Nutritional Status and Dietary Practices among University Students in Sri Lanka

Karthijekan, K[1*], Angela, A.A[2]

[1*] Department of Supplementary Health Sciences, Faculty of Health-Care Sciences, Eastern University, Sri Lanka
[2]Department of Clinical Sciences, Faculty of Health-Care Sciences, Eastern University, Sri Lanka
jeshikarthi@gmail.com

Abstract- The increasing prevalence of overweight and obesity, mostly due to various behavioral and lifestyle factors are a burden on the population. Overweight and obesity are recognized as the cause of many health related complications. Unhealthy dietary practices such as high fat and salt intake lead to excess weight gain. The study aimed to assess the nutritional status and dietary practices among university students at Faculty of Health-Care Sciences, Eastern University, Sri Lanka. A sample of 384 students was selected using a systematic sampling technique. A self-administered questionnaire assessed the socio-demographic characters, and dietary practices. Weight, height and waist circumference (WC) were measured and compared with Asian anthropometric cut-offs for Body Mass Index (BMI) and WC. Chi-squire test was used to find out the association between selected variables. The response rate was 87.5%. Out of 336 participants, the percentages of those overweight, obese and underweight were 35.2%, 10.7% and 8.6% respectively. Nearly one fifth of the students had the abdominal obesity; while one fourth of the female students had it, only about 10% male students had it. Males consumed significantly more ($p<0.05$) of unhealthy foods such as red meat and fast foods, had a higher prevalence of obesity compared to females. The findings of this study showed that the nearly half of the participants had excess body weight, with remarkable percentage of abdominal obesity. Moreover, the unhealthy dietary practices more common among males who had high percentages of obesity. Therefore, the appropriate awareness programmme could be initiated among this target population to reduce the excess bodyweight and encourage them to follow the healthy dietary practices.

Index Terms- Overweight, Obesity, University Students, Dietary Practices, Sri Lanka

I. INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation in the body, which is associated with adverse health outcomes (1). Obesity has reached epidemic proportions globally, with at least 2.8 million people dying each year as a result of being overweight or obese. Previously, it was associated with high-income countries but now, also present in low- and middle-income countries (2). In 2016, World Health Organization (WHO) estimated that the obesity prevalence has tripled compared with that in 1975 and reports that over 1.9 billion and nearly 650 million adults are overweight and obese respectively (1). Globally, the prevalence of overweight has been estimated as 39% in males and 40% in females while for obesity, the prevalence is 11% in males and 15% in females (1). The epidemic of obesity, overweight and abdominal obesity has spread rapidly through the South Asian region (3). Obesity has become an emerging public health problem in Sri Lanka as well (4). Previous studies show a clear upward trend in age-adjusted obesity (BMI ≥ 25 kg/m^2) prevalence in Sri Lankan males and females; increasing from 14.3% (males) and 19.4% (females) in 2005 (5) to 21% and 32.7% respectively in 2011 (4). One quarter (26.2%) of Sri Lankan adult population is

suffering from central obesity (WC > 80cm for woman and >90cm for man) and is double in females (36.3%) compared to males (16.5%) (5). Overweight and obesity lead to many physical, psychological and economic consequences (6).

Global increases in overweight and obesity are attributable to a number of factors such as increased intake of energy dense foods that are high in fat, salt and sugars but low in vitamins, minerals and other micronutrients; reduced physical activities due to increasingly sedentary nature of many forms of work, changing modes of transportation from walking or cycling to motor car and increasing urbanization (7). The fundamental cause of obesity and overweight is the energy imbalance between the intake and the expenditure of calories where the intake exceeds expenditure (1). Even though the rate of literacy is higher in Sri Lanka relative to the other developing countries, the incidence of overweight and obesity have risen in recent years, probably due to changes in food habits and moving towards a more sedentary life style (4). The increasing prevalence of overweight and obesity due to various behavioral and lifestyle factors are a burden on the population. For those reasons, awareness and knowledge is thought to be essential in controlling the problems of overweight and obesity and related health complications.

The transition period from high school to university seems to be linked with a decrease in physical activities and an increase in sedentary activities (8). In a study carried out in Netherlands, it was reported that majority (68%) of students had weight gain after university entrance (9). During the transition from secondary school to university, students need to adapt to a new environment. Some authors have pointed out that when students fail to adapt adequately to the new environment, it could have negative consequences towards their health and weight status (10). Therefore, this study aimed to assess the nutritional status and dietary practices and the association between selected variables among a group of Sri Lankan university students.

II. METHODOLOGY

A descriptive cross-sectional study was conducted for one year from May 2016. A sample of 384 students consisting females and males were selected from the students of the B.Sc. (Nursing) and the M.B.B.S. degree programmes. The maximum sample size was calculated for a given margin of error (d) 0.05 with the prevalence of any of the characteristics taken as 50% in the absence of similar studies in the local setting. A systematic sampling technique was used to select the subjects from the registration information kept at the university. Selected students were invited to participate in the study after written informed consent. After completion of data collection, 48 subjects were excluded from the analysis since the data given was incomplete. Therefore, data pertaining to 336 subjects only was analyzed. This study was approved by the Ethics Review Committee, Faculty of Health-Care Sciences, Eastern University, Sri Lanka (EUSL/FHCS/ERC/2016/09).

Data collection instrument

Data were collected by investigators through a self-administered questionnaire. Pre-testing was carried out among 15 students to validate the questionnaire for accountability and accuracy. Data included socio-demographic characters, anthropometric and waist circumference measurements, and dietary practices.

A self-interviewer questionnaire was used collect the data on the study subjects' dietary practices. Names of 11 common food items were given to them and their choices were recorded. They were asked to choose between the following options, which were on the frequency of consumption. The options were 'daily', 'less than or equal three times a week', 'more than thrice a week' and 'never'.

Measurements

All anthropometric measurements were performed using standard procedure. The weight was measured with a SECA 703 wireless column scale (Hamburg, Germany). Participants were weighed wearing light cloths. The height was measured in a standing position by using SECA 703 wireless column scale (Hamburg, Germany) (without shoes) and the waist circumference was measured using a non-stretchable measuring tape at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest to the nearest 1cm, at end of the normal expiration.

Statistical analysis

Subjects were classified into four groups according to their 'Measured' BMI values as underweight: $< 18.5 \text{kg/m}^2$; normal weight: $18.5\text{-}22.9 \text{ kg/m}^2$, overweight: $23.0\text{-}25.0 \text{ kg/m}^2$; obese $\geq 25.0 \text{ kg/m}^2$ (6). Abdominal obesity was defined as a waist circumference >90 cm for males and >80 cm for females (6). Collected data were transferred to SPSS 16 statistical software (SPSS Inc., Chicago, IL, USA) and analyzed based on the research problem, objectives and variables. Percentages of responses were reported according to BMI and WC level and respective weight perception. For categorical variables, Pearson's chi-square test was used to describe the association. P values < 0.05 were considered significant.

III. RESULTS AND FINDINGS

Table 1: Socio-demographic Characteristics of participants

Variables (No=336)	Number	Percentage (%)
Discipline		
Nursing	75	22.3
Medicine	261	77.7
Gender		
Male	131	39.0
Female	205	61.0
Ethnicity		
Tamils	86	25.6
Muslims	67	19.9
Sinhalese	181	53.9
Burger	02	0.6
Current Resident		
Home	54	16.0
Hostel	224	66.7
Other	58	17.3
Meal Type		
Vegetarian	21	6.2
Non-Vegetarian	295	87.8
Ovo-vegetarian	20	6.0
Sources of Food		
Home	64	19.0
Canteen	199	59.2
Shop	53	15.8
Own made	20	6.0

A total of 336 students were given their consent to participate. The respondent rate was 87.5% (n=336/384). The study sample was selected randomly from the whole 4 batches of nursing students and the 5 batches of medicine students. Among the 336 participants, majority of the participants were females 61.0 % (n=205). Out of 336 participants, Most of the participants were Sinhalese (n=181, 54%) with resident at hostel (n=224, 67%) and were non-vegetarian (n=295, 88%). Among them, the percentage of students who studied nursing and medicine were 22.3% and 77.7% respectively. While sixty percent of students consumed their regular meal from

the canteen, a very low percentage (6.0%, n=20) had self-cooked meals. Table 1 gives the percentage distribution of participants' socio demographic characteristics.

Table 2: Dietary intake of participants assessed by a food frequency questionnaire in gender

Food Category	Males (%)	Females (%)	Chi-squire	p-Value
Rice			6.015	.111
Daily	96.2	99.0		
≤3times/week	1.5	0		
>3times/week	2.3	0.5		
Never	0	0.5		
Red meats			20.965	.000
Daily	3.8	1.0		
≤3times/week	60.3	55.1		
>3times/week	22.1	11.2		
Never	13.8	32.7		
Vegetables			1.152	.562
Daily	85.5	88.8		
≤3times/week	7.6	4.9		
>3times/week	6.9	6.3		
Never	0	0		
Fruits			12.013	.007
Daily	9.9	2.4		
≤3times/week	54.2	68.3		
>3times/week	31.3	25.9		
Never	4.6	3.4		
Oil in Food			5.302	.151
Daily	42.7	44.9		
≤3times/week	31.3	39.0		
>3times/week	24.4	15.1		
Never	1.5	1.0		
Grains			.862	.835
Daily	13.0	13.7		
≤3times/week	45.0	45.4		
>3times/week	35.1	31.7		
Never	6.9	9.3		
Fish and Sea food			2.596	.458
Daily	26.0	23.4		
≤3times/week	29.0	26.8		
>3times/week	38.2	37.6		
Never	6.9	12.2		
Sweets			5.451	.142
Daily	9.2	17.6		
≤3times/week	64.9	55.6		
>3times/week	23.7	23.4		
Never	2.3	3.4		
Hot Beverages			9.240	.026
Daily	54.2	62.0		
≤3times/week	26.0	14.6		
>3times/week	18.3	18.0		
Never	1.5	5.4		
Fast food			23.295	.000
Daily	3.1	3.4		
≤3times/week	58.0	74.1		
>3times/week	35.9	14.1		
Never	3.1	8.3		

Nutritional status among participants

Out of 336 participants, the percentages of that overweight, obese, underweight, and normal weight were 35.2%, 10.7%, 8.6%, and 46% were respectively. The prevalence of overweight and obesity in males was 33.6% (n=44) and 14.5% (n=19), and in females, 36.1% (n=74) and 8.3% (n=17), respectively. Over one third of the male and female students had overweight. However, the obesity prevalence had two fold in males compared to females.

Abdominal obesity among participants

Among the 336 participants, nearly one fifth (n=64, 19%) of the study sample had abdominal obesity which constituted 25% (n=51) females and 10% (n=13) males. There was a significant association between present of abdominal obesity and gender ($X^2 = 11.592$, *p=0.001*).

Dietary practices of participants

Based on the semi-quantitative food frequency questionnaire (FFQ), significant differences were observed between male and female participants with respect to their consumption of individual food categories regularly (04 out of the 11 food items or groups). Males consumed more red meats, fruits and fast foods than females ($p < 0.05$). Rice, vegetables, grains, fish and sea foods, sweets, hot beverages and dry fish were equally consumed by males and females (Table 2).

IV. DISCUSSION

Sri Lanka is a low-middle income country that undergoes rapid transition in economics in general and food habits (11). This study provides details regarding nutritional status and dietary practices among a single group of Sri Lankan university students. The present study highlights that nearly half of the study population (n= 154) had higher than normal BMI values; one third were overweight and 10% were obese. A study by Jayawardena et al. (4) reported a much higher percentages of obesity (29%) among Sri Lankan in comparison to the findings from our study population (10%). This difference may be related to the difference in the sampling method. The alarming finding in this study is that a significant proportion of students (35%) have potential risk to become obese in future, unless appropriate action is taken. Therefore, creating awareness about their present weight status and the potential risk in future is of utmost importance to ensure safe BMI in the future. Obesity was commoner among males (14.5%) compared to females (8%), similar to two other studies done in Pakistan and USA (12, 13). In contrast, some local (4) and global (1) data showed that obesity was more prevalent in females than male and females were more vulnerable to develop obesity related negative health outcomes in future. Percentage of central obesity in this study was less than that seen in other local studies (4, 14). This feature was more prevalent among females than males. It is commonly reported that generally, females are more conscious about their body weight and seek weight control strategies (15). It has also been noted that significant percentage of female students named media and friends as the source of pressure to maintain a certain weight (16). Fat deposition in the abdominal area carries more risk for NCDs than deposition of fat in other areas of the body (6). Sri Lankan adults are reported to be more conscious about their waist circumference compared to their body weight (17).

There are many factors contribute to the unhealthful food consumption in college students include unhealthful food availability on campus, snacking, late night eating, alcohol-related eating, eating because of stress/boredom, and food in student dorm rooms (18). The present study finds out the food consumption among male and female students. In this finding, almost all students consumed carbohydrates basis foods specially rice as their main meal in daily. This is contrast with the finding of Lebanon study which stated that nearly 12% of the students consumed rice daily basis, however majority of the students daily consumed white rice (19).

Higher fibres foods such as whole grains, legumes, fruits and vegetables have been linked to lower body weights (20). In present study, majority of the students consumed vegetables daily. It contrasts with strong et al study (21). The present study revealed that less percentages of the students consumed fruits and grains as daily basis. Both males and females consumed grains more equal amount but fruits consumption was high in males compared to females. However, in strong et al study showed that both males and

females consumed fewer amounts of these food categories in daily basis (21). This indicates that efforts need to be made to improve fruit and vegetable intake among university students. There was significant correlation between gender and fruit consumption but not with vegetables consumption in the present study but it was totally opposite the findings of the strong et al study.

Increased consumption of high-fat and high-energy foods provide extra calories that cause weight gain and intake of sugar sweetened beverages such as soda and fruit drinks has been contributing increasing obesity rate (22). The fast food and red meats consumption was very low in this study sample and there was significant correlation between gender and these food categories (p<0.001). The students who were overweight and obesity were consumed large amount of fast foods and red meats as daily basis. While male students consumed red meats three times more than female students, the fast food consumption was more similar in both categories. The self-preparation of food is associated with least fast food consumption which is more healthy diet (23). This finding is differ from the Salmeh et al study which stated that nearly one third of the students consumed red meats in daily meals and fast food was approximately 12%. Female students added more red meats in their dish than male students and fast food consumption was double in males than females. There was a significant association between gender and red meats and fast food consumption (p<0.001) (19). Eating healthful diet is a challenge for the students in their transition period from secondary school to higher institution (24). The easy access to unhealthy food on a college campus is a barrier to weight management (25). Therefore, assessing nutritional status and dietary practices among university students are crucial to bring them as a healthier population in future.

V. CONCLUSION AND RECOMMENDATIONS

Almost half of the participants were overweight or obese. Abdominal obesity was seen in one fifth of the participants and it was common in females. If university students learned healthy behaviors early in life, this would not only have favorable health outcomes at an individual level, it would also reduce the burden on health services. Males consumed significantly more (*p<0.05*) of unhealthy foods such as red meat and fast foods, had a higher prevalence of obesity compared to females. This study highlights the importance of initiating the awareness programme among university students to maintain the healthy lifestyle in order to prevent the excess weight gain.

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Authors

First Author – Karthikesu Karthijekan, Lecturer, *Department of Supplementary Health Sciences, Faculty of Health-Care Sciences, Eastern University, Sri Lanka*

Second Author – Angela Arulpragasam Anthony, Senior Lecturer, *Department of Clinical Sciences*, *Faculty of Health-Care Sciences, Eastern University, Sri Lanka*

Correspondence Author – Karthikesu Karthijekan, jeshikarthi@gmail.com*, Mobile: +94772029816*