

Prevalence of acute coronary syndrome among patients presenting with chest pain in a tertiary care cardiac centre.

Rabindra Simkhada¹, Arjun Budhathoki², Santosh Kumar Yadav¹, Keshab Raj Neupane¹, Manoj Koirala², Bishal Shrestha², Chitra Raj Sharma²

¹ Department of Cardiology, Shahid Gangalal National Heart Centre, Kathmandu, Nepal.

² Department of Cardiology, National Academy of Medical Sciences, Kathmandu, Nepal.

Corresponding Author: Dr. Rabindra Simkhada
Department of Cardiology, Shahid Gangalal National Heart Centre,
Kathmandu, Nepal.

E-mail: rsimkhada2001@yahoo.com

Phone: +977-9841249210

ORCID ID: 0000-0002-3704-0175

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Abstract

Background and aims: Chest pain is one of the common reason for hospital visit. Acute coronary syndrome is an important cause of chest pain. We aimed to study the prevalence of acute coronary syndrome among patients presenting with the chest pain and its association with common cardiovascular risk factors.

Methods: Observational study conducted at Shahid Gangalal National Heart Centre from 20th January 2022 to 25th March 2022 enrolling 112 participants consecutively. Participants were interviewed focusing history of hypertension, diabetes, smoking and nature of chest pain. The diagnosis of participants whether it was acute coronary syndrome or not were recorded. Prevalence of acute coronary syndrome was calculated. Linear regression analysis was done to see the correlation with tested variables.

Results: Mean age was 53.83±15.23 years. Seventy-five (66.96%) were male. Forty-two (37.5%) were hypertensive, 30 (26.78%) were diabetes and 26 (23.21%) were smoker. Fifty-six (50%) had nonspecific chest pain, 35 (31.25%) had atypical chest pain and 21 (18.75%) had typical chest pain. Among the participants 38 (33.93%) had acute coronary syndrome. Acute coronary syndrome showed positive correlation with age, gender, nature of chest pain, hypertension and smoking.

Conclusion: Acute coronary syndrome was one of the common cause of chest pain among participants. Age, gender, nature of chest pain, hypertension and smoking showed positive correlation with it. Patients with these risk factor needs strong suspicion of acute coronary syndrome and further workup for prompt diagnosis and management.

Keywords: Acute coronary syndrome; Chest pain; Risk factors.

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Introduction

Chest pain can be symptom of disease of multiple organs. Acute coronary syndrome (ACS) is considered one of the important differential diagnosis. As ACS has high mortality and morbidity, timely recognition is always rewarding. Moreover early identification of patients of ACS helps to initiate therapies and needful interventions promptly in required persons.¹

Ischemic nature of chest pain was found in various proportions in previous studies done in different settings. Close association were seen between traditional risk factors like age, gender, diabetes (DM), hypertension (HTN) smoking and family history of cardiovascular disease with diagnosis of ACS.^{2,3,4} Substernal chest pain provoked by exertion, relieved by rest or nitroglycerin classifies chest pain into typical if it has all three characteristics, atypical if it has two characteristics and nonspecific if it has less than 2 characteristics. Studies have shown typical anginal chest pain has a high risk for coronary artery disease (CAD) in all age groups; atypical anginal chest pain carries intermediate risk for CAD in women older than 50 years and in all men; and nonspecific chest pain carries intermediate risk for CAD in women older than 60 years and men older than 40

years.^{5,6} Studies have shown few of ACS patients can have atypical chest pain at presentation.⁷

We aimed to see frequency of ACS in patients presenting with chest pain in our set up and find its association with cardiac risk factors including age, gender, diabetes, hypertension, smoking and type of chest pain.

Methods

This was an observational study conducted at Shahid Gangalal National heart centre (SGNHC) Kathmandu Nepal from 20th January 2022 to 25th March 2022. Ethical approval was obtained from institutional review board (IRB) of SGNHC. The patients of age 18 years and above presented with complaints of chest pain were enrolled consecutively. Chest pain due to trauma, recent thoracic surgeries and local visible/documented infections were excluded. Informed consent was taken from all the participants and those who denied for consent voluntarily were excluded. Sample size was calculated using formula $N = (Za)^2(P)(Q)/d^2$, where N=required sample size, Za =variant corresponding to desired reliability level (1.96% for 95% reliability), P =Estimated proportion in population

(P as 7.9%, as per Goodacre and colleague.⁸). $Q=100-P$ (if P in %) and $d=\text{maximum tolerable error}=5\%$. Thus a total of 112 participants were enrolled.

The patients were evaluated in detail about the nature of their chest pain focusing if the pain was substernal, provoked by exertion, relieved by rest or nitroglycerin. The pain was summarized typical if it had all three characteristics, atypical if it had two characteristics or nonspecific if it had less than 2 characteristics. Participants' history of diabetes hypertension and smoking were obtained. The final diagnosis of the participants were confirmed if it was ACS or not. Diagnosis of ACS was confirmed according to history, electrocardiogram (ECG) and cardiac biomarkers (Creatinine phosphokinase myocardial band (CPK-MB) and /or troponin I). They were further sub classified into ST-segment elevation myocardial infarction (STEMI), Non-ST-segment elevation myocardial infarction (NSTEMI) and unstable angina. Those having 1 mm or more ST elevation in at least 2 contiguous ECG leads were categorized as STEMI but for leads V2-V3, ST elevation of at least 2 mm or more in male ≥ 40 years, 2.5 mm or more in male < 40 years and 1.5 mm or more in female was considered STEMI. Those with positive cardiac biomarker (more than 2 fold rise in CPK-MB and / or positive troponin I) but without ST elevation were categorized as NSTEMI and those with negative biomarker and without ST elevation were categorized as unstable angina.

Data entry and analysis was done in Statistical Package for the Social Sciences (SPSS) version 20 for windows. Frequency, percentage distribution and mean \pm standard deviation were calculated for variables to be tested. Multiple linear regression analysis was done to see correlation of variables with diagnosis of ACS. P values were calculated and value < 0.05 were considered statically significant. R value was calculated to find strength of correlation.

Results

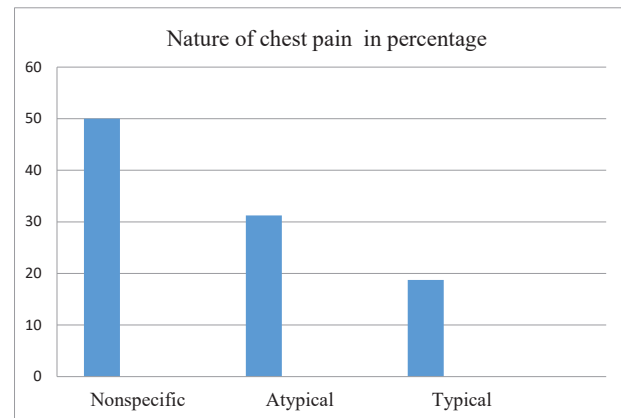
The age of participants ranged from 22 years to 92 years and mean age was 53.83 ± 15.23 years. Out of 112 participants, 75 (66.96%) were male. Hypertension was present in 42 (37.5%), diabetes in 30 (26.78%) and 26 (23.21%) were smoker. Baseline characteristics of the participants is shown in table 1.

Table 1: Baseline characteristics of the participants.

Characteristics	Value
Mean Age (Years \pm SD)	53.83 \pm 15.23
Male Gender (Frequency/Percent.)	75 (66.96%)
HTN (Frequency/Percent.)	42 (37.5%)
DM (Frequency/Percent.)	30 (26.78%)
Smoker (Frequency/Percent.)	26 (23.21%)

A total of 56 (50%) had nonspecific chest pain, 35 (31.25%) had atypical chest pain and 21 (18.75%) had typical chest pain. The characteristic nature of the chest pain of the participants is shown in figure 1.

Figure 1: Nature of chest pain of participants.



Among the participants, a total of 38 (33.93%) had acute coronary syndrome. Out of them 17 (15.18%) were STEMI, 12 (10.71%) were NSTEMI and 9 (7.63%) were unstable angina. Thus among the total 38 total cases of ACS, 44.74% were of STEMI 31.59% were of NSTEMI and 23.68% were of unstable angina.

Multiple Linear regression analysis revealed significant correlation of age, gender, nature of chest pain, hypertension and smoking with diagnosis of acute coronary syndrome ($R=0.66$). The analysis of variables and their P values are shown in table 2.

Table 2: Analysis and P values of correlation of variables with ACS.

Variables	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized coefficient B	t	P value
Age	.006	.003	.207	2.512	0.014
Gender	-.170	.080	-.168	-2.108	0.037
Nature of pain	-.170	.051	-.276	-3.336	0.001
HTN	.222	.077	.227	2.888	0.005
DM	.072	.084	.068	.859	0.392
Smoking	.231	.092	.206	2.517	0.013

Discussion

In this study mean age of participants was 53.83 ± 15.23 years and about 2/3rd of them were male. In a study by Bjornson and colleagues, the mean age of participants presenting with chest pain in a Norwegian hospital was 61 ± 18 years and 57% were male.⁹ In a study by Sharma and colleagues in India, maximum number of the patients presenting with chest pain were in the age group of 36-45 years and 63% of them were male.¹⁰

In the present study 37.5% had hypertension, 26.78% had diabetes and 23.21% were smoker. Gandhi and colleague found 61.7% hypertensive, 29.79% diabetic and 34.04% smoker among the patients presenting with chest pain in India.¹¹ Hypertension and diabetes were present in 62.9% and 15% respectively in patient presenting with shortness of breath or chest pain in Tanzania as shown by Prattipati and colleagues.¹² However Mohamed and colleagues reported hypertension in 23.5% and diabetes in 7.4% of participants presented with non-traumatic chest pain in an urban emergency department in Tanzania.¹³

Among the patients presenting with chest pain we found 33.93% cases of acute coronary syndrome. Martínez-Selles and colleagues reported ischemic cause in 15.7% of patients with chest pain.² Baccouche and colleagues reported ACS as etiology of chest pain in 22.3% of participants.⁴ However in a study by Belguith and colleagues ACS represented 49.7% of non-traumatic chest pain in a cross sectional multicenter study.³ Our prevalence of ACS in patients with chest pain was in between and comparable to published literature. Several factors like differences in prevalence of risk factors, ethnic, racial and geographical variation, differences in the level of health care providing centres and overall health care awareness in the communities might have contributed in the difference in prevalence of ACS in patients presenting with chest pain. We found age, gender, nature of chest pain, HTN and smoking had positive correlation with the diagnosis of acute coronary syndrome in emergency. Several studies in the past have shown the relation of cardiovascular disease with the above mentioned risk factors in various proportions and most of our findings in the present study was in accordance with the published literatures.^{14,15}

This study has several limitations. It was a single centre study with limited sample size and study duration. We included only few common risk factors. A larger sample size with a longer study period would have given a more comprehensive picture. Thus we encourage larger studies including large number of participants and conventional as well as new possible risk factors.

Conclusion

Acute coronary syndrome was one of the common cause of chest pain among participants visiting emergency of a tertiary cardiac centre. We found positive correlation of age, gender, nature of chest pain, hypertension and smoking with diagnosis of ACS. Patients with these risk factors need strong suspicion of ACS and prompt work up when they present with chest pain so that they can get proper management on time.

Source of funding

None

Conflict of interest

None

References

1. Bruyninckx R, Aertgeerts B, Bruyninckx P, Buntinx F. Signs and symptoms in diagnosing acute myocardial infarction and acute coronary syndrome: a diagnostic meta-analysis. *British Journal of General Practice*. 2008;58:e1-e8. <https://doi.org/10.3399/bjgp08X277014>
2. Martínez-Sellés M, Bueno H, Sacristán A, Estévez A, Ortiz J, Gallego L, et al. Chest Pain in the Emergency Department: Incidence, Clinical Characteristics, and Risk Stratification. *Rev Esp Cardiol*. 2008;61(9):953-9. <https://doi.org/10.1157/13125517>
3. Belguith AS, Beltaief K, Msolli MA, Bouida W, Abroug H, Fredj MB, et al. Management of acute coronary syndrome in emergency departments: a cross sectional multicenter study (Tunisia). *BMC Emergency Medicine*. 2018;18:1-9. <https://doi.org/10.1186/s12873-018-0201-6>
4. Baccouche H, Belguith AS, Boubaker H, Grissa MH, Bouida W, Beltaief K, et al. Acute coronary syndrome among patients with chest pain: Prevalence, incidence and risk factors. *Int J Cardiol*. 2015;214:531-535. <http://dx.doi.org/10.1016/j.ijcard.2015.11.065>
5. Cayley WE Jr. Diagnosing the cause of chest pain. *Am Fam Physician*. 2005; 72(10):2012-21.
6. Gibbons RJ, Balady GJ, Bricker JT, Chaitman BR, Fletcher GF, Froelicher VF, et al. ACC/AHA 2002 guideline update for exercise testing: summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1997 Exercise Testing Guidelines). *Circulation*. 2002;106:1883-92.
7. El-Menyar A, Zubaid M, Sulaiman K, AlMahmeed W, Singh R, Alsheikh-Ali AA, et al. Atypical presentation of acute coronary syndrome: A significant independent predictor of in-hospital mortality. *Journal of Cardiology*. 2011;57:165-171. <https://doi.org/10.1016/j.jcc.2010.11.008>
8. Goodacre S, Angelini K, Arnold J, Revill S, Morris F. Clinical predictors of acute coronary syndromes in patients with undifferentiated chest pain. *QJ Med*. 2003;96:893-898. <https://doi.org/10.1093/qjmed/hcg152>
9. Bjornson LP, Naess-Pleym LE, Dale J, Grenne B, Wiseth R. Description of chest pain patients in a Norwegian emergency department, Scandinavian Cardiovascular Journal. 2019; 53(1): 28-34. <https://doi.org/10.1080/14017431.2019.1583362>
10. Sharma A, Nadda N, Kashyap R, Parashar A, Sharma R, Merwaha R. Clinical profile and outcome of patients presenting with non-traumatic chest pain to emergency in the department of internal medicine of a tertiary care hospital in Northern India. *International Journal of current research*. 2019; 11(07):5336-53. <https://doi.org/10.24941/ijcr.36047.07.2019>
11. Gandhi KD, Tiwari SB. Feasibility of Risk Stratification of Patients Presenting to the Emergency Department With Chest Pain Using HEART Score. *JCOM* 2021;28(5):207-215. <https://doi.org/10.12788/jcom.0059>
12. Prattipati S, Sakita FM, Kweka GL, Tarimo TG, Peterson T, Mmbaga BT, et al. Heart failure care and outcomes in a Tanzanian emergency department: A prospective observational study. *PLoS ONE*. 2021;16(7):e0254609. <https://doi.org/10.1371/journal.pone.0254609>
13. Mohamed AS, Sawe HR, Muhanuzi B, Marombwa NR, Mjema K, Weber EJ, et al. Non-traumatic chest pain in patients presenting to an urban emergency Department in sub Saharan Africa: a prospective cohort study in Tanzania. *BMC Cardiovasc Disord*. 2019;19(158):1-8. <https://doi.org/10.1186/s12872-019-1133-0>
14. Hajar R. Risk Factors for Coronary Artery Disease: Historical Perspectives. *Heart Views*. 2017;18(3):109-114. https://doi.org/10.4103/HEARTVIEWS.HEARTVIEWS_106_17
15. Khattri P, Simkhada R. Conventional Risk factors of Acute coronary syndrome. *Journal of Universal College of Medical Sciences*. 2015;3(2): 1-4. <https://doi.org/10.3126/jucms.v3i2.14282>