

Assessment of Atherosclerotic Cardiovascular Disease Risk in Hypertensive Patient at Dhulikhel Hospital

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ABSTRACT

Introduction: Cardiovascular disease is the leading cause of death worldwide and the burden of which is rising in low and middle-income countries. Atherosclerotic cardiovascular disease risk scoring is a part of treatment guideline for hypertension and dyslipidemia management. **Aims:** This study is carried out to for the assessment of atherosclerotic cardiovascular disease risk among hypertensive patient. **Methods:** Hypertensive patients presenting to outpatient department were assessed for atherosclerotic cardiovascular disease risk and the 10 years risk score calculation was done using American College of Cardiology/ American Heart Association pooled cohort equation. **Results:** Out of total 212 patients 103 were male and 109 were female. 70 (33.02%) patients were smoker. The average systolic BP was 152 ± 18 mm Hg. Out of all hypertensive patients 164(77.36%) were receiving treatment and 48(22.64%) were newly diagnosed. Total of 76 (35.8%) patients were diabetic, 14 newly diagnosed. Total cholesterol was in the range of 367 mg /dl to 68mg/dl with mean 190 ± 35 mg/dl. HDL cholesterol range was 15 mg/dl to 78mg/dl with mean 42 ± 12 mg /dl. 10 years atherosclerotic cardiovascular disease risk was < 5% in 51(24.06%), 5 to < 7.5% in 34(16.04%), 7.5 to < 10% in 68(32.08%), 10 to <15% in 35(16.51%) and >15 % in 24(11.32%). **Conclusion:** From this study we can conclude that atherosclerotic cardiovascular disease risk among hypertensive population is considerable and risk score calculation should be a part of patient evaluation so that they can be managed appropriately and the future cardiovascular events can be prevented.

Keywords: Atherosclerotic cardiovascular disease, Dyslipidemia, Hypertension, risk score

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INTRODUCTION

Cardiovascular Disease (CVD) is the leading cause of death worldwide. In 2013, CVD caused an about 32% of all deaths and 13% of all disability adjusted life-years (DALYs) lost.¹ Presently low and middle-income countries are experiencing an alarming and accelerating increase in CVD.² CVD is largely driven by modifiable risk factors. Individual risk factors for CVD in 2013 were as follows: high BP, 54%; high cholesterol, 32%; overweight and obesity, 18%; dietary factor like salt, sugar or fat, 67%; and smoking, 18%. CVD being a multifactorial disease the contribution of each factor multiplies.³ The aim of management of risk factors in hypertension is to prevent the cardiovascular event. So it is important to know the actual risk.

The evidence of association of these risk factors have been proven in studies like Framingham study.⁴ With these evidences the latest guidelines on Hypertension and Dyslipidemia, both from American College of Cardiology (ACC) and European

Cardiac Society have advised to calculate ASCVD Risk Scoring as a part of treatment guideline. This helps clinicians to make rational judgement to start antihypertensive medicine, statin and aspirin and also avoids over treatment as well as under treatment.^{5,6} In context of Nepal, we have few studies on risk factors. In our clinical practice we hardly ever note down the total ASCVD Risk Score of an individual even though we may have calculated the risk.^{7,8} This study was done to signify the importance of calculating, recording and identify the burden of ASCVD Risk.

METHODS

It is prospective descriptive study done at Dhulikhel Hospital. Hypertensive patients presented without at established cardiovascular disease to cardiology OPD from August 2022 till September 2022 were included in the study. The patients demographic profile and ASCVD risk factors were noted down. Hypertensive patients were defined as those who were already

on medication for hypertension or any new patient whose BP was more than 140/90 mm Hg on at least two readings taken 5 minutes apart as per WHO recommendations.⁹ Diabetes was defined as those who were already on medication or anyone with FBS (fasting blood sugar) ≥ 126 mg/dl or HbA1C $\geq 6.5\%$ according to American Diabetes Association (ADA) recommendation.¹⁰ Morning blood sample was taken after at least 8 hours of fasting for FBS and lipid profile. Smoker is defined as someone who has smoked at least 100 cigarettes in lifetime or is currently smoking. Hypertensive patients aged between 40 to 80 years were included. Those who were not willing to participate and not willing to undergo required investigation for diabetes and dyslipidemia were excluded from the study. Once the required information was collected 10 years ASCVD risk score was calculated by ACC/AHA pooled cohort equation using application downloaded from ACC/AHA official webpage.¹¹

Gender	Male /Female
Age	years
Race	White / other African American
Total Cholesterol	mg/dL
HDL Cholesterol	mg/dL
Systolic BP	mm Hg
Receiving treatment for high blood pressure (if SBP > 120 mmHg)	No /Yes
Diabetes	No /Yes
Smoker	No /Yes

Risk Factors for ASCVD

By using standard formula 10 years ASCVD risk score was calculated and divided into categories of <5%, 5 to <7.5%, 7.5 to <10, 10 to <15% and >15%.

RESULTS

A total of 212 patients were included in the study. 103 were male and 109 were female. The largest number were in the age group 50-59. The average Systolic BP was 152 ± 18 mm Hg. Out of all hypertensive patients 164 (77.36%) were receiving treatment and 48 (22.64%) were newly diagnosed. Out of 164 patients 93 (56.7%) patients had systolic BP under 140 mm Hg. Total of 76 (35.8%) patients were diabetic, 14 newly diagnosed.

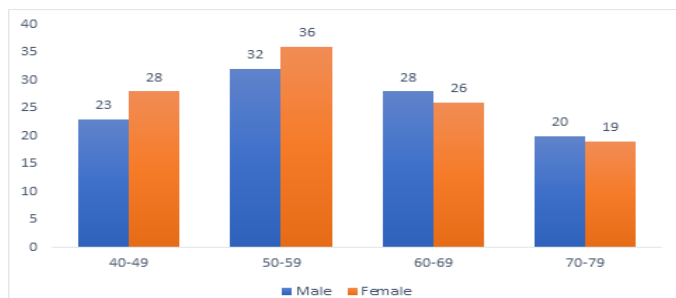


Figure 1: Gender and age distribution

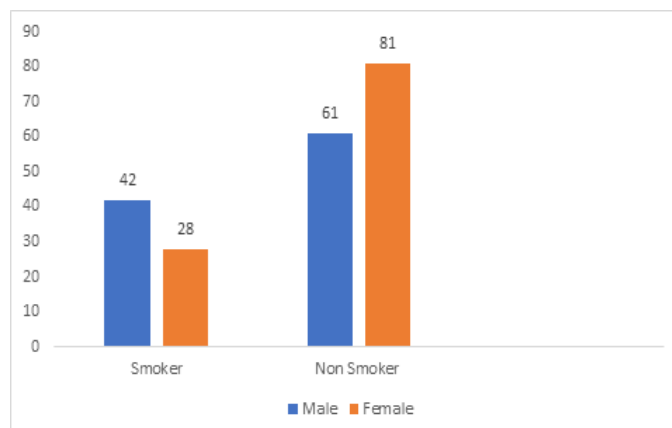


Figure 2: Smoker and Nonsmoker

Out of 212 patients 70 (33.02%) patients were smoker and among them 42 (40.78%) were male and 28 (25.67%) were female.

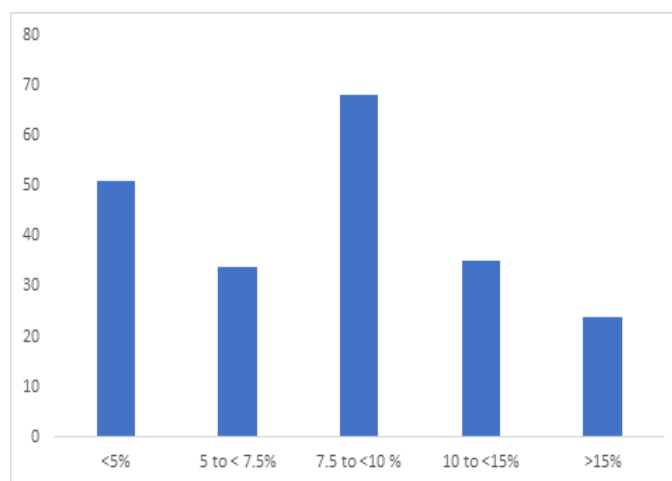


Figure 3: Distribution according to ASCVD risk score

10 years ASCVD risk was < 5% in 51 (24.06%), 5 to < 7.5% in 34 (16.04%), 7.5 to < 10% in 68 (32.08%), 10 to <15% in 35 (16.51%) and >15% in 24 (11.32%).

	Range (mg/dl)	Mean (mg/dl)
Total Cholesterol	68 to 367	190 \pm 35
HDL	15 to 78	42 \pm 12
LDL	34 to 256	130 \pm 22
TG	52 to 1342	221 \pm 43

Table 1: Lipid profiles of study population

DISCUSSION

The study found that 10 years ASCVD risk in hypertensive patient was considerable. Most of the patient were candidate for statin therapy according to the ACC/ AHA guideline for treatment of dyslipidemia. Only 24.06% had risk under 5% and 59.9% had risk more than 7.5%. In the study we found 33.03%

patients were smoker, 35.8% were diabetic.

Study done by Dhungana RR et al found 21.7 % smokers and 19.9% to be diabetic. In their study more than 10% 10 years CVD risk was seen in 14.6%.¹² In our study the number of smokers, diabetes as well as the CVD risk is higher in comparison to their study. However this difference is probably due to the fact that they studied the general population where hypertensive were 53.6 % where as we have all hypertensive patients visiting hospital to seek for medical advice. K Hasan et al did study in Pakistan and found total risk score (ASCVD) as less than 7.5 in 69.3%, 7.5–9.9 in 7.9%, 10–14.9 in 8.9%, 15–19.9 in 4.2% and greater than 20 in 9.8% of the subjects. Though our study shows greater CVD risk, again their study was in general population and our study was only among hypertensive patients. They had almost 50 % hypertensive patients. According to their study ASCD risk was higher in patient with systolic hypertension. We however did not compare the systolic and diastolic blood pressure.¹³

According to VP Menon et al in their study done in urban population of India, the 10 years ASCVD risk score was high in 26.1% subjects. This finding is similar to our study which shows 27.83 % have high ASCVD risk score.¹⁴ According to F Zibajeenejad et al study done in Iranian population demonstrated that 75.3% of the participants had low risk scores, whereas 13.2% and 2.5% of them had intermediate and high risk scores, respectively.¹⁵ In contrast to our study the difference could have been due to difference in ethnicity, study population healthy vs hypertensive and younger population in their study. However another study done in Iran by Motamed et al had findings which is similar to our study with 28.1 % having 10 years risk of CVD.¹⁶

Kandula et al conducted a community-based cohort study (MASALA study) they found that 49% of South Asian men and 13% of women had a high 10-year risk ($\geq 7.5\%$).¹⁷ Liu et al did a large scale study on Chinese hypertensive patients and enrolled total of 196,803 subjects. They found that 25.08% of subjects had high risk of 10-years ASCVD estimation. Both these studies were comparable to our study as both studies were done among the hypertensive patients.¹⁸

A survey carried out in Eastern and central Europe by G Grassi et al in 7860 hypertensive patients ASCVD high risk ranged from 24.5 to 32.5 % which is similar to our finding.¹⁹ The Chinese national survey showed about 9.5% of adults ranged 35 to 75 years had a high risk in future CVD, the proportion of 45 to 70 years old ranges from 12.6 to 17.7% and hypertension was the most prevalent risk factor among individuals with high risk.²⁰ Data from 12 high-income countries showed that the control rate in treated patients could be up to 70% or higher, as in Canada, United States and Germany.²¹ In contrast, only 10.3% of patients with hypertension achieved controlled BP because the medication rate was as low as 29.9% in low- and middle-income countries.²²

Though some studies have different finding^{12,13,15} than ours, many studies have similar findings to our study.^{14,16,17-19}

LIMITATIONS

Study population is small. The risk calculation considers the major traditional risk factors only. CVD events may be related to other novel risk factors as well and importantly we have applied the risk calculator designed by AHA/ACC which may not be completely replicable in our population.

CONCLUSION

From this study we can conclude that ASCVD risk among hypertensive population is considerable and risk score calculation should be a part of patient evaluation so that they can be managed appropriately and the future CVD events can be prevented.

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