



Research Article

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Nutritional Status and Knowledge among Students from Selected Secondary Schools in Kakamega County, Kenya



John Ombogo*

Research and Extension, Masinde Muliro University of Science and Technology, Kenya

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***Corresponding author:** John Ombogo, Research and Extension, Masinde Muliro University of Science and Technology, Kakamega, Kenya,
Email: jombogo@mmust.ac.ke

Abstract

The significance of improving nutrition knowledge in order to have a positive influence on food choices and health should not be underestimated. This study assessed the nutritional status and knowledge of school children attending selected secondary schools in Kakamega County. The study population was purposively drawn from secondary school students in Kakamega County attending Government Public schools. Four secondary schools were used for the study: Mwiya Secondary School, Ekwambwa Secondary School, Kakamega Township Secondary School and Kakamega High School. A sample of 240 school students, aged 14 to 24 years participated in the study. The measuring instruments included a questionnaire to determine the nutrition knowledge of the students. Anthropometric measurements included weight, height and mid-upper arm circumference, measured using standard methodologies. The mean age recorded for male and female students were 18.0 ± 1.90 and 15.7 ± 1.20 years, respectively. The result showed that 27.9% were underweight, 7.5% overweight and 64.6% had normal BMI status. Nutritional status was significantly related with sex ($\chi^2=16.169$, $p<0.05$) but not with age ($\chi^2=1.368$, $p>0.05$). The prevalence of underweight was higher among the males (33.9%) compared to the females (13.9%), while more females were overweight (15.3%) compared to the males (4.2%). Seventy-one percent performed poorly in the nutrition knowledge assessment rating. The overall performance of the female students was significantly higher ($\chi^2=46.386$; $P<0.05$) than their male counter parts. Furthermore, 5, 12 and 12% had excellent, very good and good nutrition knowledge, respectively, while 33% and 38% had fair and poor nutrition knowledge, respectively. The results further revealed that the students were deficient in knowledge and understanding of the facts about energy and nutritive values of foods. Therefore, adequate nutrition education is needed at the secondary school level; this will enable the students to make good food choices and positively influence their eating habits thereby ensuring better nutritional status.

Keywords : Malnutrition; Knowledge; School; Anthropometry; Assessment

Introduction

Malnutrition has an effect on children's wellbeing and their ability to learn and play normally. Indeed, healthy food choices improve a child's wellbeing and ability to learn and play normally [1]. Dietary habits in childhood impact growth, development and the prevalence of disease throughout the life cycle. Healthy eating habits should thus be established during childhood [2]. The quality of diet declines as children move from childhood to adolescence. Eating healthy is not a priority for adolescents. Poor eating patterns may thus add a risk for current and future health problems [3]. A large number of school-based nutrition programmes have been implemented globally, focusing mainly on obesity, the importance of activity and of vegetables and fruit in the diet [4]. However, little research on basic nutrition education focusing on adolescents has been published [5]. The significance of improving nutrition knowledge through nutrition education in order to have a positive influence on healthy food choices

should not be underestimated [6,7]. The aim of this study was to determine the nutrition knowledge and nutritional status of children attending a secondary school in Kakamega County. This was done in order to gain information for planning a nutrition education programme, as poor knowledge of nutrition is seen as one of the reasons for poor food choices [8] and, consequently, as a contributing factor in the development of malnutrition [9].

Materials and Methods

This study was a descriptive survey involving secondary school students comprising male and females aged 14-24 years. The study was conducted in Kakamega County, Kenya. Kakamega County has 276 Secondary Schools. Permission to carry out the study was obtained from the Ministry of Education; Kakamega County. The study population was drawn from secondary school students attending Government Public Schools. A purposive

sampling technique was used where the total number of schools used for the study as well as the total number of students from each school was purposively selected. The selected schools were: Mwiya Secondary School, Ebwambwa Secondary School, Kakamega Township Secondary School and Kakamega High School. A total number of 240 students, comprising 60 students from each school, participated in the study. Data for the study were collected using a structured and validated questionnaire. The respondents were requested to select the appropriate options as it applied to them. Anthropometric measurements of weight and height of the children were carried out based on the standardized methods of WHO [10] and UNICEF [11]. The students were weighed on a bathroom scale wearing minimal clothing. Height was measured with a wooden height meter. Children were measured without shoes. Heads were erect and hands hanging at their sides in a natural manner. Readings were taken to the nearest 0.1cm. Height-for-age, weight-for-age and weight-for-height of each student were compared with WHO Growth standards. The nutrition knowledge of the school children was assessed by the use of multiple choice questions set by the researcher to ascertain their level of knowledge of nutrition. The test comprised 12 nutrition knowledge questions. The nutrition knowledge scores of the students were graded as follows: Excellent (71-100), Very good (61-70), Good (51-60), Fair (41-50) and poor (0-40). Data collection and editing were done manually. Data processing and analysis were done using Microsoft Excel and Statistical Package for Social Sciences (SPSS) for Windows, version 18.0 (Statistical Package for Social Sciences, Chicago, IL, USA). Statistical methods used were means, standard deviations, analysis of variance (ANOVA), frequency and percentage and chi-square test. Statistical significance was set at $P < 0.05$.

Result

Food consumption and eating habits

Two hundred and forty (240) secondary school students comprising 168 males (70%) and 72 females (30%) participated in the study. The ages of the students ranged from 14 to 23 years with a mean age of 18.0 ± 1.90 years and 15.7 ± 1.20 years for males and females, respectively. The result of food consumption and eating habits of the respondents showed that more than half of the students (56.3%) ate three times daily while 27.1% ate more than three times. Meal skipping was high among the selected secondary school students as 68.8% reported that they skipped meals. Only 31.3% do not skip meals. The major reason for meal skipping was fasting/religious reasons (57.1%). This observation could be attributed to the period in which the study was carried out. The study was carried out in the month of August, which happened to coincide with the Islamic Ramadan fasting period. Further, 20.4% reported meal skipping as habitual, while dislike for the meal accounted for 15% of the reason for meal skipping. The major meal skipped by the students was breakfast (40.4%) followed by lunch (26.3%) and dinner (21.7%), respectively. Snacking was also observed to be

high among the students as 82.1% of the students reported that they consumed snacks. The students gave reasons for snacking such as like (48.3%), hunger (26.3%), habit (13.8%) and to make up for skipped meals (11.6%), respectively. The major source of snacks for the students was home (33.3%), while 30.4% obtained their snacks from the school premises, 18.8% from outside school premises and 17.5% from food vendors.

Anthropometric measures

The mean weight of the students ranged from 49.4kg for students of Kakamega Township Secondary School to 53.6kg for Ebwambwa Secondary School students with significant difference ($P < 0.05$) in the observed values (Table 2). Mean weight of Kakamega High School and Mwiya Secondary School were 55.1kg and 53.2kg, respectively. A global mean weight of 52.8kg was recorded for the study. Students of Ebwambwa Secondary School were significantly taller (164.6cm) than the other selected schools. Kakamega High School, Mwiya Secondary School and Kakamega Township Secondary School had mean height values of 159.2, 160.8 and 159.7cm respectively, although these differences were not statistically significant ($P > 0.05$). With respect to mid upper arm circumference (MUAC), Kakamega High School recorded the highest mean value (21.7cm) which was not significantly different ($P > 0.05$) from those of Mwiya Secondary School (21.6cm) and Ebwambwa Secondary School (20.8cm), respectively. Kakamega Township Secondary School students had the least MUAC value of 18.9cm. Body mass index (BMI), which is an index of nutritional status, was significantly different among students of the selected secondary schools. The overall mean BMI value was 20.3kgm⁻². Mean BMI value was highest in Kakamega (21.7kgm⁻²) followed by Mwiya Secondary School (20.6kgm⁻²). Kakamega Township Secondary School and Ebwambwa had mean BMI scores of 19.3 and 19.8kgm⁻², respectively.

Nutritional status

Results showed that 27.9% were underweight, 7.5% overweight and 64.6% had normal BMI status. Nutritional status was significantly related with sex ($\chi^2 = 16.169$, $p < 0.05$) but not with age ($\chi^2 = 1.368$, $p > 0.05$). The prevalence of underweight was higher among the males (33.9%) compared to the females (13.9%), while more females were overweight (15.3%) compared to the males (4.2%).

Nutrition knowledge

Twenty-nine percent had good nutrition knowledge while 71% performed poorly. The overall performance of the female students was significantly higher ($\chi^2 = 46.386$; $P < 0.05$) than that of their male counterparts. This was revealed by the higher percentage of female than male students who had excellent nutrition knowledge scores (8.3vs.4.2%), very good nutrition knowledge scores (25vs.6.5%) and good nutrition knowledge scores (25vs.6.5%). However, more males than females had fair (34.5vs.27.8%) and poor (48.2vs.13.9%) nutrition knowledge scores, respectively.

Response to nutrition knowledge assessment questions

Multiple-choice questions were used in the assessment. Generally, there were significant differences ($P<0.05$) in the responses of the selected secondary school students to questions 1,3,5,6,10,11 and 12. The students had better performance in their response to questions 1,5 and 12 having total scores above 60%. However, the responses to question 2 (green leafy vegetables contain more of ?) and question 11 (which food group provide the best source of energy?) is a cause for concern because the correct scores obtained were below 20% (17.5% for question 2 and 11.7% for question 11).

Discussion

This study revealed that 68.8% of the students skipped meals and the breakfast was the meal mostly skipped (40.4%). The skipping of breakfast has been associated with lower nutritional status and the risk of cardio vascular diseases [12]. It has also been reported that less adequate breakfast habits may contribute to the appearance and further development of obesity [13]. Therefore, the importance of regular eating patterns cannot be overemphasized in nutritional education. Generally, 71% of the students performed poorly. Poor nutrition knowledge among school students in rural Qwa Qwa, South Africa has also been reported by Theron & Egal [6]. This showed that the students were inefficient in knowledge and understanding of the facts about energy and nutritive values of foods Kostanjevec et al. [14] Reported a similar observation among school students in Slovenia. This however, validates the need for adequate nutrition education at the secondary school level, which will go a long way to enhance the ability of the student to make good food choices and will positively influence their eating habits thereby ensuring better nutritional status. Numerous studies have shown that well-planned nutrition education can significantly influence the quality of nutrition knowledge of children [15-18]. Nutrition education, which may take various forms of formal and informal education, can also significantly change nutrition behaviour and dietary habits of school children [19-21]. Understanding different factors which influence nutrition behaviour of children is the first step to form inefficient measures which may change nutrition behaviour [22]. Education as well as nutrition knowledge does not always have direct impact on nutrition behaviour of individuals; however, they may significantly influence the attitudes, and other psychosocial factors which directly influence nutrition behaviour [23,24]. Worsley [21] believes that nutrition education is necessary; however, it is not the only factor which can change nutrition behaviour of persons. Harnack et al. [25] stress that nutrition education is a key element to promoting lifelong healthy eating and should start at early stages of life. Nutrition education is an accessible effective tool in the promotion of health nutrition in education programmes with focus on healthy eating [26,27]. School nutrition education should focus not only on the provision of nutrition information, but also on the development of skills and behaviours related to areas such as food preparation, food

preservation and storage; social and cultural aspects of food and eating; enhanced self esteem and positive body image and other consumer aspects [28].

Conclusion

The poor nutrition education knowledge and nutritional status of the study population has revealed the need for adequate nutrition education intervention. Nutrition knowledge is needed for better dietary choices. Adolescents are becoming more autonomous and behavioural patterns acquired during this phase of life, such as dietary intake behaviour, may influence long-term behaviours. It is, therefore, recommended that a nutrition education programme be developed and implemented for this group of adolescents, as nutrition education can be an accessible and effective tool for improving food choices. Since most adolescents spend most of their time in school, school-based nutrition education, combined with physical activity programmes, can be employed to reinforce the message of healthy eating. Means in a column with different superscript letters are significantly different ($P<0.05$). Values are mean \pm standard deviation of 60 respondents (Table 1-3).

Table 1: Food consumption and eating habits of the respondents.

	Frequency	Percentage
Frequency Of Eating Per Day		
Once	8	3.3
Twice	32	13.3
Thrice	135	56.3
More than 3 times	65	27.1
Total	240	100.0
Meal Skipping		
Yes	165	68.8
No	75	31.3
Total	240	100.0
Reason for Meals Skipping		
Don't like the food	36	15.0
Fasting for religious reason	137	57.1
Not in time to eat	15	6.3
Just a habit	49	20.4
To maintain my figure	3	1.3
Total	240	100.0
Meals skipped		
Breakfast	97	40.4
Lunch	63	26.3
Dinner	52	21.7
Breakfast and Lunch	19	7.9
Lunch and Dinner	9	3.8
Total	240	100.0
Snacking		
Yes	197	82.1

No	43	17.9
Total	240	100.0
Reason for snacking		
I like them	116	48.3
Hunger	63	26.3
Habit	33	13.8
To make up for skipped meal	28	11.6
Total	240	100.0
Source of snack		
School premises	73	30.4
Home	80	33.3
Outside school premises	45	18.8
Food vendors	42	17.5
Total	240	100.0

Table 2 : Mean anthropometric values of selected secondary school students in Kakamega County.

School	Weight (kg)	Height (cm)	MUAC (cm)	BMI (kg m ⁻²)
ESS	53.6 ^a ±7.0	164.6 ^a ±8.5	20.8 ^a ±2.5	19.8bc±2.2
KHS	55.1 ^a ±9.8	159.2 ^b ±7.8	21.7 ^a ±2.1	21.7a±3.6
KTSS	49.4 ^b ±8.4	159.7 ^b ±7.6	18.9 ^b ±2.2	19.3c±2.5
MSS	53.2 ^a ±7.7	160.8 ^b ±6.6	21.6 ^a ±3.3	20.6b±2.7
Total	52.8 ± 8.5	161.1 ± 7.9	20.7 ± 2.8	20.3 ± 2.9

Table 3: Nutritional status of the respondents by age and sex. Values in parenthesis are percentage.

	Underweight	Normal	Overweight
Sex			
Male	57(33.9)	104(61.9)	7(4.2)
Female	10(13.89)	51(70.83)	11(15.28)
Total	67(27.92)	155(64.58)	18(7.50)
Chi-square=16.169,p=0.000			
Age Group (Years)			
12-15	18(32.1)	33(58.9)	5(8.9)
16-19	41(27.3)	98(65.3)	11(7.3)
20-23	8(23.5)	24(70.6)	2(5.9)
Total	67(27.92)	155(64.58)	18(7.50)
Chi-square=1.368,p=0.850			

MUAC = Mid Upper Arm Circumference

BMI = Body Mass Index

ESS = Ebwambwa Secondary School

KHS = Kakamega High School

KTSS = Kakamega Township Secondary School

MSS = Mwiya Secondary School

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