

Consumption of sweetened beverages among school-going children in a densely populated township in Lilongwe, Malawi

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Abstract

Background

The growing global childhood obesity pandemic has not spared low-income countries like Malawi, where 8% of children below the age of five years are overweight. Globally, regular consumption of sweetened beverages is implicated among the factors that fuel childhood obesity. Despite the growing problem, there are no local studies on any aspect of sweetened beverage consumption among children in Malawi that could help in guiding interventions and public health nutrition policies.

Aim

We aimed to assess sweetened beverage consumption among school-going children in Chilinde, a densely populated township in Lilongwe, the capital city of Malawi.

Methods

A total of 60 school-going children whose caregivers gave verbal consent were included, and a structured questionnaire was administered to the caregiver (or other knowledgeable and responsible member of the household) of each eligible child.

Results

Our results showed that 50 of the 60 children sampled were consuming a wide-range of sweetened beverages on a regular basis on any day of the week, mostly during meal times ($n = 23$), before going to school ($n = 22$), and after school ($n = 19$). One-third of the children were reportedly consuming up to 300 mL of several sweetened beverages per day.

Conclusion

Like in many countries around the world, consumption of sweetened beverages appears to be common among young school-going children in this urban setting in Malawi. As the country builds public health responses to the growing problem of non-communicable diseases, early preventive interventions among children should be given priority.

Introduction

Childhood obesity, along with the associated risk of acquiring non-communicable diseases, is a well-documented public health problem affecting both developed and developing countries. The WHO estimates that, globally, 170 million children below the age of 18 years were overweight in 2010¹. Overweight children, just like adults, are at high risk of a wide range of health problems, including cardiovascular diseases and diabetes^{2,3}.

By significantly contributing to total energy intake⁴, consumption of sugar-sweetened beverages (SBs), such as carbonated soft drinks and flavoured juice drinks, has been linked to the rise in obesity and abdominal obesity among children⁵⁻⁷. High consumption of SBs also reduces micronutrient intake owing to a dilution effect⁸, thereby increasing the risk of micronutrient deficiencies. Furthermore, high SB consumption results in high-magnitude weight gain⁹, dental caries in younger children¹⁰, and is associated with a high prevalence of hypertension among older individuals (≥ 19 years of age)¹¹. The weight of evidence linking SBs to higher disease burden has led to calls for public health strategies to address the growing problem of high consumption of sugar-sweetened beverages^{6,12,13}.

In Malawi, the prevalence of overweight (weight-for-height Z-score $> +2$ standard deviations, SD) among children below the age of five years is 8.3%¹⁴. If such trends continue into older ages, future generations in Malawi would be at higher risk of various metabolic disorders such as diabetes, hypertension, hyperlipidaemia, and cardiovascular diseases. In the adult population, there is already a high burden of hypertension (32.9%), elevated fasting blood glucose (5.6%) and hypercholesterolaemia (8.7%)¹⁵; this burden will only intensify in future generations if childhood obesity is not addressed. There is paucity of national data, however, on the dietary determinants of overweight and obesity among Malawian children, thereby posing public health strategic challenges in addressing the growing problem. As observed in studies from elsewhere, high consumption of SBs is one of the key factors associated with overweight and obesity. The present study was conducted to assess SB consumption among school-going children in Chilinde, a densely populated township in Lilongwe, the capital city of Malawi.

Methods

A small section of Chilinde township was chosen, out of the convenience of accessibility, to be the study area. Chilinde is a densely populated area, with a 2008 population of 44,764¹⁶. School-going children, aged six to twelve years, whose caregivers had given verbal consent to participate in the study and responded to a structured questionnaire, were eligible. Caregivers of eligible children who attended local schools in the area were chosen through snowball sampling. A total of 60 households who gave verbal consent were recruited into the study, and a structured questionnaire was administered to the caregiver of an eligible child present during the survey. Data were collected on demographic, social and economic characteristics, frequency, amount and type of SBs consumed by the children, as well as their dietary preferences. Although sugar-sweetened beverages appear to be common in Malawi, there is growing use of artificial sweeteners. In this study, however, we considered SBs in general without delineating the sources of sweetness. All data were entered in SPSS 16.0 for Windows (SPSS Inc., Chicago, IL, USA), and descriptive statistics were run to generate frequencies.

Results

Characteristics of the children who participated in the study and those of respondents are shown in Table 1. The children were 8.6 ± 1.7 years old (range: 6 to 12 years) and about two-thirds were female. Most were the first-born child in their families, and the majority were in standards 1 to 4 in school. Their caregivers were on average young adults (31.5 ± 10.9 years old) who were primarily earning income through regular wage employment and income-generating activities.

Consumption patterns of SBs

More than 80% of the children were reported to be consuming SBs on a regular basis, mostly during meal times ($n = 23$), before going to school ($n = 22$), and after school ($n = 19$) (Table 2). The pattern of SB consumption was similar on all days of the week.

A wide range of SBs was reported to be consumed by

the children (Table 3). Malawi-produced SBs that were consumed on regular bases (one or more times daily) by at least 10% ($n \geq 6$) of the children were Super Dip, Suncrest Creameries juice, and orange squash, while home-processed SBs that were regularly consumed were *bwemba* (tamarind) juice, *malambe* (baobab) juice, and *thobwa* (a whole maize and germinated sorghum-based drink, to which sugar is usually added). SBs that were least likely to be consumed were Cocopina, Coke, Drink-O-Pop, Maheu, Pure Joy juice, Red Bull, Sprite, Twizzer, Yess juice, and Zest Cola.

Table 4 shows estimates of amounts of SBs consumed by the children. For some of the beverages such as *bwemba* juice, Davida, Fanta, *malambe* juice, orange squash, Super Dip and *thobwa*, at least one-third ($n \geq 20$) of the children were reportedly consuming up to 300 mL in a day. Larger amounts were unlikely to be consumed by the children, except for *thobwa*, Jollie, *malambe* juice, orange squash and Super Dip, which were consumed even in excess of 1800 mL/day by a few children.

Table 1. Characteristics of respondents and children who participated in the study

Characteristic	n
Respondents	
Female respondents	54
Occupation	
Regular wage earner	27
Casual employee	5
Business	23
Vocational skilled worker	3
Pensioner	2
Female-headed households	25
Children	
Females	39
Level in school	
Standard 1	9
Standard 2	13
Standard 3	13
Standard 4	10
Standard 5	6
Standard 6	1
Standard 7	5
Standard 8	1
Birth order of child	
1	21
2	11
3	13
4	10
5	3
6	2

Table 2. Patterns in the consumption of sweetened beverages among school-going children in Chilinde township, Lilongwe, Malawi

Consumption of SBs	n
Children who consumed SBs on regular occasions*	50
Occasions on which SBs were consumed	
Before going to school	22
After school	19
During break times	24
During meal times	23
During weekends	1
During mid-afternoon	16
During mid-morning	4
Consumption of SBs during the week	
Sunday	36
Monday	37
Tuesday	34
Wednesday	36
Thursday	34
Friday	35
Saturday	38

*In this study, regular consumption referred to one or more times per day.
SB = sweetened beverage

Table 3. Frequency of consumption of specific sweetened beverages by school-going children in Chilinde township, Lilongwe, Malawi

Beverage	Never or less than 1 time/week	1 time/week	2-3 times/week	4-8 times/week	1 time/day	2-3 times/day	4+ times/day	Not mentioned
n	n	n	n	n	n	n	n	n
<i>Bwemba</i> juice	37	7	5	0	6	5	0	0
Cherry plum	46	8	6	0	0	0	0	0
Cocopina	44	9	5	0	1	1	0	0
Coke	46	9	4	0	0	0	0	1
Chambiko	1	0	0	0	0	0	0	59
Dairyboard juice	1	0	0	0	0	0	0	59
Davida	39	5	2	1	1	0	0	0
Drink-O-Pop	56	2		1	1	0	0	0
Fanta	27	15	11	2	4	1	0	0
Fizzes	41	3	3	5	3	2	3	0
Fruity juice	4	0	1	0	1	1	0	53
Guava	3	0	0	0	0	1	0	55
Grape juice	1	0	0	0	0	1	0	58
Jollie	47	3	2	3	1	1	2	1
<i>Kongwe</i>	0	0	0	0	1	1	0	58
<i>Maheu</i>	47	5	0	4	2	1	0	1
<i>Malambe</i> juice	27	4	2	1	8	8	8	2
<i>Mulawe</i> juice	1	0	1	0	0	1	0	57
Orange juice	1	0	1	0	0	0	1	57
Orange squash	13	4	8	6	12	11	4	2
Peach/apricot juice	1	0	0	1	0	0	0	58
Pure joy juice	56	3	0	0	1	0	0	0
Red Bull	59	0	1	0	0	0	0	0
Sprite	54	0	5	0	1	0	0	0
Suncrest Creameries juice	1	2	5	3	10	6	17	0

Table 4. Estimated amount of sweetened beverages consumed by children in Chilinde township, Lilongwe, Malawi in one day

Beverage	Estimated amount of beverage consumed (mL)							Did not mention
	300	450	600	900	1200	1500	1800	
Bwemba juice	24	1	1	1	0	1	0	32
Cherry plum	13	0	8	0	1	0	0	38
Cocopina	16	0	11	0	0	0	0	33
Coke	14	1	5	0	0	0	0	40
Chambiko	0	1	0	0	0	0	0	59
Dairyboard juice	2	0	0	0	0	0	0	58
Davida	21	0	2	3	0	0	0	34
Drink-O-Pop	4	0	3	1	1	0	0	51
Fanta	26	0	9	2	1	0	0	22
Fizzes	15	2	0	2	1	0	0	40
Fruity juice	1	1	0	0	1	0	0	57
Guava	2	0	0	0	0	0	0	58
Grape juice	1	0	0	0	0	0	0	59
Jollie	10	1	3	0	0	0	2	44
Kongwe	1	0	0	0	0	0	0	59
Maheu	8	9	0	0	0	0	0	43
Malambe juice	36	2	0	1	0	0	1	20
Mulawe juice	1	0	0	0	0	0	0	59
Orange juice	5	1	0	1	0	0	0	53
Orange squash	27	3	9	5	0	1	1	14
Peach/apricot juice	1	0	0	0	0	0	0	59
Pure joy juice	9	0	0	0	0	0	0	51
Red bull	1	0	0	0	0	0	0	59
Sprite	11	1	3	0	0	0	0	45
Suncreast Creameries juice	2	0	0	0	0	0	0	58
Super dip	24	5	2	4	1	1	10	13
Thobwa	23	1	11	4	2	2	2	15
Twizzer	4	2	0	1	0	0	0	53
Yess juice	9	12	2	0	0	0	0	37
Yoggie	16	1	0	0	0	0	0	43
Yoghurt	3	0	0	0	0	0	0	57
Zest Cola	2	1	0	0	0	0	0	57

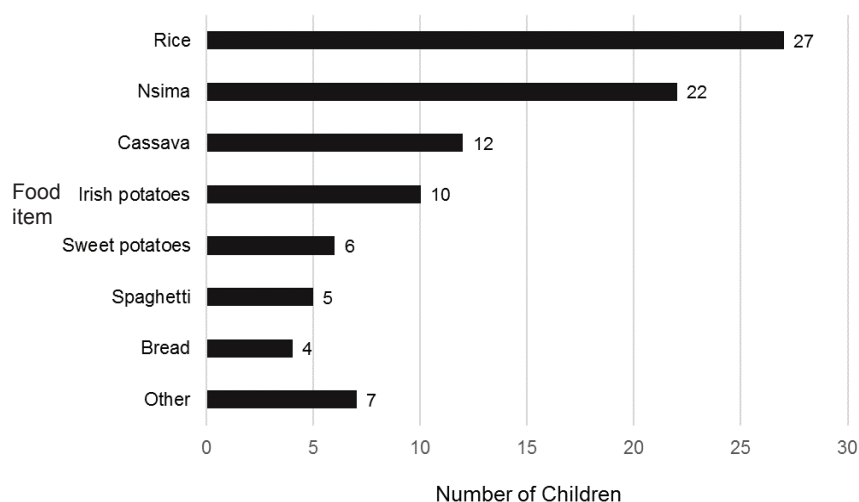
Dietary patterns

The mean number of meals consumed by the children was 3.23 ± 0.62 per day, with the majority ($n = 43$) consuming 3 meals per day. One-third of the children skipped meals, with breakfast and lunch most likely to be skipped (Table 5). Of those who skipped meals, 45 children were indicated as consuming SBs on regular occasions and 57 were children in lower primary school (standards 1 to 4). Further analysis showed that younger children were more likely to skip meals than older ones. According to the respondents, foods that were most liked by the children were carbohydrate-rich staple foods (rice, *nsima* [a maize-based hard porridge, which is the predominant form in which maize is consumed as the main portion of meals in Malawi], cassava, Irish potatoes, and sweet potatoes), with a conspicuous lack of animal-source foods listed (Figure 1).

Almost all children (97%) consumed snacks, with Malawi-produced processed snacks (Kamba Puffs, sweets, biscuits, and Jiggies) being the most commonly consumed, by at least 30% of the children. A fried wheat dough-based snack (*mandasi*) and a fried whole-maize flour snack (*zitungu*) were also commonly consumed by the children (Figure 2).

Table 5. Dietary patterns of school-aged children in Chilinde township, Lilongwe, Malawi

Dietary characteristic	n
Children who regularly skipped meals	21
Meals often skipped	
Breakfast	7
Lunch	7
Supper	4
Lunch and supper	3
No. of meals regularly consumed	
1	1
2	1
3	43
4	13
5	2
Meals that children usually ate	
Breakfast	18
Lunch	8
Supper	4
Breakfast and lunch	1
Lunch and supper	11
Breakfast, lunch and supper	17
Children who regularly consumed snacks other than sweetened beverages	58

**Figure 1.** List of foods that school-aged children in Chilinde township, Lilongwe, Malawi liked to eat

Other: Soya products, sausages, beef, fish, beans, chicken, dry roasted maize

Nsima = a maize-based hard porridge, which is the predominant form in which maize is consumed as the main portion of meals in Malawi.

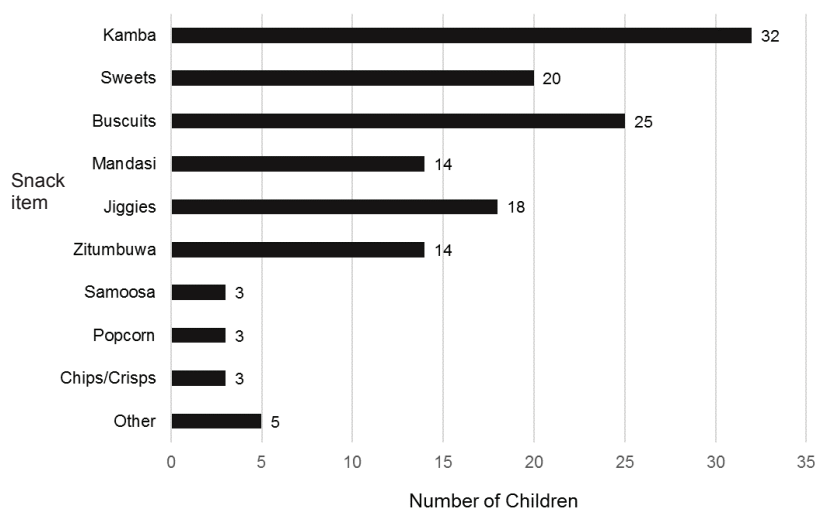


Figure 2. Snacks that were regularly consumed by school-aged children in Chilinde township, Lilongwe, Malawi
Mandasi = a fried wheat dough-based snack
Zitumbuwa = a fried whole-maize flour snack
 Other: Cassava, mango, baobab, cake, roasted maize

Discussion

In this small study of 60 school-going children, we aimed to determine the consumption of SBs, which are known to fuel the obesity pandemic in many parts of the world. We have shown that in a densely populated township in Malawi, a large proportion of school-going children aged six to twelve years were reportedly consuming SBs, particularly during meal times, before going to school, and after school. Furthermore, snacking of locally made processed foods was common among the children. To our knowledge, this is the first published study documenting the wide consumption of SBs in such a Malawian population and has comparable results to studies that have been conducted elsewhere⁴⁻¹³. The study provides a basis for future, more comprehensive studies in Malawi on SBs, which will help in designing interventions to curb childhood obesity. Close to one-tenth (8.3%) of Malawian children below the age of five years are overweight¹⁴, and although the local determinants are not yet known, regular consumption of sugar-sweetened beverages could be one of these determinants^{17,18}. Consuming sugar-sweetened beverages during meal times could mean that, in addition to replacing healthful foods, SBs increase the children's total caloric intake, thereby increasing adipose tissue and body mass index (BMI). Indeed, a Saudi Arabian study among 10- to 19-year-olds showed that increased intake of sugar-sweetened beverages was associated with poor dietary choices and positively correlated with abdominal obesity and higher BMI¹⁹. One-third of children in this study were reported to skip meals, which is lower than the national average (45%) among eight- to ten-year-old school-going children²⁰. According to the National School Health and Nutrition Baseline Survey of 2006, school-going children reported skipping meals because of not feeling hungry (49%), illness (48%), and simply not feeling like eating (5%)²⁰. Since three quarters ($n = 45$) of children who skipped meals in this study were indicated as consuming SBs on regular a regular basis, we hypothesize that SBs made up for the skipped meals in terms of caloric intake, therefore contributing to poor nutrient intake. In a French study of school children ($n = 278$, 7.50 ± 0.67 years old), high BMI was observed among children who were reported to be skipping breakfast and those who were snacking²¹. In this study, breakfast and lunch were mostly skipped, suggesting similar patterns and probable health outcomes in Malawian

children. Unfortunately, the snacks that children in this study were reported to be consuming were generally high-energy (Figure 2), which, together with the empty-calories of SBs, could elevate the risk of overweight and obesity.

The study had three main limitations. First, it was restricted in terms of study area and sample size, hence its external validity is limited. However, it could serve as a foundation onto larger studies on SB consumption by various population groups in Malawi. Secondly, although we estimated SB intake, we did not quantify their contribution to total daily energy intake. We recommend that in follow-up, larger studies, quantitative data should be generated to provide comprehensive dietary assessments around the subject, including anthropometric measurements to assess associations between SB consumption and the risk of metabolic abnormalities. Lastly, future studies should investigate and compare consumption of beverages sweetened by sugar versus artificial sweeteners.

Conclusion

Like in many countries around the world, consumption of SBs appears to be common among young school-going children in this urban setting in Malawi. As the country builds public health responses to the growing problem of diet-related non-communicable diseases, early preventive interventions that target children and their caregivers should be given priority.

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