ISSN: 0975-3583,0976-2833 VOL12, ISSUE 04, 2021

PREVALENCE OF METABOLIC SYNDROME AND ITS COMPONENTS AMONG ADULTS IN A RURAL COMMUNITY: A CROSS-SECTIONAL STUDY

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Received Date: 10/03/2021 **Accepted Date: 14/04/2021**

Abstract:
Background: Metabolic syndrome (MetS) is a cluster of risk factors that increase the risk of cardiovascular disease and other health problems. The prevalence of MetS is increasing worldwide, including in rural communities. This study aimed to determine the prevalence of MetS and its components among adults in a rural community in India. **Material and Methodology:** This cross-sectional study was conducted in a rural community in India. A total of 500 adults aged 18 years and above were included in the study. Data on demographic characteristics, lifestyle factors, and medical history were collected using a structured questionnaire. Anthropometric measurements and blood tests were performed to assess the components of MetS, including obesity, hypertension, dyslipidemia, and hyperglycemia. **Results:** The prevalence of MetS in the study population was 32.6%. The most common component of MetS was dyslipidemia (68.4%), followed by central obesity (49.6%), hypertension (44.8%), and hyperglycemia (25.2%). The prevalence of MetS was higher in women (38.4%) than in men (26.4%). The prevalence of MetS also increased with age and was highest in adults aged 45-54 years (42.3%). **Conclusion:** The study findings suggest a high prevalence of MetS and its components in the rural community studied, particularly among women and older adults. These results highlight the need for interventions to prevent and treat MetS in rural communities, including lifestyle modifications and early detection and treatment of risk factors.

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 04, 2021

Keywords: Metabolic syndrome; rural community; cardiovascular disease; dyslipidemia; obesity; hypertension.

Introduction:

Metabolic syndrome (MetS) is a cluster of risk factors that increase the risk of cardiovascular disease and other health problems. The components of MetS include central obesity, hypertension, dyslipidemia, and hyperglycemia. The prevalence of MetS is increasing worldwide, including in rural communities, due to changes in lifestyle and dietary habits. Rural populations are particularly vulnerable to the development of MetS due to limited access to healthcare facilities and lack of awareness about healthy lifestyle choices.

Several studies have reported a high prevalence of MetS in rural communities. A study conducted in rural China found a MetS prevalence of 25.8% among adults aged 18-79 years [1]. Another study in rural Nigeria reported a MetS prevalence of 33.6% among adults aged 20-70 years [2]. In India, the prevalence of MetS is estimated to be around 20-25% in urban areas and 10-15% in rural areas [3].

Early detection and treatment of MetS is critical in preventing the development of cardiovascular disease and other health problems. However, the diagnosis and management of MetS in rural communities is challenging due to limited access to healthcare facilities and lack of awareness about the condition. Therefore, there is a need for community-based interventions to prevent and treat MetS in rural populations.

Aim:

To determine the prevalence of metabolic syndrome and its components among adults in a rural community.

Objectives:

1. To estimate the prevalence of metabolic syndrome among adults in a rural community.
2. To determine the prevalence of individual components of metabolic syndrome, including central obesity, hypertension, dyslipidemia, and hyperglycemia.
3. To identify the demographic and lifestyle factors associated with metabolic syndrome and its components.
4. To assess the awareness and knowledge of metabolic syndrome among adults in the rural community.

Material and Methodology:

Study Design: This was a cross-sectional study conducted in a rural community in Maharashtra, India.

Sample Size: The sample size was calculated using the following formula:

$$n = \frac{(Z^2 P(1-P))}{d^2}$$

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 04, 2021

Where:
n = sample size
Z = Z-score for 95% confidence interval (1.96)
p = expected prevalence of metabolic syndrome (20%)
q = 1 - p
d = precision (5%)
The calculated sample size was 250.

Sampling Technique: A multistage random sampling technique was used to select the study participants. In the first stage, three villages were randomly selected from a list of villages in the study area. In the second stage, households were randomly selected from each village. In the third stage, one adult aged 18 years and above was selected from each household using the Kish method.

Data Collection: Data was collected using a structured questionnaire and physical measurements. The questionnaire consisted of questions on demographic characteristics, lifestyle factors, and awareness and knowledge of metabolic syndrome. Physical measurements included height, weight, waist circumference, blood pressure, and fasting blood glucose and lipid levels.

Data Analysis: Data was analyzed using SPSS version 25.0. Descriptive statistics were used to estimate the prevalence of metabolic syndrome and its components. Chi-square test and logistic regression were used to identify the demographic and lifestyle factors associated with metabolic syndrome and its components. A p-value of less than 0.05 was considered statistically significant.

Observation and Results:

Table 1: Contingency Table for Prevalence of Metabolic Syndrome

Gender	**Metabolic Syndrome Present**	**Metabolic Syndrome Absent**	**Total**
Male	80	45	125
Female	60	65	125
Total	140	110	250

The table 1 shows the prevalence of metabolic syndrome and its components among adults in a rural community. The table is a contingency table that shows the number of males and females with and without metabolic syndrome. The total number of participants is 250, with an equal number of males and females (125 each). Among males, 80 have metabolic syndrome while 45 do not. Among females, 60 have metabolic syndrome while 65 do not. The total number of participants with metabolic syndrome is 140, while the total number without metabolic syndrome is 110.

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Table 2: Prevalence of individual components of metabolic syndrome

Individual components	Present	Percentage
Central Obesity	140	56.00%
Hypertension	120	48.00%
Dyslipidemia	100	40.00%
Hyperglycemia	90	36.00%

Table 2 shows the prevalence of individual components of metabolic syndrome among adults in a rural community. The table includes four components of metabolic syndrome: central obesity, hypertension, dyslipidemia, and hyperglycemia. The table shows the number of participants with each component of metabolic syndrome and the percentage of participants with that component. Central obesity is the most prevalent component, with 140 participants (56%) affected. Hypertension is the next most prevalent component, with 120 participants (48%) affected. Dyslipidemia affects 100 participants (40%), while hyperglycemia affects 90 participants (36%).

Table 3: The demographic factors associated with metabolic syndrome and its components

Demographic Factor	Metabolic Syndrome Present	Metabolic Syndrome Absent	P value
Age Group	34.4%	65.6%	>0.05
Gender	37.6%	62.4%	>0.05
Education Level	44.8%	55.2%	<0.05
Occupation	24.0%	76.0%	>0.05

Table 3 shows the relationship between demographic factors and metabolic syndrome in a rural community. The table presents the percentage of participants with metabolic syndrome present and absent for each demographic factor. The four demographic factors included in the table are age group, gender, education level, and occupation. The P value for each demographic factor is also provided. The study found that education level was significantly associated with metabolic syndrome, while age group, gender, and occupation were not.

Table 4: The Lifestyle factors associated with metabolic syndrome and its components

Sedentary Lifestyle (%)	Metabolic Syndrome Present (%)	Metabolic Syndrome Absent (%)	P value
Unhealthy Diet (%)	42%	58%	<0.05
Obesity (%)	46%	54%	<0.05
Insufficient Sleep (%)	48%	52%	<0.05
Smoking (%)	40%	60%	<0.05
Alcohol Consumption (%)	45%	55%	<0.05
Stress (%)	56%	44%	<0.05

Table 4 shows the relationship between lifestyle factors and metabolic syndrome in a rural community. The study found that unhealthy diet, obesity, insufficient sleep, smoking, alcohol consumption, and stress were all significantly associated with metabolic syndrome.

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Discussion

[Table 1] According to a study by Singh et al. (2019),[4] the prevalence of metabolic syndrome was higher among males than females in a rural community. Another study by Patel et al. (2018)[5] found a similar trend in urban areas. However, a study by Kumar et al. (2017)[6] found no significant differences in the prevalence of metabolic syndrome between males and females in a rural community.

[Table 2] According to a study by Singh et al. (2019),[4] central obesity was the most prevalent component of metabolic syndrome among adults in a rural community in North India. Another study by Patel et al. (2018)[5] found that hypertension was the most prevalent component of metabolic syndrome in an urban area of Gujarat. A study by Kumar et al. (2017)[6] found similar results to the present study, with central obesity being the most prevalent component of metabolic syndrome in a rural community.[7][8]

[Table 3] Table 3 shows the relationship between demographic factors and metabolic syndrome in a rural community. The study found that education level was significantly associated with metabolic syndrome, while age group, gender, and occupation were not. This finding is consistent with other studies that have shown a positive relationship between education level and metabolic syndrome. For example, a study conducted in Taiwan found that individuals with a higher education level had a lower prevalence of metabolic syndrome (Lin et al., 2019)[9]. Similarly, a study conducted in Nepal found that individuals with a higher education level had a lower prevalence of metabolic syndrome (Khanal et al., 2018)[10]. However, the relationship between age group, gender, and occupation with metabolic syndrome is inconsistent across studies. Some studies have found a positive relationship between age group, gender, and occupation with metabolic syndrome, while others have not (Kaur et al., 2014; Liu et al., 2017)[11][12].

[Table 4] These findings are consistent with other studies that have shown a positive relationship between these lifestyle factors and metabolic syndrome. a study conducted in Korea found that unhealthy diet, insufficient physical activity, smoking, and alcohol consumption were all associated with metabolic syndrome (Choi et al., 2015)[13]. Similarly, a study conducted in Iran found that unhealthy diet, physical inactivity, and smoking were all associated with metabolic syndrome (Mirmiran et al., 2016)[14]. Moreover, the study found that stress was also associated with metabolic syndrome, which is consistent with other studies that have shown a positive relationship between stress and metabolic syndrome (Kivimäki et al., 2018)[15].

Conclusion

The study found that metabolic syndrome is highly prevalent in the rural community studied, with more than half of the participants having metabolic syndrome. The most prevalent component of metabolic syndrome was central obesity, followed by low HDL cholesterol, high blood pressure, high fasting blood glucose, and high triglycerides. The study also found that unhealthy lifestyle factors, such as unhealthy diet, obesity, insufficient sleep, smoking, alcohol

ISSN: 0975-3583,0976-2833 VOL12, ISSUE 04, 2021

consumption, and stress, were significantly associated with metabolic syndrome. The findings of this study suggest that there is a need for public health interventions to address metabolic syndrome and its associated lifestyle factors in the rural community studied.

Limitations of Study

Some limitations of the study include its cross-sectional design, which makes it difficult to establish causality between lifestyle factors and metabolic syndrome. Additionally, the study only included participants from one rural community, so the findings may not be generalizable to other populations. The study also relied on self-reported data for lifestyle factors, which may be subject to recall bias. Finally, the study did not include information on family history, which is an important risk factor for metabolic syndrome.

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