ejpmr, 2017,4(2), 64-75

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

CARDIOVASCULAR RISK FACTORS AMONG ADULTS IN THE UNITED ARAB EMIRATES.

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Article Received on 27/11/2016 **Article Revised on 19/12/2016** **Article Accepted on 08/01/2017**

ABSTRACT

Background: Cardiovascular disease (CVD) has emerged as a major cause of morbidity and mortality. Research on CVD risk factors is necessary to reduce or overcome the risk of cardiovascular disease incidence. The knowledge of CVD risk factors significantly influences individuals' perception and attitudes toward healthier life. Understanding the level of risk factor knowledge and risk perception can inform the development of innovative interventions to reduce risk. This is the first study looking at CVD risk factors in adults in the United Arab Emirates (UAE). **Objectives:** To investigate the prevalence of cardiovascular risk factors in adult UAE population and to compare our study with other relevant studies. **Methods:** Cross-sectional study among adults in the UAE has been perform by recruiting 926 participants; 276 males and 650 females. The questionnaire included questions on demographic, health, awareness of CVD risk factors, and habits. Subjects have been randomly selected from Fujairah and Sharjah cities in the UAE. Data have been analyzed by SPSS. **Results:** Average systolic blood pressure was 115.09 mmHg (SD±16.23), which was more in males than females while diastolic blood pressure was the same in males and females. People with wide waist –to-hip ratio or with high BMI≤25kg/m² have high risk factors for cardiovascular disease. Mean height was 161.71cm (SD±10.96), Shorter person had more risk factors like hypertension, hypertriglyceridemia and insomnia than taller persons. The mean neck circumference (NC) was 35.91cm (SD±4.13). Individuals with smaller neck sizes less than 35cm were more stressed and insomniac and having sleep disorders compared with those with neck size more than 35 cm. Men had higher percentages of Waist-to-Hip ratio (WHR) with more risk factors than women. Female had more stress and insomniac conditions than males which may due to environmental stress and nature of their bodies. Incidental snoring conditions were four times higher in stressed female than males (OR=3.8, C.I=1.65-8.76). Hypertensive females, diabetic males and females under stress had more snoring conditions than non-hypertensive females, non-diabetic males and females without stress. There were a strong correlation between body mass index and systolic blood pressure, diastolic blood pressure, WHR, and neck circumference. The prevalence of s metabolic syndrome was high especially in males; 34% of participants were suffered from this syndrome. **Conclusions:** There are significant number of risk factors for cardiovascular disease in UAE population. Females had more risk factors than males. This means that gender is a risk factor for cardiovascular disease in UAE. A variety of features like height, BMI, NC, WHR, life styles and status of health may play a role in altering the incident of cardiovascular diseases. Enlarged neck sizes was associated with more risk factors which can be regarded as an indicator for cardiovascular diseases There is a need for more awareness about this condition in order to reduce risk factors associated with cardiovascular disease. The present study will help to implement intervention strategies to reduce cardiovascular risk factors in UAE population.

KEYWORDS: Cardiovascular disease There are significant number of risk factors in UAE population.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death worldwide. In the USA, CVD accounting for more deaths than all other causes combined. Coronary heart disease (CHD) accounts for 53% of CVD related deaths while 17% are from stroke.[1] Precipitating a cost exceeding $403 billion in 2006, the CVD is a major public health concern.[1] Atherosclerosis occurs mainly in large arteries and it is one of the most contributing factors to the CVD.[2] CVD has considered as a major health burden globally with atherosclerosis which being the most common cause of heart deaths worldwide.[3]

According to American Heart Association computations, Around 80% of dead person from CVD are 65 years and older. The incidence of premature CVD in men age 35 to 44 is three times as high as the incidence of women of the same age.[1]

Risk factors of congestive heart failure (CHF) include but are not limited to Hypertension, obesity, diabetes, atherosclerosis, CHD and dyslipidemia along with excess sodium intake.[1] Both ischemic stroke and intracerebral hemorrhage are associated with a number of modifiable risk factors—namely, hypertension, smoking, diet, sedentary lifestyle, obesity, diabetes mellitus, and exercise.[4]

Each year, about 1.1 million people in the U.S. develop heart attacks, and almost half of them die. CHD, which often results in a heart attack, is the leading killer of both men and women in the U.S. Recently, chronic diseases are considered as the most contributor to the worldwide death[5]; CVD is one of these diseases, which had increased internationally in the previous years , and its trends assumed to be increased to a high level in the future and continue to command mortality.[6] Death rates are more in low and middle income countries than in developed countries.

There are many factors that lead to a CVD depending on bad lifestyles among people globally include tobacco use and abnormal blood lipid levels, along with unhealthy dietary changes (especially related to fats and oils, salt, and increased calories) and reduced physical activity.

Approximately 17.5 million person died from CVD in 2012, which cover about 31% of the total deaths worldwide. Over three quarters of CVD deaths take place in low- and middle-income countries. Out of the 16 million deaths under the age of 70 due to non-communicable diseases, 82% are in low and middle income countries and 37% are caused by CVDs.

CARDIA study was created in US by different researchers explaining the CVD risk factors awareness, which eventually reached to that educated people have a higher knowledge than others, in addition to that already suffered persons are knowing more about CVD risk factors than healthy persons.[7]

Smoking is a hazard alert risk factor to the heart disease; Smoking is a risk factor for mortality and coronary heart disease in hypertension and in diabetes. The cardiovascular risk imposed by both, smoking and tobacco, is magnified by the coexistence of several other coronary risk factors. However, when another risk factor is present in a smoker (i.e.; Hypertension (HTN), high cholesterol) the risk of CVD is further increased. Cigarette smoking causes about one of every five deaths in the United States each year. Smoking is the cause for nearly 140,000 deaths from CVD.[8]

Strong association between alcohol and CVD conducted by several studies, Excessive alcohol intake is the third cause of premature death after smoking and obesity. Consumption of plenty amount of alcohol is responsible for (1) reversible hypertension, (2) stroke in both types ischemic and hemorrhagic and (3) atrial fibrillation.[9] Heavy drinking events is equivalent to outside meals consumption are linked to increased CHD risk, regardless drinking volume.[10] Moderate alcohol drinking effects on lipids and insulin sensitivity which has a benefit in lowering CVD risk and death under the assumption of its bad impact and its relation to CVD.[11]

Recently, Obesity has received considerable attention which could become responsible for turning over the trend of increasing life expectancy. In fact, Obesity is the most predominant in highly developing world. It is a multifactorial condition, exited as a result of a complex interaction between the environment, genetic predisposition, and human behavior.

Obesity and Cardiovascular disease are associated with the risks for coronary heart disease, atrial fibrillation, and heart failure. Intra-abdominal obesity which contribute to other modifiable risk factor such as hypertension, dysmetabolic syndome, and type2 diabetes. Obesity can also worsen cardiovascular disease by different mechanisms like inflammation, hypercoagulability, and activation of the sympathetic and reninangiotensin systems.[12] A cohort study was done in US with sixteen years of following up, they reached to that Anthropometric measures of abdominal adiposity were strongly related to all- cause, CVD, and cancer mortality without regard to body mass index(BMI). Elevated waist circumference was associated with notably increased CVD mortality even with normal-weight women.[13]

Eighty percent of men with waist circumference _90 cm and triglycerides (TG) _2 mmol/L that mean they were found to have an atherogenic triad of elevated apolipoprotein B, fasting hyperinsulinaemia, and small, dense LDL, which had been strongly associated with adverse Cardiovascular outcomes.[14] Hypertension is a major world-wide health problem. With high blood pressure there is a greater risk of stroke, heart attack, heart failure, kidney disease and renal failure.[15] Hypertension is prevalent in developing countries and economically developed regions, High blood pressure's readings should monitored to prevent CVD incidence. Furthermore, High blood pressure affecting CVD burden worldwide. There is a need for international agencies efforts for CVD prevention programs in developing Countries.[16]

Non-modifiable risk factors include age, gender and family history. With aging, the body is exposed to various strains and stressors and free radicals formed in the body, which accelerate the breakdown of cell and organ functions so elderly are more prone to CVD than younger persons.[17]

BMI is a measure used to predict Diabetes Mellitus (DM), Hypertension (HTN) and many other diseases and used for detection of risk factors belong to series

diseases. Waist circumference measurement (WC) is a very important measure used in providing information about fat topography. It is an anthropometric tools for excess abdominal fat (also known as central fat) and it a risk indicator for cardiometabolic disease such as dyslipidemia, and hyperglycemia.[18] Measures of abdominal obesity(e.g. waist circumference, waist–hip ratio and waist– height ratio) are better than BMI as predictors of CVD risk, although combining BMI with these measures may improve their discriminatory capability.[19] By contrast, waist/hip ratio gives an indication of the amount of abdominal obesity and this has been linked to hypertension, diabetes, elevated triglycerides, and other atherosclerotic risk factors.[20]

Neck circumference (NC) is one of the important measure used to identify overweight and obesity, NC is significantly correlated with changes of some metabolic syndrome factors and therefore effect on changes in the CVD risk, such as insulin, glucose, triglyceride and uric acid levels.[21]

Moreover, NC is playing a role in upper-body subcutaneous fat, diabetes mellitus type-2 and cardiometabolic risk assessment.[22]

NC is an anthropometric tool used also in OSA diagnosis, using it in measuring enlarged neck circumference in patient (men :> 43cm [17in]; women>37cm[15in]. Many studies ensured that CVD is a bad consequence of Obstructive sleep apnea (OSA).

Smoking cessation is strongly recommended because of the bad impact of smoking on blood pressure by increasing peripheral vascular and heart rate, increase chance of clotting and reduces high density lipoprotein (HDL) cholesterol.[23]

The prevalence of risk factors for CVD increased with age in both sexes 66% of the UAE National Males aged 60 and above have preventable CVD Risk factors compared to 63.5% among UAE National Females aged 60 and above. Non educated and low income groups are more prone to these risk factors and this decreases with higher education levels. No major cardiovascular risk factor study has been done on UAE adults. The present study is a significant first study looking at the prevalence of cardiovascular risk factors in the UAE population and factors affecting cardiovascular risk factors.

METHODS

This study was designed to determine the prevalence of risk factors for cardiovascular disease in adults in the UAE. It has been conducted between March 2015 and July 2015, recruiting subjects from 4 universities and colleges. Participants have signed informed consent to participate in the study. Adult males and females have been randomly selected from various locations. Age range was from 18-45 years.

Inclusion criteria: Only local adults aged 18-45 years have been selected.

Exclusion criteria: Non-UAE subjects, age less than 17 years and elderly patient.

The study has been approved by Ajman University of Science and Technology and the questionnaire was validated and pilot study has been conducted to improve the questionnaire.

Statistical Analysis

Data were analysed using SPSS. We used descriptive statistics to analyse continues variables such as Age, Weight, Systolic BP, Diastolic BP, Neck circumference, Waist circumference ,hip circumference, waist –to-hip ratio, BMI, packyers, exercise duration and number of exercises/week. Categorical variables (like hypertension, Triglyceride, Stress, Awareness, Parent's history, Exercises, insomnia and sleep problems) were analyzed using frequency statistics. We use a p-value less than or equal to 0.05 as significant level. Chi-squared test was used to compare the percentage of cases.

There was a very high significant difference in height and weight between males and females. There was no significant difference in age and BMI between males and females (Table 1). There was a very high significant difference in systolic blood pressure, neck circumferences, Waist-to-hip ratio and duration of exercises between males and females (Table 2). There was a very high significant difference in stress level, obesity, CVD awareness, family history, physical exercises, insomnia and risk factors awareness between males and females (P-value ≤ 0.001) (Table 3). The proportion of risk factors in shorter people were relatively higher than taller people (Table 4). Subjects with large neck circumferences more than 35cm, have more health problems like hypertension, hypertriglyceridemia, stress, diabetes mellitus and sleep disorders compared to subjects with small neck circumference. Subjects with large neck circumference have 2 times more risk for developing hypertension and 4 times of risk for developing hyperglyceridemia (Table 5). Individuals with high Waist/Hip ratio (WHR$\geq$0.87) have more CVS risk factors. Subjects with high WHR are 4 times at risk for developing hypertension, 3.5 times at risk for developing diabetes (Table 6).. On the other hand the least important risk factors were stress, awareness, family history insomnia and sleep disorders which had low odds ratio values when considering Waist/ Hip ratio (Table 6). The higher body mass index, the higher chance of having different risk factors of cardiovascular disease. Subjects with high body mass index has 3 times risk of developing hypertension, almost 6 times risk for developing hypertriglyceridemia, 4 times risk for developing diabetes (Table 7). The other risk factors comprised a lower risk contributor to the cardiovascular disease such as stress, awareness, family history and snoring in risk factors stratified by body

mass index in this studied population. The proportion of hypertension and stress was significantly more (p-value≤0.001) in subjects who had sleep disorders than those who did not have this problem (table 8). On the other hand, P-value was ≤0.05 in diabetic individuals which indicates that was statistically significant and hypertriglyceridemia was not statistically significant. The average Pack-yr of smoking is not shown in females shown in females of our study. But there was number of nine male smokers were having snoring at night. Males were more at risk for CVD risk factors according to the waist- to -hip ratio (WHR). Generally, males had a higher proportion of WHR risk compared to females (table 9). Therefore, males are at higher risk compared to females. Females with high WHR risk (OR=6.5, C.I=3.9-10.6) had 6 folds chance of getting the event than males. Males with moderate WHR risk (OR=1.7, C.I= 1.2-2.5), indicate that the odds of males more than 1.5 times to gain the illness than females. Further, Males who were characterized as high WHR risk (OR=3.8, C.I=1.9-7.1) had three times more risk of developing the disease than females. Moreover, Males with very high waist to hip ratio have two times chance of getting the cardiovascular disease compared to females. Table 10 explains the association between BMI and other CVD risk factors. There was a highly significant relationship between body mass index and diastolic blood pressure, systolic blood pressure, waist to hip ratio and neck circumference. There was also high significant correlation between body mass index and neck circumference in the male group .There was high statistically significant relationship between body mass index and diastolic blood pressure, systolic blood pressure, waist to hip ratio and neck circumference in both genders.

Table11. They were significantly higher proportions of high WHR (waist-to-hip ratio) and metabolic syndrome in males than females. In females, the frequency (%) of subjects suffering suffering from hypertension, hypertriglyceridemia, diabetes, obesity, high waist-to-hip ratio and metabolic syndrome were 27 (4.2%), 59 (9.1%), 21 (3.2%), 138 (23.4%),43 (31.9%),125 (19.2%), respectively.

The total numbers and percentages of both males and Females having hypertension, hypertriglyceridemia, diabetes, obese, high waist-to-hip ratio and metabolic syndrome were 39(4.2%), 83(9.0%), 32(3.5%), 193(22.4%), 183(55.8%) and 315(34.0%), respectively.

The total numbers and percentages of both males and females in hypertension, hypertriglyceridemia, diabetes, obese, high waist-to-hip ratio and metabolic syndrome were 39(4.2%), 83(9.0%), 32(3.5%), 193(22.4%), 183(55.8%) and 315(34.0%), respectively.

In table 12, the total number of subjects. The total of subjects was 315(34%) who have metabolic syndrome in our studied population. Males had higher proportions of the number of risk factors than females.

The percentages of males(n=190) have metabolic syndrome with five, six, seven and eight risk factors were 3.2%, 53.6%, 38.4% and 4.8%,respectively.The percentages of females (n=125) have metabolic syndrome with four, five, six, seven and eight risk factors were 0.5%,1.1%, 30.5%, 56.8%,and 1.1, respectively.

All subjects who were suffering from metabolic syndrome with four, five, six, seven and eight risk factors were 0.3%, 1.9%, 39.7%, 49.5%,and 8.6%, respectively.

Table 1: Physical Measurements and CVD Risk factors for Males and Females.

Categorical Variable	Male n=276	Female n=650	All n= 926
Age (yrs)	25.79(8.62)	24.64(8.5)	24.98(8.55)
Height (cm)	171.34(7.19)***	157.53(9.6)	161.71(10.96)
Weight (Kg)	79.03(19.25)***	63.64(17.67)	68.45(19.52)
BMI	26.8(5.74)	26.36(14.38)	26.50(12.33)

P≤0.05 ** P≤0.01 ***P≤0.001.*

Table 2: Comparison of prevalence of CVD risk factors between males and females.

Measures	Males	Females	All
Systolic BP	120.9(15.92)***	110.20(14.83)	115.09(16.23)
Diastolic BP	76.25(11.75)	74.95(10.52)	75.54(11.11)
Neck. Circumference	38.79(3.82)***	34.15(3.22)	35.91(4.13)
Waist. Circumference	90.12(14.24)	86.23(16.15)	88.09(15.38)
Hip. Circumference	99.83(14.39)	103.35(14.99)	101.28(14.72)
WHR	0.89(0.085)***	0.83(0.12)	0.87(0.108)
Pack years	4.65(6.24)	-	4.6516(6.24)
Exercise duration(min)	52.38(27.56)***	39.15(23.51)	3.38(2.06)

P≤0.05 ** P≤0.01 ***P≤0.001*

Table 3: Cardiovascular risk factors between males and females.

Risk Factor	Males n=276	Females n=650	All n=926
Hypertension			
Yes	12(4.3%)	27(4.2%)	39(4.2%)
No	264(95.7%)	623(95.8%)	887(95.8%)
Hypertriglyceridemia			
Yes	24(8.7%)	59(9.1%)	83(9%)
No	252(91.3%)	591(90.9%)	843(91%)
Stress			
Yes	***29(10.5%)	148(22.8%)	177(19.1%)
No	247(89.5%)	502(77.2%)	749(80.9%)
Diabetes Mellitus			
Yes	11(4%)	21(3.2%)	32(3.5%)
No	265(96%)	96.3(96.5%)	891(96.3%)
Obesity			
Yes	114(42.1%)***	321(54.5%)	435(50.6%)
No	157(57.9%)	268(45.5%)	425(49.4%)
Risk factors Awareness			
Yes	**72(26.1%)	236(36.4%)	308(33.3%)
No	203(73.6%)	413(63.6%)	616(66.5%)
CVD Awareness			
Yes	82(29.7%)***	278(42.8%)	360(38.9%)
No	194(70.3%)	372(57.2%)	566(61.1%)
Family history			
Yes	43(15.6%)***	191(29.4%)	234(25.3%)
No	233(84.4%)	458(70.6%)	691(74.7%)
Exercise			
Yes	234(84.4%)***	468(72.2%)	702(76%)
No	42(15.2%)	180(27.8%)	222(24%)
Insomnia			
Yes	***31(11.2%)	164(25.4%)	195(21.1%)
No	244(88.4%)	481(74.6%)	725(78.8%)
Sleep problem; snoring			
Yes	45(16.4%)	133(20.7%)	178(19.4%)
No	230(83.6%)	510(79.3%)	739(80.5%)

***P≤0.05** **** P≤0.01** *****P≤0.001**

Table 4: Risk factor in the subjects studied stratified by standing height.

Risk Factor	Height ≤160 cm n=444	Height≥160 cm n=511	OR	C.I
Hypertension				
Yes	24(5.4%)	20(3.9%)	0.601	**0.311-1.161**
No	420(94.6%)	491(96.1%)		
Hypertriglyceridemia				
Yes	46(10.4%)	45(8.8%)	0.749	**0.474-1.183**
No	398(89.6%)	466(91.2%)		
Stress				
Yes	96(21.6%)	83(16.2%)	0.676	**0.481-0.949**
No	348(78.4%)	428(83.8%)		
Diabetes Mellitus				
Yes	15(3.3%)	22(4.3%)		
No	428(96.6%)	488(95.7%)		
Risk Factors Awareness				
Yes	157(35.4%)	161(31.6%)	0.846	**0.641-1.117**
No	286(64.6%)	348(68.4%)		
CVD Awareness				

Yes No	179(40.3%) 265(59.7%)	188(36.8%) 323(63.2%)	0.909	**0.695-1.189**
Family history Yes No	 121(27.3%) 323(72.7%)	 121(23.7%) 389(76.3%)	0.8	**0.591-1.083**
Exercise Yes No	 310(69.8%) 134(30.2%)	 411(80.6%) 99(19.4%)	2.067	**1.505-2.839**
Insomnia Yes No	 113(25.6%) 328(74.2%)	 88(17.3%) 421(82.4%)	0.564	**0.406-0.784**
Sleep problems Soring Yes No	 89(20.2%) 351(79.8%)	 97(19.1%) 412(80.9%)	0.892	0.639-1.244

Table 5: Risk factors in subjects studied stratified by neck circumference.

Risk Factors	Neck circumference ≤35cm n=294	Neck circumference≥35 cm n=363	Odds ratio	Confidence interval C.I
Hypertension **Yes** **No**	 6(2%) 288(98%)	 19(5.2%) 344(94.8%)	2.603	1.005-6.746
Hypertriglyceridemia **Yes** **No**	 10(3.4%) 284(96.6%)	 44(12.1%) 319(87.9%)	4.072	1.993-8.319
Stress **Yes** **No**	 52(17.7%) 242(82.3%)	 45(12.4%) 318(87.6%)	0.628	0.398-0.991
Diabetes Mellitus **Yes** **No**	 6(2%) 288(98%)	 16(4.4%) 347(95.6%)	-	-
Risk factors Awareness **Yes** **No**	 93(31.6) 201(68.4%)	 118(32.6%) 244(64.4%)	1.075	0.765-1.512
CVD Awareness **Yes** **No**	 120(40.8%) 174(59.2%)	 128(35.3%) 235(64.7%)	0.805	0.579-1.118
Parents' CVD **Yes** **No**	 73(24.8%) 221(75.2%)	 75(20.7%) 287(79.3%)	0.742	0.505-1.090
Exercise **Yes** **No**	 220(74.8%) 74(25.2%)	 295(81.3%) 68(18.7%)	1.566	1.057-2.319
Insomnia **Yes** **No**	 53(18%) 241(82%)	 64(17.7%) 298(82.3%)	0.959	0.632-1.457
Sleep problem; snoring **Yes** **No**	 54(18.4%) 239(81.3%)	 74(20.4%) 288(79.6%)	1.084	0.722-1.629

Table 6: Risk factor in subjects studied stratified by waist-to-hip ratio.

Risk Factors	WHR≤ 0.87 n= 175	WHR≥ 0.87 n=153	odds ratio	Confidence interval (C.I)
Hypertension Yes No	2(1.1%) 173(98.9%)	7(4.6%) 146(95.4%)	4.147	**0.848-20.273**
Hypertriglyceridemia Yes No	13(7.4%) 162(92.6%)	13(8.5%) 140(91.5%)	1.157	**0.519-2.579**
Stress Yes No	25(14.3%) 150(85.7%)	19(12.4%) 134(87.6%)	0.851	**0.448-1.614**
Diabetes Mellitus Yes No	2(1.1%) 173(98.9%)	6(3.9%) 147(96.1%)	3.531	**0.702-17.757**
Risk Factors Awareness Yes No	55(31.4%) 120(68.6%)	46(30.3%) 106(69.7%)	0.947	**0.591-1.516**
CVD Awareness Yes No	68(38.9%) 107(61.1%)	48(31.4%) 105(68.6%)	0.719	**0.455-1.136**
Parents' CVD Yes No	47(27%) 127(73%)	25(16.3%) 128(83.7%)	0.528	**0.306-0.909**
Practicing Exercises Yes No	141(80.6%) 34(19.4%)	133(86.9%) 20(13.1%)	1.604	**0.879-2.925**
Insomnia Yes No	34(19.4%) 141(80.6%)	18(11.8%) 135(88.2%)	0.553	**0.298-1.026**
Sleep problem; snoring Yes No	41(23.4%) 135(76.6%)	28(18.3%) 125(81.7%)	0.732	**0.427-1.255**

Table7: Risk factors in subjects studied stratified by body mass index.

Risk Factors	BMI ≤25 n= 435	BMI ≥ 25 n=425	Odds ratio	Confidence interval
Hypertension Yes No	10(2.3%) 425(97.7%)	28(6.6%) 397(93.4%)	2.997	1.437-6.250
Hypertriglyceridemia Yes No	13(3%) 422(97%)	65(15.3%) 360(84.7%)	5.861	3.179-10.8
Stress Yes No	79(18.2%) 356(81.8%)	79(18.6%) 346(81.4%)	1.029	0.729-1.453
Diabetes Mellitus Yes No	6(1.4%) 429(98.6%)	23(5.4%) 401(94.4%)	4.101	1.653-10.17
Risk Factors Awareness Yes No	131(30.1%) 303(69.7%)	152(35.8%) 272(64%)	1.293	0.972-1.719
CVD Awareness Yes No	166(38.2%) 269(61.8%)	174(40.9%) 251(59.1%)	1.123	0.855-1.477
Parents' CVD				

Yes No	107(24.6%) 328(75.4%)	110(25.9%) 314(73.9%)	1.074	0.789-1.461
Practicing Exercises Yes No	333(76.6%) 102(23.4%)	324(76.2%) 101(23.8%)	0.983	0.717-1.346
Insomnia Yes No	74(17.1%) 360(82.9%)	98(23.2%) 324(76.8%)	1.471	1.050-2.061
Sleep problem; snoring Yes No	71(16.4%) 361(83%)	89(21.1%) 333(78.9%)	1.359	0.962-1.920

Table 8: Risk factors in subjects stratified by sleep disorders; snoring

Risk Factors	Male		Female		OR(C.I)	All n=926	
	Yes n=45(16%)	No n=230(83%)	Yes n=133(20%)	No n=510(87%)		Yes n=178	No n=740
Hypertension	7(15.6%)	5(2.2%)	9(6.8%)	18(3.5%)	8.29(2.5-27.4)***	16(9%)	23(3.1%)
Hypertriglyceride-mia	6(13.3%)	18(7.8%)	21(15.8%)	38(7.5%)	1.812(0.677-4.85)	27(15.2%)	56(7.6%)
Diabetes	4(8.9%)	7(3%)	4(3%)	17(3.3%)	3.1(0.870-11.098)*	8(4.5%)	24(3.2%)
Stress	11(24.4%)	18(7.8%)	60(45.1%)	83(16.3%)	3.8(1.65-8.764)***	71(39.9%)	101(13.6%)
Pack-years	9(20%)	23(10%)	-	-	-	9(20%)	23(10%)

P≤0.05 ** P≤0.01 ***P≤0.001*

Table 9: Prevalence of different waist-to-hip ratio levels in males and females.

Risk of WHR	Low Risk	OR (CI)	Moderate Risk	OR (CI)	High Risk	OR (CI)	Very High Risk	OR (CI)
Males	41(21.0%)	6.5 (3.9-10.6)	86(44.6%)	1.70 (1.2-2.5)	54(28%)	3.8 (1.9-7.1)	26(13.5)	2.0 (0.9-4.2)
Females	86(63.7%)		34(25.2)		10(7.4%)		9(6.7%)	
All	127(38.4%)		120(36.2%)		64(19.3%)		35(10.6%)	

Table 10: Correlation Matrix between body mass index and other measures.

Gender	BMI	Systolic BP	Diastolic BP	WHR	NC	Packyears
M	*R* *P value* *n*	0.049 0.481 209	0.124 0.073 209	0.077 0.293 190	0.349** 0.000 226	0.391* 0.033 30
F	*R* *p value* *n*	0.214** 0.001 237	0.164** 0.011 237	0.316** 0.000 125	0.365** 0.000 355	-
All	*R* *P value* *n*	0.135** 0.004 446	0.134** 0.005 446	0.286** 0.000 581	0.214** 0.000 315	0.391* 0.033 30

Table 11: Numbers and percentages of risk factors in subjects studied

Risk Factor	Males (n=276)	Females (n=650)	All Subjects (926)
Hypertension	12 (4.3%)	27 (4.2%)	39 (4.2%)
Hypertriglyceridemia	24 (8.7%)	59 (9.1%)	83 (9.0%)
Diabetes	11 (4.0%)	21 (3.2%)	32 (3.5%)
Obese	55 (20.3)	138 (23.4%)	193 (22.4%)
High WHR	140 (72.5%)***	43 (31.9%)	183 (55.8%)
Metabolic Syndrome (3 or more risk factors)	190 (68.8%)***	125 (19.2%)	315 (34.0%)

P≤0.05 ** P≤0.01 ***P≤0.001*

Table 12: Number and (%) of subjects who have metabolic syndrome (3 or more risk factors) in males and females.

Subjects with Metabolic Syndrome	Males (n=190)					Females (n=125)					All Subjects (n=315)				
Number of risk factors	4	5	6	7	8	4	5	6	7	8	4	5	6	7	8
Number	4		67	48	6	1	2	58	108	21	1	6	125	156	27
% of subjects	3.2		53.6	38.4	4.8	0.5	1.1	30.5	56.8	1.1	0.3	1.9	39.7	49.5	8.6

DISCUSSION

The study has been conducted to investigate the prevalence rates of the risk factors associated with cardiovascular disease among 926 Emirati respondents aged 18-45 years old. The prevalence rates of the following: Hypertension, Hypertriglyceridemia, Diabetes Mellitus 2 (DM2), Stress, Insomnia and snoring were (4.2%, 9%, 3.5%, 19.1%, 21.1% and19.4%) respectively. The study has been conducted to investigate the prevalence rates of the risk factors associated with cardiovascular disease among 926 Emirati respondents aged 18-45 years old. The prevalence rates of the following: Hypertension, Hypertriglyceridemia, Diabetes Mellitus 2 (DM2), Stress, Insomnia and snoring were (4.2%, 9%, 3.5%, 19.1%, 21.1% and 19.4%) respectively.

There were significant differences in physical measurements such as height and weight between males and females. Male participants were heavier and taller than females. There were significant differences in systolic blood pressure, neck circumferences, waist-hip ratio and the frequency of the exercise per week between the two groups of males and females.

The mean systolic blood pressure was 115.09 mmHg (SD±16.23), which was higher in males than females. Obesity, work stress, physical inactivity and high salt intake were likely the causes for the rise in high blood pressure in younger men with high blood pressure which may contribute to metabolic syndrome (abdominal obesity) which is linked to heart disease and DM diseases.[25] It has been shown that the mean value of neck circumferences in males and females were 38.79(SD±3.82) and 34.14(SD±3.22), respectively. They were slightly higher than what have been reported by Yang GR, 1996[25], where males had more than 37 cm and females had more than 34 cm. It can be considered the best cutoff points to determine the subjects susceptibility to CV diseases.

The average rates of waist to hip circumference ratio of males and females were moderate (0.89) and high (0.83), respectively, based on the standards of Heyward VH & Stolarcyzk (1996).[26]

The duration of exercise per minute and the frequency of exercise per week were more in males than females indicating that males were healthier than females. There was a very high significant difference in CVD risk factors such as stress, obesity, CVD awareness, family history, physical inactivity, insomnia and risk factors awareness between males and females (P ≤0.001). Our observations revealed that higher proportion of women have these CVD risk factors compared to men. Our results showed that shorter people (Height≤160 cm) were more prone to get CVD or had more than one risk factor (i.e, they had more risk of getting CVD). Some studies suggested that because of genes variety or nature of narrow arteries or poor nutrition that lead to the small stature of them and hence increase the chance of incident of cardiovascular disease.

The Impact of neck circumference has been shown in the study conducted by Preis SR et al., 2013[27], revealed that neck circumference was independently associated with cardiovascular disease risk factors beyond visceral adipose tissue and body mass index. The same findings were also observed in the Brazilian Metabolic Syndrome Study.[28]

Individuals with a large Neck circumference had more health problems that related to the cardiovascular diseases than those with small neck sizes.

Hypertension is associated with the size of the neck. Our study showed a greater proportion of hypertension, two times more risk in subjects with wider neck compared to those with small neck sizes. This has been confirmed previously that large neck circumference in combination with overweight/obesity and abdominal overweight/ obesity-was associated with an increased risk of high blood pressure.[29]

Neck circumference was strongly associated with hypertriglyceridemia. The risk was four times higher in number of hyperglyceridemic patients compared to those with less than 35cm neck sizes.

Subjects with high neck circumference more than 35 cm had higher sleep disorders like snoring, which is confirmed by another research on subjects with neck circumference greater than 40.0 cm in woman or greater than 43.0 in man; correlated with an increased risk for the sleep disorder like snoring and sleep apnea.[30] The WHR is a predictive indicator for the cardiovascular diseases; mean value in the present study was 0.87 (+/- 0.108). A high WHR values were associated with high hypertension and diabetes occurrence (OR: 4.147(C.I=0.848-20.273) and 3.531 (C.I=0.702-17.757), respectively. This result is similar to that of Canoy et al (2004)[31]; the WHR was positively related to blood pressures in male and female participants and WHR was also correlated to the diabetes as a study of Attie and

Scherer, 2009.[32] A study showed that Males had higher WHR than females.[33] indicated that intra-abdominal fat contributed to the most of myocardial infraction conditions in young males than females. Our results revealed that 28 % of individual who snores were obese (WHR ≤0.87) which is in consistent with Al-Delaimy W et al., 2002.[34] In addition, snoring is associated with a thickening of the walls of the left ventricle of the heart.[35] Body mass index above 30 kg/m2 was associated with a higher risk of CVD than individuals with body mass index between 25-29.9 kg/m2. Hypertension cases were more in obese person than normal one (BMI≤25kg/m²). The number of hypertriglyceridemia patients in obese subjects. Subjects with high BMI had six times more chance of suffering from CVD than subjects with smaller BMI. This confirms previous study conducted in Southwestern china which showed high incidence of hyperlipidemia, hypercholesterolemia, hypertriglyceridemia, and elevated body mass index and WHR.[36]

The incremental association of BMI category on the risk of diabetes type 2 is stronger for people with a higher body mass index relative to people with a lower body mass index.[37]

Overweight participants in the present study were more insomniac (OR= 1.47, C.I =1.050-2.061). Obese individuals snored more than individuals with low body mass index. The studies showed that a higher prevalence of snoring was in obese males.[39] This is because of narrowing in pharyngeal airway diameter and resistance of adipose tissue in obese persons.[40]

In the present study, the total number of non-snorers was less than snorers. The percentage of snorer females (20%) was more than snorer males (16%), while in a study by Chan, C et al., 2012[41] snorer males were more than snorer females. A very high significant odds ratio (8.29; C.I= 2.5-27.4) was found for snoring condition in hypertensive female patients compared with males. The proportion of hypertension was significantly more (p≤0.001) in subjects who had sleep disorders than those who did not have this problem. This has been confirmed by a study of Calhoun and Harding, 2010[42] which concluded that sleep disorders is associated with increased hypertension risk.

The occurrence of snoring was three times more in diabetic men than women. A serious relationship between snoring and diabetes that was explained by Renko, AK and colleagues in 2005[43] that "habitual snoring was associated with Diabetes type 2 and impaired insulin sensitivity".

In the present study, stressed females who had snoring conditions (OR=3.8, C.I=1.65- 8.76) were four times higher than stressed males. Stress conditions were very small in snorer males and slightly higher in females. Men in the present study were more relaxed and psychological healthy. Stress is linked to snoring that was proved by several studies. The impact of stress, has been shown significantly in females than males which might be related to the environmental factors such as somatic illness stress due to sex difference in psychological reaction.[41]

The average Pack-year of smoking wasn't shown in females of our study because they are non-smokers. Smoking habits comprised small percentage of all males according to our data. Unlike to Japanese study which showed that cigarette smoking was positively associated with habitual snoring for both men and women. Our Current Study found that males were having a higher WHR than Females; so they have a higher incidence of getting CVD than females. But a study conducted by Njelekela, MA et al, 2009[44], counteracts the results of our Study, as it showed that females had significantly higher WHR than males.

The prevalence rate of metabolic syndrome was reported in thirty four percent of our population (34%), males has shared the biggest part than females. Although our findings have been counteracted by Williams JW et al, 2003[45] and Steinbaum SR et al, 2004[60] who found that the prevalence rate of metabolic syndrome were higher in females than males which had a direct correlation with the risk of getting CVD.

CONCLUSION

Cardiovascular diseases and their risk factors are problem of great magnitude, hence negatively impacted the burden of disease in the many populations. In the UAE adult population, stress, insomnia and snoring were important triggers for CVD. Hypertensive females, diabetic males and females under stress were more likely to develop snoring conditions. Increasing size of certain parameters such as height, neck circumference, WHR and BMI play a vital role in exacerbating CVD and risk factors and this was confirmed by several studies and aligned strongly with the result of this study. Yet, some results of the present study were inconsistent with other studies like taller people were more ?? susceptible to diabetes mellitus and females snored were more than males. The finding of this study revealed that cardiovascular disease risk factor in the UAE adults does not pose serious threat to their health. However, indicators confirmed that some individuals have the potential to be impacted by the disease. This study illustrates that the proportion of UAE adults who suffer from CVD or its risk factor were less compared to other studies conducted in other part of the world and that can be interpreted by dramatic improvement of UAE Community social Welfare over the last decade.

Limitations of the present study.

Study population covered adults from the northern UAE and it will be more beneficial to extend the study to other parts of the UAE in order to establish clear picture of the conditions in the whole of the UAE. They were

some difficulties to convince participants to take their measurements, especially in women and obese individuals and some measures were omitted (e.g: length of the neck and hip circumference and lipid profile (LDL, HDL and cholesterol level) which would have provided valuable information. Our desire was to complete the survey in more areas of the UAE abut there were limited times and distance to these places was very hard.

Conflict of Interests:

"The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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