfeeding upto two years of age and beyond (Goldman, 1993; Dewey, *et al.*, 1999).

Complementary feeding is the transitional period of gradual introduction of solid food or semi-solid food to the infant and this is usually as from six months of life (Malcolm, 1999). The transition from exclusive breastfeeding typically covers the age from 6-18-24 months of age (Pelto, Levitt *et al.*, 2003). Between these period is a critical transition period when the exposure to environmental pathogens are most intense and the likelihood of inadequate nutrient intake most probable (Underwood, 1985). Complementary-feeding should be timely, adequate, and safe and appropriate (WHO,2002). The frequency and amount of food given to the infant should also depend on the age and the need of the infant. This is important to ensure that complementary foods which are often poor do not displace the more nutritive breastmilk in the child's diet (Cohen *et al.*, 1995).

Complementary feeding is an action that is largely under the control of the family, although support from the health care provider is essential (SCN,2006). Thus complementary feeding needs to be learned through

behavioural modeling, as well as through the acquisition of knowledge (Pelto *et al.*, 2003).

Over the centuries, human infants have been fed with their mother's breastmilk. The development of alternative, milk formula, infant formula, have given contemporary mothers a second choice (Nwachukwu, 1998). Owing to the poor knowledge of composition and production of breastmilk by some mothers, insufficient milk production or weight gain is reason for not exclusively breastfeeding their babies (Nwazor,1996). According to king (1998), mothers resort to early introduction of complementary feeding thereby exposing the infant to diarrhoea, under-nutrition and malnutrition. Lack of support from close female relatives, health workers and pressure of urban life prevent mothers from breastfeeding their babies adequately. Poverty and ignorant, however, may result in nutritionally inadequate complementary foods which could lead to malnutrition and associated increase risk of infection (Ashworth and king., 1994). The level of the mother's nutritional status which is very low in most cases prevents her from meeting up with the demand made upon her by the suckling baby.

To this effect, such mothers put up non-challant attitude towards breastfeeding their babies (Azagiro, 2000). Some mothers have poor attitudes and ideas such as colostrum not being good for baby, breastfeeding may spoil a woman's figure and interfere with her relationship with men and breastfeeding in public is embarrassing which may lead to poor breastfeeding practices and early introduction of complementary food. These have adverse effect on the children if not properly handled (King, 1998).

1.1 Statement of problem

In Nigeria, Malnutrition is one of the major causes of infant mortality and this usually peaks between 1 – 2 years of life when baby is taken off breastmilk and inappropriate complementary feeding instituted. The nutrient intakes of these babies deteriorate as a result of poor knowledge, attitude, practices and ignorance of most mothers towards adequate nutrient intake. Some believe that the baby can tolerate any food provided the baby is hungry. This results in failure to thrive with resultant high mortality rate. Mother's poor attitude of complementary-feeding expose babies to so many hazards like malnutrition, infections, and stunted growth, (Filtea and Tomkins, 1994).

Infant feeding practices are influenced by numerous factors such as economic, socio-cultural and biomedical constraints in many areas (Butte, Lopez-Alarcon *et al.*, 2002). As a result of these prevailing factors, the researcher deem it fit to study the knowledge, attitude and adoption of appropriate infant feeding practices among nursing mothers in Aguata.

1.2 Objectives of the study

1.2.1 General objective: The general objective of the study is to asses the knowledge, attitude and adoption of infant feeding practices of mothers and anthropometric indices of their children in Aguata local Government Area.

1.2.2 Specific objectives

The study has the following specific objectives:

- i. to asses knowledge of infant feeding guidelines among mothers in Aguata Local Government Area.
- ii. to ascertain infant feeding methods adopted and practiced by mothers in the study area.
- iii. to asses mothers attitude towards exclusive breastfeeding.
- iv. Compare feeding methods with anthropometric indices of children 0-2years.

1.3 Significance of study

The result generated from this study will help mothers improve on their knowledge, attitude and adoption of infant feeding practice. Some of the negative beliefs and attitude of mothers towards infant feeding will be corrected. Depending on the result generated, the health workers will learn good infant feeding practices and the effect of poor practices.

1.4 HYPOTHESIS

1. More mothers know about correct infant feeding guide-lines ($P < 0.05$).
2. More mothers adopted exclusive breastfeeding (BMO). More mothers exclusively breastfed their babies for 6 months.
3. More mothers introduced complementary food at 6 months of age of their children.
4. More mothers continued breastfeeding after 18 months of age.
5. Exclusively breastfed children have higher anthropometric indices than the other groups.

CHAPTER TWO

2.0 LITERATURE REVIEW

Poor knowledge, attitudes and practices of infant feeding practices are well known to have adverse consequences on the health and nutritional status of children, when in turn have consequences for the development of the child both physical and mentally. An increase in morbidity in turn impacts heavily on public health expenditure.

2.1 Global Prevalence

The proportion of women breastfeeding varies widely throughout the world. In 1981, the world health organization reported that in some countries, most mothers' breastfed for one year but in others this figure was smaller (Malcom, 1999).

In Nigeria, breastfeeding is a common practice among women. However, the new lifestyle and the emergence of working class mothers have caused a decline in breastfeeding practice. (Labbok *et al.*, 1997; ACC/SCN, 2000). In addition, Nigerian women are familiar with socio-cultural practices such as feeding practices such as feeds and supplements as well as early weaning. These make the acceptance of exclusive breastfeeding difficult. Consequently, the practice of exclusive breastfeeding is low in Nigeria (Labbok *et al.*, 1997; ACC/SCN, 2000) despite the fact many hospitals have benefited from well drawn programmes to improve breastfeeding such as baby friendly hospital initiative (BFHI) and nutrition education and talks (ACN/SCN,2000). According to SCN (2004), 17% of Nigerian woman exclusively breastfed for a period of less than six months while sixty-three (63%) percent and thirty-five (35%) percent breastfed for 6-9 months with complementary feeding and 20-23 months respectively. The median duration is 20% per month. According to Malcolm (1999), in a group of woman in rural Nigeria, 97% were still breastfeeding at one year. Unfortunately the more economically advantaged women in Nigeria and other developing countries followed the western pattern and stopped breastfeeding only a few months or weeks (Malcolm,1999). The attitude of the father and grandmother of the infant is also of great importance in determining whether a woman wills breastfeed her infant. In developed countries, the positive reason's to breastfeed babies are mainly psychological rather those of safety (Malcolm, 1999).

In Kosovo, breastfeeding is generally recognized but exclusive breastfeeding is generally low and introduction of complementary feeding is common within first two months of life (Laura and Caroline, 1999). A number of 25% of women start to breastfeed until 24 hours or more after birth. Younger women are breastfeeding for a shorter length of time than their mother did. Although the reason for this was not established (Laura and Caroline,1999). In Bangladesh, it was reported that about 20% of mothers exclusively breastfed for 5 months and 16% of the infants were

given bottle feed by the age of one month. In another study conducted in rural Bangladesh, 85% of infants at one month and 30% at six months were breastfed predominantly. The median duration for exclusive breastfeeding is low and has been reported to be 1.5 months in rural Bangladesh, (Shameen *et al.*, 1998). In Sub-Saharan African, 26% of infants fewer than three months of age were exclusively breastfed with median range of 23% and 22% in 1996 and 2001 respectively. Then 68% of infants were introduced to complementary feed at six to nine months (UNICEF, 1997; SCN, 2004). In Mexico, 38% were exclusively breastfed for less than six months, 36% at six to nine months were breastfed with complementary feed and 21% still breastfed at 20-23 months.

In Georgia, 18% were breastfed at less than six months, 12% were breastfed at 20-23 months. In Turkey, 70% were exclusively breastfed for less than six months, 24% were breastfed with complementary food at 6-9 months while 21% still breastfed at 20-23 months (SCN, 2004).

In Britain, over the last ten years, there has been increase in the proportion of women initially breastfeeding their infants. The DHSS, (1988) reported that in the early 1980's, 67% of mothers in England and Wales breastfed initially, and 40% were still breastfeeding at 4 months. These figure were influenced by the socio-economic class of the family, 97% of women in the highest socioeconomic group fed their baby compared with a figure below 50% in a group of less advantaged women.

2.2 Composition of Breastmilk

Human milk is nutritionally adequate for the young infant's needs and, supports growth by itself for upto six months (Malcolm, 1999). Human milk is very different in composition from cow's milk. A result of previous study examined the composition of human milk compared to that of cow which included the nutritional estimation and microbiological activity as shown in the Tables 2.1. Unless altered, cow's milk should not be used in infant feeding until the infant is 12 months old because cow's milk is too high in minerals and protein, and does not contain enough carbohydrate to meet infants' needs. This may trigger development of diabetes in infants with a genetic factor (Wardlaw, 1999). Composition of breastmilk is not constant between women and some women for different lactating period and even during the day (Barasi, 1997). Beneth and Brown (1996) reported that human milk varies in its composition, maternal nutrition and individual variations. According to Linda (1999), human milk is under utilized resources, as many mothers prefer to use modified cow's milk formula as source of food of choice for infants. One major reason for under utilization is lack of consistent and accurate information from health care providers because they don't often understand process of lactation nor cultural factor that may influence a woman not to breastfeed. It is important that health worker in contact with the mothers be knowledgeable about health, nutritional and physiological influences, possible difficulties that may occur and how to over come these difficulties (Linda, 1999).

Human milk provides sufficient energy and essential micro and macro nutrients for rapid growth and development of the baby during the first six months of life (UNICEF, 2000). It also contains a repertoire of antimicrobial sub-binding proteins and many other substances of indeterminate functions (Garrow and James, 1998).

The carbohydrate in human milk is mainly lactose and its lactose concentration is greater than cow's. Lactose accounts for about 38% of total energy in human milk. Lactose enhances the absorption of calcium due to lower pH which results from formation of unabsorbed lactose to lactic acid. The resultant lower pH makes calcium more soluble (Barasi, 1997, Garrow and James, 1998).

Human milk fat is 98% triacylglycerol and contributes to 50-60% of total milk energy. Although the total fat content of human and cow's milk are similar, the fatty compositions are quite different. Human milk contains substantial amounts of unsaturated fatty acids particularly oleic acid and linoleic acids (Garrows and James 1998). Digestion and absorption of fat is aided by the presence of lipase within the milk secretion which starts the process of digestion before it reaches the small intestine (Barasi, 1997). Again human milk fat phosphoglycerides which is the main products of fat hydrolysis in cows milk (Garrows and James, 1998).

The proteins in human milk are predominantly whey protein including alpha-lactalbumin, lactoferrin, and various immunoglobulin. Although lactalbumin is a major source of amino acids, the other whey proteins have non-nutritional role as a protective agents. Immunoglobulin confers immunity and prevents allergic reactions while lactoferrin is bacteriostatic by binding iron and making it unavailable for bacteria which require it for growth. Again casein forms only 30 – 40% of the total protein in human milk whereas it comprises 80% of total protein cow's milk, casein from tough leathery curds in the stomach, which becomes more difficult to digest (Barasi, 1997; Garrows and James, 1998).

The vitamin content of human milk is related to the mother's vitamin status. Generally, the level of water soluble vitamins is adequate. Vitamin E levels tend to be high and vitamin A levels are moderate. Vitamin D and especially vitamin K tend to be low, although deficiency of vitamin D is prevented by giving breastfed infants the vitamin supplements while vitamin K deficiency is prevented by administration of intramuscular injection vitamin K to the new born immediately after birth (Garrows and James, 1998). Human milk contains binding factors folate and vitamin B₁₂ which facilitates their absorption (Barasi, 1997).

Levels of minerals in human milk are adequate. In addition specific binding factors for iron and zinc have been identified in human milk which makes their absorption much higher from formula (Barasi, 1997). Other important components of human milk include white blood corpuscles and contaminants. The white blood corpuscles are capable of destroying bacteria and producing antibodies and other immune factors such as interferon. Human milk may contain substances passed through the mother (contaminants) such as drugs, alcohol, nicotine and pollutants (Barasi, 1997).

Unfortunately too, there is evidence of transmission of variety of viruses including human immuno deficiency virus (WHO, 1998c). The water intake of an exclusively breastfed infant is adequate even in very hot climate and water supplementation is unnecessary (Barasi, 1997; WHO, 1995).

Table 2.1: Composition of human milk and cow milk

Composition	Human	Cow
Bacterial contamination	None	likely
Anti-infective substance	Antibodies active Leucocytes Lactoferrin Bifidus factor	not active not present
Energy (kcal/100ml)	75.0	66.0
Protein		
Total	1.0%	4% (too much)
Casein	0.5%	3% (too much)
Lactalbumin	0.5%	5%
Cysteine and Taurine	Enough for growing	not enough
Fat		
Total	4% (average)	4%
Saturation of fatty acid	Enough Unsaturated	too much saturated
Linoleic acid	Enough for growing brain	Not enough
Cholesterol	Enough	Not enough
Lipase	Present	None
Lactose (sugar)	7% (Enough)	3-4% (not enough)
Salts (meq/l)		
Sodium	6.5 correct amount	25 too much
Chloride	12 correct amount	29 too much
Potassium	14 correct amount	35 too much
Minerals (mg/l)		
Calcium	350 (correct amount)	1400 (too much)
Phosphate	150 (correct amount)	900 (too much)
Iodine (mg)	30	47
Selenium (mg)	3-50	5-50
Vitamins		
Vitamin A (iu)	1898	1025
Vitamin C (mg)	43	11
Thiamine (mg)	160	440
Riboflavine (µg)	60	1750
Niacin (µg)	1470	940

Source: Ene-obong 2001

The Table 2.1 showed that human milk is more nutritional and energy-giving than cow milk. It also showed that cow milk contains higher than normal required daily allowance of protein and amino acids that are capable of inducing a genetic condition such as early onset diabetes mellitus. In addition, the proportion of Calcium to Phosphorus in cow milk is apparently abnormal and may affect the skeletal, muscular and mental development of the child if fed exclusively with cow milk. Moreover, the concentration of vitamins in cow milk may not be adequate for the proper development of the child.

Though, both human milk and cow milk seem to have approximately equal amount of iron, the absorption of iron seem to be better in human milk than cow milk, but the rate of absorption is however, affected by individual dietary factors. The percentage of iron absorption may be reduced by casein or whey. These protein fractions are high in cow milk. Iron deficiency in infants and children cause them to absorb excessive amounts of iron

Iron deficiency is prevalent among infants in developing countries which usually lead to haematological manifestations, impaired immune function and thyroid hormone metabolism as well as learning disabilities. And because infant's diet is relatively uniform for a long time- an infant receives breast milk or a formula 5-6 times a day for up to 4-6 months. This puts very high demands on the nutritional adequacy of infant diets, since any nutrient deficiency or excess will be exacerbated by the prolonged consumption. The composition of human breast milk is unique for infants such that breastfed infant appears protected against nutritional imbalances unlike formula or cow milk fed infant.

The higher iodine dose in cow milk may precipitate high thyroid volume in children. Increased iodine concentration may have a negative effect on selenium metabolism and/or selenium status in infants. The result may be a diminished anti-oxidant effects or endocrine abnormality. However, many trace elements are present in low concentration in cow milk and may therefore be added as inorganic salts in processed milk and foods.

2.3 Advantages of breastfeeding

Breastfeeding has so many advantages both to infant, mother and family and nation.

2.3.1 Benefits to infant

Nutritionally: Human milk is the best food for the infants, it provides infants complete nutritional needs upto the age of at least four or usually six months, and upto one-third between twelve and twenty-four months (WHO/University of California, Davies, 1998).

WHO (1995) reported that there is evidence of higher intelligence score in children who were breastfed. There is evidence to link having been breastfed as a child with improved cognitive performance (ACN/SCN, 2000). According to Myles (1995), breast milk enhances optimal mental development of the human infants because of its content of appropriate lipoprotein. Appreciating the degree of brain development is completely one major thing that differentiates human baby from animal baby.

Human milk has significantly lower levels of calorie, phosphorous, sodium and potassium therefore imposes a lower solute load on the neonatal kidney than ordinary semi solid or solid food. (Myles, 1995). Breastmilk may have a metabolic programming effect in preventing obesity and reducing risk of several chronic diseases (ACN/SCN. 2000).

Breastmilk is easily digested, contains enzymes that help complete digestion of fat and contains enough water even in dry and hot areas. (WHO/University of California, Davies, 1998).

Colostrum, the milk produced by lactating mothers in the first few days after child birth normally contains a high concentration of Vitamin A, which is essential for the proper functioning of infant's eyes, skin, mucus membrane and immune systems, protection of infants against infection and other illnesses. Breastmilk, especially colostrum contains maternal antibodies which protect infants against infections. WHO (1995), observed that infants who were breastfed have more illnesses than those fed on breastmilk substitute. Breastfeeding reduces incidence and severity of diarrhea during the first year and reduced the risk of respiratory infections, Otitis media, Atopic disease, necrotizing enterocolitis and septicaemia in new born infants (ACN/SCN,1998). Colostrum helps to evacuate the colon of neonatal jaundice when a child passes meconium (the first black stool passed by a neonate) (American Academy of Pediatrics, 1997).

Breastfed infants have fewer and less serious illnesses and allergies than those who never breastfed, including reduced risk of sudden infant death syndrome and less childhood cancer and diabetes (Lucas *et al.*, 1998, Lancert, 1992; Cunningham *et al.*,1991).

Breastmilk is an ideal food for your baby. It's all she needs to thrive and grow for many months (AAP, 1997).

It creates bond between mother and baby, child feels psychologically secured. Research on bonding by Widstrom and others in Stockholm suggest due to the effect of oxytocin and gastro

intestinal hormones; breastfeeding appears to change psychological profile of the mother to make her more open, flexible and more “service oriented”.

Breastmilk has normal temperature and time. It is very convenient, requires no advance planning, packing or equipment. Milk is always available.

2.3.2. Contribution to maternal health

It provides most women with sense of satisfaction when successfully carried out. The emotional and psychological benefit derived from breastfeeding are very important elements of maternal and child health (ACN/SCN, 1998; Demer, 1998)

Breastfeeding helps the uterus to involute and thus minimize postpartum haemorrhage thereby reducing the risk of anaemia and contributing to reduction in maternal mortality (WHO/University of California, 1998; Davies, 1998).

Breastfeeding is also associated with improved bone demineralization and also causes mothers to return to their pre-pregnancy weight, thereby reducing chances of obesity (ACN/SCN, 1998).

Furthermore, breastfeeding protects women’s health because it reduces the risk of ovarian cancer later in life (WHO/University of California, 1998, Davies). It also contributes to women’s health by increasing child spacing.

Exclusive breastfeeding on demand, including at night delays the return of menstruation and so helps to postpone occurrence of next pregnancy (Labbok *et al.*, 1997). This protects the infants from displacement by a new pregnancy and the mother’s health for excessive reproductive stress.

2.3.3 Economic benefits

Breastfeeding is the economical method of infant feeding. Saves money and time, reducing the cost of health care for the sick children (WHO, 1998). Healthier and happier mothers and infants represent less private and public expenditure on health care. Breastfeeding also saves foreign exchange by encouraging the use of natural resources since most countries do not manufacture infant formula but to import it (ACN/SCN, 1998).

2.3.4 Factors that militate against breastfeeding

Several factors have been incriminated to be responsible for the decline on breastfeeding particularly in developing countries like Nigeria. These factors include the following according to WHO/UNICEF (1995).

1. Maternal employment: Mothers whose works involve separation from their infants face obvious obstacles in the breastfeeding of the children.

2. Rapid Urbanization and industrialization have led to a high number of mothers working for salary outside the home. The change in status of women has also redefined the attitude to the female breast, which is now seen as a sexual organ making privacy mandatory for breastfeeding.
3. Negative attitudes of health and nutritional professionals to breastfeeding.
4. Insufficient action by the government to promote breastfeeding.
5. Marketing, advertising and promotion of artificial milk (Formula)

The indiscriminate advertising and promotion of artificial formula especially in the third world countries led to the establishment of the code regulating the sale of such commodities by a joint WHO/UNICEF conference in Geneva 1997.

Rajan (1993) also observed that inaccurate and inconsistent assistance from health workers have been recognized as a major obstacle to breastfeeding. Health workers lack knowledge of breastfeeding and their unhelpful attitude and practices have been recognized for more than a decade (Lazzaro *et al.*, 1995). The assumption that health workers know enough may create barriers to breastfeeding promotion in breastfeeding management cannot be expected to give mothers guideline and provide skilled counseling (WHO, 1998). For this reason, it is recommended that all health care staff who have contacts with mothers, infant and/or children must receive instruction on the impedimentation of breastfeeding policy (WHO, 1998). According to Nwazor (1996), the retraining of health workers on modern breastfeeding management is vital to sustaining a healthy living for the child. Armed with the correct knowledge at every level, the health workers can committedly influence mothers to breastfed appropriately.

Returning to work or resuming duties have been recognized as a major reason for not practicing exclusive breastfeeding and early discontinuation for breastfeeding by working mothers (Lazzaro *et al.*, 1995; Nwazor, 1996). The reason commonly given by working mothers for not breastfeeding their babies exclusively is that a working mother's baby should be made to get used to bottle from birth so that he does not refuse the bottle when the mother has not returned to work (Nwazor, 1996). On the contrary, the baby of a woman working outside the home does not need to get used to the bottle from birth, rather the mother during maternity leave should exclusively breastfeed her baby as well as learn to express her milk so that when she returns to work, the baby can be fed on expressed milk while at work and preserve it in a container with cover (Nwazor, 1996). This is desirable because the more the breastmilk is expressed, the more breastmilk will be produced. Insufficient milk or insufficient weight gain by the baby is also one of the reasons given by some mothers for not breastfeeding exclusively (Nwazor, 1996). Some mothers fail to agree with the fact that their breastmilk alone can be enough for the baby till the babies are up to six month of age. It has been reaffirmed that

breastmilk alone provides the baby with the required nutrients and fluid within the first six months of life (WHO, 1995). The important factors to improve breastmilk production are relaxation of the mother, adequate mother's diet and fluid intake, and breastfeeding on demand (Beneth and Brown 1996).

2.4 Complementary feeding

Complementary feeding is a transitional period of generally introducing solid food to the infant usually from the first six months of life (Malcolm, 1999). Complementary feed are added to fill the gap between total nutritional needs of a child and the gap provided by the breastmilk (WHO, 1998). Jelliffe (1980) described complementary feeding as a mixed feeding; she further stated that it is giving semi-solid food such as cereals and mashed vegetable as well as milk feed from breast or bottle.

The time of introducing complementary foods depend on many factors not directly related to the needs of the infants. In industrialized countries, a wide range of such commercial products are commercially available. Introduction of this is usually 4-6 months old (Suzanne and Andrew, 1988). Prior to this time, the infants ability to swallow solids has not developed and his gastrointestinal is still not quite matured, which may increase the risk of developing allergies (Walker, 1985). According to Walker (1985), he said, it is possible in theory to develop combinations of locally available foods that meet the infant's energy, protein and micronutrient requirements. Poverty and ignorance, however, may result in nutritionally inadequate complementary foods which could lead to malnutrition and the associated increased risk of infection (Ashworth and King, 1994). Weinberg (1984) said, concern is usually raised about the adequacy of particular nutrients in breastmilk. Iron in breastmilk is bound to lactoferrin and thus is not very available so that breastfed infants loss considerably more iron than they absorb. The iron loss appears normal; however an iron supplementation may increase infection (Kuribidila, 1987). Sachder, *et al.*, (1991) also noted, despite wide spread belief that water supplementation is required to maintain adequate hydration in infants in hot weather, breastmilk above appears sufficient water supplementation of these infants may be more hazardous by decreasing breastmilk intake and increasing exposure to water-borne pathogen. It is less clear whether breastmilk alone is adequate for premature infants (Lucas, 1986). These infants have lower stores of iron (Lucas, 1986) and Vitamin A (Zachman, 1989) than full term infants and may also be at an increased risk of developing zinc deficiency (Hambidge, 1986). Vitamin A supplements may promote repair of lung damage in premature infants (Zachman, 1989) which would help prevent invasion by respiratory pathogens.

In developing countries, weaning is a vulnerable time in the child's development as protein-energy malnutrition may develop as an appropriate weaning diet is not available. In

addition vitamin deficiency syndromes (Scurvy and rickets) as well as iron deficiency anemia may develop (Axton, 1990). According to Walker, (1990), combination of available foods should be introduced to meet the infants' energy, protein and micronutrient requirement. Ene-obong (2001), commented that complementary foods should be based on foods available at home or local markets. The most common complementary food is usually a porridge of the local staple e.g. pap (ogi/akamu). Nutritional levels continue to change with time to match changing growth patterns and developing digestive abilities (Ene-obong, 2001). Mother's milk does not provide sufficient kilocalories and nutrients or food. Even when infant is being weaned, the nature of human milk ensure adequate nutrients just in case the new solid food diet cannot meet the child's needs. It has shown that human milk collected during gradual weaning has higher concentration of protein, iron and sodium with lower level of lactose (Williams, 1994).

In developing countries, a major reason to provide adequate nutrient and energy densities such that unreasonably large amounts would need to be consumed by the infant to meet his energy requirement. Energy density can be improved by addition of sugar and oils to the porridge. Alternatively, techniques such as seed germination and fermentation can be used to decrease viscosity of the porridge so that it becomes more acceptable to infants (Walker, 1990) and may be particularly important to sick infants who often have difficulty in swallowing bulky foods. Vitamin A is often deficient in weaning diets of children in poor families in developing countries. Beaton, *et al.*, (1993) suggest that vitamin A content of weaning food should be increased where there is high risk of vitamin deficiency. Infectious disease such as measles (Reddy, *et al.*, 1986) and Malaria (Thurham and Singkamani, 1991) can further decrease vitamin A status measured by plasma retinol levels. In less developed countries, supplementation of young children with vitamin A decreases mortality and some indicators of severe morbidity (Beaton, *et al.*, 1993).

In developed countries, there is a wide choice of complementary feeds. In Britain, cereals and husks were the first favoured solid food but packaged food may be used to which water is added. All modern cereals for babies are free of gluten and this may be associated with a reduction in the incidence of celiac disease (Malcolm, 1999). Alternative weaning food such as: - purees of protein-fish and meat broth (Malcolm, 1999).

2.4.1 Quality of complementary feed

It should be nutritious, clean, and safe and fed in adequate amount (WHO, 1998). Ene-Obong (2001) also said it should be nutritionally adequate, physically safe, easily consumed and digested by the child. To make sure that a young child grows well and healthy, it is important to know which foods to give, how much and how often (WHO, 1998). Breastmilk

should be the main food throughout the baby's first year and important food during the second year. According to (WHO,1998), complementary food can be given to a breastfed child between ages 4-6 months if the child is not satisfied after breastmilk; and if he is not gaining weight adequately despite appropriate breastfeeding.

2.4.2 Disadvantages of formula feed

Bergmann et al., (2003) reported that formula fed infants were more likely to exhibit higher prevalence of overweight, obesity and adiposity. Hormonal mechanism indicate that higher plasma insulin concentration in formula fed infants than in breastfed infants stimulates fat disposition and energy development of adipocytes (Lucas, *et al.*, 1980).

2.5 Practices of infant feeding.

The mothers' ignorance of the importance of the compositions of breastmilk in relation to the healthy growth of the baby affects her practice of exclusive breastfeeding.

2.5.1 Infant feeding practices in developing countries.

Initiation and duration of breastfeeding.

In Nigeria, Kenya, Zaire and India, there is prolonged lactation. In Nigeria, lactation continues up to one year naturally and even longer in rural areas, while in urban elite and middle classes, duration has declined and in one major study, only one-third of such mothers were still breastfeeding at six months (King and Ashworth, 1991). In India, although prolonged lactation is the rule, half the urban elite mothers in one major study were found to stop breastfeeding by one year. In Zaire, by contrast, nearly all mothers breastfed for at least twelve (12) months (King and Ashworth, 1991). There was more marked decline in urban areas. In Malaysia, Mexico and Caribbean there was decline in breastfeeding. Thus, half of rural Malay infants were breastfed for the period of six months; less than one-third of urban infants were breastfed for this period (Diamond and Ashworth, 1987). In Caribbean, fewer than half of urban infants were breastfed for six months compared with two-thirds of rural infants (Popkin, *et al.*, 1982). In Mexico, fewer than 10% urban elite mothers now breastfeed beyond six months' and only one-quarter breastfed for three months. Among urban poor, and rural mothers, however, half breastfed up to six months and between one-quarter and two-fifth continue for twelve months (Diamond and Ashworth, 1987).

Some circumstances that have led these mothers to stop breastfeeding earlier were previously the norm for their culture have not prevented them from breastfeeding for at least a brief period. An increased awareness within the health sector, leading to changes in health care practices that are more conducive to successful lactation may influence mothers – infant feeding behavior

(Ashworth and King, 1994). Breastfeeding is a common practice among Nigeria women and about 98% of mothers' breastfeed their infants. However, only about 28% continue breastfeeding until their children are 24 months old. (Labbok, *et al.*, 1997). They also observed that exclusively breastfeeding is practically non-existent in Nigeria, but that 64% of mothers are fully breastfeeding at birth and the median duration of breastfeeding is 20 months, about five months shorter in urban than rural areas. In line with the above, ACC/SCN (2000) reported that the rate of exclusive breastfeeding in Nigeria is 1.4 percent and median duration of breastfeeding is 19.8 months.

2.5.2 Infant feeding practices in developed countries.

Initiation and duration

A decline in duration of infant feeding was observed concurrently with industrialization and urbanization and was associated with the increased employment of women. Thus lactation lasted only seven months in the UK during the 19th century, which also saw the development of glass feeding bottle and the rubber teat and the first marketing of processed milks by 1883. (Ashworth and King, 1994). Both initiation and duration of breastfeeding continued to decline throughout the first seven decades of both century so that by 1975 only 51% of mothers in England and Wales initiated breastfeeding and only 9% continued for six months (Martin, 1978) same was also observed in U.S.A. in early 1980, a reversal in the downward trend began which was monitored in UK. In large nation wide studies, the proportion of mothers who initiated breastfeeding rose to about 60% and over one quarter were still breastfeeding at five-six months (Ashworth and King, 1994). In some western countries, however, it appeared that the return to breastfeeding has not only been maintained but has continued to increase. In Western Australia and Tasmania, a survey carried out in 1984-1985 showed that over 80% of mothers were breastfeeding on discharge from hospital, and 45% were still breastfeeding, same were also reported in Netherlands and Canada (Lawrence and Friedman, 1990) and in scandeneria (Koçturk and Zetter storm, 1988; WHO 1998a.). In a study carried out in England, Wales and USA, the longer a mother had breastfed her first baby, the more likely she was to breastfeed again. (Ashworth and King, 1997).

2.6 Attitude to infant feeding

Attitude could be defined as an organized and consistent manner of thinking, feeling and reaching to people, groups, social issues and any event in one's environment. Attitudes are therefore very important in daily life because they determine the direction of many activities.

The level of the mothers nutritional status which is very low in most cases prevent her from meeting up with the demand made upon her by the sucking baby, to this effect, such mothers put up non-challant attitude towards breastfeeding their babies (Azagiro, 2000).

2.6.1. Maternal attitude and beliefs in developing countries.

In most traditions, breastmilk itself is not considered to be sufficient, whereas great faith is placed on staple foods. Winikoff and Laureen (1989) reported that in majority of developing countries, mothers still recognize the health and nutritional value of breastmilk. In some countries, such as Nigeria and Zaire, an increase in modern traditional taboo on sexual intercourse during lactation, resulted in a shortening of breastfeeding period. Some mothers emulate elites, who use infant formula while some say breastfeeding is 'primitive' (King and Ashworth, 1997). Kleiman and Senekaya (1984) stated that this belief that there is no milk in the breast in the first three days postpartum, hindering early initiation of breastfeeding is not true. Milk is present in breast as early as 16th week of pregnancy. As a result of this palm wine, hot peppery soup and others given to postpartum mothers to initiate breastmilk. According to Myles, (1993) some mothers feel embarrassed to breastfeed in public. In Ahiara, traditionally, it is believed that intercourse during breastfeeding period exposes the child to death due to contamination of breastmilk (Azagiro, 2000). This discouraged mothers from having intercourse during breastfeeding period. Kleimen and Senakaya (1984) also said that Yoruba in West Africa, their women abstain from sexual intercourse throughout lactation period for fear of breastmilk being contaminated by semen. If eventually their men have intercourse, it will weaken the men. In some societies, colostrum is termed to be a bad milk and therefore it is thrown away. Some mothers claim that their breastmilk is bad. They diagnose this by putting a life ant. If the ant dies, they will stop breastfeeding because they assume the milk is bad (Azagiro, 2000).

2.6.2 Maternal attitudes and belief in developed countries.

Maternal decision on infants feeding has been shown to be based either wholly or in part, on a consideration of optimal health for the mother or her child. This might be reflected in concern over insufficient milk, medical problems or opinions regarding the relative merit of breastmilk versus infant formula (Carballo and Pelto, 1991) such concerns can lead to either breast or formula feeding being chosen, especially where certain types of maternal behaviour such as smoking and consuming non-nutritious foods are viewed potentially harmful. In these circumstances, mothers may prefer not to breastfeed. (Gabriel, *et al.*, 1986).

In England and Wales, main reasons given for breastfeeding were a perception by the mother that breastmilk was best for the baby and that it was more convenient (Martin and Monk, 1982; Martin and White; 1988). Breastfeeding was natural and facilitates mother infant bonding, it is cheaper. Reason for stopping breastfeeding, at stages was a perceived insufficiency of milk,

sore nipples and breast problems were common reasons for stopping within two weeks. (Martin and White, 1988).

2.7 Anthropometry

Anthropometric indices (length and weight) are used as the criteria for assessing the adequacy of growth and hence optimal nutritional status in infancy and childhood. Anthropometry is used to assess and predicts preference, health and survival of individuals and reflects the economic and social wellbeing of populations. Anthropometry is a widely used, inexpensive and non-invasive measure of the general nutritional status of an individual or a population group.

The four building blocks or measures used to undertake anthropometric assessment are: - Age, sex, length (height) and weight.

Three indices are used to assess nutritional status of infants and children. These are weight-for-age; length (height-for-age) and weight-for-length or height.

Low weight for-age index identifies the condition of being under-weight for specific age. This reflects under nutrition.

Low length-for-age or height-for-age index is referred to as stunting. Low weight-for-length or height identifies children suffering from acute undernutrition or wasting.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study area

This study took place in the three government hospitals in Aguata local government area. The hospitals were General hospital Ekwulobia, primary health center Ekwulobia and health center at Akpo, all in Aguata local government area. Aguata Local Government Area is situated in the East of Anambra State. It has about ten thousand populace. The occupation of the people is mainly farming. However, some traders, civil servants, students and artisans live in the area. The area has good roads, boreholes, streams, clinics, hospitals and schools.

3.2 Subjects

All lactating mothers attending infant welfare clinic at the period of study were selected.

3.3 Study designs

A cross sectional survey was conducted.

3.4 Population of study

All mothers/infants attending infant welfare clinic were included in the study.

3.5 Sample selection

Based on the calculated result of the key variables knowledge, attitude and adoption of infant feeding practices, the highest population size of 364 lactating mothers' attending infant welfare clinic at the three health centers were selected for the study.

Sample size was calculated using the formula of Yaro (1964), Ukwuije and Ezenwu (1989) thus:

$$N = \frac{4p(1-p)}{W^2}$$

Where N stands for total number of the sample (923)

P stands for proportion of sample to be practicing exclusive breastfeeding in Nigeria reported to be 17% (226). 63% (333) breastfeed for 6-9 months and 35% (364) breast feed for 20-23 months.

W stands for required Precision level $(0.05)^2$

The results of the calculated variables are 226, 333 and 364. The highest sample size is 364. However, the sample size will be made upto 373 to make allowance for dropout.

3.6 Preliminary visit

Preliminary visit was made to the hospital/clinics for familiarization and request for permission from the Chief Medical Director (CMD) and the chief nursing officer to carry out the study in their institutions. This request was made in writing. A letter of introduction from the Head of the Department of Home science, Nutrition and Dietetics accompanied the request.

3.7 Sampling technique

Convenience sampling technique was used in the study. In this case, every mother and child that was present at the infant welfare clinic during the course of study were selected.

3.8 Instrument for data collection.

Data was collected by the use of structured questionnaires, interview sessions and anthropometry.

3.8.1 Questionnaire

A semi structured questionnaire was used to collect data from the mothers. The questionnaire was validated by experts in the Department of Home science, Nutrition and Dietetics UNN. The questionnaire after validation was pre-tested at another hospital in the local government area before final production of the copies for the study. Specifically the questionnaire sought information on the knowledge, attitude and adoption of infant feeding practices by mothers at the welfare clinics. Modified five point Linkert-type scale weightings (1-5) were used for assessing mothers' attitude towards infant feeding. A mean value of three or more was regarded as positive attitude and a mean value of less than 3 was negative attitude.

3.8.2 Anthropometric measurements

Anthropometric measurements of weights and lengths of the infants at the infant welfare clinics were taken. Ages of the infants were ascertained from their road-to-health charts.

Weight:

A baby's weighing balanced scale was used to weight all the infants seen at the infant welfare clinic. They were weighed nude. Reading was recorded to the nearest 0.1kg.

Height:

A non-stretchable tape stapled to a smooth flat board with two thin sliding woods was used to measure length of the infant seen at child's welfare clinic. The board was placed on a flat surface on the table when measuring. The child was placed on the board by aid of the mother whereby the child is not afraid of an unfamiliar subject. The assistant placed a hand on the tighs and knees of the child. The child was laid straight on the board and the sliding thin woods were positioned over the head and the leg (feet). When the correct positioning was done, reading was taken to the nearest 0.1cm.

Anthropometric indices were analyzed using world health child growth standard reference (2006). Z-scores reference population of these children was calculated to note their nutritional status.

3.8.3 Statistical analysis.

Data from the questionnaire was coded and keyed into computer. The data was analyzed using a computer software programme statistical Package for Social Science (SPSS). The analysis include descriptive statistic such as frequency distribution, percentages, means and standard deviation, chi square; and T-test was used to compare anthropometric indices of different feeding patterns of infants.

CHAPTER FOUR

4.0 RESULTS

4.1 Age and marital distribution of the mothers

Table 4.1: shows the distribution of mothers in different age groups and marital status. A total of 4.30% of the mothers were below 20 years of age. Another 18.50% were between 20-24 years. Some 25.20% were between 25-29 years, 20.60% were 30-34 years. A few (16.10%) were between 35-40 years and 15.30% were 41 years and above.

The Table also shows that 3.20% of the mothers were single; 94.40% were married; 0.50% were divorced, 1.10% were widowed and 0.80% were separated.

Table 4.1: Age and marital distribution of mothers

Variables	No	%
Age range in years		
<20	16	4.30
20-24	69	18.50
25-29	94	25.20
30-34	77	20.60
35-40	60	16.10
41+	57	15.30
Total	373	100
Marital status		
	No	%
Single	12	3.20
Married	352	94.40
Divorced	2	0.50
Widowed	4	1.10
Separated	3	0.80
Total	373	100

As shown in Table 4.2, a total of 1.65% of the mothers did not have any formal education. A few (1.30%) did not complete primary school. A group (3.50%) completed primary school and 14.50% did not complete secondary school. About 33.50% of the mothers completed their secondary school. A total of 23.30% and 22.30% of the mothers had polytechnic/college education and university education, respectively. A total of 16.60% were house-wives, 27.30% were traders, 16.90% were skilled workers. Some (9.40%) were unskilled workers and 29.50% were civil servants.

Table 4.2: Educational attainment and occupation of mothers.

Variables	No	%
Education attainment		
Never attended formal school	6	1.60
Primary school uncompleted	5	1.30
Primary school completed	13	3.50
Secondary school uncompleted	54	14.50
Secondary school completed	125	33.50
Polytechnic./college of Education	87	23.30
University	83	22.30
Total	373	100
Occupation		
House wife	62	16.60
Trading	102	27.30
Skilled worker	63	16.90
Unskilled worker	35	9.40
Civil servant	110	29.50
No response	1	0.30
Total	373	100

In Table 4.2.1, monthly income distribution of the mothers showed that 12.10% had less than ₦5,000.00 monthly. Another set of mothers (15.80%) earned between ₦5,000 – ₦15,000. While 7.20% earned between ₦16,000 – ₦26,000. Another (11.80%) earned between ₦27,000 – ₦37,000 and 19.00% earned ₦38,000 and above.

Table 4.2.1: Monthly income distribution of mothers

Income (month)	No	%
<N5000	45	12.10
N5000-15000	59	15.80
N16000-26000	27	7.20
N27000-37000	44	11.80
N38000and above	71	19.00
Cannot estimate	60	16.10
No response	67	18.00
Total	373	100

4.2. Knowledge of infant feeding guideline

In Table 4.3, the largest house-hold size of over 7 was reported by 26.50% of the mothers followed by 5-6 by 29.50% of the mothers. Family size of 1-2 and 3-4 were reported by 4.30% and 38.90% of the mothers, respectively.

Table 4.3: Household size characteristics of the children

House hold size	No	%
1-2	16	4.30
3-4	145	38.90
5-6	110	29.50
7 and above	99	26.50
No response	3	0.80
Total	373	100

Table 4.4 showed that majority (98.10%) of the mothers knew the first food to offer a baby and 1.90% had a poor knowledge. A total of 43.40% had a fair knowledge of the time of initiating breastfeeding and 56.60% did not know when to start breastfeeding. A total of 66.80% of the mothers had good knowledge of what should be done for breastmilk to flow and 33.30% had a poor knowledge. Only 20.10% of the mothers knew the correct duration of breastfeeding and 79.90% of them did not know. Majority (86.10%) of the mothers had knowledge of exclusive breastfeeding and 13.90% had no knowledge. A good number (66.20%) of the mothers knew the benefits of breastfeeding while 33.30% did not know. A total of 68.40% of the mothers had correct knowledge of complementary feeding while 31.60% did not. A total of 67.60% of the mothers had correct knowledge of when to start complementary feeding while 32.40% had incorrect. On the average 67.74% had correct knowledge while 32.20% had incorrect knowledge.

Table 4.4: Knowledge of infant feeding guidelines

Variables	% correct	% incorrect
N=373		
First food that should be given to baby (breastmilk)	98.10	1.90
Ideal food for a baby (breastmilk }	93.00	7.00
Time of initiating breastfeeding (30-60minutes after delivery).	43.40	56.60
What should be done for breastmilk to flow (Put baby to breast).	66.80	33.30
How long should breastfeeding last (up to two years).	20.10	79.90
What is exclusive breastfeeding (feeding infant on breastmilk alone without water or any other liquid till 6 months of age).	86.10	13.90
Benefits of breastfeeding (child's spacing, and bonding).	66.20	33.30
What is complementary feeding (introduction of semi-solid food as from 6 months off age).	68.40	31.60
When does complementary feeding start (6 months after birth).	67.60	32.40
Average	67.74	32.20

Key

Very good	70-100%
Good	60-69%
Fair	40-59%
Poor	< 40%

Table 4.5, shows that greater percentage (67.60%) of the mothers got their information from nurses and midwives. However, 8.80% got from radio and 6.40% from television. The other mothers got from other sources.

Table 4.5: Source of information on breastfeeding

Source	No	%
Radio	33	8.80
Television	24	6.40
Newspaper	8	2.10
Magazine/journals	4	1.10
Midwives/nurses	252	67.60
Doctors	20	5.40
Other health care providers	6	1.60
Nutritionists	12	3.20
Relations	12	3.20
Friends/Neighbours	2	0.50
Total	373	100

4.3 Attitude of mothers towards infant feeding

Table 4.6, show that mothers had negative attitude towards exclusive breastfeeding, breastfeeding during hot weather and when baby is sick.

Table 4.6: Mean responses on attitudes of mothers towards infant feeding

Item No	questionnaires item	No of mothers	SA (5)	A (4)	UN (3)	SD (2)	D (1)	Mean x
A	Exclusive breastfeeding Is possible for the first six months of life.	373	375	284	0	328	63	2.8
B	Colostrum is good for the baby.	373	1030	644	5	2	0	4.5
C	Babies should be put to breast for milk to flow.	373	1220	488	3	2	3	4.6
D	Breastmilk does provide sufficient nutrients.	373	1140	268	6	20	62	4.0
E	Breastmilk is good for baby's growth	373	1225	480	2	10	1	4.6
F	Breastmilk provides enough water for the baby.	373	980	308	10	5	80	3.7
G	A woman should stop breastfeeding if she becomes pregnant.	373	1000	364	0	38	63	3.9
H	Breastmilk makes baby sick.	373	30	40	15	642	30	2.0
I	If baby is sick he should stop breast feeding.	373	295	24	15	420	87	2.3
J	Breastmilk goes bad if baby does not suck for a day.	373	310	252	6	252	116	2.5
K	If breastmilk goes bad, baby should not suckle.	373	550	380	6	184	70	3.2
L	Exclusively breast fed are healthier	373	1060	588	1	16	5	4.5
M	Breast feeding is not convenient for the mothers	373	220	80	12	474	60	2.3
N	Complementary feeding should be started as soon as baby wants additional food	373	520	948	0	34	15	4.1
O	Early introduction of complementary feeding before six months makes baby grow healthier	373	70	92	0	242	215	1.7
P	Consistency of complementary feeding should be put into consideration while preparing feed	373	1140	552	3	2	5	4.6
Q	Breastfeeding is impossible on hot weather.	373	45	80	6	526	75	2.0

Key:

SA – Strongly agree

A – Agree

UN – Unsure

SD – Strongly disagree

4.4 Infant feeding practices by mothers.

Table 4.7 showed that 47.70% of the mothers gave breastmilk only to the babies and 16.90% gave breastmilk plus water and the formula and 23.30% gave breastmilk plus water and the other foods.

Table 4.7: Infant feeding practices adopted by the mothers

Feeding practices	No	%
Breastmilk only (BMO)	178	47.70
Breastmilk plus water (BMW)	63	16.90
Breastmilk plus water and formula (BMWF)	45	12.10
Breastmilk plus water and other foods (BMWOF)	87	23.30
Total	373	100

Table 4.7.1 showed that 52.80% of the mothers started breastfeeding within 30-60 minutes of delivery, 24.70% started in less than 30 minutes after delivery, 15.00% within 1 hour to less than 6 hours and 5.60% of the mothers within 6 hours to less than 24 hours delivery and 1.30% of the mothers for over 24 hours, then 0.50% of the mothers initiated breastfeeding prior to placenta separation.

Table 4.7.1: Time breast-feeding was initiated after delivery.

Initiation of breast feeding	No	%
Before placenta separation	2	0.50
<30 minutes after delivery	92	24.70
30 – 60 minutes after delivery	197	52.80
1 hour < 6 hours after delivery	56	15.00
6 hours <24 hours after delivery	21	5.60
24 hours or more	5	1.30
Total	373	100

Table 4.7.2 showed that a total of 11.30% of the mothers gave water as first feed, 71.60% gave breastmilk, 1.10% concoction, 1.30% herbal liquid and 14.70% gave glucose drink. A total of 12.60% of the mothers discarded colostrum and 85.80% did not.

Table 4.7.2: First feed given to baby after delivery and mothers that discarded colostrum.

Variables	No	%
First feed		
Water	42	11.30
Breastmilk	267	71.60
Concoction	4	1.10
Herbal extract (liquid)	5	1.30
Glucose drink	55	14.70
Total	373	100
Discarded colostrum		
Yes	47	12.60
No	320	85.80
No response	6	1.60
Total	373	100

Table 4.7.3 showed that a total of 0.50% of the mothers stopped breastfeeding after 3months of baby's age, 13.90% did after 6months; 19.30% after 9months; 43.40% after 12months and 21.70% after 15 months.

Table 4.7.3: Age of stopping breastfeeding

When breastfeeding was stopped	No	%
After 3 months of age	2	0.50
After 6 months	52	13.90
After 9months	72	19.30
After 12 months	162	43.40
After 15 months	81	21.70
No response	4	1.10
Total	373	100

Table 4.7.4 showed that a total number of 34.90% of the mothers stopped breastfeeding because the baby was old enough and 21.20% due to their work. Another 17.70% of the mothers did not want their breasts to fall, 9.10% did to encourage baby to eat solid food. A total of 6.40% of the mothers stopped breastfeeding because they felt that breastmilk flow was insufficient, 5.90% did because baby cried too much, 2.90% was due to another pregnancy. A total of 1.30% and 0.50% had other views and did not respond, respectively.

Table 4.7.4: Reasons for stopping breastfeeding and complementary foods given to baby.

Variables	No	%
Reasons		
Breastmilk not sufficient	24	6.40
Baby cries always (not satisfied)	22	5.90
Baby old enough	130	34.90
Because of another pregnancy	11	2.90
To encourage infant to eat solid food	34	9.10
Separation from infant due to work	79	21.20
Do not want breasts to fall	66	17.70
Other responses	5	1.30
No response	2	0.50
Total	373	100
Complementary foods given to babies		
	No	%
Pap (maize gruel, guinea corn (dawa))	57	15.30
Soup broth	1	0.30
Infant formula	36	9.70
Solid foods (yam, akara, moi moi etc)	25	6.70
Nutrend /custard	9	2.40
Cerelac	8	2.10
Others	237	63.50
Total	373	100

A total of 63.50% did not start complementary feeding because their babies were still within 0-3 months of age. A total of 15.30% of the mothers gave pap as complementary feed, 9.70% gave infant formula and 6.70% gave solid foods. About 2.40% gave Nutrend/custard, 2.10% gave cerelac and 0.30% gave soup broth.

In Table 4.7.5, a greater number (50.10%) of the mothers introduced complementary feed at the age 4-5months and 26.30% at 6-7months and 17.70% of mothers started at less than 4months. A total of 5.40% started at 8-9months, 0.30% at 10-11months and 0.30% had no answer. Table 4.7.5 showed that 33.40% of the mothers gave complementary feed thrice a day, 23.30% four times daily, 26.30% gave five times daily, 16.40% and 0.50% gave twice and once, respectively.

Table 4.7.5: Age of introduction of complementary food and frequency of feeding

Variables	No	%
Age of introduction		
< 4 months	66	17.70
4 – 5 months	187	50.10
6 – 7 months	98	26.30
8 – 9 months	20	5.40
10 -11 months	1	0.30
No response	1	0.30
Total	373	100
Frequency of feeding		
Once a day	2	0.50
Twice a day	61	16.40
Thrice a day	125	33.40
Four times a day	87	23.30
Five times a day	98	26.30
Total	373	100

The Table 4.7.6 below shows no statistical difference at ($p > 0.05$) as

The mothers' occupation did not influence duration of breastfeeding. Among 373 (100% mothers' investigated), no house wife or civil servant stopped breastfeeding after 3 months. The greater percentage (37.93%) of the mothers who were unskilled workers breastfeed upto 10-12 months of age. However, 16-66% who were skilled workers breastfeed within 1-3 months of age. Most (22.50%) civil servants breastfeed upto 7-9 months of age. The greatest percentage (32.00%) of mothers who were traders breastfeed upto 2 years of life.

Table: 4.7.6 RELATIONSHIP BETWEEN MOTHERS' OCCUPATION WITH LENGTH OF BREASTFEEDING.

Occupation	Length of breastfeeding (months)					
	1-3	4-6	7-9	10-12	up to 2yrs	No response
House wife	-	8(21.62)	12 (15.00)	25(14.37)	17(22.67)	-
Trading	3(50.00)	8(21.62)	27(33.75)	40(22.99)	24(32.00)	-
Skilled worker	1(16.66)	8(21.62)	16(20.00)	28(16.09)	15(20.00)	1(100)
Unskilled "	2(33.33)	2(5.41)	7(8.75)	66(37.93)	10(13.33)	-
Civil servant	-	11(29.73)	18(22.50)	14(8.05)	9(12.00)	-
No response	-	-	-	1(0.57)	-	-
Total	6(100)	37(100)	80(100)	174(100)	75(100)	1(100)

Chi square 32.06, $p=0.1562$, $df = 25$.

Chi square analysis (Table 4.7.7.) shows that educational attainment influenced the mothers and the time for initiating breastfeeding after delivery ($P < 0.05$). The number of mothers breastfeeding babies 30-60 minutes after delivery increased with higher educational attainment. The greatest percentage (35.80%) and (24.40%) of the mothers who initiated breastfeeding 30-60 minutes after delivery were those who attained polytechnic/college of education and university, respectively. A few (23.46%) of the mothers who completed secondary school also initiated breastfeeding within 30-60minutes after delivery.

Table: 4.7.7 Relationship between time of initiating breast feeding after delivery and educational attainment of mothers.

Education attainment	Time of initiating breastfeeding					
	<30mins	30-60mins	61-6hrs	6hrs<24hrs	>24hrs	other
Never attended school	3(3.70)	2(1.24)	-	-	-	1(12.50)
Primary school uncompleted	1(1.12)	2(1.24)	2(2.70)	-	-	-
Primary school completed	4(4.49)	2(2.24)	5(6.76)	1(8.6)	-	1(12.50)
Secondary school uncompleted	13(14.61)	14(8.64)	18(24.34)	6(17.14)	2(40.00)	1(12.50)
Secondary school completed	32(35.96)	38(23.46)	34(45.95)	16(45.71)	1(20.00)	4(50.00)
Polytechnic college of Education	13(14.61)	58(35.80)	9(12.16)	6(17.14)	-	1(12.50)
University	23(25.84)	46(28.40)	6(8.11)	6(17.14)	2(40.00)	-
Total	89(100)	162(100)	74(100)	35(100)	5(100)	8(100)

$X^2 = 73.04$; $df = 30$; $p = 0.00$

Table 4.7.8 showed statistical significance difference at $p < 0.05$ for various options giving by mothers as their reasons for stoppage of breastfeeding.

Table 4.7.8: Relationship between occupations / reasons for stopping breastfeeding

Occupation	Breast milk Sufficient	Baby cries always	Baby old enough	Baby not gaining Weight	Because of another pregnancy	to encourage infant to eat solid food	separation from work	don't want breast to fall	other
House wife	6(25.00)	6(27.27)	19(14.67)	3(27.27)	7(20.59)	13(16.46)	7(10.61)	1(20.00)	-
Trading	6(25.00)	5(22.73)	39(30.00)	2(18.18)	14(41.18)	21(26.58)	11(16.67)	2(40.00)	2(100)
Skilled worker	4(16.67)	5(22.73)	19(14.62)	-	5(14.71)	17(21.52)	12(18.18)	1(20.00)	-
Unskilled worker	1(4.17)	2(9.09)	18(13.85)	5(45.45)	4(11.76)	3(3.80)	2(3.03)	-	-
Civil servant	6(25.00)	4(18.18)	35(26.92)	1(9.09)	4(11.76)	25(31.65)	34(51.52)	1(20.00)	-
No response	1(4.17)	-	-	-	-	-	-	-	-
Total	24(100)	22(100)	130(100)	11(100)	34(100)	79(100)	66(100)	5(100)	2(100)

$X^2 = 78.02$, $df = 40$, $p = 00$

Table 4.7.9 showed that educational attainment had influence on duration of breastfeeding among the mothers ($P>0.05$). Among 174 (100%) of the mothers that stopped breastfeeding between 10 and 12 months of child birth, 14.37% did not complete secondary school education. Another 30.46% completed secondary education, 27.01% attended polytechnic or colleges of education and 22.99% had university education. Less than a half (42.67%) of the mothers who stopped breastfeeding at two years completed secondary school education. However, 13.33% of the mothers had university education, some (12.00%) of the mothers did not complete secondary school. A very few (3.33%) of the mothers did not complete primary school. Another smaller group (1.33%) of those that never and did not complete primary school

Table 4.7.9: Relationship between educational attainment/length of breastfeeding

Educational attainment	Period (duration)					
	1-3Months	4-6months	7-9months	10-12months	Up To 2yrs	No response
Never attended School	-	-	2(2.50)	3(1.72)	1(1.33)	-
Primary school uncompleted	-	1(2.70)	-	3(1.72)	1(1.33)	-
Primary school completed	2(33.33)	1(2.70)	3(3.75)	3(1.72)	4(5.33)	-
Secondary school uncompleted	3(50.00)	3(8.11)	14(17.50)	25(14.37)	9(12.00)	-
Secondary school completed	1(16.67)	14(37.84)	24(30.00)	53(30.46)	32(42.67)	1(100.00)
Polytechnic/ college of education	-	6(16.22)	16(20.00)	47(27.01)	18(24.00)	-
University	-	12(32.43)	21(26.25)	40(29.99)	10(13.33)	-
Total	6(100)	37(100)	80(100)	174(100)	75(100)	1(100)

$$X^2 = 43.1, df = 30, p = 0.000$$

Table 4.8 showed that a fewer females (46.56%) than males (53.35%) studied. A total of 83.92% of the male children were in the age group of 0-6 months as well as 84.48% of the females. Both the male children and the female children (85.92 and 84.48, respectively) were in the age group of 0 to 6 months, followed by a few 12.56% of the males and 14.38% of the females in the age group of 7 to 12 months. A very fewer children (male and female) 1.08% and 1.3%, were in the age group of 13-18 months and 19 to 24 months, respectively.

Table 4.8.: Age and sex distribution of infants (N=373)

Age in months	males %	females %	total %
0 -6	167(83.92)	147(84.48)	314(84.18)
7-12	25(12.56)	25(14.38)	50(13.40)
13-18	3(1.51)	1(0.57)	4(1.08)
19-24	4(2.01)	1(0.57)	5(1.34)
Total	199(53.35)	174(46.65)	373(100.00)

Table 4.8.1 showed mean standard deviation of the children in different age group. Values with same superscript letters in rows are significantly different ($p < 0.05$) and those with different superscript letters are not.

Table 4.8.1: Mean length, weight and body mass index of children in different age ranges.

Age group (Months)	length (cm)		weight (kg)		BMI (kg/m ²)	
	male	female	male	female	male	female
0-6(m=167) (f=147)	57.17 ^a ± 15.55	55.86 ^a ± 6.06	5.74 ^b ± 1.38	5.50 ^c ± 1.45	17.56 ^d	17.62 ^c
7-12(m=25) (f=25)	72.32 ^b ± 4.04	71.88 ^c ± 4.17	9.50 ^a ± 0.96	8.76 ^a ± 1.17	18.16 ^a	16.95 ^a
13-18(m=3) (f=1)	76.32 ± 1.15	70.00 ± 0.00	11.67 ± 0.58	9.50 ± 0.00	20.03	19.39
19-24(m=4) (f=1)	73.25 ± 13.60	75.00 ± 0.00	9.50 ± 3.74	10.00 ± 0.00	17.70	17.77

Values with the same superscript letters in rows are significantly ($P > 0.05$) similar for males and females.

Values with same superscript letters in length (males and females), weight (males and females) and BMI (males and females) in rows are significantly ($P < 0.05$) similar.

In Table 4.8.2 a total of 53.35% male children were used for the study. The z-score for length-for-age showed that 5.50% of the subjects were above normal, and 71.86% were within normal range. Another group (10.05%) was mildly stunted; 11.56% were moderately stunted and 1.01% was severely stunted. A total of 6.32% of the females were above normal; 72.41% were within normal. A number of the subjects (10.34%) were mildly stunted; 9.77% were moderately stunted and 1.15% were severely stunted.

Table 4.8.2: Nutritional status parameters (z-scores) of males and females

Nutritional status	males (n=199; 53.35%)		females (n=174; 46.65%)	
	No	%	NO	%
Length-for-age				
Above normal	11	5.50	11	6.32
Normal	143	71.86	126	72.41
Mildly stunted	20	10.05	18	10.34
Moderately stunted	23	11.56	17	9.77
Severely stunted	2	1.01	2	1.15
Weight-for-age				
Over nourished	15	7.50	17	9.77
Normal	160	80.40	144	82.76
Mildly under nourished	20	10.05	10	5.75
Moderately under nourished	4	2.01	2	1.15
Severely under nourished	-	-	1	0.57
Weight-for-length				
Obese	16	8.00	15	8.62
Over weight	38	19.10	32	18.39
Normal	130	65.33	105	60.34
Mildly wasted	12	6.03	15	8.62
Moderately wasted	3	1.51	7	5.75
Severely wasted	-	-	-	-

Source; WHO, (2008). Geneva; SCN News, (2009) pg.70

Key:

Median value to +2 SD → normal

+3SD to >+3SD → Above normal

-1SD → mildly stunting and wasting

-3SD to -2SD → moderate stunting and wasting.

<-3SD → Severe wasting and stunting

A total of 7.50% of the boys were over-nourished; 80.40% were within normal. Some 10.05% of the children were mildly under-nourished. Another group (2.01%) was moderately under-nourished. A total of 9.77% of the females were over-nourished. Some (82.76%) were normal. However, 5.75% were mildly under-nourished, 1.15% were moderately and the rest (0.57%) were severely under-nourished.

A total of 8.0% boys were obese, 19.10% were over weight. Another of the subjects were (65.33%) normal, 6.03% were mildly, and 1.51% were moderately wasted. The girls, 8.62% were obese, 18.39% were overweight and 60.34% were normal. A few of the girls were (8.62%) mildly, and (4.02%) of the girls were moderately wasted, respectively.

Table 4.8.3 showed nutritional status of the children for different feeding methods. The length for age showed that the percentage of the boys who were mildly stunted were fed breastmilk plus water only (15.3%), breastmilk plus formula (23.33%), and breastmilk and other foods was (20.93%). A total of (26.92%) the moderately stunted boys were fed breastmilk plus water (BMW). Some group of boys were fed (23.33%) BMF and 20.93% were fed BMOF, and a very few (4.65%) who were fed BMOF were severely stunted. The greater percentage (91.00%) of the boys fed BMO was taller than others. A total number of the girls (23.40%) were fed BMW, 11.11% were BMF, and 13.51% fed BMOF were mildly stunted. The girls who were moderately stunted (27.66%) were fed BMW, another 16.67% of the girls were fed BMF, 2.70% were fed BMOF and 5.41% of the girls who were severely stunted were fed BMOF.

The weight of the boys who were fed BMOF (23.26%) were more mildly stunted than other groups of boys. On the other hand, the girls (16.22%) who were fed BMOF were much more stunted than the other the groups of girls.

Table 4.8.3: Distribution of nutritional parameters of males and females in different feeding methods.

Nutritional status	Feeding methods							
	males (n=199)				females (n=174)			
Length-for-age	BMO	BMW	BMF	BMOF	BMO	BMW	BMF	BMOF
Above normal	9(9.00)	1(3.85)	-	1(0.23)	5(6.94)	2(4.26)	1(5.56)	3(8.11)
Normal	91(91.00)	14(53.85)	16(53.33)	22(51.16)	67(93.06)	21(44.68)	12(66.67)	26(70.27)
Mildly stunted	-	4(15.38)	7(23.33)	9(20.93)	-	11(23.40)	2(11.11)	5(13.51)
Moderately								
Stunted	-	7(26.92)	7(23.33)	9(20.93)	-	13(27.66)	3(16.67)	1(2.70)
Severely								
Stunted	-	-	-	2(4.65)	-	-	-	2(5.41)
Total	100(100)	26(100)	30(100)	43(100)	72(100)	47(100)	18(100)	37(100)
Weight-for-age								
Above normal	10(10.00)	-	4(13.33)	1(2.33)	9(12.50)	6(12.77)	1(5.56)	1(2.70)
Normal	90(90.00)	21(80.77)	18(60.00)	31(72.09)	63(87.50)	36(76.60)	17(94.44)	28(75.68)
Mildly under								
weight.	-	3(11.54)	7(23.33)	10(23.26)	-	4(8.51)	-	6(16.22)
Moderately								
under weight	-	2(7.69)	1(3.33)	1(2.33)	-	1(2.13)	-	1(2.70)
Severely								
under weight	-	-	-	-	-	-	-	1(2.70)
Total	100 (100)	26(100)	30(100)	43(100)	72(100)	47(100)	18(100)	37(100)
Weight-for-length								
Obese	11(11.00)	1(3.85)	2(6.67)	2(4.65)	10(13.89)	4(8.51)	1(5.56)	-
Over-weight	22(22.00)	3(11.54)	6(20.00)	7(16.28)	15(20.83)	12(25.53)	5(27.78)	-
Normal	67(67.00)	16(61.54)	19(63.33)	28(65.12)	47(65.28)	20(42.55)	10(55.56)	28(75.68)
Mildly wasted	-	6(23.08)	1(3.33)	5(11.63)	-	7(14.89)	2(11.11)	6(16.22)
Moderately								
wasted	-	-	2(6.67)	1(2.33)	-	4(8.51)	-	3(8.11)
Severely wasted	-	-	-	-	-	-	-	-
Total	100(100)	26(100)	30(100)	43(100)	72(100)	47(100)	18(100)	37(100)

Key:

BMO – breastmilk only

BMW – breastmilk plus water

BMF – breastmilk plus formula

BMOF – breastmilk plus other food

Table 4.8.4 shows the mean length, weight and body mass index of children in different age groups. T- test was used to compare difference among these children. When comparing the various mean values for the children in BMO and BMW groups, there was no significant difference in mean values when compared with other feeding methods. It was observed that various parameters i.e. length, weight and BMI increased with age. This was similar to the T-test values which had no significant ($P>0.05$) difference for those fed BMO and those fed BMW. When those fed BMO, BMW and BMOF were compared, there was significant ($P>0.05$) difference.

Table 4.8.4: Mean weight, length and BMI of children in different feeding group according to age ranges.

Feeding methods	Age (months)							
	0 – 6		7 – 12		13 – 18		19 – 24	
	males	females	males	females	males	females	males	females
BMO								
Length (cm)	55.72±5.69	54.74±6.20	-	-	-	-	-	-
Weight (kg)	5.43±0.55	5.21±0.59	-	-	-	-	-	-
BMI (kg/m ²)	17.23	16.92	-	-	-	-	-	-
BMW								
Length (cm)	54.90±9.86	56.76±9.33	-	-	-	-	-	-
Weight (kg)	5.53±0.99	5.84±0.96	-	-	-	-	-	-
BMI (kg/m ²)	17.15	17.94	-	-	-	-	-	-
BMF								
Length (cm)	58.77±11.53	55.00±12.30	64.00	-	-	-	-	-
Weight (kg)	5.86±1.15	5.67±1.27	8.40	-	-	-	-	-
BMI (kg/m ²)	17.31	18.51	20.50	-	-	-	-	-
BMOF								
Length (cm)	68.14±18.21	62.42±18.02	73.63±4.04	71.48±14.26	76.33±1.15	70.70±0.00	9.50±13.06	75.00±0.00
Weight (kg)	7.76±2.07	6.51±1.88	9.51±0.96	8.78±1.76	11.67±0.58	9.50±0.00	11.18±3.74	10.00±0.00
BMI (kg/m ²)	19.30	16.88	17.63	16.87	20.23	19.30	17.63	17.70±0.00

Key:

BMO – Breastmilk only

BMW – Breastmilk plus water

BMF – Breastmilk plus formula

BMOF – Breastmilk and other food

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Knowledge of infant feeding guidelines

A high percentage (98.10%) of the mothers that was knowledgeable of first food to offer to the baby and those of the mothers who were knowledgeable (93.00%) for the ideal food for a baby confirmed the results of de Andraca *et al.*, (1998). They observed that human milk is the right food for the young infant which provides all the energy and nutrients that the infant needs for the first six months of life up to one-third during the second year of life. On the other hand, WHO/UNICEF, (1990) and AAP (1997) advocated that breastfeeding should exclusively be offered for the first six months of life. A little less than one-half (43.40%) of the mothers knew the time to initiate breastfeeding (30-60minutes after delivery) and 3.50% did not know because the “No breastmilk syndrome” prevented early initiation. This present observation supported that of Kleiman and Senakaya (1994). Based on this experience, some nursing mothers consumed palm wine and peppery extract to stimulate milk production and flow. Laureen, (1989) had reported that good number (66.20%) of the mothers were aware of the benefits of breastfeeding. The high average percent correct knowledge of infant feeding guidelines (67.74%) among the women was a possible indication of good knowledge.

5.2. Infant feeding practices adopted by the mothers

The 100% observed that the mothers adopted breastmilk feeding methods as the commonest method for infant feeding appeared to agree with those of Labbok *et al.*,(1997). They observed that breastfeeding is a common practice among Nigerian women and that about 98% of the mothers’ breastfeed their infants. The high percentage (52.80%) of the mothers who initiated breastfeeding within 30-60minutes of delivery did so because they were taught at the antenatal clinic that it assists breastmilk flow and is equally highly nutritious. WHO (1995) had earlier reported that breast milk contains anti-bodies as well as high concentration of vitamin A for proper functioning of infants’ eyes, skin, mucus membrane and immune system.

5.3 Reasons for stopping breastfeeding and complementary feeding offered to baby.

The higher percentage (34.90%) of the mothers who gave reasons that baby is old enough as compared to with other responses clearly suggested that this was the culprit that militate against complementary feeding. The second and third reasons (17.70% and 21.20%) suggested that separation from infants due to work and insufficiency of breastmilk and cries of the baby had also adversary affected period of complementary feeding. Lazzaro *et al.*,(1995); Nwazor, (1996) affirmed that returning to work or resuming duty were recognized as one of the major reasons mothers did not practice exclusive breastfeeding and early breastfeeding discontinuation for

working mothers. Nwazor (1996) and Martin and White (1988) observed among other reasons that insufficient milk or weight gain by the baby, sore nipples and breast problems were reasons by the mothers never practiced exclusively breastfeeding. Beneth and Brown, (1996) had strongly recommended that the most the important factors to improve breastmilk production are relaxation of the mothers, adequate diet, fluid intake and breast feeding on demand.

5.4 Age of introduction of complementary feeding.

The lower percentage (17.70%) of the mothers who introduced complementary feed at less than 4 months was due to poor nutrition education during antenatal. On the other hand, the higher (50.10%) and (26.30%) of the mothers who introduced at 4-5 and 6-7months agreed with the observation of WHO (1998) that complementary food should be given to breastfed child between 4-6months of life if the child is not satisfied after breastmilk and if he is not gaining weight adequately despite appropriate breastfeeding. According to Suzanne and Andrew (1988), the infants ability to swallow solids is not fully developed in less than 4-6months, and his gastrointestinal tract is still some what permeable which may increase the risk of allergies.

The observation from this study that complementary foods were based on locally available foods agreed with the report of Ene-Obong (2001). She discovered that the most commonly used was pap based on maize sorghum. On interviewing of the mothers, they said they feed (pap) is not given alone but addition of Soya bean, bournvita or Milo and milk. This supports (Jelliffe, 1980) who described complementary feeding as a mixed feeding. A number of (9.70%) mothers fed infantformula and 6.70% solids. Walker (1990) suggested that combination of available foods should be introduced to meet the infant's energy, protein and micronutrient requirement.

5.5 Nutritional status parameters (z-score) and z-score of different feeding patterns of the males and females.

A total of 199(53.35%) male versus 174 (46.65%) female infants were used for the study. Anthropometric indices (weight and length) were used to assess the nutritional status of these infants. WHO (2006) child growth standard was used to classify these infants according to their z-scores reference population groups. Those above 3 and 3SD were regarded above normal; median values to 2SD were normal. Those below median value to -1 were taken to be mildly; -2 and -3 moderately, and less than -3 were taken to be severely stunted according to WHO child growth standard (2006).

In accordance with (WHO, 2006) child growth standard reference population, the result shows for length-for-age, 22.62% males and 21.26% females were stunted. About 7.60% males and 12.64% females were wasted for weight-for-length while 12.06% males and 18.96% females were

undernourished for weight-for-age. A number of 71.86% and 5.50% males were within normal and above normal range.

About 72.41% and 6.32% females were normal and above normal range for their length-for-age. A total of 80.40% and 7.50% of males, 82.76% and 9.77% of females were normal and above normal for their weight-for-age. Result also showed that 19.10% and 8.00% females were overweight and obese respectively. A total number of 60.34% and 18.39% females were normal and over weight respectively while 8.62 of them were obese. Infants fed on breastmilk only (BMO) had higher anthropometric indices than those fed on other feeding methods.

Breastfeeding was predominant infant feeding method among mothers. There was no significance difference ($P>0.05$) between weight and length of children fed breastmilk only and those fed breastmilk plus water. There was ($P<0.05$) a significant difference between those fed breastmilk only, breastmilk plus formula and breastmilk plus other food. There was ($P<0.05$) a significant difference in the length and weight of males and females within 0-6months while there was no ($P>0.05$) significant difference in their body mass index and weight. For those within 7-12months, there was ($P>0.05$) no significance in their length while there was ($P<0.05$) significant difference in their weight and BMI.

There was positive and significant ($r=0.7714$; $P<0.0001$) correlation between ages and weights of the children as well as their lengths and ages ($r=0.7937$; $P<0.0001$).

Conclusion

Malnutrition remains a major cause of infant mortality, and accounts for the huge burden on infants' health and poor economic growth and development in Nigeria. There is no doubt that the health and fitness of every child depends largely on what he or she is fed. Therefore, the nutritional status underlies both mental and physical development of the child.

Although, several infants' feeding methods have been adopted by mothers in Aguata local government area of Anambra State, Nigeria, a significant number of infants less than 2 years old are malnourished and may be prone to common environmental stressors such as endemic infections that may mar infants' development. Thus, there was need to assess the nutritional status and its effect(s) on the anthropometric indices of the infants in the area studied.

Moreover, the lack of comprehensive reports on existing literatures on this subject matter covering the study area made this preliminary study a unique and essential material for further studies. It also provides preliminary data and form a basis for further studies on the relationship between nutritional status and anthropometric indices in other related areas.

The outcome of this study showed that mothers in the area studied were knowledgeable of the fact that breastmilk is the first and ideal food for a baby even though most of the mothers failed to sustain breastfeeding for upto 2 years. Virtually all the mothers understood exclusive

breastfeeding and most of them knew its benefits. Hence, further information and education may be directed towards sustenance of breastfeeding upto a maximum period of 2 years.

Mothers' inclination to complementary feeding is a social effect due to poor socio-economic factors which may include neglect and oversight, the work condition and environment, aesthetic reasons, among others. Also, the choice of infant feeding method practiced by mothers in the area studied is independent of age, occupation and education.

Furthermore, the cause of mothers to stop breastfeeding in less than 6 months may not be associated with educational attainment but adduced to other socio-economic factors.

The attitude of the mothers to stop breastfeeding in less than 3 months after delivery was exhibited by traders, skilled and unskilled workers when compared with house wives and civil servants. Thus, the effects of urbanization may be said to have adversely influenced mothers' attitudes towards breastfeeding in the area studied than the effects of local cultural practices or beliefs.

Breastmilk is a whole food for infants. Nevertheless, it may not be recommended to replace conventional methods of child spacing since some of the mothers became pregnant while still breastfeeding.

The difference in lengths and weights of infant males compared to females does not infer a healthier males than females as shown by their units of proportionality (body mass index) rather, it is only a reflection of the inherent fundamental physiology.

Infants fed on breastmilk only (BMO) had higher anthropometric indices than those fed on breastmilk in addition to other foods. Therefore, the z-scores for both males and females fed on different feeding methods showed that exclusive breastfeeding is the ultimate and gold method for infants' feeding. Therefore, further efforts by both governments and non-government organizations (NGOs) should enforce this practice among women particularly the breastfeeding mothers.

A major limitation of this study was the lack of data on maternal health profile and nutritional status to further deduce the real causes of infants' malnutrition and to ascertain certain claims by the mothers for disengaging their infants from breastfeeding. This limitation is in part due to the huge cost of health profile.

5.7 Recommendations

- * Similar study should be carried out in other communities to assess the nutritional status of infants and infant feeding practices adopted by nursing mothers.
- * Effect of maternal nutritional status in relation to anthropometric indices of their children.
- * Effect of maternal socio-economic status and nutritional status of infants.
- * Health workers, especially the nurses/midwives should be knowledgeable enough to educate the mothers on infants feeding as they are most nearer to the clients.

- * Government should also see that they equip health centers with adequate equipments for anthropometric measurements.
- * Nurses and midwives should properly take and document the anthropometric indices of these children in growth monitoring chart.
- * Benefits of exclusive breastfeeding should be taught to the mothers at the antenatal and infant welfare clinics.
- * Nutritionists should be sent to local, state and federal governments' hospital and clinics to partake at the health education of the mothers during antenatal and infant welfare clinics.

Contribution of the study to knowledge.

This study serve as a preliminary data on knowledge, attitude and adoption of infant feeding practices by mothers and anthropometric indices of their children in Aguata Local Government Area. This information can be utilized by nutritionists and health workers in management of nutritional status of infants and education of mothers on infant feeding. It can also serve as a basis for further work in other areas.

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