The Epidemiology of Wasting in Nigeria

Oluwatoyin Victoria Omotosho

Georgia State University

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ABSTRACT

The Epidemiology of Wasting in Nigeria

By

Oluwatoyin Victoria Omotosho

12/11/18

Wasting or acute malnutrition can be defined as low weight for height; it is used as an indicator of malnutrition. Wasting is a significant public health problem affecting children aged 5 and below in developing countries around the world. Nigeria, a developing country, is severely affected by wasting and it is one of the countries that accounted for the high burden of wasting in the World. Over the last decade, the global prevalence of wasting has decreased. Despite this, the prevalence of wasting in Nigeria has drastically increased at a percentage of 18%. Evidence has shown that wasting leads to high mortality in children. Intervention programs are proving to be futile in curbing wasting because they aren’t addressing the root cause of the issue. This capstone explores the complex nature of the determinants and prevalence of wasting in children under age five via a review of previous literature done in this area. Given its public health importance, the world health assembly in 2012 set a target to reduce wasting in children to less than 5 percent by 2025. Recommendations will also be discussed on the role public health professionals and the government can play in combating the high prevalence of wasting in Nigeria.
The Epidemiology of Wasting in Nigeria

By

Oluwatoyin Victoria Omotosho

B.S., BABCOCK UNIVERSITY

A Capstone Submitted to the Graduate Faculty of Georgia State University in Partial Fulfillment of the Requirements for the Degree MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303
The Epidemiology of Wasting in Nigeria

By

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November 28th, 2018
Date
Acknowledgments

I would love to thank GOD for everything in my life. I would also like to thank Queen Titi, Segun, Biola, Mummy Fashina and, Dipo.

Lastly, I would like to thank Dr. Okosun and Dr. Yankey for their patience, guidance, and supervision.
In presenting this capstone as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, to copy from, or to publish this capstone may be granted by the author or, in his/her absence, by the professor under whose direction it was written, or in his/her absence, by the Associate Dean, School of Public Health. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this capstone which involves potential financial gain will not be allowed without written permission of the author.

Oluwatoyin Victoria Omotosho
Signature of Author
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CHAPTER 1
INTRODUCTION

1.1 Background

Wasting or acute malnutrition can be defined as low weight for height (WHO, 2012). The weight-for-height (WHZ) index measures body mass in relation to height and reflects current nutritional status. According to World Health Organization (WHO), Children with weight-for-height Z-scores (WHZ) below minus two standard deviations (-2std) from the median of the WHO reference population are considered acutely malnourished or wasted while those with Z-scores below minus three standard deviations (-3std) from the median of the WHO reference population are considered as severely wasted (WHO, 2013).

In children, Wasting happens when the child loses body weight rapidly as a result of inadequate nutrition and acute shortage of food nutrients, putting the child at increased risk of illness. Wasting, usually, is a consequence of a high incidence of infectious diseases, especially diarrhea which in turn hinders the functioning of the immune system of the child and can lead to increased severity and duration of and susceptibility to infectious diseases and an increased risk for death.

Malnutrition is an important public health problem faced by children under five years as it contributes to child morbidity and mortality (WHO, 2013). Malnutrition is linked to poverty, low socioeconomic status, the presence of infections and so on. Protein-energy malnutrition (PEM) is one of the most common forms of malnutrition, its results from deficiencies in energy and protein intake. Under-nutrition which comprises of stunting, wasting, underweight is also a form on malnutrition.

Malnutrition in children occurs when they consistently do not consume the right amounts and types of food or absorb vital nutrients. Globally, malnutrition contributes to nearly half of all child deaths.
(Black et al., 2013). Around 45% of deaths among children under five years of age are linked to malnutrition, and these mostly occur in low income and developing countries.

Globally, in 2017, the WHO reported that there were 151 million children under five year of age were stunted, 51 million wasted, 16 million severely wasted and 38 million overweight.

Regionally, Africa and South Asia were reported to have the highest rate of child malnutrition in the world accounting for about 33% of all malnourished children globally. In Africa, it was reported that 9.4% of children under five years were wasted (UNICEF; WHO, 2015). Despite the global reduction, wasting has been on the rise in Nigeria in the past decade, increasing from 11% in 2003 to 18% in 2013 (National Population Commission, 2014).

While wasting and stunting are both very different expressions of malnutrition, wasting poses an immediate threat to the life of children affected while stunting does. For this reason, wasting is the highest priority form of malnutrition in humanitarian emergencies. Given its public health importance, the world health assembly in 2012 set an ambitious target of reducing wasting to less than 5 percent by 2025. To help the Nigerian government be in line with this target, we aimed at identifying factors associated with wasting.

1.2 Geography
Nigeria is a West African country, located near the northeastern corner of the Gulf of Guinea, and it is the most populated country on the African continent. It is home to almost 186 million people in 2016 (UNICEF, 2017). Nigeria is made up of 36 states grouped into six geopolitical zones.
Figure 1: Map of Nigeria showing the geopolitical zones.
Source: pubs.sciepub.com/ajis/3/1/2/figure/1

Table 1: Nigerian states by geopolitical zone

<table>
<thead>
<tr>
<th>Geopolitical zone</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central</td>
<td>Kwara, Kogi, Plateau, Nasarawa, Benue, Niger, and F.C.T</td>
</tr>
<tr>
<td>North East</td>
<td>Taraba, Adamawa, Borno, Yobe, Bauchi, and Gombe</td>
</tr>
<tr>
<td>North West</td>
<td>Sokoto, Zamfara, Kebbi, Kaduna, Katsina, Kano, and Jigawa</td>
</tr>
<tr>
<td>South East</td>
<td>Anambra, Enugu, Ebonyi, Imo, and Abia</td>
</tr>
<tr>
<td>South-South</td>
<td>Edo, Delta, Rivers, Bayelsa, Cross-River, and Akwa-Ibom</td>
</tr>
<tr>
<td>South West</td>
<td>Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti</td>
</tr>
</tbody>
</table>
Nigeria has the largest economy in Sub Saharan Africa, and it relies heavily on crude oil as its primary source of foreign exchange and government revenues. Despite being oil-rich Nigeria is still plagued by an inadequate power supply, lack of infrastructure, lack of adequate healthcare, an inconsistent regulatory environment, a slow and ineffective judicial system, unreliable dispute resolution mechanisms, insecurity, and extreme corruption. In 2017, Forbes reported that over 62% of Nigeria's population still live in extreme poverty.

1.3 Aim

This objective of this study is to identify factors associated with wasting and severe wasting among children under age five years in Nigeria. The epidemiology, assessment, and prevention of severe wasting in children under age five in Nigeria will be discussed. Lastly, this review will summarize the intervention strategies to reduce wasting in Nigerian children.
CHAPTER 2
LITERATURE REVIEW

2.1 Epidemiology of Severe wasting

Severe wasting also known as severe acute malnutrition (SAM) is extremely low weight for height, it is defined as WHZ z-scores below minus three standard deviations (-3std) from the median of the WHO reference population presence of bilateral pitting edema. Globally, nearly 20 million children under age five are affected by severe wasting contributing up 1 million deaths each year with increased susceptibility to death from severe infections (Black et al., 2013). In Nigeria it is estimated to affect 500,000 to 1,000,000 children under age 5, contributing as much as 100,000 deaths per year.

The clinical signs of a child with Severe wasting include;

- Marasmus (a form of severe malnutrition)
- Edema (a sign of kwashiorkor)

The main diagnostic features for Severe wasting include;

- WHZ <-3std
- Mid-upper arm circumference (MUAC) <115mm
- Edema on feet

2.2 Assessment and classification of Severe Wasting

Children with malnutrition are diagnosed to check for wasting or severe wasting. When severe wasting is confirmed they are classified according to the presence or absence of clinical complications (WHO, 2013);

- Complicated severe wasting: These children have clinical features of infection, have no appetite, and several other complications. There is need for hospital admission, they are
managed as an inpatient, and they are discharged only when complications are resolved to continue nutritional management as an outpatient.

- **Uncomplicated severe wasting:** These children have no signs of infection, have a good appetite and are clinically well with no indication for hospital admission. These children are managed as outpatients, with ready-to-use therapeutic foods (RUTF).

### 2.3 Risk Factors

In this study, conceptual framework depicted in Figure 2 below was used to describe the possible risk factors consisting of five categories: socio-demographic factors, Community level factors, media factors, environmental factors, and proximate determinants.

**Figure 2:** Conceptual framework of the factors associated with wasting and severe wasting in under-five aged children in Nigeria. **Source:** UNICEF, 2013

Based on this framework, the risk factors of child wasting are elaborated below;

**Community-level factor:** The community-level factors are as follows;
i) **Geographical Zone:** Previous research findings on wasting in Nigeria have shown that the prevalence of wasted children in the Northern region is higher compared to other regions. For example, a study conducted by Akombi showed that children residing in the Northwest, Northcentral, and Northeast geographical zone are more likely to be wasted and severely wasted compared to other zones (Akombi et al., 2017). Another study by Winter Rebecca and colleagues using the demographic health survey, this study showed that there was an increased prevalence of wasting in children under five in the Northern region with Northwest having the highest percentage (Winter et al., 2016).

ii) **Place of residence:** Previous research findings on wasting in Nigeria have shown that children that live in urban areas have fewer chances to be wasted than those in rural areas. (Winter et al., 2016).

**Sociodemographic factor**

i) **Wealth index:** According to the Demographic Health Survey (DHS), the wealth index is a composite measure of a household's cumulative living standard. A case-control study carried out by Owoaje in Ibadan, on the relationship between nutritional status and economic status showed that children from wealthy homes were less likely to be wasted than those from low-income households (Owoaje et al., 2014).

ii) **Father’s education:** The Father’s educational status is a crucial risk factor that has a direct impact on child health, and nutritional status as fathers are usually regarded as the breadwinners or head of the family in the most cases in the African. In a study carried out in Enugu state (Southeast), wasting was more prevalent among children whose fathers had secondary education and this difference was statistically significant (Obianuju et al., 2017).
Nigeria, surveys have shown that the percentage of men who are educated are more than that of the women and this greatly affects the nutritional status of the child.

iii) Mother’s education: The mother’s educational level is an important factor in the nutritional status of children or child’s health in general. Previous studies have shown the positive relationship between maternal Literacy and child’s health. For instance, in a study, a lower prevalence of malnutrition was found in children of mothers with tertiary education or higher (Obianuju et al., 2017). This is because educated mothers are more likely to have easier access to information on how to improve their child’s health. Also, these mothers also tend to exhibit a much higher willingness to accept and utilize current healthcare practices rather than primitive methods (Babar et al., 2013). An educated mother influences the health of their children in a positive way by adopting modern techniques of childcare and challenging existing traditional beliefs.

iv) Father’s occupation: The father having an occupation means there will be inflow of income which could increase the socioeconomic status. It has been established that there is an association between socioeconomic status and nutrition. In Nigeria, previous studies have also reported higher rates of stunting and underweight in children from lower socioeconomic class than in those from the upper class (Akor et al., 2010). For instance, in Onitsha (Southeast Nigeria), Ndukwu found that lower class children were more underweight compared to those in the upper-class (Ndukwu et al., 2013).

v) Mother’s occupation: The mother having an occupation means there will be an inflow of income and will decrease the chances of having malnourished children. Studies have shown that unemployed mothers are about five times more likely to have malnourished children compared to employed mothers (Amosu et al., 2011; Ajao et al., 2010).
Environmental Factors:

i) **Source of drinking water & sanitation:** The source of drinking water is vital in the health of a child. In Nigeria, access to portable drinking water is quite weak, and 59% of Nigerian households have access to improved water supply (NBS, 2011). The Urban areas have better access than rural areas; about 71% and 53% respectively. A greater percentage of Nigerians relies on other sources like boreholes, tap water and wells for the supply of water (NPC, 2009a). Surveys have shown that rural areas also lack proper sanitation and improved toilet facilities, many people from the rural areas take their bath, wash clothes and dishes, dispose waste including feces, and others and drink from that same source of water. The water gets contaminated due to lack of sanitation, and when children ingest this water, they are at risk of acquiring infections like diarrhea. Children who are wasted have a 5-20 times higher risk of dying from common diseases like diarrhea than normally nourished children.

Media Factors:

The Media helps with health promotion, previous studies have shown that children from households that are exposed media like television are less susceptible to wasting and severe wasting compared to others because their parents are socially advanced and exposed to relevant information about proper nutrition and child feeding practices (Akombi et al., 2017). Another study conducted in Bangladesh highlighted that there is a positive relationship between the media and wasting (Rahman et al., 2009)

Proximate Determinants

i) **Maternal factors:** Mothers with body mass index (BMI) less than 18.5 kg/m2 were significantly more likely to have children that are wasted or severely wasted than mothers
with BMI greater than 25 kg/m². (Akombi et al., 2017). Other studies showed that maternal BMI, which is an indicator of the mother’s nutritional status was significantly associated with wasting in their children (Dabale et al., 2014).

ii) **Place and mode of delivery:** The Place of delivery significantly increases a child’s susceptibility to wasting. In Nigeria, it is believed that children delivered at home have poorer nutritional status than those delivered at a health facility. Studies have shown a strong relationship between institutional delivery and mother’s education, which can, in turn, affect the health of children (Shrestha et al., 2014, Matsumura et al., 2001).

iii) **Child factors (Age and sex):** Past research indicates that boys are more likely to be wasted than girls (Dabale et al., 2014). It has also shown that there is an association between the age of the child and wasting. For example, in a study conducted by Akombi et al. (2017), the prevalence of wasting and severe wasting was higher in the age group of 0-5 months and 6-23 months.

**2.4 Trends of Wasting in Nigeria**

Over time, the percentage of wasting in Nigeria has increased as it went from 10.8% in 1990 to 18% in 2013 as seen in figure 3. This shows that the situation of wasting in Nigeria constitutes a critical public health emergency. Looking at the trends of wasting in Nigeria as illustrated in figure 3, it indicated that the prevalence of wasting in Nigeria between 1990-2013 has not improved. Past surveys showed that Nigeria has one of the highest levels of wasting in sub-Saharan Africa. Despite the extreme rate of wasting in the country, the Nigerian government commitment towards improving nutritional status is inadequate. Other countries in sub-Saharan Africa like Ghana,
Senegal, Ethiopia have made more exceptional reduction in malnutrition level compared to Nigeria within the same period (World Bank, 2011).

**Figure 3:** Trends in wasting of children under five in Nigeria, 1990-2013

(Source: ICF, 2015. The DHS Program STAT compiler)

**2.5 Consequence of Wasting**

The severity of wasting is positively correlated with an increase in the risk of death (Black et al., 2013). A study has shown that the more severe the degree or level of wasting the higher the risk of mortality (Black et al., 2013). Children who are wasted have severely disturbed physiology and metabolism and need to be treated with care and caution. Wasting increases; the risk of death due to infectious illness, a child’s susceptibility to infections and the severity of diseases (Laghari et al., 2013; Long et al., 2013; Meshram et al., 2012; UNICEF, 2013).

**2.6 Public Health Significance of Wasting**

The table below shows the WHO levels of wasting for any population or country. For wasting to be acceptable in any country the prevalence value must be less than 5%.
Table 2: Cut-off values for public health significance

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Prevalence cut-off values for public health significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasting</td>
<td>&lt; 5%: Acceptable</td>
</tr>
<tr>
<td></td>
<td>5-9%: Poor</td>
</tr>
<tr>
<td></td>
<td>10-14%: Serious</td>
</tr>
<tr>
<td></td>
<td>≥ 15%: Critical</td>
</tr>
</tbody>
</table>


2.7 Interventions

In this study, the interventions are grouped into three categories;

- Primary intervention: Involves prevention of wasting before it occurs
- Tertiary intervention: Involves treatment of wasting, severe wasting, and the recovery process.

Primary Intervention:

Prevention of wasting and severe wasting involves adhering to the public health interventions which promote optimal child growth and development. These strategies include the promotion of appropriate breastfeeding and complementary feeding practices, access to proper health care for the prevention, and improved sanitation and hygiene practices. Malnourished children are often more susceptible to infection, which contributes to weight loss through increased metabolism which leads to wasting (Guerrant et al., 2008). The critical window to ultimately prevent malnutrition is from the start of the woman’s pregnancy till her child’s second birthday is referred
to as the “1000-day period”. Proper nutrition during this period can prevent malnutrition, ensuring that children have the best opportunity to grow.

**Secondary Intervention:**

The Community-based Management of Acute Malnutrition (CMAM). The (CMAM) is an approach for managing and treating both wasting and severe wasting in children. The CMAM is a community-based program that was first introduced in Nigeria in 2009, through a program implemented by the governments of Gombe and Kebbi state. The CMAM program in Nigeria aimed to explore “different approaches to integrate CMAM into routine health services in a sustainable manner” across northern Nigeria (Gallagher et al., 2012). The CMAM intervention saves lives by providing prompt medical services to children facing a high risk of death. In Nigeria, a report by UNICEF with ACF estimated that, from the start of the CMAM in 2009 through October 2014, 172,898 deaths had been prevented thanks to the treatment (Bulti et al., 2014).

**Tertiary Intervention:**

Some of the medical complications associated with severe wasting include; anorexia, intractable vomiting, high fever, hypothermia, hypoglycemia, hypothermia, dehydration, skin lesions, etc. The World Health Organization published a ten-step guide for inpatient management and treatment of complicated SAM to reduce the case fatality in health facilities (WHO, 2003) as seen in figure 4 below.
**Figure 4**: World Health Organization’s Ten-Step Plan for the Management /Treatment of Severe Wasting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Initial treatment</th>
<th>Rehabilitation</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Days 1–2</td>
<td>Weeks 2–6</td>
<td>Weeks 7–26</td>
</tr>
<tr>
<td>Treat or prevent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Hypoglycemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hypothermia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Dehydration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Correct electrolyte imbalance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Treat infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Correct micronutrient deficiencies</td>
<td>Without iron</td>
<td>With iron</td>
<td></td>
</tr>
<tr>
<td>7. Begin feeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Increase feeding to recover lost weight (“catch-up growth”)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Stimulate emotional and sensorial development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Prepare for discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Picot et al., 2012; WHO, 2003

The steps are divided into three phases:

- **Phase I** (Initial treatment): In this phase complications such as dehydration, hypoglycemia, hypothermia, infections, and electrolyte imbalances are treated.

- **Phase II** (Rehabilitation): In this phase electrolyte imbalances and micronutrient deficiencies continue to be treated with the addition of iron; feeding is increased to encourage growth.

- **Phase III** (Follow-up): In this phase increased feeding is continued to recover lost weight.

In children with severe wasting, multiple infections are common. Therefore, on their arrival at the hospital, it is recommended to assume that they have an infection and should be treated with antibiotics immediately. On admission to the hospital, it is advised to administer broad-spectrum antibiotics. In Nigeria, where worm infestation is prevalent, treatment by antibiotics is prescribed in the rehabilitation phase. Presence of other infections like pneumonia, dysentery, malaria will be treated with the appropriate antibiotic.
CHAPTER 3

METHODS

To find available data for this study, two electronic databases were used for selecting articles: PubMed, Medline. The selection criteria for the research articles used for this paper includes recent articles, articles published in English language, articles published in Nigeria. During the database search, the following main keywords used were ‘wasting,’ ‘children,’ ‘Nigeria,’ ‘determinants,’ and ‘prevalence.’ Searches were limited to articles published in the English language. The papers identified from the literature search were screened and analyzed for enough data on child wasting in Nigeria. A detailed hand search was also conducted to check the reference lists of all included articles, and citation searches of key included paper.

Table 3: Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Full-text articles conducted in Nigeria</td>
<td>➢ Studies not carried out in Nigeria</td>
</tr>
<tr>
<td>➢ Articles between 2000 and 2018</td>
<td>➢ Studies without full-text available</td>
</tr>
<tr>
<td>➢ Articles published in English</td>
<td>➢ Studies published in other languages</td>
</tr>
<tr>
<td>➢ Articles focused on wasted Children under age 5</td>
<td>➢ Studies on children above age 5</td>
</tr>
</tbody>
</table>
39 Databases made available by the Georgia State University Library

2 databases used for search

PubMed articles  
n= 2395

Medline articles  
n= 2629

Exclusion by years of publication, language, and full-text availability:
✓ 2000-2017
✓ English language
✓ Full-text available

PubMed articles  
n= 1690

Medline articles  
n= 901

Exclusion by country and age group:
✓ Nigeria
✓ Children under age 5

PubMed articles  
n= 12

Medline articles  
n= 5

Exclusion by removing replicated articles.

N=12

2 additional articles added through Google searches.

14 articles met the inclusion criteria
CHAPTER 4

Results of selected articles

Table 4: Characteristics of Selected Literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Study design</th>
<th>Study objective</th>
<th>Sample population and settings</th>
<th>Method</th>
<th>Limitations</th>
<th>General Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akombi et al., (2017)</td>
<td>Multi-level Analysis of Factors Associated with Wasting and Underweight among Children Under 5 Years in Nigeria</td>
<td>Cross-sectional study</td>
<td>To determine the risk factors associated with wasting among children under age 5 in Nigeria.</td>
<td>24,529 Children under age 5, Nigeria</td>
<td>Data were obtained from the 2013 Nigeria Demographic and Health Survey (NDHS)</td>
<td>N. A</td>
<td>This study categorized the determinants of wasting into the community, socio-demographic, environmental, media and proximate factors. Additionally, it shows that other risk factors like low income, low socioeconomic status, maternal and paternal factor, diarrhea were associated with the increasing prevalence of wasting and severe wasting in children.</td>
</tr>
<tr>
<td>Dunn (2018)</td>
<td>The impact of the Boko Haram insurgency in Northeast Nigeria on Women with children under age 5</td>
<td>Double-difference study</td>
<td>To examine the relationship between the Boko Haram terrorist conflict and child wasting in Women with children under age 5 in Northeast Nigeria</td>
<td>Women with children under age 5 in Northeast Nigeria</td>
<td>Demographic Health Surveys data from 2008 and 2013</td>
<td>Other factors that affect both the terrorist conflict and malnutrition which might</td>
<td>This study suggests that if the affected children had not been exposed to the terrorist conflict, the chances of wasting would be 13% lower.</td>
</tr>
<tr>
<td>Study</td>
<td>Disease/Causes</td>
<td>Study Type</td>
<td>Population/Method</td>
<td>Sample Size/Study Characteristics</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------------------</td>
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<td>---------------------------------</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional survey</td>
<td>Small sample size. Additionally, this study suggests that infection of schistosomiasis and intestinal helminths increase the risk of all types of malnutrition (like wasting) in children.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional study</td>
<td>Here, the prevalence of wasting is higher in children who did not receive appropriate complementary foods and vice versa. Also, the odds for wasting in children with complementary food is very high with an OR of 5.15.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authors</td>
<td>Study Title</td>
<td>Study Type</td>
<td>Study Objectives</td>
<td>Sample Size</td>
<td>Data Collection Method</td>
<td>Results</td>
<td></td>
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<td>------------------------------------------------------------------------------</td>
<td>------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Senbanjo et al., (2016)</td>
<td>Dietary practices and nutritional status of under-five children in rural and urban communities of Lagos State, Nigeria</td>
<td>Comparative analytical study</td>
<td>To compare the diet practices and nutritional status of children in both rural and urban communities of Lagos.</td>
<td>300 mother-child pairs in Lagos.</td>
<td>Multistage sampling method</td>
<td>Here, the prevalence of wasting is slightly higher in urban areas compared to rural areas. Also, the prevalence of exclusive breastfeeding in both rural and urban communities is very low.</td>
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<tr>
<td>Ocheke et al., (2015)</td>
<td>Malnutrition in acutely ill children at the pediatric emergency unit in a tertiary hospital in Nigeria.</td>
<td>Cross-sectional descriptive study</td>
<td>To describe the patterns and prevalence of malnutrition in children with acute illnesses.</td>
<td>Children under age 5 with acute illnesses at the Jos University Teaching Hospital</td>
<td>Data were obtained from the pediatric unit from April to October in 2012.</td>
<td>Of all the children with malnutrition and acute illnesses, wasting is the most common form of malnutrition. Severe wasting was also prevalent in children with marasmus and edema.</td>
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<td>Balogun and Yakubu (2014)</td>
<td>Recent illness, feeding practices and father's education as determinants of nutritional status among children under age 5 in rural communities in North Nigeria</td>
<td>Cross-sectional survey</td>
<td>To determine the impact of feeding practices, SES and immunization.</td>
<td>374 children under age 5 in rural communities in North Nigeria</td>
<td>A multistage cluster sampling method</td>
<td>This study showed that recent episodes of diarrhea, low SES, poor feeding practices increase the risk of wasting in children.</td>
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<tr>
<td>Study</td>
<td>Research Question</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Data Collection Method</td>
<td>Bias Reporting</td>
<td>Findings</td>
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<td>Lawan et al., (2014)</td>
<td>Age-appropriate feeding practices and nutritional status of infants attending child welfare clinic at a Teaching Hospital in Nigeria</td>
<td>A Cross-sectional descriptive study</td>
<td>300 infants and their caregivers. Aminu-Kano Teaching hospital, Kano state.</td>
<td>Use of interview administered questionnaire</td>
<td>Reporting and recall bias</td>
<td>This study showed that 40% of the infants had different degrees of wasting and severe wasting. It also shows that there is a significant association between the caregiver’s practices and wasting prevalence.</td>
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<td>Senbanjo et al., (2013)</td>
<td>Maternal and child under-nutrition in rural and urban communities of Lagos state, Nigeria: the relationship and risk factors.</td>
<td>Cross-sectional survey</td>
<td>300 mother-child pairs in Lagos state.</td>
<td>Multistage random sampling method</td>
<td>Only two LGA were considered</td>
<td>Maternal and child malnutrition is highly prevalent in rural communities. The risk of malnourished mothers having wasted children was 12 times more compared to healthy mothers. There is a significant association between maternal health and child wasting.</td>
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<tr>
<td>Study</td>
<td>Title</td>
<td>Methods</td>
<td>Study Objectives</td>
<td>Sample Size</td>
<td>Data Source</td>
<td>Bias</td>
<td>Summary</td>
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<td>Ordinioha &amp; Sawyer (2008)</td>
<td>Food insecurity, malnutrition and crude oil spillage in a rural community in Bayelsa State, south-south Nigeria.</td>
<td>Cross-sectional study</td>
<td>To examine the result of the oil spillage on household food insecurity in children under age 5 in the affected communities in Bayelsa state.</td>
<td>956 children under age 5 in Bayelsa state.</td>
<td>Questionnaire s</td>
<td>Reporting and recall bias</td>
<td>This study showed that there was an increase in food security and malnutrition in affected communities. Also, there was a rise in the proportion of wasting in the affected areas due to food shortage.</td>
</tr>
<tr>
<td>Sebanojo &amp; Adeodu (2006)</td>
<td>Risk factors for malnutrition among rural Nigerian children</td>
<td>Cross-sectional survey</td>
<td>To determine the influence of feeding practices and family characteristics on the nutritional status of children under-five.</td>
<td>420 children in Ifewara, Osun state.</td>
<td>multistage cluster and random sampling techniques</td>
<td>Selection bias</td>
<td>This study showed that the risk factors like overcrowding, low income was associated with a high prevalence of wasting. The prevalence of malnutrition in this area is lower compared to rural areas in other cities like Lagos; this might be due to the presence of the NGO that provides free medical services for children under 5.</td>
</tr>
<tr>
<td>Ukwuanji &amp; Suchindran</td>
<td>Implications of women's work for child nutritional</td>
<td>Retrospective case study</td>
<td>To examine the relationship between women’s work</td>
<td>5331 children in Nigeria</td>
<td>Data were obtained from the 1990 NDHS</td>
<td>N.A</td>
<td>This study showed that there was an increase in wasting in children whose mother did not...</td>
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<td>Year</td>
<td>Study Title</td>
<td>Study Type</td>
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<td>2003</td>
<td>Status in sub-Saharan Africa: a case study of Nigeria</td>
<td>Case-control study</td>
<td>and the nutritional status of children.</td>
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<td>2014</td>
<td>Family and socio-economic risk factors for under-nutrition among children aged 6 to 23 Months in Ibadan, Nigeria</td>
<td>Case-control study</td>
<td>To determine the socio-economic related risk factors for malnutrition among children in Ibadan.</td>
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<td>2016</td>
<td>Urban–Rural Disparities and Determinants of Nutritional Status of</td>
<td>Cross-sectional study</td>
<td>To determine the differences in the predictors of the nutritional status of children in both Akinyele LGA and Ibadan.</td>
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Owoaje et al., 2014: Infections like diarrhea, fever increased wasting. Immunization reduced the prevalence of wasting. Also, Children whose mother are Christian have fewer chances to be wasted compared to other religions.

Ijarotimi et al., 2016: The prevalence of wasting is higher in children from households that have low income, low SES, low maternal and paternal educational status and vice versa, here, the prevalence of differs according to child age and sex. It was reported that boys were two times more likely to be wasted than girls.
| Under-Five Children: An Example of Akinyele Local Government Area, Ibadan | urban and rural areas in Akinyele LGA. | Children under 5 months were eight times more likely to be wasted compared to children 48-60 months. |
CHAPTER 5

5.1 Discussion

Compared to other forms of malnutrition like stunting, there is a lack of comprehensive literature for wasting and severe wasting in children in Nigerian. More studies should focus on the reasons why the prevalence and burden of wasting and severe wasting children under 5 in Nigeria is very high. The treatment and prevention intervention programs alone are not working as the prevalence for wasting in Nigeria continue to grow even after the implementation of the CMAM interventions have occurred, this might be due to the increase in the population of children in the country.

Also, most interventions including the CMAM focus in the Northern part of the country this is due to the fact that the incidence of wasting and severe wasting in children under age 5 in Northern Nigeria is very high. Evidence has shown that the CMAM intervention saves life preventing thousands of deaths yearly, but the coverage is very minimal. It was reported that two out of three SAM in Northern Nigeria are untreated due to lack of access and awareness.

The research for the literature review showed that integrating the treatment, management, and preventive interventions could be of benefit in improving the prevalence of wasting and severe wasting in Nigeria.

5.2 Recommendations and policy implications

First, Health promotion and education should focus on using mass media campaigns using billboards, posters, radio and television programs as well as telephone messages to promote the need for proper nutrition to the public. The people and the media should work jointly to advocate for development and implementation of policies that increase access to food and income for the most vulnerable households. Public health professionals should consider an educational
intervention that focuses on educating mothers, and the community is needed to assure information regarding the importance of nutrition, prevention, and treatment practices.

Second, Women should be encouraged to enroll in schools, especially in the northern region. The federal government should work together with the agencies for women affairs to advocate for the importance of education for women, and girls. Also, the government should create policies and laws that will empower women in the areas of job acquisition, land, and other resources.

Lastly, health policy advocates should lobby for the increase, and expansion of the CMAM coverage to include all the geographical regions in Nigeria not only the northern region. Also, Public health practitioners should advocate for the increase in the budget for the CMAM intervention to ensure that more children can be treated, and child deaths can be reduced. Also, strategies to improve the standard of living and the socioeconomic status would go a long way in reducing the burden of wasting and severe wasting.

5.3 Conclusion

Wasting is widespread across Nigeria, and its prevalence varies according to geographical zones with the Northern zones contributing the highest percentage. The factors associated with childhood wasting are multifactorial, complex and interrelated. Hence, there is a need to employ a multi-sectoral, multi-disciplinary approach and community-based approach that will target the distal, communities and proximate determinants of child malnutrition.

Records in Nigeria shows that a single intervention alone in addressing the issue of malnutrition is not enough hence the need for multiple responses. Such an approach should include education for mothers with the aim of improving the maternal nutritional status and maternal occupational
status. Public health promotion and health campaigns should increase awareness of the importance of proper sanitation and hygiene practice. Further intervention to improve child nutrition should also focus on food security and poverty alleviation schemes to address the issue of poverty. Adhering to these strategies will produce a more sustainable improvement in child nutrition and reduce wasting; thereby setting Nigeria on the path to achieving the World Health Organization global nutrition target by 2025.
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