

Determinants of Malnutrition in Children Under Five Years Old at Public Hospitals in Somalia

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ABSTRACT

Malnutrition in under five is a major concern in developing countries including Somalia. More than 1 billion people are malnourished and malnutrition contributes to more than 30% of all deaths in children below five years. This study will investigate determinants of malnutrition in children under five years old in Mogadishu-Somalia at Banadir and SOS Hospitals. The specific objectives are: to identify how income level of household influences determines malnutrition in children under five years old; how health education determines malnutrition in children under five years old and finally to find out how dietary intake determines malnutrition in children under five years old. The study involves a design for the collection, measurement and analysis of data. The population in study is 450, and its sample size is 212 and main data collection tool is a semi structured administered questionnaire. Qualitative data were analyzed on content matter of the responses. Quantitative data were coded and entered into Statistical Package for social Scientist (SPSS Version 22) using multiple Regression tool for analyzing the data. The result was presented in the form of summaries, such as statistical tables and discussions and illustrations. The study findings are useful for the health workers as reference in the determinants of malnutrition for children under five old and the community at large. The study findings showed that 77% of the respondents agreed that the income level of household affects child nutrition while 23% of the respondents disagreed. The study findings indicated that 21% of respondents had gone to the nutritionist 'once', 9% of them had gone to the nutritionist 'twice', 11% of them visited the nutritionist '3 times' while 4% of them had gone to nutritionist 'above 3 times' while 55% of them had 'never gone to a nutritionist. Education training on nutrition plays a very significant role in reducing malnutrition. Study findings indicated that 2% of the mothers with malnourished children breast-fed their children to provide their children balanced diet because breast milk for first six months is balanced diet. 85% of the them breast fed their children to protect them diseases. 13% of them breast-fed their children to take part their proper growth. The researcher is recommending that Income growth alone will not reduce rates of malnutrition, and so direct interventions to tackle malnutrition is needed. Things such as vitamin, mineral and micronutrient supplementation; kangaroo mother care, early initiation of breastfeeding, promotion of dietary diversity; community-based nutrition education, and school feeding programmes. Education may change women's preferences about the quantity versus the quality of children, with educated women choosing fewer children but of better "quality". Mother's education has a greater impact on the educational attainment and school achievement of children than father's education.

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1. Introduction

The World Health Organization defines malnutrition as "the cellular imbalance between supply of nutrients & energy and the body's demand for them to ensure growth, maintenance, and special functions (WHO, 2012). Children malnutrition is a worldwide burden, more than one billion people are malnourished in the world and malnutrition leads to more than 30% of all deaths in children under five years old. Malnutrition types include being stunted (low height for age), wasted (low weight for height) and under weight (low weight for age). Malnutrition has serious effect on the child, the family and the development of the countries. A malnourished child is more likely to be sick and die. Furthermore,

malnutrition can lead to stunted growth, impaired cognitive and behavior development, poor school performance, lower working capacity and lower income for the child. Malnutrition slows economic growth and leads to higher levels of poverty (UNICEF, 2009).

More than 25 % of children who are under five years old in the world are enduringly stunted from malnutrition, leaving the children physically and intellectually weak, nearly half of all deaths in children under five years old are attributable to malnutrition. This translates into needless loss of about 3 million children lives a year. Malnutrition puts children at greater danger of dying from common infection diseases, enlarged the frequency, severity of such infections, which

contributes delayed recovery. In addition, the relations between malnutrition and infection can generate a potentially fatal cycle of deterioration illness and worsening nutritional status. Poor nutrition in the first one thousand days of a child's life can also lead to stunted growth, which is irreversible and linked with damaged cognitive ability and reduced school and work performance (UNICEF, 2010).

Malnutrition is a recognized causal factor to diseases and death. In the under developed countries, malnutrition influences approximately 800 million people more than 340 million are children less than five years old. More than six million of those children die every year from malnutrition-associated causes. In the under developed countries 50% of children deaths are because of malnutrition. The most severe children who are malnourished are found in Africa. Malnutrition is one of the major problems that the world currently faces and related with more than 41% of the deaths that occur yearly in children between 6- 24 months of age in under developed countries, which are approximately 2.3 million (UNICEF, 2008).

Child malnutrition – as measured by poor child growth – is an important indicator for monitoring population nutritional status and health. In 2013, about 17%, or 98 million children under five years old in developing countries were underweight. Underweight prevalence is highest in the UN region of Southern Asia (30%), followed by Western Africa (21%), Oceania and Eastern Africa (both 19%) and South-Eastern Asia and Middle Africa (both 16%), and Southern Africa 12%. Prevalence below 10% for 2013 is estimated for the UN regions of Eastern, Central and Western Asia, Northern Africa and Latin America and the Caribbean. Childhood malnutrition, including fetal growth restriction, suboptimum breastfeeding, stunting, wasting and Vitamin A and zinc deficiencies, is an underlying causes of death in an estimated 45% of all deaths among children under five years old (WHO, 2013).

Globally, the proportion of children under five years old who were underweight declined by 10 percentage points between 1990 and 2013, from 25% to 15%. While Africa has experience the smallest relative decrease, with underweight prevalence of 17% in 2013 down from 23% in 1990, in Asia for same period it reduced from 32% to 18% and in Latin America and the Caribbean from 8% to 3%. This means Asia and Latin America and the Caribbean are likely to meet the MDG while Africa is likely to fall short, reaching about only half of the targeted reduction. Even if Asia overall is likely to meet the MDG, underweight rates continues to be very high in Southern Asia (30%). This combined with large population, means that most underweight children live in Southern Asia (53 million in 2013) (WHO, 2013).

Malnutrition in Children Under five years old becomes a major problem in developing countries including Somalia. Situational analysis demonstrates a lasting nutrition crisis illustrated by determinedly high rates of acute and chronic malnutrition throughout Somalia, which has some of the highest malnutrition rates in the worldwide (UNICEF, 2012). Malnutrition in Somalia is an enormous public problem, negatively affecting growth, development and continued survival of the inhabitants (WHO, 2012). Alarming rates of malnutrition have been observed among displaced communities in Mogadishu. Rates of acute malnutrition and chronic malnutrition are alarming throughout the country with some variations by zone and livelihood system. According to FSNAU data May/June 2014, Global Acute Malnutrition

(GAM) levels among the displaced communities in Mogadishu were reported at an alarming rate 18.9 per cent.

The Severe Acute Malnutrition (SAM) rates increased to 5.5 per cent of the 14 sampled districts in Mogadishu; the highest number of malnutrition cases was recorded displacement settlements in Mogadishu. Malnutrition is a devastating public health problem of epidemic proportions among of the children less than five years old (FSNAU, 2014). Many health and nutrition centers have been established to eradicate malnutrition and many projects were implement to reduce the rate of malnutrition in Somalia and still malnutrition is persisting in Somalia. It is because of this public problem of malnutrition that the study aims of examining the exact determinants of malnutrition among the children under five years old.

Sound nutrition is one of the important foundations for the development of a healthy, productive population. Well-nourished people are less likely to become ill or die, and are more productive and better able to learn. Attaining good nutrition, especially children, is linked with important short and long-term health, educational and economic benefits. The human body requires energy and sufficient nutrients to function. If dietary intake is inadequate, the body starts to break down body fat and muscle, the metabolism starts to slow down, thermal regulation is disordered, the immune system is weakened and kidney function is weakened. If the food consumption decreased, increased energy expenditure and illness result in malnutrition. Malnutrition is related with increased illness and death, reduced educational accomplishment, output and economic capacity, and is one of the standard mechanisms behind the transmission of poverty and inequality from one generation to the next generation (ACF International, 2010).

Malnutrition in Children Under five years old becomes a major problem in developing countries including Somalia. Malnutrition in Somalia is an enormous public health problem, which negatively affecting growth, development and survival of children under five years old. Situational analysis indicates a long-term nutrition crisis described by persistently high rates of acute and chronic malnutrition throughout the country. In the whole country, some 236,000 children under five years old are malnourished, more than two third of them in the south of Somalia including Mogadishu where clashes and limited humanitarian access unite to create some of the highest child mortality rates anywhere in the world. Somalia has some of the highest malnutrition rates in the worldwide (UNICEF, 2013).

Alarming rates of malnutrition have been observed among displaced communities in Mogadishu. Rates of acute malnutrition and chronic malnutrition are alarming throughout the country with some variations by zone and livelihood system. Globally, 162 million under-five year olds were stunted in 2012, 99 million under-five year olds were underweight in 2012, 51 million under-five year olds were wasted and 17 million were severely wasted in 2012 (UNICEF, 2012, March 13). According to FSNAU data May/June 2014, Global Acute Malnutrition (GAM) levels among the displaced communities in Mogadishu were reported at an alarming rate 18.9 per cent. The Severe Acute Malnutrition (SAM) rates increased to 5.5 per cent Of the 14 sampled districts in Mogadishu; the highest number of malnutrition cases was recorded displacement settlements in Mogadishu. Malnutrition is a devastating public health

problem of epidemic proportions among of the children less than five years old (FSNAU, 2014).

It is because of these public problems of malnutrition that the study aims of examining the determinants of malnutrition among children under five years old in Somalia.

1.3 Objectives of the study

1. To determine the effect of maternal income levels on malnutrition in children less than five years old, in public hospitals in Somalia.
2. To find out the effect of maternal health education level on malnutrition in children less than five years old in public hospitals in Somalia.
3. To examine the effect of maternal rational nutrition on malnutrition in children less than five years old, in public hospitals in Somalia.

2. Literature Review

Theoretical framework

a. Micro-economic theory of the household production and nutrition

The nutritional and health status of an individual is based on the complex interaction of genetic, behavioral, and environmental factors on the intake and absorption of nutrients. In addition, since the intake and absorption of nutrients are affected primarily by the presence or absence of disease, nutritional status is largely affected by health (Hamermesh, 2009).

Nutrition production function relates the child's nutritional status to a set of health inputs. These include the child's nutrient intake, whether the child is breastfed and the duration of breastfeeding, preventive and curative medical care, and the quantity and quality of time of the mother or others in care-related activities. The quality of child care time in turn is likely to be functions of the caregiver's age, experience, education, own health status and environmental factors are also enter the production function. The potentially conflicting effects of maternal labor supply on child nutrition are readily seen within the production function framework. Greater income from mother's employment translates into higher consumption of market-purchased inputs such as food and medical care that raise nutritional status, but reductions in the level or the quality of time in health-related activities reduce nutritional status (Mozzochi, 2010).

A child's nutritional status reflects the combined effects of many factors, including nutrient intake, health, birth order, and behavioral factors governed by parental preferences. In recognition of the interrelated variables is expressed child's nutritional production function, they represented as Child's Nutritional status = f (nutritional input, child's health, child's death, births, biological factors, childcare time, technology factors) the model is estimated at two levels: at the household level and at the child level. Child nutritional status provides an indirect indicator of overall child health as well as a direct measure of access to adequate nutritious foods. Malnutrition is a vigorous indicator of the presence of severe child deprivation. Malnutrition is frequently part of a vicious cycle that includes poverty and disease. The three factors, viz., malnutrition, poverty and disease are interlinked in such a way that each contributes to the presence and performance of the others (Mozzochi, 2010).

b. Brink's Unified Theory of Nutrition

Unified Theory of Nutrition has two Schools, old school and new school of nutrition, the old school maintains that to gain weight or loss weight is only about calories, no matter the source (e.g., carbohydrates, fats, or proteins). This school sees

that all sources of calories are the same whether it is carbohydrates, proteins and fats, they determine to gain weight or loss equal manner. The other school is new school of thought on the issue, this school states that gaining or losing weight is really about where the calories come from (e.g., carbohydrates, fats, and proteins), and that demonstrates weight loss or weight gain. Meaning, this school sees the calorie is a calorie mantra of the old school is wrong (Brink, 2006).

A calorie is a calorie it is how the old school of nutrition sees, which often includes most nutritionists, as a calorie is a calorie when it comes to gaining or losing weight, that is to gain weight or loss is strictly a matter of calories in, calories out. For example If child burns more calories than he/she takes in, he/she will lose weight regardless of the calorie source and if he/she eat more calories than he/she burns of each day, he/she will gain weight, regardless of the calorie source. If one reduces calories by X number each day, weight loss is the result, which comes out, and so it goes if the child adds X number of calories above what the child uses each day for gaining weight. However, the calories in and calories out mantra fails to take into account in the modern research, that finds that fats, carbohydrates, and proteins have very different effects on the metabolism via countless pathways as the new school maintains (Brink, 2006).

Conceptual Framework

A conceptual framework is a structure that tries to explain the relationship between variables in the study and shows the relationship by use of diagram. (Mugenda, 2013)

The occurrence or change of independent variables will result in change in the dependent variable. These variables and their relationship is illustrated in the following conceptual framework.

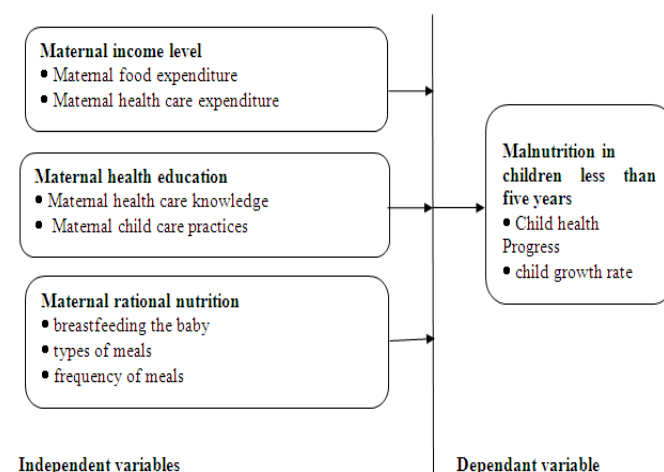


Figure 1.1. Conceptual framework.

Level and malnutrition

Income level of households and their economic growth can influence nutrition in many ways. Populations with high income have the ability to purchase more diverse foods, including animal products rich in protein—the building blocks of healthy bodies—as well as fruits and vegetables rich in essential vitamins, minerals and other nutrients. Low-income populations often lack access to the right variety of foods and the right amount of foods, leading to inadequate nutrition (Headey, 2012). For the low-income populations, economic growth can boost household incomes, resulting in more spending on food, health, and education, and better individual health and nutrition. In addition, when national economies are growing, governments have more to spend on social programs

and infrastructure necessary for health systems to function, thus increasing the overall health and nutritional status of the nation (Headey, 2012).

The World Bank reports that Somalia's GDP was \$917.0 million in 1990 and its total population was 10.81 in 2014, and classifies it as a low-income country. The United Nations Statistics Division reports a GDP figure of \$1.306 billion for 2012, compared to \$2.316 billion in 2005 and \$1.071 billion in 2010. According to the World Bank report Somalia is one of the poorest country in sub-Saharan Africa, and one of the poorest countries in the world (World Bank, 2014).

Low income raises malnutrition and, in turn, malnutrition contributes to low income, there is a vicious circle between them. The first MDGs goal calls for halving the proportion of people living under extreme poverty by 2015 from the level prevailing in 1990. There are no proper estimates for extreme poverty in Somalia available for the baseline year (1990). However, in 2002, the total share of the population living in extreme poverty in Somalia below one US \$ per day was estimated at 43.2% or 2.94 million people (UNDP, 2007). Somali families are widely based on subsistence farming and pastoralism with inadequate opportunity to earn wages. Just under half of the population live in extreme poverty on an income lower than a dollar a day per capita, while approximately two-thirds live in poverty on an income of less than two dollars a day. Chronic food insecurity and unacceptably high malnutrition levels persist in many parts of Somalia (particularly the south) for a variety of reasons, including inadequate food access, poor dietary diversity, lack of health facilities, insecurity, flooding and insufficient access to clean water. Such high malnutrition rates would trigger massive external emergency actions anywhere else in the worldwide (UNDP, 2007).

Linking Malnutrition with Poverty, at a macro-level, child malnutrition is linked to poverty, but at the community stage, poverty does not illustrate to be strongly related to child malnutrition in many cases. Other factors are significant, many of them relate to the intra-household use of resources – such as the time and the knowledge of the main caregiver, usually the mother. Poverty decreases choice and forces of households to make such difficult decisions. (UNDP, 2008). Low income is an important factor causing hunger and malnutrition. Too often children are malnourished not only availability enough food for the family, but also accessibility of food for the family. Children from the poorest twenty per cent of society in developing countries are twice as likely to be malnourished than children in the richest twenty per cent (UNICEF, 2011).

Low-income children suffer higher incidences of poor health, developmental, and other outcomes than non-poor children do. Shortage in children's nutritional status is associated with poverty (Chase-Lansdale, 2007). Malnutrition is the result of insufficient intake of food (in both quality and quantity), which causes poverty and disease. There is a cyclic relationship between malnutrition, poverty and disease: malnutrition enlarges the severity of illness through a decreasing in immune function, whilst disease increases nutritional needs and anorexia, making worse prevalence of malnutrition. One of the most significant and widely studied transmission channels between economic growth and nutrition results is via food consumption. The two most significant of these effects relate to calorie consumption relationships and dietary diversity effects (Ahmed, 2009).

Malnutrition stays a serious challenge globally and the single major contributor to child mortality. Children's nutritional status is an indication of their overall well-being and development. The nutritional wellbeing of children is therefore a sign of the family, community and national investment in household health. Occurrence of malnourished children is taken as an indicator of amount of population that is underweight. Food intake for malnourished children is always below minimum needs and inadequate to meet dietary energy (UNDP, 2007).

Health education and malnutrition

The educational level of parents can play a crucial role of ensuring that they make maximum impacts on children less than five years. For instance, educated mothers may have better-paid jobs thus be able to earn higher income and take better care of their children, so mother's education is an important determinant of malnutrition. Mothers with higher levels of education have greater access to knowledge and resources that can improve the welfare of their families (Bureau, 2010). Inadequate childcare practices are fundamental to addressing malnutrition among children. Poor maternal education (formal and informal) has been identified as a major constraint to good childcare practices in developing countries including Ghana as well as Somalia. A well-resourced, targeted and coordinated nutrition education can improve maternal nutritional knowledge, healthcare-seeking behaviors, and practices significantly. Effective utilization of knowledge and skills gained from health and nutrition education is therefore, likely to get better health and nutritional status of children through improved knowledge and care practices. Knowledge, awareness and skill levels influence practices and behaviors of individuals. Even in households with similar levels of access to disposable income and resource, there is a big variation in nutritional outcomes of children, which tends to suggest that factors other than resources are responsible for nutritional condition of children (Ghana Statistical survey, 2009).

A sufficient childcare is a fundamental factor for optimal growth. The fundamental role of care to child nutrition has been well-established since 1990 through UNICEF Model of Care. To provide care adequately, caregivers require education (both formal and informal), time, and support (e.g. control of resources). Mothers' knowledge of child nutrition and childcare practices would have a significant effect on their children's nutritional status. (Ghana Statistical survey, 2009).

One important factor relating to childhood nutrition is the mother's education. Many studies have demonstrated that improvements in secondary school enrollment rates among females are estimated to be responsible for 43% of the total 15.5% decline in the childhood underweight rate in developing countries during the period 1970–1995. The father's education also emerged as an important factor that was significantly associated with underweight status among under-five children. Analysis showed that children whose fathers had higher education had lower levels of weight deficiency than those with non-literate fathers. Usually, the father is the main earner and decision-maker in a family; so, their higher education plays an important role in ensuring better nutritional status of children (Rayhan MI, 2006). Nutrition experts say the basis determinants of malnutrition here are poverty and illiteracy. Educated parents especially women are better able to consult their place within the household and get better their status. Sen and Sengupta (1983) display in their study, that the children of literate mothers had higher nutritional intakes compared with

illiterate mothers. However, it is not just about giving education, but also effective education. The schooling of girls can lead to a reduction in fertility, infant death rate, child mortality rate, get better household health by affecting nutritional and health care practices and improve the school performance of the children (World Bank, 2007).

Maternal child marriage was also associated with malnutrition indicators for children less than five years old. The women's Children who married as minors were significantly more likely to have stunting, wasting, and underweight status. Associations between maternal child marriage and low infant birth weight as well as infant and child mortality seem to be a consequence of early motherliness, poor maternal education, and other indicators of low maternal health and socioeconomic status—factors all significantly linked to early marriage of young girls. There is a need for targeted intervention efforts to support children born to mothers married as minors, who may be more susceptible to nutritional deprivation than others in the family (UNICEF, 2008). WFP states that the Nutritious foods are those food items include fruits and vegetables, which comprise nutrients such as vitamins, protein, carbohydrates and minerals which are required to sustain the body and healthy living. Foods, which contained nutrients must be given to a child in the first thousand days, including the time of its conception. The malnutrition occurs, when a child is not getting enough food or eating a balanced diet because of many factors include lack of education for caregivers. They call for dietary diversification for children to include exclusive breastfeeding for 6 months, complementary feeding for 24 months and consumption of some food nutrients such as Vitamin A, and iodized salt and zinc supplementation. Maternal education also has a significant association with malnutrition in children (Shiklam, 2013).

Dietary intake and malnutrition

The ability to feed oneself, one's family and children adequately is a human right. The right to adequate food is realized when every child, woman and man, alone or in society with others, have physical and economic access at all times to sufficient food. This issue implies that the availability of food in a quantity and quality sufficient to satisfy the dietary needs of children, free from bad materials, and acceptable within a given culture like Somali culture, and the accessibility of such food in sustainable ways, that do not interfere with the satisfaction of other human rights. Abuse of this right, as often occurs in situations of conflict and crisis of Somalia, can lead food and nutrition insecurity. Such violations include blockades of food supplies; destruction of economic and social infrastructure, food crops and stores; appropriation of assets; discriminatory employment practices; and refusal to grant passage for humanitarian assistance (Chambers, 2008).

If the children do not consume adequate food to fill current physiological requirement they feel hunger. Hunger can be momentary, such as not having enough to consume for a day, or can be long long-term when the child does not get enough to consume to continue his or her physical requirements over many years. When a child has hunger for a persistent period, he or she can develop malnutrition. Malnutrition can start in the womb (Lancet, 2008). If malnutrition carries on in the first 1,000 days of a child's life it can also lead to stunted growth, which is irreversible at that point, linked with damaged cognitive ability, and decrease performance in school and later in life at work in general. This

cycle carries on from mother to child when chronic malnutrition persists generation to generation. If a specific essential nutrient is not consumed in enough quantities, a nutritional deficiency can increase, such as the most general form of nutritional deficiency from lack of iron, which may result in anemia. This type of malnutrition does not cause noticeable hunger for each, yet the body silently hungers for the exact nutrients. Vitamin A deficiency, which affects sight among other physiological effects, is a common deficiency. World Health Organization estimates that as many as 2 billion people worldwide, or about 30% of the world's population, are not getting enough nutrients such as vitamin A, iron, or zinc in their dietary intakes, which leads malnutrition (Lancet, 2008).

In general, when a household has access to adequate food to get all its dietary requirements, will always be satisfactorily nourished. Actual nutritional welfare depends on a range of other interconnected factors that besides food security include health and sanitation, adequate supplies of safe water, adequate methods of food preparation and allocation, and care of vulnerable individuals within the household including children. Sufficient care for mothers and children at the family and community levels is essential to advance endurance, growth and development. Such care includes activities linked to food preparation, breastfeeding and complementary infant feeding practices, hygiene practices, care for women, psychosocial care and home health practices. The resources needed include food, knowledge, income, time, and supportive thoughts and relationships (Chambers, 2008).

In many emergencies, affected inhabitants groups including children may already have been chronically food-insecure and in poor nutritional condition before the onset of the emergency: displaced populations may practice comprehensive periods of hunger during their flight from conflict areas; and humanitarian interventions may be delayed because of isolation or physical access problems. (Chambers, 2008). The simultaneous presence of malnutrition and infection results in an interaction that increases the impact of either state existing alone. Dietary deficiency diseases may decrease the body's fight to infections and badly affect the immune system so the body has decreased ability to defend itself against infections. Some dietary deficiency diseases, such as vitamin C and vitamin A deficiencies, change and damage the skin and mucous membranes. Infection, in turn, influences nutritional status (Young, 2002).

Protein-energy malnutrition occurs when individuals lack adequate quantities of food to get their energy and protein needs. The major sources of energy are cereals, roots and tubers, oils and fats. Significant sources of the protein wanted to supplement that provided by cereals include pulses, legumes, and animal and dairy products. For infants and young children, in particular, insufficient dietary intakes of these foods can cause to acute or wasting malnutrition. Eventually, after months or years of not enough diet, children will not succeed to grow normally, and become stunted or chronically malnourished. Underweight children are more vulnerable to infections, and may develop severe acute or chronic malnutrition (Young, 2002).

Malnutrition of children

The World Health Organization defines malnutrition as "the cellular imbalance between supply of nutrients & energy and the body's demand for them to ensure growth, maintenance, and special functions (WHO, 2012). The term malnutrition generally refers both to under nutrition and over nutrition, but in This research will be used the term to refer

only to a deficiency of nutrition (Blossner, 2005) The World Health Organization estimates that malnutrition accounts for 54 percent of child mortality worldwide, about 1 million children. Another estimate also by WHO states that childhood underweight is the cause for about 35% of all deaths of children under the age of five years worldwide (WHO, 2008).

In the 2008 year 178 million children under age 5 were stunted, most of whom live in sub-Saharan Africa, and 55 million children were wasted, including 19 million who have severe wasting or severe acute malnutrition (Manary, 2013)

The World Health Organization estimated in 2008 that globally, half of all cases of under nutrition in children under five were caused by unsafe water, inadequate sanitation. Malnutrition in children is common globally and results in both short and long term irreversible negative health outcomes including stunted growth which may also be linked to cognitive development deficits, underweight and wasting. There are three commonly used measures for detecting malnutrition in children: stunting (extremely low height for age), underweight (extremely low weight for age), and wasting (extremely low weight for height).

Under nutrition in children causes direct structural damage to the brain and impairs infant motor development and exploratory behavior. Children who are under nourished before age two and gain weight quickly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition (Bank, 2008)

Contaminated water contains countless parasites and diseases that, if consumed will inevitably lead to the death, especially in children. Lack of clean water causes millions of children in the developing world to suffer needlessly and die from disease and malnutrition (Prevention, 2003).

Household food insecurity, defined as the inability to provide enough food for a healthy and active lifestyle for all household members, is a major U.S. public health problem. Based on data from the U.S. Department of Agriculture (USDA), in 2010, 14.5 percent of U.S. households — 17.2 million households — were food insecure, with rates as high as 49.9 percent for low-income, female-headed households with children. Although food insecurity is associated with poverty, approximately 85 percent of food insecure households with children had an adult who was employed, suggesting that employment opportunities and wages are important considerations in food insecurity (Cook, 2008).

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. Inadequate sanitation is a major cause of disease worldwide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (WHO, 2014).

Empirical literature review

Solomon Demissie and Amare Worku in 2013 conducted a research on Magnitude and factors associated with malnutrition in children 6-59 months of age in pastoral community of Dollo Ado district, Somali region, Ethiopia.

They mentioned that the Malnutrition at the early stages of life could lower child resistance to infections, increase child morbidity and mortality, and decrease mental development and cognitive achievement. Adequate nutrition is the keystone of survival, health and development not only of current

generations but also of the ones to come. Child malnutrition is a major public health problem in Ethiopia.

A community based, cross-sectional study was conducted on 541 mother-child pairs of 6-59 month old children.

The study revealed that the overall prevalence of malnutrition in the community was high with 42.3% of the children being wasted, 34.4% for stunting and 47.7% for underweight. All three forms of malnutrition (wasting, stunting and underweight) were more prevalent among boys than girls. Prevalence of wasting was higher among young children while stunting and underweight were more likely to be observed in older children.

The prevalence of child malnutrition among the under five children was high, indicating that the nutrition situation in study area is very critical. Thus, malnutrition is a major public health problem.

Habaasa Gilbert in 2014 conducted a research on determinants of malnutrition among under-five children in Nakaseke and Nakasongola districts, Uganda. The sample size from the target population of the study was 104 children in households within the two districts.

Malnutrition is one of the major causes of mortality and morbidity among under-five children in Sub Saharan Africa. The study was conducted in Nakaseke and Nakasongola districts of Uganda to understand the determinants of malnutrition in these districts.

The study found out that Children aged 39-59 months were less likely to be underweight than those aged less than twelve months. It also revealed that stunting was more prevalent among children of peasant farmers than the pastoralists were.

The sample size of 104 respondents was relatively small hence; it could have had an effect on the outcomes of the study.

Yankinda Etienne Kadima in 2012 conducted a research on factors influencing malnutrition among children under 5 years of age in kweneng west district of Botswana.

The study aimed to identify and determine the risk factors for malnutrition among children under the age of 5 years in Kweneng West District of Botswana. The cases consisted of 37 underweight children under the age of five. Data collection was done using a combination of a review of records (child welfare clinic registers, and child welfare clinic cards) and structured questionnaires. The factors that were found to be significantly associated with child malnutrition were small number of daily meals taken by the child lack of knowledge of methods of prevention of child malnutrition by the parent, parent's unemployment low birth weight inadequate Vitamin A supplementation and child illness. The study suggest that Socio-economic factors such as unemployment, a lack of knowledge about recommended infant and child feeding practices and health-related factors such as low birth weight, inadequate Vitamin A supplementation, and child illness are predictors of malnutrition in under five. Therefore, increasing household food security and reinforcing educational interventions could contribute to a reduction in the prevalence of child malnutrition in the district.

Hanne Borgen in 2010 conducted a research on Child under nutrition in the Far-West Terai of Nepal.

Child under nutrition remains a major health problem in Nepal. Nearly fifty percentages of children below 5 years of age are undernourished. The causes of child under nutrition are multifactor, embracing aspects within the fields of dietary intake and food insecurity, and health care.

A cross-sectional study was conducted in the Far West Terai of Nepal. 1500 children (0-59 months) from 1500 households were included. In total 35 %, 35% and 16% of the children below five years were stunted, underweight and wasted, respectively.

According to the WHO classification of under nutrition, the prevalence of wasting and underweight is very high and the prevalence of stunting is high. There has been improvement in breastfeeding practices; however, the complementary feeding is still inadequate. In addition, the level of disease is high and the children do not receive appropriate care during illness. Despite high levels of breastfeeding and exclusive breastfeeding programs, which aim to improve these practices should be continued and more emphasis should be given to the quality and the quantity of complementary food.

3. Methodology

This study adapted a descriptive survey method, in which both qualitative and quantitative approaches were used. Qualitative analysis was used in behavioral skills, personal attributes and quality data that cannot be quantified while quantitative approach was used in the numerical data that can be easily measured. Descriptive studies- cross-sectional are more formalized and typically structured with clearly stated investigative questions (Cooper & Schindler, 2003). The target population was 450 participants who are mothers that bring their children in those hospitals, administration, nursing and nutrition staff working in those hospitals. This population was chosen since the mothers and the staff of the hospitals e.g. administration, nursing and nutrition staff are the ones who was involved in the day to day activities in those hospitals and thus they were well conversant with the information required in the study. The target population of this study was carried out at Banadir and SOS hospitals in Mogadishu Somalia.

4. Findings

Income level of household

Household expenditure on food in a day a week

This section tested the income level of mothers with malnourished children less than five years. Table 4.1 showed that 55% of household expenditure was between 1-3 dollars and 39% of household expenditure was between 4-6 dollars while 6% of household expenditure was above 6 dollars.

Table 4.1. Household expenditure on food in a day in dollars.

Statement	1-3 dollars	4-6 dollars	>6 dollars	Mean	Std
Household expenditure on food in a day in dollars	55%	39%	6%	1.5	0.61

The effect of income level on the child's malnutrition

Table 4.2 showed that 77% of the respondents were answered 'Yes' that the income level of household affects child's nutrition and 23% of the respondents were answered 'No' that determines income level of household affect child's nutrition.

Table 4.2. The effect of income level on the child's malnutrition.

Statement	Yes	No	Mean	Std
Income level of household affects the nutrition of children less than five years old	77	29	1.3	0.42

Health education level of mothers with malnourished children

This section tested the health education level of mothers with malnourished children less than five years. It contributes the effect of health education of mothers on children's nutrition.

Frequencies you go to nutritionist seeking the ways to feed the baby

Table 4.10 indicated that 21% of respondents were gone to the nutritionist 'once' who was very little and 9% of the respondents were gone to the nutritionist 'twice'. 11% of them visited the nutritionist '3 times' while 4% of the respondents were gone to him 'above 3 times' which is ok but very few mothers and 55% were 'never attended to the nutritionist' which is the most of the respondents which indicated that the mothers have no more information about how to feed their children properly.

Table 4.3. Frequencies you go to nutritionist seeking the ways to feed the baby.

Statement	once	twice	3times	>3times	never	Mean	Std
Frequencies you go to nutritionist seeking the ways to feed the baby	21%	9%	11%	4%	55%	3.6	1.7

Recommended period to stop breast-feeding for the baby

Table 4.4.11 showed that 3% of the respondents recommended stopping breast-feeding 'after 6 months' and 16% recommended stopping breast-feeding 'after one year' and 81% of the respondents recommended stopping breast-feeding 'after two year' which have the most percentage of the respondents which best.

Table 4.4. Recommended period to stop breast-feeding for the baby.

Statement	After 6 months	After one year	After two months	Mean	Std
Recommended period to stop breast-feeding for the baby	3%	16%	81%	2.8	0.48

Practice of family planning

Table showed 4% of the respondents used child spacing, which was good for health and well nourished of the child and 96% of the respondents did not use child spacing, which indicated that the most of the mothers do not use family planning, which is not sound for their babies.

Table 4.5. Practice of family planning.

Statement	Yes	No	Mean	Std
Do you practice family planning	4%	96%	1.96	0.196

Times receiving training about health and nutrition education

Table showed 14% of the respondents have received training about health and nutrition education 'once'. 6% of the respondents have received a training about health and nutrition education 'twice' which was less number. 7% have received '3 times' and 9% have received 'above 3 times' while 63% of the respondents have received a training about health and nutrition education, which indicated that the most of the respondents had not training about health and nutrition.

Table 4.5a. Times receiving training about health and nutrition education.

Statement	once	twice	3times	>3times	never	Mean	Std
Times of receiving training about health and nutrition education	14%	6%	8%	9%	63%	1.01	1.5

Dietary intake of the malnourished child less than five years old

This section tested the dietary intake of the malnourished child less than five years old. It deals with the effect dietary intake on child's nutrition.

Frequency of feeding child on animal dairy products a week

Table 4.6 showed that 17% of the respondents fed their children animal dairy product 'once'. 48% of the respondents fed their children animal products 'twice' that indicated most of mothers do not feed their children more times in a week. 27% of the respondents fed their children '3 times' and 10% of them fed their children 'above 3 times' while 1% of the respondent never fed their children on animal product a week.

Table 4.6. Frequency of feeding child on animal dairy products a week.

Statement	once	twice	3times	>3times	never	Mean	Std
Frequency of feeding child on animal dairy products a week	17%	48%	27%	11%	1%	2.29	0.88

Frequency of feeding the child on diet

Table 4.7 showed 3% of the mothers with malnourished children who were respondents fed their children 'once' and 16% of the respondents fed their children 'twice' and 73% of the respondents fed their children '3 times' and 8% of the respondents fed their children 'above 3 times'.

Table 4.7. Frequency of feeding the child on diet.

Statement	once	twice	3 times	Above 3 times	Mean	Std
Frequency of feed the child a day	3%	16%	73%	10%	2.9	0.59

Frequency of breast-feeding the baby

Table 4.8 showed 19% of the mothers with malnourished child breast-feed their children between 1-3 times which increased the level of malnutrition of the child. 39% of the mothers who were the respondents of the study breast feed their children between 4-6 times a day. 19% of the respondents breast fed their children between 7-9 times which is better. 21% of the respondents were above 10 time which exclusive breast-feeding, while 2% of the mothers with malnourished child were complete not breast fed their children which leads malnutrition for children under six months.

Table 4.8. Frequency of breast-feeding the baby.

Statement	once	twice	3times	>3times	never	Mean	Std
Frequency of breast-feeding the baby	19%	39%	19%	21%	2%	2.5	1.1

The reasons for breast-feeding the child baby

Table 4.8 indicated 2% of the mothers with malnourished children breast-fed their children to provide their children balanced diet because breast milk for first six months is

balanced diet. 85% of the mothers breast fed their children to protect them diseases that is why they are adding other food or liquids for the first six months because they believe that the breast milk is not enough for the baby. 13% of the mothers breast-fed their children to take part their proper growth.

Table 4.8. The reasons for breast-feeding the child baby.

Statement	To get balanced diet	To protect Diseases	To take part proper growth	Mean	Std
The reasons for breast-feeding the child baby	%2	85%	13%	2.1	0.38

The proper diet for your baby

Table 4.9 showed 8% of the mothers with malnourished child see the proper diet for her children as cow milk. 79% mothers with malnourished consider proper diet for her child breast milk for the first six months and after six a child needs complementary feeding, while 1% of the respondents consider proper diet for the child as rice and 12% of the mothers consider proper diet for their child the egg.

Table 4.9. The proper diet for the child.

Statement	Cow milk	Breast milk	Rice	egg	Mean	Std
the proper diet for the child	8%	79%	1%	12%	2.3	1.1

The meals eat a household a day

Table 4.10 showed 1% of the respondents mentioned that they eat once a day, which indicated food insecure of the household and leads malnutrition for their children. 68% of the respondents told that their household eats twice a day, which is not enough. 30% of the respondents eat 3 times a day, which is better for them and for their children. 1% of the respondents eat above 3 times a day, which is the best and very few of the household can access enough food a day.

Table 4.10. The meals eat a household a day.

Statement	Once	Twice	3 times	Above 3 times	Mean	Std
the meals eat a household a day	1%	68%	30%	1%	2.3	0.5

Food taboo

Table 4.11 showed 1% of the respondents saw that the exclusive breast-feeding is not good for the child, which led and increased the malnutrition of their children. 18% of the respondents mentioned that the egg is harm full for their children. 80% of the respondents told that the liver lead delay of speaking for the baby so they prohibited the child more amount of protein in the liver. 1% of the respondents saw that the solid food is not good for the baby while he is very young.

Table 4.11. Food taboo.

Statement	Exclusive breast-feeding	Egg	Liver	Solid foods	Mean	Std
Food taboo	1%	18%	80%	1%	2.8	0.5

Regression Analysis

In this study, a multiple regression analysis was conducted to test the determinants of malnutrition in children under five years old in Mogadishu, Somalia. The research used statistical package for social sciences (SPSS V 22) to code, enter and compute the measurements of the multiple regressions.

Standard Multiple Regression Analysis

Adjusted R^2 squared is coefficient of determination, which tells us the variation in the dependent variables due to change in the independent variables. From the findings in the above table the value of adjusted R^2 squared is 0.116 and indicates that there was variation of 11.6% on malnutrition in children under five years old in Mogadishu due to change in income level of households, healthy education levels in households and dietary intake of households at 95% confidence interval. This shows the significant that 11.6% of the variations in the malnutrition in children under five years old in Mogadishu are accounted for by the variations in the independent variables and the remaining 88.4% are accounted by other factors contained in the standard error.

R is the correlation coefficient, which shows the relationship between the study variables. From the findings shown in the table above, there was positive relationship between the study variables as shown by 0.360.

Table 4.12. Regression Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.360 ^a	.129	.116	.42672

Predictors: (Constant), Dietary intake, Income Level, Health Education

ANOVA

This was used to test the associative level of significance between the dependent variable and the independent variables.

Table 4.13. ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.361	3	1.787	9.815	.000 ^b
	Residual	36.053	198	.182		
	Total	41.414	201			

a. Dependent Variable: Malnutrition

b. Predictors: (Constant), Dietary intake, Income Level, Health Education

From the ANOVA statistics shown in table, the processed data, which is the population parameters, had a significance level of 0.05 which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value) is less than 5%. The F critical at 5% level of significance was 2.65. Since F calculated (9.815) is greater than the F critical (2.65), this shows that the overall model was significant and that income level of households, health education level of household and dietary intake of households significantly affect the malnutrition in children under five years old in Mogadishu- Somalia.

Table 4.14. Regression Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.615	.290		2.119	.035
	Income Level	.176	.068	.171	2.575	.011
	Health Education	.177	.042	.283	4.230	.000
	Dietary intake	.263	.092	.191	2.858	.005

Dependent Variable: Malnutrition

From the above regression equation, it was revealed that holding income level of household, health education level of households and dietary intake of households to a constant zero, malnutrition in children under five years in Mogadishu would be at 0.615. A unit change in income level of

households would lead to change in the malnutrition in children under five years old in Mogadishu by a factor of 0.176. A unit change in health education level of households would lead to change in the malnutrition in children under five years old in Mogadishu by a factor of 0.177 and a unit change in dietary intake of households would lead to change in malnutrition in children under five years old in Mogadishu by a factor of 0.263.

The regression results presented in above table indicate that Income level of households, health education of households and dietary intake of households were significant at 5% level. The coefficient of income level of household showed 0.176 with a p-value 0.011, which is less than 5%, the coefficient of health education of households was 0.177 which is less than 0.05, with a p-value of 0.000. And the coefficient of the dietary intake of household was 0.263, with a p-value of 0.005 which is less than 0.05 so that indicates there was statistically positive relationship between income level of household, health education level of households and dietary intake of household and malnutrition in children under five years in Mogadishu. Hence, the most significant factor is health education level of household. Overall, health education level had the greatest effect on malnutrition in children less than five years in Mogadishu, followed by income level and dietary intake. All of the variables were found to be significantly affect malnutrition in children under five years because they less than ($p < 0.05$).

The finding of this study concur with finding of Yankinda Etienne Kadima in 2012 who found that the small number of daily meals taken by the child, lack of knowledge of methods of prevention of child malnutrition by the parent, parent's unemployment and child illness. While the study disagree findings of Hanne Borgen in 2010, who found that there has been improvement in breastfeeding practices and told that mothers exclusively breast-fed their babies. Hence this study shows that the health education and dietary intake determines malnutrition of children less than five years old in Mogadishu-Somalia.

5. Conclusion

In light of the above findings, it can be concluded that the income level of a household plays a significant role in causing malnutrition. Income poverty (due to unemployment, low wages, or lack of education) can lead to household food insecurity, inadequate care, "unhealthy household environment, and lack of health services." People of low socioeconomic status are most vulnerable to food insecurity since purchasing power serves as a main determinant of the ability-to-afford nutritional food sources. Households that cannot attain nutritious foods due to income poverty are most associated with the inadequate diet and disease that leads to malnutrition.

Low-income households usually spend the majority of total household income on food. In these cases, even the lowest out-of-pocket healthcare service can severely diminish the remaining income to be used for food supply, further perpetuating the issue of food insecurity. Many adults living in low-income countries cannot afford to be sick: healthcare costs are high, transportation costs to health facilities accumulate, and taking days off work means lost productivity and lost wages. Under nutrition is a major underlying cause of illness and disease, and one that contributes to additional healthcare spending

It can also be concluded that health and nutrition education of the caregivers play a major role in preventing and

causing malnutrition in children. Overall, mothers' education persists as a strong predictor of child's nutritional status in urban slum settings, even after controlling for other factors. Given that stunting is a strong predictor of human capital, emphasis on girl-child education may contribute to breaking the poverty cycle in urban poor settings. There is a strong linkage between maternal education and children's health. Children born to educated women suffer less from malnutrition, which manifests as underweight, wasting and stunting in children. Maternal education has been associated with nutrition outcomes among children

Education may affect child health through three links. First, formal education of mothers directly transfers health knowledge to future mothers. Second, the literacy and numeracy skills that women acquire in school enhance their ability to recognize illness and seek treatment for their children. Additionally, they are better able to read medical instructions for treatment of childhood illness and apply the treatment. Third, increased number of years in school makes women more receptive to modern medicine.

6. Recommendation

1. Nutrition, while impacted by agricultural productivity, poverty and income, is unlikely to be improved through more general programmes aimed at bringing about economic and social development. Income growth alone will not reduce rates of malnutrition, and so we need direct interventions to tackle malnutrition. Things such as vitamin, mineral and micronutrient supplementation; kangaroo mother care, early initiation of breastfeeding, promotion of dietary diversity; cash transfer programmes, community-based nutrition education, and school feeding programmes.

Development of healthier food systems, modernization of food systems, which is occurring rapidly in many low- and middle-income countries, can facilitate the consumption of more packaged, processed foods with added nutrients, greater consumption of meat, increase incidence of snacking and reduced consumption of whole foods can help in reduction of malnutrition.

2. Education may change women's preferences about the quantity versus the quality of children, with educated women choosing fewer children but of better "quality". Mother's education has a greater impact on the educational attainment and school achievement of children than father's education. This is plausible given the greater interaction between mother and children in most families since, in most countries, fathers are usually the main earners in the household. In this way, education of females contributes more significantly (than the education of males) to increases in human capital, productivity, and economic growth not only in their own generation but also in the next generation.

Educating girls and women is probably the single most effective investment a developing country can make, whether or not women work outside the home. It creates a multitude of positive remunerations for families including better family health and nutrition, improved birth spacing, lower infant and child mortality, and enhanced educational attainment of children

7. Areas of Further Study

The study examined the determinants of malnutrition in children less than five years old in Mogadishu- Somalia, the study recommends a further study to be done on the determinants of malnutrition in children less than five years old. A similar study can be done on other factors like diseases, lack of breast-feeding and see whether the findings hold true.

Future studies should apply different research instruments like secondary data, focus group discussions to involve respondents in discussions in order to generate detailed information, which would help improve nutrition of children less than five years old in Mogadishu- Somalia.

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