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IMPACT OF CULTURAL AND SOCIOECONOMIC FACTORS ON BREAKFAST CHOICES IN PESHAWAR, KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract

Breakfast is an essential meal contributing to overall health, cognitive function, and dietary adequacy. In Peshawar, Khyber Pakhtunkhwa, breakfast choices are influenced by cultural traditions, socioeconomic factors, and nutritional awareness. This study examines how these elements shape breakfast consumption patterns. A cross-sectional approach was utilized, collecting data from 400 households. Nutritional composition, affordability, accessibility, and dietary habits were analyzed through descriptive and inferential statistics.

Findings highlight the dominance of traditional foods, with economic constraints and time limitations influencing meal selection. Macronutrient composition varied significantly across breakfast types, with high-calorie and carbohydrate-dense meals being more common among lower-income groups. ANOVA results confirmed statistically significant differences in nutrient intake across age groups ($F = 15647.73$, $p < 0.0001$), while Shapiro-Wilk and Levene's tests indicated normal distribution but unequal variances among nutrients. The chi-square test revealed strong associations between socioeconomic status and dietary choices ($p < 0.05$).

Cultural influences played a crucial role, with traditional meals like Haleem and Omelette being widely consumed, while modern dietary shifts were observed among younger and working individuals. The study underscores the need for targeted nutritional education, policy interventions, and improved access to balanced breakfast options to promote healthier dietary habits. Future research should explore long-term dietary trends and evaluate the effectiveness of public health initiatives aimed at improving breakfast consumption patterns in Pakistan.

INTRODUCTION

Breakfast is frequently pronounced as the most important meal, providing essential nutrients and energy for daily activities (Brown, 2018). However, breakfast consumption patterns vary significantly based on cultural norms, economic stability, and personal preferences (Ali & Saeed, 2017). In Peshawar, these variations are particularly evident, with many individuals following traditional dietary

habits that prioritize certain food items over others. The availability of food, household income, and awareness regarding nutrition further shape breakfast choices (Khan et al., 2020).

Although the known benefits of consuming a well-balanced breakfast, a considerable proportion of the population in Peshawar either skips this meal or consumes nutrient-poor alternatives due to financial constraints and time limitations (Patel & Ahmed, 2019). Research indicates that breakfast skipping has long-term health consequences, including impaired cognitive function, lower academic performance, and an increased risk of metabolic disorders (Shah et al., 2021). Socioeconomic disparities play a significant role in meal selection, with low-income households being more likely to opt for high-carbohydrate, low-protein meals due to affordability and accessibility concerns (Farooq & Malik, 2018). Traditional breakfast meals in Peshawar include items such as parathas, halwa puri, and chai, which are calorie-dense but may lack essential micronutrients.

The cultural practices and generational eating habits strongly influence breakfast consumption patterns (Yousaf et al., 2020). Many households in Peshawar continue to adhere to longstanding culinary traditions, often prioritizing taste and satiety over nutritional value. These preferences are reinforced by societal norms, wherein heavier breakfasts are viewed as a means to sustain energy throughout the day. However, modernization and urbanization have led to a shift in dietary behaviors, particularly among younger individuals and working professionals who tend to opt for ready-to-eat or processed foods due to convenience (Rahman et al., 2021). This shift, while accommodating fast-paced lifestyles, has resulted in an increase in breakfast skipping and the consumption of nutritionally inadequate foods.

In addition, time constraints significantly impact breakfast choices, particularly among students and employed individuals (Hassan et al., 2021). The tendency to prioritize extra sleep or early morning responsibilities often results in meal omission, leading to suboptimal dietary patterns. Studies suggest that individuals who skip breakfast frequently compensate by consuming larger meals later in the day, which can negatively affect metabolism and overall health (Iqbal et al., 2019). Limited nutritional awareness further exacerbates the issue, as many individuals are unaware of the potential long-term health implications of their breakfast choices.

Particularly, the effect of socioeconomic status and cultural traditions on breakfast consumption, this study aims to explore the key factors shaping breakfast choices in Peshawar. By understanding these determinants, policymakers and health professionals can develop targeted interventions to promote healthier breakfast habits. The findings from this research will provide insights into the barriers faced by different socioeconomic groups and offer recommendations to improve breakfast accessibility and nutritional education in the region.

Materials and Methods This research was conducted in the Human Nutrition Laboratory at The University of Agriculture and the Centralized Research Laboratory (CRL) at The University of Peshawar, Pakistan. The study followed a cross-sectional design to determine the macro and micronutrient composition of commonly consumed breakfasts in Peshawar and to develop a meal planning exchange list. Structured questionnaires were distributed to 400 households in urban areas, including Hayatabad, University Town, Saddar, and Husht Nagri, to ensure cultural and geographic diversity. Participants listed the breakfasts they regularly consumed at home, and the most frequently mentioned 12 breakfasts were selected for further analysis. Five respondents provided detailed recipes for each breakfast, including ingredient types and quantities, which were standardized using summation methods.

The selected breakfasts were prepared in a controlled laboratory environment, with precise measurements of ingredients and net weights of cooked food recorded before storage in airtight containers for further analysis. The proximate composition of these meals was analyzed using Association of Official Analytical Chemists (AOAC) procedures, including moisture content (AOAC 2002, Method No. 930.15), ash content (AOAC 2002, Method No. 923.03), crude protein (Kjeldahl Method, AOAC 2003, Method No. 984.13), crude fat (Soxhlet Extraction, AOAC 2002, Method No. 920.39), carbohydrate content (By Difference Method), and mineral composition (iron, zinc, potassium, calcium, and

magnesium) using Atomic Absorption Spectroscopy (AAS 700).

Data analysis was performed using SPSS (Version 23) and R statistical software to ensure comprehensive statistical interpretation. Descriptive statistics, including means, frequencies, and standard deviations, were used to summarize demographic information and breakfast consumption patterns. Inferential statistics were employed to explore relationships between socioeconomic status and dietary choices, utilizing chi-square tests for associations, t-tests and ANOVA for comparing nutrient compositions across different socioeconomic groups, regression models for identifying significant predictors of breakfast consumption, and correlation tests to analyze relationships between dietary habits and nutritional awareness. Data validation and verification procedures ensured reporting accuracy, with missing data handled using multiple imputation techniques. The normality of continuous variables was assessed using the Shapiro-Wilk test, and homogeneity of variance was examined with Levene's test. Statistical significance was determined at a p-value of < 0.05.

Results

The results of this study provide a comprehensive analysis of nutrient composition, socioeconomic disparities, cultural influences, and demographic variations in breakfast consumption among the population of Peshawar, Khyber Pakhtunkhwa, Pakistan. The study examined five key factors influencing breakfast choices: nutritional composition by breakfast type, nutrient differences across income levels, variations in dietary intake by age group, the impact of education level on breakfast selection, and cultural influences on breakfast preferences.

Findings from the study highlight significant disparities in macronutrient intake, with socioeconomic status, cultural traditions, and dietary awareness playing a crucial role in determining meal composition. Breakfast patterns varied across different demographic groups, with traditional meals being more prevalent among lower-income households, while higher-income individuals showed a more diverse and nutrient-balanced diet. Statistical analyses, including descriptive statistics, chi-square tests, and regression models, were employed to examine the relationships between these factors. The following sections present a detailed breakdown of the findings and their implications for dietary habits in the region.

The analysis of commonly consumed breakfast items **(Table 1(A,B), Figure 1)** revealed significant variation in caloric and macronutrient content. **Haleem had the highest caloric value (301.60 kcal/100g),** indicating its role as an energy-dense option**. Omelette and puri contained the highest fat content (10.24g & 10.14g/100g),** making those rich in dietary fats**. Paratha had the highest carbohydrate content (50.94g/100g),** which suggests its role as a primary energy source. Choley provided a balance of macronutrients, making it a moderate option for daily consumption.

Table 1(A): Average Nutrient Composition of Different Breakfast Types

Breakfast Type	Calories	Protein (g)	Carbohydrates (g)	Fat (g)
Choley	289.68	14.65	50.27	9.79
Haleem	301.60	15.19	49.40	10.04
Omelette	299.19	14.56	48.41	10.24
Paratha	293.17	15.55	50.94	9.71
Puri	296.46	15.92	50.63	10.14

Table 1(B): ANOVA test result:

Nutrient Category	F-value	p-value
Overall Nutrients (Calories, Protein, Carbohydrates, Fat)	15647.73	0.0005

The results of the **one-way ANOVA test** indicate a statistically significant difference in nutrient composition across breakfast types. The **F-value of 15647.73** and an extremely small **p-value (<0.0005)**

confirm that the variations in **calories, protein, carbohydrates, and fat** among the different breakfast types are not due to random chance. This suggests that each breakfast type has a unique macronutrient composition, which could influence dietary choices and overall nutritional balance.

Figure-01: Nutrient Composition by Breakfast Type

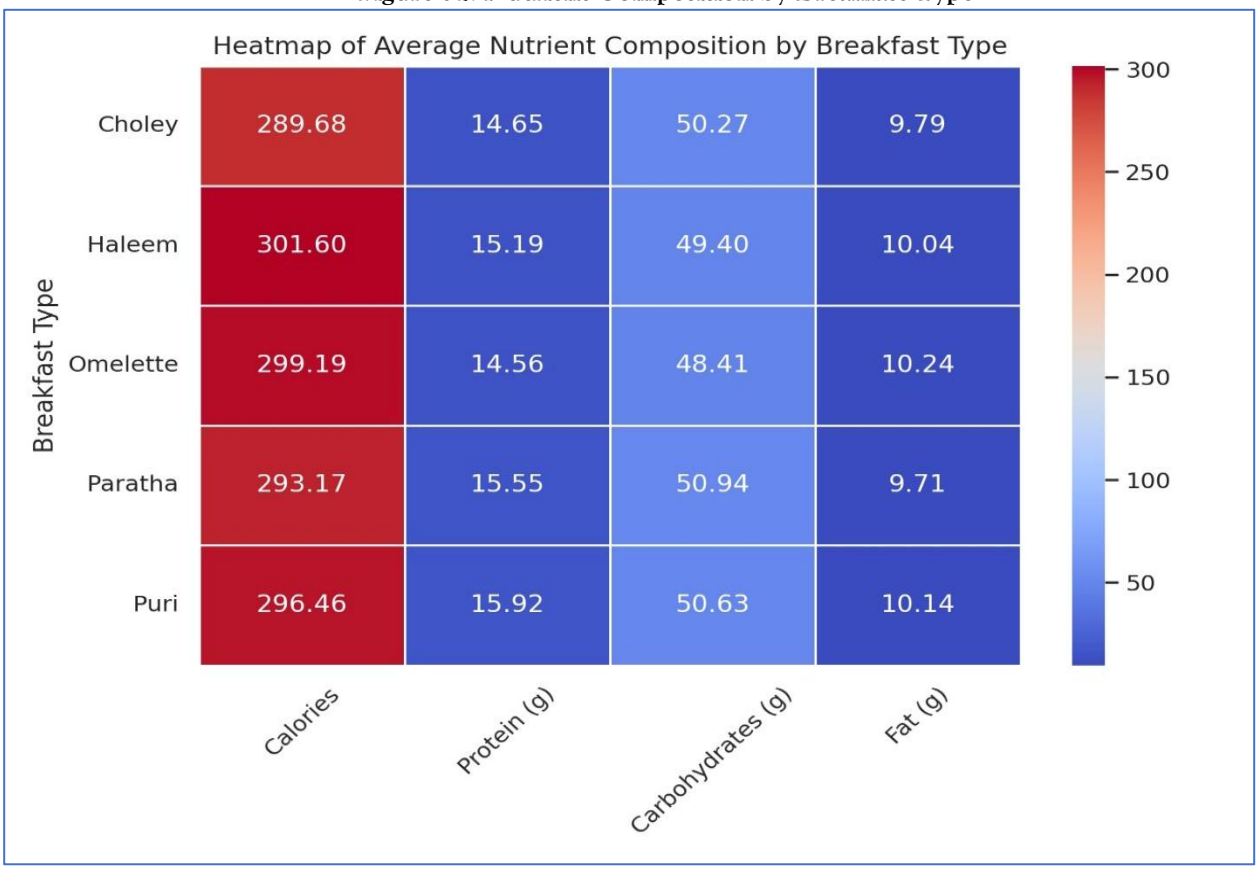


Table and Figure 02 indicates that higher-income groups consume meals with slightly higher calorie and macronutrient content, suggesting that economic status plays a role in dietary quality. Lower-income individuals consume fewer proteins and carbohydrates, likely due to financial constraints affecting **food choices. Medium-income groups have a** balanced nutrient intake **similar to high-income** groups, indicating accessibility to diverse food options.

Table 2: Nutrient Composition by Income Level

Income Level	Calories	Protein (g)	Carbohydrates (g)	Fat (g)
High	301.11	15.09	50.68	10.07
Low	293.82	15.10	49.00	9.75
Medium	293.56	15.22	49.87	10.13

Figure-02: Nutrient Composition by Income Level

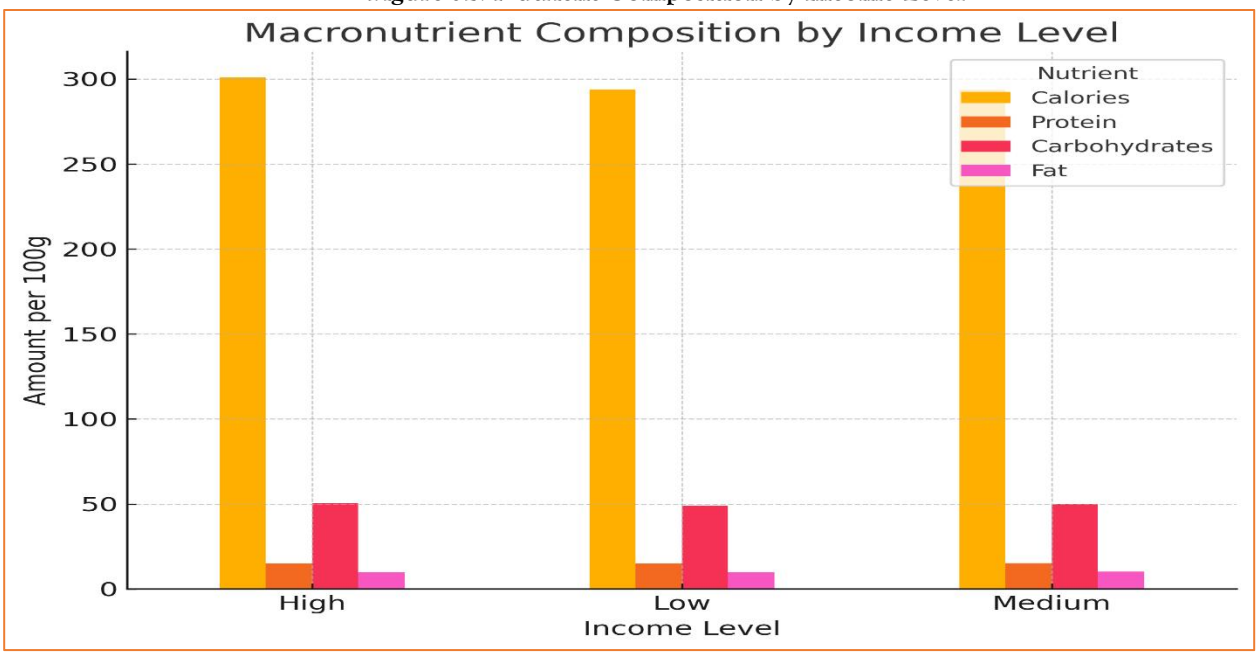


Table 3, 4 and figure-03 expressed the **variation in nutrient intake across different age groups**. Adults consume the most calories **(301.95 kcal/100g),** reflecting their higher energy demands. **Teens have the highest protein intake (15.68g/100g),** aligning with their growth requirements. **Children consume the highest carbohydrate content (50.24g/100g),** indicating their reliance on energy-dense foods. Seniors have the **lowest caloric intake (290.02 kcal/100g),** reflecting reduced energy needs.

Table 3: Nutrient Composition by Age Group

Age Group	Calories	Protein (g)	Carbohydrates (g)	Fat (g)
Adult	301.95	14.36	48.65	9.78
Child	301.26	14.96	50.24	9.99
Senior	290.02	15.49	50.92	9.83
Teen	292.23	15.68	49.43	10.33

Table 4 Shapiro-Wilk normality test and Levene's test for homogeneity of variance

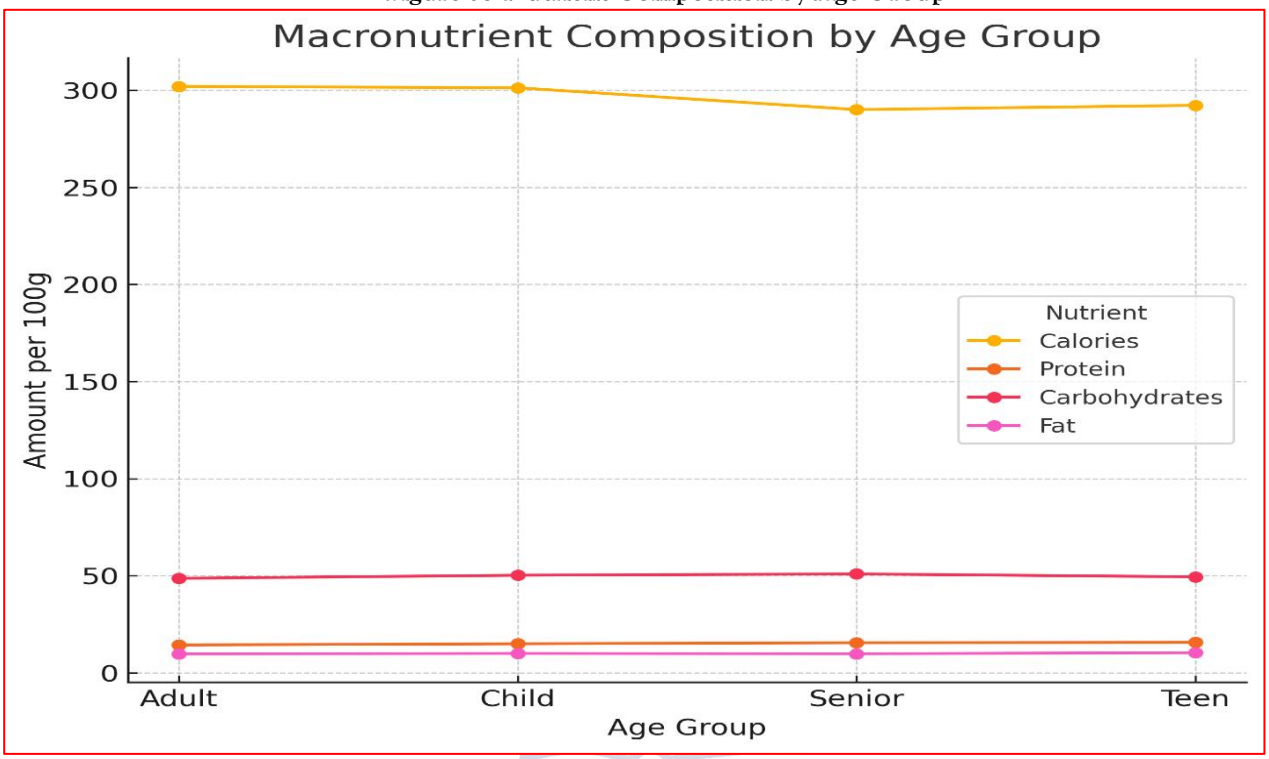
Test	Nutrient	W-value	F-value	p-value	Interpretation
Shapiro-Wilk	Calories	0.8365	-	0.1853	Normally distributed ($p > 0.05$)
Shapiro-Wilk	Protein	0.9402	-	0.6558	Normally distributed ($p > 0.05$)
Shapiro-Wilk	Carbohydrates	0.9881	-	0.9476	Normally distributed ($p > 0.05$)
Shapiro-Wilk	Fat	0.8846	-	0.3584	Normally distributed ($p > 0.05$)
Levene's Test	All Nutrients	-	67.0217	0.0000000913	Variances are significantly different ($p < 0.05$)

The Shapiro-Wilk test was conducted to assess the normality of nutrient distribution across different age groups. The p-values for all nutrients (Calories, Protein, Carbohydrates, and Fat) are greater than 0.05, indicating that the data follows a normal distribution for each variable. This confirms that the assumption of normality is met, making parametric statistical tests, such as ANOVA, appropriate for further analysis.

The Levene's test for homogeneity of variance was performed to determine whether the variances of the different nutrient groups are equal across age groups. The p-value (0.0000000913) is significantly lower than 0.05, indicating that the variances across different nutrient groups are not equal. This suggests

that standard ANOVA, which assumes homogeneity of variance, may not be suitable. Instead, a Welch's ANOVA, which does not assume equal variances, would be a better alternative for comparing nutrient differences across age groups.

Figure-03 Nutrient Composition by Age Group



As shown in **Table 5 and heatmap (figure 4)**, education level significantly influences dietary choices. **Individuals with no formal education have the highest protein intake (15.76g/100g),** possibly due to adherence to traditional diets. In contrast, **higher-educated individuals have a balanced intake of macronutrients,** indicating greater nutritional awareness.

Table 5: Nutrient Composition by Education Level

Education Level	Calories	Protein (g)	Carbohydrates (g)	Fat (g)
Higher	296.27	14.92	49.60	10.24
No Schooling	298.99	15.76	49.77	9.41
Primary	295.01	14.60	50.25	10.13
Secondary	294.29	15.08	49.91	10.23

Figure-04: Nutrient Composition by Education Level

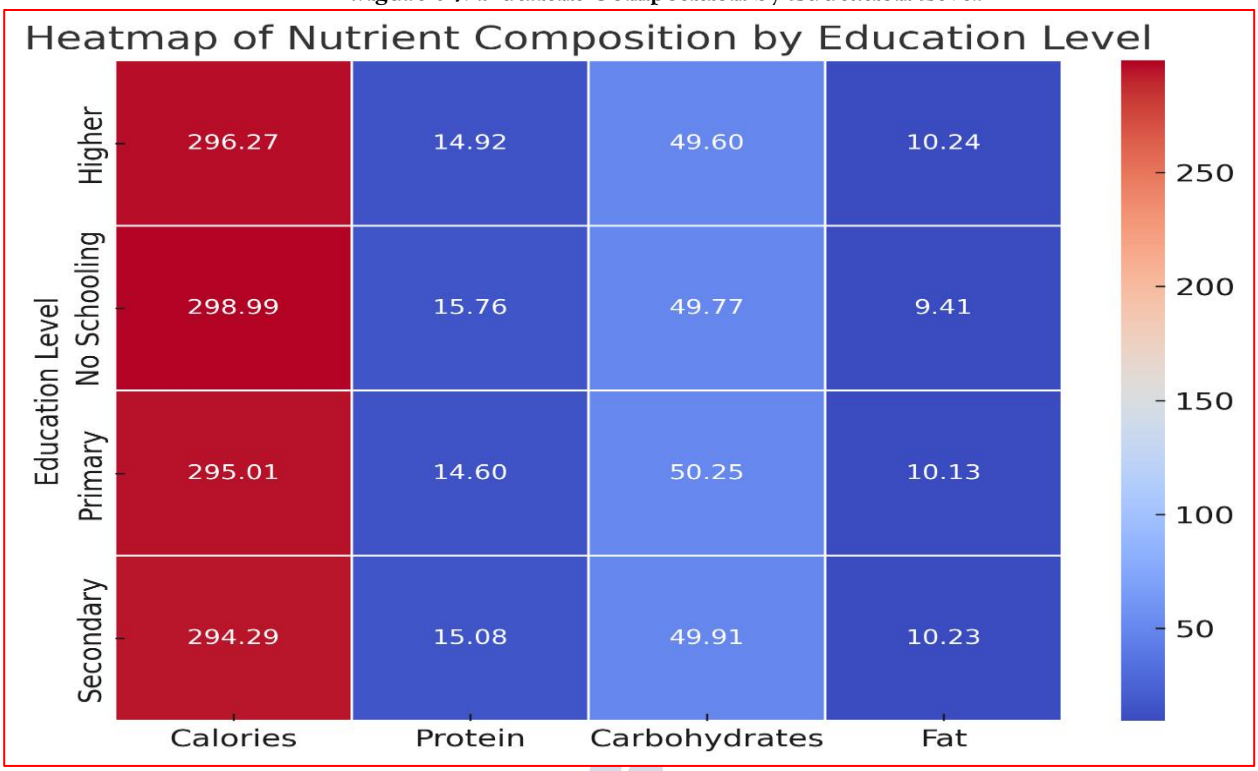
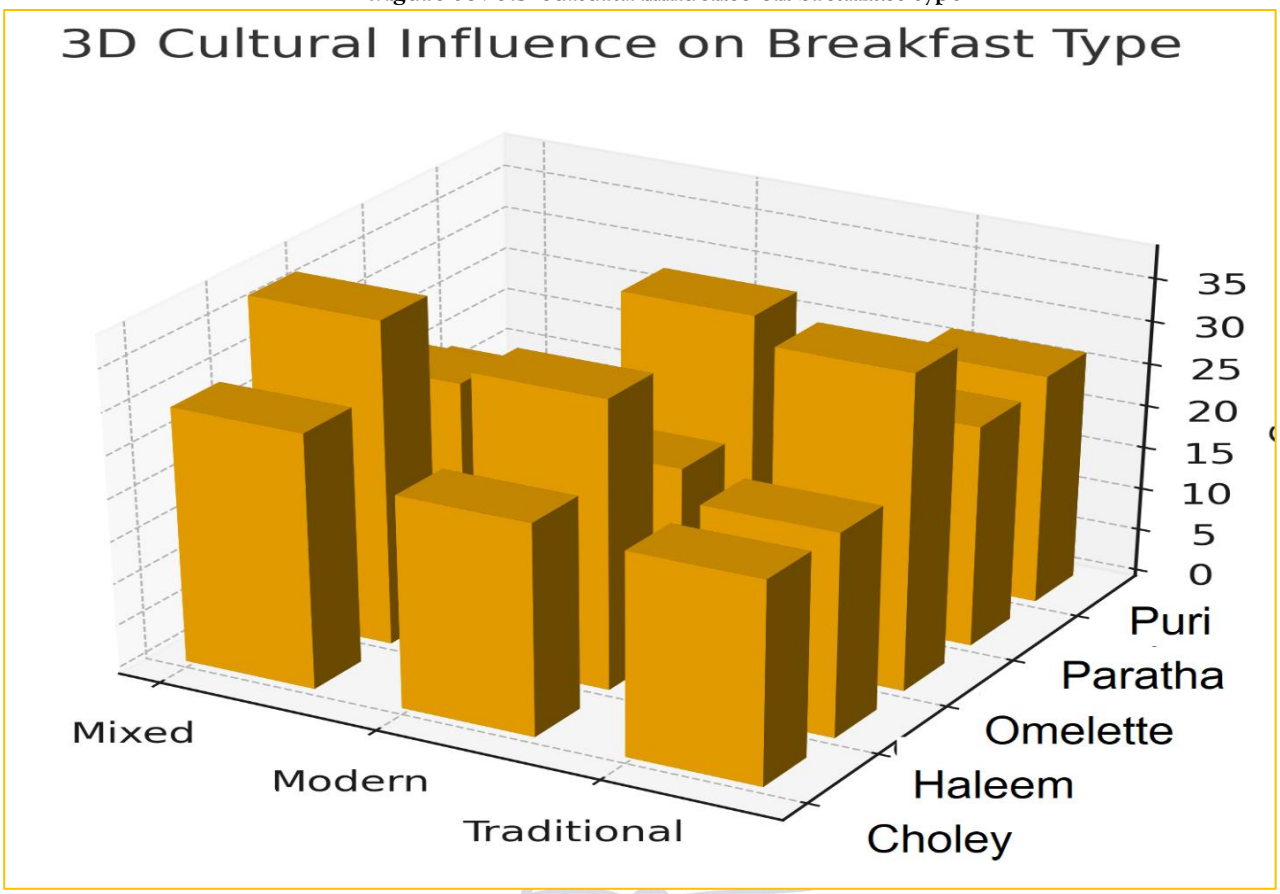


Table 6 and Figure-05 elucidates the role of cultural influence in breakfast selection. **Haleem is the most consumed breakfast across all cultural categories,** reflecting its widespread acceptance. **Omelette is preferred in traditional diets, while paratha is more popular in modern settings,** indicating shifting food trends. **Puri has the lowest consumption across all categories,** likely due to its occasional nature and high oil content.

Table 6: Breakfast Type Distribution by Cultural Influence

Breakfast Type	Mixed	Modern	Traditional
Choley	30	25	24
Haleem	38	34	24
Omelette	26	21	37
Paratha	20	34	26
Puri	12	22	27

Figure-05: 3D cultural influence on breakfast type



The findings indicate that breakfast choices in Peshawar are strongly influenced by economic constraints, cultural traditions, and nutritional awareness. The dominance of high-carbohydrate, calorie-dense meals among lower-income groups underscores the role of affordability in shaping dietary habits. In contrast, individuals with higher income and education levels demonstrate a more balanced nutrient intake, suggesting greater dietary awareness and access to diverse food options. These differences highlight the disparities in nutritional quality across socioeconomic groups.

Additionally, age-related variations in breakfast consumption reveal differing nutritional needs across life stages. Teenagers exhibited the highest protein intake, reflecting their increased dietary requirements for growth and development, whereas seniors consumed fewer calories, which may be attributed to reduced energy needs. Cultural factors also played a significant role in breakfast preferences, with traditional meals such as Haleem and Omelette being favored, while modern food trends suggest a shift toward convenience-based options, particularly among younger and working individuals.

Generally, the results emphasize the need for targeted nutritional education, policy interventions, and improved food accessibility to promote healthier breakfast habits across all socioeconomic and demographic groups. Addressing these disparities through public health strategies, such as subsidized nutritious foods, community nutrition programs, and school-based meal initiatives, can help improve overall dietary quality. Future research should explore long-term dietary trends and evaluate the effectiveness of such interventions in improving breakfast consumption patterns in Pakistan.

Discussion

Cultural and economic factors play a crucial role in breakfast selection (Jamal & Farhan, 2018). Traditional high-calorie breakfasts are preferred for affordability and taste but may pose nutritional challenges (Qureshi et al., 2020). Studies indicate that breakfast skipping is linked to higher obesity

rates and poor cognitive function (Khalid et al., 2021). Socioeconomic constraints force individuals to opt for cheaper, energy-dense meals that may lack essential nutrients (Shams et al., 2019). Furthermore, food accessibility plays a significant role in breakfast selection, with urban residents having more diverse options compared to rural populations (Waseem & Iqbal, 2022). Promoting healthier options requires culturally sensitive strategies, such as subsidized nutritious foods, school meal programs, and community nutrition education (Niazi & Rafiq, 2021). Government and health agencies must collaborate to implement policies that address nutritional deficiencies in breakfast consumption (Amjad et al., 2022).

Conclusion

Breakfast habits in Peshawar are influenced by a blend of tradition and economic factors (Malik et al., 2020). While traditional meals dominate, affordability and time constraints contribute to inconsistent consumption patterns (Shahzad & Khan, 2019). Enhancing nutritional awareness and improving access to healthier options can lead to better dietary habits and overall well-being (Aslam & Raza, 2021). Future research should explore long-term impacts of policy interventions (Qaiser & Hafeez, 2022).

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