



To Study the Risk Factors of Coronary Artery Disease in Rural Patients and Its Comparison with Urban Patients

Mohar Singh Uchariya^{1*}, Manju Pandey²

¹Assistant Professor, Department of General Medicine, KD. Medical College and Hospital, Mathura, Uttar Pradesh, India.

Email: drmohar3281@gmail.com

Orcid ID: 0000-0003-2396-1026

²Professor, Department of General Medicine, KD. Medical College and Hospital, Mathura, Uttar Pradesh, India.

Email: dmanju.pandey4@gmail.com

Orcid ID: 0000-0003-0879-7053

*Corresponding author

Received: 06 May 2021

Revised: 03 July 2021

Accepted: 12 July 2021

Published: 22 October 2021

Abstract

Background: Coronary artery disease is an emerging health problem in India. The high incidence of risk factor for CAD in young individuals is hypertension, where as diabetes is in the elderly patients. Coronary risk factors such as hypertension, diabetes mellitus, alcohol intake hypercholesterolemia, obesity and sedentary lifestyle were highly prevalent in the urban subjects and they were 2 or 3 times less common among rural subjects. Aims and Objectives: To study the various risk factors of coronary artery disease in rural patients and its comparison with urban patients. **Methods:** This Cross-Sectional Study was conducted at tertiary care hospital, Jabalpur during October 2014 to October 2015, in which 81 cases and controls were taken from rural and urban population. **Results:** Study shows presentation of risk factors of coronary artery disease in rural and urban patients. In rural cases there was history of CAD 4 (11.1%), hypertension 14 (38.8%), diabetes 5(13.8%), family history of CAD 3 (8.3%), smoking 23 (63.9%), tobacco chewing 13 (33.3%) and alcoholism 5(16.1%). In urban history of CAD 9 (20%), hypertension 14 (31.1 %), diabetes 12(26.7%), family history of CAD 6 (15.3%), smoking 18 (40%), tobacco chewing 10 (22.2%) and alcoholism was found 12 (26.6%). Family history of CAD, diabetes as a risk factors was predominant in urban patients as compared to rural population and diabetes was found to be statistically significant (P-value<0.01) as a risk factor in urban patients as compared to rural patients. Smoking and tobacco chewing is predominantly seen in rural patients as compared to urban patients, but alcohol addiction is higher in urban patients, and smoking was statistically significant in rural patients (P value- 0.02). Body mass index(BMI) was statistically significant in urban patients as compared to rural patients (P value- 0.0008, highly significant). **Conclusions:** This study demonstrates that history of diabetes was statistically significant risk factor in urban patients as compared to rural patients. (P value <0.01) But in rural patients smoking was statistically significant risk factor. Body mass index (BMI) was significantly higher in urban patients as compared to rural patients (P VALUE <0.0008).

Keywords:- Coronary Artery Disease, General Medicine .

INTRODUCTION

Acute coronary syndrome is defined as any form of symptoms compatible with acute myocardial ischemia. Ischemic heart disease

remains the leading cause of death in men and women world wide and cardiovascular death exceed the number of deaths from all cancers combined. Incidence of myocardial infarction has shown an upward trend in Indians in the

last decade. In India incidence of cardiovascular diseases was about 7% in 1970 and increased up to 32% in 2011 and is projected to the highest in India by 2020.^[1] The high burden of CAD in the Indian subcontinent is the consequence of large population and high prevalence of CAD risk factors like smoking, tobacco abuse, lack of physical activity, obesity, high BP, abnormal lipids and diabetes mellitus. Coronary risk factors such as hypertension, diabetes mellitus, alcohol intake hypercholesterolemia, obesity and sedentary lifestyle were highly prevalent in the urban subjects and they were 2 or 3 times less common among rural subjects.^[2] Understanding social and economic indicators including income, education, employment and social class play an undoubted role in improving health and quality of life, thus several studies in developing countries suggest that coronary risk factors may be related to socioeconomic status and urbanization.^[3,4] Gupta et al reported a higher prevalence of coronary heart disease, smoking and hypertension among the illiterate in a rural population.^[5,6]

Aims and objectives:

1. To study the various risk factors of coronary artery disease in rural patients.
2. To make comparison of coronary artery disease risk factors in rural patients and urban patients.

MATERIAL AND METHODS

This Cross-Sectional Study was conducted at tertiary care hospital, Jabalpur. Total participants of study.

Inclusion Criteria:

All patients with coronary artery disease attending the medicine and cardiology OPD and had admitted in medicine ICCU and wards in NSCB medical college and hospital Jabalpur, during October 2014 to October 2015, they were categorized according to rural/urban patients.

Rural Patients:

Patients belong from a cluster, which have population of <2500, according to the census-2011. And patients from places which were included as "Villages" in village list of Jabalpur district, persons born in these villages & still living there. Patients not satisfying above criteria were considered to urban patients.

Exclusion Criteria:

Patients mimicking symptoms of coronary artery disease but no evidence of CAD. Patients found suitable for the study were subjected for clinical, hematological, ECG and ECHO investigations.

Statistical Analysis:

Various statistical methods like chi-square test, independent student t-test and non-parametric tests were applied wherever applicable.

Risk Factors of CAD:

Coronary artery disease has a number of well determined risk factors. The most common risk factors include smoking, family history, hypertension, obesity, sedentary lifestyle, stress and dyslipidemia. Risk factors can be classified as modifiable and non-modifiable.

**Non-Modifiable Risk Factors:**

Age, sex and family history of CAD are the non-modifiable risk factors of CAD.

Modifiable Risk Factors:

Hypertension, diabetes mellitus, dyslipidemia, obesity and smoking etc, are modifiable risk factors of CAD. All conventional risk factors are significantly associated with the risk of CAD in Asian Indians, as in all other populations. However, compare with whites, Asian Indians have a lower prevalence of hypertension, hypercholesterolemia, obesity and smoking, but a higher prevalence of high triglycerides (TG), low high density lipoprotein (HDL), glucose intolerance and central obesity.^[7] Although the conventional risk factors appear to be doubly important in Asian Indians, and remain the principal targets for prevention and treatment.

Higher rates of cardiovascular disease in urban India compared to rural India suggest important roles for nutritional and environmental factors, or nature. There is a significantly higher body mass index (BMI) in urban India compare to rural India. There is also a higher rate of abdominal obesity among the urban population,^[8] with urban men having a waist to hip ratio (WHR) of 0.99 compare to 0.95 among rural men. Increase in

BMI and WHR results in significant dyslipidemia and insulin resistance and a 3-fold increase in diabetes.

Singh et al performed a population survey of coronary heart disease and risk factors in a rural and urban setting of Moradabad in 1997.^[9] A sample of 3575 subjects between ages 25years and 64years was enrolled in survey. Overall prevalence of CHD was 9% and 3.3% in urban and rural population respectively. Auley de, Garge Podder and Aniket Adhikari et al (2013) reported that the smoking is (62.35%) in urban population whereas 18.07% in rural population. But addiction in tobacco was some extent higher in rural areas (16.6%) as compare to urban (7.05). Alcohol intake was higher in urban areas 31.76% as compare to rural (13.28%). Family history of coronary heart disease was 57.64% in urban population and 33.74% in rural population. Presence of hypertension 52.94% and diabetes mellitus 49.41% were higher in urban population whereas 35% and 17% in rural population. Triglyceride level was significantly high ($p < 0.001$) in urban population than rural. Total cholesterol level of urban population was significantly high ($p < 0.05$) than rural population. Serum LDL concentration was significantly ($p < 0.001$) elevated in urban population in comparison with rural population.^[10]

RESULTS**Table 1:** Distribution of risk factors of CAD in rural and urban patients

| History of risk factors | | Location of residence | | | | P-value |
|-------------------------|-----|-----------------------|--------|-------|--------|---------|
| | | Urban | | Rural | | |
| | | N=45 | % | N=36 | % | |
| History of CAD | No | 36 | 80% | 32 | 88.90% | 0.29 |
| | Yes | 9 | 20% | 4 | 11.10% | |
| History of HTN | No | 31 | 68.90% | 22 | 61.10% | 0.46 |

| | | | | | | |
|-----------------------|-----|----|--------|----|--------|--------------------|
| | Yes | 14 | 31.10% | 14 | 38.90% | |
| History of diabetes | No | 33 | 73.30% | 31 | 86.20% | 0.01 (Significant) |
| | Yes | 12 | 26.70% | 5 | 13.80% | |
| Family history of CAD | No | 39 | 86.60% | 33 | 91.60% | 0.28 |
| | Yes | 6 | 15.30% | 3 | 8.30% | |

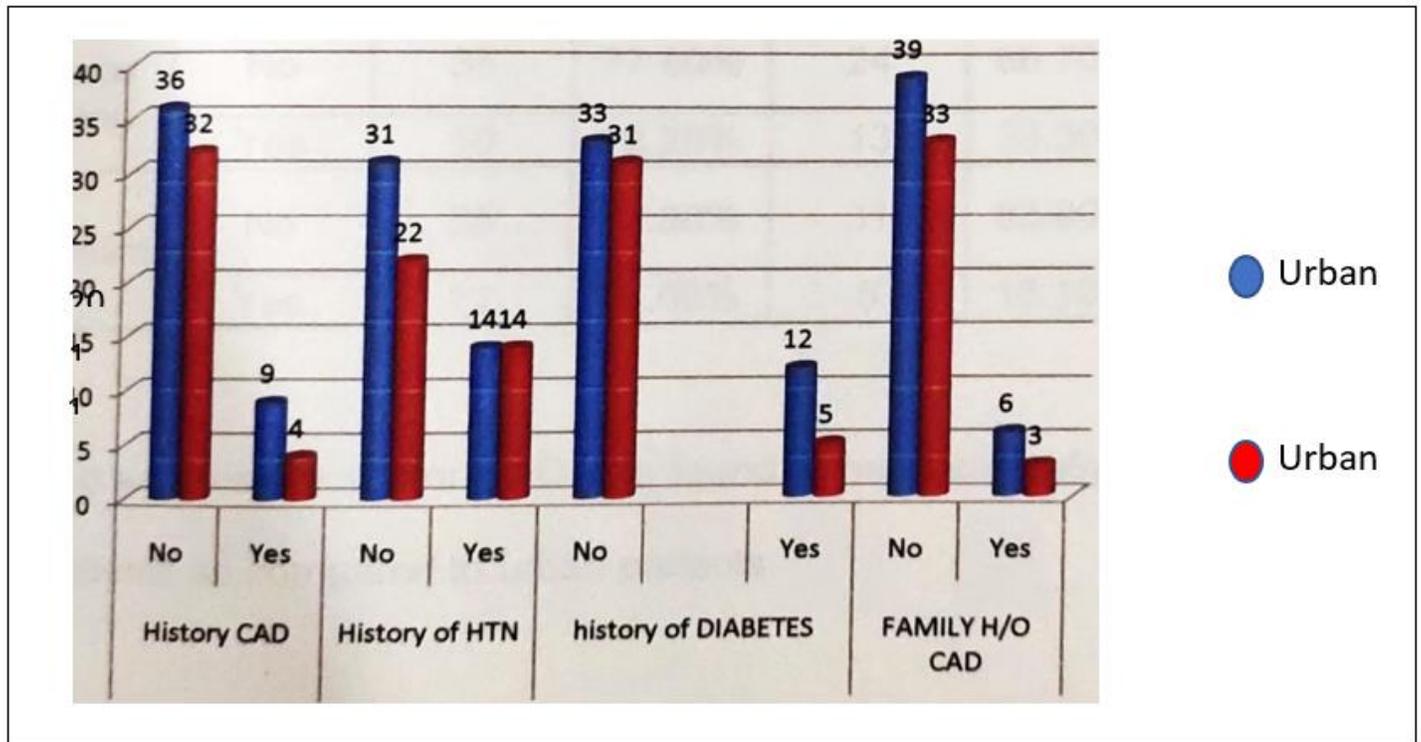


Figure 1: Distribution of risk factors of CAD in rural and urban patients

Table 2: Distribution of addiction as risk factors in rural and urban patients

| Risk factors | | Location of residence | | | | P-value |
|-----------------|-----|-----------------------|--------|-------|--------|---------|
| | | Urban | | Rural | | |
| | | N=45 | % | N=36 | % | |
| Smoking | No | 28 | 62.20% | 13 | 36.10% | 0.02 |
| | Yes | 18 | 40% | 23 | 63.90% | |
| Tobacco chewing | No | 35 | 77.80% | 24 | 66.70% | 0.26 |
| | Yes | 10 | 22.20% | 13 | 33.30% | |
| Alcoholism | No | 35 | 77.80% | 31 | 83.90% | 0.77 |
| | Yes | 12 | 26.60% | 5 | 16.10% | |

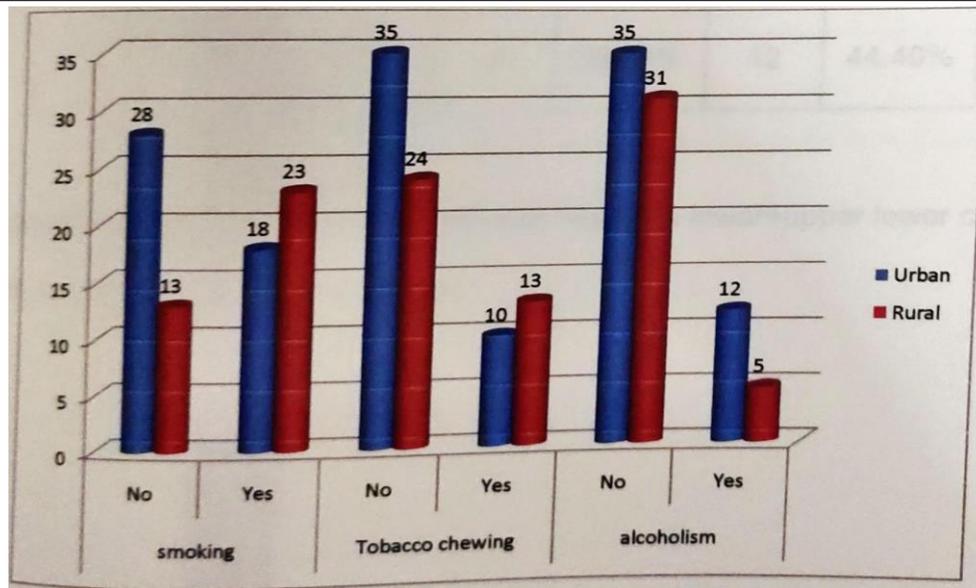


Figure 2: Distribution of addiction as risk factors in rural and urban patients

Table 3: Distribution of other parameters in rural and urban

| | Location of residence | | | | P-Value |
|--------------|-----------------------|---------|-------|--------|-----------------------------|
| | Urban | | Rural | | |
| | Mean | SD | Mean | SD | |
| Age | 57 | 13 | 56 | 12 | 0.78 |
| Pulse | 86 | 12 | 87 | 11 | 0.84 |
| Systolic BP | 132 | 28 | 143 | 26 | 0.06 |
| Diastolic BP | 81 | 15 | 87 | 13 | 0.09 |
| RR | 19 | 2 | 18 | 2 | 0.75 |
| BMI | 24.88 | 2.59 SD | 23.11 | 1.72SD | 0.0008 (Highly significant) |

Table 4: Distribution of lipid profile in rural and urban patients

| | Location of residence | | | | P-Value |
|-------------|-----------------------|------|-------|------|---------|
| | Urban | | Rural | | |
| | Mean | SD | Mean | SD | |
| Total CHOL. | 154 | 34.5 | 148.2 | 35.9 | 0.46 |
| HDL | 38.88 | 5.88 | 35.61 | 8.07 | 0.65 |
| LDL | 106.3 | 28.9 | 101.8 | 33.4 | 0.52 |
| TRI GLY | 123.3 | 46.6 | 115.7 | 31.4 | 0.4 |
| VLDL | 22.5 | 8.11 | 22.23 | 6.79 | 0.87 |

DISCUSSION

Study show the presentation of risk factors of coronary artery disease in rural and urban

patients. In rural cases there was history of CAD 4 (11.1%), hypertension 14 (38.8%), diabetes 5 (13.8%), family history of CAD 3

(8.3%), smoking 23 (63.9%), tobacco chewing 13 (33.3%) and alcoholism 5(16.1%). In urban history of CAD 9 (20%), hypertension 14 (31.1%), diabetes 12(26.7%), family history of CAD 6 (15.3%), smoking 18 (40%), tobacco chewing 10 (22.2%) and alcoholism was found 12 (26.6%). History of CAD, diabetes and family history of CAD as a risk factors was predominant in urban patients as compared to rural population and diabetes was found to be statistically significant (P-value<0.01) as a risk factor in urban patients as compared to rural patients. Smoking and tobacco chewing is predominantly seen in rural patients as compared to urban patients, but alcohol addiction is higher in urban patients, and smoking was statistically significant in rural patients (P value- 0.02) Except smoking other finding was found to be consistent with Auley de, Garge Podder, Aniket Adhikari et al (2013) study. They reported that the smoking as a risk factor for CAD was found in 62.35% in urban population whereas 18.07% in rural population. But tobacco addiction was some extent higher in rural areas (16.6%) as compared to urban (7.05%). Alcohol intake was

higher in urban areas 31.76% as compare to rural (13.28%). Family history of coronary heart disease was found in 57.64% in urban population and 33.74% in rural. Presence Of hypertension and diabetes Was found in 52.94% and 49.41% which was higher in urban population as compared to 35% and 17% in rural population respectively.^[10] Body mass index (BMI) was statistically significant in urban patients as compared to rural patients (P value- 0.0008, highly significant). Study result consistent with Palla Venkatramana and Palakuru C Reddy study, in which prevalence of obesity were significantly greater in the urban patients.^[11,12]

CONCLUSIONS

This study demonstrates that history of diabetes was statistically significant risk factor in urban patients as compared to rural patients. (P value <0.01) But in rural patients smoking was statistically significant risk factor. Body mass index (BMI) was significantly higher in urban patients as compared to rural patients. (P VALUE <0.0008).

REFERENCES

1. Yusuf S, Ounpuu S. Tackling the growing epidemic of cardiovascular disease in South Asia. *J Am Coll Cardiol.* 2001;38(3):688-9. doi: 10.1016/s0735-1097(01)01417-6.
2. Reddy KK, Ramachandraiah T, Reddanna P, Thyagaraju K. Serum lipid peroxides and lipids in urban and rural Indian men. *Arch Environ Health.* 1994;49(2):123-7. doi: 10.1080/00039896.1994.9937465.
3. Singh RB, Sharma JP, Rastogi V. Social class and coronary disease in a rural population of North India. *Eur Heart J.* 1997; 18:588 – 595.
4. Kaplan GA, Keil JE. Socioeconomic factors and cardiovascular disease: a review of the literature. *Circulation.* 1993;88(4 Pt 1):1973-98. doi: 10.1161/01.cir.88.4.1973.
5. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. *Circulation.* 1998;97(6):596-601. doi: 10.1161/01.cir.97.6.596.
6. Gupta R, Gupta VP, Ahluwalia NS. Educational status, coronary heart disease, and coronary risk factor prevalence in a rural population of India. *BMJ.* 1994;309(6965):1332-1336. doi:10.1136/bmj.309.6965.1332
7. Tan ST, Scott W, Panoulas V, et al. Coronary heart disease in Indian Asians. *Glob Cardiol Sci Pract.* 2014;2014(1):13-23. doi:10.5339/gcsp.2014.4
8. Pradeepa R, Anjana RM, Joshi SR, Bhansali A, Deepa M, Joshi PP, et al; ICMR-INDIAB Collaborative



- Study Group. Prevalence of generalized & abdominal obesity in urban & rural India--the ICMR-INDIAB Study (Phase-I) [ICMR- NDIAB-3]. *Indian J Med Res.* 2015;142(2):139-50. doi: 10.4103/0971-5916.164234.
9. Singh RB, Sharma JP, Rastogi V, Raghuvanshi RS, Moshiri M, Verma SP, et al. Prevalence of coronary artery disease and coronary risk factors in rural and urban populations of north India. *Eur Heart J.* 1997;18(11):1728-35. doi: 10.1093/oxfordjournals.eurheartj.a015167.
10. Auley de, Podder G, Adhikari A, Halder A, Banerjee J, Madhusnata De. Gorge podder and Aniket Adhikare et al. Coparative study of risk factors of cardiac diseases among urban and rural population. *Int J human Genet.* 2013;13(1):15-19 DOI:10.1080/09723757.2013.11886191.
11. Venkatramana P, Reddy PC. Association of overall and abdominal obesity with coronary heart disease risk factors: comparison between urban and rural Indian men. *Asia Pac J Clin Nutr.* 2002;11(1):66-71. doi: 10.1046/j.1440-6047.2002.00250.x.
12. Gupta R, Gupta VP, Ahluwalia NS. Educational status, coronary heart disease, and coronary risk factor prevalence in a rural population of India. *BMJ.* 1994;309(6965):1332-1336. doi:10.1136/bmj.309.6965.1332

Source of Support: Nil, Conflict of Interest: None declared