A Study on Prevalence of Cardiovascular Disease Risk Factors Among Medical and Nursing Students, HIMS, Sitapur

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Abstract

Introduction: CVDs are an emerging public health problem and responsible for about 25 per cent of the DALYs lost due to NCDs in SEAR countries while this trend is rising in younger age group in developing countries where more than three quarters of NCDs deaths occur. **Objective:** The objective of this study was to assess the prevalence of cardiovascular risk factors among medical and nursing students of HIMS Sitapur, and their association in apparently healthy students. **Methodology:** A cross-sectional study was carried out in December 2019 among medical and nursing students of HIMS, Sitapur. A total of 820 students which included 496 males and 324 females participated in the study. A Structured questionnaire for anthropometric measurements, blood pressure and fasting blood sugar was recorded among students. Data collection was compiled in MS Excel software and analysed in institutional SPSS version 22. **Result:** This study has been observed the prevalence of overweight 192 (23.4%) and obesity17 (2%) as per WHO, waist circumference 210 (25.6%) and abnormal waist hip ratio 219 (26.7%), prediabetics 110 (13.4%) in fasting blood sugar and prehypertensive 175 (21.3%) with none of the medical and nursing students either diabetic or hypertensive. **Conclusion:** Health education and primary level interventions like reducing body weight, blood pressure and blood glucose level have a beneficial impact on these biological CVDs risk factors.

Keywords: *CVDs, BMI, prediabetes, prehypertension*

Introduction

Noncommunicable diseases (NCDs) is a lifestyle disease such as cardiovascular diseases (CVDs), cancer, diabetes and chronic respiratory diseases, are the leading global cause of death and are responsible for just over 70% of deaths worldwide. These NCDs share key risk factors like overweight and obesity, raised blood pressure, raised fasting blood sugar, and ultimately diseases which are responsible for 63% of deaths from NCDs and 23% Probability of premature mortality from NCDs in India. CVDs are an emerging public health problem and responsible for about 25 per cent of the DALYs lost due to NCDs in SEAR countries while this trend is rising in younger age group in developing countries where more than three quarters of NCDs deaths occur.[1] The importance of adolescence also lies in the fact that this age group has their root causes many serious diseases in adulthood. Growing period, maturation and unique changes are occurred significantly in adolescence and many adult patterns are established during this period, therefore adolescence is the appropriate time period for appropriate intervention.[2,3] Teenagers start making individual choice and develop personal lifestyles which is highly susceptible for adopting unhealthy behaviour at individuals' level in young age and these unhealthy behaviours very difficult to modify at later ages or after the onset of disease.[4] The objective of this study was to assess the prevalence of cardiovascular risk factors among medical and nursing students of HIMS Sitapur,

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and their association in apparently healthy students.

Material and Methods

This cross-sectional study was carried out in December 2019 among medical and nursing students of Hind institute of medical sciences Sitapur, Uttar Pradesh, India. A total of 820 students which included 496 males and 324 females participated in the study. All medical and nursing students who were eligible and consented to the study were included in the study. This study was approved by the Institutional Ethics Committee and written informed consent was taken from each student and absentees, unwilling and those who were sick on the day of data collection were excluded. Purpose of the study was explained to all medical and nursing students and assured confidentiality of their responses. A Structured questionnaire was prepared for anthropometric measurements included height and weight, estimation of Body Mass Index (BMI) as per WHO and Asian criteria, and waist and hip circumference for calculating Waist-Hip Ratio (WHR). Blood pressure and fasting blood sugar was recorded for all the students. For physical examination, standardized calibrated mercury column type sphygmomanometer, stethoscope, common weighing machine, stadiometer and measuring tape were used and all measurements were taken by the investigators.

Hypertension means systolic BP ≥140mmHg and/or mean diastolic BP ≥ 90mmHg or history of anti-hypertensive treatment fifteen days before the survey and pre hypertension means as a systolic BP of 130–139 and/or a diastolic BP of 85–89, according to the JNC-7. Two measurements of blood pressure on each study participant with a mercury column sphygmomanometer were made using a standardized technique 5 minutes apart in sitting position. Body mass index (BMI) was calculated by dividing the weight in kilograms by the square of the height in meters. Overweight and obesity were defined as a BMI between 25-30 and BMI ≥30 as per WHO criteria and BMI between 23-24.9 and BMI ≥25 as per Asian criteria respectively. Excessive body fat was defined for waist circumference ≥90 cm in males and ≥80 cm in females and for waist-hip ratio ≥0.9 in males and ≥0.8 in females respectively. Diabetes mellitus and prediabetic were defined by a fasting blood sugar of >126 and >110 mg/dl apart and determined by glucometer. Data collection was compiled in MS Excel software and analysed in institutional SPSS version 22. Variables of CVDs factors were analysed either by chi square or Fischer exact test, data was presented in percentages (%) and proportions form with statistical significance was considered at 0.05 level.

Table No: -1. BMI among medical and nursing students as per WHO criteria

Variables	Medical students n (%)	Nursing students n (%)	Gender		Total n (%)
BMI			Male n (%)	Female n (%)	
Normal (<25.0)	447 (76.8)	164 (67.6)	329 (68.9)	282 (87.0)	611 (74.6)
Overweight (25.0-29.9)	125 (21.5)	67 (29.6)	155 (31.2)	37 (11.4)	192 (23.4)
Obese (30.0-39.9)	10 (1.7)	7 (2.7)	12 (2.4)	5 (1.5)	17 (2.0)
Total	582 (100)	238 (100)	496 (100)	324 (100)	820 (100)
Chi square test	$\chi2 = 5.845$, d.f.=2 p=0.00538		$\chi2 = 44.917$, d.f.=2 p<0.0001		

Table No: -2. BMI among medical and nursing students as per Asian criteria

Variables / BMI	Medical students n (%)	Nursing students n (%)	Gender		Total n (%)
			Male n (%)	Female n (%)	
Normal (<23.0)	312 (53.6)	112 (47.1)	234 (47.2)	190 (58.6)	424 (51.7)
Overweight (23.0-27.5)	194 (33.3)	77 (32.3)	174 (35.1)	97 (30.0)	271 (33.0)
Obese (>27.5)	76 (13.1)	49 (20.6)	88 (17.7)	37 (11.4)	125 (15.3)
Total	582 (100)	238 (100)	496 (100)	324 (100)	820 (100)
Chi square test	$\chi2 = 7$.733, d.f.=2 p=0.0209		$\chi2 = 11.688$, d.f.=2 p=0.0029		

Table No: -3. Gender wise Waist Circumference (abdominal fat) & Waist Hip Ratio by WHO-Asian criteria among medical and nursing students

Waist circumference	Male n (%)	Female n (%)	Total n (%)
Normal	427 (86.1)	183 (56.5)	610 (74.4)
Waist Circumference (male≥90cm, F≥80cm)	69 (13.9)	141 (43.5)	210 (25.6)
Total	496 (100)	324 (100)	820 (100)
Fisher's Exact Test	$\chi2 = 0.3714$, d.f.=1, p<0.0001		
Waist Hip Ratio			
Normal	409 (82.4)	192 (59.3)	601 (73.3)
Abnormal (male≥0.9, F≥0.8)	87 (17.6)	132 (40.7)	219 (26.7)
Total	496 (100)	324 (100)	820 (100)
Fisher's Exact Test	$\chi2 = 0.2833$, d.f.=1, p<0.0001		

Table No: -4. Prediabetes and diabetes among medical and nursing students as per WHO criteria

FBS	Medical students n (%)	Nursing students n (%)	Gender		Total n (%)
			Male n (%)	Female n (%)	
Normal (≤110)	501 (86.1)	209 (87.8)	404 (81.5)	306 (94.4)	710 (86.6)
Pre-Diabetes (110-1265)	81 (13.9)	29 (12.2)	92 (18.5)	18 (5.6)	110 (13.4)
Total	582 (100)	238 (100)	496 (100)	324 (100)	820 (100)
Fisher's Exact Test	$\chi 2 = 0.3073$, d.f.=2 p=0.5729		$\chi 2 = 0.2673$, d.f.=2 p<0.0001		

Table No: -5. Prehypertension and hypertension among medical and nursing students

Blood pressure (mmhg)	Medical students n (%)	Nursing students n (%)	Total n (%)
Systolic blood pressure			
Normal (<120)	582 (100)	238 (100)	820 (100)
Pre HTN (120-139)	0	0	0
HTN (≥140)	0	0	0
Total	582 (100)	238 (100)	820 (100)
Diastolic blood pressure			
Normal (<80)	452 (77.7)	193 (81.1)	645 (78.7)
Pre HTN (80-89)	130 (22.3)	45 (18.9)	175 (21.3)
HTN (≥90)	0	0	0
Total	582 (100)	238 (100)	820 (100)
Fisher's Exact Test	$\chi 2 = 0.004208$, d.f.=2, p=0.3023		

***Cont...* Table No: -4. Prediabetes and diabetes among medical and nursing students as per WHO criteria**

Systolic and diastolic blood pressure			
Normal Systolic <120 Diastolic <80	452 (77.7)	193 (81.1)	645 (78.7)
Pre HTN Systolic120-139 Diastolic 80-89	130 (22.3)	45 (18.9)	175 (21.3)
HTN Systolic ≥140 Diastolic ≥90	0	0	0
Total	582 (100)	238 (100)	820 (100)
Fisher's Exact Test	$\chi 2 = 0.004607$, d.f.=2, p=0.3023		

Result and Discussion

Table-1 shown BMI range among medical and nursing students as per WHO criteria of BMI. There was observed prevalence of overweight 192 (23.4%) and obesity17 (2%) and males have highly significant higher proportion than females. Studies had reported that gain in BMI was more likely to be contributed by consumption of alcohol, eating food low in fibre, consumption of caffeine and eating cruciferous vegetables. The obesity causes an approximately threefold increase CHD risk.[5] The prevalence of overweight was 11.7% in a study conducted among medical students of Delhi and 17.5% among UG medical students by Gupta et al beside this the prevalence of obesity was 3.4% in a study conducted among medical students of Delhi and 2% among UG medical students by Gupta et al that nearly similar in present study. Our study finding is contrast with other studies in which BMI was reported lower among males than females. [6,7] Table-2 shown BMI range among medical and nursing students as per Asian criteria of BMI. There was observed prevalence of overweight 271 (33.0%) and obesity 125 (15.3%) and males have significantly higher proportion than females. Currently, the WHO recommends using both international and Asian criteria-based BMI. The cut-off value for overweight and obese, the values are different. The reviewed scientific evidence suggest that Asian populations have different associations between BMI, percentage of body fat, and health risks than do European populations. The consultation concluded that the proportion of Asian people with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cut-off point for overweight.[8] Table-3 depicts that more than one fourth of students 210 (25.6%) has been occurred waist circumference and nearly same finding with overweight while almost three times more in females 141 (43.5%) as compared to males 69 (13.9%), there was a significant increase in number of students with an increased waist circumference highly significant (p<0.001) and other study comparison shown that (77.5%) subjects had a raised waist circumference.[4] Similarly, more than one fourth of students 219 (26.7%) had abnormal waist hip ratio but females 132 (40.7%) had higher proportion as compared to males 87 (17.6%) highly significant. In other study, the prevalence of high waist hip ratio 13 (7.2%) and 32 (4.63%) respectively that was much lower as compared to present study.[9,10]

Table-4 shown that 110 (13.4%) of the students had only prediabetics in fasting blood sugar and on the basis of American Diabetes Association definition of diabetes

(FBS> 126 mg/dl), none of the students had diabetes. This prediabetics changes was more common occurred in nursing students 29 (12.2%) as compared to medical students 81 (13.9%), similarly observed significantly more common in males 92 (18.5%) in comparison to females 18 (5.6%). Same finding was seen in other study that Mean fasting blood sugar level was higher among males than females and none of the participants had diabetic whereas another study observed that (3.3 %) had pre-diabetic blood sugar level and 3 (1.7 %) were in diabetic range.[5,9] Table-5 depicts that none of the medical and nursing students had shown high systolic blood pressure. More than one fifth of students 175 (21.3%) had been observed high diastolic blood pressure including medical students had higher proportion 130 (22.3%) as compared to nursing students 45 (18.9%). In contrast to other study shown that more than one third participants had raised systolic and diastolic blood pressures.[4] Hypertension is one of the most powerful and prevalent risk factor for atherosclerotic cardiovascular disease, although our study found interesting results of blood pressure measurement in medical and nursing students that majority of the students 645 (78.7%) had normal blood pressure and this finding is close to documented by Mehan et. al. and in contrast prevalence of hypertension was observed to be 7.16% in the Delhi study by Chhabra et, al..[5,6,12] Raise a concern on hypertension and associated CVD risk factors are creeping into the young age bracket and over time putting the future generation at an increased risk of CVDs that may increase morbidity and decrease productivity. Increased weight is associated with cardiovascular system changes like fat deposition in the vessel lumen which eventually lead to elevated blood pressures.[9]

Conclusion

It has been observed in current study that risk factors of CVDs are commonly prevalent like as overweight, obesity, high waist circumference and waist hip ratio, prediabetic and prehypertensive changes among medical and nursing students at their young age and may progress further with time which is alarming and definitely require early identification and intervention in the form of primary level prevention. The National Program for Prevention and Control of Diabetes, Cardiovascular disease and Stroke has been launched focusing on disease prevention and health promotion. Medical and nursing students in this study who are assumed to be knowledgeable about CVDs risk factors prevention and the challenge is to prevent acquisition of harmful health behaviours among them. Health education and primary level interventions like reducing body weight, blood pressure and blood glucose level have a beneficial impact on these biological CVDs risk factors.

Ethical approval: The study was approved by the Institutional Ethics Committee.

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Conflict of Interest - There are no conflicts of interest in this study.

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