Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2018, 7(10): 155-160

Knowledge, Attitude and Practice of Female Students towards CVD and Prevalence of Obesity and Hypertension in Arar, Saudi Arabia

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ABSTRACT

Objective: *To investigate the knowledge, attitude, and practice of female students towards CVD in Arar, Saudi Arabia and the prevalence of obesity and hypertension among them.* ***Methods:*** *A total of 150 female students participated in this study and their anthropometric measurements and blood pressure was determined. Other data including socio-demographics, knowledge, attitude and practice questions on CVD were obtained through a questionnaire.* ***Results:*** *Out of 150 participants, 20.66% were pre-hypertensive and only 1.33% was hypertensive. Regarding BMI, 11.33% students were underweight, 26.66% were overweight and only 7.33% were obese. All the anthropometric variables were found to be significantly ($p<0.05$) correlated with systolic and diastolic blood pressure. Majority of the students considered that increased intake of fat, smoking, high blood pressure, and high LDL cholesterol are the major risk factors for CVD, however, they were ignorant about few important factors involved in the CVD, like diabetes mellitus, chronic renal failure, increased use of salt and family history. Majority of the respondents believed that they must keep a check on their BP, serum cholesterol, blood sugar and maintain normal body weight. They were aware that CVD could be prevented by adopting a healthy lifestyle; however, there was a lack of practicing a healthy lifestyle in most of them.* ***Conclusion:*** *The study suggests that the younger generation's knowledge of CVD must be enhanced and they must be encouraged to change their lifestyle and dietary habits to avoid this lethal problem.*

Keywords: Obesity, Hypertension, Cardiovascular diseases, Female students, Anthropometric variables

INTRODUCTION

Obesity is defined as excessive fat accumulation in the adipose tissues and has been particularly recognized as a major independent risk factor for cardiovascular diseases [1]. This is because increased body fat is accompanied by profound changes in the physiological and metabolic functions of the body, which are directly dependent on the degree of excess weight and on its distribution around the body [2]. At present, obesity has become a pandemic in both developed and developing countries. It also bears serious implications for psychosocial health, mainly due to societal discrimination against fatness.

Cardiovascular disease (CVD) is the primary cause of mortality from non-communicable diseases (NCDs), and a chief contributor to the disease burden from chronic NCDs, worldwide [3]. The growing prevalence of CVD risk factors and specifically hypertension is the major cause of the increased burden of CVD in developing countries [4,5]. Hypertension is a major public health challenge for societies in epidemiological transition and contributes to 7.5 million deaths worldwide every year [6].

The lifestyle of the people of Saudi Arabia has changed tremendously throughout the previous years as a result of socio-economic expansion [7]. These alterations in the lifestyle have resulted in sedentary and dietary habits which are not certainly healthy ones. The lack of physical activity among a large section of society has further complicated

this public health issue facilitating the development of many diseases such as hypertension, obesity and diabetes mellitus [7,8].

Several epidemiological studies from different populations have reported a significant association between different anthropometric indicators (such as waist circumference, BMI and waist-height ratio) and blood pressure levels [9,10]. These associations between body fatness using different indices have been consistently observed but remain poorly understood.

Several studies exist about the perception regarding knowledge, attitude, and practice on CVD but only a few studies are available about the perception of young people. It is of utmost importance to be aware of the younger generation's existing knowledge, attitude, and practices on CVD to initiate the preventive efforts. Therefore, this study was designed to investigate the knowledge, attitude, and practice of female students of Northern Border University, Arar, Saudi Arabia towards CVD and prevalence of obesity and hypertension among them.

PATIENTS AND METHODS

The present cross-sectional study was conducted in the Female College of Medicine and Applied Medical Sciences, Northern Border University, Arar, Saudi Arabia. A total of 150 students participated in this study. Socio-demographic data (such as age, gender, marital status, education level), knowledge, attitude and practice questions about risk factors of CVD were collected through a questionnaire. After that, anthropometric measurements (weight, height, waist circumference and hip circumference) and blood pressure were taken.

Exclusion Criteria

Participants who had a chronic disease were on medication for hypertension and who were pregnant were excluded from the study.

Ethical Consideration

The work was approved by the Deanship of Scientific Research at Northern Border University and informed consent was obtained from all participants.

Anthropometric Measurements

All candidates participating in this study underwent a physical examination to obtain anthropometric measures. Standing height was measured by stadiometer and weight by a digital scale. Height was measured in centimeters (cm) and weight in kilograms (kg). Waist circumference (WC) was measured by a non-elastic flexible tape in the standing position. Hip circumference (HC) was measured at the maximal protrusion of the buttocks. Waist-height ratio (WHtR) was calculated as waist circumference divided by height. Waist-hip (WHR) ratio was calculated as waist circumference divided by hip circumference. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Subjects were classified as overweight or obese according to the World Health Organization (WHO) criteria [11]. Subjects with a BMI of 18.25 kg/m^2 to 24.9 kg/m^2 were classified as normal, those with a BMI of 25.0 kg/m^2 to 29.9 kg/m^2 as overweight, and those with a BMI of 30.0 kg/m^2 or more as obese.

Blood Pressure Measurement

Blood pressure (BP) was measured at the same time as the anthropometric measurements, while subjects sitting and with the cubital fossa supported at heart level. BP was measured using a digital blood pressure monitor, with the appropriate cuff for the adult's upper arm size. Systolic and diastolic BP were recorded. The mean arterial blood pressure (MABP) was calculated for each of the two readings taken for SBP and DBP by using the formula:

$$MBP = \frac{DBP + (SBP - DBP)}{3}$$

Systolic or diastolic hypertension was determined according to the seventh JNC classification of hypertension [12]:

- Normotensive (SBP: 90-120 mmHg; DBP: 60-80 mmHg)
- Pre-hypertensive (SBP: 120-139 mmHg; DBP: 80-89 mmHg)
- Hypertensive (SBP ≥ 140 mmHg; DBP ≥ 90 mmHg)

Statistical Analysis

Results are expressed as the mean ± standard deviation (SD). The correlation/association between SBP/DBP and various anthropometric variables was determined by Pearson's correlation coefficient and $p<0.05$ was considered significant.

Knowledge variable was ranked from 0 to 2 points, where 0 was for a negative answer (poor knowledge). The three-point Likert scale was used for attitude (disagree, neutral and agree) and practice (never, seldom and always) variables. The total score was labeled well on the basis of those positive responses of the participants about the particular question.

RESULTS

The mean age of the participants was 21.63 ± 1.88 with an age range of 19-25 years. Descriptive statistics for blood pressure measurements and other anthropometric variables of students are presented in Tables 1 and 2.

Table 1 Variables of anthropometric measurements among female students

Variables	Mean ± SD (n=150)
Mean Age (years)	21.63 ± 1.88
Age range	19-25 years
Body weight (kg)	59.92 ± 10.69
Height (cm)	159.86 ± 5.47
BMI (kg/m^2)	23.46 ± 4.09
WC (cm)	77.26 ± 10.04
HC (cm)	97.90 ± 10.68
WHR	0.784 ± 0.06
WHtR	0.478 ± 0.06

Table 2 Variables of blood pressure among female students

Variables	Mean ± SD (n=150)	Minimum	Maximum
SBP (mm/Hg)	112.27 ± 11.34	88	148
DBP (mm/Hg)	78.3 ± 7.70	58	100
MABP (mm/Hg)	89.60 ± 8.27	70.66	116

Out of 150 students, 2 (1.33%) were hypertensive, 31 (20.66%) were pre-hypertensive whereas 117 (78%) were normotensive. Regarding the BMI, 17 (11.33%) students were underweight, 82 (54.66%) were normal, 40 (26.66%) were overweight and 11 (7.33%) were obese (Table 3).

Table 3 Blood pressure and BMI of the participants

Parameters		n (%)
Blood pressure	Normotensive	117 (78%)
	Pre-hypertensive	31 (20.66%)
	Hypertensive	2 (1.33%)
BMI	Underweight	17 (11.33%)
	Normal	82 (54.66%)
	Overweight	40 (26.66%)
	Obese	11 (7.33%)

Table 4 summarizes the correlation coefficients of systolic and diastolic blood pressure in relation to some variables of anthropometric measurements among female students. All the anthropometric variables were found to be significantly ($p<0.05$) correlated with both systolic and diastolic blood pressure.

Table 4 Correlation of SBP and DBP with different anthropometric variables among female students

Variables	SBP		DBP	
	r	p	r	p
Body wt.	0.376	<0.05	0.375	<0.05

BMI	0.332	<0.05	0.343	<0.05
WC	0.405	<0.05	0.406	>0.05
HC	0.347	<0.05	0.343	<0.05
WHR	0.19	<0.05	0.202	<0.05
WHtR	0.301	<0.05	0.307	<0.05
r: correlation coefficient; p<0.05 was considered significant				

Table 5 exhibits the knowledge of students regarding the risk factors of cardiovascular disease (CVD). Increased intake of fat was identified as the risk factor for CVD by the majority of the students (56.66%) followed by high blood pressure (53.33%), smoking (50%) and high LDL cholesterol (50%). However, only a few students knew that chronic renal failure and family history are one of the risk factors.

Table 5 Percentage of students with good knowledge of CVD risk factors (n=150)

Risk factors	Good Knowledge (%)
Smoking	50.00%
High blood pressure	53.33%
Obesity	46.00%
High LDL cholesterol	50.00%
Increasing age (>55years)	23.33%
Stress	41.33%
Family history of CVD	11.33%
Chronic renal failure	12.66%
Diabetes mellitus	23.33%
Increased fat intake	56.66%
Increased use of salt	28.66%
Sedentary life style	40.00%
BMI >30	24.66%

Table 6 shows the percentage of students having a positive attitude towards CVD. Majority of them agreed that they must keep a check on their cholesterol level (61.33%). They were also ready to exercise regularly (54.66%) and adopt a healthy lifestyle (52.66%).

Table 6 Percentage of students with a positive attitude towards CVD (n=150)

Items	Positive attitude (%)
Must keep a check on BP	49.33%
Must keep a check on cholesterol level	61.33%
Must keep a check on blood sugar level	46.66%
Sustain normal body weight	50.00%
Ready to exercise regularly	54.66%
Ready to adopt a healthy lifestyle	52.66%
Try to decrease sugar consumption	43.33%
Try to decrease fat consumption	46.00%
Positive attitude: Whose answers agree for the item that they should have	

Table 7 displays the percentage of students with good practice towards CVD.

Table 7 Percentage of students with good practice towards CVD (n=150)

Items	Good practice (%)
Workout more than 20 minutes 3days/week	20.00%
Outdoor sports everyday/3 times a week	10.00%
Eating outside	16.66%
Avoid fatty foods	33.33%
Maintain normal weight	26.66%
Attempt to reduce stress	40.00%
Avoid smoking	73.33%

Consult a doctor for advice	20.00%
Consume fish 3days/week	33.33%
Gather information about CVD through internet or magazines	45.33%
Attempt to prevent CVD	50.00%
Good practice: Whose answers always for practice that they should adopt	

DISCUSSION AND CONCLUSION

Currently, obesity has become a worldwide epidemic in all age groups in both developing and developed countries. BMI, considered as a representative of obesity is one of the well-known predisposing reasons of CVD. In the current study, about 45.32% of students were reported to have an abnormal BMI (11.33% were underweight, 26.66% were overweight and 7.33% obese). It has been reported that the incidence of obesity among youth is escalating in Saudi Arabia; hence, it needs intervention on a priority basis. Sedentary lifestyle and dietary habits are responsible for the high incidence of overweight and obesity among the young generation [13].

Various anthropometric variables (WC, HC, WHR, WHtR) and body mass index (BMI) have been recognized for evaluating CVD risk factors, mainly due to their positive association with blood pressure [14]. This study showed a significant association between anthropometric variables and blood pressure which is in agreement with other studies that showed an important relationship especially between waist circumference and the probability of emerging cardiovascular events [15,16]. WHR is one of the most commonly used anthropometric measures to indicate a central obesity pattern and an increased risk of cardiovascular disease [17]. Results of the present study indicated that WHR was significantly correlated with the blood pressures level of participants. Some studies found that WHR was significantly associated with hypertension and was considered to be an important predictor, but there can be variations in such results [18]. WHtR considers the proportion of central fat by the individual's height. In this investigation, WHtR was found to be significantly correlated with the blood pressure in the students. In this study, we found significant positive correlations between some anthropometric parameters and systolic and diastolic blood pressures.

Results also revealed that 20.66% students were pre-hypertensive. There is controversy regarding the extent to which pre-hypertension constitutes a serious health concern. Some studies suggest no significant increase in mortality over long periods of time for pre-hypertensive individuals [19,20], while others suggest that people with pre-hypertension are at a higher risk for developing hypertension, compared to people with normal blood pressure. Alteration of lifestyle or behaviors is necessary to prevent the progression of pre-hypertension to hypertension.

The current study demonstrated good attitude but inadequate knowledge of students about certain risk factors of CVD. They were ignorant about few important factors implicated in the CVD, like diabetes mellitus, chronic renal failure, increased use of salt, family history, increasing age and BMI>30. Increased intake of fat was identified as the risk factor for CVD by the majority of the students (56.66%) followed by high blood pressure (53.33%), smoking (50%) and high LDL cholesterol (50%). However, only 12.66% of students knew that chronic renal failure is one of the risk factors. Hence, the younger generation needs to be educated to enhance their knowledge regarding CVD.

Majority of the students believed that they should maintain their normal body weight. They were of the opinion that they must keep a check on their cholesterol, BP and blood sugar level and were also ready to adopt a healthy lifestyle. They wanted to reduce fat and sugar consumption. This positive attitude of students towards risk factors of CVD may be attributed to the awareness created by mass media towards adopting a healthy lifestyle.

The present study observed a lack of practicing a healthy lifestyle among participants. Most (54.66%) of the students were ready to exercise regularly, indicating their positive attitude, but only 20% exercised regularly more than 20 minutes 3 times a week. The reason for this poor practice could be a lack of awareness about certain risk factors of CVD, lifestyle pattern and the dietary habits of the young generation which leads to overweight and obesity. This suboptimal practicing might aggravate the condition leading to an increased burden of CVD in the society.

We strongly suggest that the younger generation's knowledge on CVD must be enhanced and they must be encouraged to change their lifestyle and dietary habits to avoid this lethal problem.

DECLARATIONS

Acknowledgment

The authors gratefully acknowledge the approval and the support of this research study under the grant no. 7400-AMS-2017-1-8-F from the Deanship of Scientific Research at Northern Border University, Arar, Kingdom of Saudi Arabia.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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