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An Assessment of the Nutritional Status of University of Zimbabwe Students

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Abstract: Information on nutritional status among tertiary students in most developing countries is limited. The aim of this study was to conduct a nutritional assessment and eating habits of University of Zimbabwe students, using anthropometric measurements and a food frequency questionnaire. This was a study to generate baseline information for evaluating nutritional status of tertiary students in a resource limited setting. Anthropometric data including weight, height, waist and hip circumference was collected randomly among students from three sites at the University of Zimbabwe campus. Body Mass Index (BMI) and Waist Hip Ratio (WHR) were calculated from anthropometry data collected. Students' eating habits were gathered using a standardized frequency questionnaire. Approximately over 58% of the students who participated in the study had acceptable nutritional status with their BMI falling within the range of 18.5-24.9 and waist-to-hip ratio indicators of <0.80 for females and <0.95 for males. However, 18% of the students assessed were found to be overweight and obese which is indicative of high risk of developing non-communicable diseases later in life. Consumption of milk, vegetables and fruits was generally low. There is need for nutrition education among university students on consumption of diversified meals.

Key words: Nutritional status, anthropometry, university students, BMI, WHR

INTRODUCTION

Evaluation of the nutritional status of individuals and population groups is an important tool in public health and a feasible indicator of standards of living (Nurul and Ruzita, 2010). Anthropometric measurements are commonly used to assess the nutritional status of an individual or a community. Some of the measurements are weight/height, weight/age, height/age, mid-upper-arm circumference, head circumference and waist-to-hip ratio (Kruette, 1996). Nutritional status is the combination of an individual's health as influenced by intake and utilization of nutrients and is determined from information obtained by physical, biochemical and dietary studies (Durning and Fidanza, 1985).

Information on nutritional status of individuals or populations is used for planning and execution of food relief operations as well as monitoring the impact of interventions by governments (Kruette, 1996). Anthropometric measurements have an advantage in that the data can be disaggregated and made available in secondary sources. The relative cost of data collection for anthropometric measurements is not high in comparison with other survey methods such as assessing vitamin A or haemoglobin status of a population.

Nutritional status of an individual is a result of several factors other than food consumption and it may be influenced by the genotype of the individual as well as disease condition among other factors (Mahan, 1996).

Food Frequency Questionnaire (FFQ) is another method used to assess the nutritional status of a population, through evaluating eating habits. It is a retrospective data collecting method that can be used to assess the adequacy of the diet and establish food habits (Mahan, 1996). It organizes food into groups that have common nutrients and intake is assessed per day, week, or month. FFQ does not measure specific nutrients consumed but nutrient intake is implied through the food groups that will have been mentioned.

Scientific evidence suggests that the way people store fat increase their risk to certain non-communicable diseases (NCDs) (Adu *et al*., 2009). Some individuals tend to store fat in the abdominal area called the 'apple shape' which is measured through the waist circumference. Others store it mainly around the hips and thighs (gluteal femoral fat or 'pear shape') (Mitchell, 2011). Obese individuals with excess abdominal fat are clearly at higher risk of developing NCDs such as coronary heart disease, congestive heart failure, hypertension, non-insulin dependent Diabetes Mellitus and strokes than are obese people with similar amounts of total body fat stored primarily in the hips and thighs (Adu *et al*., 2009). The waist-hip ratio is a measurement that can be used to estimate the risk of developing NCDs. A higher ratio shows an increased risk of developing NCDs especially among overweight individuals who store excess fat in the abdominal area, compared to individuals who store fat around hips and

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thighs with a lower waist-hip ratio (Mitchell, 2011). The waist measurement is taken at the point of smallest circumference above the umbilicus and the hip measurement is taken at the point of greatest circumference of the hips. Women and men with a waist-hip ratio >0.85 and 1.0, respectively are at an increased risk of developing NCDs. Some conservative estimates indicate that the risk is increased when the ratio exceeds 0.80 and 0.95 for women and men respectively.

Body Mass Index (BMI) is another reliable assessment tool that has been used to assess nutritional status of individuals to indicate thinness and excessive fatness. This index incorporates height and weight to estimate critical fat values at which the risk per disease increases (Martinez *et al*., 2005). According to BMI, the lowest risk for chronic disease is in the 18.5 to 24.9 range (World Health Organization, 1990). According to National Institute of Health USA, mortality rates are 25% higher for individuals with a BMI between 25-30 and 50-100% higher for those individuals with a BMI above 30. BMI is a useful tool for evaluating nutritional status of the general population. Table 1 illustrates how BMI values are interpreted and classified in different nutritional status categories.

MATERIALS AND METHODS

Data collection: A sample of 84 students consented to participate in the study. The study was carried out at the University of Zimbabwe campus. A cross-sectional study design was used to assess the nutritional status and eating habits of the students using anthropometry and a food frequency questionnaire. Anthropometric measurements that included weight, height, waist and hip circumference were done on students from various faculties. The measurements were used to calculate the nutritional indices namely BMI and waist-hip ratio. Three data collection points within the campus were selected and participants were selected using a random systematic method on the students who were passing through these points. Participants who satisfied the eligibility criteria and gave consent were then recruited in the study.

A Tanita scale was used to measure weight. Students were weighed with light clothes on and without shoes. A height metre was used to measure height of students, who were made to stand straight, with back, head and heels against the wall before a reading was taken. A non-stretching measuring tape was used to measure the waist and hip circumferences. The waist circumference was measured at the site just above the umbilicus and hip circumference at the widest part of the hip. Measurements were conducted according to WHO and UNICEF recommended standards. A FFQ was administered to each participant stating food intake within the past three days.

Data were analyzed using SPSS software version 16. Mean values of indices were compared using Chi-square for different categories.

RESULTS

Eighty-four students (47 females and 37 males) gave consent to participate in the study. Mean age, weight, height and WHR among the students were 22±2 years; 62±1 kg; 168±0.1 cm and 0.8±0.1, respectively. The average BMI was 22±4 with males showing a slightly higher BMI compared to their female counterparts. According to the BMI values, 58% of the students who participated in the study were healthy.

On the other hand, a significant number of students were malnourished with 18% overweight while 24% were underweight.

The results showed that on a daily basis consumption of milk, vegetables and fruits were 10, 14 and 11%, respectively. Weekly intake of vegetables was higher (10%) compared to milk and fruit which was the same (7%). Eleven percent, 18% and 7% of the students indicated consuming milk, vegetables and fruits respectively on an occasional basis. One percent of the students reported not to consume any fruit or milk and 2% did not consume vegetables at all. Generally vegetable consumption was higher than milk and fruit consumption.

Eighty-six percent of male students were at a lower risk of developing non-communicable diseases (NCDs) while 63% of female students had a low risk of developing the diseases. Fourteen percent of male students and 26% of female students were at a higher risk of developing NCDs due to increased waist-hip ratio.

DISCUSSION

On the basis of BMI indicator and WHR, most of the students were found to be well nourished. Most of the participants were aged between 22 and 30 years. This could explain the increased percentages of BMI (58%) and WHR (86%) falling within the healthy category because young adults tend to be more conscious of their weight, particularly females who choose to be thin than being overweight. Students showing healthy normal BMI and WHR values were advised to maintain their food intake and diversify their diets as much as possible to include fruits and vegetables. Students were also advised to engage in regular physical activity to keep healthy as 18% of the students were within the overweight and obese categories. Obesity is known to be closely linked to development of NCDs (Weili *et al*., 2007). This study showed that about 5% of the students were obese and had BMI ranging from 30-35. This increase in obesity could be due to poor eating habits such as high intake of energy dense foods such as fatty and sugary foods. Cannon and Leitzmann (2005)

Table 1: BMI classification (Source: WHO, 1990)

BMI	Classification
<18.5	Underweight
18.5-24.9	normal
25-29.9	overweight
>30	obese

Table 2: BMI classification of University of Zimbabwe students who participated in the nutritional status assessment conducted in 2010

Nutritional status	No. of students	No. of Females	No. of Males	Total percentage
Underweight	20	13	7	24
Healthy	49	24	25	58
Overweight	11	7	4	13
Obese	4	3	1	5
Total	84	47	37	100

Table 3: Waist-hip ratios of University of Zimbabwe students who participated in the nutritional status assessment conducted in 2010

Value-WHR	No. of Males	Value-WHR	No. of Females	Disease risk
<0.95	32	<0.80	29	very low
0.96-0.99	0	0.81-0.84	6	low
>1.00	5	>0.85	12	high
Total	37		47	

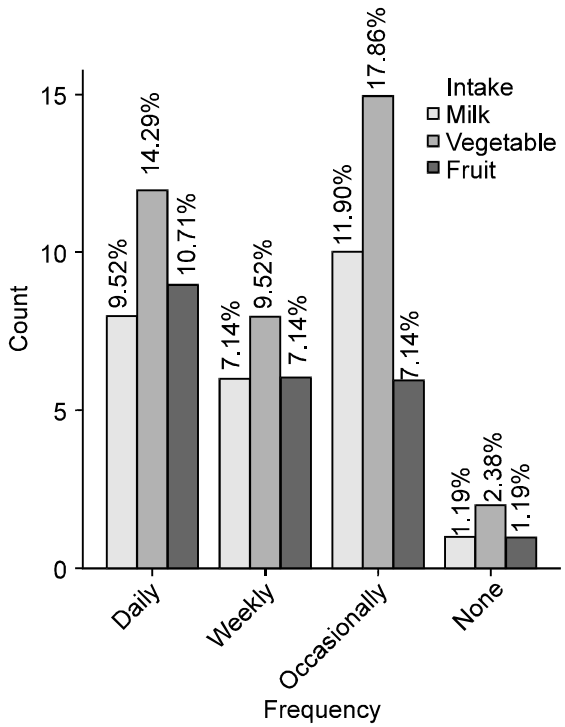

Fig. 1: Frequency of consumption of milk, vegetables and fruits by University of Zimbabwe students who participated in the nutritional status assessment conducted in 2010. Count represents the number of students who had intake of milk, vegetables and fruits.

indicated that there is a steady rise of obesity in young people and this is detrimental to their health later in life. This suggests that nutritional status of young people such as University students should be monitored closely and nutrition education provided. Twenty-four percent of students were undernourished. The results concur with a Nigerian study (Adu, 2009) which indicated that usually university students are underweight due to socio-economic challenges. Results of the study showed that female students were more likely to be in both extremes of malnutrition compared to male students. This was shown by 28% females compared to 19% males having a BMI of <18.5. On the other hand 21% female students compared to 14% males were in the overweight and obese category. This confirms the findings by other studies that females are more likely to be overweight and obese than males (Kamadjeu *et al*., 2006).

The study showed that the association between gender and BMI was not statistically different ($p = 0.318$). This finding is consistent with results of other previous studies (Martinez, 2005) (Heid *et al*., 2010). According to a study by Heid *et al*. (2010) age and BMI were not significantly associated ($p = 0.953$), showing that BMI of an individual can be calculated regardless of knowledge of the age. Sixty-three percent of female and 86% of male students had waist-hip ratios in the normal range showing a lower risk of developing NCDs. However, these indices are also affected by other factors that may increase the risk of developing disease such as genes and the environment (Heid *et al*., 2010). The major limitation of BMI in assessing nutritional status is that it does not differentiate lean body mass from fat (Pivarnik *et al*., 2007). BMI is usually used in combination with waist-hip ratio and other body consumption measurements to get an accurate assessment (Daniels, 2009).

Association of milk, vegetable and fruit intake across gender was not significant. For both female and male students, consumption of milk, vegetables and fruits was low. This could be attributed to the economic status of the students' families. During the year 2010 all University of Zimbabwe students were not in campus residence which could have been a contributing factor as they were less likely to access healthy meals. This could suggest an increase in the risk of micronutrient deficiencies and malnutrition among the students. Thus there is need to encourage university students to consume diversified meals. Food consumption is influenced by socio-economic, cultural, health status and accessibility (Black *et al*., 2008). Students who were underweight may be affected by socio-economic factors as well as accessibility as there are no fruit and vegetable stalls in and around the University. This study had limitations in that a small sample size was recruited and only students from one University were assessed. There is need for a larger study among different

universities to gather adequate information on the nutritional status and eating habits of tertiary students in resource limited settings.

The sample population comprised mostly of young adults who are more likely to be conscious of their health and active as shown by an increase in the number of healthy compared to malnourished students.

Conclusion: Nutrition and health education has to be intensified at the University. The assessment revealed that most of the students (58%) were healthy with normal BMI values. Twenty-four percent of the students were undernourished and had BMI <18.5. Five percent of the students were found to be obese with a BMI >30. Consumption of milk, fruits and vegetables was generally low among students. Hence there is need for interventions to improve meal diversity among university students.

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