



Determinants of Household Food Insecurity and Its Association with Child Malnutrition in Sub-Saharan Africa: A Review of the Literature

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Abstract

Food insecurity is a global public health challenge. Household food insecurity is the leading risk factor of malnutrition, claiming approximately 300,000 deaths each year. Whether directly or indirectly, due to inadequate food consumption and poor diet quality, it is also accountable for over half of all deaths among children in Sub-Saharan Africa. It is estimated that the prevalence of food-insecure individuals in the area will reach 17 million by the year 2021. Inadequate nutrition may result in low immunity, impaired physical and mental development and reduced productivity among children under five years and throughout the life course. This review article attempts to discuss the various household food insecurity determinants and their association with child malnutrition in a Sub-Saharan Africa context. The purposes of this article are to inform governments, policymakers and service providers regarding the importance of household food security and its determinants on child malnutrition, and to plan strategies to improve the household food security status in Sub-Saharan Africa.



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Introduction

Household food insecurity is increasingly known to be a global health problem, especially in Sub-Saharan Africa.¹ The Sustainable Development

Goals (SDGs) have emphasised the urgent need to tackle food insecurity in achieving human rights by the year 2030.² The first goal is to end 'poverty in all its forms everywhere', and the second is to 'end

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hunger, achieve food security, improved nutrition, and promote sustainable agriculture'; both goals have been clearly stated as the frontline of the SDGs.² During the World Food Summit in 1996, the Food and Agricultural Organisation (FAO) defined food security as follows:

*At the individual, household, national, regional and global levels is achieved, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.*³

The above definition of food security captured four vital components: accessibility, availability, utilisation and stability.⁴ Based on this definition, tackling food insecurity means that food should always remain available and accessible to all individuals throughout the life course. In the year 2010, around 795 million people (globally) lacked access to adequate food for a healthy and active life.⁵ Among these, 12.9% were from developing countries, with the majority living in Sub-Saharan Africa.⁶ Deprivation of food access, low income, and climate change, such as with drought and flood, causes poverty and hunger.⁷ Over the last two decades, hunger, malnutrition and chronic food insecurity have continued to be discussed as a global problem that is not due to a food-deficit at the global and national levels, but to a lack of access and redistribution at the household level.⁸ The most common form of food insecurity occurs when food is unavailable for consumption due to inadequate resources and, consequently, results in the physical and psychological outcomes of hunger.⁹ The most recent press release by the World Health Organisation (WHO) reported that the right investment in nutrition intervention programmes could save the lives of 3.7 million people by 2025.^{10,11}

The determinants of food insecurity include social factors, income and environmental calamities. These determinants cause numerous households in Sub-Saharan Africa to experience food insecurity (forcing them to reduce), uncertainty in access to nutritionally adequate and safe food, and limited or uncertain ability to obtain acceptable food in socially acceptable ways.¹² The household socio-economic status (SES) is among the major contributing factors to the household food insecurity in Sub-Saharan

Africa. Being of low SES, vis-à-vis low-income household status leads to the consumption of both an inadequate quantity and low-quality foods; the limited dietary diversity leads to a low-quality diet with poor vital nutrient content.¹²

Food insecurity remains a public health threat; it is widespread in developing countries, as millions of people continue to suffer from food scarcity and death due to food insecurity.¹³ Whereas a varied and balanced diet is essential to reducing the rate of malnutrition, food insecurity jeopardises dietary intakes.¹⁴ Due to the high nutrient demands for growth, children are the most vulnerable.¹⁵ Poor nutritional status among children leads to low school admission, absenteeism, early dropout and low academic achievement, which results in reduced productivity during adulthood.¹⁶ The presence of food insecurity at the household level implies a high level of vulnerability to broad consequences, including psychosocial dysfunction among household members, especially children, socioeconomic predicaments and poor overall health status.¹⁶

Malnutrition is the most severe consequence of food insecurity. Over the past decade, the number of malnourished children in Sub-Saharan Africa has increased from 5.5 million to 30 million, resulting in the death of over 3.5 million children under age five every year due to the inadequate consumption of food.¹⁷ In the year 2008, the global deaths of children under age five were 8.8 million, with 93% of them occurring in the developing countries of Africa and Asia. Most of these deaths occurred in Sub-Saharan Africa.¹⁸ In 2012, Africa registered the highest prevalence of underweight children and infant/child mortality in the world,¹⁹ with 60% of these under age five deaths occurring in Sub-Saharan African countries.²⁰ Studies conducted in this region demonstrated a clear connection between household food insecurity and malnutrition among children, including such as stunting, underweight and wasting.^{21,22}

Based on these facts, the purpose of the present review was to investigate the prevalence of household food insecurity, its determinants and the association of food insecurity with malnutrition among children under five years of age in Sub-Saharan Africa. This article is directed towards targeting and informing

health care providers, programme managers in the field of nutrition, authorities and policymakers regarding the situation and challenges of food insecurity and children’s nutritional status in Sub-Saharan Africa.

Determinants of Household Food Insecurity

The factors that determine food security at the different levels either at global, national, regional, sub-regional, provincial, district, village, household and individual levels—have been well researched.²³ Identifying the determinants of food insecurity requires exploration of the contributing factors for the main features of food security. It is essential to investigate the determinants of both the availability of/and access to food: the two broadly studied dimensions of household food insecurity. The

availability of food depends on factors determined by the demand-side, while the supply side determines factors contributing to the access to food. As a result, factors that trigger variations in both the demand and the supply of food would additionally influence the availability and access to food, respectively. This eventually results in food insecurity.²⁴

Food insecurity at the household level is related to several factors, including poverty, low income, level of education, household size, employment status, age, the type of household head (gender) and food price. Understanding the characteristics and determinants of household food insecurity is crucial to developing policies that address the challenges associated with household hunger and food insecurity.²⁵

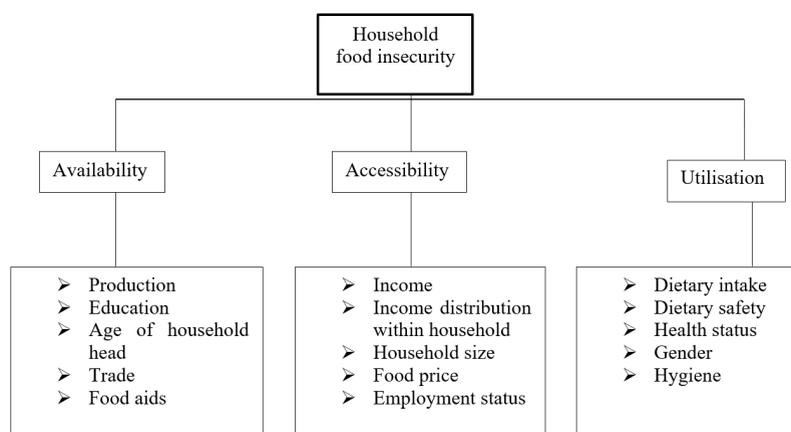


Fig. 1: Conceptual model of household food insecurity

The conceptual model of household food insecurity takes into account the three components of household food insecurity and the factors that determine each of them into consideration, as depicted in Figure 1. Factors such as production, education, age of household head, trade and food aids have been identified as the determinants of the availability component of household food insecurity. Income and its distribution within the household, the household size, food prices and employment status are identified as the determinants of the access component. Dietary intake, dietary safety, gender and hygiene are considered as determinants of the utilisation component.

Total Income and Poverty Level

Poverty is the main underlying factor that hinders access to adequate food among households with low income. Due to their low socioeconomic status, poor households are not able to be food secured and acquire sufficient resources.²⁶ This renders them vulnerable to limited access to food, which could further deter its re-distribution to household members.²⁶ In Sub-Saharan Africa, income is undoubtedly one of the essential determinants influencing food insecurity and hunger among the population. Poverty and food insecurity are correlated, and they lead to malnutrition.²⁷ Although approximately 1.4 billion (40%) people in the world

live in poverty, developing countries are the most affected.²⁸ The number of people in Sub-Saharan Africa who live below the poverty line of 1 US dollar daily has increased since 1990.²⁹ The poor cannot afford to purchase food to perform their daily activities or provide adequate housing, quality health care or quality education for their families.³⁰ Poverty is perceived to be a determinant of acquiring resources to obtain food. Poverty, coupled with other socio-economic and political predicaments, leads to food insecurity in Sub-Saharan Africa.³¹ In comparison to high-income households, the overall expenditures on food that includes both milk (and milk products) and meat (and meat products) are limited in low-income households. The purchase and consumption of healthy foods, such as fruits and vegetables, are equally low in low-income households.¹²

Adequate monthly income may improve the household food security status in Sub-Saharan Africa.³² Several studies conducted in Nigeria and Ghana demonstrated that monthly household income increased household food security by 1.65 times.^{33,34} Household income was also found to be an essential factor in measuring food access at the national, household and individual level.²⁴ A similar study reported that the household budget for food is affected by household size, total earnings by household members and family structure.³² A comparable study reported that low household income is connected to household food insecurity, which leads to poor living conditions and a high occurrence of malnutrition in children below five years old.³⁵ However, other determinants, such as overcrowding and inadequate access to health services, also cause malnutrition among children.³⁶ Even though it has been established that a household with higher expenses on food and health services was more likely to be food secure, underweight, stunting and wasting prevalence were mostly found in food-insecure households.³⁷

Household Size

One of the main challenges among food-insecure households in Sub-Saharan Africa is the sharing of limited foods among family members. Household size is a significant determinant of household food security.³⁸ A large family size puts an extra burden on food consumption, and more likely to experience

food insecurity in contrast to households with a small family size.³⁹ Household structure, the number of household members, gender and age define the food intake, allocation and nutritional needs of the household, and generally influence the household food insecurity as well.²⁷ Members of large families tend to compete for the limited resources available in the household. As a strategy, large households tend to consume a limited volume or frequency of meals, without considering the quality of the diet.²⁵ Large households, with more young or school-going children, also tend to be below the poverty line and vulnerable to food insecurity.²⁵ However, it reduces the adverse consequences of food insecurity if other household members are able to contribute to the total household income.³⁹

Age of the Head of the Household

The age of the family head is an essential factor in decision-making for the family. The literature has shown a direct association between the age of the head of the household and farm food production.⁴⁰ An increase in age decreases food production and inversely affects household food security, as compared to the younger age group.⁴⁰ A study conducted in Nigeria showed that households headed by an older person experienced a high prevalence of food insecurity, as compared to those households headed by a younger person.⁴¹ Owusu and colleagues,³⁴ stated that, since the elderly could not actively engage in off-farm job activities for the income generation of the household, an increase in age affects the food production and supply system. Young people are expected to embark actively on large-scale food production and undertake jobs, alongside farming, which will increase the household income and food security status.⁴²

Female-Headed Household

Gender has been recognised as a significant factor in food security, and women contribute towards the achievement of food availability, accessibility and utilisation.⁴³ In comparison to men, women produce a large number of cultivated foods in Sub-Saharan Africa.²⁴ However, females are vulnerable to food insecurity, as compared to males. This phenomenon has been demonstrated in Nigeria and South Africa, whereby food insecurity affects households headed by a female, in contrast to male-headed households.^{33,44} The Food and Agricultural

Organisation (FAO) stated that, globally, a large number of poor people live in rural communities and are highly dependent on agriculture as the primary source of income generation for their livelihood. Gender discrimination limits rural women's access to land, thus directly limiting their food production.^{45,46} If the status of women were improved, agricultural productivity would increase, which would increase household income and food availability, ultimately improving the nutritional status.⁴⁷ When women contribute to the household economy and are able to participate in the decision-making of the household, they are more likely to prioritise the household budget on food, health services and childcare, while a male household head may devote part of the income to non-food items and activities.⁴⁷ In general, female-headed households are less likely to achieve food security than male-headed households.²⁶

Educational Status

Educational status is recognised to be associated with household food insecurity. It is an essential determinant of food production, access and utilisation.⁴² Alongside improving the household's income and access to food, education also provides employment opportunities. Education additionally helps farmers to adopt new technological inputs into agriculture, the proper application of fertilizers and engagement in other activities to generate income for the household, which enhances the household food security.⁴⁸ A higher level of educational attainment amongst the household heads, especially women, influences proper food preparation and good nutrition practices. These improve adequate feeding practices to prevent malnutrition among children.⁴² Data from various studies revealed that problems associated with health and nutrition affect access to quality education and good academic performance in low- and middle-income countries, especially Sub-Saharan Africa.^{45,49} Food insecurity and lack of education were the main obstacles, and they remain as barriers to achieving the Sustainable Development Goals of education in developing countries, especially Sub-Saharan Africa.^{45,49,50}

Food Price

High food prices affect the household food security status, food production and the supply at the national level.⁵¹ In 2008, the sudden increase in food prices increased the vulnerability to food insecurity, and a

large number of individuals lacked access to proper nutrition.⁵² The poorest households in developing countries, especially Sub-Saharan Africa, spend approximately 80% of their income on food.⁵³ As a result of the increase in food prices, which affected the well-being of a large number of people, there were numerous street protests in most Sub-Saharan African countries.⁵⁴ In comparison to previous years, by the end of 2008, the price of staple foods remained comparatively high at 17% above average. In Egypt, for instance, the price of bread increased by 26% and cooking oil increased by 40%. Due to the price inflation of food items during that period, the cost of importing food to Africa increased from \$6.5 billion in 2002 to \$14.6 billion in 2008.⁵⁵

Table 1 summarised the literature consisted of findings related to household food insecurity and malnutrition. Food insecurity consists of a variety of determinants that lead to child malnutrition; one of its factors is the socioeconomic level of households.⁵⁶ Low economic status affects households by limiting access to food; high food prices hinder consumption of nutritious food in the household, thereby compromising the household food security status.⁵⁴ This could additionally influence food production and supply at the national level.⁵⁴ Due to multiple factors related to the food supply system, along with the supply chain, the absolute risk and vulnerabilities influence food insecurity. The lack of a proper food distribution system and limited access to food markets are some of the factors that can influence food security in Sub-Saharan Africa.⁵⁷ The food security crisis at the household level might be improved by directing attention to access to food and food distribution systems. Adequate food distribution systems depend primarily on food and market access. Accessibility refers to 'ease to use' or 'openness to' a particular facility.⁵⁸

In comparison to larger households, a small size household is less likely to have a negative impact on food security at the household level. Households with a small family size create less additional stress on food expenditures that are proportionate to food production.²⁴ A large family size, with a greater number of productive adults contributing financially to the affairs of that household, improves the household's food security status. However, households that include the elderly contribute to a

direct negative impact on food security, since older individuals cannot actively engage in hard labour jobs to acquire income for the household livelihood, as compared to younger adults.²⁴ Therefore, a younger head of household may contribute positively to the achievement of food security in that household.

Table 1. Summarised literature findings related to household food insecurity and malnutrition

Author and Year	Study Location	Participants	Study Title	Findings
Romain Frelat <i>et al.</i> , 2016	Sub-Saharan Africa	13,000 households	Drivers of Household Food Insecurity	Lack of market access and food price were associated with household food insecurity.
N Abbasi <i>et al.</i> , 2016	Ghana	166 rural and urban households	Assessment of Household Food Insecurity	Household food insecurity was associated with education and household income level.
Nweze Nnakwe <i>et al.</i> , 2013	Nigeria	411 heads of household	Food Insecurity and Inadequate Dietary Pattern	In comparison to male , female-headed households were more food insecure.
Ngianga-Bakwin Kandala <i>et al.</i> , 2011	DR Congo	8.992 children under five years old	Prevalence of Malnutrition in Rural and Urban Areas	Malnutrition was prevalent in rural areas, as compared to urban areas.
Emily Walton Stephen Allen, 2011	Developing countries	Review of literature	Malnutrition in Developing Countries	Severe acute malnutrition was a problem in developing countries.
Raphael Babatunde, 2010	Nigeria	Households	Impact of Off-Farm Income on Food Security	Income was associated with household food insecurity.
CJ Arene <i>et al.</i> , 2010	Nigeria	Households	Determinants of Food Security among Households	Income and age of the household head were associated with food insecurity.
E Kimani-Murage <i>et al.</i> , 2016	Ghana	2,262 women aged 15–49 years	Women's Participation in Household Decision-Making and Dietary Diversity	Women who participated in the decisions were more diversified, as compared to those who did not take part.
T Belachew <i>et al.</i> , 2011	Ethiopia	Adolescents 13–17	Food Insecurity among Adolescents	Food insecurity was associated with illness and place of residence.

D Tamiru <i>et al.</i> , 2017	Ethiopia	Adolescents in grades 5– 8	Food Insecurity and Its Association with School Absenteeism	Gender, household size and school absenteeism were associated with household food insecurity.
Dessalegn Tamir <i>et al.</i> , 2016	Ethiopia	School children	Household Food Insecurity and Its Association with School Absenteeism	Household food insecurity was associated with maternal education, school absenteeism and income.
C Hawkes <i>et al.</i> , 2017	City, University of London		Countries	Global Nutrition Report High prevalence of global malnutrition.
BJA Kombi <i>et al.</i> , 2017	Sub-Saharan Africa	2,810 articles were reviewed	Stunting, Wasting and Underweight in Sub- Saharan Africa	Low education of mother-father, child's age, sex of child (male) and poverty were associated with all forms of malnutrition.
M Sanfilippo <i>et al.</i> , 2012	UNICEF Office of Research	Children	The Impact of Social Protection on Children	Social protection is a means of improving child. health status
UNICEF 1990	Developing countries	Women and children	Strategy for Improved Nutrition of Children and Women	Food insecurity is associated with child and maternal malnutrition.
AR Quisumbing <i>et al.</i> , 2012	Developing countries	Women	Intrahousehold Allocation, Gender Relations, and Food Security	The programme improved the condition of the poor households.
CC Campbell, 1991	UNICEF	Household- level	Food Insecurity: A Nutritional Outcome or a Predictor Variable	Food insecurity was a predictor of nutritional outcome.
Stephanie Psaki, 2012	Eight country study	800 households and with children aged 24–60 months	Household Food Access and Child Malnutrition	Food insecurity was associated with wasting, underweight stunting.
RE Black <i>et al.</i> , 2013	Low- and middle -income countries	Households	Maternal and Child Undernutrition and Overweight	Maternal and child undernutrition was prevalent in Sub-Saharan Africa and Asia.
Solomon Demissie <i>et al.</i> , 2012	The Somali region, Ethiopia	541 mother- child pairs of 6–59 months	Magnitude and Factors Associated with Malnutrition in Children 6–59	Boys were more malnourished than girls; income and illness were malnutrition.
D Tembo <i>et al.</i> , 2009	Malawi	Households	The Effects of Market Accessibility on Household Food Security	Households without access to the market were more food insecure,

R Aidoo <i>et al.</i> , 2013	Ghana	Households	Determinants of Household Food Security	as compared to those with access. Household size, farm size, off-farm income, credit access and marital status were found to influence household food insecurity significantly.
Ason Bremmer, 2012	Africa	African countries	Population and Food Security	30 million children in sub-Saharan Africa are underweight.
Obadiah K, 2014	Kenya	Households	Determinants of Household Food Security	Income is associated with food insecurity.
DA Amugsi <i>et al.</i> , 2016	Ghana	2,262 women aged 15–49 years	Women's Participation in Household Decision-Making and Higher Dietary Diversity	Women with primary education were more diversified, as compared to those without primary education.
B Titus <i>et al.</i> , 2007	Nigeria	Households	An Analysis of the Food Security Situation among Nigerian Urban Households	Household food insecurity was associated with residence.
R Ejaz Ali Khan	Pakistan	Households	Determinants of Food Security in Rural Areas	Production negatively affected food availability.
V Owusu <i>et al.</i> , 2011	Northern Ghana	Farm households	Non-Farm Work and Food Security	Household food insecurity was associated with income.
RO Babatunde <i>et al.</i> , 2010	Nigeria	Households	Impact of Off-Farm Income on Food Security and Nutrition	Household food insecurity was associated with off-farm income.
N Ihab <i>et al.</i> , 2015	Malaysia	223 households of mothers aged 18–55 years old	Assessment of Food Insecurity and Nutritional Status of Children	The prevalence of underweight, stunting and wasting was high among food-insecure households. Income, household size and the number of children were associated with household food insecurity.
Abo T <i>et al.</i> , 2015	Ghana	Households	Determinants of the Food Security Status of Female-Headed Households	Age of household head, educational level of household head and the size of the family were predictors of household food insecurity.
E Walton <i>et al.</i> , 2011	Developing countries	Households	Malnutrition in Developing Countries	Severe acute malnutrition is a key contributor to global childhood morbidity and mortality.
OS Ijarotimi, 2013	Developing countries	Countries	Determinants of Childhood Malnutrition	Poverty, lack of nutrition knowledge, poor child-

			and Consequences in Developing Countries	feeding practices and lack of care by caregivers all-cause malnutrition.
J de Graaff <i>et al.</i> , 2011	Sub-Saharan	Eight countries	Agriculture and Food Security	Some countries were not able to achieve national food security while others were.
HA Mbwana <i>et al.</i> , 2016	Tanzania	120 households	Determinants of Household Dietary Practices in Rural Tanzania	The literacy status of the mother and the distance to a water source impact household dietary diversity.

Household Food Insecurity and its Association With Malnutrition Among Children The Framework of Food Insecurity and Malnutrition

Although various determinants influence malnutrition, food insecurity is the leading risk factor for child malnutrition.⁵⁹ The immediate factors include the reduced food consumption of interlinked macronutrients—such as energy, protein and micronutrients.⁶⁰ Inadequate dietary intakes affect a child's nutritional status, which leads to poor health status.⁶¹ For example, infections in children cause a loss of appetite, which affects the dietary intake both in quantity and quality.⁶²

The malnutrition conceptual framework, developed by Campbell (1991), indicated that food insecurity is known to affect suboptimal nutritional outcomes and limit the quality of healthy living among children.⁶³ Malnutrition among children is caused by different factors, which include immediate (individual level), underlying (household or family level) and basic (societal level). These factors work together and influence other factors. Due to the occurrence of diseases and lack of adequate intake of food, both the basic and the underlying causes affect the immediate causes at the individual level.⁶⁴ The emphasis of the underlying factors is on household food insecurity, unhealthy household environment, poor health services, insufficient care and feeding practices.⁶⁵ The basic causes reflect societal, cultural, structural, economic and political processes within society, which have resulted in inadequate financial, human, physical and social capital, subsequently influencing household access to an adequate quantity and quality of resources.⁶⁶

The presence of severe food insecurity in the household implies nutritional risk.⁶³ The conceptual framework developed by the United Nations International Children's Emergency Fund (UNICEF) indicates that food security and health are the major determinants of nutritional status in children, as stated in the malnutrition framework (Figure 2). This framework emphasises that household food security, health and care are essential to achieving nutrition security for all.⁶⁷ Studies in Sub-Saharan Africa have demonstrated that, due to the consumption of a poor quality diet, this relationship with household food insecurity is associated with adverse health consequences such as obesity, chronic disease and nutritional disorders among children.^{61,68}

Overcoming food insecurity at the household level is challenging for two main reasons. First, the lack of ability to acquire adequate food may undoubtedly not be equivalent to food purchases. Households may not prioritise nutritious food acquisition over the purchase of other goods and services, such as school fees and housing. Second, the strategies of the intrahousehold allocation of food may not be based on the needs of each household member.⁸ Dr Naoko Yamamoto, Assistant Director-General at the World Health Organisation (WHO), stated, 'To provide quality health services and achieve Universal Health Coverage, nutrition should be positioned as one of the cornerstones of essential health packages. We also need better food environments that allow all people to consume healthy diets'.¹¹ Focusing on nutrition activities will help countries come closer to achieving universal health coverage and the Sustainable Development Goals.⁶⁹

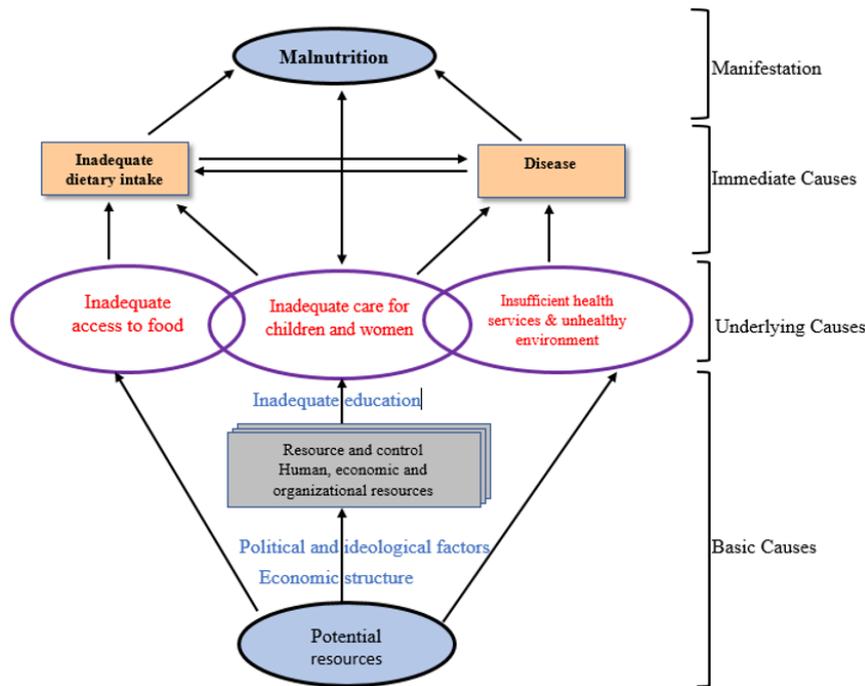


Fig. 2: UNICEF Conceptual framework of malnutrition (1991)

Tackling household food insecurity and malnutrition in Sub-Saharan Africa requires proper design along with robust strategic plans and intervention programmes that are cost-effective. Alongside economic growth, policies on poverty, food insecurity and malnutrition should be prioritised, and they should work in synergy. Food should be available, accessible and affordable at the household level and in conjunction with providing income-generating activities to the communities to improve their livelihood. Women’s empowerment projects should be prioritised to enhance their economic status. Since women spend their income in the household, when women’s situation improves, there will be a likely decline in poverty, an increase in food production and an improvement in nutrition.⁴⁷ Family planning services should be strengthened at the community level, as a means of birth control and to reduce unplanned pregnancies and high population growth. Empowerment of women and education accessibility should be further increased, as it will empower them to take part in decision-making in the household, in terms of income allocation and choice of family size. In addition to expanding agricultural activities by optimising land availability, other ways

to improve food insecurity in Sub-Saharan Africa include increasing educational opportunities for girls, access to family planning counselling, improving maternal health care services and reducing infant and child mortality.⁷⁰

This current review article attempted to review the current literature on the determinants of household food insecurity and its association with child malnutrition in Sub-Saharan Africa in general. However, this article was not able to highlight all aspects of household food insecurity determinants and their influence on undernutrition across all sub-regions. This is due to the variation in how factors were defined and measured in each study.

Conclusion

Evidence from this review article showed that many factors influence household food insecurity. Few of the multiple factors highlighted in the article included the gender of the household head; age, educational status, household size, income, poverty and food price were the main determinants that were shown to affect the status of household food security and lead to child malnutrition in Sub-Saharan Africa.

Author's Contributions

W. Drammeh prepared the manuscript. All the authors have proofread the manuscript.

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Conflict of Interest

The authors declare no conflict of interest.

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