ORIGINAL ARTICLE

DIETARY PATTERNS AND THEIR DETERMINANTS AMONG MEDICAL STUDENTS OF KHYBER MEDICAL UNIVERSITY– INSTITUTE OF MEDICAL SCIENCES, KOHAT, PAKISTAN

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ABSTRACT

Background and Introduction: The concept of a balanced diet was introduced to promote optimal health and well-being. Dietary patterns are crucial for analyzing consumption habits and the frequency of food and nutrient intake within a population, ultimately aiding in the prevention of chronic diseases. According to the World Health Organization, 80% of people develop chronic diseases due to unhealthy lifestyles and dietary factors. The determinants include age, gender, year of study, residency, financial status, whether a student lives in a hostel or is a day scholar, level of physical activity, weight (kg), height (m), for calculating BMI (kg/m ^ 2), smoking habits, daily intake of breakfast, lunch, and dinner, any acute or chronic diseases, and the frequency of food consumption.

Objective: The main goal of this study was to identify dietary patterns among medical students and examine how these patterns are related to modifiable, non-modifiable, socioeconomic, personal, and environmental factors that influence nutrition.

Materials and Methods: After obtaining ethical approval, a descriptive cross-sectional study

The study was conducted at Kohat Institute of Medical Sciences, Kohat, Pakistan, involving 405 medical students. A semi-structured questionnaire, including a validated food frequency questionnaire along with lifestyle and sociodemographic questions, was used to assess dietary patterns and their determinants. The research took place from February to September 2024. All medical students aged 19 to 25 were eligible to participate. Data analysis and interpretation were performed using Microsoft Office 2010 and SPSS version 22. The results were presented in tables.

Results: The study showed that among 182 females, 115 (63.1%) followed a healthy pattern, while among 223 males, 135 (60.5%) maintained a healthy pattern. Respondents with a normal BMI (18.5-24.9 kg/m^2) also displayed healthy habits. Middle-aged students, around 22 years old, exhibited healthier behaviors. Following a healthy pattern helps prevent all medical illnesses, with 219 (60.8%) reporting no health issues. Unhealthy dietary habits were linked to lower daily food intake, smoking, fast food consumption, and decreased physical activity. Respondents with higher family incomes (<$100,000) and more disposable income for food, especially hostel residents, showed a healthier dietary pattern.

Conclusions: It was observed that dietary patterns vary among medical students, with key factors influencing these differences including age, physical activity, daily food intake, family income, BMI, monthly pocket money, and smoking habits. Many students reported following a healthy dietary pattern. University policies aimed at improving students' lifestyle behaviors by offering nutritious foods and encouraging regular physical activity are essential for supporting healthy development.

Keywords: Dietary Pattern, Medical Students, Age, Body Mass Index, Food Frequency Questionnaire

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INTRODUCTION

The concept of a Balanced Diet was introduced to promote optimal health and development, including a nutritious diet that supports longer life expectancy and helps prevent serious diseases. [1, 2] A dietary pattern (DP) helps analyze the overall profile of food and nutrient intake and frequency within a population. Patterns established in childhood often carry into adulthood, and an unhealthy or

sedentary dietary pattern can lead to the development of chronic diseases. [3] Analyzing dietary patterns with dietary data can also uncover the link between diet and chronic illnesses related to specific eating behaviors. [4]

Understanding nutrition and diet is crucial for choosing a healthy, balanced lifestyle. According to the World Health Organization, 80% of people suffer from chronic diseases caused by lifestyle and dietary factors; therefore, making informed choices is advised to lessen this burden. [5]

Several studies have shown that various factors, including socioeconomic status (SES), living environment, education, occupation, family background, and income, influence dietary habits and food intake. Research on Caucasian children examined the relationship between these factors and nutritional habits, reporting that a healthy diet characterized by high consumption of carbohydrates, proteins, and fats is positively associated with higher SES and educational levels, and negatively associated with unhealthy behaviors such as smoking and low physical activity. [6] A study in Kelantan state found that different ethnic groups display distinct, significant dietary patterns. Studies conducted in Australia, Brazil, Scotland, and China briefly explored the link between nutrients and food consumption. In the United States (US), about 31.8% of male and 33.5% of female adolescents have poor dietary habits. In Alberta, Canada, approximately 42.0% of adolescents exhibit poor eating habits, primarily due to a shift from consuming vegetables, fruits, nuts, and dairy products to junk food and snacks. [7]

The rapid social changes, socioeconomic progress, globalization, and health disparities that have occurred in recent years have led to shifts in food consumption patterns, causing more people to focus on processed and refined foods. [8, 9] Globally, studies conducted between 2000 and 2020 consistently show that university students are at the peak of transitioning from a healthy to an unhealthy lifestyle. [10, 11] Similarly, medical students play a significant role in promoting a healthy lifestyle, which is why it is highly emphasized. They should adopt effective and healthy eating habits during their studies and pass this knowledge on to their patients as well. [12] Therefore, this study aims to identify dietary patterns among medical students and explore how these patterns relate to age, gender, year of study, residency, financial status, whether they are hostel residents or day scholars, level of physical activity, weight (kg), height (m) for calculating BMI (kg/m^2), smoking habits, daily intake of breakfast, lunch, and dinner, presence of any acute or chronic diseases, and the frequency of food consumption via FFQ.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out at the Department of Community Medicine, KMU-IMS Kohat, Khyber Pakhtunkhwa, Pakistan, from February 2024 to September 2024. After receiving ethical approval, 405 students from first to final year, aged 19 to 25, were eligible to participate. A semi-structured questionnaire, including a validated food frequency questionnaire along with lifestyle and socio-demographic questions, was used to assess dietary patterns and their determinants. The semi-structured FFQ, comprising 25 items, aimed to determine food consumption frequency, categorized as daily, 2-3 times a week, once a week, once a month, or once every two months. The study identified two distinct dietary patterns: one healthy and one unhealthy. Respondents who consumed carbohydrates, proteins, fruits, vegetables, and other items daily or 2-3 times a week, and other items once a month or twice a month, were classified as following the healthy pattern. An unhealthy pattern was observed among respondents who consumed fast food and snacks daily or 2-3 times a week, as well as other items once a month. Data were analyzed using SPSS 22 and Microsoft Office 2010, with results presented in charts and tables.

RESULTS

A study involving 405 medical students from KMU-IMS Kohat, Khyber Pakhtunkhwa, Pakistan, including MBBS students from all years, found that 3rd and 4th-year MBBS students comprised 24.0% of the sample. The students ranged in age from 18 to 26 years, with the highest percentage (21.2%) being 22 years old. The percentages of males and females were 51.4% and 48.6%, respectively.

The study results indicated that students with a normal weight had the highest percentage at 64.7%, while students who were overweight or obese comprised 16.1%. The examination of family illness history revealed that 58.5% of participants reported no family illness. Among those with a family history of illness, 9.7% had acute diseases, 17.3% had chronic illnesses, and 7.8% had both. Additionally, 55.6% ate three meals a day, 39.5% had two meals, and 5.7% ate only one meal daily. A healthier diet was more common among those who ate more frequently—62.6% of three-meal eaters followed a nutritious diet, compared to 63.1% of two-meal eaters and 43.5% of one-meal eaters. See Table 1 for details.

Generally, unhealthy patterns were most common among those with fewer meals, with 56.5% of one-meal eaters showing poor dietary habits. Among the students, 49.2% were moderately active, 24.4% were regularly active, 15.8% were less active, and 8.6% were very active.

Physical activity levels were connected to dietary patterns, as more active individuals tended to follow healthier diets. Among moderately active students, 59.4% had a healthy diet, while 40.6% followed an unhealthy pattern. Similarly, 67.7% of regularly active students and 82.9% of very active students maintained a healthy diet. Conversely, less active students had roughly an even split, with 56.3% following a healthy diet and 43.7% having an unhealthy one. Additionally, 51.6% of students with a family income above 100,000 PKR followed a healthy dietary pattern. Higher income groups showed a stronger tendency toward healthier diets, with 61.2% in the >100k category eating healthily, compared to 58% in the 20-50k range and 50% in the 50-100k range. In contrast, students from lower-income families (<20k) had an almost equal split between healthy and unhealthy diets.

DISCUSSIONS

This study was conducted to assess the frequency of dietary patterns and their determinants among students at a medical college in Pakistan. Ahmed Jaeydi et al. concluded in a study that most people who consume a healthy diet (fruits, vegetables, carbohydrates, protein, and legumes) are less likely to have acute and chronic diseases compared to those with an unhealthy pattern, which aligns with our findings, where 60.8% of medical students reported following a healthy dietary pattern and had no medical issues. [13] The survey conducted in Broda, India, noted that nearly one-third of adolescents skipped meals regularly, a behavior mirrored in our study, where 36.9% of students reported eating only two meals a day and 5.3% ate just one, highlighting the impact of demanding academic schedules on students' meal patterns, where convenience often takes precedence over nutrition. [14] Our study revealed that 47.7% of students were moderately active. In comparison, only 8.1% were very active, reflecting a trend toward physical inactivity that aligns with a study conducted in KSA, where 75.3% of individuals did not exercise regularly. [15]

Additionally, a study conducted in South Africa found that 59.3% of the low-income population relied on reduced food intake, which included not just vegetables and fruits, aligning with our findings that privileged students exhibited healthier dietary patterns compared to those from low-income households. [16] A study from India revealed that 40% of the population was underweight,

Table 1: Demographic variables, physical activity, BMI, food intake habits, illnesses, and income

Variables	% age
Year of Study	
1st year	14.5
2nd year	15.4
3rd year	24
4th year	24
Final year	15.4
Age	
18	1.6
19	4.4
20	15.9
21	15.7
22	21.2
23	18.7
24	12.2
25	3.5
Gender	
Male	51.4
Female	41.9
Physical Activity of Medical Students	
Less active	14.7
Moderately Active	47.7
Regularly active	22.8
Very Active	8.1
BMI of Medical Students	
Underweight <18.5	18.4
Normal 18.5-24.9	64.7
Overweight & obese	
25-29.9	16.1
Daily Food Intake of Medical Students	
Only one meal a day	5.3
Two meals a day	36.9
Three meals a day	51.2
History of Family Illness of Medical Students	
No illness	58.5
Acute	9.7
Chronic	17.3
Acute & Chronic both	7.8
Medical Issues of Medical Students	
No Medical Issue	82.9
Acute Medical Issue	6
Chronic Medical Issue	3
Both Acute and Chronic	
issues	1.4
Family Monthly Income	
< 20000	11.3
> 100000	47.9
20-50000	11.1
50-100000	23

while 6% were overweight, likely due to poor dietary choices and a lack of nutritious foods. [17] In contrast, our study found the prevalence of obesity among hostel residents to be 11.5%. A similar pattern was observed in the article, noting that poor dietary habits and stress contribute to both underweight and overweight conditions among medical students. The study also found that lower physical activity levels were directly associated with higher BMI among medical students. [18]

Additionally, the study emphasizes that insufficient physical activity combined with a high-calorie diet contributes to rising obesity rates among medical students. A survey showed that 64% of participants had a normal weight, and 18% were overweight, which aligns with our study, indicating that 64.7% of students had a normal BMI and 16.1% were classified as overweight or obese, engaging in low to moderate physical activity. In a study conducted at an Egyptian university, nearly one-quarter of the students met the recommended daily intake of fruit. [20] However, our data reveal interesting trends, with 60.4% of students consuming fruits 2-3 times per week and maintaining healthy dietary patterns. [21]

CONCLUSIONS

This study found that most students follow a healthy diet, regularly eating carbohydrates, proteins, fruits, and vegetables. However, a notable number of students have unhealthy eating habits, often consuming fast food, snacks, and processed foods. Furthermore, there is a clear link between unhealthy eating patterns and lower physical activity levels among obese and overweight students. In addition, students' pocket money, parents' monthly income, tobacco use, and fast-food consumption are closely associated with their dietary habits.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Nadeem A	✓	×	✓	×	✓	×
Eman[1]	✓	✓	×	✓	✓	×
Khalid Y	×	✓	×	×	✓	×
Kanwal N	✓	✓	✓	×	✓	✓
Safeer M	✓	✓	×	✓	✓	×
Habib H	✓	✓	×	✓	✓	×
Falak M	×	✓	×	×	✓	×
Zaman H	✓	✓	✓	×	✓	✓
Naveed E	✓	✓	×	✓	✓	×
Asad T	×	✓	×	×	✓	×
Najeeb B	✓	✓	✓	×	✓	✓
Ishtiaq M	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.