

# CONCEPTUAL FRAMEWORK OF UNDERLYING FACTORS LIMITING ERADICATION OF HIDDEN HUNGER IN DEVELOPING COUNTRIES

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## Abstract

**Background:** Hidden hunger (HH) is a global public health problem. There is interplay of several underlying factors limiting HH in developing countries.

**Objective:** This paper aims at conceptualising the interplay of these underlying factors limiting HH in developing countries.

**Methodology:** A mixed method was used. A goggle search was done to extract data from literature on underlying factors of HH using the following term “corruption,” “nutrition knowledge,” “war,” “ agricultural food production,” “food choices and handling,” “caring practices,” “refugees,” “food scarcity,” “prevalence of micronutrient deficiencies”, “malnutrition”, and “country populations” to construct a conceptual framework. Out of 34 Low Income and 47 Lower Middle, 20 countries each were randomly selected from World Bank Country Classification. Secondary data were collected from Global Hunger Index (GHI) 2015), Food Insecurity Experience Scale (FIES) 2018, Corruption Perceptions Index (CPI) 2018 and World Population Review, 2019. Data was analysed using descriptive statistics and presented as means, standard deviation and percentages.

**Result:** Regional mean GHI was world (11.6%), Africa (19.5%), Asia (13.1%). Mean CPI, GHI and population for developing countries were 29.1, 40.7 million and 25.9. Mean FIES was world (9.1%), Africa (24.9%), Asia (6.8%). Conceptualised frame work showed that the major underlying causes of hidden hunger were nutrition knowledge, war, corruption, low agricultural productivity and over population culminating in HH.

**Conclusion:** Policies discouraging the underlying risk factors of hidden hunger and that promoting adequate micronutrients supply for vulnerable groups in developing countries are very important.

**Key words:** hidden hunger, micronutrient deficiencies, underlying factors, developing countries

**Word count:** 239

## 1.0 Introduction

Hidden hunger also called micronutrient deficiency is a global public health problem in developing countries especially Sub-Saharan Africa (SSA) and Asia (Sight and Life, 2013; UNHCR, 2013)). Globally, about 2 billion people lack key micronutrients like iron and vitamin A (Development Initiatives, 2017). One in three people in the world suffer from hidden hunger [2]. Nigeria, South Sudan and Somalia are countries cited as experiencing food insecurity and malnutrition from famine and droughts. In these countries, it is estimated that about 38 million people are severely food insecure, approximately 2 million children under five have severe acute malnutrition and 5 million people have moderate acute malnutrition (Development Initiatives, 2017).

Sustainable development Goals (SDGs) Targets 1 and 2 aim at no poverty and zero hunger and these are some of the risk factors of hidden hunger. Hunger has been reported to influence life expectancy in war-torn Sub-Saharan African countries (Uchendu, 2018). There are about 1 million Rohingya refugees from Myanmar many of whom are suffering from acute food insecurity, poor health, and injuries caused by violence (Hammond, 2018). Nigeria has approximately 7 million persons internally displaced persons (IDPs) (Lenschie and Yenda, 2016) while about 200, 000 Nigerians are refugees in Chad, Niger and Cameroun (WFP, 2018). Chad has 1 million IDPs, Niger 1.2 million, Cameroon 50, 000 and Ghana, 150, 000 (Lenschie 2016). Food shortage in Nigerian IDP camps has resulted in chronic hunger, and acute malnutrition (Adedibu, 2017). SDG Target 2.1 says “By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.” (FAO, IFAD, UNICEF, WFP and WHO, 2018). It has been suggested that hunger and displacement must be understood and treated as political problems (Hammond, 2018). It has been reported that food shortage in Nigerian IDPs’ camps have resulted in chronic hunger, and acute malnutrition (Adedibu, 2017).

Micronutrient deficiencies are silent epidemics of vitamin and mineral

deficiencies affecting people of all genders and ages, as well as certain risk groups (Tulchinsky, 2010). The most vulnerable are pre-school children, pregnant and lactating mothers and adolescents. In Nigeria, hidden hunger is a serious problem, with 29.5 % of children under-five estimated to be vitamin A deficient (HarvestPlus, 2012). Hidden hunger is a chronic lack of vitamins and minerals that often has no visible warning signs, so that people who suffer from it may not even be aware of it. It is as a result of inadequate intake of micronutrient dense staples and low food diversity. Other studies have also shown that micronutrient deficiency and worm infections are intertwined and co-exist among low-income population (Al-Mekhlafi et al. 2008; Khor and Zalilah, 2008). An association has been found between nutrition knowledge and food intake indicating that knowledge is an important factor in explaining variations in food choice (Wardle et al, 2000).

Poverty combined with other socioeconomic and political problems create the bulk of food insecurity around the world (FAO, 2011). 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 (Black et al. 2008). 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 (Wieser et al. 2013). Poverty, hunger, and gross food insecurity are ravaging the masses not because of lack of resources in some cases, but due to the absence of a ‘messiah’ or a true patriot or selfless advisors and managers of national resources and tax payers’ money (Uchendu, 2013). Corrupt practices have been reported to be negatively influencing food security and life expectancy in developing countries (Uchendu and Abolarin, 2015). This is an indication that if positive effort is not made to stop this trend, SDG target 2.1 which aims at eradicating hunger by 2030 might not be achieved (FAO, IFAD, UNICEF, WFP and WHO, 2018).

The prevalence of undernourishment is used to monitor hunger while the prevalence of severe food insecurity is measured using the Food Insecurity Experience Scale (FIES) which was introduced in 2017. FIES provides an estimate of the proportion of the population experiencing serious challenges of obtaining safe, nutritious and sufficient food (FAO, IFAD, UNICEF, WFP and WHO, 2018). The aim of this study therefore is to describe underlying risk factors responsible for persistent increase in hidden hunger in developing countries.

## **Materials and methods**

### **Inclusion criteria**

Countries were excluded if they do not have complete relevant data (CPI, FIES, POP, GHI) available. Global hunger Index (GHI) 2015 and Corruption Perceptions Index 2018 had records for 104 and 180 countries, respectively. Only developing countries that had complete data and a population of at least 1 million were included in the study resulting in 40 countries selected.

### **Sample collection**

A mixed method was used in collecting the data. A systematic review of relevant databases was searched from the earliest record until November 2019. Comprehensive search terms included: global prevalence of micronutrient deficiencies, malnutrition, country populations, corrupt practices, refugees, social amenities, food security, food scarcity, food availability, war incidences in

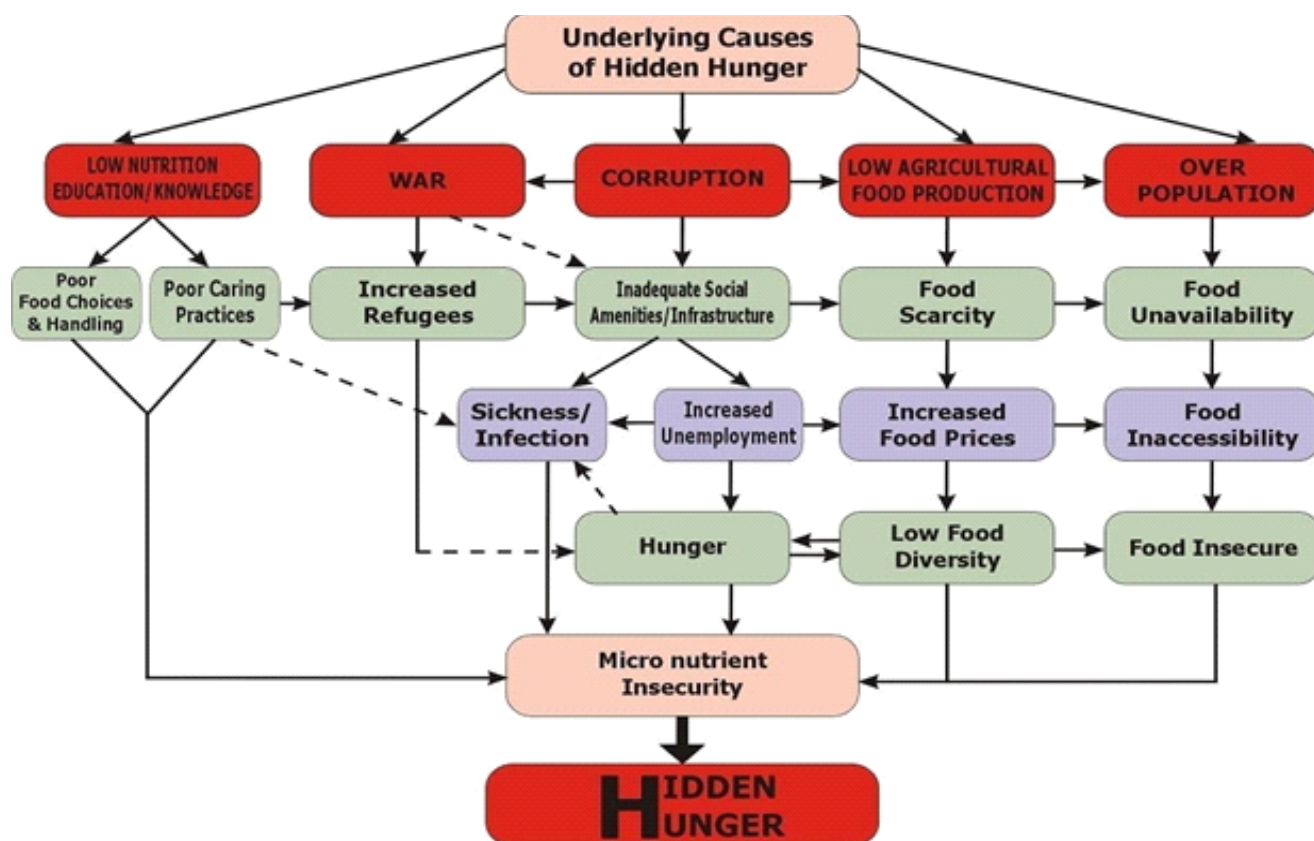
SSA, agricultural productivity in developing countries and nutrition knowledge among women. A conceptualised framework was constructed. List of developing countries were collected from World Bank Country Classification, 2019. Developing countries were randomly selected from Low Income (LEs) (\$995 or Less) and Lower Middle (LMEs) (\$996 to \$3,895) Economies. Out of 34 LEs and 47 LMEs, 20 countries each were randomly selected. Secondary data were also collected from Global Hunger Index (GHI) 2015, Food Insecurity Experience Scale (FIES) 2018, Corruption Perceptions Index (CPI), 2018 and World Population Review, 2018. 2019. Out of 104 and 180 countries in GHI and CPI. Countries were arranged according to their CPIs in chronological order.

### **Statistical analyses**

Data was analysed using descriptive statistics and presented in tables as means, standard deviation and percentages.

### **Result**

Figure 1 shows the conceptual framework of the major underlying factors limiting hidden hunger in developing countries. It reveals the major underlying factors as low agricultural food production, war, corruption, and over population and poor nutrition education/knowledge among women and children. The underlying factors had either direct or indirect influences on HH but the overall effect was micronutrient insecurity. This conceptual framework will guide the discussion.



**Figure 1: Conceptual framework of risk factors limiting the eradication of hidden hunger in developing countries**

Table 1 shows the mean corruption perceptions index 2018 of selected developing countries to be 29.1, GHI 2015 (25.9) and population (40.3 million).

**Table 1: Developing countries' corruption perceptions index 2018 and their population**

S/N	Country	CPI Score <sup>a</sup> 2018/100	GHI 2015 <sup>b</sup>	Population (≈million) <sup>c</sup>
1	Morocco	43	9.5	36.6
2	Lesotho	41	23.5	2.3
3	Burkina Faso	41	31.8	20.3
4	Ghana	41	15.5	30.1
5	Benin	40	21.8	11.8
6	Gambia	37	21.5	2.2
7	Mongolia	37	14.7	3.2
8	Philippines	36	20.1	108.1
9	Tanzania	36	28.7	60.9
10	Côte d'Ivoire	35	26.3	21.1
11	Zambia	35	41.1	18.1
12	Ethiopia	34	33.9	110.1
13	Niger	34	34.5	23.1
14	Pakistan	33	33.9	204.8
15	Vietnam	33	14.7	97.4
16	Liberia	32	30.8	4.9
17	Mali	32	29.6	19.7
18	Sierra-Leone	30	38.9	7.9
19	Togo	30	23.0	8.2
20	Bolivia	29	16.9	11.4

21	Honduras	29	13.4	8.6
22	Myanmar	29	23.5	54.3
23	Paraguay	29	10.5	6.8
24	Equatorial Guinea	28	28.8	1.4
25	Kenya	27	24.0	52.2
26	Nigeria	27	32.8	200.9
27	Bangladesh	26	27.3	168.1
28	Uganda	26	27.6	45.7
29	Cameroon	25	24.2	25.3
30	Madagascar	25	36.3	26.9
31	Nicaragua	25	13.6	6.0
32	Mozambique	23	32.5	31.4
33	Uzbekistan	23	13.3	32.8
34	Zimbabwe	22	30.8	17.2
35	Democratic Republic of Congo	20	26.6	86.7
36	Haiti	20	37.3	11.2
37	Angola	19	32.6	31.8
38	Chad	19	46.9	15.8
39	Congo, Rep.	19	26.6	5.5
40	Yemen	14	34.2	29.6
	<b>Mean<sup>d</sup></b>	<b>29.1±7.69</b>	<b>25.9±9.13</b>	<b>40.7±51.43</b>
<sup>a</sup> Transparency International Corruption Perceptions Index, 2018: Score 0 -100; The high the cleaner				
<sup>b</sup> Global Hunger Index, 2015;				
<sup>c</sup> World Population Review, 2019				
<sup>d</sup> Developing countries without complete data and population <1 million were excluded.				

Table 2 reveals the mean regional CPI scores of the world. The average CPI scores for Asia Pacific, Eastern Europe & Central Asia, Middle East & North Africa and Sub-Saharan Africa regions were 44 %, 35%, 39 % and 32 %.

<b>Table 2: Mean regional CPI scores of the world</b>						
S/N	Region	CPI Scores 2018/100*				
		Average	Top	Score	Bottom	score
3	Asia Pacific	44	New Zealand	87	North Korea	14
4	Eastern Europe & Central Asia	35	Georgia	58	Turkmenistan	20
5	Middle East & North Africa	39	United Arab Emirates	70	North Korea	14
6	Sub-Saharan Africa	32	Seychelles	66	Somalia	10
*Scale of zero (highly corrupt) to 100 (very clean)						
Source: Transparency International 2019						

Table 3 shows the regional prevalence of hunger (GHI) in the world from 2005 - 2017. The mean prevalence of hunger indices were world (11.6), Africa (19.5) and Asia (13.1).

<b>Table 3: Global prevalence of undernourished people (GHI) in regions of the world 2005 - 2017</b>								
S/N	Region	Undernourishment (years) <sup>a</sup>						
		2005	2010	2012	2014	2016	2017	Mean
1	World	14.5	11.8	11.3	10.7	10.8	10.9	11.6±1.44
2	Africa	21.2	19.1	18.6	18.3	19.7	20.4	19.5±1.10
3	Asia	17.3	13.6	12.9	12.0	11.5	11.4	13.1±2.21
4	Latin America and the Caribbean	9.1	6.8	6.4	6.2	6.1	6.1	6.7±1.16

5	Oceania	5.5	5.2	5.4	5.9	6.6	7.0	5.9±0.72
6	Northern America and Europe	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Source: <sup>a</sup> FAO, IFAD, UNICEF, WFP and WHO (2018); <sup>b</sup> Population Reference Bureau, (2019) *billion, Population mid-2018 (millions)								

Table 4 shows the prevalence of severe food insecurity, measured with the food insecurity experience (FIES) scale, 2014–2017 in developing countries as world (9.1 %), Africa (24.9 %) and Asia (6.8 %).

S/N	Region	Food Insecurity Experience Scale (FIES) by year				
		2014	2015	2016	2017	Mean
1	World	8.9	8.4	8.9	10.2	9.1±0.77
2	Africa	22.3	22.4	25.4	29.8	24.9±3.52
3	Asia	7.3	6.6	6.5	6.9	6.8±0.35
4	Latin America	7.6	6.3	7.6	9.8	7.8±1.45
5	Northern America and Europe	1.5	1.5	1.2	1.4	1.4±0.14
Source: FAO, IFAD, UNICEF, WFP and WHO. (2018).						

## Discussion

Corruption, war, over population, low agricultural food production and low agricultural food production might be underlying risk factors limiting the eradication of hidden hunger in developing countries (Figure 1). Developing countries are densely populated (40.7 million), have the highest mean corrupt practices tendencies below 30 % (29.1) and very high hunger people (25.9). Sub-Sahara African countries have the highest corrupt perceptions index (32.0 %), Africa has the highest undernourished people (19.5 %) followed by Asia (13.1 %) when compared with the rest of the regions while the highest most food insecure people is in Africa only (24.9 %). The prevalence of food insecurity in Africa is four times that of Asia and twice the world prevalence. Even though the level of undernourishment in Asia has reduced and remained stable, that of Africa starting increasing again from 2016. This is an emergency trend and needs critical action to check met it. Hidden hunger is precipitated by underlying factors such as corruption, war, over population, low agricultural food production and low agricultural food production. These underlying risk factors either have direct or indirect influence on

hidden hunger and they are also interlinked (Figure 1).

Corruption is described as the dishonest and fraudulent practices by officials in power or position of authority. It is an abuse of entrusted power for personal gain (Transparency International, 2018).

From the conceptual framework, corruption leads to unavailability of adequate social amenities/infrastructures. Absence of social amenities/infrastructures in turn precipitates sickness, infection and increased unemployment. For example, lack of portable water will lead to infection and sickness and if there is no money to pay for hospital bills due to unemployment, this might result to increased morbidity and mortality. Corrupt practices have been reported to negatively influence food security and life expectancy in developing countries (Uchendu and Abolarin, 2016). Unemployment in the presence of increased food prices results in hunger and prolonged hunger gives rise to micronutrient insecurity among the vulnerable groups.

Many African countries are over-populated with a mean population of 41.7 million. The three most populous countries were Bangladesh (156.6 million), Nigeria (173.6

million), and Pakistan (190.7 million) (Table 1). Developing countries are highly populated but with very high mean CPI index less than 30 %. Poverty, hunger, and gross food insecurity are ravaging the masses not because of lack of resources in some cases, but due to the absence of a 'messiah' or a true patriot or selfless advisors and managers of national resources and tax payers' money (Uchendu, 2013).

There is an increasing incidences of war, conflicts and unrest in many developing countries especially Sub-Sahara Africa. War and conflicts forcefully displaces people from their residences or homes and makes them refugees incapable of helping themselves. There are about 1 million Rohingya refugees from Myanmar many of whom are suffering from acute food insecurity, poor health, and injuries caused by violence (Hammond, 2018). Nigeria has approximately 7 million persons internally displaced (Lenshie and Yenda, 2016) while about 200, 000 Nigerians are refugees in Chad, Niger and Cameroun (WFP, 2018). Chronic hunger threatens the lives of forcibly displaced persons. Hunger has been reported to influence life expectancy in war-torn Sub-Saharan African countries (Uchendu, 2018). The prevalence of undernourished people (PoU) in the world has stabilized except in Africa where the PoU started increasing again from 2016 (19.7 %) to 2017 (20.4 %). This might be attributed to the underlying factors that limit eradication of hidden hunger (Figure 1). War results in forced migration via increased number of refugees and internally displaced persons (IDPs) who live in camps with no shelter, food, portable water and clean environment. Children and women especially pregnant women and lactating mothers in IDP camps face prolonged hunger and malnutrition. Hunger has been reported to influence life expectancy in war-torn Sub-Saharan African countries (Uchendu, 2018). It has been suggested that hunger and displacement must be understood and treated as political problems (Hammond, 2018).

Low agricultural food production leads to inadequate supply of food which is an indicator of hunger and it affects the whole population both adults and children. This in turn causes food scarcity resulting in increased food prices, low food diversity and undernourishment. Low food diversity

affects the quality of food consumed. Food scarcity results in food unavailability, food inaccessibility and eventually food insecurity due to low food diversity ultimately leading to hidden hunger. Most developing countries do not embark on mechanized agriculture to produce enough food for their population.

Low nutrition knowledge gives rise to poor food choices, poor food handling and poor caring practices. Poor food choices would result in low food diversity while poor food handling could lead to degradation and destruction of micronutrients during processing. Low food diversity and degradation of micronutrients have a direct relationship with hidden hunger. Adequate nutritional knowledge is required to make the right food choices by mothers and care-givers. In the presence of low agricultural food production, good nutritional knowledge is necessary to be able to combine the available and affordable food to get quality meal. Good nutritional knowledge will provide the citizens with the information necessary to choose healthy foods which will eventually lead to an improvement in dietary intake. Also, good nutritional knowledge will give accurate information about what the people should be eating and the implications to their health if they eat the 'wrong' foods, and this will make them change their diets appropriately. An association has been found between nutrition knowledge and food intake indicating that knowledge is an important factor in explaining variations in food choice (Wardle et al, 2000). Women who had better knowledge of nutrition also exhibited better dietary behaviour, thus underlying the importance of nutrition education for improving dietary behaviour (25). Global nutrition education is very important among children, adolescents, and adults to eradicate hidden hunger.

### **Conclusion**

The underlying primary socio-economic factors for persistent increase in hidden hunger in developing countries include corruption, over population, incessant war, low agricultural food production, and low nutrition knowledge among mothers and care-givers. The region of Africa still has the highest corrupt practices, undernourished people and severe food insecurity. Implementation and monitoring

of policies geared at reducing the underlying risk factor of hidden hunger in developing countries is very important. Hidden hunger policies face the challenges of implementation and monitoring.

### Ethics statement

The datasets used in this study were obtained from [21-25]. Full review of this study from an institutional review board was not sought as the datasets were anonymous and they are available for public use with no identifiable information on the survey participants.

**Conflict of interest:** The author declares no conflict of interest.

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