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# Nutrition knowledge, attitude and practices among urban primary school children in Nairobi City, Kenya: a KAP study

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## Abstract

**Background:** Kenya is undergoing rapid urbanization resulting in changing lifestyles. Childhood dietary habits are changing and might result in childhood obesity and related health risks. Dietary habits learnt in early life are likely to be carried to adulthood. Nutrition knowledge and positive attitude are known to influence dietary practices. There is paucity of information on nutrition knowledge, attitude and practices of school-children in cities. This study established nutrition knowledge, attitude and practices among urban school children in Nairobi.

**Methods:** A cross-sectional study was conducted among 202 school-children aged 8–11 years, systematically sampled from four randomly selected schools. Structured questionnaire, key informant interviews and focus group discussions were used to collect data. A nutrition knowledge score was determined (correct response: 1, incorrect: 0). Overall knowledge level was the total of correct responses in percentages. Scores of  $\leq 40$  %, 41–69 % and  $\geq 70$  % were categorized as low, moderate and high knowledge respectively. Dietary practices were determined from frequency of food consumption, habitual patterns and attitude on what they ate. Data were analyzed using SPSS. *P*-value of  $p < 0.05$  was considered significant.

**Results:** Pupils had moderate nutrition knowledge (mean score  $5.16 \pm 1.6$ , 51.6 %). 65 % did not care what they ate. About 82 % ate food in front of TV unsupervised. Over 70 % had consumed sweetened beverages and 73 % junk foods in previous 7 days. Only 9 % consumed fruits 4–7 times a week. Almost all study children carried money to school and made decision on foods to buy. Chips, candies, sausages and smokies, doughnuts and chocolate were preferred snacks. Nutrition knowledge had no significant relationship with dietary practices, but attitude had.

**Conclusion:** Children had moderate nutrition knowledge and poor dietary practices, associated with negative dietary attitude. This study recommends activities to raise awareness on the effect of poor dietary practices on obesity and related health risks.

**Keywords:** Nutrition knowledge, Dietary practices, School children, Urban primary schools

## Background

Poor dietary practices are major contributors to the development of chronic non-communicable diseases [1, 2]. Kenya is a sub-Saharan country undergoing rapid urbanization resulting in changing lifestyles and dietary habits; the so-called nutrition transition [3, 4]. Most chronic diseases in adulthood originate from

dietary practices which are mainly formed during childhood [5–7]. In order to promote healthier eating habits, nutrition knowledge is believed to be important [8]. However, nutrition knowledge alone may not be sufficient to change dietary habits hence in addition there is need to mold a positive attitude toward healthy eating early in childhood [9–11]. With the current change in dietary habits to the western diet and increase in televised food advertisements targeting children, there is even greater need to empower children with the right knowledge and

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attitudes for making proper food choices [12]. School age children spend more time away from their parents thus, influence from friends and media further affect the formation and stabilization of their dietary practices [13, 14].

There is growing evidence suggesting that young children from developing countries are increasingly making unhealthy food choices especially due to lack of knowledge and wrong perception towards healthy foods [11, 15]. This is mainly because presently the concept of 'food' has changed from a means of nourishment to a marker of lifestyle and a source of pleasure as portrayed by media [16]. A large proportion of televised food advertisements are of highly processed foods/convenient foods with, high caloric content, large amounts of fat and sugar, and with little or no micronutrient content [14]. In addition, children in urban centres such as Nairobi, the capital city of Kenya have easy access to numerous fast food outlets, restaurants and supermarkets, and they are left to make decisions on what to eat [17]. Therefore, to be able to overcome the emerging issue of obesity and overweight among children and related health risks, school children have to be empowered to make the right food choices by providing them with nutrition knowledge and changing their attitudes towards healthy eating. A larger study was conducted to assess nutritional status, including body composition, blood pressure, and physical activity levels, along with nutritional knowledge, attitude and dietary practices of school going children in four urban schools in Nairobi Kenya. This article presents the findings on the nutrition knowledge, practices and attitudes.

## Methods

The study adopted a cross-sectional study design which was conducted among children aged 8–11 years from four randomly selected day public primary schools in Kasarani Sub-county in Nairobi city. The city was purposively selected due to rapid urbanization, transition in dietary practices and lifestyle. Kasarani sub-county was randomly selected. Four primary schools were randomly selected from 17 day public primary schools in the selected sub-county. Proportionate to size sampling was used to sample 202 children. At the school level stratified random sampling was used to select children from each age group 8 years, 9 years, 10 years and 11 years. A representation ratio of boys to girls as 1:1 was anticipated.

A structured questionnaire with a with figure-rating scale for girls (silhouettes) validated and widely used in other studies [18, 19], a head teacher key informant interview (KII) guide and a focus group discussion (FGD) guide were used to collect data. All data

collection instruments were pretested in a fifth school that was not part of the main study. The questions were designed based on the research objectives of the larger study. The study pupils filled the questionnaires under the supervision of the researchers who ensured that all the children responded to the study questions. FGDs were conducted to get more information on knowledge, attitude and dietary practices of the children towards healthy eating. Two FGDs per school each comprising of 8 children were researcher facilitated. The research assistant recorded all the deliberations of the discussion. The researcher ensured that the selected venues were comfortable and free from disturbance. Deliberate efforts were made to ensure discussion questions followed each other as they appeared in the guide. To achieve a balanced discussion the facilitator moderated the discussions. The discussions took an average of one hour. Key informant interviews were held with the head teachers of the participating schools to get in depth information on the school environment in terms of promoting healthy dietary practices.

The level of nutrition knowledge was determined using 10 multiple choice questions concerning food, nutrition and healthy eating. For each question, a correct response was coded as 1 and an incorrect response as 0. The total score for every child was calculated from all correct responses with a maximum of 10. This was then converted to a percentage. Those who scored below 40 % were categorized as having low nutrition knowledge, 41–69 % moderate, and >70 % high nutrition knowledge which was predetermined before the study.

A food frequency questionnaire (FFQ) with foods arranged into 9 categories based on food grouping was used to assess dietary practices. A list of commonly available soft drinks and fast foods were provided for the children to indicate the frequency of consumption in the last seven days prior to the study [20]. Total frequency of consumption of all sweetened drinks, fast foods and fruits was computed. Consumption of sweetened beverages, fruits and fast foods more than four times in a week was considered excess consumption while consumption of fruits less than four times in a week was considered inadequate intake as provided by Food and Nutrition Technical Assistance [21]. In addition, eating habits like eating in front of the television (TV), eating with other family members, eating breakfast and sharing food in school with other children and presence of food vendors in the school were used to assess influence of home and school environment to children's dietary practices. To assess the attitude towards good dietary practices, the study children were asked whether they were concerned about what they ate.

Data were analysed using SPSS version 20 [22, 23]. Pearson product moment correlation and chi-square

tests were used to establish relationships and associations between nutrition practice, knowledge and attitude. Results were considered significant at  $P < 0.05$ . Qualitative data from FGD and KII were coded by assigning labels to variable categories. Common themes were then established and clustered in a patterned order to clarify variables. Inferences were made from particular data under each theme then conclusions were drawn from the findings. The findings were triangulated with the reported quantitative data. The study was approved by the Kenyatta University Ethical Review Committee. Written informed consent was sought from the children's parents and assent sought from the study children.

## Results

### Demographic characteristics of study pupils

The age distribution of the study population was between 8–11 years with majority (40.6 %) being 11 years. Mean age was  $10.07 \pm 0.9SD$ . Most of the study pupils were girls (54.0 %) while boys were 46.0 %. There was no significant difference ( $P > 0.05$ ) between sexes. The average household size was  $4.9 \pm 1.4 SD$  with maximum of nine members and minimum of two members in a household. Majority (28.2 %) of the household's had five household members. Most (79.7 %) households had fathers as household head with only a few (20.3 %) were being headed by females (Table 1).

**Table 1** Demographic characteristic of the study pupils

|                | Characteristics | Number  | Percent (%) |
|----------------|-----------------|---------|-------------|
| Sex            | Boys            | 93      | 46.0        |
|                | Girls           | 109     | 54.0        |
|                | Total           | 202     | 100         |
| Age (years)    | 8               | 15      | 7.4         |
|                | 9               | 38      | 18.8        |
|                | 10              | 67      | 33.2        |
|                | 11              | 82      | 40.6        |
|                | Total           | 202     | 100         |
| Household size | 2               | 4       | 4.0         |
|                | 3               | 25      | 12.4        |
|                | 4               | 46      | 22.8        |
|                | 5               | 57      | 28.2        |
|                | 6               | 41      | 20.3        |
|                | 7               | 16      | 7.9         |
|                | >8              | 9       | 4.5         |
|                | Total           | 202     | 100         |
|                | Household head  | Fathers | 183         |
| Mothers        |                 | 19      | 20.3        |
| Total          |                 | 202     | 100         |

### Nutrition knowledge of the study pupils'

Results from this study showed that close to half (49.5 %) had moderate knowledge, about 32.7 % had low knowledge while 17.8 % had high knowledge (Table 2).

The mean knowledge score was  $5.16 \pm 1.6 SD$  with a minimum of 1 point and maximum of 9 points, with lower quartile as 4, medium as 5 and upper quartile being 6 which indicated that pupils had moderate nutrition knowledge. This was despite the fact that all schools had lessons where healthy eating was taught as confirmed by the pupils' responses in the questionnaire and the key informants. The study established the proportion of pupils who responded correctly on various test questions (Table 3). This was mainly to identify which aspects of the knowledge aspects pupils were weaker or stronger. Majority of the children (90.6 %) knew that fruits are healthy snacks and that consumption of too much fat can make someone become fat (62.4 %), while consumption of fruits and vegetables daily is good for body to fight against illnesses (74.3 %). Most children (88.1 %) knew that sugar, sweets and sweet foods are not good for health. However, most (77.2 %) were not aware that over consumption of sugary foods can make someone fat. Other nutrition aspects tested included the role of various food groups in the body. According to this study, pupils were found to be weak in identifying the role of various food groups in the knowledge test. Only 21 % were able to correctly identify the best source of energy food group while 54 % could not identify the group of nutrients that is good for building body muscles. Only 46 % of the study children knew that sweets and sugary foods should be least consumed. This shows that most children had minimal knowledge on nutrient classification and their functions in the body.

### Attitude toward healthy eating

The study pupils were asked their feelings towards what they ate. Only 35.1 % of them reported that they were concerned about the foods eaten, while 64.9 % of them reported that they did not care about what they ate since they were still young. Figure rating scale established that more than half of the girls (59.6 %) had the perception that they were of lean size despite some of them being big from observation. A similar proportion (52.3 %) felt that they wanted to remain in that body shape, therefore felt no need to check their diet in relation to their body

**Table 2** Nutrition knowledge level among the school children

| Nutrition knowledge (percentage) | Number | Percent |
|----------------------------------|--------|---------|
| Low (<40)                        | 66     | 32.7    |
| Moderate (41–69)                 | 100    | 49.5    |
| High (>70)                       | 36     | 17.8    |
| Total                            | 202    | 100     |

**Table 3** Proportions of respondents with correct scores in various nutrition knowledge aspects

|    | Nutrition knowledge aspect tested   | Number | % correct answers |
|----|---|--------|-------------------|
| 1  | Fruits are healthy snacks   | 183    | 90.6              |
| 2  | When you eat too much fat you can become fat  | 126    | 62.4              |
| 3  | Is eating fruit and vegetables every day good for our bodies to fight against illnesses like colds and flu? | 150    | 74.3              |
| 4  | Eating a lot of sugar, sweets and sweet food, is good for health  | 178    | 88.1              |
| 5  | Eating a lot of sugar, sweets and sweet food can make you fat   | 46     | 22.8              |
| 6  | Food group that you should eat the most of every day  | 62     | 30.7              |
| 7  | Food group that you should eat the least of every day   | 93     | 46.0              |
| 8  | Food group that gives your body the best energy   | 43     | 21.3              |
| 9  | Food group that your body uses to build muscles   | 93     | 46.0              |
| 10 | Food group that best protects the body against illnesses  | 124    | 61.3              |

size and shape. From the FGDs, boys had a perception that being thin is not good since other boys would bully them and this made them eat a lot of food to be energetic in case other boys want to fight them.

### Dietary practices

#### *Frequency of consumption of various foods among the children*

From a 7 day food frequency questionnaire, 28 % of the children consumed sweetened drinks 4–7 times in a week while 49.0 % consumed sweetened drinks 1–3 times in a week. Fast foods were consumed by 40.6 % of study children 4–7 times and 32.7 % 2–3 times in a week. Some of the soft sweetened drinks consumed by the study children were carbonated sweet drinks (sodas) and artificial juices such as *Afia*, *Quencher*, *Minute maid* (brand names). Fast foods consumed by the children were smokies, sausages, chips (French fries), fatty doughnuts (*mandazi*) sweets, cakes, chocolate and popcorns.

**Table 4** Frequency of consumption of various food items in the last 7-days

| Food group       | 4–7 times |      | 2–3 t/times |      | once |      | Not consumed in the last 7 days |      |
|------------------|-----------|------|-------------|------|------|------|---------------------------------|------|
|                  | N         | %    | n           | %    | n    | %    | n                               | %    |
| Fruits           | 19        | 9.4  | 67          | 33.2 | 98   | 48.5 | 17                              | 8.4  |
| Nuts             | 3         | 1.5  | 24          | 11.9 | 54   | 26.7 | 121                             | 59.9 |
| Milk             | 24        | 11.9 | 43          | 21.3 | 124  | 61.4 | 11                              | 5.4  |
| Sweetened drinks | 57        | 28.2 | 72          | 35.6 | 27   | 13.4 | 46                              | 22.8 |
| Fast foods       | 82        | 40.6 | 66          | 32.7 | 0    | 0.0  | 54                              | 26.7 |

Regarding consumption of fruits, only 9.4 % had consumed fruits 4–7 times in the previous 7 days prior to data collection as reported from food frequency questionnaire. About 33.2 % had consumed fruits 2–3 times in 7 days while 48.5 % had consumed fruits only once in 7 days (Table 4). Follow up questions showed that of those who had consumed fruits, 49 % ate fruits because of the sweet taste, while 17.3 % ate fruits because they were told by parents to eat them. About 33.7 % of the children reported to eat fruits because they saw other family members eat them. Consumption of other healthy snacks like nuts and milk (not in tea) was assessed. It was noticed that although nuts such as groundnuts were available and packaged in small and affordable portions, most children never consumed them. More than half (59.9 %) had not consumed nuts even a single time in the last seven days prior to the study. Milk on its own had been consumed only once by 61.4 % of the study children. Complementary findings from focus group discussion showed that study children preferred to buy processed juices and carbonated sweet drinks rather than milk. From the FGDs, it was noted that most of these soft drinks were consumed mainly away from home, when the pupils were going to or coming back from school. Children who did not carry packed lunch were given money to carry to school to buy either lunch or snacks. Children did not report back to their parents what type of food and/or snacks they bought while at school and therefore parents were not aware of the foods that their children consumed outside home especially snacks.

#### *Snacking habits of the study children*

To establish whether study children were able to make informed choices on healthy snacks, they were asked what they usually ate when they felt like snacking. The findings are presented in Table 5.

The most preferred snacks were potato chips (78.2 %) and chocolate (69.3 %). Other commonly preferred snacks by children were cakes, sandwiches, sweets, smokies (smoked sausage), sausages, and popcorn (Table 5). Fruits like an apple or nuts were indicated only a few times. This shows that children did not engage much in healthy snacking. From FGDs, children

**Table 5** Choice of snacks made by the study children

| Food/snack*              | Number | Percent |
|--------------------------|--------|---------|
| Chips (French fries)     | 158    | 78.2    |
| Sweets                   | 105    | 52.0    |
| Sandwich                 | 110    | 54.4    |
| Chocolate                | 140    | 69.3    |
| Cakes                    | 116    | 54.7    |
| Popcorns                 | 82     | 40.5    |
| Sausages                 | 83     | 41.1    |
| Smokies (smoked sausage) | 103    | 51.0    |

\*Multiple responses were allowed in this question

reported that they consumed the mentioned food items mainly because of the sweet taste. In addition, children reported that while away from home they would tend to buy snacks, which were usually not found at home. Availability of cheap fast foods and sweet beverages in the environment surrounding the school encouraged their consumption among the pupils. Other practices associated with food intake while at school were carrying of packed lunch to school which was often shared among the pupils and carrying money to school for buying lunch or snacks (Table 6).

From the results, 68.3 % children carried lunch box daily to school. The study noted that majority of those who carried lunch to school (77.3 %) usually shared with other children. This shows that what children ate was also greatly influenced by what other children carry to school. Almost all of the study children (95.5 %) carried money to school to buy either mid morning snacks or lunch for those who did not carry lunch box to school. All schools had a parent-funded feeding program whose participation was not compulsory as reported by key informants hence most children preferred carrying lunch box to school and/or money to buy food. From the key

**Table 6** Practices associated with food intake

| Variable                | Frequency                      | Percent |
|-------------------------|--------------------------------|---------|
| Carry lunch box         | Yes                            | 138     |
|                         | No                             | 48      |
|                         | Sometimes (2–3 times per week) | 16      |
|                         | Total                          | 202     |
| Share lunch with others | Yes                            | 99      |
|                         | No                             | 35      |
|                         | Sometimes (2–3 times a week)   | 20      |
|                         | Total                          | 160     |
| Carry money to school   | Yes                            | 193     |
|                         | No                             | 9       |
|                         | Total                          | 202     |

informants, there were many food vendors adjacent to the schools. The schools did not have food policy to regulate food items sold in the surrounding shops. Key informants reported that children had easy access to variety of snacks from the shops. Moreover, the schools did not have shops within the school compound and therefore children relied on what was available in the surrounding shops. In addition, the products were also easily available and in various packaging sizes, which children would afford.

#### Eating environment at home

Eating environment at home was also assessed. Most of the children (82.1 %) ate food in front of the TV at home, either daily or at least 2–3 times in a week (Table 7). Moreover, about 32.2 % of the study children ate their food in the absence of their parents, either always or sometimes (at least 2–3 times in a week). This is an indication that most children ate food unsupervised. In this study, breakfast was consumed by the majority of children (92.1 %), although the quality of the breakfast is not reported in this paper.

#### Relationship between nutrition knowledge, attitude and practices

Nutrition knowledge had no significant relationship ( $P > 0.05$ ) with dietary practices (Table 8). Attitude was found to have a significant relationship ( $p < 0.05$ ) with practices on consumption of sweetened beverages, consumption of fast foods and consumption of fruits (Table 8). This implies that good attitude towards nutrition plays an important role in improving nutrition practices among school children. Children who watched TV were found not to be concerned on what they ate as

**Table 7** Eating environment among the study pupils at home

| Home eating environment aspect |                              | Number | Percent |
|--------------------------------|------------------------------|--------|---------|
| Ate in front of TV             | Yes                          | 131    | 64.9    |
|                                | No                           | 38     | 18.8    |
|                                | Sometimes (2–3 times a week) | 33     | 16.3    |
|                                | Total                        | 202    | 100     |
| Eating meals with the family   | Yes                          | 137    | 67.8    |
|                                | No                           | 22     | 10.9    |
|                                | Sometimes (2–3 times a week) | 43     | 21.3    |
| Consumption of breakfast       | Total                        | 202    | 100     |
|                                | Yes                          | 189    | 92.1    |
|                                | No                           | 9      | 4.5     |
|                                | Sometimes (2–3 times a week) | 7      | 3.5     |
| Total                          | 202                          | 100    |         |

**Table 8** Relationship between knowledge, attitude, home environment and dietary practices

| Relationship between overall nutrition knowledge score and frequency of food consumption |  |
|--|--|
| Sweetened/sugary drinks  |  |
| Carbonated drink   | $r = -0.101; p = 0.061$                |
| Artificial juice   | $r = -0.112; p = 0.059$                |
| Fast foods   |  |
| Chips  | $r = -0.115; p = 0.062$                |
| Chocolate  | $r = -0.157; p = 0.078$                |
| Sausages   | $r = -0.101; p = 0.061$                |
| Doughnuts  | $r = -0.114; p = 0.060$                |
| Smokies  | $r = -0.129; p = 0.063$                |
| Sweets   | $r = -0.165; p = 0.058$                |
| Sandwich   | $r = -0.154; p = 0.069$                |
| Popcorns   | $r = -0.185; p = 0.06$                 |
| Cakes  | $r = -0.165; p = 0.06$                 |
| Fruits   | $r = (0.101-0.170); p > 0.05$          |
| Relationship between attitude and frequency of food consumption                          |  |
| Sweetened/sugary drinks  |  |
| Carbonated drink   | $\chi^2 = 101.7$ df = 6, $P = <0.001$  |
| Artificial juice   | $\chi^2 = 64.738$ df = 6, $P = <0.001$ |
| Fast foods   |  |
| Chips  | $\chi^2 = 70.969$ df = 6, $P = <0.001$ |
| Chocolate  | $\chi^2 = 181.8$ df = 6, $P = <0.001$  |
| Sausages   | $\chi^2 = 185.8$ df = 6, $P = <0.001$  |
| Doughnuts  | $\chi^2 = 71.836$ df = 6, $P = <0.001$ |
| Smokies  | $\chi^2 = 172.0$ df = 6, $P = <0.001$  |
| Sweets   | $\chi^2 = 62.778$ df = 6, $P = <0.001$ |
| Sandwich   | $\chi^2 = 163.7$ df = 6, $P = <0.001$  |
| Popcorns   | $\chi^2 = 111.7$ df = 6, $P = <0.001$  |
| Cakes  | $\chi^2 = 125.5$ df = 6, $P = <0.001$  |
| Fruits   | $p > 0.05$                             |
| Relationship between home environment and attitude towards healthy eating                |  |
| Watching TV  | $\chi^2 = 4.5215$ df = 1, $P = 0.002$  |
| Eating with family members   | $\chi^2 = 2.5462$ df = 1, $P <0.001$   |

compared to those who did not ( $\chi^2 = 4.5215$  df = 1  $p = 0.002$ ). Children who ate together with parents were found to be concerned of what they ate than those who ate alone ( $\chi^2 = 2.5462$  df = 1  $p < 0.001$ ).

## Discussion

The aim of this study was to establish nutrition knowledge and attitudes of school going children in relation to dietary practices. Overall, children in this study had moderate nutrition knowledge. In contrast to previous studies which reported low nutrition knowledge among

school children [6, 13, 24]. This current finding could be attributed to the fact that at present health lessons were offered in school. School children however felt that they needed not be concerned about what they ate as they were still young.

Nutrition knowledge had no significant relationship with dietary practices in this study. This implies that even though study children had some level of knowledge on the effect of unhealthy diet on their health, they still continued to consume unhealthy diets. This finding is similar to that of another study which found poor dietary practices even among children with good nutrition knowledge [5]. Other studies have shown nutritional knowledge as a factor that influence the decisions individuals make about food [20, 24, 25]. Lack of nutrition knowledge has been implicated as a cause of poor dietary habits [26]. However, knowledge alone may not be adequate to have proper dietary practices. Positive attitude and behaviour change toward healthy eating early in childhood contributes immensely in adopting healthy food habits [8]. Studies also confirm that linking knowledge and practice in nutrition education is a challenge and need behaviour and attitude change [27].

Findings that dietary practices among children were characterized by excess consumption of fast foods and sweetened beverages, an indication of unhealthy food choices and the main reason for consumption of these foods being sweet taste and ease accessibility, are in agreement with other studies which found that young children from developing countries are increasingly making unhealthy food choices especially due to lack of knowledge and negative attitude [15, 28]. Previously, over consumption of sweetened drinks/beverages was a trend observed among American population [29]. However, current studies indicate increased consumption of fast foods among children in developing countries, with increased consumption of sugar-sweetened beverages, contribute to a greater number of total caloric intake and directly to obesity epidemic [29–31]. Contribution of total energy intake from fast foods and sweetened beverage in relation to obesity has been supported by other studies [10, 32, 33]. There is supporting evidence that excessive sugar and fat intake from soft drinks and junk foods increases energy intake, which is likely to increase the risk of overweight and obesity [16].

Availability of cheap snacks in the environment surrounding the school encouraged consumption of the junk foods by the pupils as reported in the FGDs and by the key informants. Other researchers support that easy access to soft drinks from local vendors contribute to their increased consumption [34]. Research has also demonstrated the importance of not only food availability but also accessibility of healthier foods as a measure to promote good dietary practices among children. This

is because whichever foods are easily accessible and ready to be eaten, children are more likely to eat them [35]. From the focus group discussions, sweet taste was highlighted as among the main reasons for consumption of soft drinks and fast foods. Children in Nairobi have easy access to numerous fast food outlets [17]. Children also reported that some of the sweet snacks such as juices, biscuits, cakes chocolate were hardly bought at home by the parents and therefore once given money for lunch they preferred buying such. In addition, the products were easily available in local *kiosks* and in various packaging sizes, which children could afford even without the knowledge of the parents. This shows that children have an opportunity to make food choices, thus with good nutrition knowledge and positive attitudes, there exists an opportunity to make healthier choices.

The findings that most children in this study ate their meals at home without parent's supervision are in agreement with other studies that showed that the proportion of school age children spending more time away from their parents is increasing thus parents miss out the opportunity to impact good nutritional knowledge and practices [8, 36]. Another study showed that about 60 % of 8–12-year-old children chose their own foods yet studies have associated children's eating alone with poor dietary practices due to lack of parental guidance [25]. Family environment has the potential to influence and enhance good dietary practices as children are likely to mimic their parents' practices [37]. Recent research conducted with Irish children indicated that parents were major influencers in their children's diets and that frequency of shared meals has a positive effect on children's food knowledge [38].

Majority of the children in this study ate while watching television and those that had access to TV had higher consumption of fast foods and sweetened beverages. While the television is an avenue for food advertisement and promotion [39, 40] most of the televised foods are junk and highly processed with high sugar, fat and salt content. These televised adverts greatly influence dietary habits of children [40, 41]. A study on chronic non-communicable diseases in Brazil noted that a considerable number of the foods requested by children were advertised on TV during the 6 previous months [1]. Further, another study reported that exposure to TV food advertisement brought negative changes in dietary behaviour especially among school children [36]. In this current study, both quantitative and qualitative methods were used to support this discussion. However, the results in this study are limited to urban day public schools only.

## Conclusion

Children had moderate nutrition knowledge. Knowledge had no association with practices. However, attitude

significantly influenced dietary practices. Children did not translate nutrition knowledge into practice. The main factors that influenced dietary practices were mainly the taste of foods (sweet taste) and the feeling that they did not have to be concerned about what they ate since they were still children. This study concludes that there was a disconnect between nutrition knowledge, dietary practices and attitude. Children had money and made independent decisions on what to buy while away from home. At home children mainly ate food alone, unsupervised. Availability of unhealthy snacks contributed to their high consumption.

## Recommendation

Since children at this age make more independent decision on food choices, this study recommends creating awareness on the effect of poor dietary practices on overweight and obesity and associated health risks. This should aim at improving nutrition knowledge, positive attitudes and appropriate dietary practices. Parents are encouraged to monitor their children's eating process and expenditure of pocket money. This study recommends availability tuck shops within the school environment and appropriate policies if school children must bring lunch money to school.

## Abbreviations

FANTA: Food and nutrition technical assistance; FFQ: Food frequency questionnaire; FGD: Focus group discussion; KI: Key informant interview; SPSS: Statistical package for social sciences; TV: Television.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

DMDK, CL and TM conceived the study. DMDK and ZWN with support from CL, TM and CMM collected data, conducted data analysis and interpretation and drafted the manuscript. CL, TM and CMM revised the manuscript. All authors read and approved the final manuscript.

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