

**DIETARY PATTERNS AND PREVALENCE OF WASTING AMONG
STREET CHILDREN IN LILONGWE, MALAWI**

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ABSTRACT

Street children are persons under the age of 18 years who spend all or most of their time on the streets as a result of many social problems within their communities. Although the number of street children is unknown in Malawi, the problem is thought to be increasing. In a cross-sectional study of 36 street children in Lilongwe, Malawi, dietary practices and the prevalence of wasting were assessed to provide information on the risk of poor dietary intake and malnutrition in this population. A food frequency questionnaire and 24-hour dietary recalls were used to determine dietary practices, while anthropometric measurements were taken to assess the prevalence of low weight-for-height (wasting). Because of their high mobility, the participants were recruited using purposive sampling, primarily around the streets that lead to Lilongwe main market. A qualitative checklist was used to identify prospective participants, and interviews were only done after the respondent had given informed assent. The study showed that most (91.7%) of the street children are boys aged between 10 and 12 years (47.2%), largely illiterate (58.3%), sleep at home (41.6%), and have both parents still living (55.6%). Through begging and engaging in piece work, 61.1% of the children indicated that they earn between US\$0.55 and US\$1.09 per day. The majority (72.2%) use the money solely to buy food from street vendors and restaurants. Foods that are mostly eaten on a daily basis include *nsima* (100%), rice (50%), confectionery (44.4%), and mangoes (41.7%). On the other hand, foods that are eaten three times a week are fish (80.6%), chicken (58.3%), potatoes (36.1%), cookies (19.4%), pumpkin leaves (19.4%), and bananas (13.9%). For the majority of the children, fruits and vegetables are mostly eaten once a week. Assessment of the children's nutritional status showed that up to 8.4% were wasted (<-2 weight-for-height Z-scores), the majority (5.6%) severely (<-3 weight-for-height Z-scores). Limited as it is in terms of sample size and breath, the study forms a stepping stone for investigating in more detail, food and nutrition issues that affect street children in Malawi.

Key words: Malawi, cross-sectional study, dietary assessment, street children, wasting

MODÈLES DIÉTÉTIQUES ET PRÉVALENCE DU DÉPÉRISSEMENT CHEZ LES ENFANTS DE LA RUE DE LA CAPITALE DU MALAWI

Résumé

Les enfants de la rue sont des personnes de moins de 18 ans qui passent tout le temps ou la plupart de leur temps dans la rue suite à beaucoup de problèmes sociaux qui prévalent dans leurs communautés. Bien que le nombre d'enfants de la rue soit inconnu au Malawi, d'aucuns pensent que le problème augmente. Au cours d'une étude transversale menée sur 36 enfants de la rue à Lilongwe, capitale du Malawi, les pratiques diététiques et la fréquence de dépérissement ont été évaluées en vue de fournir des informations sur le risque de régime alimentaire pauvre et de malnutrition dans cette population. Un questionnaire sur la fréquence des repas et rappels diététiques en 24 heures a été utilisé pour déterminer les pratiques diététiques, tandis que les mesures anthropométriques ont été prises pour évaluer la prévalence de basses proportions entre le poids et la taille en hauteur (dépérissement). A cause de leur grande mobilité, les participants ont été recrutés en utilisant un échantillonnage fondé sur le but visé, principalement autour des rues qui mènent vers le principal marché de Lilongwe. Une liste de contrôle qualitative a été utilisée pour identifier des participants éventuels, et des entrevues n'ont été faites qu'après que la personne interrogée ait donné son consentement. L'étude a montré que la majorité (91,7%) des enfants de la rue sont des garçons qui ont entre 10 et 12 ans (47,2%), analphabètes en grande partie (58,3%), passent la nuit à la maison (41,6%), et ont les deux parents encore en vie (55,6%). En mendiant et en s'engageant dans le travail à la pièce, 61,1% des enfants ont indiqué qu'ils gagnent entre 0,55 \$ américain et 1,09 \$ américain par jour. La majorité de ces enfants (72,2%) dépensent cet argent uniquement pour acheter de la nourriture chez des vendeurs de rue et dans des restaurants. Les aliments qu'ils mangent quotidiennement sont surtout *nsima* (100%), le riz (50%), des friandises (44,4%) et des mangues (41,7%). Par ailleurs, les aliments qu'ils mangent trois fois par semaine sont le poisson (80,6%), le poulet (58,3%), les pommes de terre (36,1%), les biscuits (19,4%), des feuilles de courge (19,4 %) et des bananes (13,9%). La majorité de ces enfants ne mangent des fruits et des légumes qu'une fois par semaine. L'évaluation de l'état nutritionnel de ces enfants a montré que jusqu'à 8,4% d'entre eux étaient décharnés (des scores de $Z < -2$ du rapport entre le poids et la taille en hauteur), la majorité (5,6%) sérieusement atteints (des scores de $Z < -3$ du rapport entre le poids et la taille en hauteur). Limitée qu'elle est en ce qui concerne la taille et l'insufflation prises comme échantillons, la présente recherche constitue un point de départ pour étudier dans plus de détail les problèmes de nutrition et d'alimentation qui affectent les enfants de la rue au Malawi.

Mots-clés : Malawi, étude transversale, évaluation diététique, enfants de la rue, dépérissement.

INTRODUCTION

Street children are persons under the age of 18 years who spend all or most of their time on the streets, maintaining little or no contact with their families, hence lacking supervision, protection, and guidance [1]. Generally, such children are identified either as children *on* the street, or children *of* the street. Children *of* the street are those who roam and seek shelter and economic opportunities within the streets, while children *on* the street are those who return to their homes at the end of the day [2].

Globally, the number of street children is unknown [3]. Similarly, the number of street children in Malawi is not known. Because of increasing social and economic burdens in families and communities, the population of street children is likely to be increasing in Malawian cities. The problems include poverty which affects 65.2% of Malawians [4], chronic food insecurity, urban migration, as well as HIV infection which has rendered 330,000 to 710,000 children under the age of 18 years, orphans [5].

According to Street Child Africa, street children are some of the most vulnerable children who are separated from their families, and likely to be undernourished, stigmatized, abused, uneducated and anonymous [6]. However, it has been noted that many of such children are not orphaned [3]. In a large ($n=1,232$) cross-sectional study of street children in Lusaka, Zambia, it was noted that street children are mostly boys (82%), and 42.2% still had both parents living [7]. More than a third of the children (35.6%) indicated that they always use the money they earn either by begging or doing piece work to buy food, suggesting high vulnerability to food insecurity.

However, despite being a presumably growing social problem, there is very little known about the food and nutrition situation of street children, and the academic literature is vividly lacking. Such gaps are likely to make it difficult to design evidence-based interventions to address specific food and nutrition concerns of such children. It is for this reason that the present study was done as one way of documenting and publicizing the dietary practices of street children in Malawi.

METHODS

Study area

The study recruited street children from Malawi's capital, Lilongwe because of ease of accessibility by the authors who were resident within 30 km from the city centre. A brief structured questionnaire was used to gather demographic, social, economic, dietary and anthropometric data.

Study design and recruitment of subjects

A descriptive cross-sectional study was constructed, with all the streets of Lilongwe serving as potential recruitment areas. However, for practical purposes it was decided that the study should consider recruiting children from high-density areas such as the streets that are in close proximity to the main market since in the Lusaka study, about one quarter (24.3%) of the children were mostly found around markets [7].

Since street children are highly mobile, a purposive sampling method was used to recruit children who suited characteristics of being street children. The characteristics included begging, appearing to be seeking social favours such as piece work, looking generally disadvantaged, scavenging, and without guidance of an older responsible person. To avoid raising unnecessary suspicions from street gang leaders, thieves and other potentially dangerous street people or groups, it was decided that the interviewers should be mobile instead of setting up stationary sites. The inclusion criteria were: (1) that the subject be identified as a street child based on the descriptions mentioned above as well as self testimony; (2) that the subject be adequately briefed about the study and give verbal assent to participate in the study; and, (3) that the subject was not already interviewed. Because the study involved a small number of children ($n=36$), it was easy to know if a child had already been interviewed. Being an exploratory study in a less-familiar population, the study aimed to conduct dietary assessments in at least 30 street children, a goal which was exceeded by six children.

Dietary assessment

Dietary patterns were assessed using both the 24-hour recall and a food frequency questionnaire [8]. The food frequency questionnaire was used to find out the usual foods eaten by the children, and frequency of consumption within a seven-day period. This was followed by a 24-hour dietary recall in which the children were asked to recall the actual foods they ate 24-hours preceding the survey. In addition, the children were asked to indicate whether or not they thought that they usually eat adequate amounts of food. The data were collected mostly on Fridays or Saturdays because those are the days when one of us (LC) was able to conduct the study. Since subsequent analysis was aimed at summarising the food frequency data, the bias toward weekend days is less likely to have a major effect in understanding the kinds of foods available to street children in Lilongwe.

Nutritional status assessment

Initially, it was planned that the prevalence of stunting, underweight and wasting would be assessed. However, it was apparent that the majority of the children had difficulties knowing their dates of birth, although they had an idea of the year in which they were born. For that reason, it was deemed impractical to assess stunting and underweight because the indices height-for-age and weight-for-age require accurate age assessment. Hence, only wasting was assessed using the weight-for-height index. The children's heights and weights were measured using standard methods [9]. After entering the data in Epi Info for Windows 2002 (Centers for Disease Control and Prevention, Atlanta, Georgia), standard deviation scores were derived for all children based on the 1978 NCHS/WHO international references for the growth of children aged zero to 18 years [10]. The resulting weight-for-height Z-scores (WHZ) were used to determine whether or not the children were undernourished. All children with WHZ <-2 were considered wasted, while those with WHZ <-3 were considered severely wasted [10].

Data analysis

The data were entered in Epi Info 2002 for Windows, and analysed in SPSS 9.0 for Windows (SPSS Inc., Chicago, Illinois). The results were summarized as means and frequencies. For purposes of this study, the subjects were considered simply as street children without partitioning them into children *of* or *on* the street.

Ethical considerations

The study received approval from the Ministry of Gender and Community Services, as well as permission from the Malawi Police Service. Every child who participated in the study gave verbal assent.

RESULTS

Characteristics of the children

A total of 36 street children were recruited, and all their records were eligible for analysis and interpretation for this report. As shown in Table 1, the sample consisted mostly (91.7%) of male children. Because it was difficult for some of the children to indicate their actual dates of births, only the age range of the children was recorded based on their estimates of year of birth, hence no mean age is provided. It was noted from the results that close to half of the children were aged between 10 and 12 years, with slightly over a tenth being below 10 years. Most (63.9%) of the children were resident within the city's slum areas of Mtandire, Phwetekere, Chinsapo and Chilinde. Nearly one in ten (86.4%) children had at least one parent still living, and slightly over four in ten children (42%) reported to have been commuting from their homes on a daily basis.

Time lived on the street, reasons for leaving home, and ways of earning a living

Half of the children indicated that they have been living on the street for less than one year, 38.9% for 1-2 years, and 11.1% for 3 to 4 years. Slightly over half of the children (52.8%) reported to have left their homes due to food insecurity, abuse (25%), rejection at home (5.6%), sent by parents (11.1%), and surprisingly, to play (5.6%). While some of the children (41.7%) reported to be earning a living by casual labour, begging was reported by all the children, while very few (5.6%) were being supported from home.

As shown in Table 2, the children usually earn between K50.00 and K100.00¹ (61.1%). Half of the children reported that the lowest amount they receive in a day is between K20.00 and K40.00. Incomes were reportedly higher on Fridays and Saturdays than on other days. In their opinion, the children indicated that the money they earned was enough considering that the food they buy is supplemented with that which they receive in kind.

¹ K, Kwacha is Malawi's currency. During the study in 2003, US\$1.00 was equivalent to K91.5934 [11].

Dietary patterns and nutritional status

Three quarters of the children indicated that most of the times they eat three main meals each day, one fifth (19.4%) eat two main meals each day, while 5.6% indicated eating only one meal a day. When the children were asked to state their impression about the adequacy of the food they ate in the 24 hours preceding the survey, 75% perceived it to be adequate.

Results on the diversity of foods and frequency of consumption are given in Table 3. Notably, foods that were mostly consumed on a daily basis include *nsima*² (100%), rice (50%), confectionery (44.4%), and mangoes (41.7%). On the other hand, foods that were consumed three times a week included fish (80.6%), chicken (58.3%), potatoes (36.1%), cookies (19.4%), pumpkin leaves (19.4%), and bananas (13.9%). For the majority of the children, vegetables were mostly consumed once a week. Legumes and nuts were vividly not reported, with only 11% indicating that they consume legumes (beans only) on a daily basis.

Results of nutritional status assessment showed that 8.4% of the children were wasted (WHZ <-2), with 5.6% being severely wasted (WHZ <-3).

DISCUSSION

A search of the academic literature suggests that this is the first time in Malawi that an attempt has been made to assess and publicize the dietary practices of street children. Admittedly, the study was small and less comprehensive; however, it forms an important foundation for future food and nutrition studies among Malawian street children.

In the present study, a high prevalence (13.9%) of orphaned children was noted. According to the National Statistical Office, only 1.1% of street children in Lilongwe are orphaned, of which 90.9% report that they resort to street life because of poverty [11]. It is suspected that other than poverty alone, children resort to street life because of lack of parental care and guidance, neglect, abuse, and other social ills within the family and community environments where such children come from. The fact that 42% of the children in this sample go back home each day is a clear indication of failure by society to motivate the children and retain them in their communities for proper growth and development. An early exposure to street life is likely to be detrimental to the children's future lives because they get exposed to desperate situations, learn gang life, and are likely to engage in child labour and criminal activities. As noted, children do not continue to live on the streets for a long time. Only 11.1% had lived on the streets for 3 to 4 years. This means that as the children grow older, they give up street life, which suggests that street life is an unpleasant and unsustainable way of mitigating early childhood socioeconomic problems. In addition, the children may indulge in risky behaviours that can render them susceptible to infections, including HIV.

² *Nsima* is a stiff, cooked, maize-based paste that is eaten almost everyday in most Malawian households.

Although stunting and underweight were not assessed due to lack of dependable age assessment, the prevalence of wasting (8.4%) is worrying. According to the World Health Organisation, a prevalence of 5-9% in wasting among children under the age of five years is considered *poor* [10]. In the general preschool population in Malawi, wasting is estimated at 5.2% [12]. Since preschool children are highly vulnerable to malnutrition, with wasting levels normally elevating in excess of 5% during severe food shortages [10], the present results suggest that Malawian street children, although they are older, are living in appalling conditions that expose them to a possible multiplicity of the risks of undernutrition.

Despite perceiving their dietary intake as adequate, it is logical to suspect that practically the food is insufficient to meet the daily energy and nutrient needs of the children. This would be particularly true considering that street children are highly mobile, and are likely to engage in high energy-demanding activities to earn money. As well, since frequent illnesses are an immediate cause of malnutrition [13], it is hypothesized that there is also high incidence of diseases in this population. This notion is supported by the fact that in Lusaka, 12.4% of the children self-reported that they suffer from malaria, headache (6.8%), and respiratory infections (3.5%) [7].

The present study also shows that street children have poor daily intake of a variety of foods. Notably, the meals are highly carbohydrate (100% eat *nsima*; 50% rice; and 44.4% confectionery every day), with very little diversity of side dishes such as animal source foods, legumes, fruits, vegetables, and other food groups. As noted in Table 3, the highest frequency for consumption of animal-source foods is that 80.6% indicated eating fish three times per week. The only vegetable that was reportedly consumed on a more regular basis (three times per week) was pumpkin leaves in 19.4% of the children. In terms of fruits, the results showed that mangoes were eaten daily in 41.7% of the children. However, it is apparent that when mangoes are not in season, the intake of fruits is likely to decline considerably. Taken together, the results of dietary assessment suggest that there is inadequate intake of a variety of foods, which in the long-term may render the children vulnerable to various nutritional deficiencies. Not surprisingly, therefore, close to a tenth of them were wasted.

It is impossible at the present time to make any inferences about the adequacy of the foods consumed because the study did not attempt to accurately estimate dietary intakes. Having known what the street children eat, future research should estimate dietary intakes and adequacy of the meals. The fact that the prevalence of wasting was high is good reason to suspect frequent intake of inadequate and unbalanced meals. In the long term, this may weaken the immune system [14-17], which, with the likelihood of high infection rates due to poor living conditions on the street, is likely to worsen the vicious cycle of malnutrition and infection [16].

Limited as it is in terms of sample size and breath, the present study forms a stepping stone for future nutrition and dietary studies involving street children in Malawi. Ultimately, such studies are likely to help in understanding food and nutrition

problems that are associated with street life, thereby help in formulating appropriate interventions that seek to address the plight of street children in Malawi.

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Table 1: Demographic characteristics of the respondents

Characteristics	n	%
Sex		
Males	33	91.7
Females	3	8.3
Estimated age group (years)		
<10	4	11.1
10-12	17	47.2
13-15	10	27.8
>15	5	13.9
Literacy		
Some literacy	15	41.7
Illiterate	21	58.3
Education level		
None	11	30.6
Standard 1 – 4	21	58.3
Standard 5 – 8	4	11.1
Where they come from		
Lilongwe townships	23	63.9
Lilongwe rural areas	2	5.6
Outside Lilongwe	11	30.6
Where the children sleep		
Home	15	41.6
Under a bridge	1	2.8
In a market	2	5.6
Inside telephone booths and small shops	5	13.9
On the verandas of shops	13	36.1
Parental survival		
Both alive	20	55.6
Mother only alive	7	19.4
Father only alive	4	11.1
None alive	5	13.9

Table 2. Daily amount of money earned through begging

Amount received (K)	Frequency (%), n=36		
	Lowest	Highest	Usual amount
<50.00	100	16.7	36.1
50.00-100.00	0	58.3	61.1
>100.00	0	25.0	2.8

¹ K, Kwacha is Malawi's currency. During the study in 2003, US\$1.00 was equivalent to K91.5934 [11].

Table 3. Types of food eaten and frequency of consumption

Food	n	%	Frequency of consumption			
			Daily	3 X/week	Once a week	Occasionally
Animal source foods						
Goat meat	29	86.1	2.8	0	77.8	0
Beef	24	69.5	5.6	0	63.9	0
Chicken	26	72.2	0	58.3	11.1	2.8
Fish	33	91.7	0	80.6	11.1	0
Pork	5	13.9	0	13.9	0	0
Eggs	10	27.8	0	2.8	0	0
Cereals and cereal products						
<i>Nsima</i>	36	100	100	0	0	0
Rice	33	91.7	50	0	41.7	2.8
Confectionery	25	69.4	44.4	5.6	25.0	0
Porridge	6	16.7	0	5.6	11.1	0
Roots and tubers						
Sweet potatoes	34	94.4	22.2	0	72.2	0
Cassava	31	86.1	19.4	0	66.7	0
Irish potato	30	83.3	5.6	36.1	52.8	0
Chips	13	36.1	0	11.1	25.0	0
Fruits						
Peaches	1	2.8	0	0	0	2.8
Bananas	5	13.9	0	13.9	0	0
Strawberries	1	2.8	0	0	0	2.8
Papaya	3	8.3	0	0	0	8.3
Mulberries	2	5.6	0	0	0	0
Guavas	1	2.8	0	0	0	0
Apples	7	19.4	0	0	0	0
Mango	21	58.3	41.7	0	13.9	2.8
Jujube	12	33.3	22.2	0	8.3	2.8
Oranges/tangerines	19	52.8	22.2	0	0	0
Vegetables						
Mustard	26	72.2	2.8	2.8	72.2	0
Rape	21	58.3	0	0	58.3	0
Chinese cabbage	13	36.1	0	0	33.3	0
Cabbage	11	30.6	0	0	27.8	0
Okra	4	11.1	0	0	2.8	5.6
Pumpkin leaves	11	30.6	0	19.4	0	11.1
Legumes						
Beans	34	94.4	11.1	0	83.3	0
Miscellaneous						
Candy	10	27.8	0	5.6	22.2	0
Cookies	8	22.2	0	19.4	5.6	0
Sugarcane	5	13.9	0	0	0	13.9

REFERENCES

1. **UNODCCP.** United Nations Office for Drug Control and Crime Prevention. Rapid Situation Assessment of Street Children in Cairo and Alexandria. UN ODCCP, Cairo, no date. Available from: http://www.unodc.org/youthnet/pdf/egypt_street_children_report.pdf.
2. **Scanlon TJ, Tomkins A, Lynch MA and Scanlon F** Street children in Latin America. *B.M.J.* 1998; **316**:1596 – 1600.
3. **UNICEF.** United Nations Children’s Fund. The State of the World’s Children 2006. UNICEF, New York, 2005: 40 – 41.
4. **Malawi Government.** Malawi Poverty Reduction Strategy Paper. Ministry of Finance, Lilongwe (Malawi), 2002: 5.
5. **UNAIDS.** Joint United Nations Program on HIV/AIDS. AIDS Epidemic Update 2004. UNAIDS, Geneva, 2004: 191.
6. **Street Child Africa.** About Street Children (website), 2005. Available from: <http://www.streetchildafrica.org.uk/>.
7. **Lemba M** Rapid Assessment of Street Children in Lusaka. Project Concern International, Lusaka (Zambia) 2002: 7-19. Available from http://www.unicef.org/evaldatabase/files/ZAM_01-009.pdf.
8. **Gibson RS** Principles of Nutrition Assessment 2nd ed. Oxford University Press, New York, 2005: 41 – 49.
9. **Gibson RS** Nutritional Assessment: a Laboratory Manual. Oxford University Press, New York, 1993: 44 – 55.
10. **WHO.** World Health Organization. Physical Status: the Use and Interpretation of Anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series 854. WHO, Geneva, 1995: 29 – 32, 208.
11. **National Statistical Office.** Statistical Yearbook 2004. National Statistical Office, Zomba, Malawi, 2004. Available from http://www.nso.malawi.net/data_on_line/general/yearbook/yearbook.html.
12. **National Statistical Office.** Malawi Demographic and Health Survey 2004. National Statistical Office, Zomba, Malawi, 2005: 163 – 184. Available from <http://www.nso.malawi.net/>.
13. **UNICEF.** United Nations Children’s Fund. The State of the World’s Children 1998. UNICEF, New York, 1998.

14. **Caulfield LE, de Onis M, Blössner M and Black RE** Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. *Am. J. Clin. Nutr.* 2004; **80**: 193 – 198.
15. **de Onis M, Frongillo EA and Blössner M** Is malnutrition declining? An analysis of changes in levels of malnutrition since 1980. *Bull. World Health Organ.* 2000; **78**: 1222 – 1233.
16. **Pelletier DL, Frongillo EA Jr, Schroeder DG and Habicht J-P** The effects of malnutrition on child mortality in developing countries. *Bull. World Health Organ.* 1995; **73**: 443 – 448.
17. **Pelletier DL and Frongillo EA** Changes in child survival are strongly associated with changes in malnutrition in developing countries. *J. Nutr.* 2003; **133**: 107 – 119.