Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com/sjams/

OPEN ACCESS

General Medicine

Evaluation of Smoking as a Predominant risk factor in Coronary Artery Disease: A Case Control Study

Dr. Venkata Subbarao. M[1], Satyendra Kumar. A[2*]

[1]Associate Professor, Department of General Medicine, Kamineni Institute of Medical Sciences, Narketpally , Nalgonda, Telangana-508254.
[2]Assistant Professor, Department of Cardiology, GSL Medical College, Rajahmundry, Andhra Pradesh.

DOI: 10.36347/sjams.2020.v08i11.024 | Received: 02.05.2020 | Accepted: 14.05.2020 | Published: 18.11.2020

***Corresponding author:** Satyendra Kumar. A

Abstract **Original Research Article**

Introduction: Smoking remains the number one cause of preventable morbidity and mortality. A leading cause of death attributable to smoking is Cardiovascular disease (CVD). Most common presentation of Coronary artery disease (CAD) is myocardial infarction and angina pectorals. Cigarette smoking also contributes to CVD in a number of ways. ***Materials and Methods:*** A Case Control Study was conducted in Tertiary care teaching center and Hospital over a period of 6 months. Patients admitted in the Medical ward who are willing to participate in this study were enrolled in this study. ***Results:*** In our study, both the groups consisted of 100 subjects each. While comparing between Smoker and non-smoker mean age was not statistically significant by using unpaired t-test (p-value 0.36). While comparing between Smoker and non-smoker group in hypertensive was statistically significant difference by using Chi-square test (p=0.025). While comparing between Smoker and non-smoker group, with more than 50% stenosis, with or without co-morbidities. While comparing between Smoker and non-smoker group in co-morbidities was statistically highly significant difference by using Chi-square test (p=0.0001). Whereas, comparing between Smoker and non-smoker group in without co-morbidities was statistically highly significant difference by using Chi-square test (p=0.0001). ***Conclusion:*** In our study that both the case and control groups shows in both group smokers and non-smokers have CAD but higher in smokers group then in non-smokers and data was statistically insignificant between case and control group.

Keywords: Coronary Artery Disease, Smoking, Case Control Study.

INTRODUCTION

Smoking remains the number one cause of preventable morbidity and mortality. A leading cause of death attributable to smoking is Cardiovascular disease (CVD) [1]. Cardiovascular disease covers all disease processes of the heart and blood vessels. Premature CVD is highly preventable. Tobacco smoking, raised blood pressure, elevated blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition, drinking at harmful levels and diabetes are major preventable risk factors for CVD [2]. A substantial proportion of population in India is exhibiting increasing prevalence of cardio-vascular disease and associated risk factors. Overall prevalence has increased from 2.06% in 1970 to 5% in 2002 in rural area and 1.04% in early 1960 to 13.02% in 2004 in urban area [3]. According to WHO estimation, 194 million men and 45 million women use tobacco in smoke or smokeless form in India and in keeping with current trends in India, it is estimated to cause about 1.5 million deaths per year by 2020 [4].

Most common presentation of Coronary artery disease (CAD) is myocardial infarction and angina pectorals. Cigarette smoking contributes to CVD in a number of ways. Toxic products from cigarette smoke, in particular nicotine and carbon monoxide (CO), circulate in the bloodstream, interfering with the efficient working of the endothelium, eliciting blood fat abnormalities and impairing glucose regulation. Each effect is implicated in the development of atherosclerotic lesions in the arterial walls. These collections narrow the arteries, gradually impairing blood flow, and making the arteries harder, less elastic, and more liable to rupture [5]. The process leading to atherosclerosis—plaque deposited within the inner layers of the arteries—is slow and complex, often starting in childhood and progressing with age. Smoking also has a direct effect on platelets (blood cells involved in the clotting process), leading to increased activation and stickiness. This in turn causes an increased risk of thrombosis, or development of blood clots [6].

Smoking a cigarette also temporarily increases heart rate and blood pressure and also affects the ability of the heart to contract. These circulatory changes result in increased work for the heart muscles, which in turn raises the body's demand for oxygen. At the same time, the body is deprived of oxygen through the effects of CO on reducing transport oxygen. The resulting imbalance in oxygen supply and demand promotes the complications of atherosclerosis. These include ischemia, with resultant angina pectoris or myocardial dysfunction [7].

Taking into consideration of multiple risk factors for CAD, the present case control study was conducted to study the role of tobacco smoking in the occurrence of CAD.

MATERIALS AND METHODS

A Case Control Study was conducted in Tertiary care teaching center and Hospital. Patients admitted in the Medical WARD who are willing to participate in this study were enrolled in this study over a period of 6 months.

Inclusion criteria for cases: -

1. Patients who are willing to give consents.
2. Well conscious, co-operative, and well-oriented with time, place and person, to avoid bias from respondent's answers.
3. Age group from 18 to 80 years.
4. Old & Newly diagnosed cases of CAD on CAG with 2 or more ECG showing specific changes.
5. An ECG showing probable changes plus abnormal cardiac injury enzymes;
6. Patients CAG suggestive of clinically significant CAD. (Having >50% stenosis)

Exclusion Criteria of Cases: -

1. Patients below age group of 18 years are excluded.
2. Patients with ERDS (ENDSTAGE RENAL DISEASE), Vasculitis syndrome etc.
3. Those who fails to fulfill above inclusion criteria are excluded.

Inclusion criteria of Control: -

1. Patients who are willing to give consents.
2. Well-conscious, co-operative, and well-oriented with time, place, and person, who voluntary agree to participate in the study to avoid bias from respondent's answers.
3. Patients whose CAG suggestive of > 50% stenosis.

Exclusion criteria of Control: -

1. Patients whose CAG suggestive of < 50% stenosis

RESULTS

In our study, both the groups consisted of 100 subjects each. The mean age in smoker was 57.74±8.99 whereas as in mean age in non-smokers were 57.38±9.217. While comparing between Smoker and non-smoker mean age was not statistically significant by using unpaired t-test (p-value 0.36).

Table 1: Mean age of patients

	Smokers (n=100) (MEAN±SD)	Non-Smokers (n=100) (MEAN±SD)	p - VALUE
AGE	57.74 ± 8.99	57.38 ± 9.217	**0.36**

P> 0.05 – Not-Significant, P ≤ 0.05 – Significant, P ≤ 0.01 – Highly Significant, P-value – probability value

Table 2: Gender difference between smokers and non-smokers

	Smokers (n=100)	Non-Smokers (n=100)	p - VALUE
Men	**97%**	69%	**0.019**
Women	3%	31%	

Fisher exact test was applied

P> 0.05 – Not-Significant, P ≤ 0.05 – Significant, P ≤ 0.01 – Highly Significant, P-value – probability value

In table 2, both the groups consisted of 100 subjects each. Smokers were 97% men and 3% were women on another hand non-smokers were 69% and 31% were men and women respectively. While comparing between Smoker and non-smoker group was statistically significant difference by using Fisher's exact test (p-value-0.0019).

Table 3: Comparison of smokers and Non-smokers with less than 50% stenosis with or without Co-morbidities

	Smokers (n=100)	Non-Smokers (n=100)	p - VALUE	Chi-square value
Co-morbidities	**3**	**5**	**0.05**	**8.0**
Without Co-morbidities	25	37	**0.0001**	**62.0**
Total	28	42		

Chi-Square test applied

In table 3, while comparing between Smoker and non-smoker group, with less than 50% stenosis, with or without co-morbidities. In co-morbidities in Smokers were 3 and non-smokers were 5. Furthermore, without co-morbidities were 25 and 37 in smokers and non-smokers respectively. While comparing between Smoker and non-smoker group in co-morbidities was statistically significant difference by using Chi-square test (p=0.05). Whereas, comparing between Smoker and non-smoker group in without co-morbidities was statistically highly significant difference by using Chi-square test (p=0.0001).

Table 4: Comparison of smokers and Non-smokers with less than 50% stenosis with Co-morbidities (Hypertension and Diabetes)

	Smokers (n=100)	Non-Smokers (n=100)	p - VALUE	Chi-square value
Hypertension	**2**	**3**	**0.025**	**5.0**
Diabetes	1	2	**0.083**	**3.0**
Total	3	5		

Chi-Square test applied

In table 4, while comparing between Smoker and non-smoker group, with less than 50% stenosis, with hypertension and diabetes. In hypertensive Smokers were 2 and hypertensive non-smokers were 3. Furthermore, diabetics smokers and non-smokers were 1 and 2 respectively. While comparing between Smoker and non-smoker group in hypertensive was statistically significant difference by using Chi-square test (p=0.025). Whereas, comparing between Smoker and non-smoker group in diabetes were statistically not significant by using Chi-square test (p=0.083).

Table 5: Comparison of smokers and non-smokers with more than 50% stenosis but with or without Co-morbidities

	Smokers (n=100)	Non-Smokers (n=100)	p - VALUE	Chi-square value
Co-morbidities	**18**	**32**	**0.0001**	**50.0**
Without Co-morbidities	54	26	**0.0001**	**80.0**
Total	72	58		

In table 5, while comparing between Smoker and non-smoker group, with more than 50% stenosis, with or without co-morbidities. In co-morbidities in Smokers were 18 and non-smokers were 32. Furthermore, without co-morbidities were 54 and 26 in smokers and non-smokers respectively. While comparing between Smoker and non-smoker group in co-morbidities was statistically highly significant difference by using Chi-square test (p=0.0001). Whereas, comparing between Smoker and non-smoker group in without co-morbidities was statistically highly significant difference by using Chi-square test (p=0.0001).

Table 6: Comparison of smokers and Non-smokers with more than 50% stenosis with Co-morbidities (Hypertension and Diabetes)

	Smokers (n=100)	Non-Smokers (n=100)	p - VALUE	Chi-square value
Hypertension	**10**	**22**	**0.0001**	**32.0**
Diabetes	8	10	**0.0001**	**18.0**
Total	18	32		

Chi-Square test applied

In table 6, while comparing between Smoker and non-smoker group, with more than 50% stenosis, with hypertension and diabetes. In hypertensive Smokers were 10 and hypertensive non-smokers were 22. Furthermore, diabetics smokers and non-smokers were 8 and 10 respectively. While comparing between Smoker and non-smoker group in hypertensive was statistically significant difference by using Chi-square test (p=0.0001). Whereas, comparing between Smoker and non-smoker group in diabetes were statistically not significant by using Chi-square test (p=0.0001).

DISCUSSION

Coronary Artery Disease (CAD) is the primary reason of mortality universally whereas India has the maximum load. It origins 3 million deaths/ year, accounting for 25% of all death in India. Hospitals data expose that 20-25 % of all hospital admissions are owing to Coronary artery disease. As per to the National Commission on Macroeconomics and Health (NCMH), there could be nearby 62

million patients with CAD by 2015 in India, and of these, 23 million could be patients earlier than 40 years of age. By 2020, 60% of the world's heart disease is probable to happen in India [8]. The risk of CAD in Indians is 3-4 times more than white Americans, 6 times greater than Chinese and 20 times upper than Japanese. CAD is affecting Indians 5-10 years earlier than other communities; in some studies, from South India, the percentage of patients under 45 years suffering from AMI is stated to be as highest as 25-40% [9].

With the increase in the percentage of CAD over the past century, more research has focused on CAD in smokers and non-smokers. Studies from our country reports differences in the effects that society, economics, and culture have on smoking in both men and women. They also describe that physiological, sociodemographic, psychological, personal, and sociocultural issues play specific roles in male and female smoking behavior [10].

Barley E et al conducted study in the year 2016 that, Tobacco Consumption in any forms major etiology behind the occurrence of CAD. People know much about the health hazards of tobacco and that merely is not sufficient to stop them from taking up or from continuing the habit. There is a need to develop multifactorial tobacco quitting strategies focusing on early age intervention and covering the addict along with his surrounding environment [11].

Janati et al conducted study in the year 2011, to halt the disease process and its consequences for patients, his/her family and also to the wider community it is suggested to better understand the socioeconomic status phenomenon behind the CHD in local settings. Planning intervention programmed that are especially tailored lower/middle social classes in developing countries may also have greater impact in presentation of CHD risks. Thus, we need further information about way of people live and policy changes in our educational and economics [12].

In our present study, the patients included in the study were a total of 100 cases of Non-smokers of CAD and 100 controls of smokers with CAG suggestive of > 50% stenosis were analyzed. The mean age of cases and controls were 57.74 ± 8.99 years and 57.38 ± 9.21 years respectively and this difference was not statistically significant (P > 0.05). Study of Socio demographic appearances did not disclose any significant variance between cases and controls.

Furthermore, we found that Comparison of smokers and Non-smokers between men and women, no. of smoker were 97 men and 3 were women on the other hand Non-smokers 69 men and 31 were women and p-value is 0.019 and statistically significant between smokers and non-smokers gender. These results support with the studies conducted by Coogan, P MA *et al*, for the Smoking and smokeless tobacco consumption: Likely risk factors for CAD between female and male patients [13].

Moreover, we Compared of morbidities and without morbidities between smoker and non-smokers with less than 50 stenosis, morbidities in smokers 3 and non-smokers were 5 whereas, without morbidities were smokers 25 and non-smokers 37. The p-value is 0.05 and 0.0001 smokers and non-smokers respectively and statistically insignificant in smokers but statistically highly significant in non-smokers.

In addition, when we compare between smokers and Non-smokers with less than 50% stenosis with Co-morbidities such as Hypertension and Diabetes. Hypertensive smoker was 2 and Hypertensive non-smoker were 3, besides Diabetic smoker were 1 and non-smoker were 2. Hypertensive patients were statistically significant ($p<0.025$). Whereas, diabetic patients were statistically insignificant ($p>0.083$).

Additionally, we Compared of morbidities and without morbidities between smoker and non-smokers with more than 50 stenosis, morbidities in smokers 18 and non-smokers were 32 whereas, without morbidities were smokers 54 and non-smokers 26. The p-value is 0.0001 results depicts statistically highly significant when compared with the smokers and non-smokers.

While comparison of between smokers and Non-smokers with more than 50% stenosis with Co-morbidities such as Diabetes and Hypertension. Hypertensive smoker was 10 and Hypertensive non-smoker were 22, besides Diabetic smoker were 8 and non-smoker were 10. Hypertensive and diabetics patients of smokers and Non-smokers were statistically highly significant.

CONCLUSION

In our study that both the case and control groups shows in both group smokers and non-smokers have CAD but higher in smokers group then in non-smokers and data was statistically insignificant between case and control group.

Whereas, India has highest burden of acute coronary syndromes in the world, yet little is known about the treatments and outcomes of this disease. The most striking feature of management of patients with cardiovascular disease in India, is its heterogeneity: from patients managed at tertiary care teaching hospitals, who obtain the greatest possible evidence-based care, to patients who are poor or, even no, access to specialist care and whose complaint, therefore, is poorly cured.

BIBLIOGRAPHY

1. Global Health Risks. Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva, Switzerland: World Health Organization; 2009.
2. Ezzati M, Hoorn SV, Lopez AD, et al. Comparative quantification of mortality and burden of disease attributable to selected risk factors. In: Lopez AD, Mathers CD, Disease and Risk Factors. Washington, DC: World Bank; 2006:241---396.
3. Briffa, T, Greenhalgh, EM & Winstanley, MH. 3.1 Smoking and heart disease. In Scollo, MM and Winstanley, MH [editors]. *Tobacco in Australia: Facts and issues*. Melbourne: Cancer Council Victoria; 2015. Available from http://www.tobaccoinaustralia.org.au/chapter-3-health-effects/3-1-smoking-and-heart-disease.
4. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. Circulation. 1998; 97(6):596-601.
5. Cao, S., Yang, C., Gan, Y., and Lu, Z. The Health Effects of Passive Smoking: An Overview of Systematic Reviews Based on Observational Epidemiological Evidence. PLoS. 10 (10) ;2018:36-41.
6. Sinha DN, Gupta PC, Pednekar MS. Tobacco use in a rural area of Bihar. Indian J Community Med 2003; 28(4):10-2.
7. Murray, Christopher J. L, Lopez, Alan D, World Health Organization, World Bank & Harvard School of Public Health. ((1996The Global burden of disease : a comprehe .nsive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020 : summary / edited by Christopher J. L. Murray, Alan D. Lopez. Geneva : World Health Organization. http://www.who.int/iris/handle/10665/41864
8. Almirall, J., Serra-Prat, M., Bolibar, I., Palomera, E., Roig, J., Hospital, I., Carandell, E., Agusti, M., Ayuso, P., Estela, A., and Torres, A. The Study Group of Community-Acquired Pneumonia in Catalan Countries (PACAP). 2014.23-38.
9. Passive smoking at home is a risk factor for community-acquired pneumonia in older adults: A population-based case-control study. BMJ. 4 (6); 2018:116-126.
10. Hori, M., Tanaka, H., Wakai, K., Sasazuki, S., and Katanoda, K. Secondhand smoke exposure and risk of lung cancer in Japan: a systematic review and meta-analysis of epidemiologic studies. Japanese Journal of Clinical Oncology. 46 (10); 2016.942-951.
11. Barley, E. and Lawson, V. Using health pyschology to help patients: theories of behaviour change. British Journal of Nursing. 25 (16);2016: 924-927.
12. Janati, Gupta R. Burden of Coronary Heart Disease in India. Indian heart J. 2011; 57:632-638.
13. Coogan, P., Castro-Webb, N. Yu, J., O'Connor, G., Palmer, J., and Rosenberg, L. Active and Passive Smoking and the Incidence of Asthma in the Black Women's Health Study. American Journal of Respiratory and Critical Care Medicine. 191 (2); 2015:168-176.