The Egyptian Journal of Hospital Medicine (October 2017) Vol. 69 (8), Page 3154-3159

Coexistence of Hypertension and Diabetes Mellitus in Elderly Population of Arar City, Northern Saudi Arabia

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ABSTRACT

Background: Type 2 diabetes (DM) mellitus and Hypertension (HT) are among the most common chronic non-communicable diseases affecting at a higher prevalence in the older age group. The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. The objective of this study is to determine the prevalence rate and risk factor associated with co-existence of hypertension and diabetes mellitus in elderly population in Arar city, Northern Saudi Arabia. **Methods:** A cross sectional study, included 181 elderly attending seven randomly selected primary healthcare centers in Arar city during the period from 1st January to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second elderly attending the PHC during the study period. Data collected by means of personal interview using a predesigned questionnaire covering the required items. **Results:** The prevalence of coexistence of diabetes and hypertension was 16.6% while coexistence of diabetes, hypertension and obesity were found in 9.9%. Two-thirds (66.66%) of cases of coexisting diabetes and hypertension were females (P value>0.05). The relation between coexisting diabetes and hypertension with smoking status was significant (P value<0.05) while the relation with BMI was non-significant (P value>0.05).

Conclusion: Coexistence of diabetes and hypertension were found in 16.6% of elderly population of Arar, Northern KSA. This association leads to several cardiovascular complications, so it is mandatory to adopt more strategies for the control of DM and HT in Arar elderly population by appropriate methods.

Keywords: Coexistence of diabetes and hypertension; elderly population; Arar; Northern Saudi Arabia.

INTRODUCTION

Type 2 diabetes (DM) mellitus and Hypertension (HT) are among the most common chronic non-communicable diseases affecting both developed and developing countries and occur at a higher prevalence in the older age group and result from both genetic and environmental factors [1]. HT is considered to be one of the most common causes of morbidity and mortality affecting mankind [2]. It is a multifactorial clinical condition called a syndrome and characterized by the presence of high tension levels, associated with metabolic and hormone changes and with trophic phenomena [6]. HT is a common health problem in developed countries and a major risk factor for CVD. DM is a disease of insidious onset and the symptoms, when they eventually appear, do not demand immediate attention and thus remain undiagnosed at onset and even when diagnosed is often ignored by persons afflicted by it [3]. Studies indicate that the prevalence of DM ranges from 7 to 14% in the population aged 30 to 69 years old [5]. The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. When HT coexists with DM, the risk of CVD is increased by 75%, which further contributes to the overall morbidity and mortality of already high risk population [4]. Epidemiologic studies provide evidence for co-existence of hypertension and diabetes and possibly point towards a common genetic and environmental factor promoting both diabetes and hypertension [7].

Received: 11/09/2017
Accepted: 21/09/2017
DOI: 10.12816/0042867

The objective of this study is to determine the prevalence rate and risk factor associated with co-existence of hypertension and diabetes mellitus in elderly population in Arar city, Northern Saudi Arabia, KSA.

PARTICIPANTS AND METHODS

Type of the study: Cross sectional hospital based study.

Sampling: The sample size calculated using the sample size equation: $n=z^2p\ (1-p)/e^2$, considering target population more than 1000, and study power 95%.

Data collected from 181 elderly participant aged 60 years and above, attending 5 randomly selected primary healthcare centers in Arar city during the period from 1st January to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second elderly attending the PHC during the study period.

Each participant interviewed separately, and confidentiality assured.

Data collection: Data collected by means of personal interview with the sampled elderly using a predesigned questionnaire covering the following items:

(1) Socio-demographic characteristics including age, sex, educational and marital status.

(2) Smoking status.

(3) Questions regarding the previously diagnosed diabetes mellitus and hypertension, and coexistence of both after ensuring the diagnosis and by reviewing the accompanied health reports and prescriptions.

(4) Anthropometric examination included height and weight measurements with the use of a calibrated balance beam scale and a wall-mounted stadiometer and calculation of body mass index (BMI). Underweight weight defined as BMI <18.5kg/m^2, Normal weight BMI 18.5-25 kg/m^2, overweight 25.1-30 kg/m^2, obese >30kg/m^2.

Statistical analysis

Collected data coded and analyzed using statistical package for the social sciences (SPSS, version 16). Descriptive statistics for the prevalence and quantitative variables was used. Relation between DM and HT was determined using the Chi-square test. P-value of less than 0.05 was considered statistically significant.

Ethical considerations

Data collectors gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent obtained from all participants. Anonymity and confidentiality of data maintained throughout the study. There was no conflict of interest. **The study was done according to the ethical board of Northern Border university.**

RESULTS

Table 1 illustrates the socio-demographic characteristics, hypertension, DM, BMI group and smoking of the studied elderly population, the total number of the study participants was 181 elderly. Females constitute 55.2% who aged 60-70 years were 39.2%, 26.5% aged 80 years or more. Illiterate participants constituted 41.4%, about one-fifth (19.9%) were university graduates. More than two thirds (66.9%) were married, one-third (28.7%) were widow, and only 5% divorced. The prevalence of hypertension in the studied elderly was 43.1%, diabetes was 35.4%, coexistence of both diabetes and hypertension found in 16.6% while coexistence of diabetes, hypertension and obesity were found in 9.9%. Regarding the obesity alone it was found in about half (47.5%) and 23.8% were overweight. The majority (68.5%) were X-smokers and only 9.4% were smokers.

Table 2 describes the relationship between sociodemographic characteristics and the coexistence of both diabetes and hypertension, smoking and BMI group in the studied elderly. About two thirds (66.7%) of cases of coexisting diabetes and hypertension were females but (P value>0.05). The percentage of coexisting diabetes and hypertension was higher (40%) in elderly 60-70 years than other elderly age groups (P value<0.05). Most (60.0%) coexisting diabetes and hypertension cases were obese, 86.7% of them were X-smokers and 43.3% were widow. The relation between presence of coexisting diabetes and hypertension with smoking status was significant (P value<0.05). While the relation with marital status, educational level and BMI group was non-significant (P value>0.05).

Table (1): Sociodemographic characteristics, hypertension, DM, BMI group and smoking of the studied elderly population, Arar, KSA, 2017

Sex	No. (n=181)	%
• Female .	100	55.2
• Male .	81	44.8
Age group		
• 60-	71	39.2
• 70-	62	34.3
• 80+	48	26.5
Educational level		
• Illiterate	75	41.4
• Primary	33	18.2
• Preparatory	12	6.6
• Secondary	25	13.8
• University+	36	19.9
Marital status		
• Widow	52	28.7
• Married	121	66.9
• Divorced	9	5.0
Hypertension		
• Yes	78	43.1
• No	103	56.9
DM		
• Yes	64	35.4
• No	117	64.6
Coexistence of DM and Ht		
• Yes	30	16.6
• No	151	83.4
Coexistence of DM, HT and obesity		
• Yes	18	9.9
• No	163	90.1
BMI group		
• Underweight	4	2.2
• Normal	48	26.5
• Overweight	43	23.8
• Obese	86	47.5
Smoking		
• X-smoker	124	68.5
• Smoker	17	9.4
• Non smoker	40	22.1

Table (2): The relationship between coexistence of diabetes and hypertension and socio-demographic characteristics, smoking and BMI group of the studied elderly population, Arar, KSA, 2017

Variables	Existence of both DM + Hypertension		Total	P value
Age group	Yes (n=30)	No (n=151)	=181)	
60-	12	59	71	0.031
	40.0%	39.1%	39.2%	
70-	10	52	62	
	33.3%	34.4%	34.3%	
80-	8	40	48	
	26.7%	26.5%	26.5%	
Sex				
Female	20	80	100	0.119
	66.7%	53.0%	55.2%	
Male	10	71	81	
	33.3%	47.0%	44.8%	
Marital status				
Married	16	105	121	0.128
	53.3%	69.5%	66.9%	
Widow	13	38	51	
	43.3%	25.2%	28.2%	
Divorced	1	8	9	
	3.3%	5.3%	5.0%	
Educational level				
Illiterate	19	56	75	0.08
	63.3%	37.1%	41.4%	
Primary	5	28	33	
	16.7%	18.5%	18.2%	
Secondary	3	22	25	
	10.0%	14.6%	13.8%	
University +	2	34	36	
	6.7%	22.5%	19.9%	
Preparatory	1	11	12	
	3.3%	7.3%	6.6%	
BMI				
Underweight	1	3	4	0.405
	3.3%	2.0%	2.2%	
Normal	5	43	48	
	16.7%	28.5%	26.5%	
Overweight	6	37	43	
	20.0%	24.5%	23.8%	
Obese	18	68	86	
	60.0%	45.0%	47.5%	
Smoking				
X-smoker	26	98	124	0.042
	86.7%	64.9%	68.5%	
Smoker	0	17	17	
	.0%	11.3%	9.4%	
Non smoker	4	36	40	
	13.3%	23.8%	22.1%	

DISCUSSION

Diabetes mellitus and hypertension are both multifactorial disorders, which occur at a higher prevalence in the older age group. The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy [4]. The objective of this study is to determine the prevalence rate and risk factor associated with co-existence of hypertension and diabetes mellitus in elderly population in Arar city, Northern Saudi Arabia. A cross sectional study, included 181 elderly attending seven randomly selected primary healthcare centers in Arar city during the period from 1stJanuary to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second elderly attending the PHC during the study period. Data collected by means of personal interview using a predesigned questionnaire covering the required items.

Our study showed that the prevalence of hypertension in the studied elderly was 43.1%, DM was 35.4%, coexistence of diabetes and hypertension was 16.6% while coexistence of diabetes, hypertension and obesity together found in 9.9%. A cross-sectional study was conducted on 400 geriatric population at Attayampatti village, reported prevalence of diabetes among study population was 36% and the prevalence of hypertension was 59% diabetics, the prevalence in males was 22% and in females it was 15%, hypertensives, the prevalence in males was 33.3% and in females it was 26.2% [11]. There is high prevalence of diabetes and hypertension in older Mexican adults [9]. And this was proven by Mexican study which reported 34.3% of older adults which were classified having diabetes, It was also determined that 73.9% of this population presented HTN, Of the subjects who had HTN, 36.6% also had DM, and of the patients with diabetes 74.1% also had HTN [8]. Regarding obesity; our study found 47.5% were obese and 23.8% were overweight. The majority (68.5%) was x-smokers and only 9.4% were smokers. Another study reported the prevalence of overweight among geriatric population was 38.7%, obesity was present in 25.6%, and abdominal obesity in 58.6% of the population, smoking was a prevalent habit among 14.2% of the subjects [8]. Another study in Turkey among 1601 patients reported that; 18.1% of patients had combined obesity, hypertension and diabetes mellitus, 16.1% had hypertension and diabetes mellitus, approximately 16.1% had only hypertension, 15.4% had obesity and hypertension, 13.3% had diabetes mellitus, 12.7% had obesity and diabetes mellitus and 8.4% were obese [10]. Retrospective analysis of all elderly patients following up in NEERI Hospital among 585 elderly people found that; 178 have been diagnosed till date to have DM. Thus, the prevalence rate of DM in elderly population is 30.42%. 90 (50.56%) are males and 88 (49.43%) are females, Thus almost equal numbers of both sexes are affected, the ratio being-(1:0.97), 114 patients (64.04%) have central obesity and 80% patients had associated hypertension [12]. In Manipur, India; a study conducted on 1768 individuals found that; 294 (16.63%) individuals were found to be diabetic, 321(18.16%) to be hypertensive, a total of 244 (13.8%) individuals had both DM and HT, Of the 294 individuals with DM, 139 (47.28%) had HT, Out of 321 individuals with HT, 105(32.7%) were reported with DM [13]. Several studies show close association between HT and DM. In a study in France (Marre et al.) reported HT in almost one-third of diabetic cases [14]. The prevalence of HT is 1.5–2.0 times more in those with DM than in those without DM, whereas almost one-third of the patients with HT develop DM later [15]. In a large prospective cohort study that included 12,550 adults, the development of diabetes was almost 2.5 times as likely in persons with hypertension as in their normotensive counterparts [16]. Similarly, evidence points to increased prevalence of hypertension in diabetic persons [17].

CONCLUSION AND RECOMMENDATIONS

Coexistence of diabetes and hypertension found in 16.6% of elderly population of Arar, Northern KSA. This association leads to several cardiovascular complications, so it is mandatory to adopt more strategies for the control of DM and HT in Arar elderly population by appropriate methods.

ACKNOWLEDGMENT

The success and final outcome of this work required support and assistance of many people and we are fortunate to have got this all along the completion of the work. Our thanks go to Wafaa Mohamed Bakr Ali (Faculty of Pharmacy Sohag University, Egypt) and Omar Mohamed Bakr Ali for their help in different steps of the research.

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