Assessment of nutritional status for middle adolescent using anthropometric measurements

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Abstract

A cross sectional study was carried out at the Kamel Ibraheem Model School for Girls and Abdullah Ibn Abbas School for Boys, Shendi, Sudan, to assess the nutritional status for middle adolescents using anthropometric measurements, from August to November 2016. Eighty one participants were selected using a stratified random sampling. Data were collected using a questionnaire and a body mass index equation. Results revealed that 37% of the participants were knowledgeable about the important element of nutrition during the adolescent period, according to priorities of proteins, carbohydrate and fats. More than half of the study group found underweight with differences between sexes in nutritional status. However, there was no significant relationship found between the body mass index and number of meals taken.

Keywords: Assessment, nutrition, anthropometrics, body mass index, adolescent.

Introduction

Adolescents are tomorrow's adult population, their health and well-being are crucial; they include persons aged 10–19 years [1]. Yet, interest in the health of adolescents is relatively recent, and focuses on their nutrition even more. The adolescent is maturing physically and emotionally, growing from childhood toward adulthood, and seeking to understand what it means to be grown up. Adolescence can be divided into three stages: Early adolescence (11-13 years) is characterized by the onset of puberty and increased cognitive development, middle adolescence (14-18 years) is characterized by increased independence and experimentation and late adolescence (19-21 years) is a time for making important personal and occupational decisions [2].

The phenomenal growth that occurs during adolescence is second only to the growth that occurs during the first year of life, and it increases the body's demand for energy and nutrients. Nutrition needs are greater during adolescence than at any other time in the life cycle. During this period, adolescents achieve the final 15-20% of their adult height, gain 50% of their adult body weight, and accumulate up to 40% of their adult skeletal mass [3].

Nutrition influences growth and development throughout infancy, childhood and adolescence. However, nutrient needs are greatest during adolescence. Many adolescents are in school, which provides an effective and efficient opportunity for large portions of the population beyond the

students themselves to be reached, including school personnel, families and community members overall, nutritional status is better assessed with anthropometry in adolescence, as well as at other stages of the life cycle [2]. Anthropometry is the single most inexpensive, noninvasive and universally applicable method of assessing body composition, size and proportion, body mass index (BMI) has been recommended for use as a screening tool for overweight, obesity and thinness in adults and adolescents.

This study was carried out to assess the nutritional status of middle adolescents using anthropometrics measurement at two secondary schools of Shendi city, River Nile State, Sudan.

Materials and Methods

From August to November 2016, a cross-sectional study was conducted at two secondary schools of Shendi city, Kamel Ibrahim model school for Girls and Abdullah Ibn Abbas School for Boys, to assess the nutritional status of middle adolescents using anthropometric measurements. Age of participant boys was 14-18 years and for participant girls was 12-16 years. Prior to the study initiation, consent was obtained from the selected school authorities.

Samples were distributed proportionally (Table 1), and the body mass index (BMI =

weight (Kg) /height (meters)^2 [3] was classified into three categories; healthy weight, underweight and overweight (Table 2). Data analysis was performed using Chi-square within the statistical software, SPSS 23, for Windows.

**Table 1.** Study population according to the administrative units.

Administrative unit	Sample size	Population (%)
First level kamel school	30	122(37.5)
First level Abdullah school	16	56(17.2)
Second level kamel school	25	102(31.4)
Second level Abdullah school	10	45(13.9)
Total	**81**	**325(100)**

Table 2. Percentile ranking

Percentile ranking	Weight status
Less than 5th percentile	Underweight
5th percentile to less than 85th percentile	Healthy weight
85th percentile to less than 95th percentile	Overweight
Equal to or greater than 95th percentile	Obese

Results

Most participants were found to have knowledge about the important element of nutrition during adolescence as priorities (Fig. 1).
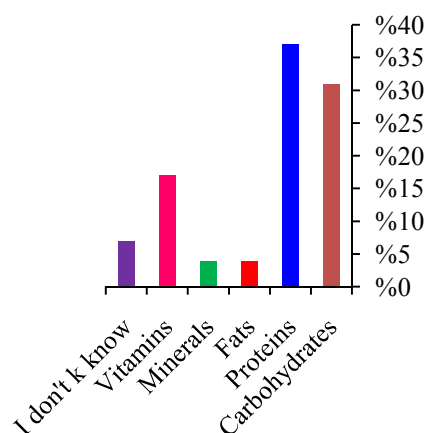
Figure 1. Participants' awareness of the important elements of nutrition as priorities.

Most participants were found to prefer carbohydrates and proteins; however, the most didn't take their meals in a regular way. Likewise, most of them preferred home prepared food (Table 3).

Table 3. Type, regularity and method of preparation of food consumed by the study participants.

Properties - food items		Frequency (%)
Frequent type of food during day	Carbohydrates	34(42)
	Proteins	34(42)
	Fats	7(9)
	Minerals	6(7)
	Total	81(100)
Daily meal regularity	Always	14(17)
	Sometimes	52(64)
	Never	15(19)
	Total	81(100)
Favorite method for food preparation	House food	42(52)
	School noshery	27(33)
	Manufactured foods	12(15)
	Total	81(100)

Most of the participants were found under weight. Contrariwise, only some of them were found overweight (Table 4).

Table 4. Body mass index (BMI) of the study participants (n=81).

Body mass index	Frequent of boys (%)	Frequent of girls (%)
Under weight	15(55.6)	29(52.7)
Healthy weight	11(40.7)	22(40)
Over weight	1(3.7)	3(5.5)

Most of the study participants, 52%, were found to have three meals a day and 27% of them have two meals a day. However, 21% having more than three meals a day. There was no significant relationship found between the body mass index and number of meals taken (P = 0.881).

Discussion

In this study, 37% of the participants were found knowledgeable about the important element of nutrition during the adolescent period. This finding corresponds with a previous study that the mean of vitamin intake was below the recommended levels in adolescent diet, although the vitamins need should be increase during the adolescent period with a degree of maturity [4]. In this study, most of the participants didn't take their meals in a regular way. Likewise, the most preferred the home food. A previous study showed that most females skip a lunch meal and most of males skip breakfast[5]. However, some showed a regular three meals taken a day [6].

In this study, most of the participants were found to be underweight; this is likely due to their socioeconomic status, of which 48.1% belonged to families who were unemployed. This result agrees with a previous study that the difference in the nutritional status and the body mass index (BMI) mainly refers to the socioeconomic background [6].

In this study, there was no significant relationship found between the BMI and the number of meals taken. This may due to some factors such as sexual maturation [7]. Some problems associated with using BMI for children and adolescent related to factors such as height and level of sexual

maturation influence relationship between BMI and the number of meals among children, also BMI interpreted for adolescence is different because it is depending on the body fat change with age and sex.

In conclusion, it is important designing of school health units and implements cooperation between the health and education sectors to follow up on the health status of students.

Acknowledgements

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