DOI: https://doi.org/10.4038/gmj.v30i1.8306 **Original article**

Association between obesity and family history of non-communicable diseases among a group of medical students in Sri Lanka

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ABSTRACT

Introduction: Obesity is a major predisposing factor for non-communicable diseases (NCDs) with a strong familial tendency. Since medical student life is typically characterized by a decrease in physical activity levels, stress and associated poor eating habits, they are at a higher risk of developing obesity.

Methods: This study was conducted among 2nd, 3rd, and 4th - year medical students at the University of Sri Jayewardenepura. Height and body weight were measured, and socio-demographic data, information regarding NCDs, and family history of NCDs were collected using a self-administered questionnaire.

Results: The sample size was 113 with 52 (46%) male students. Among male students, 30.8% were obese, and 26.9% were overweight, while that of female students is 3.3% and 8.2%. The prevalence of obesity was significantly higher among males than females ($p<0.05$) and significantly associated with a family history of cardiovascular disease ($p<0.05$) and dyslipidemia ($p<0.01$). A family non-communicable disease score had a significant correlation with the body mass index of students ($p<0.05$).

Conclusions: The study revealed that medical students have a higher prevalence of obesity compared to already published data on the general population in Sri Lanka. A significant association between obesity among students and a family history of cardiovascular disease and dyslipidemia is an alarming concern for the possibility of developing cardiovascular disease in the future.

Keywords: *Cardiovascular disease, Non-communicable diseases, Medical students, Obesity.*

Introduction

Obesity is defined as abnormal or excessive fat accumulation that may impair health according to the World Health Organization (WHO) definition (1). In South Asians, a body mass index (BMI) of 25 kg/m² or above is considered obese, while a BMI of 23 kg/m² or more is considered overweight (2). The prevalence of obesity and overweight is 9.2% and 25.2% respectively in the Sri Lankan adult population (3) and 31.2% and 34.3% respectively in the Colombo district (4).

Lack of exercise, poor eating habits, such as a preference for fast food and processed foods with high sugar content, and missing meals, are known causes of obesity (5). The literature shows genetic influences on an individual's body-mass index (6, 7).

Obesity is a major predisposing factor for non-communicable diseases (NCDs). Individuals with obesity have a higher chance of developing NCDs in life. Obesity has a similar impact on mortality

as smoking, and it can decrease life expectancy by eight years for women and 13 years for males with a BMI > 45 kg/m² (8). The main causes of mortality related to obesity include coronary heart disease, hypertension, diabetes mellitus, stroke, and some cancers (9). Because medical student life is typically characterised by a decrease in physical activity levels and poor eating habits, they are at a higher risk of being overweight or obese (10). Academic stress of medical students also can cause unhealthy eating habits leading to obesity (11).

A strong familial tendency for the development of NCD and its complications is shown in the literature (12, 13). Therefore, medical students with a family history of NCD and obesity are at a higher risk for the development of NCD and their complications in the future.

Thus, identifying the prevalence of obesity among medical students and understanding associated family factors are crucial.

Methods

This study was conducted as a cross-sectional, descriptive study among 2nd, 3rd and 4th - year students in the Faculty of Medical Sciences, University of Sri Jayewardenepura. A stratified random sampling method was used to select participants for the study. The study was conducted in 3 batches, selecting approximately 40 students from each batch.

The data were collected on weekdays after the lectures. At the time of data collection, all the participants who fulfilled the eligibility criteria were selected to participate in the study according to stratified random sampling methods. A sufficient amount of time was given for the participants to decide to participate in the study. After making their decision to participate in this study, they were given a specific number. All the data and investigations related to each participant were documented under this number. Therefore, no personal data were collected. Height and body weight were measured by investigators using a stadiometer and electronic scale before filling out the questionnaire. A self-administered online questionnaire (*Google* ™ form) was used with the consent of the participant to collect socio-demographic data and information regarding NCDs (diabetes, hypertension, dyslipidemia, cardiovascular disease, fatty liver disease), and family history of NCD. Participants filled out the form in the place where the height and weight measurements were taken. Most students used their own devices to fill out the questionnaire, while devices were given by the investigators to those who needed them. Data were collected in November 2022. BMI was calculated and classified according to WHO South Asian recommendations (Underweight <18.5, Normal - 18.5-22.99, overweight - 23-24.99 and Obese > 25) (2).

A family non-communicable disease score (Family NCD score) was calculated considering the family history of diabetes, dyslipidemia, cardiovascular disease, hypertension, fatty liver disease, and obesity.

SPSS™ Statistical (22 version) Package was used for data analysis. Descriptive statistics and the *Chi-square* test were used. Ethical clearance for this study was obtained from the Ethics Review Committee (ERC) of the Faculty of Medicine, University of Colombo (2018/1481).

Results

The total sample included 113 undergraduate students. The response rate was 83%, with 52 (46%) male students and 61 (54%) female students, 46%, 26% and 26% from 2nd, 3rd and 4th years respectively.

Among male students, 30.8% (16) were obese, and 26.9% (14) were overweight, while among female students, 3.3% (2) were obese, and 8.2% (5) were overweight. Obesity was significantly higher among males than females ($p<0.05$).

The prevalence of obesity among students was significantly associated with a family history of cardiovascular disease ($p<0.05$) and dyslipidemia ($p<0.01$). A Family NCD score showed a significant positive correlation with the body mass index (BMI) of students ($p<0.05$).

Table 1: Classification of the sample according to BMI

Category / BMI	Underweight <18.5		Normal 18.5 - 22.99		Overweight 23 - 24.99		Obese >25	
	Count	%	Count	%	Count	%	Count	%
Male (n=52)	6	11.5	16	30.8	14	26.9	16	30.8
Female (n=61)	15	24.6	39	63.9	5	8.2	2	3.3

Table 2: Association of NCDs in the family and BMI categories

Factor	Underweight		Normal		Overweight		Obese		χ^2	*P* value
	N	%	N	%	N	%	N	%		
Diabetes Type 1 or 2 (n=59)	10	16.9	28	47.5	10	16.9	11	18.6	0.788	0.852
Hypertension (n=57)	6	10.5	28	49.1	12	21.2	11	19.3	6.072	0.108
Dyslipidemia (n=47)	7	14.9	17	36.2	8	17	15	31.9	16.085	0.001*
Cardiovascular Disease (n=26)	2	7.7	14	53.8	2	7.7	8	30.8	8.681	0.034*
Fatty Liver disease (n=18)	3	16.7	9	50	2	11.1	4	22.2	0.997	0.802

* NCDs- Non Communicable Diseases; * BMI- Body Mass Index

Discussion

Based on BMI values and according to Asia-Pacific guidelines, the prevalence of overweight and obesity among the medical students in the current study was 16.8% and 15.9%, respectively. Since the prevalence of obesity in Sri Lanka is 9.6% (3), the prevalence in this sample was significantly higher than that of the general population ($p<0.05$). However, the age distribution is wider in the general population than in the sample in this study.

At the time of the study, few publications were available on the prevalence of obesity among university students in Sri Lanka. Jayasinghe, *et al.,* reported that overweight were 7% and 12% among female and male university students respectively (14). Ekanayake, *et al.,* reported prevalence of overweight and obesity was 19.9%, and 4.1% among university students (15). But none had focused on medical undergraduates separately. Compared to other studies, this study shows a higher prevalence of obesity and/or overweight. Medical students are generally considered as a group with low physical activity, increased stress, and possibly associated poor eating habits (16). Therefore, they are at risk of developing obesity.

A higher prevalence of obesity was found in males than in females in the sample. That is contrary to Sri Lankan studies in the general population in which a higher prevalence of obesity was reported among females than males (3,4). This gender disparity in this sample may be due to females of these age groups being young, more concerned about maintaining a slender body and taking more precautions to control their body weight.

This study found an association between obesity among students and a family history of cardiovascular disease and dyslipidemia. Further, family NCD score is correlated with the BMI of the students. Even though NCDs are low among the students due to their young age, it is a known fact that obesity significantly increases the risk of developing cardiovascular diseases such as coronary artery disease and stroke in the future (17).

Excess body fat, especially around the abdomen is associated with dyslipidemia and a risk factor for cardiovascular diseases (18). Considering the associated family history of cardiovascular disease and dyslipidemia as an added risk factor, these students with obesity and overweight are at high risk for cardiovascular diseases in the future (19, 20).

The familial tendency of obesity can be due to genetic predisposition, and environmental factors shared by the family such as dietary habits, lifestyle, and physical activity (21, 22). Energy metabolism, fat storage, and appetite regulation have a genetic component; hence obesity and related cardiovascular risk factors run in families. Both forms of obesity (common obesity and early-onset obesity) show that they have a similar genetic and biological foundation with the involvement of the brain in the control of body weight (23). In addition, unfavourable household environmental factors such as the availability and accessibility of unhealthy foods, parental role modelling, unfavourable mealtime habits, and decreased physical activity at home contribute to childhood and young adult obesity (24).

This study identifies the necessity of the implementation of preventive measures for obesity such as promoting physical activities and dietary modification among medical students. Furthermore, the implementation of NCD screening programmes focused on students with obesity and overweight is of immense importance in early detection (25).

Limitations

This study uses self-reported data; there can be under-reporting due to many reasons including being unaware and being undiagnosed related to family NCD.

Conclusions and recommendations

A significant association between obesity among students and a family history of cardiovascular disease and dyslipidemia is an alarming concern for the possibility of developing cardiovascular disease in the future. Creating awareness about obesity and NCD together with screening the medical students will help them to follow a healthy lifestyle and help to improve the health of future doctors.

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