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### RESEARCH ARTICLE

#### CARDIOVASCULAR SYSTEM PROBLEMS AMONG GERIATRIC POPULATION OF ARAR CITY, KINGDOM OF SAUDI ARABIA: PREVALENCE AND DETERMINANTS

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#### Abstract

##### Abstract:

**Background:** Over the last twenty years, Saudi Arabia has witnessed major socioeconomic development leading to significant changes in its standard of living and lifestyle. This transformation of the society resulted in changes in dietary habits, compounded by a lack of exercise among elderly have contributed to the emergence of diseases, including hypertension and IHD and other important cardiovascular diseases. **Objectives:** To estimate the prevalence of cardiovascular system diseases, its types and its determinants among the elderly population of Arar city, Kingdom of Saudi Arabia. **Participants and methods:** A cross sectional study included 276 participant aged 60 years and above, attending 5 randomly selected primary healthcare centers in Arar city. Data was collected through personal interviews with the sampled elderly and filling the questionnaire which guided us to the data of socio-demographic characteristics, smoking status and diabetes millets. BMI was calculated. The questionnaire included questions regarding the cardiovascular system diseases, its types and its determinants, after ensuring the diagnosis and by reviewing the accompanied health reports and prescriptions and asking the caregivers about the case. **Results:** The overall prevalence of cardiovascular diseases was 73.2%, hypertension was found in about half (44.9%) of them, ischemic heart diseases in 18.9%; Myocardial infarction was found in 10.9%, Ischemia in 8.0% and Arrhythmias in 6.5% of the studied elderly population. There is insignificant relationship between the occurrence of hypertension and sex, age group, DM and obesity ( $P>0.05$ ). But there is significant relation between the occurrence of hypertension and smoking in studied elderly population ( $P<0.05$ ). There is significant relation between the occurrence of ischemic heart diseases and sex, age group, smoking and DM in studied elderly population ( $P<0.05$ ). But there is insignificant relationship between the occurrence of ischemic heart

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diseases and obesity ( $P>0.05$ ). **Conclusion and recommendations:** The study revealed that elderly were suffering from many cardiovascular diseases. Such common comorbidities as DM, obesity, and Smoking need decision makers to plan and implement more effective preventive, curative and rehabilitative services to improve the health status and the quality of life of those vulnerable group.

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## **Introduction:**

Ageing is a natural biological process which is associated with deterioration of health status of elderly people. The ageing is inevitable and it is a concern of every one. Ageing is known as a process of deterioration in the functional capacity of a person that results from structural changes, with advancement of age [1].

The world will have more elderly people than children because economies are globalizing and the technologies are evolving rapidly [2].

Elderly life is full of problems- physical, social and economic. Older people are helpless and a disability is more likely to occur in the old age [3]. From 1990 through 2010, there was a decline in age-specific mortality in KSA. During the same time, life expectancy increased from 72.5 to 75.0 for men and from 76.3 to 79.9 for women. During the same time, healthy life expectancy increased from 61.8 to 63.9 for men and from 63.5 to 66.6 for women [4].

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 emergence of life style-related diseases, including hypertension and diabetes mellitus.[5].

Cardiovascular disease (CVD) is a class of diseases that involve the heart or blood vessels which are the leading cause of death globally. In the Cardiovascular Health Study which the prevalence of cardiovascular diseases in older Americans, the prevalence rates of definite myocardial infarction and angina were 11% and 15%, respectively, among men aged 65–69 years, 18% and 17% among men aged 80–84 years, 4% and 8% among women aged 65–69 years, and 3% and 13% among women aged 80–84 years [6].

In southwest Saudi Arabia, Al-Modeer study found that, the most prevalent cardiovascular disease is hypertension (59.1%) followed by ischemic heart diseases (16.7%) and arrhythmias occurred among 8.1% of study population; 8.9 in females % and 7.0% in males. Most of the cardiovascular morbidities have the same percent in both genders. Some diseases show significant ( $P < 0.005$ ) high prevalence among males such as hypertension, its prevalence among males was 63.7% compared to 55.5% in females [7].

In Fayum, Egypt, hypertension was the second prevalent disease (37.4) with more prevalence among males (19.3%) than Females (18.2%). CHD was 5.9% 3.6% in males and 2.2% in females [8].

In a national study in KSA conducted by Al-Nozha et al., the overall prevalence of Coronary Artery Diseases obtained from this study is 5.5% in KSA. The prevalence in males and females were 6.6% and 4.4% ( $P<0.0001$ ). Urban Saudis have a higher prevalence of 6.2% compared to rural Saudis of 4% ( $P<0.0001$ ). The following variables are found to be statistically significant risk factors in KSA: age, male gender, body mass index (BMI), hypertension, current smoking, fasting blood glucose, fasting cholesterol and triglycerides [9].

In a study conducted in Dubai, the most common prevalent disease was hypertension (67.5%) [10].

In Udaipur, Rajasthan Vishnoi et al., found hypertension among elderly was 25% it was 38.7 in females and 15.3 in males [11].

Assessment of the cardiovascular morbidity profile will help in the application of interventions, to keep and improve vision and the quality of life of the elderly. Yet, up to our knowledge, there is little or no baseline information on the prevalence of cardiovascular diseases in the elderly population in our region.

## **Objectives:**

To estimate the prevalence of previously diagnosed cardiovascular system diseases, its types and its possible determinants among the elderly population of Arar city, Kingdom of Saudi Arabia.

## **Participants and methods:**

### **Study design and setting :**

The present cross sectional study was conducted in Arar city, which is the regional headquarter of the Northern Border Province of Saudi Arabia.

**Study period and target population:** During the period from 1 June to 30 September 2016, on elderly people of age 60 years and more.

**Sampling:**

The sample size was calculated using the sample size equation:  $n = z^2 p(1-p)/e^2$ , considering target population more than 1000, and study power 95%. Data was collected from 276 elderly participant aged 60 years and above, attending 5 randomly selected primary healthcare centers in Arar city. They were selected using a systemic random sampling procedure. Each participant was interviewed separately, and confidentiality was assured. Health centers provide healthy and sick citizens with healthcare services in an acceptable atmosphere of both privacy and confidentiality.

**Data collection:**

Data were 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 and certain types of diseases that may be prevalent among elderlies suggested to affect cardiovascular system diseases such as diabetes millets and thyroid gland diseases.
- (3) Questions regarding the previously diagnosed cardiovascular system diseases, its types and its determinants, after ensuring the diagnosis and by reviewing the accompanied health reports and prescriptions and asking the caregivers about the case.
- (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). Normal weight was defined as  $BMI < 25 \text{ kg/m}^2$ , overweight as  $25 \leq BMI < 30 \text{ kg/m}^2$  and obesity as  $BMI \geq 30 \text{ kg/m}^2$  [16].

**Ethical considerations**

Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

**Statistical analysis**

We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results were displayed as counts and percentages. The X2 test was used as a test of significance, and differences were considered significant at P value less than 0.05.

**Results:**

Table (1) illustrates the socio-demographic characteristics and BMI status of the studied elderly population. The table showed that mean age ( $\pm$  SD) was 70 ( $\pm 9.25$ ) years, male to female ratio was 47.8 to 52.2, married were 88.4 while 9.4 were widow, illiteracy constitutes 52.9% and 20.3% completed primary education, 13% preparatory and 13.8% completed the secondary education. Regarding working status, most of the participants (38.4%) haven't work while 33.3% were retired, 15.2% house wives and 10.9% were Shepherd. D.M was found in 37.0% and 44.9% were hypertensive. About half (45.7%) were obese, 26.8% underweight and only 24.6% had normal weight.

Table (2) illustrates the percentage distribution of cardiovascular diseases among the studied elderly population. The overall prevalence of cardiovascular diseases was 73.2%, hypertension was found in about half (44.9%) of them, ischemic heart diseases in 18.9%; Myocardial infarction was found in 10.9%, Ischemia in 8.0% and Arrhythmias in 6.5% of the studied elderly population.

Table (3) illustrates the relationship between hypertension and socio-demographic characters, obesity and D.M in the studied elderly population. There is insignificant relationship between the occurrence of hypertension and sex, age group, DM and obesity ( $P > 0.05$ ). But there is significant relation between the occurrence of hypertension and smoking in studied elderly population ( $P < 0.05$ ).

Table (4) illustrates the relationship between ischemic heart diseases and socio-demographic characters, obesity and D.M in the studied elderly population. There is significant relation between the occurrence of ischemic heart diseases and sex, age group, smoking and DM in studied elderly population ( $P < 0.05$ ). But there is insignificant relationship between the occurrence of ischemic heart diseases and obesity ( $P > 0.05$ ).

**Table (1): Socio-demographic characteristics, chronic diseases 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 ( $\pm$ SD)	70 $\pm$ 9.25	
<b>Sex</b>		
• Female	144	52.2
• Male	132	47.8
<b>Marital status</b>		
• Widow	26	9.4
• Married	244	88.4
• Divorced	6	2.2
<b>Educational level</b>		
• Illiterate	146	52.9
• Primary	56	20.3
• Preparatory	36	13.0
• Secondary	38	13.8
<b>Working status</b>		
• Shepherd	30	10.9
• House wife	42	15.2
• Military	6	2.2
• No work	106	38.4
• Retired	92	33.3
<b>Chronic diseases</b>		
• DM	102	37.0
<b>BMI (kg/m<sup>2</sup>) status</b>		
• Underweight	8	2.9
• Normal	68	24.6
• Overweight	74	26.8
• Obese	126	45.7
Mean BMI ( $\pm$ SD)	29.99 $\pm$ 9.73	
• Shepherd	30	10.9
• House wife	42	15.2

**Table (2): Percentage distribution of cardiovascular diseases in the studied geriatric population, Arar, 2016**

Cardiovascular diseases	No. (n=276)	%
<b>Yes</b>	<b>200</b>	<b>72.5</b>
Hypertension	124	44.9
Ischemic heart diseases	52	18.9
• Myocardial infarction	30	10.9
• Angina pectoris	22	8.0
Arrhythmias	18	6.5
Coronary artery bypass operation	2	.7
Hypertension and previous myocardial infarction	2	.7
Valve diseases	2	.7
<b>No</b>	<b>76</b>	<b>27.5</b>

**Table (3): the relationship between Hypertension and sex, age group, obesity and D.M in the studied elderly, Arar, 2016**

Sex	Hypertension		Total (n=276)	Chi-square	P value
	No	Yes			

	(n=150)	(n=126)			
• Female	74 (49.3)	70 (55.6)	144 (52.2)	0.531	0.289
• Male	76(50.7)	56(44.4)	172(47.8)		
<b>Age group</b>					
• 60 -	102(68.0)	78(61.9)	180(65.2)	0.755	.561
• 70 -	36(24.0)	36(28.6)	72(26.1)		
• 80 +	12(8.0)	12(9.5)	24(8.7)		
<b>Smoking history</b>					
• Non smoker	90(60.0)	100(79.4)	190(68.8)	5.98	0.050
• Smoker	14(9.3)	6(4.8)	20(7.2)		
• Ex-smoker	46(30.7)	20(15.9)	66(23.9)		
<b>Diabetes</b>					
• Diabetic	54(36.0)	48(38.1)	102(37.0)	0.065	0.469
• Non diabetic	96(64.0)	78(61.9)	174(63.0)		
<b>Obesity</b>					
• Non obese	82(54.7)	68(54.0)	150(54.3)	0.007	0.535
• obese	68(45.3)	58(46.0)	126(45.7)		

**Table (4): the relationship between ischemic heart diseases and sex, age group, obesity and D.M in the studied elderly, Arar, 2016**

Sex	Ischemic heart diseases		Total (n=276)	Chi-square	P value
	No (n=224)	Yes (n=52)			
• Female	128(57.1)	16(30.8)	144(52.2)	5.88	0.01
• Male	96(42.9)	36(69.2)	132(47.8)		
<b>Age group</b>					
• 60 -	156(69.6)	24(46.2)	180(65.2)	14.03	0.001
• 70 -	44(19.6)	28(53.8)	72(26.1)		
• 80 +	24(10.7)	0(0)	24(8.7)		
<b>Smoking history</b>					
• Non smoker	156(69.6)	34(65.4)	190(68.8)	5.98	0.050
• Smoker	10(4.5)	10(19.2)	20(7.2)		
• Ex-smoker	58(25.9)	8(15.4)	66(23.9)		
<b>Diabetes</b>					
• Diabetic	72(32.1)	30(57.7)	102(37.0)	5.91	0.015
• Non diabetic	152(67.9)	22(42.3)	174(63.0)		
<b>Obesity</b>					
• Non obese	118(52.7)	32(61.5)	150(54.3)	0.668	0.276
• Obese	106(47.3)	20(38.5)	126(45.7)		

## Discussion:

Saudi Arabia like most countries in the world is facing the challenge of an ageing population. The recent increases in the proportion of elderly has raised attention to issues concerning the morbidity profile of this potentially vulnerable age group. The Physical functioning and psychological wellbeing of elderly are influenced by their morbidities. (12)

This study is a cross-sectional study was carried out in Arar city, the capital of the Northern Province of KSA, during the period from 1 June to 30 September 2016, on 138 elderly people of age 60 years and more.

In this study hypertension was the most common among these morbidities (44.9%) and is also found to be more prevalent among females (55.6%) than males (44.4%), however the gender difference was insignificant ( $P>0.05$ ).

In Al-Modeer study hypertension was the most common among these morbidities (59.1%) and is also found to be more prevalent among males than females this isn't in agreement with findings of our study [7]. In Dubai study, the most common prevalent disease among studied elderly was hypertension (67.5%) [10] which is more than our figure. In Fayoum, Egypt, hypertension was the second prevalent disease (37.4) with more prevalence among males than females [8]. Other studies found hypertension was (73.6% and 67.9% among males) [13,14]. In Udaipur, hypertension among elderly was 25%, it was more prevalent in females than males (38.7 Vs. 15.3) [11] which is consistent with our result, but the figure is less than our figure.

The gender differences may result from biological differences, but they may be due to other comorbidity as obesity. A systematic review of the overall worldwide prevalence of hypertension, showed no gender difference [15] This study further supports this finding.

Results of the current study showed that Ischemic Heart Diseases was found in 18.9% of studied elderly population, it was more encountered among males compared to females ( $P < 0.05$ ). Results of the Fayoum, Egypt study showed that 5.9% of elderly had coronary heart disease (CHD) which was more encountered among males compared to females [8] this was greeted with our result but the figure is far less than us. Al-Modeer study found IHD in 16.7% of elderly (18% in males and 15% in females) with insignificant difference between males and females ( $P > 0.05$ ) [8]. In Dubai study, Ischemic Heart Diseases was found in 15% of studied elderly population, with more prevalence among males than females (17.9% Vs. 13.7%) [10]. All are consistent with our findings. Results from the National Community Based Survey in the Saudi Arabia revealed that the prevalence of IHD was 9.3% and male gender was a risk factor [16].

In the current study arrhythmias occurred among 6.5% of study population, this finding is in accordance with Al-Modeer et al. findings, arrhythmias occurred among 8.1% of study population; 8.9 in females % and 7.0% in males [8].

In the current study, there is significant relation between the occurrence of ischemic heart diseases and age group, smoking and DM in studied elderly population ( $P < 0.05$ ). But there is insignificant relationship between the occurrence of ischemic heart diseases and obesity ( $P > 0.05$ ). National Community Based Survey in the Saudi Arabia revealed that the prevalence of IHD among elderly aged 60-70 years was lower [16].

In a national study in KSA conducted by Al-Nozha et al., the following variables were found to be statistically significant risk factors of ischemic heart diseases: age, male gender, obesity, hypertension, current smoking and Diabetes [9].

### **Conclusion and recommendations:**

The study revealed that elderly were suffering from many cardiovascular diseases. Such common comorbidities as DM, obesity, and Smoking need decision makers to plan and implement more effective preventive, curative and rehabilitative services to improve the health status and the quality of life of those vulnerable group.

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