

A Review on Nutritional Status of Children: Association with Maternal Empowerment and Food Security Status for Intervention Implications to Developing Countries

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ABSTRACT

Background: In developing countries, child undernourishment is one of the most serious public health problems. There are many factors that are associated with and affect the nutritional status of children.

Aims: The aim of this review was to investigate nutritional status of children in association with maternal empowerment and food security status from developing countries.

Methods: The review used a insightful strategy of electronic databases such as Medline, Central, Scopus, Web of Science, CrossRef, PubMed, and Google Scholar using English language.

Results: Fifty papers were acknowledged using publication year of 2000 and recent for description of the problems. Accordingly, major factors linked to poor nutrition comprise income of households, parent's education level, the low-birth-weight of children, parent's status in terms of nutrition, access to safe drinking water, sanitation, primary health care facility and access, child's age and gender. The less control a woman has over her own time and household resource, the less likely to make a timely decision to treat her sick child after discovering an illness, to make use of health services and follow through with treatment recommendations, to have the child immunized, to obtain and prepare a portion of special food for a child, and feed it to the child at an appropriate frequency and with the degree of patience required.

Conclusions: Local policymakers, health programmers, nutritionists, health practitioners, researchers, and other organizations should enhance household food security status, promoting mothers, improving the socioeconomic status, and care practice for improved health of children.

Keywords: Food security, Women empowerment, Nutritional status of children, Developing countries

INTRODUCTION

Malnutrition is one of the most challenging and complex global problem affecting development, particularly that of under privileged and the poor [1]. Internationally, more than 10 million under five children die every year from avoidable illnesses despite effective health interventions and half of the deaths are due to malnutrition [2]. Globally, malnutrition is one of the most common causes of morbidity and mortality in children under the age of five years [3] and increase the risk of both morbidity and mortality associated with other disease. Worldwide, it is estimated that 45% of all child deaths directly and indirectly associated with under nutrition and hence, of 6.9 million of death occurred 3.1 million were associated with malnutrition [4]. The proportions are 70% in Asia, 26% in Africa and 4% in Latin America and Caribbean. It occurs more frequently in infant and young children. Generally, the causes of malnutrition are multiple and operating at different levels or simultaneously and

classified as immediate causes (inadequate intake of nutrients and illnesses), underlying causes (food insecurity, poor care and sanitation) and basic causes (ecological, social, political and other [2]. Seventy percent of food insecure peoples in the world are live in rural areas [5-7].

Ethiopia suffers from high levels of food insecurity, exacerbated by population growth, land degradation, and

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frequent droughts. Togo, Ethiopia and the Democratic Republic of Congo rank at the bottom; all three also lack even basic national nutritional guidelines [8]. According to an Ethiopia situation analysis for transforming nutrition (2013), children and their mothers were suffering disproportionately from poor health and nutrition in the country. Nationally, 40%, 25% and 9.5% of children under the age of five years were stunted, underweight and wasted, respectively [7]. Similarly, 51% of all causes of death in under five-year children were associated with malnutrition [9]. National nutrition program implementing sector also declares that enhanced strategic partnerships to prioritize the elimination of malnutrition from Ethiopia as one of the most viable strategies for achieving the growth and transformation plan and the millennium development goals [3].

In Oromia region, 41.4 % of the children were stunted (18% severely stunting), 26% were underweight (7.8% severely underweight) and 9.7% of the children were wasted (2.8 % severely wasting) [10]. As study done by Girmay showed that the prevalence of underweight, stunting and wasting in infant at Butajira hospital district sites was 21.2%, 37.7% and 12.5%, respectively [11]. Stunting levels are above the national average in SNNPR (44 percent). Sidama zone is one of the most populous zones in southern region and it ranked as high under five old age child, stunted rate (50.3%) and household food insecure above national level [12,13].

In Afar and Somali regions, more than 20% of children wasted where large numbers of households rely on livestock as their main livelihood. Accordingly, 25% and 7% of children were underweight and severely underweight, respectively. Furthermore, about 40% of under five years children are stunted and 18 percent are severely stunted [7]. WHO has classified stunting above 30% and underweight above 20% as high public health problems [14] it is estimated that malnutrition contributes to the death of 270,000 children less than 5 years of age every year in Ethiopia [15]. Between 2000 and 2016, the prevalence of stunting declined from 58 to 38.4 % and underweight declined from 41 to 23.6, wasting declined from 12 to 9.9 %, nationally [16]. Hence, the prevalence of underweight and stunting is declined by 1.063 and 1.23% % per year and wasting is declined by only 0.33 %. While this trend is clearly progressing in the right direction and its baseline level is high. However, still it shows as a public health problem of the country.

Looking at the policies on problem, the government of Ethiopia has demonstrated its policy commitment to nutrition by developing a standalone national nutrition strategy and a national nutrition programme, along with a set of guidelines. Through referring research finding done in different part of the world, the author of national nutrition programme of Ethiopia acknowledged maternal empowerment as it is highly correlated and interconnected with livelihood security at household and community levels

throughout life (gestation, infancy, childhood, adolescence, adulthood and old age). Later, they set enhancing women empowerment as a key intervention strategy to improve nutritional wellbeing of people in all age group [3]. Reviewing the research finding on the determinant factors of malnutrition, the risk factors of malnutrition are multifaceted and complex, and the relative importance of each of the known risk factors of malnutrition including household food insecurity is likely to vary between settings. This review, therefore, aims at to explore major barriers, the association between maternal empowerment and food insecurity with undernutrition in children.

BASIC CONCEPTS OF LITERATURE REVIEW

Overview

Many people's diets are deficient in more nutrients when the deficit in energy is moderate, people get enough of staple foods but often lack other foods such as legumes, meat, fish, oils, dairy products, fruits and vegetables that provide essential elements like protein, fat, and micronutrients [17]. Very low food security involves reports of multiple indications of disrupted eating patterns and reduced food intake [18]. Food insecurity, poverty and malnutrition are some of the major challenges that face sub-Saharan Africa resulting in a serious problem of not being able to feed their people [6]. Recent FAO [8] report estimated that about 795 million people in the world are chronically undernourished and still lack sufficient food for conducting an active and healthy life especially women and children.

Healthy child growth and development is a basic human right of children and maintained by good nutrition, which is the cornerstone for survival, health and development for current and succeeding generations. Well-nourished children will have good school performance, healthy adult stature during conception and inane they give a healthy child at the start of their life. Conversely, the impact of malnutrition is multidimensional and has a great impact on country development by causing direct losses of future productive children, poor childhood development, poor school performance and unnecessary medical cost. If interventional measures are not taken appropriately, the grown child will enter into motherhood as malnourished and which again perpetuate malnutrition ultimately poverty [19].

Malnutrition of Under Five Children

The nutritional status of children is important as it determines their health, physical growth/development, academic performance and progress in life. All children have the right to adequate nutrition, which is essential for attainment of the highest standard of health. Global estimates for 2012 suggested that 162 million children under five were stunted (low height for age) on the basis of indices lower than two standard deviation (z) scores below the median for age and sex. Furthermore, more than 200 million school age children are underweight and if no action is taken

and at this rate, about one billion school children will be growing up by 2020 with impaired physical and mental development [20]. Children who are underweight have low weight for their age, and this reflects a combination of chronic and acute malnutrition (wasting). Stunting reflects chronic nutritional deficiency among children. Childhood malnutrition is a public health priority to which one-third of child deaths can be attributed and long-term malnutrition manifest as stunting increases the risk of infections and reduces cognitive development and economic productivity. Lack of nutritious food, coupled with infection and illness, means their bodies and brains don't develop properly and at least 170 million children are affected by stunting [20].

In Ethiopia, child undernourishment rate is one of the most serious public health problems and the highest in the world. High underweight rates in the country pose a significant obstacle to achieve better child health outcomes [21]. According to Ethiopian Demographic and Health Survey, the prevalence of stunted, underweight and wasted children under five years were 44%, 29% and 10% respectively [9]. Meeting the minimum dietary diversity, minimum meal frequency and minimum acceptable diet was associated with better nutritional status of children [15]. The Ethiopian Demographic and Health Survey also shows that the prevalence of malnutrition among different region of Ethiopia is vary. For example, in Oromia region 41.4% of the children were stunted, 26% were underweight and 9.7% of the children were wasted [10]. Additionally, in the Somali region the prevalence of stunting, wasting and underweight were 33, 22.2 and 33.5 % respectively for under five-year-old children [22]. As the study conducted in food insecure households in two districts of North Shewa, Ethiopia, the overall prevalence of stunting, underweight and wasting was 54.2%, 40.2% and 10.6%, respectively. The prevalence of malnutrition is also high in other regions of Ethiopia i.e., 52% and 51% of children were stunted in Amhara and Tigray regions respectively [9]. According to study conducted in rural communities of Tigray region [23], the prevalence of children stunted in food secure households and food insecure households was 46.1% and 52.1% respectively. A community based cross sectional study also conducted at Kunama Ethnic groups Tahtay Adiyabo, woreda, Tigray region, Ethiopia, revealed that the prevalence of stunted, underweight and wasted of children Awere 57.1%, 37.4% and 17.8%, respectively. According to Ethiopian Demographic Health survey, 9% of children are wasting and in Oromia region prevalence of child malnutrition indicated that 9.6% of the children are wasted. A community-based cross-sectional study conducted in rural kebeles of Hidhabu Abote woreda, and Haramaya districts, Oromia region also showed that the prevalence of stunted, underweight and wasted children was 47.6%, 30.9% and 16.7% and 42.2%, 36.6% and 14.1%, respectively. In addition, the proportion of the prevalence of malnutrition by its level of severity in Haramaya districts indicated that

19.9% were severely stunted, 16.6% were severely underweight and 3.9% were severely wasted [10].

Presented literature showed that factors such as child caring, knowledge of health practice, parent's education level, age of child, low-birth weight of children, lack of decision making mainly on spending of money, and lack of cattle effect on family and community variables which the child develops are the most important contributing factors of undernutrition [24]. The root cause of malnutrition in early childhood is complex with a variety of direct and underlying contributors related to lack of food, including insufficient breastfeeding and inadequate complementary foods; protein and nutrient loss from respiratory and gastrointestinal infections; chronic immune stimulation due to persistent parasitic intestinal infections; and inadequate water and sanitation. Dietary intake (energy, protein, fat, and micro nutrients) must be adequate both in quantity and quality, and nutrients must be consumed in appropriate combinations for the human body to be able to absorb them.

Lower intakes of food have been observed among children from low-income households where food availability and the amount of time parents spend managing their children's eating behavior were reduced. According to the study conducted in the rural communities of Arba Minch Zuria woreda, children who did not consume diversified diet were more underweight than who consumed different types of food. The lack of dietary diversity is particularly critical because they need energy and nutrient dense foods to grow and develop both physically and mentally and to live a healthy life. According to the infant and young children nutrition project workshop, the key factors contributing to under nutrition among children in Ethiopia are poverty, household food insecurity and low levels of maternal education [25].

Maternal Empowerment and Nutritional Status

Many studies have looked for associations between indicators of women's empowerment and child nutrition and survival. Accordingly, some literature read that enhancing women's status leads to more investment in their children's education, health and overall wellbeing [26]. Maternal disempowerment is not only related with child nutrition and growth but also it undermines nutritional outcomes as young children grow older [27]. Epidemiological studies done in India indicate that intra-household women's empowerment has a strong association with better long term nutritional status of children [28]. According to the lancet, evidence supports that there are positive associations between women's empowerment and improved maternal and child nutrition and negative associations between disempowerment such as domestic violence and child nutrition outcomes. A study done in Japan revealed that domestic violence had significant and negative effects on both height- and weight-for-age of children under the age of five year [29]. Studies done in Ethiopia, Tanzania and India

also indicated that involvement in decision making related to maternal own and child care had a significant association with an association with protein energy malnutrition [30].

Maternal empowerment is a difficult concept to define, conceptualize and to measure also. There is no agreed definition up on maternal empowerment but there are plenty of a few overlapping terms like: options, choice, control, and power included in the definition of the empowerment in various literatures. Most often these terms are referring to self-confidence, autonomy and control of resources by the mother, mother's workload and time availability, and the extent of social support available to women's ability to make decisions on issue that affect themselves and their families [31]. Numerous studies showed that clinical depression in mothers as well as self-reported depressive symptoms, anxiety, and psychological distress, are important risk factors for adverse emotional and cognitive outcomes in their children, particularly during the first few years of life. Depressed mothers of infants were less interactive with and less responsive to their children, and were less likely to seek appropriate health care for their children compared to infants of healthy mothers. Maternal empowerment has an inevitable role in production of food, management resources, income generation, household food and nutrition security and child welfare [32]. Moreover, where rural women control assets and decide what to produce, they tend to favor the production of food crops that ensure food security for the family in contrast to Men who more frequently show a preference for cash crops sold on markets [5]. Various initiatives have thus sought to promote homestead food production, particularly of fruits, vegetables, and livestock by women who can combine such production on gardens with household chores and the care of children, with encouraging results in dietary diversity [33].

Two separate indicators of empowerment were developed in EDHS [22]. These indices are: the number of participants in the decision-making process and the number of situations in which a woman considers wife beating is justifiable. These indices use three questions in the decision-making process and five questions on attitude toward wife beating separately. They were developed based on the idea that, if the mother lacks autonomy on three decisions making process and justified wife beating, it reflects women's low status and can predict demographic and health outcomes, including contraceptive use, ideal family size, unmet need for family planning, access to reproductive health care, and, for the Woman's children, childhood mortality [9]. A case control study done in Northwest of Ethiopia indicated that only paternal decision making to use money in the household expenditure was strongly associated with malnutrition among under five children than that of decision made by both father and mother jointly [34]. Studies done in Bangladesh, and Tanzania established that maternal involvement in decision making process of household resources allocation /expenditure didn't had statistical

association with PEM in that particular set up [35]. Parents' employment status may have an impact on children's body weight because parents may influence children's behavior related to body weight or body composition. For example, parents' availability at home, especially the mother's availability may impact food choices and time for physical activity versus engaging in sedentary behaviors. Parents' employment status is frequently cited as a possible predictor of child weight status [36]. The finding of Vyas et al shown that the maximum under nutrition was found in children whose mothers were working by occupation, Chances of being underweight increased if the mother was employed than the group where the mother was unemployed.

Although the outcome was not weight status, the study reported that children whose mothers worked part time or full-time were more likely to primarily drink sweetened beverages between meals, use the television, computer, or be driven to school than children whose mothers had never been employed. Children whose mothers worked full-time were less likely to primarily eat fruit/ vegetables between meals or eat three or more portions of fruit daily. According to the meta- analysis study, all the combined behavioral outcomes, an average effect size estimated from all of the studies was very small and not significant. Employment was associated with higher achievement especially during 2 and 3 Years. However, there was a significant negative association between employments and internalizing behaviors. Most research focuses on the effects of maternal employment on children's academic and behavioral outcomes. Recent research indicates that early maternal employment increases the frequency of child behavior problems, and detracts from school readiness, verbal ability, and test scores.

Food Security and Nutritional Status

Anthropometric status is linked to the availability of healthy food, income sources, local food production and getting nutrition awareness, good environment, enough dietary intake including healthy feeding pattern, proper utilization of food, which depends on physiological status of the body, which in turn, is influenced by the environmental situation, accessibility to safe water, and the morbidity status. The risk factors of malnutrition are multifaceted and complex, and the relative importance of each of the known risk factors of malnutrition including household food insecurity is likely to vary between settings [37]. According to the United States Agency for International Development (USAID), food security is defined as a state in which all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life [38]. It uses nine generic questions that represent apparently universal domains of the household food insecurity experience and can be used to assign households and populations along a continuum of severity, from food secure to severely food insecure. Of course, understanding and

measuring the impact of programming on the utilization component of food insecurity is equally important, but is better accomplished using other measurement tools, such as anthropometric indicators. The underlying causes of malnutrition are food security, care and healthy environment. Food security at the household and individual level is a necessary but not sufficient condition for adequate nutrition [23].

Food security is, a key risk factor for child malnutrition is achieved when a person has access to enough food to lead an active and healthy life. Because of its complexity, multidimensional concept, measuring food insecurity become a challenge for both researcher and practitioners too. To solve this challenge, USAID Food and Nutrition Technical Assistance (FANTA) project prepare Household Food Insecurity Access Scale (HFIAS), which provide a means for food security programs to easily measure the impact of their programs on the access component of household food insecurity. The method is based on the idea that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarized in a scale [5,38]. According to joint assessment programme of UNICEF, WHO and World Bank, 805 million people are affected from hunger in 2012 and 2014, nearly 161 million children who are under five years of age, suffering from stunting, and wasting affects 51 million children of under five years age of children. While, undernutrition was the major underlying cause of under five children in global which accounts 45% of total deaths in the global in 2013. FAO claimed that the dietary risk factors with inadequate physical activity responsible for nearly 10% of disability and ailment of the global burden. According to the most recent survey done by FAO, in 2011-13, a total of 842 million globally people were estimated to be suffering from chronic hunger, regularly not getting enough food to conduct an active life. Even though in developing regions the per capita availability of fruits, vegetables, livestock, vegetable oils, and hence diet, has increased, the benefit is not fully evident in Africa and South Asia [5].

A cross-sectional study done in Colombia revealed that there is an important link between household food insecurity and child nutritional status in participants of a food assistance program [39]. Similar study in Ghana demonstrated that compared to children in food insecure households, children in food secure households were 46% protected from chronic malnutrition [40]. Study from Nepal established that there is a significant association between household food insecurity and childhood stunting [41]. However, another study done the same country Nepal showed that there is no significant association between household food insecurity and under nutrition among children in the age group of 6-36 month [42]. Additional studies done in different part of the world revealed that there is significant association between food insecurity and malnutrition [43]. A study done in Brazilian

children showed that children living with some level of food insecurity have worse rates of stunting, even controlling for demographic and socioeconomic factors [39]. But studies done in east rural Ethiopia found that food insecurity had no significant association with protein energy malnutrition [44]. As the study conducted, households with low or very low food security are considered to be food insecure and as children who are food insecure often have poorer nutritional, educational, cognitive, developmental, and social outcomes compared to food secure children since household food insecurity determines reduces the dietary diversity in their house.

Food insecurity is probably one of the determinant factors of malnutrition in developing countries, but its role remains unclear [37,40]. In Ethiopia, as in many other African countries, there is a pressing need to improve household food security. Ethiopia is striving forward to ensure food security and become food self-sufficient, one of the pillars of improved nutrition status but it doesn't necessarily mean that food secure households are nutritionally secured. In Ethiopia food insecurity is quite prevalent with sporadic cases of acute food insecurity leading to malnutrition and deaths. The situation in Ethiopia is not much different from the conditions in other developing regions [23]. According to World Food Programme, common factors that cause household food insecurity in urban areas of the country are: household size, age of household, sex of household head, marital status of household, education level of household, sources of food, availability and supply of food commodities. A combination of those factors has resulted in serious and growing food insecurity problem, affecting as much as 45% of the population. Food insecurity and poverty in Ethiopia are attributed to the poor performance of the agricultural sector, which in turn is attributed to both policy and non-policy factors. Among the non-policy factors, recurrent drought is mentioned as the number one cause of food shortage in Ethiopia. The problem is worsening, despite massive resources invested each year into humanitarian aid and food security programs.

Poverty and inability to purchase adequate food leading to under nutrition and micronutrient deficiencies persist even today among the poor segments of population living in developing countries. It links food security and nutrition security acknowledging that food security at the household and individual level is a necessary but not sufficient condition for adequate nutrition and that food and nutrient intake interacts with the individual health status. Rising food costs, along with other shocks such as drought, floods and economic crises can have a major impact on food and nutrition security. The most vulnerable households are the rural households and the female-headed households. Average caloric intake in rural areas of Ethiopia is 1,750 calories/person/day, which is far below the recommended minimum daily intake of 2100 calories/person/day [21]. Accordingly, half percent of the populations are

undernourished and there were 5 million people live under chronic food insecurity in nationwide and 10 million people lived under transitory food insecure condition. Tackling underlying causes of a problem usually takes more time than tackling immediate causes. Finally, the root or structural causes refer resource allocation at the societal level and reflect problems which require long term interventions to change the policies and societal attitudes. At the household level, food insecurity has been associated with disrupted household dynamics evidenced by parental irritability, anger, parental unavailability, and conversation gap with children. At the individual level, food insecurity has been linked to feelings of deprivation or lack of choice and to higher levels of anxiety affecting parental psychological well-being. Food insecurity has also been associated with overcompensation during periods when food is available, a practice that may compromise children's dietary and nutritional status and may be expected to have long-term detrimental effects.

Food insecurity has been associated with poverty, unemployment, poor access to education, lack of awareness about the benefits of food consumption, lack of rain, and climate change. However, the root cause of undernutrition is not only food insecure households but also food hygiene and sanitation practices, household food distribution problem, lack of toilet, a far distance of health facilities from their residence and other factors [21]. Under nutrition is strongly associated with social class, ecological, economic and many more other determinants which differ from nation to nation. Besides these most serious problems are primarily low consumption of meals, household's income, locality, education, occupation of parents, birth spacing or interval, sanitation and hygiene and source of drinking water [23]. A study conducted in rural Tigray region reported that pre-lacteal feeding practice, age of child, characteristics of maternal anthropometric, insufficient complementary foods, and locality were the major contribution factors for the stunting and underweight. In the food secure households, wasting was associated with age of the father and number of cattle owned by the household while age of child and main source of water to the household were the factors associated with child wasting from the food insecure households [45].

The major significant linked determinants of poor nutrition comprise income of households, level of education, parents' status in terms of nutrition, access to safe drinking water, sanitation, primary health care facility and access, child's age and gender. These contributing factors of undernutrition may vary between communities, regions and countries and over time. Presented literature showed that factors such as child caring, knowledge of health practice, parent's education level, age of child have strong, low -birth weight of children, lack of decision making mainly on spending of money, and lack of cattle effect on family and community variables which the child develops. Undernutrition has serious consequences and reduces the individuals' income

generation potential, lowers children's schooling performance, increases the risk of disability, morbidity, and mortality, and thus contributes to the intergenerational transmission of poverty and illness. Even temporary malnutrition such as during food crises or the (pre-harvest) rainy season (frequently referred to as hunger season) can cause irreversible health impairments especially in children. Health problems associated with inadequate calorie consumption and insufficient micronutrients now coexist with the growing presence of diet related chronic diseases. Child's dietary intake is an immediate determinant of his/her nutritional status. Undernutrition of under five years children is widespread in Ethiopia, especially in the rural areas primarily because of inadequate food intake and poor dietary diversity.

Caring practices and Nutritional Status

There are a multiple of epidemiological done on the relationship between malnutrition and child feeding practice both nationally and globally. As the study conducted in Uganda, the major causes of stunting were improper health and sanitation, poor child feeding practices, poor access to appropriate knowledge for health and nutrition, poor socio-economic variables of access to food, type of employment, distance to main roads and markets, housing facility, income flow regime, gender disparities and access to fuel for cooking. A prospective cohort study in Abidjan, Co^ted'Ivoire, evidenced that adequate feeding practices around the weaning period are crucial to achieving optimal child growth. Unmatched case control study done in Mekakele woreda of south west Ethiopia indicated that squeezed out of colostrum's has significant positive association with protein energy malnutrition [34]. Similar study conducted in southern Ethiopia revealed that suboptimal complementary feeding has significant positive association with protein energy malnutrition [30].

A community based matched case control study done in southern Ethiopia revealed that inadequate complementary feeding and exclusive breast feeding have a significant positive association with protein energy malnutrition [30]. Similar study in Gondar hospital also revealed that lack of exclusive breast feeding and initiation of complementary feeding after one year of age have a significant positive association with protein energy malnutrition [2]. Many studies done in different part of the world like Ethiopia, Bangladesh and Nepal explored that practice of exclusive breast feeding had a negative significant association with protein energy malnutrition [46]. The nutrition, growth and development of infants and young children depend not only on sufficient food, but also on adequate health services and appropriate care behaviors. A household's capacity to provide care is dependent on the availability of resources or the absence of constraints within the household and the widest of community [21].

Early introduction of liquids and solid foods at too early age also increases the risk of diarrheal disease in addition to risks of malnutrition which has been playing great role for more than half of infant and young children's deaths in a year. According to the study conducted in West Gojjam, Ethiopia, wasting was association with diarrhea [23]. According to the recommendation of WHO, there is no substitute of breastfeeding for the health of the child. First 6 months of exclusive breastfeeding is required for the healthy life of the child. It is well known that early breastfeeding causes proper nourishment of the child. Feeding care has been one of the most important care aspects for young children, as inadequacy of food intake is one of the direct factors for malnutrition [21], while child feeding practices were not associated with household food availability, income, wealth, and any other maternal or household characteristics.

Feeding practices in early life are important as they determine health and development of an entire lifetime. In the growth and development of a child, the impact of feeding practices is more significant than lack of food. Inappropriate feeding of the child during early childhood, due to lack of knowledge of mothers about appropriate foods stands out as a major determinant of childhood malnutrition [5]. Improving quality of complementary food has been cited as one of the most cost-effective strategies for improving health, reducing morbidity and mortality of young children. Nearly one third of child deaths could be prevented through optimal complementary feeding practices. Approximately 50% of all childhood mortality were related to malnutrition, but also that the first 2 years of life represents a critical window of vulnerability. Ethiopia ranks third in Africa for the prevalence of stunting at 18 months, after Madagascar and Zambia. It is the same level as some of the poorest countries of Asia, such as Bangladesh and Nepal).

In Ethiopia child malnutrition is highly associated with poverty, food insecurity and low access into health care which result in an inadequate infant and young child feeding practices and high levels of infectious disease. In Ethiopia, malnutrition is reported to be responsible for about 57% of all under five deaths particularly in combination with abrupt cessation of breastfeeding, diarrhea, malaria or measles, but it is closely linked to inappropriate feeding practices and food insecurity. A combination of religion and caste or different religion and caste are strongly related with food habits. Family habits were in turn influenced by the local socio- cultural environment and seem to be adversely associated with lower social status.

Risk factors for malnutrition and illness include but are not limited to dietary intake and poor environmental sanitation. Access to health services may mediate the debilitating consequences of illness and provide opportunities for health and nutrition information and education [22]. Health care facility usage, maternal and child health facilities in the rural

communities is poor, as are health seeking behaviors. Research evidence underscores the importance of water and sanitation in reducing a broad range of infections and so improving nutritional status. In many Ethiopian urban households are using water from improved sources and improved toilet facilities, rural communities are using small proportion of these facilities [21,22]. The availability of a toilet facility, the number of antenatal visits the mother had, occupation of the father, family head and duration of continued breastfeeding were significantly associated with child stunting in children from the food secure households and the food insecure households [23]. Repeated infections, especially diarrhea, and helminths, caused by poor environmental conditions (inadequate water and sanitation provisions and poor hygienic practices) are the cause for the 50 percent of malnutrition (stunting, underweight) in children under the age of five year [47].

Poor environmental condition can result in maternal anemia in pregnant women by exposing them to malaria and hookworm infections. These condition causes malnourishment of the fetus called intrauterine growth restriction (IUGR) which a potential predictor of low birth weight and ultimately, growth failure [48]. Study done in Kwara State of Nigeria and Somalia region of Ethiopia showed that malnutrition had a significant association with sanitation in children under the age of five year [49]. Unmatched case control study conducted in Machakel Woreda of Northwest Ethiopia also found that using unprotected source of water for drinking had a significant association with protein energy malnutrition [34]. In contrast, similar study in southern Ethiopia demonstrated that unavailability of latrine in household has no significant association with protein energy malnutrition among children under the age of five year [30]. These growth-faltering effects, in turn, make individuals more predisposed to infections and even to chronic diseases later in life. Preventive health seeking includes growth monitoring in the previous month, and whether the child had received diphtheria, pertussis and tetanus and measles immunization [48].

According to the EDHS [22] report about 7% of children under five were ill with cough and rapid breathing, symptoms of an acute respiratory infection in the two weeks before the survey. Of these children, 27% were taken to a health facility or provider. Day-care and nursery-school attendances were used as a measure of exposure potential to infectious agents. Common childhood infections were reported less frequently in both cases and controls that stayed home before age 2 years than in children attending an outside program. Children who stayed home had fewer episodes of common illnesses argues against illness as the reason for keeping the child at home. The pattern of immunization did not affect by the child's gender, education, residence and job of the mother, while negative attitude of

mothers afraid from vaccination significantly affected the immunization status.

Water, Sanitation and Hygiene (WASH) play a fundamental role in improving nutritional outcomes. Hygiene behaviors were measured using a spot check approach, whereby field workers were trained to observe and grade a list of predetermined hygiene-related aspects of the caregiver/mother, index child, house and compound in which they lived. Poor food-hygiene practices, i.e. mother's hand washing before preparing food and feeding the child, child's hand washing before eating a meal and after defecating/urinating, food preparation, cleanliness of utensils, water source and safe drinking water, habits of buying cooked food, child's bottle feeding hygiene and housing and environmental condition are the main sources of diarrhea which can affect the health status of children under five years.

Safe water sources play particularly important; children from households, who use safe water sources, are less likely to be underweight and wasted and more likely to be normal in weight for age z- score and weight for height z-score. Malnutrition and diarrhea are common in developing countries, so, it is interesting to note the source of water to the households. According to the survey of Tadiwos and Degnet that conducted in Kombolcha District of Eastern Harerghe Zone, Ethiopia, about 41% of the households were using water from safe source. Safe water sources play particularly important role in determining child nutritional status. Specifically, the estimation result of Tadiwos and Degnet showed that children from households, who use safe water sources, are less likely to be underweight and wasted and more likely to be normal in weight for age z-score and weight for height z-score. Another study on Nigeria posts that the policy to reduce child malnutrition should target women education program and public health programs to provide clean drinking water in rural areas.

Other important socio-demographics cause of undernutrition in Children

Globally under nutrition is a leading cause of childhood morbidity and mortality. According to the study conducted in South Africa (2013) Innocent Declaration on Infant and Young Child Feeding recognizes that inappropriate young child feeding practices; sub-optimal or inadequate complementary feeding, are significant threats to child health. While economic and contextual factors are strong determinants of child nutritional status, immediate causes such as feeding practices are associated with nutritional outcomes, particularly stunting, independent of socio-economic determinants. Even with optimum complementary feeding, children are at risk of being stunted if adequate quantity and quality of complementary food is not given beginning at 6 months of age. Recognizing this, in 2001 the World Health Organization (WHO) released global recommendations for child feeding practices. WHO

recommends that children should take nutritionally appropriate and safe complementary foods after six months.

Residence, education of parents, economic status of the household, number of antenatal care visit for the mother, age, birth order and birth interval of the child were found to be determinants of child nutritional status [23]. Mother's age at the time of first birth is an important determinant of the children health. It is hypothesized that a young mother has a high probability of a child to be malnourished. The child's mother's age and child's own age were both significant at 1%, but was surprising negative signs. Better nutritional profile of under-three year children of educated mothers indicates that the right to have education and to achieve good literacy will help in promoting the nutritional status of children. Educated mothers are more aware about the health services and can easily introduce new feeding practices scientifically, which helps to improve the nutritional status of their children. Another study in this country showed that unlike the education of mothers, the education of fathers independently influenced the nutritional status of children and they deduced that a one-year increase in schooling of the father can reduce 11% of stunting in children [49].

The study conducted in the rural communities of Arba Minch Zuria woreda also revealed that about one-fourth of children were underweighted which significantly associated with lack of maternal and paternal education and low dietary diversity score. According to the finding of Ifeanyi et al, the child's mother's position among women married was had a negative sign significant only at 5% with child nutritional status than the male household head. A study in Nepal shows that household economic status, occupation of the household-head, number of children under five in a household, availability of public health services in the community and mothers' health's are important determinants for child nutrition status. Evidence in Bangladesh showed that there is a strong relationship between household wealth status and stunting and it recommend that to improve the health and nutritional status of children by giving due consideration to household wealth is crucial [50].

The demographic variables such as age, birth order and preceding birth interval of the child were significantly associated with child nutritional status. Significant association was observed between birth weight and malnutrition. Majority of malnourished children had birth weight less than 2500 gm which is low birth weight. In Pakistan malnutrition is significantly higher among girls than boys, indicating child level gender issues to be crucial. It also depends on family income and breastfeeding practices. According to the survey of Tadiwos and Degnet the prevalence of underweight and wasting were higher in female children in the age group of 24-59 months. However, stunting was lower in female children in the same age group. According to the survey conducted by Jeannot and his colleagues, preschool girls are more likely to be overweight

or obese at a young age than boys. This observation shown a greater increase in weight for girls than boys, compared to the data used to establish the BMI norms in 10 years ago study. According to the hypothesis that was considered, going from hormonally induced early puberty to a potentially stronger influence of environmental factors such as food, exercise, and diets in girls compared to boys.

Child with higher birth order may be neglected by the family and thus having higher chance to be malnourished. Children of first birth order were found to be at a significantly higher risk of stunting than children of higher birth. But, the highest level of stunting was also observed among children whose birth order was 4 or 5, followed by birth order 6 and more. This higher risk of stunting in first birth order children could be due to mothers' low level of experience at first delivery in the area of child care and feeding, which are important components of improved nutrition. The gap between two babies is also important for the nutrition of children. According to medical literature, birth gap less than 3 years may lead to some physical problem of mother as well as to children.

The Ethiopia Demographic and Health Surveys [9] indicated that prevalence of severe wasting was higher at younger ages and declined by 24 months while stunting prevalence peaks around 24 months and plateaus at a high level thereafter. The study had shown a strong correlation between the ethnicity of the children and the risk of overweight and obesity in which children of Kosovar origin have a higher risk of overweight and obesity than children from Kosovo who had brought attention to the importance of change in the environmental and strain induced by immigration on their parents. The explanations for these ethnic differences in overweight are linked to a number of factors including the family environment, nutritional habits, physical activity and television/screen viewing, can be strongly conditioned by culture.

CONCLUSIONS AND RECOMMENDATIONS

Optimal nutrition during childhood is critical to ensuring optimal child health and development. A variety of factors have been reported to affect the nutritional status of children i.e., maternal characteristics, infant characteristics, and cultural practices. Maternal disempowerment and severe food insecurity were independently associated with undernutrition of children. The effects of these factors vary according to cultural context and related socioeconomic conditions. Household food insecurity, inadequate maternal and child care, and inadequate health services and health environment are the most important contributing barriers of undernutrition and they operate at household level. They influence the availability of food, the physical and economic access which an individual or household has to that food, the caregiver's knowledge of how to utilize available food and to properly care for the individual child, the caregiver's own health status, and the control the caregiver has over

resources within the household that might be used to improve the nutritional status of the child.

Additionally, the level of access to information and services for maintaining health, whether curative services are available, and the presence or absence of a healthy environment with clean water, adequate sanitation, and proper shelter all contribute to determining the nutritional status of an individual child. The less control a woman has over her own time and household resource, the less likely; To make a timely decision to treat her sick child after discovering an illness, to make use of health services and follow through with treatment recommendations, to have the child immunized, to obtain and prepare a special food for a child, and feed it to the child at an appropriate frequency and with the degree of patience required. Given the link between maternal empowerment with the underlying cause of malnutrition it can be affected by level of education, employment status, particularly employment for cash, and media exposure. Women who are educated, employed, and exposed to the media are likely to be better equipped with the information and the means needed to function effectively in the modern world. Contextual factors such as urbanization and socio-economic development foster the above factors in terms of availing opportunities to education, employment and media access. Local policy maker, health programmer and nongovernmental organization should enhance the nutritional status children using the possible interventions; Enhancing the household food security status; promoting mother to decide lonely or jointly with their husband on issue that affects their own self or child health, household resource allocation and freedom of mobility, improving the socioeconomic status and care practice of the household.

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