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Nutritional Status of Under-five Children and Associated Factors in Okeyinmi Comprehensive Health Centre, Ado-Ekiti, Ekiti State, Nigeria

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Abstract:
The difference between food consumption and utilization determines the nutritional status of the individual. Efforts have been made nationally and internationally by governmental and non-governmental organizations to maintain normal nutritional status but poor nutrition remains a major link to diseases and reduced life-span. The study assessed the nutritional status of the under-five children using anthropometric measurements, found out the level of awareness of mothers about nutritional status of the under-five children, assessed the factors that influence the nutritional status of the under-five and found out the feeding practices engaged in by mothers of under-five children.
A cross sectional study was done to assess the nutritional status of the under-five. Sample size of 216 was determined using Leslie Kish (1965) formula. The respondents were selected using simple random sampling. Weighing scale, stadiometer, and Shakir's tape were used to get data from the under-five children while a self-structured questionnaire was used to get data from the primary care givers/mothers of the under-five. Face and content validity of the questionnaire were ensured by the researcher's supervisor and other experts in research and paediatrics. The reliability of the questionnaire was ascertained using test re-test. A mean coefficient value of 0.74 was obtained which was considered high enough for the reliability of the questionnaire. Data collected were analyzed using Emergency Nutrition Assessment for Standardized Monitoring and Assessment of Relief and Transition (ENA for SMART) software and Statistical Package for Social Sciences (SPSS) version 20. The research questions and hypotheses were tested through descriptive and inferential statistics.
Findings showed that low weight for age (underweight) affects 18.5% of the under-five, low height for age (stunting) affects 20.4% of the respondents while low weight for height (wasting) affects 13.4% of the under-five. Lack of awareness about the method of feeding the child properly, knowledge on the type of food and non-availability of nutritious food in the locality were found to be major factors affecting the nutritional status of the under-five. 73% of the primary care givers/mothers practiced exclusive breastfeeding. 43.1% practiced complementary feeding for 12-18months. There was significant association between the nutritional status and the age group of the child ($F_{4,211}=2.955$, $p<0.05$) but there was no significant relationship between the nutritional status of the under-five and the socio-economic status of the primary care giver/mothers of the under-five ($r=0.010$, $p>0.05$).
There was need for frequent assessment and early intervention of the nutritional related problems of the under-five. The researcher recommended nutritional counselling by Nurses and Nutritionists for the primary care giver/mothers to reduce the prevalence of nutritional related problems, Nurses should take the lead role in educating mothers about the need for exclusive breastfeeding for the first six months of life and complementary feeding for 18-24months and measures should be instituted by the government through provision of needed social amenities to curb the menace of nutritional related problems.

Keywords*: Nutritional Status, Under-five Children, Anthropometric Measurements, Stunted, Underweight and Wasting*

1. Introduction

The difference between food intake and utilization determines the nutritional status of the individual. Change in food consumption and the biological utilization will directly or indirectly reflect in the nutritional status. The nutritional status can be normal, under nutrition or over nutrition. The under and over nutrition are considered as malnutrition. The nutritional status of the under-five might be affected by some factors ranging from busy schedule of the primary care giver to inability to provide enough food and needed health care to maintain normal nutritional status. The determinants of the nutritional status may differ based on regions, communities, or even over time. To proffer necessary recommendations or solve any nutritional problem in an area, it will be important to determine the nutritional status and the underlying causes.

Efforts have been made both nationally and internationally by governmental and non-governmental organizations to maintain normal nutritional status but poor nutrition remains a major link to diseases and reduced life-span (Tette, Sifah & Nartey, 2015). According to Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014), one quarter of the under-five children are stunted. Many factors have been implicated to influence the nutritional status. Poor diet and disease are considered as immediate factors but there are underlying factors like food security, caring practices of the mother, healthy environment and assessment of health facilities. The underlying causes are also considered to have basic causes which are seen as socio-economic and political conditions (Asegedech, 2014).

Nutritional status of the under-five is of great importance since this period of life is considered as pivotal for adequate growth (Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, & Mutea, 2014). Under-nutrition could be described as weighty medical condition characterized by a deficient bodily nutrition (energy, essential proteins, fats, vitamins, and minerals in a diet) as a result of inadequate food intake or faulty assimilation. Over 10 million children of under-five are lost annually due to diseases that can be prevented and even easily treated. Most of these illnesses and majority of these deaths occur in developing countries because of the poor economy of such Countries (Black, Morris & Bryce, 2003). Malnutrition cause more over 30% of all children's deaths who are under-five (United Nations Children's Fund (UNICEF), 2009). According to Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo and Mutea, (2014), assessing the growth of children is a good parameter to look at the development of the children and this also gives insight about food security in the area and assess to good health services.

Poor nutritional status has called for different programmes and interventions in different sectors in order to improve the nutrition status. Sequel to this, experts from different fields are strategizing and evaluating various interventions that have nutrition components (Macias & Glasauer, 2014). Assessing nutritional status is the easiest indicators for assessing the impact of interventions that are nutrition focused and this can be done using various methods. Assessing nutritional status entails a deep understanding of what people consume and the determinants of people's nutritional habits. The nutritional status can then be traced to have a myriad of determinants.

Different factors have been implicated to affect the nutritional status of the under-five and there are repeated episodes of diseases that are often seen among these children. Some of the factors include inadequate food availability, poor caring capacity of the caregiver, lack of basic education, poor health systems, poor housing and environmental conditions. Communities that are unable to satisfy the basic needs of its citizens are likely to generate more individuals with poor anthropometric indices.

Several strategies have been put in place to maintain adequate nutritional status of the children (e.g. exclusive breastfeeding). 17% has been found to be the exclusive breastfeeding rate in Nigeria and it has also been documented that 21% of mortality among the under-five can be traced to breastfeeding patterns that do not follow the set standard (Ojofeitimi, 2016). Adequate diet and health care during first few years of life is fundamental for child's development and this help to maintain adequate or normal nutritional status. Early in life, irreversible drop in linear growth and psychological impairment can occur when there is problem with food consumption or utilization (Alamu, Atawodi & Edokpayi, 2011). Growth is most rapid in the early years of life and this may not be comparable to any other time after birth. Since good nutrition has been identified to play a pivot role in growth particularly in the early years of life, it is important to assess the nutritional status of the under-five and the associated determining factors.

The need for food by mankind most especially the growing up children has been emphasized over the years (Adegun, Ajayi-Vincent, & Alebiosu, 2013). The nutritional status is solely dependent on the adequate and right consumption of nutrients from foods and the body's ability to make use of them adequately to meet its metabolic needs of health and fitness. At early stage of growth, several biochemical activities that affect growth and development are going on in the body and these require nutrition. When there are inadequate nutrients available for these activities then there is likelihood of developing stunted growth and development (Adegun, Ajayi-Vincent, & Alebiosu, 2013).

To find solutions to the nutritional related problems that are common in the early stage of life, it is very necessary to determine the nature, magnitude and determinants of malnutrition. Anthropometric measurements are accepted widely as key indicator of the nutrition status of the community. Anthropometric indices are also suggestive of the socio-economic level. The anthropometric measurements include measurement of weight for age, height for age, weight for height and measurement of mid-upper arm circumference (MUAC). The integrated management of childhood illness (IMCI) approach for the classification of nutritional status will be used in this study.

According to Hunger Facts (2015), globally about 795 million individuals are undernourished. The vast majority (98%) of these undernourished reside in the developing countries. Under-nutrition among the under-five remains a problem faced by different parts of the world. Close to 50% of all deaths among under-five are attributable to under nutrition. This implies that there is unnecessary loss of about 3 million young lives every year (Hunger Facts, 2015). In Sub-Saharan Africa, close to 50% of children particularly the under-five is malnourished and deaths from such nutrition related condition is on the increase (FAO, 2008). Nutrition related problem in Sub-Saharan Africa has added more to the burden of childhood morbidity and mortality. However, the information available on the nutritional status of the under-five in informal settlements can be considered as little and inadequate (Olack, Burke, Cosmas, Bamrah, Dooling, Feikin & Breiman, 2011).

Nigeria (especially the rural areas) is one of the developing countries that are affected by this nutrition-related problem. This might be related to causes that are found in other regions of the world like poor access to food, primary care

giver factor, socio-economic factor, area of abode and other related factors. The Nigeria Demographic and Health Survey (2003) put the rate of stunted growth among the under-five years to be 38%, underweight to be 29% while wasting was 9.2%. Several factors can be considered to have caused these nutritional deficiencies. According to the Federal Ministry of Health (FMOH) Nigeria (2007), 7% is the rate of compliance of mothers to exclusive breastfeeding of their children who are less than 6 months.

According to Adegun, Ajayi-Vincent, and Alebiosu (2013) there are not enough supporting data on under-nutrition among children in schools in Ekiti State which can easily be generalized but a closer look at the children in schools by different investigators suggests the prevalence of nutritional related problems among children in Ekiti. Common nutritional problems as faced by the under-five made are protein energy malnutrition (PEM), anemia due to iron deficiency, vitamin A and iodine deficiency respectively (Babatunde, 2003).

Factors including biologic, economic, cultural, environmental and of disease origin have been found to affect nutritional status. Inadequate food intake, food insecurity, poor distribution of food in the household, poor storage pattern of the available food, wrong food handling, nutritional taboos/ harmful traditional practices and different types of infections among under-five children might make the children to be most vulnerable to nutritional related problems. These factors might be seen to have immediate, underlying biological and behavioural, underlying social and economic, and basic influences on the children (Degarege, Degarege & Animut, 2015). Understanding the causes and the effects of different nutritional status will help proffer necessary recommendations.

2. Statement of the Problem

Nutrition related problems affect the populace but the under-five and women are most susceptible to this condition. The unique physiology of the under-five, socioeconomic factor, and other related factors in the society might be implicated. Available data shows that more than 2billion individuals are affected with different degrees of nutritional related problems. Children that are up to 2.6million die yearly following nutrition related problem. This accounts for about one third of children's deaths globally. Stunted children are highest in number in Nigeria which makes Nigeria to have the highest stunted rate in Africa and third globally having above 10 million citizens who are stunted. Within the first 1,000days of life, malnutrition accounts for over one-third of deaths among the under-five years and half of all child deaths worldwide (Malnutrition and Child Survival in Nigeria, 2016).

North-Eastern and North-Western parts of Nigeria where most of the food consumed in Nigeria are cultivated have the increased number of cases of nutritional deficiencies as compared to other zones (Nigeria Demographic and Health Survey, 2016). This depicts that food production does not translate to food consumption. Several under-five children would have developed micronutrient deficiencies before they reach the age of 2years to the extent that their growth and development become impaired. Children from families living below the poverty line have been proven to be at risk of malnutrition four times more than people living above the poverty line. The children from homes that are not poor too can be malnourished when the food intake is not adequately and well combined. Food insecurity has been found to be closely linked to hunger and malnutrition. 39% of people living in Nigeria are considered to be living below the poverty live.

The North-East and North-Western zones of Nigeria have witnessed a lot of insurgents and the Niger Delta region too has been troubled by militancy acts. These acts transform to the increase in malnutrition rate among citizens in Nigerian because farming activities are hindered in these regions. This is often clearly seen among the internally displaced persons (IDP) living in IDP camps in the North-Eastern and North-Western zones of Nigeria. People are now confined to the IDP camps where they are made to struggle for little rations of food available for consumption. Farming activities/ food production becomes completely paralyzed. The largest percentage of people that bear these burdens are the under-five children, women and the elderly.

There are also cases of food availability but inability of the illiterate parents and caregivers to combine the food sources correctly and give adequate diet to the under-five still bring about malnutrition. Harmful traditional practices in the community can also affect the nutritional status of the under-five and that of the family as a whole which then translate to that of the entire nation. The intellectual development of the child is at stake when there is poor nutritional intake (UNICEF, 2016).

Managing the incessant illnesses of children places economic burden on the family and government because the money spent on these nutritional-related diseases (which would have been prevented) could be used for other developmental projects (Kitinya, 2013). Poor school performance and lower productivity could also be the impact of poor nutritional status on the society. As a result of the magnitude of the identified problem, the researcher is set to assess the major determinants of nutritional status among under-five in Comprehensive Health Centre, Ado-Ekiti.

2.1. Objective of the Study

- Assess nutritional status of the under-five children using anthropometric measurements in Okeyinmi Comprehensive Health Centre, Ado-Ekiti;
- Find out the level of awareness of mothers about nutritional status of the under-five children;
- Assess the factors that influence the nutritional status of the under-five children and
- Find out the feeding practices engaged in by mothers of under-five children.

2.2. Hypotheses

- H_{01}: There is no significant relationship between the nutritional status of the under-five and the socio-economic factor of the primary care giver.
- H_{02}: There is no significant difference between male and female under-five nutritional status.
- H_{03}: There is no significant association between nutritional status and the age group of the child.

2.3. Conceptual Model

The conceptual framework that was adopted for this study is the extended UNICEF care model. The extended UNICEF model of care is a modified UNICEF conceptual model for nutrition which was developed in 1992. It has been accepted widely even at the international level. The model considered nutritional status to be closely linked with growth, survival, and development of children. The model identified nutritional status to be borne out of the contextual, familiar and environmental factors. Nutritional status cannot be determined by a single factor but by a number of factors interlinked together over a given period of time.

The model proposed a systemic approach to understand nutritional status rather than a single/linear causal relationship. Any of the factors can have severe effects on the nutritional status and through in-depth analysis and recommendations; any of the factors can be modified. The extended UNICEF model stresses the need to identify the determinants of nutritional status. The relationship among all the factors is reflected in the manifestation as child survival which is mainly considered by growth and development of the child.

Engle (2012) reviewed the UNICEF conceptual framework for nutrition and explained each of the associated factors with nutritional status. The underlying biological and behavioural factors include mothers, fathers, siblings, and other care givers. These biological and behavioural factors are providers of food, emotional supports, stimulation for growth and development. The factors affect food security and health status of the child. The resources available in the environment will also affect the biological and behavioural factors. The care providers cannot function adequately without the needed resources such as time and energy of the care providers. The environment can be political, economic, and rural/urban. The environment is considered to have basic influence on the nutritional status of the child.

It is possible to have suitable environment and still the child might suffer if care practices are hindered or if the needed resources in the environment are not enough. This model of care is a useful schema for identifying the ability and capacity of the caregiver to provide care behaviours. Care givers need education, time and support in order to exhibit care behaviours. Care practices need to be adequate even when the environment is poor so that the available resources in the environment can be maximized. Mothers are considered as the primary care giver in most societies. Therefore, the mother's knowledge, spirituality, belief, and cultural practices are fundamental.

2.4. Application of the Extended UNICEF Model of Child Care

The extended UNICEF model of care is very relevant to this study because if focuses on nutritional status and the relationship among the determinants. The nutritional status of the under-five is manifested as growth and development which determines the child's survival. Child survival is mainly determined by growth and development and this has some underlying factors that are closely linked together which are considered as the associated factors of nutritional status.

The factors can be grouped into immediate factors, underlying biological and behavioural factor, underlying social and economic factor, and basic factor. The factors that are considered in this study include: Immediate factor (Food intake and health status of the child), underlying biological and behavioural factor (Care giver behaviour, child spacing, maternal age, and feeding practices), underlying social and economic factor (Knowledge/Belief of the care giver, nutritional status of the care giver, workload/time constraint), and basic factor (urban/rural environment).

The interactions of these groups of factors determine the nutritional factor. Food intake would directly affect the growth of the child while the health status of the child (infectious disease, diarrhea, cough) would directly affect the development. Food intake and the health status of the child are seen to have a direct link with child survival which is often assessed during nutritional assessment. This does not mean that food intake and health status of the child are the only determinants of the nutritional status. The two are just the immediate determinants.

Food intake and the health status of the child are dependent on the care giving behaviour which involves the feeding practices, child spacing, and maternal age. This care giving behaviour is considered as the biologic and behavioural factor. The care giving behaviour could be greatly influenced by the resources available to the caregiver. The resources are not limited to finances but also include caregiver's knowledge/belief, nutritional status of the care giver, workload, income and time constraint to cater for the child. The resources have social and economic influences on the child. The resources are either available or not available in the environment and that is why the environment would form the basic factor influencing the nutritional status.

The identified factors depict that nutritional determinants are many factors that are closely linked together with influences varying from immediate, to underlying, to basic. The figure shows the schematic representation of the nutritional status of the under-five and the associated factors.

2.5. Research Methods

The study employed a cross-sectional form of descriptive design to find out the nutritional status of the under-five children and the associated factors among children attending Okeyinmi Comprehensive Health Centre, Ado-Ekiti.

2.6. Sample size and sampling Technique

Leslie Kish (1965) formula was used to calculate the sample size

$$n = \frac{z^2pq}{e^2}$$

Where; n: Sample size

z: Standard normal variate/ Confidence level. At 95%, z = 1.96

p: Expected proportion in the population based on previous studies =17% (Adeomi, Adeoye, Bamidele, Abodunrin, Odu and Adeomi, 2015)

e: Absolute error or precision = 5%

q:1-p

$$n = \frac{1.96^2 \times 0.17 (1- 0.17)}{0.05^2}$$

$$n = \frac{3.84 \times 0.17 (0.83)}{0.0025}$$

$$n = \frac{3.84 \times 0.14}{0.0025}$$

$$n = \frac{0.54}{0.0025}$$

n=216

Therefore, a sample size of 216 respondents were recruited for the study.

Simple random sampling was adopted in selecting the respondents until a sample size of 216 respondents were gotten from the target population. Balloting type of the simple random sampling technique was done. “Yes” or “No” was written on the ballots and anyone that picked “Yes” was involved in the study and anyone that picks “No” was not involved. Average of about 20 respondents were recruited on each clinic day. This was done until the total sample size of 216 was reached. The researcher and the trained research assistants were involved in the data collection process.

2.7. Instrumentation

This is a community-based study where a direct method of nutritional assessment (anthropometric measurements) was adopted. The anthropometric measurement was adopted because the anthropometric measurements can easily be used in the community setting. The researcher used a self-structured questionnaire, a weighing scale, Shakir’s tape/MUAC tape, and a stadiometer to collect the data for this study. The self-structured questionnaire was used for data collection from the primary care givers/mothers while the weighing scale, Shakir’s tape, and the stadiometer were used for data collection from the under-five children. The questionnaire consisted of four sections with 45 items. Items on the questionnaire were included based on the reviewed literatures on nutritional status and the associated factors.

2.8. Method of Data Collection

Verbal and written consents were gained from all the selected under-five children and the primary care givers/mothers. The purposes of the research were explained to the mothers and the under-five children. The researcher and research assistants who have been trained on the measurements of anthropometric measures administered questionnaire to the mothers on face to face contact on clinic days. The under-five children were weighed using weighing scale, the mid upper arm circumference (MUAC) was checked using the Shakir’s/MUAC tape, and the height of the under-five children were taken using the stadiometer. The weight was recorded to the nearest 0.1kg, the height and MUAC were recorded to the nearest 0.1cm. All these anthropometric measurements were recorded on the questionnaire (Socio-demographic aspect) filled by the mothers. The researcher guaranteed the privacy of individual respondent as the respective names and addresses were not required. The mothers and children were allowed to ask questions on areas that are not clear to them. Interpretations were done for mothers who did not understand English Language. Collection of the filled questionnaire was done immediately after filling of the questionnaire by the mothers of the respondents. The data collection process was done by the researcher and with assistance from trained research assistants to avoid loss of questionnaire. On site screening of the questionnaire was done to ensure that all the aspects of the questionnaire were filled.

2.9. Method of Data Analysis

The collected data with the research instruments were analyzed quantitatively. Data editing and on-site checking were done on the field by the researcher and the research assistants to rule out omission and gross errors. The anthropometric measurements were analyzed using the Emergency Nutrition Assessment for Standardized Monitoring and

Assessment of Relief and Transition (ENA for SMART) and the WHO standards (2006) were used as the reference standard. The ENA for SMART 2011 version was used. The ENA for SMART software was developed by Erhardt in collaboration with Golden, Seaman and Bilukha (2003). The ENA for SMART software helped in determining the z-score for the data. Z-score < -2 standard deviation from the median of all reference population were considered as stunted (low height for age), underweight (low weight for age), or wasted (low weight for height). In testing the hypotheses and answering other research questions, descriptive and inferential statistics of the Statistical Package for Social Sciences (SPSS) version 20 was used at 95% confidence interval. The hypotheses were tested using Pearson Product Moment Correlation, t-test, and analysis of variance (ANOVA).

2.10. Ethical Consideration

Approval to carry out the study was sought and obtained from the Babcock University Health Research Ethics Committee (BUHREC) and Okeyinmi Comprehensive Health Centre. The respondents' informed consents were gained with adequate explanation of the reason for conducting the research and signing of informed consent before using any of the research instruments on them and any of the respondents was allowed to pull out from the study at any time without any negative consequence. The mothers helped fill the questionnaire while the weighing scale, stadiometer, and the MUAC tape were used by the researcher and the research assistants on the under-five children after consent have been properly gained.

3. Testing of Hypotheses

3.1. Hypothesis 1

H_0: There is no significant relationship between the nutritional status of the under-five children and the socio-economic factor of the primary care giver.

Variables	WAZ_WHO	HAZ_WHO	WHZ_WHO	Socio-economic status
WAZ_WHO	1.000			
HAZ_WHO	.625**	1.000		
WHZ_WHO	.728**	-.071	1.000	
Socio-economic status	.010	-.014	.037	1.000

Table 1: Relationship between nutritional status of the under-five children and the socio-economic factor of the primary care giver of the under-five children
**P<0.05, **p<0.01*

Keys: WAZ-Weight for age Z score
HAZ-Height for age Z score
WHZ-Weight for height Z score
WHO-World Health Organization

Table 1 presents the relationship between the nutritional status of the under-five children and the socio-economic status of the primary care giver. The result shows that there were no significant relationships between socio-economic status of the primary care giver and weight for age (r=0.010, p>0.05), height for age (r=-0.014, p>0.05), and weight to height (r=0.037, P>0.05) of the under-five children. The null hypothesis is not rejected. This implies that there is no significant relationship between the nutritional status of the under-five and the socio-economic status of the primary care giver/mother of the under-five. It can be deduced that no matter the socio-economic condition of the primary care giver/mother, the nutritional status of the under-five does not depend on it.

3.2. Hypothesis 2

- H_0: There is no significant difference between male and female under-five nutritional status.

Nutritional status	Gender	N	Mean	Std. Deviation	Std. Error Mean	T	P
WAZ_WHO	Male	118	-.69317	1.277775	.117629	4.063**	0.000
	Female	98	.06702	1.471836	.148678		
HAZ_WHO	Male	118	-.63212	1.927348	.177427	2.070*	0.040
	Female	98	-.11822	1.672382	.168936		
WHZ_WHO	Male	118	-.36078	1.551016	.142783	3.127**	0.002
	Female	98	.27745	1.420676	.143510		

Table 2: Nutritional status of under-five children and the gender
**P<0.05, **p<0.01*

Keys: WAZ-Weight for age Z score
HAZ-Height for age Z score

WHZ-Weight for height Z score
WHO-World Health Organization

Table 2 presents the nutritional status of the under-five based on gender. The result revealed that there was statistical gender difference in the weight for age ($t_{(214)}$=4.063, p<0.05), height for age ($t_{(214)}$=2.070, p<0.05), and weight for height ($t_{(214)}$=3.127, p<0.05). The null hypothesis is rejected. This implies that there is significant difference between male and female under-five nutritional status. It shows that the gender of the child affects the nutritional status of the child

3.3. Hypothesis 3

- H_0: There is no significant association between nutritional status and the age group of the child.

Nutritional status	Source	SS	Df	MS	F	P
WAZ_WHO	Between Groups	1.611	4	.403	.197	.940
	Within Groups	430.485	211	2.040		
	Total	432.097	215			
HAZ_WHO	Between Groups	21.509	4	5.377	1.624	.169
	Within Groups	698.541	211	3.311		
	Total	720.050	215			
WHZ_WHO	Between Groups	25.184	4	6.296	2.804	.027
	Within Groups	473.861	211	2.246		
	Total	499.046	215			

Table 3: Nutritional status of the under-five children by age group
**p<0.05*

Keys: WAZ-Weight for age Z score
HAZ-Height for age Z score
WHZ-Weight for height Z score
WHO-World Health Organization

Table 3 reveals that there was significant difference between nutritional status and the age group of the child ($F_{4,211}$=2.955, p<0.05). The null hypothesis is rejected. Therefore, there is significant difference between nutritional status and the age group of the child. Similarly, there was significant difference between weight for height of the under-five and the age group of the child ($F_{4,211}$=2.804, p<0.05). However, the mean difference in terms of weight for age ($F_{4,211}$=0.197, p>0.197) and height for age ($F_{4,211}$=1.624, p>0.05) based on age group was not statistically significant at 95% confidence level in each case.

4. Discussion of Findings

The study was conducted in the Infant Welfare Clinic of Okeyinmi Comprehensive Health Centre, Ado- Ekiti. The study included 216 under-five children which involved 54.6% males and 45.4% females. This is close to the findings of Babatunde, Olagunju, Fakayode, and Sola-Ojo (2011) where the respondents were 52% males and 48% females but in contrast with the respondents of Badake, Maina, Mboganie, Mucheni, Kihoro, Chelimo and Mutea (2014) where 42% of the under-five children studied were males. Most (69%) of the children examined in this study were between 6-17months unlike the study of Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar, Jadhav and Bhawalkar (2014) where most of the under-five examined were in the age group of 13-36months. The sex ratio in this study ranged from 0.7 to 1.8 without following any particularly order unlike the findings of Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar, Jadhav and Bhawalkar (2014) who found slight decline in the sex ratio.

The nutritional status of the respondents showed that 18.5% of the under-five children were underweight (low weight for age) with the prevalence more (21.1%) among males and 15.3% among females. This prevalence rate is just a bit above 15.9% prevalence rate of underweight found in Addis Ababa, Ethiopia by Degarege, Degarege, and Animut (2015) which is also close to the findings of Babatunde, Olagunju,, Fakayode, and Sola-Ojo (2011) that discovered 22.0% underweight among the under-five in farming households of in Kwara State and Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) where underweight was found to be 18.1% among the under-five in Mbeere District of Kenya with more boys than girls.

The findings of 34.3% underweight by Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014) who conducted a nutritional survey on under-five children in Pune is almost double the findings of from this study and that of Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014), Degarege, Degarege, and Animut (2015), and that of Babatunde, Olagunju,, Fakayode, and Sola-Ojo (2011) whereas Olack, Burke, Leonard, Sapna, Kathleen, Daniel, Fekin and Robert (2008) only found 1% underweight among the under-five in Nairobi. Hassan, Mahmood, Fahd, Slim and Jaddon (2010) found that 21% of the under-five in Pakistan were underweight. However, Akorede and Abiola (2013) found the rate of underweight in Akure South to be 8.5%.

The stunting rate (low height for age) among the respondents was 20.4%. Boys were more stunted (24.6%) than girls (15.3%). This is in agreement with the findings of Degarege, Degarege and Animut (2015) who found out 19.6% as the stunting rate in Addis Ababa and the findings of Olack, Burke, Cosmas, Bamrah, Dooling, Feikin and Breiman (2011) who also found out that boys were more stunted than girls in a study carried out in Nairobi. The findings of Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014) contradicts this and showed that girls are more likely to be stunting.

These rates are very close to the findings of Babatunde, Olagunju,, Fakayode, and Sola-Ojo (2011) who found out the rate of stunting among under-five in farming households in Kwara State to be 23.6%. These rates of stunting are mild when compared with the findings of Olack, Burke, Leonard, Sapna, Kathleen, Daniel, Fekin and Robert (2008) in Nairobi who found out that the 47% of the under-five were stunted and 58.7% were stunted among the under-five in Pune according to the study conducted by Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014) whereas the rate of stunted growth in Kenya according to Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) was 39%. However, stunted rate was 12.5% in the study conducted by Akorede and Abiola (2013) in Akure South.

Wasting was found to be the least (13.4%) prevalent form of nutritional disorder among the under-five children assessed. This finding is in contrast to the findings of Ndukwu, Egbuonu, Ulasi and Ebenebe (2013) on the determinants of nutritional status of primary school children residing in slum areas of a Nigeria city where stunting was found to be the major form of under nutrition. The prevalence of wasting was 26.9% with higher percentage in males (30.5%) and lesser percentage in females (22.4%). This findings was supported by the findings of Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014) who also argued that male were more likely to be affected by wasting than girls.

Study by Babatunde, Olagunju,, Fakayode, and Sola-Ojo (2011) found out 14.2% as the wasting rate among under-five in farming household of Kwara State whereas Olack, Burke, Leonard, Sapna, Kathleen, Daniel, Fekin and Robert (2008) found out greater percentage (39%) of wasting among the under-five in Nairobi with 66% prevalence in girls and 34% prevalence in boys whereas Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) in a study in Kenya found out 7.1% prevalence rate of wasting among the under-five. Mamulwar, Rathod, Jethani, Dhone, Bakshi, Lanjewar *et al.* (2014) found out that wasting was 16.9% among under-five in Pune as supported by the findings of Hassan, Mahmood, Fahd, Slim and Jaddon (2010) in a study in Pakistan who found out that 17% of the under-five were wasted.

Findings from this study showed that the respondents' level of awareness on nutritional status of the under-five children was found to be high. It was noted that all the items mean scores are within the range MS >1.50 ≤ 1.93. This is not in agreement with the findings of Akorede and Abiola (2013) who found out that the level of awareness about nutritional status of the under-five was low and this is further corroborated by Saaka (2014) who found out that only 31.8% of the mothers of the under-five in rural Northern Ghana have high knowledge about what constitute nutritional status of the under-five.

This study identified various factors that determined the nutritional status of the under-five. The factors ranged from lack of awareness about the method of feeding the child properly, child's intolerance of the food, knowledge on the type of food, frequent diarrhea and cough, availability of nutritious food in the locality, early introduction of food to the child, mother's tight work schedule, financial incapability of the mother, inability of the mother to compliment the husband's financial contribution to the family, cohabitation with the in-law, lack of water supply in homes, lack of toilet facility and electricity supply. This is not in total disagreement with the findings from the study conducted by Frye (2013) in Wasiko Distric of Uganda who found out that the determinants of nutritional status are mainly related to access, availability, and utilization of food which is averagely supported by the findings of Ndukwu, Egbuonu, Ulasi and Ebenebe (2013) on the determinants of nutritional status of primary school children residing in slum areas of a Nigeria city, poor housing and household income were found to be a major determinants of the nutritional status.

Asegech (2014) found out the determinants of nutritional status among under-five in farming households in Northern Ethiopia (Central Zone of Tigray) to be the age of household head, sex of household head, education of household head, presence of latrine in the household, use of treated water, sex of child, child age and child birth interval. This is in contrast to the findings of Akorede and Abiola (2013) who opined that mother's level of education is the major factor that determines the nutritional status of the under-five whereas Olack, Burke, Cosmas, Bamrah, Dooling, Feikin and Breiman (2011) found out that food shortages/ food insecurity were the main determinants of the nutritional status of the under-five in Nairobi whereas Mashal, Takano, Nakamura, Kizuki, Hemat, Watanabe and Seino (2008) found out that lack of education of the mothers and child marriage of the mothers predispose the child to nutritional problem.

Yasoda-Devi and Geervani (2016) found child related factor (like number of episodes of diarrhea and diet adequacy) and parental influence (like socio-economic status and parental care) as the determinants of nutritional status which is similar with the findings of Babatunde, Olagunju,, Fakayode, and Sola-Ojo (2011) in Kwara State where gender, age of child, education and body mass index of mother, calorie intake of the households, access to clean water and presence of toilet in the households were found to be the significant determinants of nutritional status whereas findings from Kapilvastu District of Nepal by Bhandari and Chhetri (2013) showed complete immunization, socio-economic status, exclusive breast feeding, early recommended supplementary foods, birth order, mother's age, gap more than two years between two pregnancies, and timely care seeking as the major factors that affect the nutritional status of the under-five. Son and Menchavez (2006) found out different factors (differ across the communities) as the determinants of the nutritional status when a community-based multi dimensional approach was used in seven cities of Palawan in 2001 and 2003 to find out the determinants of nutritional status of the under-five. Gobotswang (2013) discovered that the nutritional status of preschool children in Botswana (North-Western

District of Chobe) had a positive correlation with availability and access to latrines and ownership of cattles whereas Olack, Burke, Leonard, Sapna, Kathleen, Daniel, Fekin and Robert (2008) found poor weaning and complementary feeding practices among the mothers of the under-five and attributed it as the cause of the prevalence of stunting among the under-five in Nairobi.

The disparity in the findings on the determinants of the nutritional status of the under-five is likely to be in agreement with the extended UNICEF care model that identifies different factors that determines the nutritional status and grouped the determinants into immediate, underlying and basic determinants. This shows that there are several factors linked together to determine the nutritional status of the under-five and the factors can vary from one region to another.

Majority (73%) of the primary care givers/mothers of the under-five in this study did exclusive breastfeeding. However, this study found out that despite the claim to have done exclusive breastfeeding only 40.7% waited until the right time of 6months before introducing any food outside breastfeeding to the child which is in contrast to the findings of Akorede and Abiola (2013) in a study in Akure South who found out that only 16.7% of the mothers did exclusive breastfeeding but supported by the findings of Alamu, Atawodiu, and Edopayi (2011) in a study in Zaria where 72% of the mothers were found to practise exclusive breastfeeding and 62% were found to introduce complementary feeding at the appropriate age of 6months. Majority (33.3%) of the respondents in this study used locally available foods for complementary feeding. Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) found out that cereals were the most popular food consumed by under-five children. Only 14.4% practiced complementary feeding for up to 19-24months. Majority (43.1%) stopped the complementary feeding between 12-18months.

The results from this research showed that there were no significant relationships between socio-economic status of the primary care giver and weight for age ($r=0.010$, $p>0.05$), height for age ($r=-0.014$, $p>0.05$), and weight to height ($r=0.037$, $P>0.05$) of the under-five children. This implies that there is no significant relationship between the nutritional status of the under-five and the socio-economic status of the primary care giver/mother of the under-five and this is also supported by the findings of Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) who found no direct significant associations between household income and the nutritional indicators.

This study found out that there was statistical gender difference in the weight for age ($t=4.063$, $p<0.05$), height for age ($t(214)=2.070$, $p<0.01$), and weight for height ($t(214)=3.127$, $p<0.05$) of the under-five. This finding showed that there is significant difference between male and female under-five nutritional status and this is in line with the findings of Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) that found out that there was significant relationship between gender and the nutritional status.

This study found out that there was significant association between nutritional status and the age group of the under-five child ($F_{4,211}=2.955$,$p<0.05$). Furthermore, there was significant difference between weight for height of the under-five and the age group of the child ($F_{4,211}=2.804$, $p<0.05$). However, the mean difference in terms of weight for age ($F_{4,211}=0.197$, $p>0.197$) and height for age ($F_{4,211}=1.624$, $p>0.05$) based on age group was not statistically significant at 95% confidence level in each case. This is in agreement with the findings of Badake, Maina, Mboganie, Muchemi, Kihoro, Chelimo, and Mutea (2014) found who found significant differences in the nutritional status between the age groups. However, Gobotswang (2013) in a study in North-Western District of Botswana found a negative association between age and nutritional status (older children were found to be more likely to be underweight than the younger children). Also, Degarege, Degarege and Animut (2015) found out that the risk of underweight increased significantly with an increase in age.

5. Conclusion

Nutritional related problems exist among the under-five children. Several factors were identified to be the determinants. These factors were seen to be interconnected and were grouped into immediate, underlying, or basic determinants by UNICEF extended care model and the factors vary from one region to another. The growth and development of the under-five depend solely on the interactions among these factors. Nutritional related problems have short term and long-term effects on the under-five children.

6. Recommendations

- Nutritional counselling should be done for the primary care givers/mothers of the under-five to reduce the prevalence of nutritional related problems.
- The MUAC tape should be used as a medium of educating the mothers during the clinic days.
- Nurses should teach the primary caregivers/mothers how to use the growth monitoring chat and the need to report promptly any deviation from normal.
- Primary care givers/mothers whose children are well nourished should be praised and references should be made to such children so that the morale of the primary care givers can be boosted.
- Nurses should take the lead role in educating mothers about the need for exclusive breastfeeding for the first 6 months of life and complementary feeding for 18-24months.
- Emphasis should be laid on the fact that exclusive breastfeeding is feeding of infants with breast milk only for the first 6months of life without introduction of any other thing, not even water.
- Measures should be instituted by the government to curb the menace of nutritional related problems.

- The government should work on the factors that influence the nutritional status of the under-five particularly the areas of income and social amenities.

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