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Research Article

Awareness about Metabolic Syndrome among the General Population in a Major Tertiary Hospital KSA

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Abstract

Background: The present study aimed to assess the level of awareness about metabolic syndrome among the general population in a major tertiary hospital in Saudi Arabia. A cross-sectional study design was used, and data were collected from 318 participants attending primary healthcare centers over the course of one year. Convenience sampling was used to obtain the sample, and data were analyzed using SPSS software. The results showed that the majority of participants (67.6%) did not have sufficient knowledge about the definition of metabolic syndrome, while 29.2% believed it was caused by obesity and a sedentary lifestyle. Most participants were also unaware of normal blood pressure (15.7% aware) and fasting blood glucose levels (18.6% aware), and the majority did not know the appropriate waist circumference for their gender (49.7% and 53.8% unaware for males and females, respectively). These findings suggest that there is a need for improved education and awareness about metabolic syndrome in the general population. The chi-square test of association was used for inferential statistics, and a 95% confidence interval was set. The study received clearance from the IRB of the department of family medicine and authorization from the hospital.

Methodology: In this study, we will use a cross-sectional method to collect data from patients attending primary healthcare centers at the Primary Health Care Corporation (PSMMC) over the course of one year. The target population is patients who are 18 years old or older, and all patients attending these healthcare centers during the study period will be eligible to participate by completing a questionnaire.

Results: The study involved 318 participants of the general population in PSMMC primary healthcare centers. More than half (n = 172, 54.1%) of the population in the study were aged between 18-34 years old. 59.7% (190) of the respondents were male while 40.3% (128) were female. The majority (n = 234, 73.6%) were married. In terms of educational level, 46.9% (n = 149) of the study population had a bachelor's degree or higher followed by 42.5% (n = 135) who had been in high school. Because most of the participants had a bachelor's degree or higher this resulted in 57.9% (n = 184) of the participants being employed.

Conclusion: The results showed that the majority of participants had insufficient knowledge about metabolic syndrome and its common features, such as normal blood pressure, fasting blood glucose levels, and waist circumference. Most participants did not know the definition of metabolic syndrome and were unaware of normal blood pressure and fasting blood glucose levels. Additionally, a large portion of participants did not know the appropriate waist circumference for their gender. These findings suggest that there is a need for improved education and awareness about metabolic syndrome in the general population.

Keywords: Metabolic Syndrome; Diabetes Mellitus; Cardiovascular Risk; Obesity; Hyperlipidemia

Introduction

Metabolic syndrome is a group of risk factors that increase the chances of developing cardiovascular disease, type 2 diabetes, and other health problems. These risk factors include abdominal obesity, high levels of cholesterol and other lipids, high blood pressure, and impaired glucose tolerance [1]. Other factors that may contribute to Metabolic syndrome include insulin resistance, excessive fat tissue, unhealthy cholesterol levels, impaired blood vessel function, genetic factors, high blood pressure, chronic stress, and an increased tendency for blood clotting. People with Metabolic syndrome are at increased risk for type 2 diabetes, cardiovascular disease, stroke, and heart attacks [2].

Several organizations have developed criteria for diagnosing Metabolic syndrome, including the World Health Organization, the National Cholesterol Education Program, the European Group for the Study of Insulin Resistance, the American Association of Clinical Endocrinologists, and the International Diabetes Federation. These criteria often focus on insulin resistance, obesity, and abnormal lipid levels as key components of Metabolic syndrome. It has been suggested that Metabolic syndrome should be considered a public health issue that can serve as a starting point for preventing obesity-related health problems such as type 2 diabetes, cardiovascular disease, and even kidney disease [3].

Healthcare workers, such as nurses and doctors, play an important role in the health and economy of a country. However, it has been found that some healthcare workers themselves suffer from the same diseases that they treat, or are at risk of developing these diseases. Studies have found high rates of obesity and other risk factors for Metabolic syndrome among healthcare workers. These factors may be due to a lack of time, a sedentary lifestyle, higher socio-economic status, and difficulties in balancing personal and professional responsibilities.

The worldwide prevalence of Metabolic syndrome is estimated to be around 20-25% among the adult population, and it is a major contributor to non-communicable diseases. The prevalence of Metabolic syndrome in Saudi Arabia is about 18% to 40% [4]. Studies have also found an increased prevalence of Metabolic syndrome among healthcare workers. This study aims to evaluate knowledge about common features of metabolic syndrome and major complications of metabolic syndrome.

A metabolic syndrome is a group of risk factors that occur together and increase the risk of developing serious health problems, such as diabetes and heart disease. These risk factors include high blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol levels. Metabolic syndrome is a major public health concern as it affects a significant proportion of the general population worldwide [5]. However, despite its importance, there is a lack of awareness about metabolic syndrome among the general population, particularly in developing countries [6]. This literature review aims to summarize and synthesize the existing knowledge on the awareness of metabolic syndrome among the general population in a major tertiary hospital.

The first theory that explains the awareness of metabolic syndrome among the general population is the health belief model [7]. The health belief model proposes that individuals' health-related behaviors are determined by their beliefs about the severity of a health threat, the benefits of taking action to prevent or control the threat, and the barriers to taking action. According to this model, individuals who perceive metabolic syndrome as a serious health threat and believe that taking preventive action will lead to significant health benefits are more likely to engage in behaviors that can prevent or control metabolic syndrome. On the other hand, individuals who do not perceive metabolic syndrome as a serious threat or do not believe that taking preventive action will have any benefits are less likely to engage in such behaviors.

The second theory that explains the awareness of metabolic syndrome among the general population is the social cognitive theory [8]. According to the social cognitive theory, individuals' health behaviors are influenced by their personal beliefs, attitudes, and self-efficacy, as well as by social factors such as the influence of family, friends, and the media. This theory suggests that individuals who have positive attitudes towards preventing or controlling metabolic syndrome, high self-efficacy, and support from their social network are more likely to engage in behaviors that can prevent or control metabolic syndrome. On the other hand, individuals who have negative attitudes towards preventive behaviors, low self-efficacy, and a lack of support from their social network are less likely to engage in such behaviors.

The third theory that explains the awareness of metabolic syndrome among the general population is the theory of planned behavior [9]. The theory of planned behavior proposes that

individuals' behaviors are determined by their intentions, which are influenced by their attitudes, subjective norms, and perceived behavioral control. According to this theory, individuals who have positive attitudes towards preventive behaviors, perceive that their social network supports such behaviors, and believe that they have the control and resources to engage in such behaviors are more likely to intend to engage in behaviors that can prevent or control metabolic syndrome. On the other hand, individuals who have negative attitudes towards preventive behaviors, perceive that their social network does not support such behaviors, or believe that they do not have the control or resources to engage in such behaviors are less likely to intend to engage in such behaviors.

In conclusion, the awareness about metabolic syndrome among the general population in a major tertiary hospital is influenced by a range of factors, including individuals' beliefs about the severity of the health threat, the benefits of taking preventive action, and the barriers to taking action (health belief model), as well as personal beliefs, attitudes, self-efficacy, and social factors (social cognitive theory), and intentions, which are influenced by attitudes, subjective norms, and perceived behavioral control (theory of planned behavior). Further research is needed to understand the specific factors that influence the awareness about metabolic syndrome among the general population in a major tertiary hospital and to develop effective interventions to increase awareness and improve health outcomes.

Research objectives

To assess and Measure the knowledge about metabolic syndrome among the general population in PSMMC primary healthcare centers.

The hypothesis of the Study

- Null hypothesis: The general population in PSMMC primary healthcare centers isn't aware of common features of metabolic syndrome.
- Alternative hypothesis: The general population in PSMMC primary healthcare centers is aware of common features of metabolic syndrome.

General objective

- To evaluate knowledge about common features of metabolic syndrome.
- To evaluate knowledge about major complications of metabolic syndrome.

Methodology

Study design

In this study, we will use a cross-sectional method to collect data from patients attending primary healthcare centers at the Primary Health Care Corporation (PSMMC) over the course of one year. The target population is patients who are 18 years old or older, and all patients attending these healthcare centers during the study period will be eligible to participate by completing a questionnaire.

Sampling and data collection

Convenience sampling was performed to get the required sample for the analysis. A 95% confidence level and an expected absolute error of 5% were used to determine the study's sample size. The formula described below was used to determine the sample size.

$n = [\mathbf{Z}_{\alpha/2}/E]^2 * \mathbf{P}\ (1- P)$

Where

n = sample size

$Z_{\alpha/2}$ = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

p = the prevalence of the outcome variable

E = the margin of error (= width of confidence interval)

$n = [1.96^2 \times 0.3(1-0.3)]/(0.05)^2$

$= 322.7 \sim 323$

Data presentation and statistical analysis/management

Data entry will be done with Microsoft Excel and SPSS software, version 22.0, which will be used to do the analysis of the collected data. Statistics of a descriptive kind will be compiled. Frequencies and percentages will be used for categorical data, while mean and standard deviation will be used for numerical data. Logical regression will be used for inferential statistics (t-test for numerical data and chi-square for categorical data), and the confidence

interval will be set at 95%. A value of P less than 0.05 was regarded to be statistically significant.

Ethical consideration

Everyone who volunteered to take part in the research was given reassurances that their answers would be kept private. A concise explanation of the research and its aims was provided to the respondents at the beginning of the survey. The IRB of the department of family medicine gave its clearance to proceed with the research. The authorization was received from my hospital on April 15th, 2019.

Budget

This study was not funded.

Results/Analysis

Descriptive statistics

The study involved 318 participants of the general population in PSMMC primary healthcare centers. More than half (n = 172, 54.1%) of the population in the study were aged between 18-34 years old. 59.7% (190) of the respondents were male while 40.3% (128) were female. The majority (n = 234, 73.6%) were married. In terms of educational level, 46.9% (n = 149) of the study population had a bachelor's degree or higher followed by 42.5% (n = 135) who had been in high school. Because most of the participants had a bachelor's degree or higher this resulted in 57.9% (n = 184) of the participants being employed.

Variable		Description	
		n	%
Age	18-34	172	54.1
	35-49	96	30.2
	50-59	45	14.2
	60-69	5	1.6
Gender	Male	190	59.7
	Female	128	40.3
Social status	Married	234	73.6
	Single	78	24.5
	Widow	6	1.9
Education level	Elementary school	16	5
	Middle school	18	5.7
	High school	135	42.5
	Bachelor's degree and higher	149	46.9
Occupational status	Employed	184	57.9
	Un-employed	111	34.9
	Retired	23	7.2

Table 1: Demographic characteristics.

Knowledge of common features of metabolic syndrome

Common features of metabolic syndrome are high blood pressure, high fasting blood glucose levels, and excess body fat around the waist. Knowledge of this will show awareness of the metabolic syndrome.

More than half (n = 215, 67.6%) of the study population do not know the definition of metabolic syndrome while 29.2% believe that Metabolic syndrome is a cluster of conditions that occur together caused mainly by obesity and sedentary lifestyle, increasing your risk of heart disease, stroke, and type 2 diabetes. This is shown in table 2 below.

What is the definition of metabolic syndrome?	Frequency	Percent
Metabolic syndrome is a cluster of conditions that occur together caused mainly by obesity and a sedentary lifestyle, increasing your risk of heart disease, stroke, and type 2 diabetes	93	29.2
I don't know	215	67.6
Metabolic syndrome is a cluster of conditions that occur together caused mainly by iron deficiency anemia increasing your risk of heart disease and stroke	8	2.5
Metabolic syndrome is a rare genetic disease affecting 1/100000 person	2	.6

Table 2

Tables 3 and 4 show the participants' knowledge of normal blood pressure and normal fasting blood glucose levels. These are among the common features of metabolic syndrome. The majority of the participants are not aware of their normal blood pressure and fasting glucose levels. 15.7% are aware of normal blood pressure (120/80 mm/Hg) while 18.6 are aware of the threshold of normal fasting glucose levels (90-99 mg/dl).

What is the threshold of normal blood pressure?		
	Frequency	Percent
120/80 mm/Hg	50	15.7
130/85 mm/Hg	57	17.9
140/90 mm/Hg	97	30.5
I don't know	114	35.8

Table 3

What is the threshold of normal fasting blood glucose levels?		
	Frequency	Percent
90-99 mg/dl	59	18.6
100-125 mg/dl	67	21.1
126-135 mg/dl	50	15.7
I don't know	142	44.7

Table 4

From tables 5 and 6 49.7% and 53.8% of males and females, respectively do not know the threshold waist circumferences. This is a risk because many might have metabolic syndrome without them realizing it.

What is the threshold for waist circumference in males		
	Frequency	Percent
80 cm and above	36	11.3
90 cm and above	77	24.2
100 cm and above	47	14.8
I don't know	158	49.7

Table 5

What is the threshold for waist circumference in females		
	Frequency	Percent
80 cm and above	84	26.4
90 cm and above	34	10.7
100 cm and above	29	9.1
I don't know	171	53.8

Table 6

Knowledge about the major complications of metabolic syndrome.

Table 7 below shows the complications of metabolic syndrome recognized by the participants. 59.7% (n = 190) do not know the complication. While the rest know that Type 2 diabetes, heart disease, and stroke are the major complications of metabolic syndrome.

What are the complications of metabolic syndrome?		
	Frequency	Percent
Type2 diabetes	15	4.7
Stroke	5	1.6
Heart disease	36	11.3
Thyroid gland disorders	11	3.5
I don't know	190	59.7
Type2 diabetes, Heart disease	23	7.2
Type2 diabetes, Stroke	4	1.3
Type2 diabetes, Stroke, Heart disease	12	3.8
Type2 diabetes, Heart disease, Thyroid gland disorders	3	.9
Type2 diabetes, Thyroid gland disorders	6	1.9
Heart disease, Thyroid gland disorders	6	1.9
Stroke, Heart disease	7	2.2

Table 7

From table 8 below majority (n = 221, 69.5%) of the respondents did not know the medication given in case one is diagnosed with metabolic syndrome. 9.7% stated that medication for lowering blood lipid level and lowering blood glucose level are commonly given for cases of diagnosis of metabolic syndrome.

What medication can you be given in case you were diagnosed with metabolic syndrome		
	Frequency	**Percent**
Medication for lowering blood lipid level	25	7.9
Multi vitamin	7	2.2
Steroids and/or non-steroidal anti-inflammatory medications	6	1.9
Medication for lowering blood glucose level	10	3.1
I don't know	221	69.5
Medication for lowering blood lipid level, Medication for lowering blood glucose level	31	9.7
Medication for lowering blood lipid level, Multi vitamin, Medication for lowering blood glucose level	6	1.9
Multi vitamin, Medication for lowering blood glucose level	2	.6
Medication for lowering blood lipid level, Multi vitamin, Medication for lowering blood glucose level	6	1.9
Medication for lowering blood lipid level, Multi vitamin, Steroids, Medication for lowering blood glucose level	2	.6
Medication for lowering blood lipid level, Steroids and/or non-steroidal anti-inflammatory medications	2	.6

Table 8

From table 9 below majority (n = 185, 58.2%) of the participants do not know the risk factors associated with metabolic syndrome. This shows their negative awareness of metabolic syndrome as a disease. 10.1% and 9.1% state being overweight and sedentary lifestyle as the major risk factors.

What are the risk factors associated with metabolic syndrome?		
	Frequency	**Percent**
Sedentary lifestyle	29	9.1
Excessive intake of painkillers	4	1.3
Being overweight	32	10.1
Vitamin D deficiency	3	.9
I don't know	185	58.2
Sedentary lifestyle, Excessive intake of painkillers, Vitamin D deficiency	4	1.3
Sedentary lifestyle, Excessive intake of painkillers	2	.6
Sedentary lifestyle, Excessive intake of painkillers, Being overweight, Vitamin D deficiency	2	.6
Sedentary lifestyle, Vitamin D deficiency	3	.9
Excessive intake of painkillers, Being overweight	3	.9
Sedentary lifestyle, Excessive intake of painkillers, Being overweight	2	.6
Sedentary lifestyle, Being overweight, Vitamin D deficiency	8	2.5
Sedentary lifestyle, Being overweight	41	12.9

Table 9

Because half of the population does not know the threshold of waist circumference, this shows why 42.5% of them do not know the effects of having a high waist circumference. 21.7% from table 10 state elevated blood cholesterol levels and 8.5% state type 2 diabetes as the major effect of having a high waist circumference.

What are the effects of having a high waist circumference?		
	Frequency	**Percent**
Elevated blood pressure	10	3.1
Elevated blood cholesterol levels	69	21.7
Type2 diabetes	27	8.5
Bronchial asthma	2	0.6
I don't know	135	42.5
Type2 diabetes, Elevated blood cholesterol levels	26	8.2
Type2 diabetes, elevated blood pressure, Elevated blood cholesterol levels	15	4.7
elevated blood pressure, Elevated blood cholesterol levels	15	4.7
Type2 diabetes, elevated blood pressure, Bronchial asthma, Elevated blood cholesterol levels	2	0.6
Type2 diabetes, Bronchial asthma, Elevated blood cholesterol levels	2	0.6
Elevated blood pressure, Bronchial asthma	4	1.3
Bronchial asthma, Elevated blood cholesterol levels	3	0.9
Type2 diabetes, Elevated blood pressure	6	1.9
Type2 diabetes, Elevated blood pressure	6	1.9

Table 10

From table 11 below, 21.4%, 16%, and 8.5% believe that regular exercise, a Low-fat diet, and smoking sensations are lifestyle modifications that can prevent metabolic syndrome. The fact that 42.5% do not know these lifestyles shows that many participants do not have knowledge of metabolic syndrome.

What are the lifestyle modifications that can prevent metabolic syndrome and/or its complications?		
	Frequency	**Percent**
Regular exercise	68	21.4
Caffeine ingestion (coffee - tea)	4	1.3
Smoking cessation	2	.6
Low-fat diet	13	4.1
I don't know	135	42.5
Regular exercise, Low-fat diet	51	16.0
Regular exercise, Smoking cessation, Low-fat diet	27	8.5
Regular exercise, Caffeine ingestion (coffee - tea)	2	.6
Caffeine ingestion (coffee - tea), Low-fat diet	4	1.3
Regular exercise, Smoking cessation	12	3.8

Table 11

Inferential statistics

Chi-square distribution is used to analyze the relationship between the demographic factors, questions such as what are the complications of metabolic syndrome, and what is the definition of metabolic syndrome to show the awareness of common features and complications of metabolic syndrome. From Table 12 below age, gender, and educational level with p<0.0001, 0.021, and p< 0.0001p-values respectively, are associated with responses to what are the complications of metabolic syndrome. The above p-values are less than 0.05 thus we reject the null hypothesis and conclude that age, gender, and educational level do affect the knowledge of complications of metabolic syndrome with the majority of the participants not knowing the complications.

Variable	**p-value**
Age * What are the complications of metabolic syndrome	p < 0.0001
Gender * What are the complications of metabolic syndrome	0.021
Social status* What are the complications of metabolic syndrome	0.094
Educational level* What are the complications of metabolic syndrome	p < 0.0001
Occupational status * What are the complications of metabolic syndrome	0.172

Table 12

From table 13 below, gender with a p-value of 0.09, which is less than the alpha value of 0.05, has an association with responses to what is the definition of metabolic syndrome.

Variable	p-value
Age * What is the definition of metabolic syndrome	0.715
Gender * What is the definition of metabolic syndrome	0.009
Social status* What is the definition of metabolic syndrome	0.598
Educational level * What is the definition of metabolic syndrome	0.104
Occupational status * What is the definition of metabolic syndrome	0.428

Table 13

Discussion

Metabolic syndrome is a cluster of conditions that increase the risk of developing serious health issues such as heart disease, stroke, and type 2 diabetes. The aim of this study was to assess the awareness of metabolic syndrome among the general population in a major tertiary hospital in KSA. The study included 318 participants from primary healthcare centers in the general population. The results showed that the majority of participants did not have sufficient knowledge about metabolic syndrome and its common features, such as normal blood pressure, fasting blood glucose levels, and waist circumference. 67.6% of participants did not know the definition of metabolic syndrome, while 29.2% believed it was caused by obesity and a sedentary lifestyle. Most participants were also unaware of normal blood pressure and fasting blood glucose levels, with 15.7% and 18.6% aware, respectively. The majority of participants did not know the threshold waist circumference for males and females, with 49.7% and 53.8% unaware, respectively.

The results of this study are consistent with previous research on awareness of the metabolic syndrome. A study conducted in Turkey found that the majority of participants had poor knowledge about metabolic syndrome and its risk factors [11]. Another study in Iran found that only a small percentage of participants were aware of the definition and risk factors of metabolic syndrome [12]. These findings highlight the need for increased education and awareness about metabolic syndrome in different populations. There are several potential explanations for the low levels of awareness about metabolic syndrome in the general population. One possible reason is a lack of access to information and education about [10].Top of Form

A survey that was conducted in Makkah found that 74.5% of participants were aware of the definition of metabolic syndrome (MS), but the same percentage of participants were unaware of the age-adjusted prevalence of MS in the KSA. According to the findings of the research, most doctors were aware of metabolic syndrome (MS), but their expertise in diagnosis and care was lacking; on the other hand, their attitude was sufficient [14]. According to the findings of research that was conducted in Pakistan on the subject of MS knowledge among medical professionals, just a small percentage of medical staff were aware of the condition [13].

The present research did not uncover any characteristics that were connected with or affected the degree of knowledge; on the other hand, a positive attitude was linked to the male gender and training at the KFMC. In addition, a high level of practice was shown to have a significant association with training level R4, while a low level of practice was found to have a significant association with training level R1. This conclusion highlights the significance of training since it reveals that the degree of practice increases in direct proportion to the amount of training received.

Conclusion

The study aimed to assess the level of awareness about metabolic syndrome among the general population in a major tertiary hospital in Saudi Arabia. The study included 318 participants from primary healthcare centers, the majority of whom were young and male, with a high level of education and employment. The results showed that the majority of participants had insufficient knowledge about metabolic syndrome and its common features, such as normal blood pressure, fasting blood glucose levels, and waist circumference. Most participants did not know the definition of metabolic syndrome and were unaware of normal blood pressure and fasting blood glucose levels. Additionally, a large portion of participants did not know the appropriate waist circumference for their gender. These findings suggest that there is a need for improved education and awareness about metabolic syndrome in the general population. Given the high prevalence of metabolic

syndrome in the region and its associated complications, such as heart disease and type 2 diabetes, it is important that the general population is aware of the condition and its risk factors in order to take preventive measures. It is therefore recommended that efforts be made to increase awareness about metabolic syndrome through education and public health campaigns.Top of Form

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