

Cardiovascular Risk Factors among First Year Medical Students

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ABSTRACT:

Introduction: Detection of cardiovascular risk in young age is important to motivate them to modify life styles and seek health care early to lower the chances of acquiring cardiovascular disease in later age. This study was done to assess cardiovascular risk factors among first year medical students. **Methods:** A cross-sectional study was conducted throughout September and October 2017 in which all first year medical students from a medical college were assessed for the presence of cardiovascular risk factors. Participants' demography, family history of illness, anthropometric measurements, and blood reports of lipid profile and fasting glucose were acquired. Data were analyzed with Statistical Package for Social Sciences (SPSS-21). **Results:** There were 99 participants; 55 males and 44 females. One or more risk factors were present in 87 (87.9%) participants. Moreover, 67.7% ($n = 67$) participants had more than one risk factors. Low HDL-cholesterol was the most common ($n = 55$, 55.6%) risk factor followed by elevated triacylglycerol ($n = 47$, 47.5%) and family history of hypertension ($n = 45$, 45.5%). There was no significant difference in presence of various risk factors between genders. **Conclusion:** There was higher prevalence of cardiovascular risk factors among first year medical students. Majority of them had more than one risk factors. Low HDL-cholesterol was the most common risk factor. The risk factors were comparable in males and females.

Keywords: cardiovascular disease • medical student • prevalence • risk factor • risk assessment

INTRODUCTION:

Cardiovascular diseases (CVDs) have remained the leading causes of global death in the last 15 years which take the lives of 17.7 million people every year. According to world health organization, it is responsible for 31% of all deaths worldwide with 75% of total CVD deaths take place in low- and middle-income countries.[1] It is anticipated to rise

to 23.3 million by 2030.[2]

Nepal is also facing increasing incidence of cardiovascular disease but the actual burden and trends of disease is unknown. Combined data from different sources indicate the problem is common.[3] A hospital based prevalence of non-communicable disease from different hospitals across the country found cardiovascular disease as the most common (40%) among non-communicable diseases.[4]

Risk factors for this disease such as hypertension, dyslipidemia, diabetes, smoking, and obesity are controllable. The development of risk factor in early life often persist into adulthood making it an ideal time to target cardiovascular disease prevention. More recent 2013 ACC/AHA CVD assessment guidelines also support the need for risk assessment early in life to motivate lifestyle changes in younger individuals who may be at low short term risk but who could benefit from long term risk assessment.[5] The present study on medical students is of particular interest as they are future

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physicians and role models of the society.

The objective of this study was to identify prevalence of cardiovascular risk factors among first year medical (MBBS) students and motivate them to reduce those factors, if any, to prevent themselves from cardiovascular disease in future.

METHODS:

This observational, cross-sectional, and analytical study was carried out in Department of Biochemistry, Lumbini Medical College Teaching Hospital throughout the month of September and October 2017. The study was approved by Institutional Review Committee of the hospital. Data were collected prospectively.

All first year medical student (MBBS) of Lumbini Medical College were included in the study. Those who were already diagnosed as having cardiovascular disorder were excluded. Also, those who did not consent or were not available throughout the study were excluded.

Data were collected once a week during a class hour. Data from the absentees were collected on subsequent weeks until all students were included. Students were explained in detail each week by the principal author about the nature of the study and confidentiality was assured. Consent was obtained from each participants. A questionnaire containing the study variables was given to each student to be examined that day. Study variables were: Age, sex, weight, height, waist circumference, blood pressure, smoking, regular alcohol consumption, lipid profile, fasting blood sugar, and family history of hypertension, cardiovascular diseases, and diabetes mellitus.

Students were supposed to fill in the information like age, sex, smoking, alcohol intake, and family history of diseases themselves. Measurement of height, weight, waist circumference, blood pressure, and blood parameters were done by the researchers.

Anthropometric measurement:

This was carried out at the Department of Physiology in Lumbini Medical College. Height and weight were determined with participants in light clothing and without shoes. Body Mass Index (BMI) was calculated as weight in kg divided by the square of the height in meters (m²). Waist circumference was measured by placing a measuring tape around the

waist just above the uppermost lateral border of the iliac crest. Blood pressure was measured in clothless left arm with manual sphygmomanometer with subjects sitting in a chair with feet on the floor and arm supported at heart level.

Laboratory measurement:

After an over-night fast, five ml of venous blood sample were drawn from each participant for measurement of serum glucose and lipid profile. The estimation was performed by using enzymatic reagent manufactured from Benesphera with the help of Robochem Autoanalyzer. Serum glucose was measured by glucose oxidase peroxidase method. Serum total cholesterol by CHOD-POD method, serum triacylglycerol by GPO-POD method and HDL-Cholesterol (HDLc) by PEG-PA method were used for estimation. Serum LDL-Cholesterol (LDLc) was calculated by **Friedewald formula:**

$$\text{LDLc} = \text{Total Cholesterol} - \text{HDLc} - \text{Triacylglycerol}/5$$

Definition of cardiovascular risk factor:

The following cut-off values were used to define cardiovascular risk among the students:-

- Smoking: daily smoking of cigarette,
- Alcohol intake: consumption of alcohol three or more times a week,
- Blood pressure:-
 - ◆ systolic ≥ 140 mmHg; diastolic ≥ 90 mmHg,
- BMI ≥ 23 , [6]
- Waist circumference ≥ 90 cm (male) and ≥ 80 cm (female), [7]
- Dyslipidemia was defined by presence of one or more of the followings:- [8]
 - ◆ Triacylglycerol ≥ 150 mg/dl
 - ◆ Total Cholesterol ≥ 200 mg/dl
 - ◆ LDLc: ≥ 130 mg/dl
 - ◆ HDLc: ≤ 40 mg/dl
- Family history of cardiovascular disease,
- Family history of hypertension,
- Family history of diabetes mellitus.

All data collected in the questionnaire were entered into Microsoft Excel™ 2007 and analysis was done with Statistical Package for Social Sciences (SPSS™ version-21) for Windows™ (SPSS Inc.; Chicago, IL, USA). Data were presented as percentage, frequency, mean, and standard deviation. Categorical data were analyzed with Chi-

square test, mean were compared with student *t-test*. *P* value less than 0.05 was considered statistically significant.

RESULT:

There were a total of 100 students; however, one student could not be contacted throughout the study period. Hence, 99 students were enrolled in the study. Mean age of the participants was 19.74 years (*SD* = 0.98). There were 55 (55.6%) male and 44 (44.4%) female students.

One or more cardiovascular risk factors were present in 87 (87.9%) participants. There were only 12 (12.1%) participant who did not have any cardiovascular risk factors. Moreover, 67.7% (*n* = 67, *N* = 99) students had more than one risk factors. Distribution of the number of risk factors among the participants is presented in Fig 1.

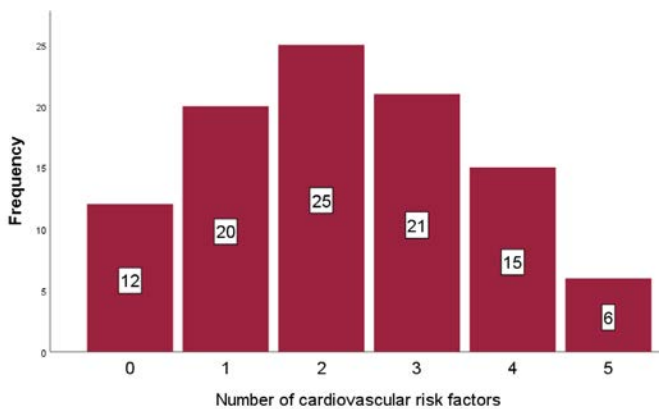


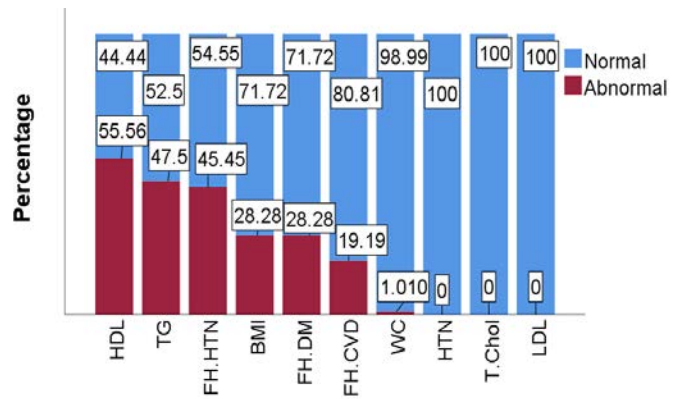
Fig 1: Distribution of number of cardiovascular risk factors among participants

Low HDL cholesterol was the most common (*n* = 55, 55.6%) cardiovascular risk factor. Frequency of other risk factors is presented in Fig 2. There was one smoker and no one who regularly took alcohol.

Gender-wise analysis of presence of risk factors is presented in Table 1. There was no significant difference in presence of risk factors between male and female students. Thus, the risk factors were equally likely to be present in each gender.

DISCUSSION:

The aim of this study was to identify the prevalence of cardiovascular risk factors among the first year medical (MBBS) students. It is important to seek those risk factors in this population because



Risk factors found in study population

FH - family history; HTN - hypertension; DM - diabetes mellitus; CVD - cardiovascular disease; WC - waist circumference; T - total; Chol - cholesterol

Fig 2: Figure showing frequency of various cardiovascular risk factors among participants (*N* = 99)

Table 1: Relationship between risk factors and gender (*N* = 99)

Variables		Male <i>n</i> (%)	Female <i>n</i> (%)	Stats
BMI	normal	39 (70.9)	32 (72.7)	$\chi^2=0.04,$ $p=0.84$
	abnormal	16 (29.1)	12 (27.3)	
Waist Circumference (cm)	normal	55 (100)	43 (97.7)	$\chi^2=1.26,$ $p=0.26$
	abnormal	0	1 (2.3)	
Hypertension	absent	55 (100)	44 (100)	
	present	0	0	
Impaired fasting glucose	absent	55 (100)	44 (100)	
	present	0	0	
Triacylglycerol	normal	29 (52.7)	23 (52.3)	$\chi^2=.002,$ $p=0.96$
	abnormal	26 (47.3)	21 (47.7)	
Total Cholesterol	normal	55 (100)	44 (100)	
	abnormal	0	0	
HDL	normal	22 (40)	22 (50)	$\chi^2=0.99,$ $p=0.32$
	abnormal	33 (60)	22 (50)	
LDL	normal	55 (100)	44 (100)	
	abnormal	0	0	
Family history of CVD	Yes	9 (16.4)	10 (22.7)	$\chi^2= 0.64,$ $p=0.42$
	No	46 (83.6)	34 (77.3)	
Family history of hypertension	Yes	24 (43.6)	21 (47.7)	$\chi^2= 0.16,$ $p=0.68$
	No	31 (56.4)	23 (52.3)	
Family history of diabetes	Yes	17 (30.9)	11 (25)	$\chi^2= 0.42,$ $p=0.52$
	No	38 (69.1)	33 (75)	

all of them are young adults pursuing their medical career and early detection of risk factors within themselves will enlighten them for preventive measures for themselves and for others. Many cardiovascular risk factors surface in adolescence and track forward to adulthood.[9]

In agreement with different national and international articles, the data from the present study showed considerable prevalence of cardiovascular risk factors among medical students. We found that 87.9% ($n = 87$, $N = 99$) of the participants had one or more risk factors. This is in contrary to the common belief that young people in their teens and early twenties are very less likely to have cardiovascular risk factors. Another study by Kuklina EV. et al. also found a high prevalent of cardiovascular risk factors in young adults but it was lower (59%) as compared to our finding.[10] The severity of asymptomatic coronary and aortic atherosclerosis in young people has been found to be increased with increasing number of risk factors.[11]

A family history of cardiovascular disease, hypertension, and diabetes mellitus was reported by many participants. A study carried out by Dunkley AJ. et al revealed a greater prevalence of cardiovascular risk factors in relatives of individuals with cardiovascular disease when compared with those without family history of these diseases.[12]

Anthropometric variables have extensively been shown to predict cardiovascular risk.[13] A combination of BMI and central obesity could have the best clinical utility in identifying patients with cardiovascular disease risk factors among adult patients.[14] So, we used BMI for obesity and waist circumference for central obesity in our study. After adjusting of cut-off value for BMI and waist circumference, we found 28.3% ($n = 28$, $N = 99$) of participants had higher BMI than the cut-off value and 1% ($n = 1$, $N = 99$) had greater waist circumference than the cut-off. BMI in male and female was comparable ($p = 0.84$). In contrast, a cross sectional study conducted by Kutty NAM et al. found higher BMI in males as compared to that in females.[15] Similarly, a study conducted in Nigerian University by Johnson OE et al. reported higher BMI in female participants as compared to that in male.[16]

The impact of dyslipidemia on cardiac function and its economic consequences makes it a major public health concern worldwide. Increased lipid parameters like triacylglycerol, total cholesterol, LDL-cholesterol, and decreased HDL-cholesterol are considered as dyslipidemia and its association with cardiovascular disease in later decades was confirmed by previous studies.[17] Reduced HDL-cholesterol was the most common (55.6%, $n = 55$) cardiovascular risk in our study.

Similar result was also found by Pyakurel M. et al. at Nepalgunj, Far-western Nepal.[18] The prevalence of elevated triacylglycerol was 47.47% ($n = 47$) in our study which was much higher than that in the study conducted at Nepalgunj (8.9%). Higher level of triacylglycerol among male and female were also reported by other studies.[7,19]. The prevalence of abnormal total cholesterol and LDL-cholesterol were not found among our participants. Dyslipidemia early in life is directly related to pathological changes and functional abnormalities of cardiovascular system and strongly predicts CVD in adulthood.[9] The medical students are mostly members of affluent society. They usually live a sedentary life and also they experience several physical and mental stress due to their duties. All of these contribute to risk factors of CVDs.[7]

Limitations of this study include a small sample size which cannot represent general population, limited dietary questionnaire for understanding dietary habits, and no data on physical activities of the participants. Similarly, age of onset of cardiovascular disease in family was not recorded.

CONCLUSION:

There is a high prevalence of one or more cardiovascular risk factors among young medical students. Low HDL-cholesterol was the most common risk factor. A majority of them had multiple risk factors. The risk factors were comparable in males and females.

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Conflict of interest:

None declared.

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