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Original Research Article

Prevalence of coronary artery diseases in type 2 diabetic women

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ABSTRACT

Background: There was increasing evidence that gender differences are important in epidemiology, treatment and outcomes of many diseases, relevant for non-communicable diseases.
Methods: Study was conducted in Department of General Medicine, GSL Medical College. Patients who were admitted with type 2 diabetes were recruited in the study. Each patient was interviewed to obtain detailed history and examined thoroughly as per predetermined protocol, national diabetes data group and WHO diagnostic criteria was used. Myocardial infarction was diagnosed by convex ST segment elevation in corresponding leads (early) or QS complexes or abnormal Q waves i.e. Q waves of 0.04 seconds or more in width (or) 25% or more of the voltage of the R wave in the same lead or both in the corresponding leads (late) or T wave inversion in the corresponding leads (late). Statistical analyses were done by using SPSS software version 21.0. Chi-square test was used to assess the association between different categorical variables; $p<0.05$ was considered statistically significant.
Results: Out of 250 participants, 97 were diagnosed as coronary artery disease (CAD), maximum between 51-60 years age group; the difference was statistically significant ($p<0.05$). The association between dyslipidemia and CAD was statistically significant ($p<0.05$). Out of 188 post-menopausal cases, CAD was diagnosed in 86 cases; out of the 62 non post-menopausal cases, CAD was diagnosed in 11 cases; The difference was statistically significant ($p<0.05$).
Conclusions: In premenopausal women, the prevalence of CHDs are significantly higher when compared to postmenopausal women.

Keywords: Diabetes, Disease, Patient, Women

INTRODUCTION

Diabetes is among the most common chronic diseases in the world, affecting an estimated 8.5% of the global adult population.[1] According to International Diabetes Federation in India the number of individuals with diabetes are 65.1 million second only to China.[2] CHD (coronary heart disease) of atherosclerotic origin is the leading cause of morbidity and mortality for individuals with diabetes.[3] There is increasing evidence that gender differences are important in epidemiology, pathophysiology, treatment, and outcomes in many diseases, but they appear to be particularly relevant for non-communicable diseases.[4]

CHD is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium. It typically occurs when there is an imbalance between myocardial oxygen supply and demand. The most common cause of myocardial ischemia is atherosclerotic disease of an epicardial coronary artery.[5] Studies showed that patients with diabetes had more traditional risk factors than patients without diabetes.

Diabetes has long been recognized to be an independent risk factor for CAD. Though diabetes mellitus is a metabolic disease, it is also considered as a vascular disease.[6] The American Heart Association has designated DM as a CHD risk equivalent, and type 2 DM patients without a prior MI have a similar risk for coronary artery related events as non-diabetic individuals who have had a prior MI.[7] With these study was conducted the prevalence of CHD in women with type-2 DM.

METHODS

Study was conducted in department of general medicine, GSL Medical College. It was a single center, observational, cross sectional hospital-based study, conducted from 1st November 2015 to 30th April 2017. Samples were collected by systematic random sampling method. Patients who were admitted with type 2 diabetes, aged >20 years were recruited in the study. Type 1 diabetic women, patients with <20 years, pregnant diabetic women and male patients were excluded in the study.

Each patient was interviewed to obtain detailed history and examined thoroughly as per predetermined protocol. The national diabetes data group and WHO diagnostic criteria was used. DM was diagnosed by symptoms of diabetes plus random blood glucose concentration 11.1 mmol/L (200 mg/dL) or fasting plasma glucose 7.0 mmol/L (126 mg/dL) or two-hour plasma glucose 11.1 mmol/L (200 mg/dL) during an Oral Glucose Tolerance Test (OGTT). Serum lipid profile was also analyzed for all the participants.

For CAD diagnosis, history and ECG criteria were used. Angina pectoris usually described as heaviness, pressure, squeezing, smothering, or choking, and only rarely as frank pain. Angina is usually crescendo-decrescendo in nature, typically lasts 2-5 min, and can radiate to either shoulder and to both arms, especially the ulnar surfaces of the forearm and hand. It can also arise in or radiate to the back, interscapular region, root of the neck, jaw, teeth, and epigastrium. At least 1.0 mm (0.10 mv) depression at the J point and either a horizontal or downward slope towards the end of the ST segment at its junction with the T wave combination in at least one ECG lead for the diagnosis was considered as diagnostic criteria.

Myocardial infarction was diagnosed by convex ST segment elevation in corresponding leads (early) or QS complexes or abnormal Q waves i.e. Q waves of 0.04 seconds or more in width (or) 25% or more of the voltage of the R wave in the same lead or both in the corresponding leads (late) or T wave inversion in the corresponding leads (late).

Statistical analyses were done by using SPSS software version 21.0. Chi-square test was used to assess the association between different categorical variables; $p<0.05$ was considered statistically significant.

RESULTS

Out of 250 participants, it was found that majority of the cases with CAD were in the age group of 51-60 years (42.3%) followed by more than 60 years (26.8%) which shows that risk of CAD increases with higher age groups as compared to lower age groups. Most of the cases without symptoms of CAD were similar in both age group of 41-50 and 51-60 years (32.7% in each group) (Table 1). The difference in the age distribution between cases with CAD symptoms and without CAD symptoms was found to be statistically significant ($p<0.05$).

Table 1: Prevalence of CAD according to age group.

Age	CAD		Total
	Absent	Present	
<30	5 3.3%	0	5(2%)
31-40	20(13.1%)	6(6.2%)	26(10.4%)
41-50	50(32.7%)	24(24.7%)	74(29.6%)
51-60	50(32.7%)	41(42.3%)	91(36.4%)
>60	28(18.3%)	26(26.8%)	54(21.6%)
Total	153(100%)	97(100%)	250(100%)

Chi square = 10.627; p=0.031; Statistically significant

It was found that out of 97 cases with CAD symptoms 70 cases (72.2%) were found to have dyslipidemia as compared to 72 out of 153 cases (47.1%) without CAD. This shows an association between dyslipidemia and CAD and it was also found to be statistically significant ($p<0.05$) (Table 2).

Table 2: Dyslipidemia and CAD; n (%).

Dyslipidemia	Symptoms of CAD		Total
	Absent	Present	
Absent	81(52.9)	27(27.8)	108(43.2)
Present	72(47.1)	70(72.2)	142(56.8)

Chi square = 15.249; p=0.001; Statistically significant.

Majority of patients with CAD symptoms had a history of 1-5 years duration of T2DM, 29.9% of cases with CAD had history of 6 to 10 years duration of type 2 DM as compared to 26.8% of cases without CAD. Also 18.6% of cases with CAD had history of 11 to 20 years duration of type 2 DM as compared to 14.4% of cases without CAD. Patients with long duration history of type 2 DM were at increased risk of CAD. However, on chi square test this difference between cases with and without CAD and their relation to duration of type 2 DM was not found to be statistically significant ($p<0.05$).

When post menopause status and CAD were correlated, out of 188 post-menopausal cases, CAD was diagnosed in 86(88.7%) cases; out of the 62 non post-menopausal

cases, CAD was diagnosed in 11 cases; the difference was statistically significant (p<0.05) (Table 3).

Table 3: Post-menopausal cases and CAD.

Post menopause	CAD		Total
	Absent	Present	
Absent	51(33.3%)	11(11.3%)	62(24.8%)
Present	102(66.7%)	86(88.7%)	188(75.2%)
Total	153(100%)	97(100%)	250(100%)

Chi square = 15.397; p=0.001; Statistically significant.

DISCUSSION

Considering the significant impact of T2 DM on CHD related morbidity and mortality, and the resulting pressure on health care resources, understanding the epidemiology of type 2 DM and CAD is of great importance.

In diabetic patients, the diagnosis of CAD generally is missed or delayed because the typical symptoms of cardiac ischemia are often masked. As a result, multi vessel atherosclerosis often is present before ischemic symptoms occur and before treatment can be instituted.[8]

Viswanathan Mohan et al, reported 21.5% prevalence of CAD and it was reported to be 10% and 15% by another study.[9-11] In the present study the prevalence was 39%. The difference in diagnostic criteria adopted by different authors due to difference of various risk factors in the selected study populations, phenotypic, genotypic and environmental variations and various bias.

The Chennai Urban Population Study (CUPS) provided valuable data from India on the complications related to diabetes. The prevalence of coronary artery disease was 21.4 per cent among diabetic subjects compared to 9.1 per cent in normal subjects.[9]

Majority of patients with CAD symptoms had a history of 1-5 years duration of T2 DM, 29.9% of cases with CAD had history of 6 to 10 years duration of type 2 DM as compared to 26.8% of cases without CAD. Also 18.6% of cases with CAD had history of 11 to 20 years duration of type 2 DM as compared to 14.4% of cases without CAD. Patients with long duration history of type 2 DM were at increased risk of CAD. However, on chi square test this difference between cases with and without CAD and their relation to duration of type 2 DM was not found to be statistically significant (p value >0.05). The inter heart study also showed that hypertension and diabetes were more important risk factors for CAD in younger Indian women than men.[12]

In this study the mean age of the 62 premenopausal cases was 39.7±7.0 years, while the mean age of the 188 postmenopausal subjects was 57.1±7.9 (Table 3). The occurrence of heart disease in pre-menopausal women was much less than in men, due to the vascular protective action of estrogen which helps in preventing atherosclerosis. Studies reported the prevalence of hypertension and dyslipidemia, were significantly lower in the premenopausal group. Positive family history was higher in premenopausal women. Pre-menopausal women more commonly associated with single vessel disease (LAD being most commonly involved) whereas post-menopausal women with triple vessel disease.[13] Lu Yihua et al, reported, 83%, 49% CHD cases respectively in pre and post menopause.[14]

CONCLUSION

In premenopausal women, the prevalence of CHDs is significantly higher when compared to postmenopausal women.

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REFERENCES

1. WHO Library Cataloguing-in-Publication Data Global report on diabetes. Available at: https://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf;jsessionid=40045B67340AA3168134C573F226D287?sequence=1. Accessed 15 July 2019.
2. L. Guariguata, D.R. Whiting, I. Hambleton, J. Beagley, U. Linnenkamp. Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes research and clinical practice 2014; 103 (2): 137-49.
3. Mansour M Al-Nozha, Hussein M Ismail, Omar M A, l Nozha. Coronary artery disease and diabetes mellitus. J Of Taibah University Medical Sciences 2016; 11 (4): 330-8.
4. Alexandra Kautzky-Willer. Sex and Gender Differences in Risk, Pathophysiology and Complications of Type 2 Diabetes Mellitus. Endocr Rev. 2016; 37(3): 278-316.
5. Dennis Kasper, Anthony Fauci, Stephen Hauser, Dan Longo, J. Larry Jameson, Joseph Losc. Harrison's Principles of Internal Medicine, 19th ed. New York, NY: McGraw-Hill; 2015: 2215-2229.
6. Clinical Update: Cardiovascular Disease in Diabetes Mellitus Atherosclerotic Cardiovascular Disease and Heart Failure in Type 2 Diabetes Mellitus – Mechanisms, Management, and Clinical Considerations Cecilia C. Low Wang; Connie N. Hess, 2016;133:2459-2502.
7. Matthew J. Budoff, Paolo Raggi. Noninvasive cardiovascular risk assessment of the asymptomatic diabetic patient. The Imaging Council of the Am College Cardiol. 2016;9(2):176-92.
8. Sandeep Chopra, Soumia Peter. Screening for coronary artery disease in patients with type 2

diabetes mellitus: An evidence-based review. Indian J Endocrinol Metab. 2012; 16(1): 94-101.
9. Viswanathan Mohan, Viknesh Prabu Anbalagan. Expanding role of the Madras Diabetes Research Foundation - Indian Diabetes Risk Score in clinical practice Indian J Endocrinol Metab. 2013; 17(1): 31 -6.
10. Gupta R, Gupta VP, Sarna M, Bhatnagar S, Thanvi J, Sharma V. Prevalence of CHD and risk factors in an urban Indian population: Jaipur Heart Watch2. Indian Heart J. 2002; 54(1): 59-66.
11. Arvind Gupta, Rajeev Gupta, Krishna Kumar Sharma, Sailesh Lodha. Research Prevalence of diabetes and cardiovascular risk factors in middle-class urban participants in India BMJ Open Diabetes Res Care. 2014; 2(1): e000048.
12. Meenakshi Sharma, Nirmal Kumar GangulyVasc Health Risk Manag. Premature coronary artery disease in Indians and its Associated Risk Factors. 2005; 1(3): 217-25.
13. Martín-Timón. Type 2 diabetes and cardiovascular disease: Have all risk factors the same strength? World J Diabetes. 2014; 5(4): 444-70.
14. Lu Yihua, G Nabel, Eugene Braunwald, Elizabeth. A Tale of Coronary Artery Disease and Myocardial Infarction. N Engl J Med 2012; 366:54-63.

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