CARDIOVASCULAR DISEASE AND DIABETES RISK SCORE AMONG UNDERGRADUATE MEDICAL STUDENTS IN KHYBER PAKHTUNKHWA: A CROSS SECTIONAL SURVEY

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ABSTRACT

Objective: *To determine the prevalence of risk and risk factors of CVDs and diabetes among the undergraduate medical students of Khyber Pakhtunkhwa Pakistan.*

Materials and Methods: *900 students were sampled from nine medical colleges of KPK. A cross-sectional study was completed amid the instructive year of 2019 at Northwest school of medicine (NWSM), Peshawar. The ethical protocol was pursued and purposive and multistage sampling techniques were utilized. Data was collected through a questionnaire based on Framingham risk score for CVDs and Findrisc scale for diabetes risk among undergraduate medical students.*

Results: *The results showed that 2.3% of undergraduate medical students are at high risk of whereas 12.4% are at moderate risk developing CVDs. 6.3% of students are at high risk while 34% are at moderate risk of developing diabetes. 95% of students have good knowledge of risk factors for developing CVDs and diabetes.*

Conclusion: *Students are more prone to developing diabetes than cardiovascular diseases which require serious attention. Projects should be initiated to bring awareness about CVD risk factors.*

Keywords: *Cardiovascular diseases, Diabetes mellitus, Medical students, Risk factors*

INTRODUCTION

Non communicable diseases are increasing day by day globally especially underdeveloped countries are at high risk.[1] The World Health Organization (WHO) records cardiovascular diseases (CVD) and diabetes as the fundamental drivers of mortality and morbidity in both developed and underdeveloped nations. It is estimated that about 17.3 million people died as a result of CVDs. It is estimated that by the year 2020, it would account for at least 32% of mortality worldwide.[2] In Pakistan, Cardiovascular diseases are responsible for 46 percent deaths in males and 38 percent in females.[3] The worldwide increase in CVDs is driven by both urbanization and its related way of life adjustments.[4] Pakistan is no exception either and is encountering a higher increase in frequency and mortality rates from CVDs. Risk factors, for example, sex, genetics, and age are viewed as non-modifiable; therefore, there is no way to cope with these factors. However, the World Heart Federation lists, tobacco use, diabetes, physical inactivity, unhealthy dietary intake, hypertension, blood lipids profile, high Body Mass Index (BMI), as modifiable risk factors.[5] The development of CVDs in a person is can be due to presence of these risk factors since childhood, which whenever controlled can decrease the risk of development of full blown disease later in life. It is estimated that risk factor profiles in young adults (18–25 years of age) emphatically predict long-term chance of developing CVD. Almost half of young adults of

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age group 18-25 years are said to have at least one risk factor to develop cardiovascular disease later in life.[6] Understanding the size and types of CVD risk factors among young adults is a significant aspect in setting up focused interventions, before the disease happens, through promoting lifestyle changes.[6,7] Despite these well-established risk factors, there have been no risk assessment or profiling in young adults and subsequent disease counteractive action efforts to target this age group.

Moreover, according to World Health Organization (WHO), 422 million individuals worldwide had diabetes in 2014, and the predominance of individuals with diabetes is expected to increase twofold between the years 2000 and 2030.[8,9] The risk factors of diabetes and CVDs are almost the same. Identifying young people (18-25 years age) with risk factors for or undiscovered Type 2 diabetes mellitus (T2DM) is a general health need since the progression to complicated T2DM can be impeded or ceased with lifestyle alterations or pharmacological interventions.[10] The previous studies on this topic worldwide have mainly focused on the adult population whereas scanty studies are conducted on young adults especially in nations like Pakistan.

The alarming fact is that CVDs and diabetes have been diagnosed very frequently in young adults, specifically the age group of 18-25 years. The young adults, who grew up with the web and internet-based life, may vary from their elders in terms of awareness, lifestyle, sustenance propensities, physical activity and other habits. In the present study, therefore, we aimed to determine the prevalence of risk and risk factors for cardiovascular diseases and diabetes as well as the awareness about these risks among young undergraduate medical students in Khyber Pakhtunkhwa (KPK).

MATERIALS AND METHODS

A cross-sectional study was conducted during the educational year 2018/2019 after the study was approved by the Institutional Review Board (IRB) of the Northwest School of Medicine (NWSM). A properly signed consent based on WHO protocol was taken from every member upon his/her acknowledgement to take part in the research study. Appropriate permission was obtained from all the administrative authorities to collect data from their respective medical colleges.

The inclusion criteria were all the medical students enrolled in different medical colleges of KPK. We used the purposive and multistage sampling techniques to select nine medical colleges for this study. Our sample size was nine hundred students with one hundred students from each selected medical college and 20 students from each year of study i.e. from 1st year to final year MBBS. The sample size was calculated according to (WHO) sampling and applying finite population correction method.

Data was collected using a comprehensive self-administered questionnaire containing five sections. The first section was consent form, second part was demographics section, third was Framingham risk score, fourth part consisted of Findrisc diabetes risk score and the fifth section consisted of questions to assess awareness of the participants regarding CVDs and diabetes.

Each filled questionnaire was first analyzed separately online using Mayo clinic CVD risk calculation tool (based on Framingham Heart Study General Cardiovascular Disease 10-Year BMI-Based Risk Score Calculator for CVD risk of each individual. Similarly, Findrisc (Finnish Diabetes Risk Score) online tool was used for calculating diabetes risk score of the students to assess their risk of developing diabetes in the next 10 years. The individual Framingham risk score for CVDs and Findrisc score for diabetes of students was then analyzed using SPSS (version 21). The knowledge and awareness of undergraduate medical students regarding CVDs and diabetes was assessed asking them 11 questions and analyzed using 5 points Likert scale with maximum score anticipated 55 and minimum 11, the cut-off point was set to be 33 points. Descriptive analysis was done, and means were calculated for continuous data such as age, height, weight and BMI of medical students. Frequencies and percentages were calculated for categorical data such as gender, socioeconomic status and family history. Association between demographic data of students and the risk factors of Diabetes and CVDs were cross tabulated by Chi Squared test.

RESULTS

Of the 900 participants, 386 (42.9%) were male and 514 (57.1%) were female students. The mean age was 20.84 ± 1.0 and mean BMI recorded was 21.49kg/m2. Overall, 9% students were either

overweight (BMI 25.0–29.9 kg/m2) or obese (BMI ≥ 30 kg/m2).

Five male and four female students reported that they were currently suffering from heart related disease (1%), however, eight male and three female students (1.2%) were suffering from diabetes. The family history of diabetes showed that in 40.6% of students had their 1st degree relatives suffering from diabetes, whereas, 10.6% students reported that diabetes was present in their 2nd degree relatives. Moreover, family history of cardiovascular diseases at age <55 years was present in 169 students out of which 85 were male students and eight were females (19%). For physical activity, 635 (70.5%), 404 male and 230 females, students were physically inactive, whereas 155 male and 110 female (total 29.5%) students were physically active (at least 150 minutes of aerobic activity or 75 minutes of vigorous aerobic activity a week or 30 minutes of moderate activity daily). 181 female and 122 male students (total 33.7%) were having more vegetables and fruits in their diet whereas 333 female and 264 male students (66.3%) were having more saturated fats and sugars in their daily dietary intake. We also found out that 11% students (72 males and 27 females had been smoking in the past 12 months. (Table 1).

The cardiovascular disease risk score of students based on Framingham scale showed that 21 (2.3%) undergraduate medical students are at a high risk of developing a cardiovascular disease in the next 10 years. 112 (12.4%) undergraduate medical students are at moderate risk, 153 (16.8%) at low risk, whereas, 614 (68.2%) students are at a very low risk of developing any cardiovascular disease in the next 10 years. The gender wise CVD risk score of students is showed in table 2.

The diabetes risk score of undergraduate medical students based on FINDRISC scale showed that 57 (6.3%) undergraduate medical students are at high risk and 306 (34%) students are at moderate risk of developing diabetes types 2 in the next 10 years. However, 340 (37.7%) students are at low risk and 197 (21.8%) students have very low risk of developing diabetes in the next 10 years. The gender-wise diabetes risk score is shown in table 3.

The knowledge and awareness of undergraduate medical students about the risk of Diabetes and Cardiovascular diseases showed that 95% of students had good knowledge about the risk factors of diabetes and cardiovascular diseases, whereas only 5% of students had poor knowledge.

DISCUSSION

Cardiovascular diseases (CVDs) and type 2 diabetes mellitus (T2DM) are the most common chronic public health problems of both developed

Table: 1 The frequency of risk factors for CVDs and Diabetes among undergraduate medical students

Characteristics	Frequency		Total Percentage
	Female	Male	
Students suffering from Heart Disease	5	4	1%
Family history of Heart disease (less age)	85	86	19%
Students suffering from Diabetes	8	3	1.2%
Family history of Diabetes	172	288	51.1%
Smoking in the last 12 months	72	27	11%
Physical inactivity	230	404	70.5%
More saturated fats and sugars intake	264	333	66.3%
More fruits and vegetables intake (daily)	122	181	33.7%

Table: 2 Gender-wise CVDs Risk Score of Undergraduate Medical Students based on Framingham Scale

CVDs Risk score	Very low	Low	Moderate	High	Total
Male	244(27.1%)	76(8.4%)	53(5.8%)	13(1.4%)	386
Female	370(41.1%)	77(8.5%)	59(6.5%)	8(0.8%)	514
Total	614(68.2%)	153(16.8%)	112(12.4%)	21(2.3%)	900
More fruits and vegetables intake (daily)	122	181	33.7%	33.7%	33.7%

Table: 3 Gender-wise Diabetes type 2 Risk Score of Undergraduate Medical Students based on based on Findrisc Scale

Diabetes Risk score	Very low	Low	Moderate	High	Total
Male	101(11.2)	136(15.1%)	124(13.7%)	25(2.7%)	386
Female	96(10.6%)	204(22.6%)	182(20.2%)	32(3.5%)	514
Total	197(21.8%)	340(37.7%)	306(34%)	57(6.3%)	900

and developing countries, with the later carrying the double burden of both communicable and non-communicable diseases. Evidences from research shows that both CVDs and T2DM are preventable provided proper lifestyle modifications are adopted by those at risk. Globally, different risk calculating validated tools are used to identify those at risk of developing CVDs and T2DM so as to devise and implement appropriate strategies and interventions to prevent or at least decrease those risks.

To the best of our knowledge, this is the first preliminary study conducted among nine major medical colleges of Khyber Pakhtunkhwa (KPK) to assess the risk of undergraduate medical students to develop cardiovascular diseases and diabetes in the future, based on the most popularly accepted tools such as Framingham risk score scale for CVDs and Findrisc (Finnish Diabetes Risk Scale) for diabetes. All CVD and Diabetes risk factors including dietary intake, physical activity, smoking, family history, past medical history of diabetes and CVDs and BMI of students were assessed. The CVD and diabetes risk scores of undergraduate medical students were calculated online first and then analyzed through SPSS version 21 to identify those at high, moderate, low and very low risk of developing CVDs and diabetes later in life.

The cardiovascular disease risk score of undergraduate medical students in Khyber Pakhtunkhwa Pakistan, based on Framingham scale, showed that 21 (2.3%) were at a high risk, 12.4% students are at moderate risk, 16.8% students are at low risk while 68.2% students are at very low risk of developing a cardiovascular disease in the next 10 years. However, the diabetes risk score of undergraduate medical students based on FINDRISC scale showed that 57 (6.3%) were at a high risk while 306 (34%) students are at moderate risk of developing diabetes type 2 in the next 10 years.

A study conducted in Jordan showed that almost 50% of Jordanian medical students have moderate risk of developing the diabetes in future.[12] More-

over, in Helsinki Finland, investigating the general community's risk of developing CVDs and diabetes, it is reported that 66% of men and 70% of ladies with a moderate or high FINCRISC score ended up having undiscovered Type 2 diabetes mellitus.[13] In the United States of America (USA), it is reported that more than half of the youth population have somewhere around one factor that places them in danger of developing diabetes.[14] These findings, from previous studies on more or less the same lines, show very high risk of CVDs and diabetes among younger populations based on the Framingham and Findrisc scales. Whereas, in our study we have found out that 34% students are at moderate risk and 6.3% students are at high risk of developing diabetes types 2 and only 21 (2.3%) were at a high risk of developing a cardiovascular disease in the future. These findings from our study, albeit alarming, however, are still with lower risk of CVDS and diabetes among younger people from a developing country. These fndings are in accordance with another study conducted in the USA and found that the Framingham Risk Score was around 10% (moderate and high scores) for all the Chicago Heart Association Detection Project in Industry - anticipated risk among the 18 to 29-year-old people.[16]

We also assessed the risk factors profile of undergraduate medical students for development of CVDs and diabetes in future. Obesity is a major risk factor for developing CVDs and diabetes and our study found out that 9% of undergraduate medical students were overweight or obese. A Prevalence of 26.8% was reported among the medical students from various medical colleges of the Middle East.[12] Again, our study shows overall lower rate of high BMI in medical students compared to their counterparts in Middle East. Furthermore, our investigation demonstrated that dietary risk factor of CVD was evident from high consumption of fats and sugary materials among medical students (66.3%) and low intake of vegetables and fruits (33.7%). A study in Saudi Arabia found that only 20.1% of undergraduate medical students were consuming vegetables and

fruits almost 6–10 times/week.[7] Likewise, Larson et al 2008, found that 24% of male and 21% of female teenagers in Minnesota reported low intake of vegetables and fruits.[15]

Moreover, our findings showed that the 11% of students had been smoking in past 12 months. Comparing our results to other similar studies, we found out that Sabra et al 2007 reported that about 19% of medical students were smokers in their study.[7] This is in contrast to our findings with relatively lower frequency of smokers in our medical students' community.

The knowledge and awareness of undergraduate medical students of KPK about the risk factors of Diabetes and Cardiovascular diseases showed that 95% of students had good knowledge about the risk factors of diabetes and cardiovascular diseases, whereas only 5% of students had poor knowledge. Similarly, a study conducted in Serbia for the knowledge of risk factors of CVDs and Diabetes showed that 90.21% were well aware about risk factors of these ailments.[17] These findings are in accordance to our study results and the higher level of education and awareness regarding risk factors for CVDs and diabetes could be due to the medical background among these students. This recognition and prevalence of risk factors for CVDs and diabetes among undergraduate medical students would prove beneficial in successfully tailoring their lifestyle modifications to reduce these risk factors among them.

LIMITATIONS

Our study had certain limitations too. As in many diabetes and CVD risk assessment studies about the hazard appraisal was put together both with respect to objective and subjective evaluations. In this way, it is conceivable that participants underreported propensities which are seen as negative, as physical dormancy, smoking habits and other habits which are not considered good in the community. Second, we didn't gauge fasting blood glucose and proper lipid profile in all students due to lack of resources. Further studies are needed to validate risk scores based on clinical investigations. The fundamental quality of this study was the extensive sample size and the high response rate, from nine medical colleges of KPK including both public sector and private sector medical colleges, which presumably implies that it represents the entire medical students' population.

CONCLUSION

In conclusion, we have shown that risk factors for Type 2 diabetes mellitus and cardiovascular diseases are common in a young student population in Khyber pakhtunkhwa. Especially, an alarmingly high prevalence of T2DM risk factors revealed among medical students. The FINDRISC scale and Framingham scale appears to be suitable tools to identify high-risk individuals in this age group (18). Lack of exercise, fewer intakes of fruits and vegetables, more intakes of saturated fats and sugars, chronic smoking and high BMI appeared to be major risk factors among the students. In spite, having good theoretical knowledge about the hazards still the risk factors of CVDs and DIABETES are increasing day by day especially in young population, so we recommend that Health institutes should arrange Public Health seminars and Educational interventions on awareness of this problem. Besides this, students should be self conscious about their health in terms of physical activity and diet. It is the need of the day to bring awareness about risk factors of CVDs and diabetes and coping strategies among the general population as incidence of these diseases are increasing day by day.

ACKNOWLEDGMENTS

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