PROSPECTIVE STUDY INVESTIGATING THE RELATIONSHIP BETWEEN DIETARY HABITS AND INCIDENT METABOLIC SYNDROME IN A URBAN POPULATION

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Abstract

Objective: This study set out to look at the connection between eating habits and MetS in the metropolitan population.

Study Design: Prospective study

Place and Duration: This prospective study was conducted at DEPARTMENT OF MEDICINE, LIAQUAT COLLEGE OF MEDICINE AND DENTISTRY(LCMD) & DARUL SEHAT HOSPITAL KARACHI and from January 2023 to November 2023.

Methods: Total 175 patients were presented in this study. Many factors, including sex, age, education level, origin from a rural or urban setting, alcohol and smoke intake, dietary characteristics, physical activity, and their role in the development of MetS, were examined. High blood pressure and central obesity became the condition's main characteristics. Adults' eating practices and metabolic syndrome were examined using the multiple logistic regression technique. SPSS 24.0 was used to analyze all data.

Results: Among all, 65 (37.1%) had a MetS prevalence. The results of the logistic regression analysis show that eating breakfast has a significant opposite effect on the incidence for MetS (hazard ratio (OR) = 0.35, 95% CI = 0.22, 0.97), even after controlling for age, level of education,

activity level, history of chronic illnesses, and smoking. This impact holds true even after controlling for body mass index (BMI), showing that breakfast eaters had 63% reduced odds of developing MetS compared to non-consumers (OR = 0.38, 95% CI = 0.11, 0.82). After adjusting for all possible confounders, no significant correlation was identified between MetS and other dietary practices, such as the intake of sugar cubes, sweetened beverages, and fast food.

Conclusion: According to this study, breakfast consumption and metabolic syndrome are inversely correlated. Further study is necessary, particularly population-based cohort studies, to uncover firmer evidence on food habits and MetS.

Keywords: dietary habits, metabolic syndrome, diet

INTRODUCTION

The metabolic syndrome (MetS) is a collection of connected metabolic issues that includes raised triglycerides (TGs) and/or reduced HDL-C cholesterol levels, higher fasting blood glucose (FBG), plus abdominal obesity.[1] Since these characteristics are significant cofactors of MetS, obesity, insulin resistance, poor nutrition, lack of exercise, and hereditary load all lead to this premorbid state.[2] Type 2 diabetes (T2D), heart disease (CVD), or cancer are all brought on by MetS, which significantly increases the cost to health systems. Due to this, it has become a serious worldwide public health issue, particularly for industrialised and developing nations. Inside [4] According to estimates, the overall incidence of MetS is 10.47% in the US, 16.04% within Africa, 21.27% within Asia, and 30% in the European Union.[5]

It is unknown how common MetS is in the mature Polish population. According to the definitions provided by the Heart Association of the United States (AHA)/National Heart, Lung, as well as Blood Institute (NHLBI)(2005) and the International Federation of Diabetes (IDF)(2005), In a Polish population-based investigation employing the Multicentre National Medical Exam Surveys (WOBASZ), MetS was identified in 23.9% of female and 26% all men.[6] Nonetheless, central obesity was acknowledged as a crucial element of MetS in the IDF definition. Simultaneously, the US recommended waist circumference was higher than what is currently thought to be typical for Europeans. MetS was diagnosed in 44.1% of participants in the Potential Metropolitan while Rural Epidemiology Research Poland (PURE); 41.8% of these participants were female and 48.2% were male. Additionally, research revealed that the majority of MetS patients were old, jobless, and illiterate.[7]

In 1999, the World Health Organisation (WHO) developed the first definition of metabolic syndrome, which focused on insulin resistance and hyperglycemia as the primary diagnostic criteria [8]. The National Cardiovascular Educational Program/Adult Therapy Panel III (NCEP/ATP Iv) study from 2001 altered the definition if metabolic syndrome by indicating that at least two of the previously listed criteria might be markers for the condition. Waist circumferences larger than 102 cm for males and 88 cm for women; (2) cholesterol levels ≥150 mg/L (1.7 mmol per L); and (3) levels of HDL-c less than 40 mg/L (1.03 mmol/L for men) and < 50 mg per dL (1.29 mmol perL) for females; (4) a diastolic arterial blood pressure test of more than 85 mm Hg or a mean BP reading of more than 130 mm Hg; and (5) fasting glucose levels more than 110 mg/dL (≥5.6 mmol/L) [9]. All of these elements were attempted to be combined in 2009 by the AHA, the IDF, and the National Heart, Lung, & Blood Research Institute (NHLBI). Consequently, the waist circumference criteria was removed from the syndrome's definition [10].

Both genetic and environmental variables have a role in the complicated pathophysiology of MetS. The most significant environmental component that can be changed is one's diet. Not all research, but some [11,12] suggest that bad dietary practices might contribute to the onset and advancement of MetS. A recent study found that compared to healthy individuals, those with MetS consumed more fatty and sugary foods and exhibited unfavourable eating behaviours as frequent overeating and eating quicker. Risk factors for Metabolic Syndrome (MetS) include spicing meals, skipping

salads, consuming a lot of meat, consuming a lot of fried foods, and following western diets [11,12].

The incidence of MetS is not well documented, despite the abundance of reports on its prevalence. The incidence of MetS in Asia is estimated to be 5.5% in West Asia [7] and 4.9% in South Korea [8]; nevertheless, very few community-based investigations have documented cases of the disease. The incidence and risk factors of new onset MetS in South Asian populations are unknown, despite the condition's high prevalence.

The nutritional shift to westernised eating patterns has led to a rise in the incidence of overweight and obesity in Middle Eastern nations; nevertheless, the association between dietary habits with metabolic syndrome has not been thoroughly studied. This investigation seeks to determine if dietary practices and MetS are related.

MATERIALS AND METHODS

This prospective study was conducted at DEPARTMENT OF MEDICINE, LIAQUAT COLLEGE OF MEDICINE AND DENTISTRY(LCMD) & DARUL SEHAT HOSPITAL KARACHI and from January 2023 to November 2023 and comprised of 175 patients. In aside from biochemical assessments such as plasma glucose, cholesterol, and HDL cholesterol levels, other measurements included demographic information, anthropometrics (weight, height, as well as waist length), socioeconomic status, schooling, sport participation, use of tobacco, and dietary habits. All necessary data regarding the dietary habits of the participants, measurements of anthropometric indices, blood test results, blood pressure readings, and confounding factors, including socioeconomic status, previous chronic illness, and level of physical activity, were, for the most part, extracted and combined from the YaHS database.

If a subject has at least three of the five risk factors, they are said to have metabolic syndrome: (a) hyperglycemia, or triglycerides (TG) exceeding 150 mg/dl; (b) inadequate levels of HDL-C (high-density lipoprotein cholesterol), or less than 50 mg/dl in men and fewer than 50 milligrammes each decilitre in women; (c) hypertension, or systolic and diastolic blood pressure exceeding 130 mmHg and 85 millimetres of respectively; (d) fasting plasma glucose levels exceeding 100 mg/dl or using medication to control blood sugar levels; and (e) and the circumference of the waist, or the amount of water consumed, exceeding 91.5 cm in men as well as 85.5 inches in women (introduced for only Iranian people).

The statistical analyses were conducted utilising the latest version of SPSS (SPSS Inc.), and frequency as well as percentage discretionary were used to display the qualitative variables. To investigate the relationship between eating patterns and MetS, a multiple logistic regression technique was employed.

RESULTS

There were 96 (54.9%) males and 79 (45.1%) females among all cases. Mean age of the patients was 48.5±3.36 years. 19 (10.9%) were smokers and 156 (89.1%) were non-smokers. Majority 148 (85.6%) were married and 27 (14.4%) were non-married. As per physical activity, 92 (52.6%) were active and 83 (47.4%) were non active.(table 1)

Table-1: Information of the patients that were enrolled

Variables	Frequency (175)	Percentage
Gender		
Male	96	54.9
Female	79	45.1
Age (mean)	48.5±3.36	
Smokers		
Yes	19	10.9
No	156	89.1
Marital Status		
Yes	148	85.6

No	27	14.4
Activity Status		
Yes	92	52.6
No	83	47.4

Among all, 65 (37.1%) cases had a MetS prevalence.(figure 1)
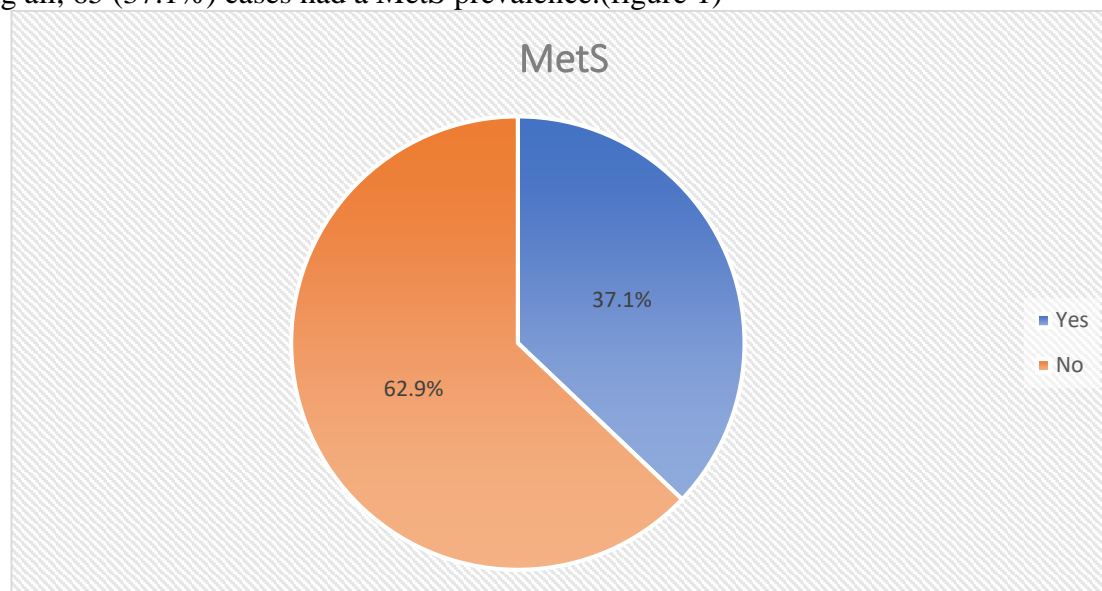

Figure-1: Association of MetS

The results of the logistic regression analysis show that eating breakfast has a significant opposite effect on the incidence for MetS (hazard ratio (OR) = 0.35, 95% CI = 0.22, 0.97), even after controlling for age, level of education, activity level, history of chronic illnesses, and smoking. This impact holds true even after controlling for body mass index (BMI), showing that breakfast eaters had 63% reduced odds of developing MetS compared to non-consumers (OR = 0.38, 95% CI = 0.11, 0.82). After adjusting for all possible confounders, no significant correlation was identified between MetS and other dietary practices, such as the intake of sugar cubes, sweetened beverages, and fast food.(table 2)

Table-2: Metabolic syndrome (MS) multivariable-adjusted risk ratios (95% CI) for varied dietary patterns across various frequencies or serving sizes

	Multivariable-adjusted		Multivariable + BMI	
Habits (Dietary)	OR	95% Cl	OR	95% Cl
Drinks (Sweet)				
less frequently than once every week	0.94	0.71–1.25	0.96	**0.71–1.22**
At least once every week	0.97	0.74–1.26	1.05	**0.71–1.22**
Fast Food				
1-3 times every month	1.01	0.79–1.20	0.95	0.72–1.15
At least once every week	0.91	0.63–1.19	0.87	0.62–1.28
Breakfast				
Every week, once	0.37	0.16–0.72	0.30	0.10–0.27
Every week, once	0.76	0.40–1.35	0.32	0.35–1.88
Sugar cubes				
1-2 cubes every day	1.05	0.70–1.46	1.05	0.70–1.50
Over two cubes every day	1.04	0.75–1.46	1.08	0.77–1.46

DISCUSSION

According to the results of the present study, eating breakfast can greatly reduce the risk of MetS. On the other hand, research indicates that the use of sugar cubes, fast food, and sweetened beverages does not significantly affect the incidence of MetS. The associations between eating behaviours and MetS persisted when potential confounders like age, level of education, exercise level, previous chronic diseases, smoking, or BMI were included.

Numerous studies indicate that having breakfast is linked to a healthy lifestyle and generally higher food quality.[13,14] Studies have indicated that eating poorly at breakfast may be a component of a bad lifestyle that increases the risk of MS.[15,16] Moreover, we discovered no correlation between our population's use of sugar cubes and sweetened beverages and MetS. Some research, in contrast to our findings, indicate that there is no substantial correlation between drinking sweetened drinks and an increased risk of developing MetS including its subtypes. In a middle-aged population, a future investigation has also shown that the use of sweet drinks was not linked to the occurrence of metabolic syndrome.[17] Both handmade and artificially sweet drinks were included in this analysis. Iranians typically drink plant-based sweetened drinks, including as polyphenols, which are beneficial substances that have an inverse relationship with metastases and their constituent parts. This issue, together with differences in the confounders included in the analysis, may be the reason of discrepancy between the current research and other ones since some studies failed to take BMI into account, a crucial variable in the association between dietary behaviours and MetS.

The pathogenesis of the metabolic syndrome is therefore significantly influenced by food. Well-established dietary practices, like the Mediterranean Diet (MedDiet), have been shown to reduce the risk of the metabolic syndrome [18]. They also help people lose weight by controlling blood pressure, inflammation, and plasma glucose levels. The adverse relationship between risk for cardiovascular disease and Mediterranean diet adherence is supported by the PREDIMED trial [19]. As an alternative to the MedDiet, other preventative strategies like the Diet Approach with Avoiding Hypertension, or DASH, or nation-specific dietary guidelines like the Healthy Eating Index (HEI) have been consistently linked to a lower prevalence of the metabolic syndrome [20].

Furthermore, we were unable to discover any meaningful correlation between eating fast food and metabolic syndrome. Our findings conflict with a number of studies that claim eating fast food often worsens general health and increases the risk for diabetes, insulin resistance, and various other metabolic problems [21]. However, there isn't a consensus definition of "rapidly foods," and discrepancies in the research results might be attributed to differences in the fast-Food ingredients. In addition, the research population's total fast-food consumption remained low, with the majority sixty-six percent just sometimes or never consuming fast food.[22]

CONCLUSION

According to this study, breakfast consumption and metabolic syndrome are inversely correlated. Further study is necessary, particularly population-based cohort studies, to uncover firmer evidence on food habits and MetS.

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