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**Review Article**

# **Trends of Child Wasting and Stunting in Uganda from 1995 to 2016, and Progress Towards 65<sup>TH</sup> World Health Assembly Global Nutrition Targets**

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**Abstract:** Between 1995 and 2016, the government of Uganda ratified several commitments to fight child undernutrition including achieving the 65<sup>th</sup> World Health Assembly (WHA) targets of reducing stunting and wasting by 2025. It is important we monitor such commitments to inform policy makers about the progress of their commitments. The objective of this study was to review national and regional trends of stunting and wasting in Uganda from 1995 to 2016, and assess progress towards the 65<sup>th</sup> WHA global nutrition targets for stunting and wasting. The Uganda Demographic and Health Surveys conducted from 1995 to 2016 were used to review national regional trends in stunting and wasting for children less than five years of age. At national level, the prevalence of wasting decreased from 5.3% in 1995 to 4.0% in 2016 while the prevalence of stunting decreased from 38.3% in 1995 to 29% in 2016. The annual reduction rate of stunting and wasting were 0.45% and 0.01% respectively. At regional level, the prevalence of wasting in Karamoja increased from 7.1% in 2011 to 10% in 2016, a similar trend of wasting was observed in west Nile (from 6.2 % in 2011 to 10.4 % in 2016), the prevalence of stunting (13.5% in 2011 to 18% in 2016) increased in Kampala region. In the year 2016, there was regional inequalities of stunting and wasting. Some regions were above or below the national prevalence. There was an overall decline of wasting and stunting in Uganda between 1995 and 2016, but the prevalence of stunting remained unacceptably high at 29%. By the year 2016, Uganda had already achieved the 65<sup>th</sup> WHA target for wasting but may not achieve for stunting by 2025 if the annual reduction rate of stunting remains low at 0.45%. These findings summarize progress achieved towards fighting stunting and wasting in the last two decades in Uganda and help identify regions that need feasible interventions.

**Keywords:** Stunting, Wasting, Trends, Uganda, 65<sup>th</sup> World Health Assembly

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## **1. Introduction**

Child undernutrition like stunting (low height for child's age) and wasting (low weight for child's height) remain a public health concern in the developing world [1–3]. In the year 2016, 22.9% and 7.7% of the world's under-five years old children were stunted and wasted respectively, and the highest burden was on Africa and Asia [4]. It is projected that by the year 2020, 64 million children below five years of age from Africa will be stunted [5]. The most recent 2016 Uganda

Demographic and Health Survey (UDHS) revealed that the prevalence of stunting and wasting for Uganda is 29% and 4% respectively [6].

Stunting is associated with poor mental development and cognitive function, poverty, low productivity [7–9], which compromise national development while wasting is associated with high infant morbidity and mortality [10–12]. Furthermore, childhood stunting and wasting are associated with Non Communicable Diseases (NCDs) development in later life [8, 13, 14]. Moreover, it is projected NCDs will be

the leading cause of death by the year 2030 in the developing world [15].

Early interventions can prevent such poor nutrition and health outcomes. To this end, from 1995 to 2015, Uganda ratified a variety of national and international agreements and committed itself to fight child undernutrition [16–18]. Moreover, in May 2012, during the 65<sup>th</sup> World Health Assembly (WHA), Uganda committed to reduce stunting by 40% between 2010 and 2025 and reduce wasting to below 5% by 2025 [19]. It is important we monitor such commitments to inform policy makers about the progress of their commitments. However, no published study has attempted to monitor the progress of such commitments made between 1995 and 2016. As a result of increased recognition of the relevance of child nutrition as a basic pillar for social and economic development, monitoring trends in childhood stunting and wasting has gained increasing importance in assessing the progress made by nations in achieving internationally set goals, such as the 65<sup>th</sup> WHA global nutrition targets [19]. The aim of this study was to review national and regional trends of childhood stunting and wasting in Uganda from 1995 to 2016, and inform Uganda's progress towards achieving the 65<sup>th</sup> WHA nutrition targets on stunting and wasting.

## 2. Methods

### 2.1. Search Strategy

This study reviewed the Uganda Demographic and Health Surveys (UDHSs) conducted from 1995 to 2016. The UDHSs were searched from the website for the Demographic and Health Program (DHP) website (<https://dhsprogram.com/>). The DHP is an internationally recognised program that displays a listing of all demographic and health surveys conducted in selected countries.

### 2.2. Data Sources

To achieve the objective of this study, child nutrition status prevalence information for children below five years was extracted from nationally representative Uganda Demographic and Health Surveys (UDHSs) conducted from 1995 to 2016. The UDHSs are conducted every after 5 years. The prevalence information came from five UDHSs of 1995 [20], 2001 [21], 2006 [22], 2011 [23] and 2016 [6].

### 2.3. Study Population and Variables

This study reviewed prevalence for wasting and stunting among Ugandan children below five years old from 1995 to 2016. In UDHSs, wasting was assessed by determining weight-for-length/Height Z score (WLZ or WHZ) by comparing weight and height/length with the weight and height/length of the World Health Organization (WHO) reference population of the same age and sex. Children were wasted if WHZ was below -2 standard deviation (SD). Stunting was assessed by determining height/length-for-age Z score (H/LAZ) through comparing height /length and age with the height and age of the World Health Organization (WHO) reference population of the same age and sex. Children were stunted if their HAZ or LAZ was below -2 SD.

## 3. Results

### 3.1. National Trends of Childhood Wasting and Stunting from 1995 to 2016 in Uganda

First, the prevalence of child wasting and stunting at national level was examined. Findings from this study showed that the prevalence of wasting reduced from 5.3 percent in 1995 to 4.0 percent in 2016 while the prevalence of stunting decreased from 38.3 percent in 1996 to 29.0 percent in 2016. (Figure 1). On average, stunting and wasting reduced at a rate of 0.45% and 0.01% per year respectively between 1996 and 2016.

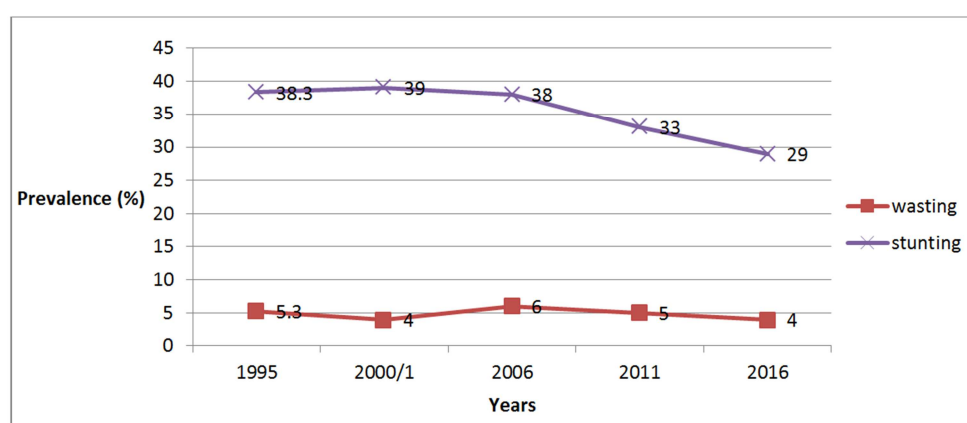


Figure 1. Below five years childhood wasting and stunting in Uganda from 1995 to 2016.

### 3.2. Regional Trends of Child Wasting and Stunting

Regional trends of wasting and stunting from 1995 to 2016 in Uganda were examined. However, there was limited data to compare regions from 1995 to 2016 because stratification of

regions by the UDHSs were not similar over this study period. However, the 2016 UDHS had some three regions which were also included in the 2011 UDHS. These regions included Karamoja, Kampala and West Nile. To this end, regional trends

of wasting and stunting for only 2011 to 2016 in the regions of Kampala, West Nile and Karamoja were reviewed (figure 2).

At regional level, the prevalence of wasting increased in Karamoja region from 7.1% in 2011 to 10% in 2016, the increase was also observed in West Nile from 6.2 % in 2011 to

10.4% in 2016. However, the prevalence of wasting reduced in Kampala from 4.4 % in 2011 to 3.9 % in 2016. In contrast, stunting increased in Kampala from 13.5 % in 2011 to 18% in 2016 but reduced in Karamoja (45% in 2011 to 35.2% in 2016) and West Nile (37.8% in 2011 to 33.9% in 2016)-figure 2.

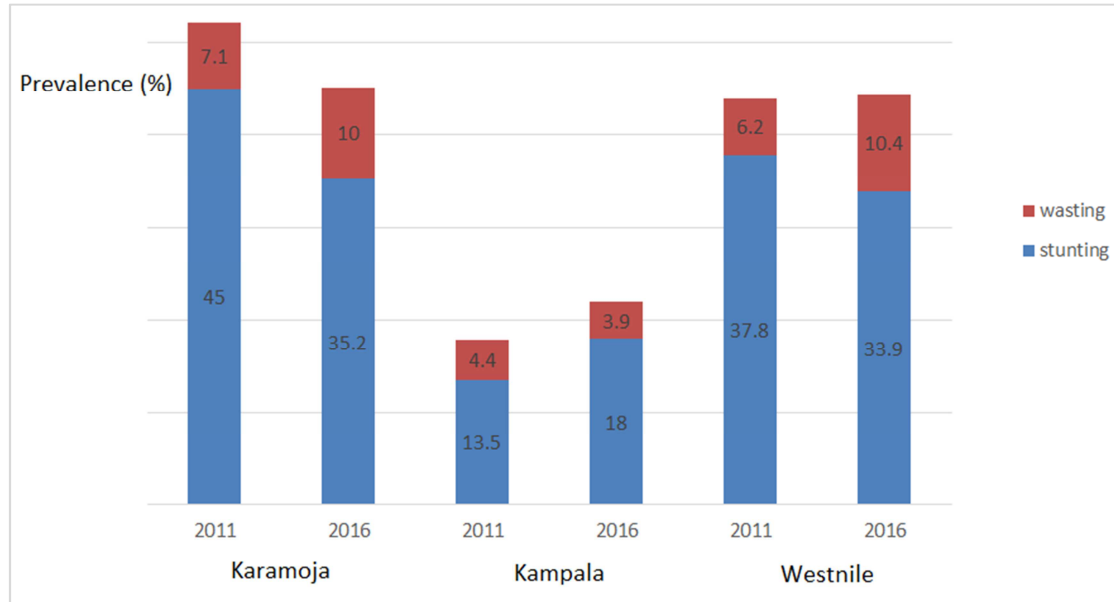


Figure 2. Regional trend of childhood stunting and wasting from 2011 to 2016.

### 3.3. National Prevalence of Childhood Wasting and Stunting Compared to Regional Prevalence in 2016

Since there was no child nutrition status prevalence information across same regions in UDHSs conducted from 1995 to 2016, this study also compared national against regional prevalence of child wasting and stunting using the most recent 2016 Uganda demographic and health survey [6]. The 2016 UDHS stratified Uganda into 15 regions namely south central, North central, Kampala, Busoga, Bukedi, Bugisu, Teso, Karamoja, Teso, Karamoja, Lango, Acholi, West Nile, Bunyoro, Tooro, Kigezi and Ankole. There are

regional differences in the prevalence of wasting and stunting (figure 3).

#### 3.3.1. Stunting

The national prevalence of childhood stunting in 2016 was 29%. At regional level there are wide disparities ranging from 14.3% in Teso to 40.6 % in Tooro. The prevalence of stunting in Tooro (40.6%), Bugisu (35.9%), Karamoja (35.2%), Bunyoro (34.5%), West Nile (33.9%), Kigezi (30.8%), Acholi (30.6%), and Ankole (29.3%) are above the national prevalence while north central, south central, Kampala, Teso, and Lango are below national prevalence.

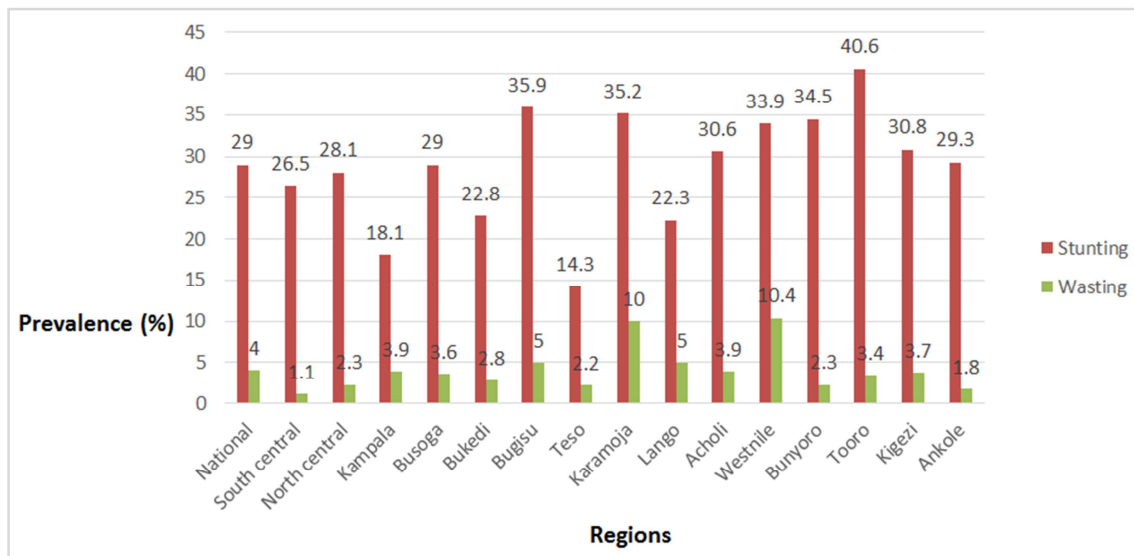


Figure 3. National versus regional prevalence of child wasting and stunting in 2016 for Uganda.

### 3.3.2. Wasting

The national prevalence of wasting was at 4% in 2016. The only three regions that have prevalence rates of wasting higher than the national prevalence are Bugisu (5.0%), Lango (5.0%), Karamoja (10.0%) and West Nile (10.4%). The other regions are below the national prevalence, with South central (1.1%), Ankole (1.8%), Teso (2.2%), North central (2.3%) and Bukedi (2.8%) registering the lowest prevalence of wasting (figure 3).

## 4. Discussion

The aim of this study was to review national and regional trends of childhood wasting and stunting in Uganda from 1995 to 2016, and inform Uganda's progress towards achieving the 65<sup>th</sup> WHA nutrition targets on stunting and wasting [19]. This study confirms that wasting and stunting have declined in Uganda between 1995 and 2016. This is consistent with a previous analysis which revealed that child Anthropometric status including wasting and stunting worsened in sub-Saharan Africa until the late 1990s and improved thereafter [24].

### 4.1. Wasting

The prevalence wasting reduced from 5.3% in 1995 to 4% in 2016, suggesting that wasting reduced by 1.3% in two decades, translating to 0.01% reduction rate per year. These findings suggest that in 2016, Uganda had already achieved the 65<sup>th</sup> WHA nutrition target of reducing wasting to below 5% by the year 2025 [19]. Between 1995 and 2000/1, childhood wasting reduced by 1.3 % (figure 1). However, the prevalence hiked again by 2% between 2000/1 and 2006 probably because 3.1 million households (17.5 million people) were hard hit by food insecurity during this period [25]. Household food insecurity has a link to child undernutrition [26]. To this end, the greatest challenge Uganda may face is to sustain the low prevalence of wasting observed in 2016 until 2025 and beyond as suggested by 65<sup>th</sup> WHA so that it does not hike again as observed between 2000/1 and 2006 (figure 1).

At inter-regional levels, wasting is staggering as the proportion of wasted children increased in some regions during the study period and unacceptably registered over 2 fold the national prevalence in 2016. During 2011–2016, the prevalence of wasting in Karamoja and West Nile increased from 7.1% to 10% and 6.2% to 10.4% respectively, meaning that the rate of wasting increased at a rate of 3% and 4% per year in Karamoja and West Nile respectively. If the trend of wasting continues like this, regions like Karamoja and West Nile may not achieve the 65<sup>th</sup> WHA target of reducing wasting to below 5% by 2025 [19]. In contrast, wasting reduced from low prevalence of 4.4% to 3.9% for the same period in Kampala. This finding confirms that there is regional persistent inequalities in child undernutrition as reported elsewhere [27]. Rural settings like West Nile, Lango, Bugisu and Karamoja are the only regions having a higher proportion of wasting than the national prevalence, therefore rural and urban differences may be a factor for inequalities in child

undernutrition [28]. According to the United Nations Children's Fund (1990), inadequate dietary intake and infectious diseases like diarrhoea are immediate causes of acute malnutrition like wasting. The chronic food insecurity, a high burden of childhood diseases, and high levels of poverty in Karamoja that hinder child caretakers to get economic access to diversified diets including those from animal food sources partly explains the high burden of wasting in Karamoja region [29]–[32]. The high prevalence of wasting observed in West Nile could be attributed to the high growth rate of refugee camps sheltering people from West Nile and Democratic Republic of Congo, and internally displaced persons. Recent studies in Uganda have shown that people residing in camps have higher risk of child undernutrition [33].

### 4.2. Stunting

Stunting reduced from 38.4% in 1995 to 29 % in 2016. The national prevalence of stunting observed in 2016 remains higher than the 22.9% at global level in the same year [4]. The 65<sup>th</sup> WHA recommends that for countries to hit the 40% target reduction of stunting by the year 2025 is by having 3.9% annual reduction rates of stunting. However, this present study revealed that the national rate of stunting reduction was at 0.45% per year in Uganda. This may suggest that if the rate of stunting reduction remains at this level, Uganda may not achieve the 40% stunting reduction by the year 2025.

At regional level, stunting increased by over 5% in Kampala between 2011 and 2016. Kampala is the capital city of Uganda, therefore this finding may echo that there is need to meet the urban challenges of food and nutrition security in Uganda [34].

Stunting reduced by 10% and 4% in Karamoja and West Nile respectively between 2011 and 2016. Stunting occurs in the first 1000 days (just after conception to up to when the born child is 24 months old) of life. The reduction rate of stunting in both regions could be attributed to the several implementing partners that have promoted and supported nutrition and health interventions during the first 1000 days of life [30, 35]. There is evidence that nutrition and health interventions that target women just before pregnant, during pregnancy, lactation and children up to when are 2 years prevent against stunting [36]. Although stunting reduced in Karamoja and West Nile between 2011 and 2016, the 35.2% and 33.9% prevalence observed in Karamoja and West Nile respectively in 2016 remains unacceptably high compared to the national and global prevalence [4, 6]. Since Karamoja and West Nile also present with high rates of wasting, this indicates that stunting and wasting coexist in both regions, which this present study terms it a double burden of undernutrition.

In 2016, 67%, 13% and 20% of the regions had stunting above, equal, and below that of the national level respectively. This may suggest that the causal factors at national level may be different from regional levels and could be multifactorial as suggested by the UNICEF conceptual framework for the

causes of child undernutrition [26]. For example, the causes of child under nutrition in food insecure Karamoja [29–31, 37] are quite different from those of food secure Kigezi region [38–40], and therefore may need different interventions.

This study had several strengths, the UDHSs conducted from 1995 to 2016, collected a wide range of objective child nutrition status data. Key strengths of the UDHSs included high response rates, national coverage, and high quality interviewer training, and standardized anthropometric data collection procedures consistent overtime allowing comparability over the study period. To this end, stunting and wasting information from these UDHSs was able to facilitate research focused on monitoring of prevalence, trends and inequalities [41]. However, some limitations also exist. Wasting in the UDHSs was diagnosed basing on weight for Height Z scores only, ignoring an important measure of wasting basing on Mid Upper Arm Circumference (MUAC) [42]. To this, end there is a possibility that wasted children by MUAC may have been missed out in the UDHS as identification of wasting using MUAC may not correlate with WHZ [43, 44].

## 5. Conclusion

In conclusion, this study shows that both stunting and wasting reduced between 1995 and 2016 at national level. However, the prevalence of stunting remained unacceptably high at 29% by 2016. There are regional inequalities in the prevalence of stunting and wasting, with some regions having a double burden of child undernutrition. At national level, Uganda had already achieved the 65<sup>th</sup> WHA target of reducing wasting to below 5% in 2016. If the annual reduction rate of stunting remains low at 0.45%, Uganda may not achieve the 65<sup>th</sup> WHA target of reducing stunting by 40 percent in the year 2025. These findings summarize progress achieved in Uganda for the last two decades and help identify regions that need feasible interventions.

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