

*Original Article*

**Nutritional Status of Children in Displacement Camps in Sierra Leone**

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**ABSTRACT**

Civil wars have resulted in the displacement of millions of people worldwide and have forced many into temporary displacement camps. Sometimes, most are caught in prolonged and overcrowded refugee camps, which provide ideal grounds for the transmission of diseases, increased risk for acute respiratory infections, diarrhoeal diseases, and malnutrition. In this study, stunting, under nutrition, and wasting were measured among 454 children under the age of 10 years in four internally displaced persons (IDP) camps. Stunting was found to be the most common nutritional abnormality in all four IDP camps with the highest prevalence rate (29.3%) in the Trade Center Camp and lowest (14.2%) in the National Workshop Camp. This study indicates that forced internal displacement results in high prevalence of stunting, wasting and underweight among children.

**Key Words: Nutritional status, Children, Displacement, Sierra Leone.**

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## INTRODUCTION

The main feature of armed conflicts is violence or the threat of violence during which large numbers of civilian population are displaced and end in temporary camps without sanitary facilities. Women and children make up the larger proportion of the displaced population and they normally suffer the most in such situations. The other effects of conflict on public health are mediated through a wider complex of circumstances (Loretti 1996). These internally displaced individuals are often trapped by fighting and are inaccessible to international help (Spiegel et. al 2004). The public health impact of these conflicts comprise increased prevalence of acute and chronic malnutrition, low cognitive development and school performance, high mortality rates and high rates of diarrheal diseases (Dillington and Guerrant 2004; Toole 1995; Gbakima et. al. 2001).

The civil war in Sierra Leone generated over 200,000 internally displaced persons (IDPs) who lived in overcrowded camps with gross unhygienic conditions and suffering (Gbakima et al., 2002). In addition, the civil war, which began in 1991, has claimed the lives of over 100,000 people and displaced approximately 2.5 million who had to live outside the country. Similarly, the effects of the war forced the displaced people to move frequently from camp to camp in different parts of the country until they arrived in the camps in and around Freetown which were safer from further attacks by the rebels.

Malnutrition is widespread in the developing world and severe malnutrition, defined as gross protein – energy and micronutrient malnutrition, carries significant increased risks of short-term and long-term morbidity and mortality (Golden et al 2001). Severe malnutrition is usually exacerbated by famine or war and children are particularly vulnerable to the immediate consequences of food shortage, infections associated with lack of adequate sanitation and loss of support services as a result of war (Golden et al., 2001). In addition, nutritional status is one of the most important public health indicators among refugees and/or displaced populations since it reflects the risks of short-term mortality (MMWR 1989). Furthermore, children less than 5 years of age are most severely affected and the prevalence of under nutrition in this age group can serve as an indicator of the nutritional status of the general population (Golden et al., 2001).

This study is part of a human assistance program of the United Methodist Committee on Relief (UMCOR). The study is aimed at investigating the prevalence of stunting, wasting, and underweight among children less than 10 years in different populations living in the four displacement camps in Freetown, so as to provide malnutrition data for health education and treatment.

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## **PATIENTS AND METHODS**

### ***Study site and population:***

All camp residents were registered and all those who seemed healthy after the initial screening were examined at a later date. All persons who attended the clinics were pre-examined by a clinician and vital signs including weight and height recorded by a nurse. Free treatment was provided for all whether they participated in the study or not. Residents from four camps participated in this study: Approved School Camp, Mandela Camp, National Workshop Camp, and Trade Center Camp. A total number of 1000 children below 10 years of age from the four displacement camps were screened for enrollment in to the study. Of the 1000 children screened, only 454 were enrolled in the study as informed consent for participation in the study could not be obtained from all the mothers (Table 1).

### ***Anthropometrics:***

Participants were weighed to the nearest 0.5 kg using standardized scales (Healthometer Profession, United States). The height/length of each child was also measured to the nearest centimeter. Anthropometric data of

the children were determined using z-scores and percentages of the median according to the World Health Organization/CDC *standards* (WHO 1983). Records yielding scores exceeding 2 z-scores were dropped because according to WHO/CDC, these values are likely to be a consequence of unreliable measurements (WHO 1986). The nutritional assessment in the study considered three measures of malnutrition: stunting, under nutrition and wasting.

### ***Statistical analysis:***

After adjusting the weight for age (underweight), weight for height (wasting), height for age (stunting) and comparing them with the WHO/CDC standards, the data was analyzed using student t-test to determine nutritional status in terms of underweight, wasting and stunting. Further analysis of the data was done using chi-square tests to determine any other underlying factors responsible for malnutrition in the population.

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**Table 1: Age and Gender distribution of the Children in the study group**

Age	Male	Female	Total
0-1	59	61	120
2-3	48	52	100
4-5	61	57	118
6-7	34	33	67
8-9	17	32	49
Total	219	235	454

## Results

Table 1 refers to the age and sex distribution of the 454 children enrolled in the study from the four (4) displaced camps. About 50% of the children enrolled were between 0 – 3 years and the median age of the study population was 3 – 5 years. The male to female ratio of the study population was almost 1:1 in all the age groups except in the 8 – 9 years age group which was 1:2. From Figure 1, stunting and severe stunting were recorded in all 4 Camps with the highest prevalence of stunting recorded in the Trade Centre Camp (29.3%) and the lowest recorded in the National Workshop Camp (14.3%). Severe stunting was highest in the Mandela Camp (11.2%) and lowest in the Approved School Camp (3.36%).

Unlike stunting and severe stunting, wasting was not recorded in all the age groups. Very low percentages were observed within the age groups where it was recorded (Fig 2).

Stunting was higher among girls in the 2 – 3 years, 4 – 5 years and 8 – 9 years age group than their boys counterparts although the differences were not found to be statistically significant ( $p>0.5$ ) (See Figures 3 and 4). The difference in underweight and wasting between boys and their female counterparts were not found to be significant in almost all the age groups.

## Discussion

The rebel incursions started in 1991 and as the fighting advanced from different parts in the country, the refugees descended into Freetown for security reasons. Refugee families were assigned to camps as they arrived in Freetown between 1992 and 1994. Prevalence of malnutrition, which included stunting, underweight and wasting, was high among the children in the all four-displacement camps. Data from this study does not provide firm evidence that camps

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had a significantly different prevalence rate of malnutrition. The data however, indicates that Trade Center Camp had the highest prevalence of malnutrition in all age groups. The differences in nutritional status in the camps may be due to the different hygienic facilities available in the camps. In the armed conflict that began in Guinea-Bissau in June 1998, it was reported that non-camp resident children aged 9-23 months suffered from malnutrition more than the refugee children from Bissau (Aaby et al., 1998). The report further indicates that despite the differences between non-camp and refugee children, children between 6-46 months were most vulnerable to malnutrition, infections and mortality (Toole and Waldman 1993).

High degree of stunting was characteristic in all age groups with the highest prevalence recorded in the 8-9 year age group. The effects of war and the subsequent migration from one camp to another in search of safety could explain the age-specific differences in the malnutrition of the children. The frequent migration patterns of these children and the lack of sufficient intake of the required foods to support their growth is indicative of the impact of displacement on stunting and acute malnutrition. Figures obtained in this study were however lower than the 35.2%, 37.7% and 33.8% of malnutrition reported by the Ministry of Health and Sanitation (MOH) for 1989, 1990, and 2000 respectively, as quoted by the MICS (MOHS 2005). The differences in the prevalence of malnutrition could be due to the health education provided by the

NGOs in the displacement camps. This may probably indicate that severe malnutrition is associated with the same age-dependent factors that contribute to overall malnutrition. The difference therefore between the results of this study and that of the MOHS may be due to the smaller population size used in the study. It is possible that malnutrition in all its forms is more wide spread in Sierra Leone than the results indicated in this study and this is supported by the MICS Survey data. In addition, the MICS Survey indicated that 30% of children under age five in Sierra Leone were underweight or severely underweight for their age. Forty percent of children were stunted for their age, while 9% were wasted or too thin for their height.

After the civil conflict in Liberia, a sub-sample of 200 Liberian refugees and resident Guinean children revealed a 0.3% and 0.5% severe malnutrition respectively (MMWR 1990). These findings support these findings that nutritional indices can be affected by civil conflict.

Underweight seems to be a problem for all age groups in this study population. However, it was more prevalent among younger children, especially among those that were 4 years and below. This could be a consequence of inadequate feeding pattern of the children in displaced camps. Other factors observed in the camps included inadequate supplies of food and weak integrated management of childhood illnesses. Although it cannot be determined directly from this study whether higher

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prevalence of underweight in younger children is a permanent feature in this population, it could probably be the consequence of a particular situation occurring at the time of the study. In a collaborative nutritional assessment study among children 0 – 59 months in a Displacement Camp in Daru, Eastern Sierra Leone in 2000, it was shown that the malnutrition rate was 7.6%, moderate malnutrition was 3.9%, and severe acute malnutrition rate was 3.7% (Cadge and Russell 2001). These high rates were attributed to aggravating factors such as poor food security and lack of access to adequate food to support growth.

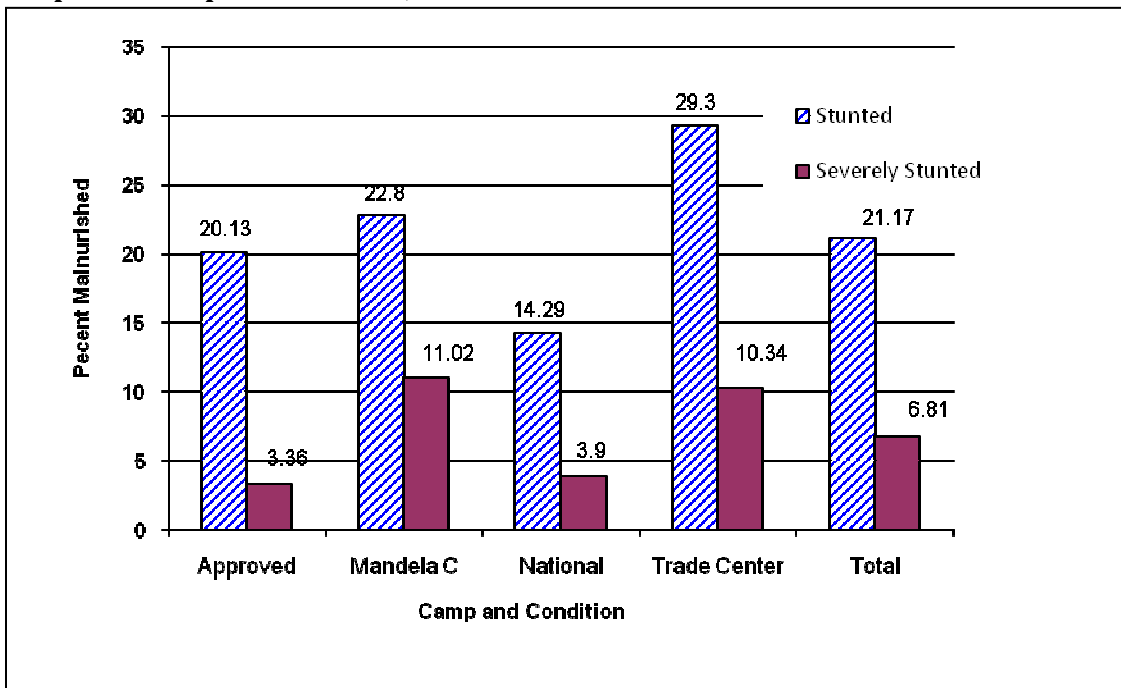
In conclusion, the impact of the 10 year rebel war in Sierra Leone resulted in the forced

internal displacement of thousands of people who are burdened by severe malnutrition probably resulting in decreased productivity of the population.

### Acknowledgement

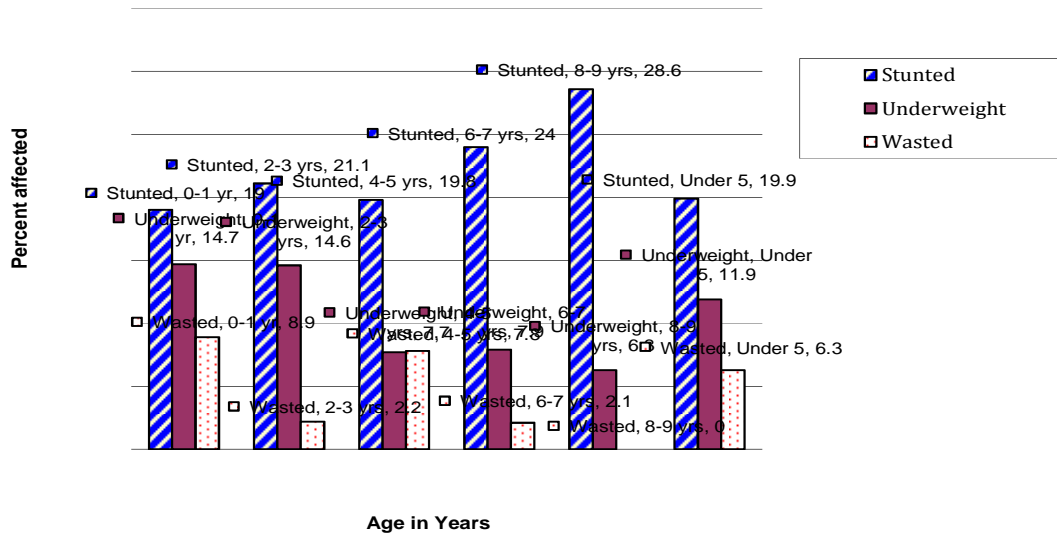
We thank the people in the IDP camps for their cooperation, the Ministry of Health and Sanitation and the Kingtom Police Hospital who allowed us to use their Laboratory Technicians. Funding for the Humanitarian Displacement Project was provided by the United Methodist Committee on Relief (UMCOR) of the Board of Global Ministries, and recommended by Bishop May, the then leader of the Baltimore-Washington United Methodist Conference.

**Figure 1. Prevalence of malnutrition (Stunting and severely stunted) among children in the four displaced camps in Freetown, Sierra Leone.**



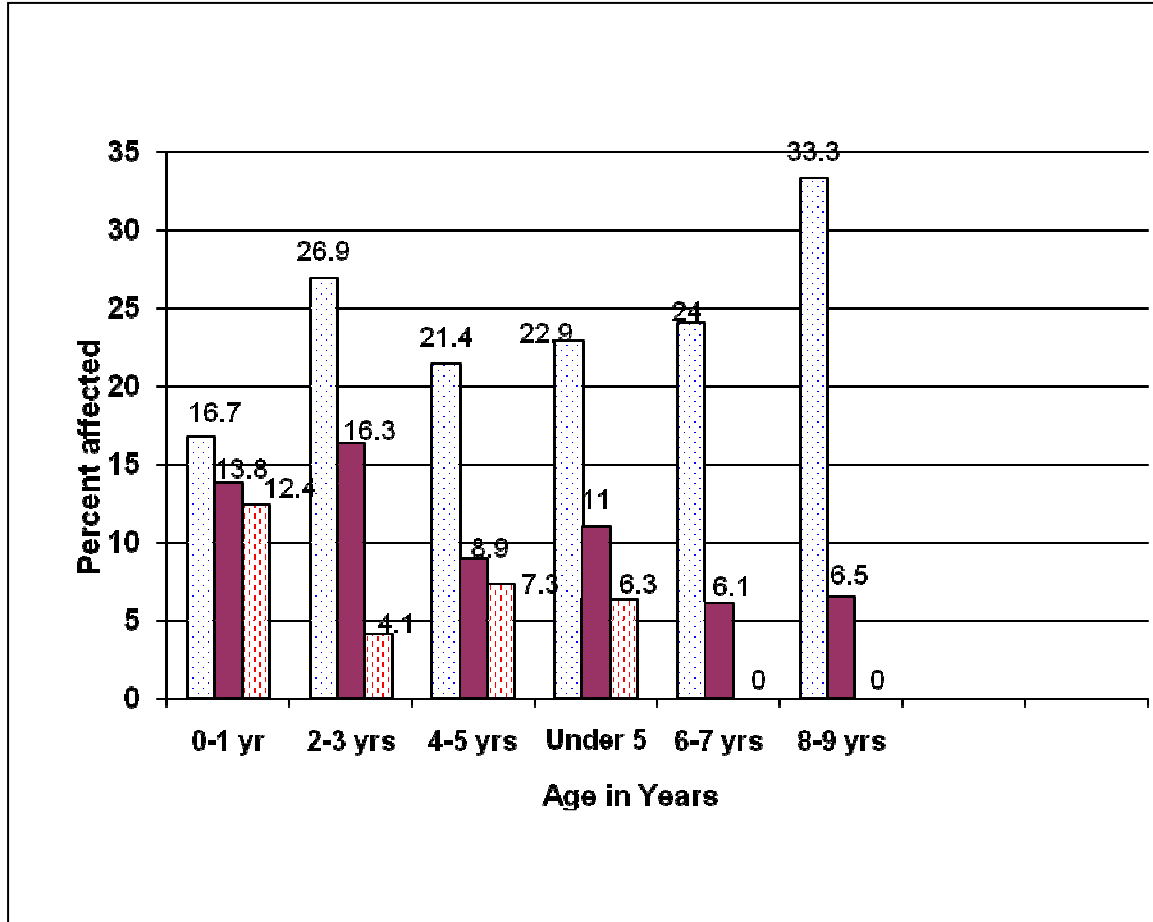
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**Figure 2: Prevalence of malnutrition (Stunting, Underweight, & Wasting) among Children 0 – 9 years in the 4 displaced camps in Freetown, Sierra Leone**



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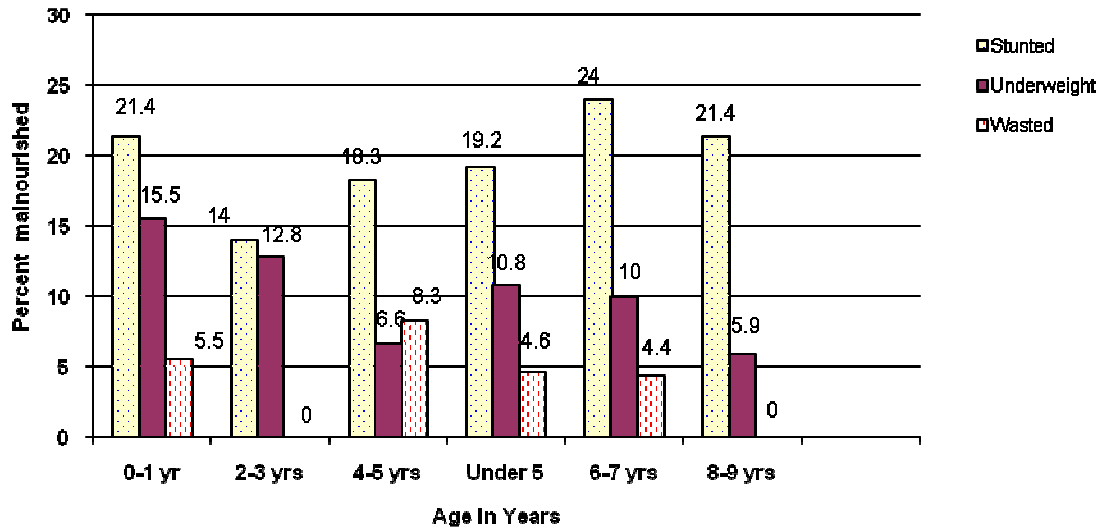
**Figure 3: Prevalence of malnutrition (Stunting, Underweight, & wasting) in girls by age group from four displaced camps in Freetown, Sierra Leone**



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**Figure 4. Malnutrition (Stunting, Underweight, and Wasting) in Boys by age group in four displaced camps around Freetown, Sierra Leone**



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