Nutrition knowledge and consumption of sugar sweetened beverages among high school students in Kenya.

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Abstract

Diet-related health problems are on the rise as a result of high consumption of sugar-sweetened beverages (SSBs). Nutrition knowledge enables consumers to make informed decisions on the choice of food to eat. There is a paucity of data on the relationship between nutrition knowledge of Kenyan secondary school students and their SSBs consumption behavior. Therefore, this article is based on nutritional knowledge and SSBs consumption of secondary school students. This study employed a descriptive cross-sectional study design among 249 randomly selected students in form three and four respectively. Probability proportion to size sampling technique was utilized to establish the number of respondents in the various schools. Students were randomly selected in each class till the sample size was achieved. A structured questionnaire was utilized to collect data in the selected schools. Data collected were coded and analyzed using Statistics Package for Social Sciences version 21. Chi-square analysis and binary logistic regression analysis were used to process data. Associations were considered significant at $p<0.05$. Regression analysis established a strong association between nutritional knowledge and SSBs consumption ($p=0.02$). Consumption of SSBs was found to be high despite moderate level of nutritional knowledge by majority of the students. There is need for restriction of access to SSBs within and around the school environment in order to reduce intake.

Keywords: Sugar sweetened beverages, Added sugars, Consumption behaviour.

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Introduction

According to the Centre for Disease Control and Prevention (CDC), sugar-sweetened beverages (SSBs) are defined as water-based beverages to which sugar has been added and include soft drinks, fruit drinks, sports drinks, tea and coffee drinks, energy drinks, sweetened milk or milk alternatives [1]. They contain caloric sweeteners mainly high fructose corn syrup (HFC) and sucrose. Despite recommendations by medical experts and health organizations to limit consumption of SSBs, their sales have been increasing worldwide especially in low and middle-income countries [2]. Their consumption has been increasing steadily because of their palatable sweet taste and popularity due to the presence of advanced production technologies [3]. SSBs lead to excess calories in the body but they do not generally provide a feeling of fullness that solid food provides hence consumers do not reduce intake of other foods sufficiently to compensate for the extra calories they provide.

Previous studies have shown that the rate of consumption of SSBs is increasing among the general population especially the young adults and adolescents in developing and developed countries [4]. Renata in his study among the youths in Nigeria found that adolescents aged 13-19 are the highest consumers of SSBs [5].

Consumption of SSBs is associated with many health conditions such as Type 2 diabetes, cardiovascular diseases, elevated uric acid levels, gout, and dental caries, overweight and obesity [1]. These negative health and life consequences associated with excessive calories and sugars have made SSBs attract increasing scholarly attention both in developed and in the developing world including Africa. For example, studies carried out both in Sudan and South Africa found a strong relationship between SSBs consumption and development of dental caries [6,7]. In Kenya, the prevalence rate of diabetes is estimated to be 4.2% nationally [8]. Hypertension is estimated at 13% of the population and obesity affects 25% of all Kenyans [9]. These health conditions have become a public health concern in Kenya. Increased knowledge of food value improves dietary practices whereby people understand how to utilize a healthy diet for greater benefits.

A study regarding the consumption of SSBs by youths attending high schools in the U.S. indicated that 65% of them consume SSBs on a daily basis [10]. Further, the same study found that 64.5% of the participants drank SSBs more than one time per day and 34.5% drank more than twice per day. It became evident that on average energy intake from SSBs was 273 kilo calories for boys and 171 kcalories for girls [10]. Most of the studies based on consequences of SSBs intake have reported that environmental factors like availability of the drinks, and family food rules, determine the youths' consumption levels of SSBs [11].

Studies carried out in Kenya found that SSB consumption is high among school going children and is a cause of overweight

and obesity. Further, Vitamin C is not present in many of the SSBs although nutritional information on the packages indicates so [12]. In another study conducted among primary school children in Nairobi, it was found that even though the study children had some level of knowledge on the effects of unhealthy diet like SSBs, they still consumed them because of easy accessibility [13].

Kigaru et al., explored the nutrition knowledge, attitude and practices among urban primary school children in Nairobi [13]. The study found out that almost half of the respondents had moderate nutrition knowledge (49.5%) and that 28% of the children consumed sweetened drinks 4-7 times in a week. Most of the respondents knew that sugars, sweets and sweet foods are not good for body health, hence, there was no significant relationship between nutrition knowledge ($p>0.05$) and practices on consumption of sweetened beverages because despite majority of the respondents having moderate knowledge on the health risks of sugary drinks they still continued to consume them.

Consumers also need to know what to look for on labels and ingredient lists so that they make the best choices. Nutrition knowledge is therefore required for proper interpretation of advertisements and information given on labels and the meaning attached to it [14]. Rampersaud found out that there was a lack of knowledge among consumers regarding the healthiness of various categories of SSBs [15]. Many of the participants believed other drinks like fruit drinks, sport drinks and energy drinks were healthier than soda. Only a few reported correctly that all these drinks contain added sugars and so are less healthy. Nutritional knowledge on the effects of these beverages on health is required for them to make healthy food choices [16]. The American Heart Association (AHA) recommends that added sugars intake should not exceed one serving per day which may be difficult to be interpreted by an ordinary consumer and therefore knowledge on the recommended amounts of sugar intake is required.

The two studies that were carried out in Kenya focused on primary school children in Nairobi between age 7 and 13 years. However, there is a paucity of data on the nutrition knowledge, and consumption of SSBs among students attending secondary school students in Kenya. The scarcity of data limits explanation of the nutrition knowledge and the consumption level of SSBs by Kenyan secondary school students hence the need for this research in Kenya. This study therefore, assessed the nutritional knowledge and consumption of SSBs among high school students in Likuyani Sub-County, Kenya.

Materials and Methods

Study area

This study was conducted among secondary school students in Likuyani Sub County, Kenya.

Sampling techniques

Probability proportional to size sampling technique was used to sample the number of respondents in each school. Simple random sampling was used to select respondents from each class in the participating schools as shown in Table 1.

Inclusion criteria

All girls and boys aged between 16-19 years old, attending secondary school.

Exclusion criteria

Students who are under 16 and above 19 years old.

Data collection instruments

A structured-self-administered questionnaire was utilized to gather information. The questionnaire was divided into two parts. The first part assessed the type and frequency of Sugar-sweetened beverages consumed by the students. The second part of the questionnaire assessed student's nutritional knowledge of SSB consumption based on eight knowledge items concerning. Nutritional value, the quantity of SSBs consumed and the health risks due to consumption of SSBs.

Data analysis

After data collection, the items were coded then entered into Statistical Package for Social Sciences (SPSS) software, version 21 for analysis. Both descriptive and inferential statistics were used. Frequencies and percentages were used to describe both independent variables and dependent factors. Associations between variables at bivariate level were tested using chi-square and binary regression analysis at multivariate level. Associations were considered significant at $p<0.05$. Nutritional knowledge was measured using a composite score derived from calculating the mean response from each respondent. Mean scores were re-coded to a three variable measure of poor, moderate and good nutritional knowledge as displayed in Table 2.

Results and Discussion

Level of Sugar-sweetened beverages consumption

The level of sugar-sweetened beverages was calculated by computing the mean for each response as a composite score for all the respondents. The composite score was further recoded to a binary variable of high and low to determine the level of

Table 1. *Proportion of respondents in selective schools.*

Schools in Likuyani Sub County	Form Three	Form Four	Total	Number Sampled
St. Annes Nzoia Girls	70	50	120	43
Lwanda secondary	70	60	130	46
Kongoni secondary	50	64	114	41
Evugwi Secondary	56	40	96	34
John the Baptist	70	80	150	53
St. Basils academy	50	40	90	32
Total	**366**	**334**	**700**	**249**

Table 2. *Nutritional knowledge level.*

Category	Mean Range
Poor knowledge	0-1.9
Moderate knowledge	2-2.9
Good knowledge	3.0 & above

Table 3. *Level of SSBs consumption.*

The level of sugar-sweetened beverage consumption	Frequency	Percent
Low	115	46.2
High	134	53.8
Total	249	100

sugar-sweetened beverage consumption as illustrated in Table 3 wherein, there was high level of sugar-sweetened beverage consumption among more than 53.8% of respondents. Less than half of respondents 46.2% reported low consumption of sugar-sweetened beverages.

Nutritional knowledge of respondents

Responses to various nutritional related knowledge on the aspect of sugar sweetened beverages is represented in Table 4. From Table 4, 89% of respondents were in agreement that sugar-sweetened beverage contained high sugar content. Close to half (42.6%) of respondents were able to correctly point out that SSBs contain high levels of calories and contribute to overweight. Majority of respondents (50.2%) of respondents were able to distinguish the composition of one gram of SSB compared to either fat or sweetener.

Nutritional knowledge level on SSBs

According to data in Table 5, majority of respondents, (73.9%) had moderate nutritional knowledge about sugar-sweetened beverages and only 19.7% had good knowledge about the sweetened beverage.

Inferential analysis in Table 6 was done to find out if nutritional knowledge of high school students was associated with the level of consumption of sugar-sweetened beverages.

The results in Table 6 show no significant association (p=0.211) of nutritional knowledge with the level of SSBs consumption. This implies that nutritional knowledge of the students was not associated with the consumption level of sugar sweetened beverages.

Data illustrate that the coefficient of nutritional knowledge is statistically significant as such, influence sugar-sweetened beverage consumption. Table 7 illustrates that there is a strong association between, nutritional knowledge (p=0.021) and SSBs consumption.

Bivariate analysis revealed no significant association between nutrition knowledge (p=0.211) with the level of SSB consumption, however, regression analysis, invalidates chi-square analysis to establish a strong predictor of SSB beverage consumption (p=0.021).

Frequency of sugar-sweetened beverage consumption

This study has established that more than half (53.8%) of high students surveyed consumed high amounts of sugar-sweetened beverages. This corroborates Ventura and colleagues (2010) study which reported high daily consumption of SSBs in U.S.A in both adults and children.

Nutritional knowledge of students regarding sugar-sweetened beverages

Nutritional knowledge contributes significantly towards eating habits. This study assessed student's nutritional knowledge on sugar-sweetened beverages. Findings illustrated that students were fully aware that SSBs contained high sugar calories. The findings in Table 4 showed that, at least 42.6% of students mentioned that sugar-sweetened beverages contributed to weight gain, dental erosion (74.7%) and diabetes (79.5%). Descriptive analysis on knowledge composite score, reveals that overall, respondents had moderate knowledge level on the

Table 4. *Nutritional knowledge of respondents.*

SSBs are High in Sugar	Frequency	Percent
FALSE	14	5.6
TRUE	223	89.6
No Idea	12	4.8
Total	**249**	**100**
100% fruit Juice is high in Calories	**Frequency**	**Percent**
FALSE	66	26.5
TRUE	91	36.5
No Idea	92	36.9
Total	**249**	**100**
High Levels of SSBs consumption contributes to overweight	**Frequency**	**Percent**
FALSE	91	36.5
TRUE	106	42.6
No Idea	52	20.9
Total	**249**	**100**
High levels of SSBs consumption contributes to Dental erosion	**Frequency**	**Percent**
FALSE	26	10.4
TRUE	186	74.7
No Idea	37	14.9
Total	**249**	**100**
High levels of SSBs consumption contributes to diabetes	**Frequency**	**Percent**
FALSE	23	9.2
TRUE	198	79.5
No Idea	28	11.2
Total	**249**	**100**
One gram of sugar contain the same amount of calories as one gram of fat	**Frequency**	**Percent**
FALSE	82	32.9
TRUE	52	20.9
No Idea	115	46.2
Total	**249**	**100**
One gram of sugar contain the same amount of calories as one gram of sweetener	**Frequency**	**Percent**
FALSE	59	23.7
TRUE	65	26.1
No Idea	125	50.2
Total	**249**	**100**

Table 5. *Nutritional knowledge level on sugar-sweetened beverages.*

Knowledge Assessment Categories	Frequency	Percent
Poor Knowledge	16	6.4
Moderate	184	73.9
Good Knowledge	49	19.7
Total	**249**	**100**

Table 6. *Cross-tabulation of Nutritional knowledge and level of SSBs consumption.*

Level of Consumption	Poor	Moderate	Good	χ^2(df)	p-value
Low	4(3.5)	82(71.3)	29(25.2)	3.11(2)	0.211
High	12(9)	102(76)	20(15)		

Table 7. *Regression analysis illustrating predictors to the level of SSBs consumption.*

Regression Analysis	Sig.	Exp(B)	95% C.I. for EXP(B)	
			Lower	Upper
Nutritional knowledge level	0.021	1.439	0.899	2.303

effects of SSBs on health. In addition, respondents exhibited limited knowledge on calorie levels of sugar and fat. Bivariate analysis revealed no significant association (p=0.211) with the level of SSB consumption, however, regression analysis, invalidates chi-square analysis to establish a strong predictor of SSB beverage consumption (p=0.02). As such, the null hypothesis was thus rejected. This finding contrasts with Mbithe and others (2015) study findings wherein, despite majority of students exhibiting moderate knowledge on the ill effects of unhealthy sugary dinks, there was no significant relationship between nutritional knowledge and the level of SSBs consumption [13].

This underscores the critical need to raise awareness among children and adolescents on what to look for on labels on packaging as well as the merits and demerits of the content in the Sugar-Sweetened Beverages. Increased knowledge of food value improves dietary practices whereby people understand how to utilize a healthy diet for greater benefits to their health. Achieving this calls for clear methods or ways of displaying nutritional information, easily readable to this cohort of the population. Choi et al., acknowledges that changing dietary habits is often a challenge in all groups; however, nutritional education complements efforts to positive dietary behavioural practices [17].

Conclusion

This study established that frequency of consumption of Sugar Sweetened Beverages varies depending on the type of beverage, and that overall, the more than half of the students surveyed reported consuming high amounts of sugar-sweetened beverages. Observations from the study showed that energy drinks were the least consumed while sugar-sweetened beverages like tea, coffee and cocoa were the most highly consumed SSBs. Moderate nutritional knowledge on possible effects of SSBs such as weight gain and dental erosion was observed among respondents. There was however, limited knowledge on calorie composition components of SSBs. Regression analysis, illustrated that there was direct relationship between nutritional knowledge and consumption of the Sugar-Sweetened Beverages. Additionally, this study has established a direct association between nutritional knowledge and consumption of sugar-sweetened beverages. This underscores the need to regulate the sale and accessibility of SSBs within and around the school environment in order to reduce intake.

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