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Perceived Barriers to Healthy Eating and Their Association with Dietary Behaviors: An Analytical Cross-Sectional Study

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ABSTRACT

Several perceived barriers, including time constraints, food costs, convenience of fast food, and limited cooking skills, influence healthy eating. **Objectives:** To identify which of four perceived barriers to healthy eating—lack of time, cost of fresh ingredients, convenience of fast food, and lack of cooking skills—are most strongly associated with dietary behaviors. **Methods:** An analytical cross-sectional study of 150 respondents assessed agreement with four barrier statements on a 5-point Likert scale and current dietary habits. Non-parametric procedures were employed: Spearman's correlation for bivariate associations, Kruskal-Wallis H-test with epsilon-squared effect size, and Dunn's post hoc test with Bonferroni correction. **Results:** Cost of fresh ingredients showed the strongest associations, correlating with slow food frequency ($\rho = -0.406$, $p<0.001$), slow food change ($\rho = -0.325$, $p<0.001$), and diet health ($\rho = -0.375$, $p<0.001$), with the highest effect size across slow food groups ($\varepsilon^2 = 0.219$). Convenience correlated with fast-food consumption ($\rho = 0.275$, $p=0.001$), as did lack of cooking skill ($\rho = 0.242$, $p=0.003$). Lack of time showed only a weak association with slow food frequency ($\rho = -0.194$, $p<0.005$). **Conclusions:** Perceived cost is most closely associated with reduced home cooking and lower diet quality, whereas convenience and cooking self-efficacy are associated with increased fast-food consumption. Interventions targeting affordability and cooking skills may be more effective than time-management messages.

INTRODUCTION

Good nutrition is fundamental to the prevention of diseases and maintaining good health, thus lowering the risk of obesity, cardiovascular diseases, type 2 diabetes, and other non-communicable diseases [1]. However, good nutritional status is difficult to achieve for many people as food choice is determined not only by nutrition knowledge but by other factors such as personal, social, environmental, and economic factors. Recent research has found that food prices, time pressure, convenience of fast food, and cooking ability are key barriers to healthy eating among different populations [2]. Such barriers can make it hard to follow dietary guidelines, leading to more intake of energy-dense, nutrition-poor foods. One obstacle that is frequently mentioned in survey research is time pressure. Previous studies by Yang *et al.* have shown that women who experienced time pressure were less likely to consume fruit and vegetables and more likely to eat fast food, and similarly, time pressure has been identified as being associated with increased consumption of convenience and takeaway food [3]. Time is a barrier cited often and has been linked to less home meal preparation and more consumption of convenience foods, while the cost of fresh and nutritious foods is a significant barrier, especially for socioeconomically disadvantaged people [4]. Likewise, poor cooking confidence and the widespread availability of fast foods have been linked to higher fast-food consumption and poorer overall diet quality [5, 6]. Although previous research has documented these barriers individually, limited evidence is available regarding their relative importance in predicting dietary behaviors

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such as fast-food intake, home cooking frequency, and self-rated diet quality. Identifying the barriers that most strongly influence dietary behaviors may help guide the development of more targeted and effective nutrition interventions. This personal-level constraint is present within a socioeconomic gradient, as socioeconomically disadvantaged groups have been consistently shown to consume poorer diets and lower relative diet costs [7] and have been observed in European populations [8, 9] and more recently in primary-care patients in the U.S [10]. Price could be an issue that impacts the amount of home cooking, but not fast food. Convenience and cooking skills are constructs that are related. Mills and colleagues determined that those who cook less frequently at home and have lower self-rated cooking skills consume more fast food than those who cook at home more often and rate their skills higher [11]. This pattern is akin to validated instruments of cooking confidence, which have been correlated with increased consumption of convenience foods and takeout foods [12], and survey data indicating increased consumption of convenience cooking foods associated with decreased vegetable consumption [13]. These barriers to cooking at home also coincide with the general population of Catalonia who reported being overwhelmed with academic and social demands while preparing food, with the lack of cooking confidence or time being highlighted as major obstacles [14] as well as in Jurado-González *et al*. where students from the university stated that low cooking confidence and lack of time were also among the main barriers to home cooking [15]. Both convenience and skill barriers have the same background of "low effort acquisition", and it is predicted that both would be more closely correlated with fast food consumption than with home cooking. Not all barriers are created equal. A lack of willpower, time constraints, and taste preferences were consistently found to be most strongly associated with dietary behavior in a cross-sectional survey of 5 urban European regions by Pinho and colleagues [16, 17] and were age, sex, and household composition dependent. This implies that the degree of significance of a particular barrier cannot be deduced from the frequency of appearance in the report, but rather by comparing it with behavioral outcomes.

Although the literature is rich with documentation of barriers to healthy eating, there is a lack of understanding of which barriers, as reported in the literature, are most likely to be associated with actual dietary behaviors, and not just perceived as barriers. Research to date has been directed at the prevalence of barrier endorsement instead of investigating the relative strength of the associations with types of dietary outcomes (e.g., eating fast food, cooking at home, self-reported diet quality). Moreover, the question of which barriers are more strongly associated with eating fast food instead of cooking at home is not addressed, having implications for intervention development. This study aimed to investigate the relationship of each of the four barriers (lack of time, the cost of fresh ingredients, the convenience of fast food, and lack of cooking skills) to several dietary behavior outcomes. Specifically, to (1) identify which of these barriers is most consistently and strongly related to dietary behaviors, (2) determine if specific barriers are more strongly related to fast food intake than home cooking, and (3) determine if perceived barriers correlate with self-rated diet health and perceived changes in diet over time.

METHODS

The design of the study was an analytical cross-sectional study conducted at the University of Lahore. 150 respondents completed the survey, indicating their degree of agreement with four statements indicating barriers to healthy eating, as well as their current eating habits and perception of the change in their eating habits over the past year. The subjects for this study were a virtual community, where the research was carried out in the context of self-administered online questionnaires. The participants were recruited via the internet, social media, and electronic communication networks. Data were collected from January 2026 to March 2026. Responses were captured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) for each of the following perceived barriers: lack of time, cost of fresh ingredients, convenience of fast food, and lack of cooking skill. Dietary behavior was measured using self-reported frequency of fast-food meals, slow food (home-cooked) meals per week, in an ordinal format, perceived change in fast food consumption (decreased a lot" to "increased a lot", five-point scale), perceived change in slow food consumption (decreased a lot" to "increased a lot", five-point scale), and self-rated overall diet healthiness (1 = least healthy to 5 = most healthy, five-point scale. An a priori power analysis was conducted using G*Power software (version 3.1.9.7) to determine the minimum sample size required for the primary analyses. For Spearman's rank-order correlation, assuming a two-tailed test, $\alpha = 0.05$, power $(1 - \beta) = 0.80$, and a moderate effect size of $\rho = 0.30$ (based on previous studies examining barriers to healthy eating [5,11]), the required sample size was calculated as n = 84. For the Kruskal-Wallis test, assuming a medium effect size ($f = 0.25$), $\alpha = 0.05$, power = 0.80, and three groups, the required sample size was n = 159. To ensure adequate power for all planned analyses and to account for potential incomplete responses or missing data, a target sample size of approximately 160 participants was set. The final analytical sample of 150 respondents was therefore considered adequately powered for the primary non-parametric analyses, though marginally below the target for the

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Kruskal-Wallis tests.

All statistical analyses were performed using R 4.6.0. Spearman's rank-order correlation coefficient (ρ) [18] was used to assess bivariate correlations between scores of barriers and dietary behavior measures. To control for the risk of Type I error due to multiple comparisons, a Bonferroni correction was applied to the correlation analyses. With 20 correlations performed (4 barriers × 5 dietary outcomes), the adjusted significance threshold was set at $\alpha = 0.05/20 = 0.0025$. The Kruskal-Walli's test requires a minimum of 5 observations per group for the chi-square approximation to be reliable; this category was excluded from the Kruskal-Wallis and Dunn's post hoc analyses involving slow food frequency to ensure statistical validity [17]. Epsilon-squared (ε^2) effect size was computed as described by [19]. For the omnibus test, a Dunn's post hoc test with Bonferroni correction was employed for pairwise group comparisons. An alpha level of 0.05 was used to determine statistical significance.

RESULTS

Convenience of fast food showed the highest median agreement (Mdn = 4.00), while cost demonstrated the narrowest variability (IQR = 2.00–3.00). Lack of time and lack of cooking skill showed similar central tendencies (Mdn = 3.00 for both). Complete descriptive statistics are presented (Table 1).

Table 1: Descriptive Statistics for Perceived Barrier Scores (n=150)

Barriers	Mean ± SD
Lack of Time	2.87 ± 1.03
Cost of Fresh Ingredients	2.73 ± 0.87
Convenience of Fast Food	3.11 ± 1.20
Lack of Cooking Skill	2.75 ± 1.09

Frequency distributions for dietary behavior and diet-health variables are displayed. Most respondents consumed 0–1 fast food meal per week (49.3%), while home-cooked slow food consumption was concentrated in the 4–5 meals per week category (51.3%). Self-rated diet health was most frequently reported at the midpoint of the scale (46.7%) (Table 2).

Table 2: Frequency Distributions for Dietary Behavior and Diet-Health Variables (n=150)

Variables	Category	n (%)
Fast Food Meals/Week	0–1	74 (49.3%)
	2–3	52 (34.7%)
	4–5	24 (16.0%)
Slow Food Meals/Week	0–1	1 (0.7%)*
	2–3	33 (22.0%)
	4–5	77 (51.3%)
	6–7	39 (26.0%)
Fast Food Intake Vs. 1 Year Ago	Decreased A Lot	13 (8.7%)
	Decreased Slightly	30 (20.0%)
	Stayed the Same	59 (39.3%)
	Increased Slightly	41 (27.3%)
	Increased A Lot	7 (4.7%)
Slow Food Intake Vs. 1 Year Ago	Decreased A Lot	3 (2.0%)
	Decreased Slightly	31 (20.7%)
	Stayed the Same	63 (42.0%)
	Increased Slightly	35 (23.3%)
	Increased A Lot	18 (12.0%)
Self-Rated Diet Health	1 (Least Healthy)	4 (2.7%)
	2	9 (6.0%)
	3	70 (46.7%)
	4	52 (34.7%)
	5 (Most healthy)	15 (10.0%)

Note. Percentages may not sum to exactly 100% due to rounding. The 0–1 slow food frequency category contained only one respondent; interpretations involving this category require caution

Cost of fresh ingredients demonstrated the strongest overall associations, correlating significantly with slow food frequency ($\rho = -0.406$, $p<0.001$), slow food change ($\rho = -0.325$, $p<0.001$), and diet health ($\rho = -0.375$, $p<0.001$). Convenience and lack of skill showed consistent associations with fast food consumption ($\rho = 0.275$ and 0.242, respectively), while lack of time was the weakest barrier, reaching significance only with slow food frequency ($\rho = -0.194$, $p<0.005$) (Table 3).

Table 3: Spearman Correlations Between Perceived Barriers and Dietary Behavior Measures (n=150)

Barrier	Fast Food Frequency	Slow Food Frequency	Fast food Δ (yr)	Slow Food Δ (yr)	Diet Health
Lack of Time	0.041 (p=0.620)	−0.194 (p=0.017)*	−0.017 (p=0.835)	0.031 (p=0.703)	−0.151 (p=0.064)
Cost	0.035 (p=0.671)	−0.406 (p<0.001)**	0.116 (p=0.157)	−0.325 (p<0.001)**	−0.375 (p<0.001)**
Convenience	0.275 (p=0.001)**	−0.212 (p=0.009)*	0.161 (p=0.048)*	−0.164 (p = 0.044)*	−0.018 (p=0.830)
Lack of Skill	0.242 (p=0.003)*	−0.219 (p=0.007)*	0.212 (p=0.009)*	−0.235 (p=0.004)*	−0.310 (p<0.001)**

Note: Positive correlations with fast-food frequency and fast-food increase indicate higher barrier agreement associated with greater fast-food consumption. Negative correlations with slow food frequency, slow food increase, and diet health indicate higher barrier agreement associated with less home cooking or lower self-rated diet health. *p <0.050. **p <0.001

Significant omnibus differences emerged for convenience and lack of skill across fast food frequency groups, with cost demonstrating the largest effect across slow food frequency groups ($\varepsilon^2 = .219$). Lack of time showed no significant

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differences across any frequency groups. Complete Kruskal-Wallis results are presented (Table 4).

Table 4: Kruskal-Wallis Test Results for Barrier Scores Across Dietary Behavior Frequency Groups (n=150)

Barriers	Grouping Variable	H	df	p-value	ε^2
Lack of Time	Fast Food Frequency	0.403	2	0.818	0.000
Cost	Fast Food Frequency	0.911	2	0.634	0.000
Convenience	Fast Food Frequency	12.726	2	0.002**	0.073
Lack of Skill	Fast Food Frequency	8.767	2	0.013*	0.046
Lack of Time	Slow Food Frequency	5.669	3	0.129	0.018
Cost	Slow Food Frequency	35.013	3	<0.001**	0.219
Convenience	Slow Food Frequency	9.351	3	0.025*	0.044
Lack of Skill	Slow Food Frequency	8.053	3	0.045*	0.035

Note. ε^2 = epsilon-squared effect size (small ≈ .01, medium ≈ .06, large ≈ .14). *p <0.050. **p<0.001

Post hoc pairwise comparisons clarified the pattern of group differences. For fast food frequency, respondents reporting agreement with convenience as a barrier showed significantly higher scores in the highest fast food consumption groups compared with the lowest, and a similar pattern was observed for lack of skill. For slow food frequency, cost showed the largest and most consistent pairwise differences, with respondents in the lowest home-cooking category reporting markedly higher cost-barrier scores than those cooking most frequently (Table 5).

Table 5: Dunn's Post Hoc Pairwise Comparisons with Bonferroni Correction

Barriers	Grouping Variable	Comparison	M (group 1 → Group 2)	p (adj.)
Convenience	Fast Food	0–1 to 2–3	2.78 → 3.35	0.004**
Convenience	Fast Food	0–1 to 4–5	2.78 → 3.58	0.045*
Convenience	Fast Food	2–3 to 4–5	3.35 → 3.58	1.000
Lack of Skill	Fast Food	0–1 to 2–3	2.47 → 2.96	0.131
Lack of Skill	Fast Food	0–1 to 4–5	2.47 → 3.17	0.021*
Lack of Skill	Fast Food	2–3 to 4–5	2.96 → 3.17	0.831
Cost	Slow Food	2–3 to 4–5	3.52 → 2.53	<0.001**
Cost	Slow Food	2–3 to 6–7	3.52 → 2.46	<0.001**
Cost	Slow Food	4–5 to 6–7	2.53 → 2.46	1.000
Convenience	Slow Food	4–5 to 6–7	3.32 → 2.46	0.037*
Convenience	Slow Food	2–3 to 6–7	3.36 → 2.46	0.060
Lack of Skill	Slow Food	2–3 to 6–7	3.09 → 2.31	0.060
Lack of Skill	Slow Food	4–5 to 6–7	2.83 → 2.31	0.102

Note. Bonferroni-adjusted p-values. The 0–1 slow food frequency category (n = 1) was omitted from slow food comparisons due to statistical unreliability. M = mean barrier agreement score on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). p <0.050. p <0.001

DISCUSSION

This analysis was conducted to evaluate which of the four barriers (time, cost, convenience, and cooking skills) most often reported by individuals was most predictive of actual dietary behavior in a sample of 150 individuals. Two trends emerged. The cost of fresh ingredients had the broadest links to outcomes and was correlated with reduced home cooking, a decrease in home cooking over the past year, and decreased self-rated diet health, and also had the largest effect size in the Kruskal-Wallis comparisons. Notably, lack of cooking skill showed a strong negative correlation with self-rated diet health ($\rho = -0.310$, $p<0.001$), suggesting that individuals with lower cooking confidence not only consume more fast food but also perceive their overall diet quality as poorer. This finding aligns with previous research linking cooking self-efficacy to better dietary outcomes [11, 12] and underscores the potential value of interventions aimed at building cooking confidence as a means of improving diet quality. Convenience and cooking skills were the factors associated only with fast food consumption [20]. The present findings extend this literature by demonstrating that perceived cost was consistently associated with lower home cooking frequency, perceived decline in home cooking over time, and lower self-rated diet quality. These results are consistent with the interpretation that cost may act as a structural constraint on home meal preparation, though causal conclusions cannot be drawn from this cross-sectional design. Similarly, the correlations involving convenience and lack of skill, while statistically significant, ranged from small to moderate (ρ = 0.161 to 0.275). The practical significance of these associations should be interpreted cautiously, as they explain only 3% to 8% of the variance in dietary behaviors. Nevertheless, even small effect sizes can be meaningful at the population level, particularly if interventions targeting these barriers are low-cost and scalable. The relatively weak associations observed for lack of time contrast with studies that identify time as the most frequently reported barrier to healthful eating [3, 4]. One possible explanation is that subjective time pressure may not directly correspond to objective time constraints [3]. Alternatively, time pressure may not have varied sufficiently across dietary frequency groups in this sample to detect group differences. Both interpretations are consistent with the cross-national findings of Pinho and colleagues [16], who reported that the relative importance of a barrier is not necessarily reflected in its endorsement frequency. The results from this study would imply that time-management messages would be a less viable target of dietary interventions than affordability and cooking confidence, for practical purposes. The two most apparent mechanisms that would be related to dietary behavior in this sample would be reducing the cost to fresh produce and improving basic food preparation

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skills. The online convenience sampling strategy may have introduced selection bias, as participants who volunteer for web-based surveys may differ systematically from the general population with respect to dietary behaviors and barrier perceptions.

This study has several limitations that warrant consideration. The convenience sampling strategy may have introduced selection bias, limiting generalizability. The absence of sociodemographic data (age, sex, income, education) precluded adjustment for potential confounding. The cross-sectional design prevents causal inference, and the use of single-item barrier measures precludes reliability assessment. Multiple statistical tests were performed without correction for multiple comparisons, except for Dunn's post hoc tests, resulting in inconsistent Type I error control. Additionally, the post hoc power analysis is not appropriate for justifying sample size, and one analysis included a group with only one participant. Despite these constraints, the findings offer meaningful preliminary evidence regarding barriers to healthy eating.

CONCLUSIONS

Perceived cost of fresh ingredients emerged as the strongest and most consistent barrier, closely associated with reduced home cooking frequency and poorer self-rated diet quality. Convenience of fast food and lack of cooking skills were primarily linked to higher fast-food consumption, whereas perceived time constraints showed only weak associations. These findings suggest that public health interventions may achieve greater impact by addressing food affordability and building cooking confidence, rather than focusing on time-management strategies. Given the cross-sectional design, future longitudinal research is needed to confirm these associations and explore causal pathways.

Author's Contribution

Conceptualization: LS
Methodology: LS
Formal analysis: LS
Writing and Drafting: LS
Review and Editing: LS

The author approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

The author declare no conflict of interest.

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