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DISCOVERY
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Prevalence and awareness of hypertension among the shopkeepers working in the market in Northern Border Province of Saudi Arabia

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ABSTRACT

Background: The public health systems of developing and developed countries are seriously threatened by hypertension because it is a widespread non-communicable disease and a global pandemic. We anticipate a high incidence of cardiovascular disease risk factors in our study because we assume that shopkeepers within the market population lead sedentary lifestyles as most of their jobs involve not much physical activity. *Aim and objectives:* To know the prevalence and awareness of risk factors for cardiovascular disease (CVD) and the relation with the dietary patterns in the market population in Arar, Kingdom of Saudi Arabia (KSA). *Material & methods:* In a randomized cross-sectional study, a population of market workers was surveyed for cardiovascular diseases and their risk factors by giving a pre-validated structured questionnaire. *Results:* The prevalence of hypertension and obesity was found to be high in the market population of Arar. Hypertension was more prevalent in overweight and obese individuals. A sedentary lifestyle among shopkeepers who continue to sit for long hours was more prevalent in obese and in the pre-hypertensive or pre-diabetic category. *Conclusions:* A wholesome diet awareness corresponds with knowledge of high-risk factors for cardiovascular diseases (CVD), corresponding to the hypothesized link between nutritional knowledge and diet quality. It may influence poor dietary behavior found among the market population, and it may help reduce the incidence of hypertension, heart attack, stroke, and other associated risk factors for CVD.

Keywords: Prevalence, CVD, Hypertension, Market Population, Saudi Arabia

1. INTRODUCTION

Since hypertension is a common non-communicable disease and a global pandemic, it poses a severe threat to both emerging and industrialized public health infrastructures (Roger et al., 2012). The prevalence of cardiovascular diseases has been rising on a worldwide basis. Age, gender, ethnicity, and physical attributes of an individual significantly impact the prevalence rates of cardiovascular diseases. Cardiovascular diseases are among the leading causes of mortality in Saudi Arabia. Cardiovascular diseases, cerebrovascular disorders, blindness, and kidney diseases are associated with uncontrolled blood pressure (Ng et al., 2018). Proper blood pressure control can help to avoid severe complications of hypertension.

We expect a high incidence of cardiovascular diseases in our research group of the market population since we assume they live sedentary lifestyles because most of their work requires them to sit in a single place (Padmanabhan et al., 2018). Besides living a sedentary lifestyle, most of them don't regularly exercise. The workers would spend most of their day at the market, relying on food vendors and eating fast food for most of their meals (Roy et al., 2017). Foods rich in oil and salt make them a risk factor for cardiovascular diseases. For awareness among the market population, extensive health education addressing the risk factors for cardiovascular diseases was needed (Forouzanfar et al., 2017).

Appropriate hypertension control is necessary to lower the mortality rate linked to hypertension, the most prevalent CVD risk factor (Al-Nozha et al., 1997). Hypertension is linked to 23% of all deaths and 32% of adult deaths (Al-Hamdan et al., 2011). Numerous studies have found a connection between high blood pressure and millions of disability-adjusted life years (DALYs) (Saeed et al., 2011). The load of hypertension expected to increase significantly in the forthcoming years due to stressful environmental and lifestyle changes that stem from dangerous working conditions and growing societal pressures (Memish et al., 2014).

Aims and objectives

To know the prevalence and awareness of risk factors for cardiovascular disease (CVD) in the market population in Arar, Kingdom of Saudi Arabia (KSA)

To study the dietary pattern of the market population in Arar, Kingdom of Saudi Arabia.

To analyze the relationship of diet patterns with prevalence risk factors for cardiovascular disease in the market population in Arar, Kingdom of Saudi Arabia (KSA)

2. MATERIALS AND METHODS

Study Design and Participants

In a randomized cross-sectional study, cardiovascular diseases and their related risk factors were surveyed in the market population. To check the demographic details and awareness regarding cardiovascular diseases, a structured questionnaire was distributed to the market population in Arar, Saudi Arabia. The sample included 333 shopkeepers and workers in the market in Arar, Saudi Arabia.

Research tool

A pre-structured questionnaire designed after a literature review. The dietary pattern of the market population in Arar, Saudi Arabia, was studied using a food frequency questionnaire (Geaney et al., 2015). All participants were given a self-administered questionnaire (in both English and Arabic). A survey conducted for the enrolment of the participants. The consent obtained from the willing participants. Participants filled a pre-validated survey questionnaire.

Study tool

The survey questionnaire contained two sections. The first section included items related to the demographic information of the participants. The second section had information to assess the Food frequency analysis of participants.

Study setting

Markets of Arar City, Saudi Arabia, from 1/1/2023 to 1/2/2023.

Study population

Market worker population in Arar City.

Study Design
Cross-sectional study.

Sampling tool
Structured, well-designed questionnaire (both English and Arabic versions).

Sampling Method
Simple random sample

Sampling technique
Simple random sample

Sample size
333 Market Population workers
The sample size was calculated using the formula n=z2p (1-p) where p=prevalence found in the previous study is 0.22, d=tolerated error is 0.05, Confidence interval=95%, and Z score =1.96.

Inclusion and Exclusion criteria
Inclusion criteria
Males and females working in the market in Arar.

Exclusion criteria
Pregnant females and children and the elderly population.
Males and females who had been undergoing treatment for any chronic illnesses

Data Analysis
Statistics
The data obtained from the questionnaire analysis was entered into Microsoft Excel 2013. Microsoft Excel and Statistical Package for Social Science (SPSS) software program (IBM SPSS v.20 Inc., Chicago Il, USA) were used for descriptive analysis of the data. The results were presented as frequency distribution. P-value< 0.05 was considered significant.

3. RESULTS

The socio-demographic details of the participants (n = 333) given in (Table 1). The average height was 158 cm, and the average weight was 82 kg. The majority of the people had poor dietary habits, and they were unaware that nutritional habits and physical fitness are related to cardiovascular diseases and their risk factors. The food habits of participants were assessed using the food frequency questionnaire listed in (Tables 2-6) and (Figure 1). The prevalence of hypertension and obesity, which are major risk factors for cardiovascular diseases, were found to be high in the market population of Arar. A sedentary lifestyle (39%) among shopkeepers who continue to sit for long hours were found to be more obese and in pre-hypertensive or pre-diabetic people.

Daily Physical Activity Information
52% of participants stated they had been active in general, and 45% had no weekly physical activity.

Blood pressure treatment information
27% of participants had taken medicine to lower blood pressure.

History of Diabetes-mellitus-related information
23% of participants had been taking diabetes-mellitus treatment, 18% had been doing Self-Monitoring of Blood Glucose, 27% had a family history of diabetes-mellitus, 39% had a family history of heart disease and 59% stated that they are under stress all the time.

Results of Food Frequency Questionnaire-FFQ (Total number of participants=333)

The FFQ approved for usage in a variety of populations. Participants tracked how frequently they typically ate each meal item throughout one month. The FFQ includes 150 food items divided into the major food groups and evaluated the entire diet. The frequency of consumption of each food item was recorded and converted into amounts using typical serving sizes. Information collected was translated to food quantities and nutrient values using NetWISP4 (Weighed Intake Software application; Tinuviel Software, Warrington, UK), a specially developed nutrition software application. Some 333 participants were involved in this study. 52.9% were single, and 40.2% were married. The majority have a university educational background, 72.4%. Smokers in the study were 57.4%. Having a first-degree family member with hypertension was 43.2%. And more than half of the participants, 52.9%, had standard body mass index (Table 1).

Table 1 Socio-demographic characteristics

Characteristics		N (%)	Total
Social status	Single	52.9%	333
	Married	40.2%	
	Divorced	6.9%	
Educational background	High school	27.6%	
	University	72.4%	
Do you smoke	Yes	42.6%	
	No	57.4%	
Family history (first-degree) of hypertension	Yes	43.2%	
	No	36.6%	
	I do not	20.1%	
Body mass index categories	Underweight	11.1%	
	Normal body mass index	52.9%	
	Overweight	25.8%	
	Obese	10.2%	

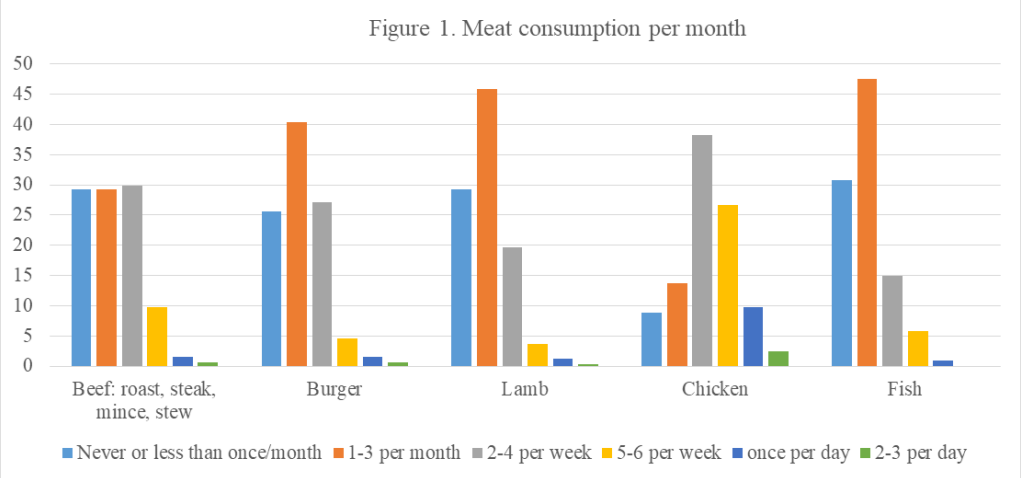

Figure 1 Meat consumption per month

40.4% and 47.6% include burgers and fish 1-3 per month in their diet, respectively. Including Beef: Roast, steak, mince, and stew for Never or less than once/month, 1-3 per month, and 2-4 per week 29.2%, 29.2%, and 29.8%, respectively (Figure 1). 44.4% had low-fat yogurt never or less than once per month. 1-3 per month had Full-fat or Greek yogurt, Cottage cheese, low-fat soft cheese, Eggs as boiled, fried, and scrambled, and Salad cream, mayonnaise 31.8%, 28.2%, 23.4% and 25.2%, respectively (Table 2).

Table 2 Dairy consumption per month

	Low-fat yogurt	Full-fat or Greek yogurt	Cottage cheese, low-fat soft cheese	Eggs as boiled, fried, scrambled	Salad cream, mayonnaise
Never or less than once/per month	44.4%	29.7%	40.8%	15.9%	52.9%
1-3 per month	27.6%	31.8%	28.2%	23.4%	25.2%
2-4 per week	20.7%	25.5%	23.7%	35.1%	15.9%
5-6 per week	3.9%	8.4%	3.9%	15.3%	3.0%
once per day	1.8%	2.7%	1.8%	6.0%	0.0%
2-3 per day	0.9%	0.9%	0.6%	1.5%	2.1%
4-5 per day	0.6%	0.6%	0.3%	1.2%	0.3%
More than 6 per day	0.0%	0.3%	0.6%	1.5%	0.6%

30.9% had sweet biscuits and chocolate in their diet 2-4 per week 35.1%, 29.7%, and 21.6% had cake, Buns, or pastries. Croissants, doughnuts, and Sugar were added to tea and coffee 1-3 per month, respectively. 41.1% had Ice cream and chocolate ices in their diet never or less than once per month (Table 3).

Table 3 Snacks consumption per month

	Sweet biscuits, chocolate	Cake	Buns, pastries, e.g., croissants, doughnuts	Ice cream, chocolate ices	Sweets	Sugar added to tea, coffee	Peanuts or other nuts	Tomato ketchup	Pickles	Jam, honey
Never or less than once/per month	16.2%	22.5%	18.3%	41.1%	20.7%	19.8%	35.7%	34.8%	43.2%	41.7%
1-3 per month	20.1%	35.1%	29.7%	34.5%	26.7%	21.6%	30.3%	31.2%	28.2%	27.0%
2-4 per week	30.9%	30.9%	30.3%	18.9%	27.9%	27.6%	18.0%	19.5%	17.1%	18.6%
5-6 per week	18.6%	5.1%	11.7%	3.9%	11.1%	10.2%	10.5%	8.4%	5.1%	5.1%
once per day	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2-3 per day	3.0%	0.6%	0.6%	0.3%	1.5%	5.1%	1.8%	1.2%	0.3%	0.9%
4-5 per day	1.2%	0.3%	1.5%	0.6%	1.8%	3.0%	0.6%	0.9%	1.5%	0.9%
More than 6 per day	9.9%	5.4%	7.8%	0.6%	10.2%	12.6%	3.0%	3.9%	4.5%	5.7%

Participants consume tea, coffee, soft drinks, and pure fruit juice 2-4 per week 28.8%, 24.0%, 25.2%, and 27.3%. Apples, pears, bananas, grapes, and melon are the least consumed by the participants, never or less than one/month (Table 4).

Table 4 Drinks and fruit consumption per month

	Tea	Coffee	Hot chocolate	Soft drinks	Pure fruit juice	Apple	Pears	Orange	Banana	Grapes	Melon	Peaches, plums, apricots	Strawberries, raspberries, kiwi fruit
Never or less than once/per month	13.8%	11.7%	40.8%	22.5%	25.8%	33.0%	42.6%	29.4%	30.3%	38.7%	45.9%	45.9%	42.6%
1-3 per month	13.2%	12.0%	28.8%	23.7%	34.2%	31.2%	30.3%	31.5%	30.9%	34.2%	29.7%	30.3%	31.2%
2-4 per week	28.8%	24.0%	15.3%	25.2%	27.3%	20.1%	16.5%	24.3%	22.8%	17.7%	15.3%	16.2%	17.1%
5-6 per week	12.9%	12.9%	6.6%	12.9%	5.4%	7.2%	3.9%	6.6%	6.9%	3.0%	4.5%	3.0%	3.0%
once per	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

day													
2-3 per day	12.0%	15.3%	1.2%	4.2%	0.9%	1.8%	2.1%	2.1%	1.8%	2.4%	1.5%	1.2%	2.1%
4-5 per day	1.8%	3.3%	0.6%	1.8%	1.2%	1.5%	0.6%	1.5%	1.8%	0.9%	0.9%	0.9%	0.6%
More than 6 per day	17.4%	20.7%	6.6%	9.6%	5.1%	5.1%	3.9%	4.5%	5.4%	3.0%	2.1%	2.4%	3.3%

Carrot, Spinach, Broccoli, Cabbage, Peas, beans, onion, garlic, tomatoes, Avocado Tofu, soya meat, and TVP Vege-burger are the least consumed by the participants, never or less than once/per month. Peas, beans, Avocado Tofu, soya meat, and TVP Vege-burger none of the participants consumed more than six times per day (Table 5).

Table 5 Vegetables consumption per month

	Carrot	Spinach	Broccoli	Cabbage	Peas	Beans	Onion	Garlic	Tomatoes	Avocado	Tofu, soya meat, TVP, Vege-burger
Never or less than once/month	35.4%	48.6%	47.4%	23.1%	43.5%	42.3%	23.4%	25.5%	21.0%	59.5%	71.8%
1-3 per month	22.5%	22.5%	22.8%	18.9%	19.25%	22.8%	21.9%	24.9%	17.7%	14.7%	16.8%
2-4 per week	25.8%	17.1%	16.5%	28.2%	22.5%	21.3%	25.8%	24.0%	31.5%	13.2%	5.4%
5-6 per week	12.6%	9.0%	11.1%	20.7%	12.3%	11.4%	19.2%	17.7%	17.4%	9.9%	3.9%
once per day	3.0%	1.8%	1.5%	7.5%	2.1%	1.8%	5.4%	3.9%	7.8%	2.4%	1.8%
2-3 per day	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	1.5%	1.5%	2.4%	0.3%	0.3%
4-5 per day	0.3%	0.3%	0.3%	0.6%	0.3%	0.3%	0.9%	0.3%	0.6%	0.0%	0.0%
More than 6 per day	0.3%	0.3%	0.3%	0.9%	0.0%	0.0%	1.8%	2.1%	1.5%	0.0%	0.0%

4. DISCUSSION

The medical issue with an inadvertent onset is hypertension, which may cause blood vessels to explode and cause bleeding in organs like the brain or kidneys with fragile capillary beds. Hypertension exceeds obesity, diabetes mellitus, and smoking as the primary risk factors for cardiovascular disease-associated morbidity and mortality (Ahmed et al., 2017). Hypertension and obesity are significant indicators of cardiovascular disease-associated impairment and premature death; hypertension has vast effects on human capital (Chobanian et al., 2003). The prevalence of hypertension and obesity increased with rapid expansion, economic development, acceleration of population aging, and modifications in lifestyle and traditional dietary habits (Geaney et al., 2015). Because it contributes to vascular problems, coronary heart disease (CHD), and stroke, high blood pressure is a condition that should be taken seriously (El-Bcheraoui et al., 2014).

Epidemiological change, an aging population, urbanization, and an increase in the age-specific rates of several chronic disorders are all factors that may be contributing to the total burden of diseases linked with hypertension (Al-Ghamdi et al., 2018). Our study results highlight risk factors for cardiovascular illnesses in the Arar market population are the same as studies done earlier (James et al., 2014). The overall estimated prevalence of hypertension and obesity in our study is comparable to another research (Lu et al., 2022). For female gender, the overweight problem appears to be substantially more prevalent than in earlier research (Mills et al., 2016; Steptoe et al., 2004; Mohammed, 2019; Staessen et al., 2017). Comparatively, the majority of studies Omidi et al., (2021), Adeloye et al., (2014), Alsheikh-Ali et al., (2014) found that men were more likely to have hypertension than women, whereas just a small number of studies Al-Mohaissen et al., (2017) found that women were more likely to have it.

The results of our study provide strong evidence that obesity, overweight problems, and hypertension increase with aging, similar to those found in earlier studies (Mohamed, 2019; Staessen et al., 2017; Omidi et al., 2021). Central obesity is well known to be significantly associated with hypertension (Omidi et al., 2021; Adeloye et al., 2014; Alsheikh-Ali et al., 2014; Al-Mohaissen et al., 2017; Reddy et al., 2004). Many studies accept that central adiposity and hypertension are highly correlated (Reddy et al., 2004).

Those who reported being single in our study had higher blood pressure values than those who had been married. Being single was substantially related to having higher blood pressure levels (Lipowicz et al., 2005; Jeppesen et al., 2000; Khan et al., 2013). Sedentary lifestyle, hypertension, and obesity were the main risk factors for CVD in the market population in our study.

Hypertension and obesity were found to be more common, especially among men in the market population in Arar. In Saudi Arabia, men (18.7%) were more likely than women (14.0%) to have hypertension (Di-Chiara et al., 2017; Whelton et al., 2018). The Eastern province of Saudi Arabia has the most significant prevalence of cardiovascular-associated diseases (Whelton et al., 2018). According to some research, men are more likely than women to have cardiovascular-associated diseases, independent of age (Ferguson et al., 2008; Tsai et al., 2005). There are a few limitations to this search. It is not to extrapolate the findings to the entire market population of Saudi Arabia due to the cross-sectional approach.

Our study was limited to Arar; therefore, it may be difficult to generalize the findings to the entire country. This study is significant and sheds light on the prevalence of risk factors for cardiovascular diseases in Arar, which is significantly high. In our study, the market population with poor diet knowledge was associated with a higher risk factor for CVD. Diet modification can decrease the prevalence of hypertension (Kawamoto et al., 2008; Yu et al., 2008; Darnton et al., 2004). Normotensive and hypertensive adults have shown a marked drop in blood pressure following a healthy diet. A healthy diet encourages consuming more fruit and vegetables while consuming less fat, sodium, and processed foods (Fung et al., 2008).

5. CONCLUSION

Overall, the results of the current study reported risk factors for CVD, especially hypertension and obesity, to be prevalent, particularly among adult male sedentary shopkeepers. Awareness campaigns directed towards increasing people knowledge about risk factors for obesity and hypertension are warranted. Awareness programs are needed to educate people about the association of dietary patterns (effects) and physical activity levels with the risk of obesity and hypertension. Our study results highlight that individuals with excellent nutrition and diet quality knowledge are more likely to consume healthier diets, which may significantly influence dietary behaviors among the market population, helping to reduce the incidence of cardiovascular diseases like hypertension, heart attack, and stroke.

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Author's Contributions

The authors confirm their contribution to the paper as follows: Study conception and design: 1. Anshoo, Khalid; data collection: 1. Abdulaziz, 2. Abdulaziz; analysis and interpretation of results: 1. Amin, 2. Rahma; draft manuscript preparation: 1. Eslam, 2. Anshoo. All authors reviewed the results and approved the final version of the manuscript.

Ethical Approval

The study received ethical approval from the Northern Border University-Local Bioethics Committee with decision number (12/44/H).

Informed Consent

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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