

Coexistence of Prehypertension and Hypertension and Obesity in Young Adults in Arar, Saudi Arabia

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ABSTRACT

Background: Obesity often coexists with hypertension (HTN) and a linear relationship between blood pressure (BP) values and weight was observed.

Objective: The aim of this study was to determine the prevalence rate of prehypertension and hypertension and to estimate the coexistence of prehypertension and hypertension and obesity in young adults in Arar, Saudi Arabia.

Materials and methods: This was a cross sectional study. The study subjects were selected from health young adults attending 5 randomly selected primary health care centers in Arar city, the capital of the Northern Province of KSA. Participants were given a predesigned and pretested questionnaire to collect the relevant data.

Results: Among the studied participants, Fifty (52.1%) of females and 58.8% of males were pre-hypertensive and 1.5% from males were hypertensive. 37.9% of the studied participants were obese and same percentage were overweight. 18.2% of obese were hypertensive or pre-hypertensive and 40.9% of overweight were hypertensive or pre-hypertensive. While 3% of the underweight were hypertensive or pre-hypertensive and 3% were not ($P < 0.05$).

Conclusion: in young adults in Arar, KSA. 37.9% of the studied participants were obese and same percentage were overweight. About half of females and more than half of males were pre-hypertensive and small percentage of males were hypertensive. Obesity was associated with pre-hypertension and hypertension. So education sessions should be carried out to educate the public specially adolescents and young adult population.

Keywords: Prehypertension, Hypertension, Obesity, Overweight, Young adults.

INTRODUCTION

Obesity often coexists with hypertension (HTN) and a linear relationship between blood pressure (BP) values and weight was observed^[1]. Obesity increases the risk of the development of hypertension. This linkage has been the subject of several recent reviews^[2, 3]. Hypertension, a non-communicable cardiovascular disease has become one of the leading cause of morbidity and mortality throughout the world. The seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure (JNC7) defined hypertension as blood pressure $>140/90$ mmHg^[4], when prehypertension was defined as individuals with blood pressure (BP) above optimal levels, but not clinical hypertension^[5].

Obesity, genetic factors, sedentary life style and family history are the most common risk factors of hypertension and other cardiovascular disorders. Over the last few decades, obesity has become a global public health concern. In 2005, the estimated total number of obese and

overweight adults around the globe was 396 million and 937 million respectively^[6]. In Saudi Arabia a national study was conducted in 1998 to determine the prevalence of hypertension among the adult population. It revealed that its prevalence was higher among males (18.7%) than females (14.0%) and was highest in the Eastern province^[7]. Another recent national study done in 2007 reported a higher prevalence rate of hypertension among Saudi adults (28.6% for males and 23.9% for females), indicating a rising trend in hypertension in Saudi Arabia^[8]. An attempt was made in the present investigation to determine the prevalence of and correlation between HTN and obesity among the adults in Arar city, northern borders Saudi Arabia. Moreover, we aimed to determine risk factors of these conditions including smoking, lifestyle behaviors, dietary factors, and family history.

Objectives:

The objective of this study was to determine the prevalence rate of pre-hypertension and hypertension and to estimate the coexistence of Prehypertension and Hypertension and Obesity in Young Adults in Arar, Saudi Arabia.

PARTICIPANTS AND METHODS

This was a cross sectional study. The study subjects were selected from health young adults attending 5 randomly selected primary health care centers in Arar city, the capital of the Northern Province of KSA. The study subjects were selected by systematic random sampling method as we include every 2nd person attending the PHC center. A total of 232 young adults were included in this study (136 male and 96 female). The study period was from 1 March to 31 May 2017.

Data collection

Participants were given a predesigned and pretested questionnaire to collect the relevant data on Socio-demographic characteristics including age, sex and marital status.

Body weight and height were measured. Body Mass Index (BMI) was calculated using the formula weight (kg)/height (m²).

BP was measured in sitting posture using a standard sphygmomanometer on two different occasions, with at least 10 min gap and the average was noted. WHO criteria were strictly followed. BP was classified as per the Joint National Committee on prevention, detection, evaluation and treatment of blood pressure⁽¹²⁾. BP in pre-hypertension was 120-139/80-89 mmHg. Hypertension stage I was 140-159/90-99 mmHg. Hypertension stage II was 160 mmHg or above.

Statistical analysis

Collected data coded and analyzed using statistical package for the social sciences (SPSS,

software version 16). Descriptive statistics for the prevalence and quantitative variables was used. Significance was done by Chi-square test. P value considered significant if <0.05.

Ethical considerations

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

RESULTS

Table (1) showed that the total number of cases was 232; normal blood pressure was detected in 47.9% females and 39.7% males. 52.1% from females were pre-hypertensive and 58.8% were males. Also, we found that 1.5% from males were hypertensive with blood pressure (140-159/90-99) while, no female was detected with hypertension.

Table (2) showed that 37% of prehypertension and hypertension were 20-22 years, 39.6% were 22-24 and 24.1% were 24 or more (P=0.05). Also, the table showed that 78% of normal students were single and only 22% were married. 66.7% of pre hypertensive or hypertensive was single and almost 30% were married (P=0.03).

Table (3) showed the relationship between prehypertension and hypertension and BMI among the studied participants. It is clear that 18.2% of obese were hypertensive or pre-hypertensive. Also, 6% of the underweight wasn't hypertensive or pre-hypertensive and 3% were hypertensive or pre-hypertensive. 34% of overweight wasn't hypertensive or pre-hypertensive and 40.9% were hypertensive or pre-hypertensive (P<0.05).

Table (1): The relationship between systolic and diastolic blood pressure level and sex of the studied participants

Blood Pressure	Sex		Total n=232)	P value
	Female (n=96)	Male (n=136)		
Systolic Blood Pressure / Diastolic Blood Pressure				
• Normotensive (<120/<80 mmHg)	46	54	100).177
	47.9%	39.7%	43.1%	
• Prehypertension (120-139/80-89 mmHg)	50	80	130	
	52.1%	58.8%	56.0%	
• Hypertension (140-159/90-99 mmHg)	0	2	2	

	.0%	1.5%	.9%	
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Table (2): The relationship between prehypertension and hypertension, age group and marital status among the studied participants

Age group	Prehypertension and hypertension		Total(n=232)	P value
	No (n=100)	Yes (n=132)		
20-	34	50	84	0.052
	34.0%	37.9%	36.2%	
22-	32	60	92	
	32.0%	45.4%	39.6%	
24+	34	22	56	
	34.0%	16.7%	24.1%	
Marital status				
Single	78	88	166	0.039
	78.0%	66.7%	71.6%	
Married	22	44	66	
	22.0%	33.3%	28.4%	

Table (3): The relationship between prehypertension and hypertension and factors influencing them among the studied participants

Factor	Prehypertension and Hypertension		Total (n=232)	P value
	No (n=100)	Yes (n=132)		
BMI				
• Underweight	6	4	10	0.012
	6.0%	3.0%	4.3%	
• Normal	50	50	100	
	50.0%	37.9%	43.1%	
• Overweight	34	54	88	
	34.0%	40.9%	37.9%	
• Obese	10	24	34	
	10%	18.18%	37.9%	

DISCUSSION

Hypertension is the most common cardiovascular disorder and it is a major public health challenge to population in socio-economic and epidemiological transition^[9]. It has become one of the leading causes of morbidity and mortality throughout the world.

This was a cross sectional community-based study conducted in Arar, Saudi Arabia. The objective of this study was to determine the prevalence rate of prehypertension and hypertension and to estimate the coexistence of prehypertension and hypertension and obesity in young adults in Arar, Saudi Arabia. The present study included 232 young adults, 96 females and 136 males. The overall prevalence of prehypertension and hypertension in the entire

group was 56.89%. We found that 1.5% from males were hypertensive, no female was detected with hypertension. In Saudi Arabia a national study was conducted in 1998 to determine the prevalence of hypertension among the adult population. It revealed that its prevalence was higher among males (18.7%) than females (14.0%) and was highest in the Eastern province^[10].

A more recent national study in 2007 reported a higher prevalence rate of hypertension among Saudi adults (28.6% for males and 23.9% for females), indicating a rising trend in hypertension in Saudi Arabia^[11]. Another study reported the prevalence of hypertension was 2.2% (3.3% males, 0.4% females)^[12]. In Northwest Ethiopia: a cross sectional study showed that the prevalence of HTN, was 13.3%. The prevalence

among men and women was 17.2% and 10.3% respectively ^[13]. In our study we found 52.1% from females were pre-hypertensive and 58.8% were males. Another study detected pre-hypertension 27.1% (38% males, 11.2% females) ^[12].

Another study reported the prevalence of pre-HTN 38.2% ^[13]. A cross-sectional study was conducted in the University of Dammam, revealed that 13.5% of female university students in Dammam had pre-hypertension ^[14]. A similar study conducted in the same region on male university students recorded a higher prevalence of prehypertension (32.7%) ^[15].

A study of 100 medical students in Davangere showed that the prevalence of prehypertension was 64% ^[16]. While, two studies of 100 boys and girls in the Medical College in Wardha showed a prevalence of prehypertension in 52% ^[17]. Another study of 500 medical students in a Mangalore College showed a point prevalence of 55.4% ^[18]. In our study, there was a significant correlation between prehypertension or hypertension and marital status ($p=0.039$). Our study showed that 18.2% of obese were hypertensive or pre-hypertensive. Also 6% of the underweight wasn't hypertensive or pre-hypertensive and 3% were hypertensive or pre-hypertensive. 34% of overweight wasn't hypertensive or pre-hypertensive and 40.9% were hypertensive or pre-hypertensive ($P<0.05$).

There was a significant correlation between excess weight and prehypertension or hypertension in our study which is similar to findings in another study done in Coastal Karnataka ^[19]. In Dammam University, a study reported that one-quarter of overweight/obese female university students (24.5%) had pre-hypertension and 3.8% had hypertension ^[14]. Another study in Turkey among 1601 patients reported that, 15.4% had obesity and hypertension ^[20].

Overweight and obesity is are present in more than 70% of US adults with hypertension ^[21]. In the Lagos State Hospital, Ikeja, Lagos, Nigeria, a study involved three hundred and forty (340) adult males and females hypertensive patients, reported only 0.9% of the hypertensive patients were underweight, 20.9% had normal weight while 78.2% were either overweight or obese ^[22].

A hospital-based descriptive study was conducted in Cardiology Department of Postgraduate Medical Institute, Lady Reading Hospital among 200 patients, a total of 111 patients (55.5%) were found to be hypertensive

and 66 (59.46%) were obese ^[23]. Another study reported that 57.1% of obese were hypertensive, 41.3% of the overweight were hypertensive and 10.9% of the normal weight were hypertensive. This indicates that the prevalence of hypertension was more in obese than other ^[24]. In a community-based study in Rangpur division among the hypertensives, 38.2% were obese ^[25].

Wakabayashi *et al.* reported that adiposity was strongly associated with HTN ^[26]. Another study reported that High BP was associated with excessive weight gain. Also, Pre-HTN and HTN were associated with obesity ($p<0.001$) ^[12]. The association between BP and weight is strong and linear, even in the normal range of BP and BMI ^[27].

CONCLUSION AND RECOMMENDATIONS

In young adults in Arar, KSA. 37.9% of the studied participants were obese and same percentage were overweight. About half of females and more than half of males were pre-hypertensive and small percentage of males were hypertensive. Obesity was associated with pre-hypertension and hypertension. So education sessions should be carried out to educate the public specially adolescents and young adult population.

LIMITATIONS

The study involved a homogenous group of people with mostly similar backgrounds and socioeconomic parameters. The study has displayed facts based on a single visit, small sample size and lack of follow up data.

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