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Risk of Cardiovascular Disease among Saudi Diabetic Patients

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Abstract: One of the most serious complications of DM is cardiovascular disease, particularly among asymptomatic patients or those without glycemic control. Therefore, the aim of the present study was to assess the risk of cardiovascular disease (Heart attack, congestive heart failure, stroke and deep vein thrombosis) among Saudi Diabetic patients. In this study, bout 1406 diabetic patients' records were retrieved from different hospitals and primary health centers in Hail region, Northern Saudi Arabia. The overall prevalence of cardiovascular disease (CVD) among Saudi diabetic patients was 10.2%. The highest prevalence rate of cardiovascular conditions was pointed out to heart attack followed by stroke, CHF and DVT representing 4%, 3%, 1.6%, and 1.5%, respectively. The prevalence rates of CVD are relatively higher among Saudi diabetic population. There is urgent need for implementing specific strategies to decrease the prevalence of CVD among Saudi diabetic patients.

Keywords: Diabetes Mellitus, Cardiovascular disease, Saudi Arabia, heart attack, stroke, CHF, DVT.

INTRODUCTION

Diabetes mellitus (DM) is one of the most important public health challenges of the twenty-first century [1]. DM includes a cluster of heterogeneous complaints, usually manifested by elevated blood glucose [2]. The prevalence of type 2 diabetes is growing globally, most likely due to a longer life expectancy of the general population, and an inactive lifestyle in addition to increasing obesity [3]. In 2013, 382 million people had diabetes; this number is expected to rise to 592 million by 2035. Most people with diabetes live in low- and middle-income countries and these will experience the greatest increase in cases of diabetes over the next 22 years [4].

The prevalence of DM is significantly increasing in all regions over the country [5-7]. The World Health Organization has ranked Saudi Arabia as having the second highest rate of diabetes in the Middle East (7th highest in the world) with an estimated population of 7 million living with diabetes and more than 3 million with pre-diabetes [8].

DM is a chronic illness, which associated with high morbidity and mortality usually result from the diverse complications that occur during the disease clinical progression. Diabetic patients are twice susceptible to cardiovascular diseases compared to their non-diabetic counterpart of the same age and sex [9]. What is more, cardiovascular disease is the leading cause of death in 80% of diabetic patients compared to only 30% in the general population [10]. Therefore, the aim of the present study was to assess the risk of cardiovascular disease (Heart attack, congestive heart failure, stroke and deep vein thrombosis) among Saudi Diabetic patients.

MATERIALS AND METHODS

This is a retrospective descriptive study conducted in Hail region, Northern Saudi Arabia. About 1406 Diabetic patients' records were retrieved from different hospitals and primary health centers in the region. Data regarding the study subjects was collected randomly regardless of age or sex. The only exclusion criteria was non-diabetic diagnosis. Diagnosis of diabetes in this study was based on the information provided in the patient's file that he/she was being under treatment for diabetes due to a previous well-established diagnosis.

The diagnosis of cardiovascular was based on records of previous physical examination, electrocardiography, radiologic tests, cardiac biomarker estimations and patient's history.

STATISTICAL ANALYSIS

Data management was done using Statistical Package for Social Sciences (SPSS version 16). SPSS was used for analysis and to perform Pearson Chi-square test for statistical significant (P value P<0.5).

Ethical consent

The protocol of the present study was approved by the ethical committee at College of Medicine, University of Hail. The informed consent was agreed about by health service providers. All procedures performed this study were in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS

This study investigated 1406 diabetic patients, their ages ranging from 25 to 100 years with a mean age 44 years. Out of the 1408 patients, 749/1406(53.3%) were males and 657/1406(46.7%) were females, giving males' females' ratio of 1.14 to 1.00. The distribution of the study subjects by age was relatively similar for males and females among different age groups, as shown in Table 1, Fig 1.

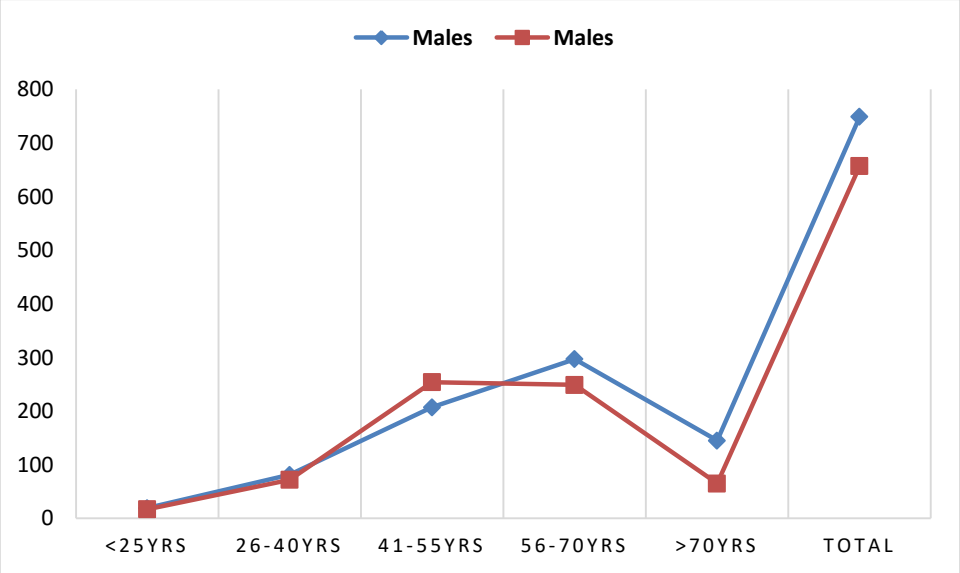

Fig-1: Description of the study population by age and gender

Out of the 1406 diabetic patients, 143/1406(10.2%) were found with cardiovascular changes. Out of 126 diabetic patients with cardiovascular disorders, 57/143(40%), 22/143(15.3%),43/143(30%) and 21/143(14.7%) were identified with heart attack, congestive heart failure (CHF), stroke and deep vein thrombosis, respectively, as shown in Fig 2. The risk of cardiovascular disease associated with DM was found to be statistically significant P <0.001. The highest prevalence rate of cardiovascular conditions was pointed out to heart attack followed by stroke, CHF and DVT representing 4%, 3%, 1.6%, and 1.5%, respectively.

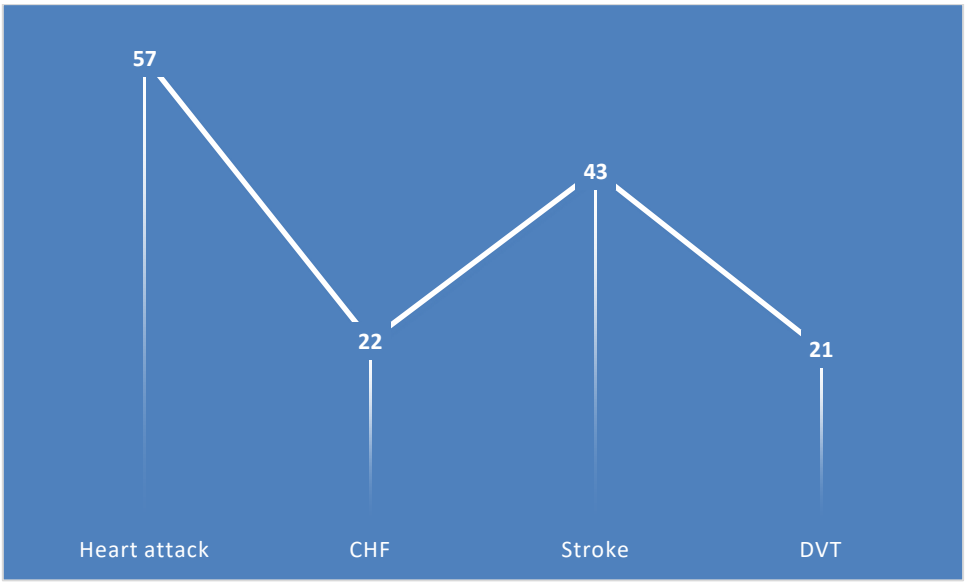

Fig-2: Description of the diabetic patients by cardiovascular changes

With regard to the distribution of patients by gender and cardiovascular disorders, out of the 57 patients with heart attack, 44/57(77%) were males and 13/57(23%) were females. Out of the 22 patients with CHF, 12/22(54.5%) were males and 10/57(45.5%) were females. Out of the 43 patients with heart attack, 31/43(72%) were males and 12/43(28%) were females. Out of the 21 patients with heart attack, 9/21(48%) were males and 12/21(52%) were females, as indicated in Table 1, Fig 3.

Table-1: Description of diabetic patients by cardiovascular disorders and demographical characteristics.

Variable	Category	Males	Females	Total
Age				
	<25 years	19	17	36
	26-40	81	72	153
	41-55	207	254	461
	56-70	297	249	546
	71+	145	65	210
	Total	749	657	1406
Heart attack				
	Yes	44	13	57
	No	705	644	1349
	Total	749	657	1406
CHF				
	Yes	12	10	22
	No	737	647	1384
	Total	749	657	1406
Stroke				
	Yes	31	12	43
	No	718	645	1363
	Total	749	657	1406
DVT				
	Yes	9	12	21
	No	740	645	1385
	Total	749	657	1406

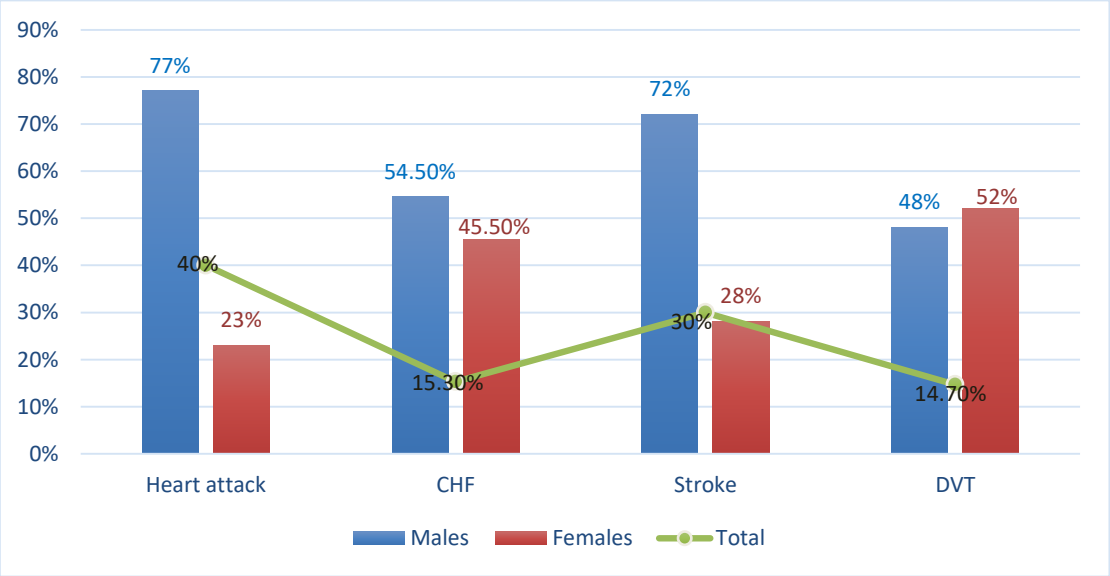

Fig-3: Description of the study subjects by sex and cardiovascular disorders

Table 2 summarizes the distribution of the diabetic patients by age and cardiovascular disorders. For heart attack, the majority of patients were found in age group 56-70 years followed by age ranges >70 years, 41-55 and <25 years representing 26/57(45.6%), 18/57(31.6%),11/57(19.3%) and 2/57(3.5%), respectively.

For CHF, the majority of patients were found in age group 41-55 years followed by age ranges >70

years, 56-70 and <25 years representing 10/22(45.5%), 6/22(27.3%), 5/22(22.7%) and 1/22(4.5%), correspondingly.

For stroke, the majority of patients were found in age group 56-70 years followed by age ranges >70 years, 41-55, 26-40 and <25 years representing 19/43(44.2%), 11/43(25.6%), 11/43(25.6%), 1/43(2.3%) and 1/43(2.3%), respectively.

For DVT, the majority of patients were found in age group 41-55 years followed by age ranges 56-70 years, >70 years, 26-40 and <25 years representing 9/21(42.8%), 5/21(23.8%), 4/21(19%), 2/21(9.5%) and 1/21(4.7%), respectively.

However, when calculating the percentages of the affected patients within each age group in relation to the total patient in age groups, different proportions can be observed, as shown in Fig 4.

Table-2: Distribution of the diabetic patients by age and cardiovascular disorders

Variable	Category	<25yrs	26-40	41-55	56-70	71+	Total
Heart attack							
	Yes	2	0	11	26	18	57
	No	34	153	450	520	192	1349
	Total	36	153	461	546	210	1406
CHF							
	Yes	1	0	10	5	6	22
	No	35	153	451	541	204	1384
	Total	36	153	461	546	210	1406
Stroke							
	Yes	1	1	11	19	11	43
	No	35	152	450	527	199	1363
	Total	36	153	461	546	210	1406
DVT							
	Yes	1	2	9	5	4	21
	No	35	151	452	541	206	1385
	Total	36	153	461	546	210	1406

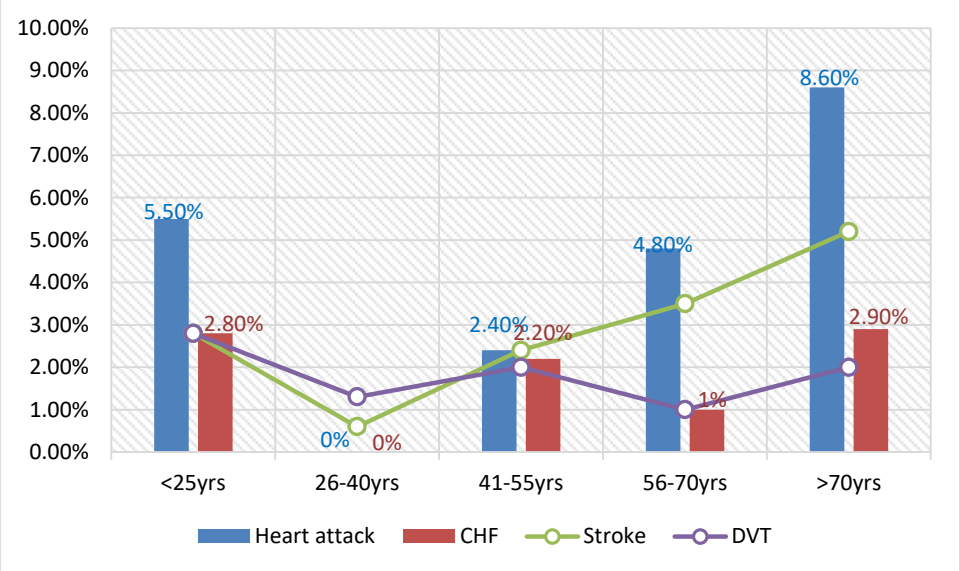

Fig-4: Description of the study population by percentages of cardiovascular disorder in each age group.

DISCUSSION

Cardiovascular disease (CVD) is a leading cause of death worldwide, and its prevalence rates are tremendously increasing in both developed and developing world [11]. One of the most serious complications of DM is cardiovascular disease, particularly among asymptomatic patients or those without glycemic control. Therefore, in the present study we tried to find out the prevalence rates of heart attack, CHF, stroke and DVT in a series of Saudi diabetic patients, in order to notify the health practitioners to this important challenging issue. Since, diabetic patients with insulin resistance or those without glycemic control are even at a greater risk of

cardiovascular disease [12]. Although there are tremendous efforts made to formulate the best management approach [13], the issue needs more efforts in Saudi Arabia. In the lack of clear strategies many patients may die from diabetes-related cardiovascular complications.

In the present study the overall prevalence of cardiovascular disease was found to be 10.2%, which is relatively high. To the best of our knowledge, there is no such study from Saudi Arabia that investigated the risk of cardiovascular disease among Saudi diabetic patients. Most studies devoted to the study of the cardiovascular disease's risk factors. Moreover, in the current study the highest prevalence rate of cardiovascular conditions was pointed out to heart attack followed by stroke, CHF and DVT representing 4%, 3%, 1.6%, and 1.5%, respectively.

Although the prevalence of CVD was reported 11% in one study [14], which is consistent with our findings, studies from different parts of the glob have revealed a diverse epidemiological values of cardiovascular disease among diabetic patients. These variations may be attributed to diabetic control system in each entity as well as, the presence of absence of other risk factors. In a study to evaluate the prevalence of CVD, cardiovascular risk factors (CVRFs), and their control in patients with type 2 diabetes mellitus (T2DM) at primary care settings, CVD prevalence was 22.0% (CHD: 18.9% and peripheral ischemia: 4.5%) and more frequent in men [15]. In another study of people with type 2 diabetes, 6137 (17·9%) had a first cardiovascular presentation, the most common of which were peripheral arterial disease (reported in 992 [16·2%] of 6137 patients) and heart failure (866 [14·1%] of 6137 patients). Type 2 diabetes was positively associated with peripheral arterial disease (adjusted HR 2·98 [95% CI 2·76–3·22]), ischemic stroke (1·72 [1·52–1·95]), stable angina (1·62 [1·49–1·77]), heart failure (1·56 [1·45–1·69]) [16].

The prevalence of CVD risk factors is high in Saudi Arabia particularly among women. Prevalence rates of CVD risk factors among Saudi women of smoking ranged from 1.1% to 9.1%, hypertension was 21.8%, diabetes ranged from 9.6% to 27.6%, overweight was 27%, and obesity was 40.23%, and physical inactivity ranged from 53.2% to 98.1% [17]. The prevalence of diabetes foot complications among patients with diabetes in Jeddah, Saudi Arabia was 11.4% [18]. In a prospective cross-sectional study of Saudi patients aged >or= 45 years, the prevalence of Peripheral arterial disease was 11.7% (95% CI: 8.9-14.9%), and 92.7% of them were asymptomatic [19].

Nevertheless, it was observed that in the present study, the heart attack, stroke and CHF were higher among men, whereas, DVT was relatively high among women. Moreover, though the risk of CVD was observed to increase with increase of age, but heart attack was observed to be elevated among younger patients.

CONCLUSION

The prevalence rates of CVD are relatively higher among Saudi diabetic population. There is urgent need for implementing specific strategies to decrease the prevalence of CVD among Saudi diabetic patients.

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