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Original Research Article

Diabetes Mellitus among Elderly Population In Arar City, Northern Saudi Arabia

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Abstract

Elderly are vulnerable group in any population. Determining the prevalence of diabetes mellitus in any community is important to for planning and implementation of control services. Therefore, we conduct this study to determine the prevalence of diabetes among elderly population of Northern Saudi nationals. A cross-sectional study among patients attending a primary health care centers during the period from 1June to 31 October 2016. Elderly participants were interviewed with structured questionnaires to determine the presence of diabetes by questioning for history of the disease, and prescriptions, reports and center records were reviewed to document any diabetic therapies that the patients may have undergone in the past or were undergoing at that time. Of 276 elderly subjects, the mean age (± SD) was 69 (±8.95) years, male to female ratio was 46.7 to 53.3. The total prevalence of diabetes mellitus among the studied elderly population in Arar is 63.0%, 19.5%of cases were irregular with treatment, about third (30.4%) of them were uncontrolled in spite of treatment, diabetic neuropathy was found in 35.0% of cases, diabetic foot in 14.4%, diabetic retinopathy in 43.1% and diabetic nephropathy in 9.1% of cases of diabetes. No significant relation between diabetes and sex, age group and BMI group among the studied elderly (P>0.05). The prevalence of diabetes is high among elderly Saudi population and represents a major clinical and public health problem. A national prevention program to prevent diabetes and address the modifiable risk factors at the community level, targeting elderly population, should be implemented soon.

Keywords: Provide minimum of five keywords

INTRODUCTION

The topic of WHO Day 2012 was ageing and health with the theme "good health adds life to years". Aging is a natural biological process which is associated with deterioration of health status of elderly people. As aging progress, an inevitable change in each of the body's organs contributes to the body's declining functions (Balamurugan and Ramathirtham, 2012).

Diabetes mellitus is the most common chronic endocrine disorder, affecting an estimated 5% to 10% of the adult population in industrialized Western countries,

Asia, Africa, Central America and South America, and it has a large impact on society (Wild et al., 2004; Al-Nozha et al., 2004). The IDF has subsequently released estimates of the numbers of people with diabetes for 2003 to be 194 million and forecasts for 2025 to be 334 million (Elhadd et al., 2007).

Over the last twenty years, Saudi Arabia has witnessed major socioeconomic development leading to significant changes in its standard of living and lifestyle. The transformation of the society has also resulted in changes in dietary habits and related social practices. This has been compounded by a lack of exercise among large segments of the society. These factors and others have contributed to the increased prevalence of life style-related diseases, including obesity, hypertension and diabetes mellitus (Bani, 2011).

Diabetes is one of the growing health problems in the elderly population in the world and in the Middle East region in general and Saudi Arabia in particular (Ahmed, 2009; Hossain et al., 2007; Chang et al., 2009; Mokdad et al., 2003).

In Al-Modeer study, diabetes mellitus was the second common chronic disease (57.3%) diagnosed among elderly patients (Al-Modeer et al., 2013). Al-Nozha *et al*., 2004, in a National Community Based Survey in the Saudi Arabia found that the prevalence of diabetes among elderly population aged 60-70 years was 36.5 % and other 14.9 % showed impaired glucose tolerance (Al-Nozha et al., 2004). In Fayoum Governorate, Egypt, the prevalence of DM in elderly (17.6%)was more in females than in males (Hassan, 2015). Morbidity Profile of Elderly in Urban Slum of Udaipur shows that (12.33 %) respondents were Diabetic (Vishnoi et al., 2015). However, it is projected that, the number of people with diabetes ≥ 65 years of age will increase 3.6 times between 1995-2025 (Kamble et al., 2012).

In a study carried out in King Fahd hospital, it was found that, the prevalence of diabetes was 34.1% in males and 27.6% in females with mean (SD) age for onset of diabetes in males and females was 57.5 (13.1) and 53.4 (13.1) years, respectively, however, prevalence of diabetes decreased in patients older than 70 years (Khalid et al., 2011).

Elderly are vulnerable group in any population. Determining the prevalence of diabetes mellitus in any community is important to for planning and implementation of control services. Therefore, we conduct this study to determine the prevalence of diabetes among elderly population of Northern Saudi nationals.

PARTICIPANTS AND METHODS

Study design and setting

A cross-sectional study targeting elderly individuals attending 3 randomly selected primary health care centers during the period from 1June to 31 October 2016.

Data collection

Elderly participants were interviewed with structured questionnaires covering the following items:

(1) Socio-demographic characteristics of the participants, including age, educational and marital status.

(2) Presence of diabetes by questioning for history of the disease, and prescriptions, reports and center records were reviewed to document any diabetic therapies that the patients may have undergone in the past or were undergoing at that time.

(3) Anthropometric examination included height and weight measurements with the use of a calibrated balance beam scale and a wall-mounted stadiometer; calculation of body mass index (BMI); and measurement of waist circumferences (WC) using standard methods. Normal weight was defined as BMI<25 kg/m^2, overweight as 25≤BMI<30 kg/m^2 and obesity as BMI≥30 kg/m^2 (WHO Expert Consultation, 2004).

Ethical considerations

Participants were informed that participation is completely voluntary, and written consent was obtained from each participant before being subjected to the questionnaire and after discussing the objective with the participants. No names were recorded on the questionnaires. Adequate training of data collectors took place to ensure protection of confidentiality, and all questionnaires were kept safe.

Statistical analysis

Collected data were coded and analyzed using statistical package for the social sciences (SPSS, version 15). The X^2-test was used as a test of significance, and differences were considered significant at P value 0.05 or less.

RESULTS

Table 1 illustrates the socio-demographic characteristics and BMI status of the studied elderly population. The table showed that, the mean age (± SD) was 69 (±8.95) years, male to female ratio was 46.7 to 53.3, married were 57.9% while 37.7% were widow, illiteracy constitutes 57.9% and 11.9% completed primary education, 11.9% preparatory and5.8% completed the secondary education. About half (45.7%) were obese, 26.8% overweight and only 24.6% had normal weight. (Figure 1)

Table 2 shows the percentage distribution of

Table 1. Sociodemographic characteristics and BMI status of the studied elderly population, Arar, 2016

Age group	No. (n=276)	%
• 60-	180	65.2
• 70-	72	26.1
• 80+	24	8.7
Mean age (± SD)	69±8.95	
Sex		
• Female	147	53.3
• Male	129	46.7
Marital status		
• Widow	104	37.7
• Single	3	1.1
• Married	160	57.9
• Divorced	9	3.3
Educational level		
• Illiterate	160	57.9
• Primary	33	11.9
• Preparatory	33	11.9
• Secondary or more	16	5.8
Working status		
• Not working		68
• Retired		31
• Working		1
BMI (kg/m^2) status		
• Underweight	8	2.9
• Normal	68	24.6
• Overweight	74	26.8
• Obese	126	45.7
Mean BMI (± SD)	29.99±9.73	

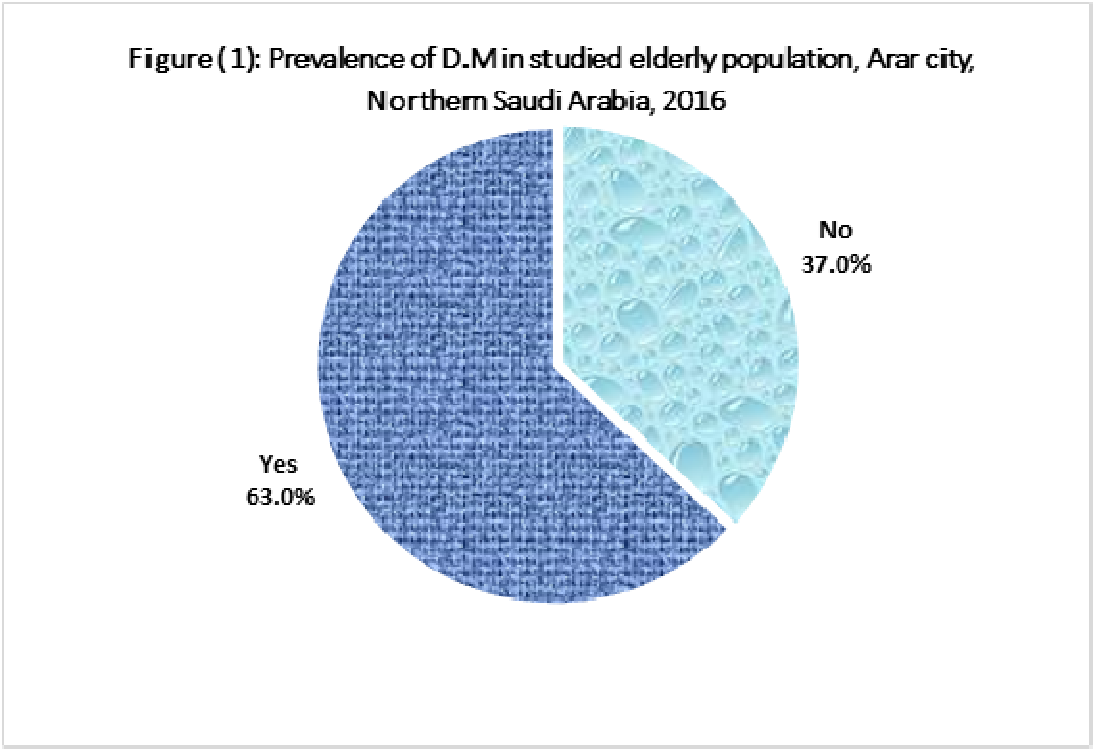

Table 2. Percentage distribution of diabetes mellitus and its complications among the studied elderly population, Arar, 2016

DM (N = 276)	No	%
• No	**102**	**37.0**
• Yes	**174**	**63.0**
Type of treatment (N = 102)		
• Tablets	**111**	**63.8**
• Insulin	**37**	**21.3**
• Both	**26**	**14.9**
Regularity of treatment (N = 102)		
• Regular on treatment	**140**	**80.5**
• Irregular	**34**	**19.5**
Compliance with doctor's instructions (N = 102)		
• **Yes**	**38**	**21.8**
• **No**	**136**	**78.2**
Performing muscular exercise (at least walking) (N = 102)		
• **Yes**	**56**	**33.9**
• **No**	**118**	**66.1**
Diabetic complications (N = 102)		
• Uncontrolled (HbA1c level of 8 mmol/l or above) cases in spite of treatment	**53**	**30.4**
• Diabetic neuropathy	**61**	**35.0**
• Diabetic foot	**25**	**14.4**
• Diabetic retinopathy	**44**	**43.1**
• Diabetic nephropathy	**16**	**9.1**

Table 3. The relationship between DM and sex, age group and BMI group of the studied elderly population, Arar, 2016

Variable	DM		Total (n=276)	Chi-Square	P value
	No (n=102)	Yes (n=174)			
Sex	**No. (%)**	**No. (%)**	**No. (%)**		
Female	56(38.9)	88(61.1)	144(100.0)	0.24	0.37
Male	46(34.8)	86(65.2)	132(100.0)		
Age group					
60 -	60(33.3)	120(66.7)	180(100.0)	2.20	0.33
70 -	34(47.2)	38(52.8)	72(100.0)		
80+	8(33.3)	16(66.7)	24(100.0)		
BMI group (Kg/m^2)					
Underweight	2(25.0)	6(75.0)	8(100.0)	2.55	0.46
Normal	18(26.5)	50(73.5)	68(100.0)		
Overweight	30(40.5)	44(59.5)	74(100.0)		
Obese	52(41.3)	74(58.7)	126(100.0)		

diabetes mellitus and its complications among the studied elderly population. It is clear from the table that, the total prevalence of diabetes mellitus among the studied elderly population in Arar is 63.0%, 19.5%of cases were irregular with treatment, about third (30.4%) of them were uncontrolled in spite of treatment, diabetic neuropathy was found in 35.0% of cases, diabetic foot in 14.4%, diabetic retinopathy in 43.1% and diabetic nephropathy in9.1% of cases of diabetes.

Table (3) shows the relationship between DM and sex, age group and BMI group of the studied elderly population. No significant relation between diabetes and sex, age group and BMI group among the studied elderly (P>0.05).

DISCUSSION

Diabetes is one of the growing health problems in the elderly population in the world and in the Middle East region in general IDF estimates that there are currently 34 million people living with diabetes in the Middle East and North Africa (WHO Expert Consultation, 2004). That number is set to almost double by 2030. Therefore we

conduct this study aiming to determine the prevalence of diabetes among elderly population of Northern Saudi nationals. This is a cross-sectional study targeting elderly individuals attending 3 randomly selected primary health care centers during the period from 1 June to 31 October 2016.

The present study showed that the prevalence of DM in elderly (63.0%) was more in females than in males with insignificant difference ($p>0.05$).

This prevalence was higher than Al-Modeer study, diabetes mellitus was the second common chronic disease (57.3%) diagnosed among elderly patients (Al-Modeer et al., 2013). Our prevalence was also higher than Al-Nozha *et al*., 2004, found that the prevalence of diabetes among elderly population aged 60-70 years was 36.5 % (Al-Nozha et al., 2004). Again, our prevalence was higher than higher than findings of a study in King Fahd hospital, found that, the prevalence of diabetes was 34.1% in males and 27.6% in females (Khalid et al., 2011). Our prevalence is far more than findings of Hassan SK, in Fayoum Governorate, Egypt, the prevalence of DM in elderly (17.6%) was more in females than in males (Hassan, 2015). Morbidity Profile of Elderly in Urban Slum of Udaipur shows that (12.33 %) respondents were Diabetic (Vishnoi et al., 2015). This difference may be due to that many people in Egypt and Udaipur are living with undiagnosed DM.

Aging occurs at different rates among individuals and among individual organs and tissues in the body. Advancing age is associated with glucose intolerance and changes in bodily functions thus, actively screening older people in hospitals and care facilities for diabetic complications is warranted (Tuomilehto et al., 2001).

In the current study, the overall prevalence of diabetic retinopathy was 43.1%, which is more than which found among Saudi diabetic patients, the prevalence of retinopathy was 31% after a mean duration of diabetes greater than 10 years (Abu El Asrar et al., 1999). Al-Modeer et al., shows so much less prevalence among diabetic elderly (1.7%) (Al-Modeer et al., 2013). However, to date no study has examined screening strategies for diabetic retinopathy in Saudi patients (Al-Modeer et al., 2013).

Diabetic neuropathy (DN) refers to symptoms and signs of neuropathy in a patient with diabetes in whom other causes of neuropathy have been excluded.

In the current study, diabetic neuropathy was found in 35.0% of diabetic elderly. Research estimates that the prevalence of DPN in Saudi population was 19.9% (Wang et al., 2014). While the incidence of DN in a study from South India was 19.1% of type II diabetic patients (Ashok et al., 2002), which is less than our finding.

Ulceration of the foot in diabetes is common and disabling and frequently leads to amputation of the leg. Mortality is high and healed ulcers often recur. In the current study, diabetic foot was found in 14.4% of diabetic elderly, Research estimates that the lifetime incidence of foot ulcers within the diabetic community is around 15% and may become as high as 25% (Singh, 2013). Other studies reported that diabetic foot ulcers are common and estimated to affect 15% of all diabetic individuals during their lifetime (Pendsey, 2003; Pecoraro et al., 1990). All are consistent with our finding. The 2010 International Diabetes Federation IDF comparative prevalence rate of diabetic food 16.8% (Hasan, 2012).

In the study, an HbA1c level of 8 mmol/l or above was used to define uncontrolled diabetes. In the study, the rate of uncontrolled diabetes was 30.4%, this finding was less than findings of (Alsenany and Al Saif, 2015) study, >44% of individuals aged 55 or older had severe to uncontrolled diabetes (Alsenany and AlSaif, 2015). The rate of uncontrolled diabetes was 59.3% in King Abdulaziz Housing City (Iskan) population, Saudi Arabia (Thamer et al., 2016). A study by Zhaolan *et al*., found that 63% of their studied population had poorly controlled diabetes (A1c >7.5%) while only 12.1% met an optimum HbA1c target (<6.5%) (Liu et al., 2010). Another study by Al-Rowais, in Riyadh, found that the rate of "unacceptable HbA1c" for diabetics attending a university hospital was about 60% (HbA1c >7), while 36% had an HbA1c above 8 (Al-Rowais, 2014). The rate of uncontrolled diabetics (HbA1c >7) in a Jordanian study by Khattab et al., was about 65% (Khattab et al., 2010). Several factors including patient's compliance and understanding of the disease, literacy and treatment strategy by physicians contribute to the lack of control (Moorthi et al., 2011).

Obesity and DMT2 are chronic conditions, and long-term management strategies are needed. Obesity is defined as excess body fat and is now recognized as a disease in its own right (Fatani et al., 1987).

No significant relation between diabetes and BMI group among the studied elderly ($P>0.05$). In contrary, there is a strong relationship between obesity and diabetes (Alsenany and Al Saif, 2015) study (Alsenany and AlSaif, 2015). Also, there is a higher incidence of obesity in people with diabetes, with 80–90% of people diagnosed with DMT2 also diagnosed as obese (Mohsen et al., 1998; World Health Organization). In the Saudi community, the prevalence of obesity has been increasing and is now considered a common problem resulting from a sedentary lifestyle that includes excessive television viewing, insufficient physical activity, and the high consumption of fatty foods, which this study confirmed.

CONCLUSION

The prevalence of diabetes is high among elderly Saudi population and represents a major clinical and public health problem. A national prevention program to prevent diabetes and address the modifiable risk factors at the

community level, targeting elderly population, should be implemented soon.

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