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Prevalence of Cardiovascular Risk Factors among Community During Screening Campaign in Makkah 2022-2023

Dr. Reham Naif Bin Hassan[1*], Dr.Bashaier Ahmad Fairaq[1], Dr. Mansour Matok Madabighy[1], Fayza Humod Alhazmy[1], Dr. Yasmeen Ismael Barnawi[2], Dr.Bayan Saleh Bin saeed[2], Dr.Wael Hassan Alzahrani[3], Zainab Talha Hawsawi[4], Abdullah Saeed Alyamani[4], Kawther Habiballah Turkistani[4]

[1]Executive Administration of Population Health Management in Makkah Health Cluster, Makkah AlMukarramah, Saudi Arabia.
[2]Infectious diseases Administration, in Makkah Health Cluster, Makkah AlMukarramah, Saudi Arabia.
[3]Executive Administration of Population Health Management in Jeddah Health Cluster, Jeddah, Saudi Arabia.
[4]Health Promotion Administration in Makkah Health Cluster, Makkah AlMukarramah Saudi Arabia.
Email: rbinhassan@moh.gov.sa
*Corresponding Author

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ABSTRACT
Objective: This study aimed to set up a database of the prevalence of CVD risk factors and their relation to others for the population in the Makkah region, which helped empower the planning for future campaigns and screening programs.
Material and Method: This cross-sectional study has been performed from January 2022 to August 2023. We measured the prevalence of overweight, obesity, diabetes, and hypertension in 4405 males and 1627 females in Makkah city.The data was collected using an Electronic Excel Sheet. All measurements were taken by trained staff and volunteers.
Results: the prevalence of CHD risk factors among the study population according to measurement and laboratory results. About 41.6% obese, 36.8% overweight, and 19.2% normal.
The body mass index for females [29.0±.60] was higher than that of males[$p<0.05$]. Also, the mean of random blood sager for females was higher than that for males [$p<0.05$].
However, the mean of SBP, and DBP were higher among males than females [$p<0.05$].
Conclusion: Our study confirmed a relationship between risk factors like obesity blood sugar levels and the development of coronary heart diseases. The lowest risks have been seen in people with lower body mass index and normal pressure.

Keywords: Cardiovascular disease, Cardiovascular risk factor, Screening, Campaign.

INTRODUCTION

Worldwide, communicable and noncommunicable diseases are on the rise. Saudi Arabia is well-known for having a high prevalence of these diseases; according to the Saudi Vision 2030, they will prioritise public health prevention measures, early screening, and detection of risk factors over disease management [1].
Cardiovascular diseases [CVDs] are a group of heart and blood vessel disorders that are the leading cause of death worldwide. CVDs were responsible for 38 percent of the 17 million premature deaths [under the age of 70] caused by noncommunicable diseases in 2019. Many risk factors for CVD are modifiable, such as diabetes, obesity, smoking, and hypertension, while others, such as gender and age, are not [2].
Diabetes affects more than 37 million people in the United States, a figure that has more than doubled in the last 20 years. One in every five do not know if they have it. Predicates affect 96 million adults in the United States. Type 2 diabetes accounts for 90-95 percent of all diagnosed cases, while type 1 diabetes accounts for 5-10%. More than 670,000 people died in the United States in 2020 as a result of hypertension risk factors; nearly half of adults (47%) have hypertension, and only 24 percent have it under control. From 2017 to March 2020, the obesity prevalence in the United States was 41.9 percent. Simultaneously, the prevalence of severe obesity increased from 4.7 to 9.2 percent [3].
The prevalence of hypertension was determined to be 7% in a prospective study conducted in rural Nigeria. SSA currently has 10.4 million people with diabetes, accounting for 4.2 percent of the global diabetes population. This figure is expected to increase by 80 percent by 2025, reaching 18.7 million in this region. In Africa, the

estimated prevalence rate of type 2 diabetes is around 2.8 percent. Malawi and Ethiopia have prevalence rates of less than 2%, whereas Ghana, Sudan, and South Africa have prevalence rates of more than 3% [4].

A study conducted in South Asia, specifically in India, for cardiovascular risk factors among undergraduate medical students found a high prevalence of modifiable risk factors, a high CVD risk ratio of 14.3 percent, and a significant positive correlation between weight and CVD risk score [R = 0.33, p 0.001] for obesity and overweight. 82.7 percent, and 29.3 percent used tobacco [5].

Many EMR countries in the Mediterranean region have reported that the onset of type 2 diabetes is increasing in younger age groups. According to studies, the prevalence of diabetes among adults ranged from 10% to 15%. In this region, the prevalence of type 2 diabetes has risen dramatically over the last two decades. Age-standardized adjusted estimates for raised blood glucose in EMR countries showed that Saudi men and women (20 years and older) had the highest prevalence at 22 percent and 21.7 percent, respectively. However, the proportion of undiagnosed diabetes and prediabetes, hypertension, and pre-hypertension is significant, resulting in a significant burden of diabetes on healthcare systems in this region. 32 In Iran, newly diagnosed diabetes accounts for 47 percent of all diabetes cases. Age and gender have different effects, with male adults ranging from 38.8 percent in Egypt to 51.7 percent in Libya. The corresponding figure for female adults is 32.5 percent in the UAE and 46.0 percent in Morocco. Except for Morocco, women were less likely than men to have hypertension. In terms of weight, the prevalence of overweight and obesity (body mass index 25 kg/m2) has reached an alarming level in most of the region's countries, ranging from 25% to 82 percent, with a higher prevalence among women. Tobacco smoking is a well-documented risk factor in countries with a high prevalence of tobacco smoking (57-77 percent), such as Djibouti, Tunisia, and Yemen. Lebanon [35 percent] and Yemen [29 percent] had the highest female prevalence rates [6].

Furthermore, studies in the Arabian Gulf region show an increased prevalence of obesity among a population, which may result in a large burden of noncommunicable diseases. According to a study conducted in the United Arab Emirates (UAE), the prevalence of overweight and obesity was 43.0% and 32.3 percent, respectively. Furthermore, in 2016, the prevalence of obesity was estimated to be 31.2 percent in Bahrain, 26.1 percent in Israel, 28.3 percent in Oman, and 17.0 percent in Yemen [6].

In 2019, the Saudi Ministry of Health released the most recent Saudi data from the World Health Organization's World Health Survey [SAWHS]. Obesity was reported to affect 20% of people in South Africa, with a higher percentage among females (21%), urban dwellers (21%), and those with no formal education (29%). Obesity also increased with age, rising from 10% in the 18-29 age group to 20% in the 70-79 age group before falling to 22% in the elderly over the age of 80 [7].

Several studies conducted in Saudi Arabia reveal a high prevalence of obesity risk factors, indicating that people with chronic diseases are more likely to be obese. A 2022 systematic review for obesity found that the highest percentage appeared in the Eastern region (BMI > 30 kg/m2: 29.4 percent), and multiple cohort studies confirmed that geographical area affects the prevalence of obesity distribution, with rural residents having a significantly lower prevalence of obesity than urban residents. Morbid obesity was higher among females than males, which may play an important role in an increased risk of obesity and cardiovascular disease [[36.5 percent versus 29.4 percent (p 0.001) [8]. Also, the severity of obesity was higher in women, particularly in obesity classes II and III (BMI > 35 kg/m2) (26.1 percent vs. 14.5 percent) [7].

Another study found that males had a significantly higher mean score for CVD risk compared to females [p 0.05], and that the prevalence of hypertension was much higher among males (20.8 percent) compared to females (5.8 percent). There was a highly statistically significant difference (X2 = 10.82, p 0.01) [9].

A study was conducted to determine The levels and correlates of physical activity, inactivity, and body mass index among Saudi women working in office jobs in Riyadh city show that the majority of subjects have a mean BMI of 27.1 (5.7), which falls into the 'overweight' BMI category. The majority of respondents (38.2 percent) were of 'normal' weight; however, over fifty percent of the sample were either 'overweight' or 'obese' (58.3 percent). A significantly greater proportion of respondents were 'overweight or obese if they were over 35 years old (p 0.001), and Age appears to increase risk of overweight or obesity by an OR of 1.1 (95 percent CI 1.06-1.54) [10].

The high prevalence of undetected risk factors such as diabetes mellitus, pre-diabetes, raised blood pressure, and hypercholesteremia, which are linked to cardiovascular complications, according to a study done among Saudi male office workers in Makkah, contribute to a person with undetected pre-diabetes being twice as likely to be overweight. Despite this, the majority were classified as obese (P value =.027). Undiagnosed diabetes was significantly higher in overweight people, but there was no significant increase in obese people (P value =.094) [11].

Study Methods

Study setting

Community Screening Campaign. The Makkah region was home to a diverse range of nationalities. Saudi citizens account for approximately 63.6 percent of the total population of Saudi Arabia. In KSA, 4.2 percent of

the total population is over the age of 65, with 24.5 percent residing in the Makkah region. Recently, more than half of the population (65.4%) is over the age of 20, while 30.4 percent is under the age of 20. (General Authority for Statistics Kingdom of Saudi Arabia, 2019).
Chronic disease is prevalent in Saudi Arabia. The Makkah region has 20.5 percent of chronic disease diagnosed cases, and the highest incidence of cardiovascular disease, diabetes, and hypertension diagnosed was 1.5 percent, 11 percent, and 10.2 percent, respectively (General Authority for Statistics Kingdom of Saudi Arabia, 2018).
In campaigns, a cross-sectional study was conducted on all people over the age of 18. Al-Mukarrmah is a holy city in Makkah.
During the screening campaign in the Makkah region of Saudi Arabia, all people over the age of 18 were included.
During the screening campaign in the Makkah region of Saudi Arabia, people over the age of 18 were excluded.
A stratified cluster sampling technique with multiple stages. We will select different locations at random from each of the eight regions in Makkah.

Data collection
The screening health department team is preparing for a large campaign in various locations with a large number of visitors. After completing all approval papers within three months, the screening department team distributed them in three locations to prepare for the campaign, screening the community for (random blood sugar, blood pressure measurement, weight, height, and other demographic data). These campaigns were launched in order to attract the target audience for screening. After obtaining individual consent, all information was recorded. The data collector team gathered all of the responses; each collector was tasked with gathering data from his or her region. These campaigns were supposed to begin in 2023.

Data collection tool
The information was gathered using an electronic Excel spreadsheet. All measurements will be performed by trained personnel and volunteers. The sheet will be created in two versions: a paper version and an online version. Because it is simple to use, saves resources, provides more complete answers, and facilitates data collection, the latter will evolve to reduce the item-non-response rate and incomplete data.
Glucometer (ACCU-CHEK) blood sugar measurement tool, electronic blood pressure monitoring (EDAN - company), and anthropometric weight and height measurement tool (SECA tool).
First, perform community service to gauge (blood sugar, blood pressure, weight, and height).
Second, choose various locations for community service campaigns.
Third, a focus group discussion with staff and volunteers will be held to solicit their expert opinions on the community's health needs campaign.
Focus group discussion: (4-8) volunteers, staff, and the governor will be asked about the following topics: 1- What is the most prevalent health issue in the community?
2- What is the most common healthy behaviour in your neighbourhood?
3- What is the most harmful behaviour in the community?
4- How can we improve health and service delivery?
5- Health services for early detection and screening for cardiovascular risk factors are available.

Statistical procedure
MS Excel and SPSS software version 20 were used to perform statistical analysis on the data. For quantitative data, mean SD was calculated; for qualitative data, frequency and proportion were calculated. The data was examined to determine the significance of statistical differences. For quantitative data, the student's t-test was used, while for categorical data, the Chi-square test or Fisher's exact test was used. If p0.05 at a confidence interval of 95%, the p-value was considered significant.

RESULT
The study population was composed of 6032 people whose ages ranged from 18 years old and above with a mean of 43 years. Table 1 shows: the personal and sociodemographic characteristics of the population enrolled in the study. Males represented about three-quarters (73% of the sample). Regarding the nationality, 3281 (54%) were Saudis, and 2750 (45.6%) for non-Saudi. Concerning smoking history 5241 (86.9%) were nonsmokers, and 791 (13%) were smokers.

Table 1: personal and sociodemographic characteristics.

Variable	No.	Percent
Gender		
Male	4405	73

Female	1627	27
Nationality		
Saudi	3281	54
Non-Saudi	2750	45.6
Smoking		
Yes	791	13
No	5241	86.9

Table 2 demonstrate the prevalence of CHD risk factor among the study population according to measurement and laboratory result. About 41.6% obese, 36.8% overweight, and 19.2% normal. The prevalence of hypertension according to SHAMS guidelines was 35.5% HTN, 43.4% pre-HTN, and 20.4% Normal. About 82.8% of the study population had normal blood sugar, while 16.3% had high blood sugar.

Table 2: coronary heart disease risk factors among the study population according to measurement and laboratory investigation.

Variable	No.	Percent
Body Mass Index BMI		
Normal	1156	19.2
Overweight	2218	36.8
Obese	2447	41.6
Blood pressure (BP)		
Normal	1231	20.4
Pre-HTN	2617	43.4
HTN	2138	35.5
Random blood sugar (RBS)		
Normal	4997	82.8
High	984	16.3

Table 3: comparison of means of anthropometric and laboratory parameters among male and female population

Variables	Male (Mean± SD)	Female (Mean± SD)	T.test	P
Hight	168.7±19.40	154.8±23.02	3.375	.066
Weight	83.69±18.85	72.44±19.50	1.908	.167
Body mass index	28.6±5.92	29.0±7.60	108.99	.000
Randone blood sager	117.5±46.03	119.21±51.59	12.400	.000
SBP	129.9±17.808	127.82±25.350	116.036	.000
DBP	81.25±12.837	79.50±16.306	34.22	.000

Table 3 shows the male population had higher mean levels of height (168.7) and weight (83.69) compared to female height (154.9) and weight (72.44). The calculated mean of body mass index for females (29.0±.60) was higher than that of males which is statistically significant (t test=108.99, $p<0.05$). The mean of random blood sager for females (119.21±51.59) was higher than that for males (117.5±46.03). A highly statistically significant difference was found (t.test=12.400, $p<0.05$). The mean of SBP, and DBP were higher among males than females. A highly statistically significant difference was present (t-test=116.036, t-test=34.22, $p<0.05$).

DISCUSSION

The current study sought to investigate coronary heart risk factors in the Saudi population, taking into account various demographic factors as well as specific factors such as obesity and blood pressure. According to the study, Saudi nationals outnumber non-Saudis in terms of enrollment. This is due to the fact that Saudi nationalities account for 59% of the population in Makkah. There were fewer smokers than non-smokers. This could be because fewer people are willing to talk about their smoking habits.

The study's main findings revealed that people who are obese have a higher risk of coronary heart disease, followed by those who are overweight, and finally those who have a normal body mass index. These findings are consistent with those of Ibrahim et al. [16] in Saudi Arabia, who discovered that obesity is one of the leading risk factors for coronary heart disease. This could be due to a variety of unhealthy practises such as physical inactivity, daily fat intake, and daily fast food consumption. Furthermore, coronary heart disease may be caused by changes in metabolic profiles and subsequent events such as new adaptations in cardiac structures and functions as a result of excessive adipose tissue accumulation (Hajar, 2017) [13]. People with a normal BMI had a lower risk of coronary heart disease. This finding is consistent with the findings of Alkhawam et al. [15] in the United States, who discovered that a normal BMI is a lower risk factor for coronary heart disease. This is

because people with a high BMI have more adiposity, which is strongly linked to atherosclerosis, a key factor in the development of coronary heart disease [15].

This is because blood pressure above 120/80mmHg is directly related to an increased risk of cardiovascular disease. Participants with normal blood pressure, on the other hand, had a lower prevalence of coronary heart disease. The findings are consistent with the findings of Alenazi et al. [14] in Saudi Arabia, who found that people with normal blood pressure had a lower risk of developing coronary heart disease. The reasons for this could be due to economic and environmental changes in the Middle East, which act as a barrier to coronary heart disease. First, people attend a lot of social gatherings, making it difficult to keep track of their diet and find time to exercise. Second, frequent temperature increases to above 55oC during the summer, as well as sandstorms, are some of the environmental factors that have necessitated the need to modify physical activities, thereby lowering the risk of coronary heart disease.

Normal random blood sugar levels are associated with an increased risk of coronary heart disease. High random blood sugar levels are less likely to cause coronary heart disease. These findings contradict Ali's [2010] finding that blood sugar levels increase the risk of coronary heart disease. This could be due to an inaccurate device reading or a failure to obtain the participants' diabetic history.

Females had higher blood sugar levels than males, according to the findings. These findings contradict those of Mauvais-Jarvis [2017], who found that males have higher blood sugar levels than females. This could be due to differences in body fat mass between men and women, particularly at young ages.

The male population had higher mean height and weight levels than the female population. The findings support the findings of Chiriboga et al. [2008] [17] that obesity and height are important predictors of health problems. The similarity in findings could be explained by men being more muscular and having heavier Bones than women. That means that any healthy man of the same height would weigh more than any healthy woman of the same height [Sperrin et al. 2016].

Our study's strengths are that it used a larger sample size and a randomised sample size. However, the study has limitations because our findings are based on a single baseline assessment of various factors, which cannot explain variation over time, which has previously been linked to coronary heart disease risk by other researchers. Furthermore, the lipid profile, which is an important risk factor for coronary heart disease, was not measured in the study. Furthermore, without knowing the patient's diabetic history, only random blood sugar levels were measured.

CONCLUSION

In conclusion, our research found a link between risk factors such as obesity and blood sugar levels and the development of coronary heart disease. People with a lower BMI and normal blood pressure have the lowest risks. It is suggested that more attention be paid to groups with high BMI, sugar levels, and blood pressure in order to identify any underlying risks and optimise coronary heart disease prevention.

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