Original Article

Family history of cardiometabolic diseases based anthropometric and blood pressure evaluation of final year MBBS students

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Objective: To investigate family history of cardiometabolic diseases based differences in body mass index (BMI), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR) and blood pressure (BP) of final year MBBS students.

Methodology: In this observational, cross-sectional study, 106 final year MBBS students were included after informed consent by simple random sampling technique. Based on family history suggestive of cardiometabolic diseases in first and /or second-degree relatives, participants were divided into two groups; Group I without family history of cardiometabolic disease and Group II with family history of cardiometabolic disease. Blood pressure (BP), weight, height, BMI, waist-hip ratio, waist-height ratio of were recorded. Comparison of the two groups was done using Chi-square test.

Results: Out of 106 students, 79(74.5%) were female and 27(25.3%) male. Mean age was 22±1.08 years. Group I comprised of 46(43.4%) participants. Of these, 14(30.46%) were males and rest females. Group II comprised of 60(56.6%) participants. Of these, 13 (21.6%) were males and the rest female. Except for waist-hip ratio (p=0.03), no statistically significant difference between the two groups was found.

Conclusion: Final year MBBS students with and without family history of cardiometabolic diseases differ significantly in terms of waist-hip ratio only when compared with reference to BMI, waist-hip ratio, waist-height ratio and blood pressure. (Rawal Med J 202;46:303-306).

Keywords: Cardio metabolic, diabetes mellitus, hypertension.

INTRODUCTION

Cardiovascular diseases (CVD) are the leading causes of death and are responsible for >17 million deaths each year around the world and 80% of these occur in under developed and developing countries.[1] Prevalence of CVD in Pakistan varies from 18% to 46%[2] and cause more than 100,000 deaths every year (12% of all-cause mortality).[3] Cardiometabolic diseases which include obesity, hypertension, diabetes mellitus and dyslipidaemia along with a positive family history of these diseases are major risk factors for CVD.[4] Positive family history of cardiometabolic diseases increase chances of obesity that in turn lead to increased propensity to develop CVD due to insulin resistance.[5] Increased body-mass index (BMI), waist-hip ratio (WHR) or waist-height ratio (WHtR) that are a measure of obesity are associated with increased chances of CVD.[6]

Pakistan is considered to be suffering from an obesity epidemic.[7] Females particularly from urban areas are more obese compared to other population groups.[7] About 60% of the Pakistani population is categorized as youth.[8] Knowing the relationship between family history of cardiometabolic disease and obesity in younger population groups can help in devising focused management plans. Increased waist circumference and WHR have been associated with increased blood pressure which is responsible for increased chances of cardiovascular diseases.[9] The objective of this study was to determine the family history of cardiometabolic diseases-based differences in BMI, WHR, WHtR and blood pressure of final year MBBS students.

METHODOLOGY

This observational, cross-sectional study was conducted from January to May 2017 at Rawalpindi Medical University, Rawalpindi after approval from Institutional Research Forum. It included 106 final year MBBS students after informed consent by

simple random sampling technique. Sample size was calculated keeping in mind; 1) strength of class i.e. 339 students, 2) 5% margin of error, 3) 95% confidence level and 4) 11.2% response distribution.[9] Cardio metabolic diseases were defined as the following: CVD (ischemic heart disease, stroke, peripheral vascular disease), hypertension, diabetes mellitus, and dyslipidemias. Students known to be suffering from any of these diseases were excluded from the study. A specifically designed survey was used to note age, gender, BP, weight, height, waist and hip circumference. **Statistical Analysis:** Statistical analysis was performed using SPSS version 22. Chi[x] test and student t-test were used as tests of significance for comparing the two groups with reference to categorical and continuous variables, respectively. p<0.05 was considered significant.

RESULTS

Out of 106 participants, 79 (74.5%) were female and 27(25.5%) male. Mean age was 22±1.078 years. Mean systolic and diastolic blood pressure, BMI, WHtR, and WHR were 115.99 ±11.66 (mmHg), 77.5 ±8.56 (mmHg), 21.89±3.16 (kg/m^2), 0.47±0.054 and 0.799±0.075, respectively (Table 1). Gender based similar comparison is given in Table 2.

Table 1. Comparison of the two groups.

		Group-I (n=46)	Group-II (n=60)	P-value
Mean age (years)		22.03±0.73	21.96±1.4	0.71
Gender	Male	14 (30.4%)	13 (21.6%)	0.316
	Female	32 (69.5%)	47 (78.3%)	
Mean BMI (kg/m^2)		21.96±3.43	21.81±2.81	0.178
BMI > 23 (kg/m^2)		15 (32.6%)	20 (33.3%)	0.94
Mean WHR		0.79±0.08	0.81±0.07	0.434
WHR (> 0.88 in males and >0.80 in females)		14 (30.4%)	29 (48.3%)	0.03*
Mean WHtR (%)		0.46±0.052	0.48±0.056	0.367
WHtR > 0.55		15 (32.6%)	24 (40%)	0.44
Mean systolic blood pressure (mmHg)		115.76± 12.62	116.16±10.98	0.549
Systolic blood pressure > 120 (mmHg)		13 (28.2%)	12 (20%)	0.33
Mean diastolic blood pressure (mmHg)		77.19±8.47	77.73±8.69	0.713
Diastolic blood pressure > 80 (mmHg)		8 (17.3%)	14 (23.3%)	0.46

Table 2. Gender based comparison.

	Males (n = 27)	Females (n = 79)	P – value
Positive family history of cardiovascular diseases	13 (48.14%)	47 (59.5%)	0.316
Mean age (years)	22.04±1.16	21.99±1.05	0.83
BMI > 23 (kg/m^2)	12 (51.85%)	21 (26.58%)	0.016*
WHR >0.88 in males and >0.80 in females	7 (25.9%)	36 (45.5%)	0.05
WHtR >0.55	10 (37.03%)	29 (36.7%)	0.57
Systolic blood pressure >120 (mmHg)	15 (55.55%)	10 (12.56%)	0.00*
Diastolic blood pressure >80 (mmHg)	10 (37.03%)	12 (15.18%)	0.019*

DISCUSSION

We found >50% of students had a positive family history of cardiometabolic diseases. The study participants were divided into two groups; 1) Group I - with negative family history of cardio metabolic disease; 2) Group II- with positive family history of cardio metabolic disease.[10] Blood pressure (BP), weight, height, BMI, and waist-hip ratio (WHtR) of each study participant were noted in a standard way.[11] Systolic and diastolic blood pressures were classified abnormal if these were >120 (mmHg) and >80 (mmHg), respectively. Participants with BMI > 23 (kg/m^2) were categorized as overweight/obese.[12] WHR was considered abnormal if it was >0.88 in males and >0.80 in females.[12] WHR > 0.5 was considered abnormal.[13] Coronary heart disease, stroke, hypertension, and diabetes are diagnosed at earlier ages in persons with positive family history.[15] Siblings of patients suffering from cardio metabolic diseases have a 40% chance of developing cardiovascular diseases while their children have a 60-75% chance.[16]

In a Pakistani study in a public sector medical college, obesity and overweight status was determined using a BMI ≥23.0 (kg/m^2). 14.7% of participants were overweight and 12.7% were obese and more males were overweight or obese compared to females.[18] In another study, 21% of

medical students were obese with a BMI ≥25.0 (kg/m^2).[19] BMI of males is generally higher than females.[20]

We found that 33.3% of our study participants with a positive family history had a BMI >23 (kg/m^2). WHR is a measure of abdominal obesity. It is generally greater in females.[21] There is an inverse relationship between WHR and cardiometabolic risk.[22] Additionally, females have a higher chance of myocardial infarction with increased WHR compared to males.[22]

In our study, statistically significantly higher percentage i.e. 48.3% of participants with a positive family history had a WHR >0.88 for males and >0.80 for females. WHtR of >0.5 is considered a more favorable parameter for obesity evaluation compared to other anthropometric variables as it is neither race nor gender specific.[13] Hypertension is a prime risk factor for stroke and coronary artery disease and hypertensive patients with a positive family history of hypertension are more likely to have complications.[23]

CONCLUSION

Final year MBBS students with and without family history of cardiometabolic diseases differ significantly in terms of waist-hip ratio only when compared with reference to body-mass index, waist-hip ratio, waist-height ratio, and blood pressure.

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