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Ten-Years Cardiovascular Disease Risk Assessment among Health Camp Attendees

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ABSTRACT

Introduction

Cardiovascular disease burden has been increasing globally. The risk was greater in low-middle-income countries than in developed countries. The objective of the study was to assess the ten years CVD risk among the health camp attendees.

Methods

Physiometric measurement of the 159 participants was used as data. The major variables were height, weight, systolic blood pressure, gender, and smoking. WHO non-laboratory-based CVD risk chart was used to analyze data.

Results

The mean age (SD) of the participants was 45.64 (±13.97) ranging from 19 to 82 years. The majority of participants (99, 62.3%) were female, Brahmin/Chhetri (93, 58.5%), and 20 (12.6%) were smokers. The mean systolic BP (SD) was 121.84 (±19.3) mmHg ranging from 90 to 200, among this 62.9% of participants had less than 120 mmHg. Similarly, the mean body mass index (SD) was 25.3 (±5.1) ranging from 16.6 to 38.8, out of this 42.8% had a body mass index of 20-24. Regarding the ten years CVD risk of participants, the majority (76.1%) had very low CVD risk followed by 14.5% low risk, and 9.4% had a moderate risk. There was no high and very high CVD risk found among participants. Ten year CVD risk had strong positive relation (r=0.795) with age and a moderated positive relation (r= 0.519) with systolic BP at 0.01 level of significance.

Conclusion

CVD risk was lower among the participants who were female, non-smoker, systolic BP <140, and normal body mass index. Therefore, priority should be given to those who are smoker and abnormal SBP and BMI.

Keywords

Cardiovascular disease; health camp attendees; non-laboratory risk chart; risk assessment

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INTRODUCTION

Cardiovascular diseases (CVDs) are rapidly emerging diseases in this contemporary era. Though CVD was perceived as a disease in developed countries previously, however, the statement is being falsified by increasing trends of CVD in low-middle income countries.[1,] CVDs are caused by multiple risk factors which include tobacco use, harmful alcohol use, sedentary lifestyle, unhealthy diet, high blood pressure, high blood glucose, high body mass index (BMI), and high blood cholesterol.[3,4,5,6]

Personal level attributes such as age, sex, ethnicity, and family history of CVD also act as causative factors.[5,6] Identifying and addressing risk factors and categories of risk individuals at the right time would be helpful in the prevention of CVDs.[7,8] Risk prediction charts help to quantify CVD risk by considering multiple risk factors and categorizing individuals into high and low risk. [9,10] Non-laboratory based risk prediction chart is efficient in terms of resources and especially developed for the setting where laboratory facilities are no available and affordable.[11,12]

This study aimed to estimate ten-year CVD risk among the health camp attendees by using non–laboratory-based WHO CVD risk chart. The main purpose of this study is to identify individuals at 10 years' risk of CVD so that appropriate interventions, such as lifestyle changes or medication, can be initiated. This helps in the prevention of CVDs including heart attacks and strokes.

METHODS

A cross-sectional descriptive study was conducted among the participants of cardiothoracic vascular health camp attendees, which was organized by the Society of Cardiothoracic Vascular Nurses, Nepal at the premises of Kathmandu Municipality Ward no. 3 in February 2023. In the health camp, the data was collected among total 181 attendees; among them, 22 provided incomplete information, and they were excluded from the study. The socio-demographic (age, sex, marital status, education, religion, occupation, smoking status) and physiometric measurement (height, weight, and systolic blood pressure) were the major variables assessed among 159 participants for the data in this study.

In 2019, the World Health Organization (WHO) revised the 2007 CVD risk prediction chart with the help of a risk-chart working committee using data from 21 global regions.[12] The committee revised the two previous laboratory-based charts and proposed a new non-laboratory-based chart which was designed for low-resource settings like Nepal.[11,13] This chart predicts ten-year CVD risk using the information on age, sex, smoking status, systolic blood pressure, and body mass index. This tool is especially designed for the five south Asian countries (Bangladesh, Bhutan, India, Nepal, and Pakistan) by WHO, which is a standard tool.[11,12,13] Convenient sampling technique was adopted and a survey questionnaire was used for data collection. Data was coded manually before being entered into SPSS. Re-coding of the data was done according to the WHO CVD risk chart [13,14] which included age, sex, smoking, systolic blood pressure, and BMI categories of the participants.

There are seven categories for the age (40-44, 45-49, 50-54, 55-59, 60-64, 65-69, and 70 to 74 years), sex (man and woman), smoking status (smoker and non-somker), systolic blood pressure (<120, 120-139, 140-159, 160-179, ≥180 mm of Hg), and BMI (<20, 20-24, 25-29, 30-34, and >35). In reference of these categories, our data were tallied in the row and column reference values of the chart with age, sex, smoking status, systolic blood pressure and BMI of each participant. The non-laboratory-based CVD risk chart identified 5 risk groups: very low (<5%), low (5% to <10%), moderate (10% to <20%), high (20% to <30%) and very high (≥30%) risk.[11,12] We performed descriptive analyses to report the distribution of CVD risk. The descriptive (mean, frequency, percentage, range and standard deviation) and inferential (Pearson correlation calculation between CVD risk score with age, systolic blood pressure, and BMI) analysis was calculated as per the objective of the study. Consent was obtained from each participants before the collection of data. Ethical approval was obtained from the Institutional Review Committee of Institute of Medicine, TU. See figure 1 for non-laboratory based CVD risk chart.

RESULTS

The participants mean age was 45.64 with SD (±13.97) ranging from 19 to 82 years. Out of this, less than 39 years (35.8%), 62.3% were female participants, 58.5% represented Brahmin/ Chhetri. More than seventy-five percent (78.6%) of participants were married, and 91.2% belonged to Hinduism. The majority of participants (82.4%) had formal education, among them 39.6% had university degrees in their areas of interest. More than fifty percent (56.0%) of participants were employed, only 12.6% were smokers. (See Table 1 for details)

Similarly, the mean weight (SD) of the participants was 65.20 (±12.02) kg ranging from 32 to 93 kg. The mean height (SD) of the respondents was 157.9 (±20.3) cm ranging from 129 to 180 cm, and the mean diastolic BP (SD) was 81.1 (±12.3) mmHg ranging from 60 to 120.

The mean systolic BP (SD) was 121.84 (±19.3) mmHg ranging from 90 to 200, among this 62.9%

Table 1. Socio-demographic variables of the participants (n=159)

Variables	Frequency (%)
Age in years	
<39	57 (35.8)
40-49	46 (28.9)
50-59	26 (16.4)
60-69	18 (11.3)
>70	12 (7.6)
Gender	
Female	99 (62.3)
Male	60 (37.7)
Ethnicity	
Brahmin/Chhetri	93 (58.5)
Janjati	57 (35.8)
Madhesi	5 (3.1)
Dalit	4 (2.5)
Education	
Formal education	131(82.4)
Never formal education	28 (17.6)
Marital status	
Married	125 (78.6)
Unmarried	21 (13.6)
Widow	13 (8.2)
Religion	
Hindu	145 (91.2)
Buddhist	9 (5.7)
Christian	5 (3.1)
Occupation	
Employed	89 (56.0)
Unemployed	59 (37.1)
Retired	7 (4.4)
Students	4 (2.5)
Smoking status	
Non-smoker	130 (81.8)
Smoker	20 (12.6)
Do not want to reveal	9 (5.7)

of participants had less than 120 mmHg followed by 19.5% had 120 to 139 mmHg. The mean body mass index (SD) was 25.3 (±5.1) ranging from 16.6 to 38.8, out of this 42.8% had a body mass index of 20-24.9 followed by 36.5% had 25-29.9, and 15.1% had more than 30 BMI. (Table 2)

Regarding the CVD risk of the participants the

Table 2. Systolic blood pressure and body mass index of the respondents (n=159)

Variables	Frequency (%)
Systolic BP (mmHg)	
<120	100 (62.9)
120-139	31 (19.5)
140-159	23 (14.5)
160-179	2 (1.3)
>180	3 (1.9)
Body Mass Index (Kg/m^2)	
<19	9 (5.7)
20-24.9	68(42.8)
25-29.9	58 (36.5)
30-34.5	20(12.6)
>35	4(2.5)

majority (76.1%) had very low CVD risk followed by 14.5% low risk, and 9.4% had a moderate risk of CVD whereas, there is no high (20-<30%) and very high (≥30%) risk of CVD among the respondents (Table 3)

Table 3. CVD risk of participants (n=159)

Risk	Frequency (%)
<5% (very low risk)	121 (76.1)
5-<10% (low risk)	23(14.5)
10-<20% (moderate risk)	15(9.4)

Table 4 represented the data regarding CVD risk according to the age and sex categories. Majority 56 (35.2%) of the participants has very low ten

Table 4. CVD risk score according to age and sex of the participants (n=159)

Variables	Very low risk	Low risk	Moderate risk
Age			
<39	56(35.2)	1(0.6)	-
40-49	46(28.9)	-	-
50-59	16(10.1)	9(5.7)	1(0.6)
60-69	2(1.3)	13(8.2)	3(1.9)
>70	1(0.6)	-	11(6.9)
Sex			
Male	41(25.8)	14(8.8)	5 (3.1)
Female	80(50.3)	9(5.7)	10(6.3)

Table 5. CVD risk score with age, systolic BP, and BMI

Variables	CVD Risk Score	Age	Systolic BP	BMI
CVD Risk Score	1			
Age	.795** .000	1		
Systolic BP	0.519** .000	.331** .000	1	
BMI	.060 .456	.147 .067	.198* .013	1

years CVD risk which age less than 39. Similarly, female 80 (50.3%) were in very low ten years CVD risk than male. (Table 4)

In this study, Karl Pearson correlation for numerical and spearman correlation for categorical data was calculated to identify the relations between CVD risk with different variables (age, systolic BP, BMI, smoking and sex). CVD risk has a strong positive relation (r=0.795) with age and a moderated positive relation (r= 0.519) with systolic BP at 0.01 level of significance. However, there was no association of BMI, smoking, and sex with CVD risk. (Table 5)

DISCUSSION

In this study, 159 participants from a one-day cardiothoracic vascular health camp ages ranging from 19 to 82 were included to find out the ten-year CVD risk by using a non-laboratory CVD risk chart. This study reveals very low (<5%) to moderate risk (10 to <20%) of CVD for the ten years of camp attendees. Whereas, no participants have a high (20 to <30%) risk and very high (>30%) risk of CVD among the participants. This result predicts a very low to moderate level of ten-year risk of CVD.

The current study showed that 76.1% of participants had been at very low CVD risk. However, 9.4% of the participants had an elevated 10-year risk of CVDs (>10%). In contrast, the published national studies in western Nepal show an increased 10-year risk of CVD in the general population. Sitaula et al. 2023 reported that 35.4 % of the population had moderate to high risk of CVDs.[14] Similarly, Khanal et al. in 2017 also reported that 13.6% population had a moderate to high risk of CVDs.[15] In this study majority 80 (50.3%) of female participants were in very low risk for ten years CVD than in males. This finding was similar to a previous study conducted in western Nepal.[14,15]

This study also suggests less moderate to high (>10%) CVD risk in Nepal when compared to India (17%), China (3.9%), Pakistan (20.8%), Sri Lanka (5%), and Iran (6.2%).[16,17,18,19,20] We also found that males had moderate risk of CVDs was higher than in female. This is following previous studies reporting an increased risk of CVD in males than in females. [15,21,22] We found that the estimated risk is similar in the previous community-based studies done in Nepal and internationally. [14,15]

This study is limited to only participants who attended the one-day cardiothoracic vascular health camp and a non-probability sampling technique was used to collect data collection although inferential analysis was conducted. This also limits the generalizability of the study and may not reflect the true community prevalence. Although the WHO risk chart, used for estimating CVD risk is an effective tool for low-resource settings, it has its limitations. It lacks adjustment for the people who are taking antihypertensive medications during the calculation of CVD risk.[15] Additionally, this tool underestimates CVD risk among those with target organ damage and diabetic patients with complications.[17]

CONCLUSION

CVD risk was lower among the participants who were female, non-smoker, SBP <140 and within a normal range of BMI. Therefore, priority should be given to those who practice unhealthy behavior and abnormal SBP and BMI. Age higher than 40 years and systolic blood pressure more than 140 should be given higher priorities while planning the policies to prevent the risk of CVD. Further study should be conducted on this topic on a nationally representative sample.

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CONFLICT OF INTEREST

The author(s) declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

AUTHORS CONTRIBUTION

Pratima Khatri: Concept, proposal, ethical clearance, data analysis and article writing

Bhawana Regmi: Concept, data collection and article writing

Jamuna Tamrakar Sayami: Concept, proposal,

ethical clearance, data collection and analysis, article writing

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