Prevalence and correlates of hunger among primary and secondary school children in Malawi: results from the 2009 Global School-based Health Survey

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Abstract

Background

Education is important in improving economies and creating literate, self-reliant and healthy societies. However, hunger is a barrier to basic education in Malawi. Hunger is also associated with a number of health risk behaviours, such as bullying, suicide ideation and unhygienic behaviours that may jeopardize the future of children. There are, however, limited data on the prevalence and associated factors of hunger among school children in Malawi.

Methods

The study used data from the Malawi Global School-Based Health Survey conducted in 2009 to estimate the prevalence of self-reported hunger within the last 30 days among primary and secondary school age group. It also assessed the association between self-reported hunger and some selected list of independent variables using frequency distribution, chi-squared test and logistic regression.

Results

A total of 2359 students were available for analysis. The overall self-reported prevalence of hunger within the last 30 days was 12.5% (18.9% (172) in the rural and 8.3% (115) in urban areas; and 11.9%(123) for male and 12.5(148) for female children). In the final analysis, geographical location, eating fruits, having been bullied, suicide ideation, and washing hands with soap were significantly associated with hunger.

Conclusion

Hunger in both primary and secondary school children in Malawi is a major social problem. The design of school feeding programmes aimed to reduce hunger should incorporate the factors identified as associated with hunger.

Background

Health and education are two of the cornerstones of human capital and form the basis of an individual's economic productivity[1]. Basic education is important in improving economies and creating literate, self-reliant and healthy societies[2]. Education gives a person understanding, knowledge, training and stimulation. Likewise, it refines innate capacities of individuals to think in a positive way. Therefore a population which enjoys the fulfillment of the right to basic education will be able to contribute to the life of their nation in a positive and responsible way.

Hunger is a barrier to basic education (primary and secondary) in Malawi and beyond. Reports from a National School Health and Nutrition (SHN) baseline survey conducted in 2006 in Malawi had indicated that 70% of primary school children go to school without taking breakfast[3]. A study commissioned by UNICEF during the 2002 hunger crisis in Malawi found that food shortages increased student absenteeism rates, particularly in the peak food shortage months, promoted erratic student attendance and increased drop-out rates[4]. It is likely that hungry or sick children generally do not go to school, and if they do go, it is difficult for them to concentrate and keep up with their well-fed peers. Net enrolment in primary school in Malawi is estimated to be about 78%, but 30% of poor children do not even begin school, while only 38% of children who enrol in primary school will go as far as completing Grade 8[5].

Hunger is also a determinant of multiple health risk behaviours which may jeopardize the future of the primary and secondary school children in Malawi. Hungry children have been reported to be associated with bullying victimization, involvement in physical fighting, social isolation, sadness, suicidal ideation, alcohol use, and drug use[6].

The role of school feeding programmes in preventing and mitigating hunger in Malawi cannot be over-emphasized. Yet there are thousands of children in Malawi, especially those residing in poverty stricken areas, who have no access to basic education, commonly owing to malnutrition, anaemia and mental disorders caused by hunger[7]. Measures to prevent and mitigate hunger are aimed at supporting some of the most vulnerable children – those who have so little to eat that hunger negatively affects their behavior and choices today, to the point that deprivation robs them of their future[8]. Since there is limited information about the prevalence of hunger among primary and secondary school children in Malawi, we carried out this study to provide such information. These data are potentially useful in designing school feeding programmes that may reduce the problem of hunger and hunger related issues in the country. The specific of objectives of the study are:

• To determine the prevalence of hunger among primary and secondary school children in Malawi

• To compare the prevalence of hunger among different groups of primary and secondary school children in Malawi

• To identify factors that are associated with hunger among the primary and secondary school children in Malawi.

Methods

This study involved secondary analysis of existing data from the 2009 Malawi GSHS. The GSHS was developed by the World Health Organization (WHO) in collaboration with United Nations' UNICEF, UNESCO, and UNAIDS with technical assistance from the Centers for Disease Control and Prevention[9]. A two-stage cluster sample design was used to produce data representative of all students in standards 7 and 8 (primary school) and in forms 1 and 2 (secondary school) in Malawi. At the first stage, schools were selected with a probability proportional to enrolment size. At the second stage, classes were randomly selected and all students in selected classes were eligible to participate. The school response rate was 100%, the student response rate was 94%, and the overall response rate was 94%. A total of 2,359 students participated in the Malawi GSHS. Pupils selfreported their responses to each question on a computer scannable answer sheet. Pupils were encouraged to answer all questions but also told that they were free not to answer any question they felt uncomfortable with.

Dependent variable

For the outcome variable, study participants were asked: During the past 30 days, how often did you go hungry because there was not enough food in your home? The responses were never, rarely, sometimes, most of the time and always. The response was categorized into 1 for yes (combined most of the time and always) or 2 for no (combined never, rarely and sometimes).

Independent variables

Regarding the independent variables, study participants were asked the following questions:

During the past 30 days, how many times per day did you usually eat vegetables, such as cabbage, rape leaves, mustard leaves, turnips, sweet potato leaves, cassava leaves, or pumpkin leaves? During the past 30 days, how many times per day did you usually eat fruit, such as papaya, oranges, avocado, pears, or bananas? The responses to the above predictor variables were: I did not eat for the past 30 days, less than one time per day, 1 time per day, 2 times per day, 3 times per day, 4 times per day, 5 or more times per day. These responses were categorized into 1 for yes (combined 2 times per day to 5 or more times per day) or 2 for no (combined I did not eat for the past 30 days, less than one time per day, 1 time per day).

During the past 30 days, how often did you wash hands before eating? During the past 30 days, how often did you wash hand after using the toilet or latrine? During the past 30 days, how often did you use soap when washing your hands? The responses to the above predictor variables were never, rarely, sometimes, most of the time and always. The study was interested in never and rarely washing hands. Therefore, responses were categorized into 1 for yes (combined never and rarely) or 2 for all of sometimes, most of the time and always.

During the past 12 months, how many times were you physically attacked? Responses: 0 times, 1 time, 2 or 3 times, 4 or 5 times, 6 or 7 times, 8 or 9 times, 10 or 11 times and 12 or more times. The responses were categorized into 1 for yes(combined 1 time, 2 or 3 times, 4 or 5 times, 6 or 7 times, 8 or 9 times, 10 or 11 times and 12 or more times) or 2 for no (0 times).

During the past 30 days, on how many days were you bullied? During the past 30 days, on how many days did you smoke cigarette? During the past 30 days, on how many days did you have at least one drink containing alcohol? Responses were 0 days, 1 or 2 days, 3 to 5days, 6 to 9 days, 10 to 19 days, 20 to 29 days and all 30 days. The responses were categorized into 1 for yes (combined 1 or 2 days, 3 to 5days, 6 to 9 days, 10 to 19 days, 20 to 29 days and all 30 days) or 2 for no (0 days).

During the past 12 months, how often have felt lonely? Responses: never, rarely, sometimes, most of the time, and always. The responses were categorized into 1 for yes (combined most of time and always) or 2 for no (never, rarely and sometimes).

During the past 12 months, did you ever seriously consider attempting suicide? Responses: 1 for yes and 2 for no.

The study also included the following demographic predictor variables in the analysis and study participants were asked the following questions:

How old are you? Responses: 11 years old or younger,12 years old,13 years old,14 years old, 15 years old, and 16 years old or older. The responses were categorized into 1 for 14 years and under (combined 11 years old or younger,12 years old, 13 years old,14 years old) and 2 for 15 years and above (combined15 years old, and 16 years old or older). What is your sex? Response (Male= 1 and female=2). In what class are you? Responses: Standard 7, Standard 8, Form I, and Form II. Responses were grouped into primary (combined Standard 7 and Standard 8) and secondary (Form I and Form II). Geographical location of student (Rural=1, urban=2).

Statistical Analyses

Data analysis was performed using SPSS version 16 software. The weighting factor was used in the analysis (due to the nature of the study design) to reflect the likelihood of sampling each pupil and to reduce bias by compensating for differing patterns of non response.

We made frequency distributions to describe demographic characteristics of the sample, and cross tabulation with chi-squared test to estimate and compare the prevalence of hunger. We also conducted logistic multivariate regression analysis using the backward variable selection method to estimate associations between relevant predictor variables and hunger within the last 30 days and other predictor variables within 12 months. We report demographic characteristics of the sample, and also prevalence, chi-squared test and p-value for selected predictor variables with having been hungry in the last 30 days as a dependent variable. Finally, we report adjusted odds ratios (Exp (B)) and their confidence intervals from a multivariate analysis considering factors that were significantly associated with the outcome in chi-squared test analyses.

Study Setting

Malawi has an estimated population of about 15 million and almost half of the population is under 15 years of age. Primary education runs for eight years with an entry age at 6 years, and has been free since 1994. The eighth year is externally examined by the Malawi National Examination Board (MANEB) and these examinations serve as a selection tool for students to proceed to junior secondary education. Junior secondary education takes two years and culminates in the Junior certificate qualifying examinations administered by MANEB. The final phase of secondary school is 2 years and students sit for Malawi School Certificate of Education examinations (Cambridge O level examinations UK equivalent). School meals are only given to primary school pupils. Lack of provision of meals in secondary school may result in drop-out. Literacy rate is estimated at 62% and it is higher among men (69%) than women (59%). In 2009, the proportion of people living below the poverty line was higher among rural residents (43%) than urban residents (14%)[10].

Results

Table1: (Frequency distribution) shows demographic characteristics of the sample.

Table1. Demographic characteristics of participant in Malawi, 2009

Sex n* (%) **		Location n* (%) **		Age n* (%) **		Grade n* (%) **	
Male	Female	Rural	Urban	14 years and under	15 years and under	Primary	Secondary
1054 (46.6)	1012 (53.4)	937 (39.7)	1422 (60.3)	1687 (73.2)	618 (26.8)	1842 (81.1)	429 (18.9)

n* unweighted frequency

(%)** weighted percent

Table 2 (cross tabulation and chi-squared test) shows the hunger characteristics among primary and secondary school pupils in Malawi. Overall, 12.5% of pupils went hungry most of the time or always because there was not enough food in their home during the past 30 days.

Table 2. Hunger characteristics of pupils in primary and secondary schools in Malawi, 2009

Factor		Yes N* (%) **	Ch-squared	P-value
Age	14 years and under	198 (12. 0)	1.248	0.264
	15 years and above	83 (13.8)		
Sex	Male	123 (11.9)	0.194	0.660
	Female	148 (12.5)		
Grade	Primary	214 (11.8)	1.964	0.161
	Secondary	59 (14.3)		
Location	Rural	172 (18.9)	56.550	0.000
	Urban	115 (8.3)		
Eating fruits	Yes	111(8.9)	33.729	0.000
	No	175(17.0)		
Eating vegetables	Yes	71 (11.8)	0.395	0.530
	No	216 (12.8)		
Bullied	Yes	141(15.8)	17.408	0.000
	No	120 (9.8)		
Hunger	Yes	287(12.5)		
	No	2012(87.5)		
Cigarette smoking	Yes	23 (19.3)	5.627	0.018
	No	256 (12.0)		
Drinking alcohol	Yes	15 (11.9)	0.038	0.846
	No	259 (12.5)		
Feeling loneliness	Yes	63 (17.2)	9.576	0.002
	No	212 (11.4)		
Suicide ideation	Yes	53(18.0)	9.394	0.002
	No	230(11.7)		
Never washed hands with soap	Yes	62(18.3)	13.055	0.000
	No	219(11.3)		
Never washed hands after toilet	Yes	24(21.8)	9.132	0.003
	No	262 (12.0)		
Never washed hands before eating	Yes	9(13.2)	0.032	0.858
	No	274(12.5)		
Physically attacked	Yes	130(14.2)	5.390	0.020
	No	149(10.9)		

Table 3 (Multivariate analysis) shows factors that are associated with hunger among primary and secondary school pupils in Malawi. In a multivariate analysis, geographical location, eating fruits, bullying, suicide ideation and washing hands with soap were significantly associated with hunger.

Pupils who came from urban (Exp (B) = 0.345, 95% CI [0.259, 0.459]), not bullied in the past 30 days (Exp (B) = 0.698, 95% CI [0.525, 0.927]), no suicide ideation (Exp(B) = 0.643, 95% CI [0.439, 0.942]), and pupils who washed hands with soap (Exp(B) = 0.701, 95% CI [0.492, 0.998]) were less likely to report being hungry. However, pupils who did not eat fruits (Exp (B) = 1.847 95% CI, [1.382, 2.469]) were more likely to report being hungry. In other words, pupils from rural areas, bullied, who had suicide ideation, never washed hands with soap and those who did not eat fruits were more likely to report being hungry.

Table 3: Factors associated with hunger among pupils in primary and secondary schools in Malawi, 2009

Factor		Exp(B)	95 % CI for exp b		B	Sig
			Lower	Upper		
Location	Rural	1			-1.064	0.000
	Urban	0.345	0.259	0.459		
Eating fruits	Yes	1			0.614	0.000
	No	1.847	1.382	2.469		
Bullied	Yes	1			-0.360	0.013
	No	0.698	0.525	0.927		
Suicide Ideation	Yes	1			-0.442	0.023
	No	0.643	0.439	0.942		
Never washed hands with soap	Yes	1			-0.355	0.049
	No	0.701	0.492	0.998		

Discussion

The 2009 Malawi GSHS among primary and secondary children revealed the prevalence of hunger within the last 30 days to be 12.5%. This finding is similar to the previous study commissioned by UNICEF in Malawi. According to the previous study, 12 percent of primary school children had dropped out of school in 2001 and 9 percent in 2002, specifically owing to food shortages[4]. This shows that hunger is a chronic problem in Malawi despite government efforts to eliminate it with farm inputs subsidy and school feeding programmes. However, the prevalence of hunger in this study is lower than in Zambia (28.7%), Kenya (14.7%) and Botswana (13.9%) [6]. The low rate of hunger in this study compared to neighboring countries may be due to influence of farm inputs subsidy which started in Malawi in the year 2005[11].

As in other studies, we found that sex, age and grade were not statistically associated with hunger. A study conducted in Zambia, Botswana, Kenya and Uganda reported that, no differences were found for hunger based on sex or age across the four countries [6]. Secondary school children may have higher a slightly higher hunger prevalence (14.3%) than primary school children (11.8%), although the difference is not statistically significant. Such a difference could be due to the protection against hunger that children who are normally in primary school receive from mothers. A 2012 study undertaken by Netmums in the UK found that one

in five mothers would sometimes miss out on food so as to be able to save their children from going hungry[12,13,14]. Likewise, female children (12.5%) have a slightly higher prevalence of hunger than male children (11.9). Studies by World Bank haveconsistently found that about 60% of those experiencing hunger are female[12]. By tradition in developing countries, women eat last and least. They may eat the food that is left over after the males have eaten. Often men and boys consume twice as many calories – even though women and girls do much of the heavy work[15].

This study also found that geographical location was statistically significant with hunger and geographical location the strongest predictor of hunger. Pupils who were from rural areas were more likely to be hungry than pupils from urban areas. These findings are similar to the previous study commissioned by UNICEF during the 2002 hunger crisis in Malawi. The previous study found that the problem of food shortage is higher in rural areas; children living in rural areas were 30 percent more likely to drop out of school because of food shortages than children living in urban areas[4]. The FAO report shows that the incidence of poverty is 2 to 4 times higher in rural areas than urban areas[16].

We found that eating fruits was negatively and significantly associated with hunger, i.e., adolescents who reported eating fruits were less likely to report hunger. A study in the US reported that fruit and vegetable intake was declining as food insecurity becomes more severe[17], suggesting that in that setting, hunger was positively associated with lower fruit intake. Further, our study has shown clearly that eating vegetables is not associated with hunger. Studies in some countries have shown that vegetables especially cassava leaves are regarded as a poor man's food and only eaten when there is nothing else[18] thus linking vegetable consumption with deprivation.

We found that bullying was statistically significantly associated with hunger, and that bullying is a predictor of hunger. This finding is similar to the conclusion of a study that was conducted in Zambia, Botswana, Kenya and Uganda, which also reported that bullying was associated with hunger[6]. School authorities must tackle the problem of hunger together with the problem of bullying. A bully-free school environment may help to improve the school feeding programme.

Suicide ideation, being physically attacked and loneliness were significantly associated with hunger, but suicide ideation is the only predictor of hunger among these three variables in this study. A similar study reported that suicidal ideation was associated with hunger in Botswana, Kenya, and Uganda[6]. Students in each country who reported hunger were at increased risk for at least two or more emotional or behavioural adverse outcomes such as loneliness and being physically attacked. By elementary school, children who are hungry are four times more likely than non-hungry children to have a history of needing mental health counseling; seven times more likely to be classified as clinically dysfunctional; seven times more likely to get into fights frequently; and twelve times more likely to steal[19]. These findings underscore the urgent need to focus additional efforts on eliminating hunger among adolescents in developing world. Most countries in developing countries are implementing school feeding programmes, and, if implemented fully, would likely significantly improve the emotional and physical health of these young students.

We found that smoking cigarettes was significantly associated with hunger. A study conducted in Kenya, Namibia, Swaziland, Uganda, Zambia, and Zimbabwe reported that poverty was associated with substance use, including tobacco, alcohol, and illicit drugs[20]. Alcohol consumption was not associated with hunger in this study, perhaps because most students cannot afford it.

Most importantly, this study found that both washing hands after toilet and washing hands with soap were statistically significantly associated with hunger. Washing hands with soap is a predictor of hunger. These findings are similar to a survey which was conducted in Mangochi (one of the hunger stricken districts in Malawi[21] which found that 59% of children reported to have not washed hands after visiting the toilet and 72% of children reported to have not used soap the last time they washed their hands[22]. The same survey also found that 67 percent of the handwashing facilities in schools were not functional and none of the 33% of the functional facilities had soap or ash. The survey further reported that when communities provide soap, it usually gets stolen. The stealing of soap is a defining feature of poverty in the district and the country as a whole and poverty is associated with hunger. This may suggest that in hunger stricken areas, buying of soap for hand washing is not a priority. To support this assumption, studies in Ghana have shown that people buy a lot of soap, yet almost all used it for cleaning clothes, washing dishes, and bathing[23].

Washing hands before eating was not associated with hunger in this study. This may be due to the fact that most people in the developing world use bare hands (they don't use utensils) for eating almost anything. Hence, washing hands is must to them before eating. A global volunteer organization has observed that nearly every culture and many religions promote hand washing, and most people do wash their hands[24].

Washing hands with soap and water is the most cost-effective preventative health measure readily available to virtually everyone. From a cost-benefit perspective, washing hands with soap is three times more effective than building latrines, nearly 60 times as effective as providing clean running water, and more than 300 times as effective as any single immunisation[23]. In addition to preventing diarrhoea, handwashing significantly reduces the risk of cholera and dysentery. Latrines, clean water, and immunizations are all important and necessary health initiatives. However, washing hands with soap will save more lives than any single vaccine or other medical intervention[23].

The study had limitations. Firstly, the study was based on self report data. Pupils may have misreported owing to failure to recall, or they may have misreported intentionally. However, pupils were told that they were free not to answer any question they felt uncomfortable with so as to maintain confidentiality and reduce possibility of intentional misreporting. Data were collected from pupils who were available in school on the day of the survey. Pupils who were absent, whether hungry or otherwise, were not included, and thus the study may have underestimated the prevalence of hunger. The responses to both criterion and predictor variables were obtained as categories, however, the study further dichotomized them and this may have reduced the statistical power in the analysis.

Recommendations

We recommend the following to the public health and education policy makers.

1. Assessment of hunger among children is a guiding tool for designing and planning school feeding programmes. And the prevalence of hunger among school children may serve as a surrogate for the school drop-out rate.

2. Considering the prevalence of hunger among school children in Malawi, it is advisable for school authorities to provide school meals to both primary and secondary school children, because these groups are equally affected by hunger.

3. The prevalence of child hunger in Malawi is higher in rural than urban areas. School authorities must explore why this is the case and provide safety nets to those who are affected by hunger, so that every child – whether rural or urban – has an equal chance to go and attend school.

4. Every school - especially those that are implementing school feeding programmes - in Malawi must have water, sanitation and hygiene facilities, a school garden, and a curriculum that incorporates practical and life skills, to minimize the likelihood of pupils being hungry.

Conclusion

This study found the prevalence of hunger within the past 30 days among the primary and secondary school children in Malawi to be 12.5%. Factors such as geographical location, bullying and suicide ideation are predictors of hunger among primary and secondary school children in Malawi. Up to date, this is the first study we know of to have reported prevalence of hunger and its predictors in Malawi. The design and implementation of school feeding programmes aimed to reduce hunger should incorporate the recommendations suggested by this study.

Competing interest

The authors declare that they have no competing interests.
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References

1.World Health Organisation (2001). 'Macroeconomics and health: Investing in health for economic development. Report on the Commission on Macroeconomics and Health.' World Health Organisation: Geneva.

2. World Food Programme, United Nations Children's Fund. The Essential Package: Twelve interventions to improve the health and nutrition of school-age children. Rome: WFP. 19 August 2010.

3. Ministry of Education and Vocational Training, Ministry of Health, National Statistical Office (2006). National school health and nutrition baseline survey. Zomba: Malawi Government.

4. Centre for social research (2002). Impact of food shortage schooling in Malawi.

5. World Food Programme (2006). 'Where we work: Malawi.' Retrieved from www.wfp.org

6. Swahn MH, Bossarte RM, Gaylor E, Elimam DM, Walingo MK. Associations between hunger and emotional and behavioral problems: A comparison between students in Botswana, Kenya, Uganda, and Zambia. International Public Health Journal 2(2):185- 194, 2010.

7. Burbano C. (2007). Appraisal mission report: WFP Malawi support to primary education under Country Programme 10106. WFP, Lilongwe.

8. Mar'ys meals (2007). A simple solution to world hunger.Mary's meals FAQ, Malawi.

9. Center of Disease Control and Prevention (CDC) (2003). The global school and health survey background. Retrieved from http://www.cdc.gov/gshs/background/index.htm

10. National Statistics Office (NSO). Welfare monitoring survey 2009. Zomba: NSO

11. Government of Malawi (2005). Farm Inputs Subsidy programme. Lilongwe, Malawi.

12. "Food Price Volatility a Growing Concern, World Bank Stands Ready to Respond". World Bank. 2012-03-30. Retrieved 2012-07-31.

13. Miriam R. (2012). 555 million women go hungry worldwide. World Development Movement. Retrieved 2012-07-31.

14. "Mums missing meals to feed kids". The daily Telegraph. 2012-02-16. Retrieved 2012-07-31.

15. Hunger project policy report (2007). Gender dimensions of hunger. Retrieved 2007.02.12

16. Ahmed AU, Hill RV, Smith LC, Frankenberger T. (2007). Characteristics and Causes of Severe Poverty and Hunger. 2020 Focus Brief on the World's Poor and Hungry People. Washington, DC: IFPRI.

17. Kendall A, Olson CM, Frongillo EA. Relationship of hunger and food insecurity to food availability and consumption.J Am Diet Assoc, 96 (1996), pp. 1019–1024 quiz 1025-1026

18. Lancaster PA, Broooks JE. Cassava leaves as human food – 1983

19. Kleinman R. (1998). Hunger in children in the United States: Potential behavioral and emotional correlates. Pediatrics 101(1):e3.

20. Peltzer K. (2009). Prevalence and Correlates of Substance Use Among School Children in Six African Countries. International Journal of Psychology. 44(5):378-86.

21. Ligomeka B. Food crisis worsens in malawi. News and views on Africa 2002

22. Kalengamaliro H. Improving water, sanitation and hygiene behaviours in schools.Success and lessons learned from Mangochi District, Malawi, September 2008.

23. Global Handwashing Day Planners Guide (2OO8). 44. http://www.who.int/gpsc/events/2008/global_handwashing

24. Global volunteers (2011). 12 essentials services proven to eradicate hunger, improve health and raise iq. Retrieved from www.globalvolunteers.org