

FROM PSYCHOLOGICAL DISTRESS TO FOOD CHOICE: AN EXPLANATORY SEQUENTIAL MIXED-METHODS STUDY OF ANXIETY SENSITIVITY, EMOTIONAL EATING, AND ULTRA-PROCESSED FOOD CONSUMPTION AMONG UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

Background: Undergraduate medical education carries heavy academic, examination, and clinical demands that can shape both psychological well-being and dietary behaviour. Earlier quantitative work has linked anxiety sensitivity, emotional eating, and ultra-processed food (UPF) consumption, but statistical associations alone say little about why students with similar psychological profiles end up eating so differently. **Objective:** To explain the psychological, behavioural, social, and environmental pathways underlying emotional eating and UPF consumption among undergraduate medical students by integrating quantitative behavioural profiles with qualitative accounts of lived experience. **Materials and Methods:** This explanatory sequential mixed-methods study (quantitative phase → connecting phase → qualitative phase → integration) surveyed 142 undergraduate medical students on anxiety sensitivity, emotional eating, and UPF consumption. Findings from this phase guided purposive selection of 36 participants, representing five contrasting behavioural profiles, for semi-structured interviews. Qualitative data were analysed thematically, and the two datasets were integrated through a joint display to identify points of confirmation, expansion, and discordance and to generate meta-inferences. **Results:** Anxiety sensitivity correlated positively with emotional eating ($r = 0.512$, $p < 0.001$) and with UPF consumption ($r = 0.387$, $p < 0.001$); emotional eating correlated with UPF consumption ($r = 0.462$, $p < 0.001$). Emotional eating ($\beta = 0.338$) and anxiety sensitivity ($\beta = 0.214$) together explained 24.4% of the variance in UPF consumption ($R^2 = 0.244$, $p < 0.001$). Thematic analysis generated six themes: academic stress and emotional states as triggers for eating; emotional eating as short-term emotion regulation; the food environment as a determinant of food choice; social and sensory influences on UPF consumption; protective coping and contextual factors; and a knowledge-practice gap. Students with high anxiety and high UPF consumption described food as a readily accessible response to academic stress; those with high anxiety but low UPF consumption instead described exercise, family support, planning, and self-regulation; and those with low anxiety but high UPF consumption emphasised taste, convenience, availability, and peer influence. **Conclusions:** Psychological vulnerability is associated with, but does not deterministically produce, UPF consumption. Emotional eating is one important pathway through which psychological distress can influence eating, while contextual and protective factors shape how that vulnerability is ultimately expressed in food choice. Integrating both methods explained behavioural heterogeneity that the quantitative associations alone could not.

INTRODUCTION

Medical school runs on pressure: dense academic schedules, high-stakes examinations, clinical responsibilities, and a lifestyle that leaves little room for anything else. These conditions are consistently associated with elevated psychological distress and with changes in health-related behaviour, including diet.^[1] An explanatory sequential design suits this kind of question particularly well, since it allows a quantitative association to be established first and then examined more closely through the accounts of the people living it.^[2] Systematic reviews report a high prevalence of depression, anxiety, and related distress among medical students internationally.^[3,4] Anxiety sensitivity — the tendency to interpret anxiety-related bodily sensations as threatening — has been linked to maladaptive coping strategies, including disordered and emotional eating.^[5,6] Emotional eating, in turn, describes eating driven by emotional state rather than physiological hunger, and is typically directed toward highly palatable foods.^[7] Ultra-processed foods (UPFs) — industrially formulated products, classified under the NOVA system, that are typically high in additives, sugar, fat, and salt — are cheap, convenient, and easy to like.^[8] University environments often push UPF intake higher simply through time pressure and what happens to be available nearby.^[9,10] Bringing quantitative and qualitative findings together in a genuinely integrated way, rather than reporting them side by side, is what allows a study to generate credible metainferences about behaviour this multifactorial.^[11] Anxiety sensitivity is most commonly measured with the Anxiety Sensitivity Index-3,^[12] emotional eating with the Emotional Eater Questionnaire,^[13] and qualitative interview data of this kind are typically analysed thematically.^[14] Current models of eating behaviour describe several distinct pathways through which emotion shapes food choice.^[15]

An earlier quantitative analysis of this same sample found significant positive associations between anxiety sensitivity, emotional eating, and UPF consumption.¹ That finding establishes a statistical pattern, but it cannot explain why students with comparable psychological profiles go on to eat so differently, nor whether emotional eating necessarily involves UPFs at all. The present study extends that earlier work using an explanatory sequential design, integrating the quantitative behavioural profiles with qualitative interview data to explain the pathway from psychological vulnerability to food choice among undergraduate medical students.

2. Study Objectives

Primary objective: To explain the factors underlying emotional eating and UPF consumption by integrating quantitative and qualitative findings.

Secondary objectives

1. Assess anxiety sensitivity, emotional eating, and UPF consumption.

2. Determine the associations between them.
3. Explore the psychological, academic, social, and environmental influences on eating behaviour.
4. Identify protective factors across contrasting behavioural profiles.
5. Develop integrated mixed-methods metainferences.

MATERIALS AND METHODS

3.1 Study Design

This study used an explanatory sequential mixed-methods design — a quantitative phase, followed by a connecting phase, a qualitative phase, and integration.² The quantitative results identified contrasting behavioural profiles, which then guided purposive sampling for the qualitative interviews. The two datasets were brought together through a joint display and used to generate metainferences.^[11]



Figure 1. Overall mixed-methods study design

3.2 Quantitative Phase

The quantitative phase involved 142 undergraduate medical students (90 female, 63.4%; mean age 20.8 ± 1.4 years) at a tertiary teaching institution in Guntur, India.¹ Anxiety sensitivity was measured with the Anxiety Sensitivity Index-3,¹² emotional eating with the Emotional Eater Questionnaire,¹³ and UPF consumption with a semi-quantitative food-frequency questionnaire built on the NOVA

classification.⁸ High UPF consumption was defined as intake of eight or more times per week. Data were

analysed using Pearson correlation and multiple linear regression.

Table 1: Quantitative Participant Characteristics

Characteristic	Finding
Total participants	142
Female	90 (63.4%)
Mean age	20.8 ± 1.4 years
Setting	Tertiary teaching institution, Guntur, India

Table 2: Measurement of Study Variables

Variable	Instrument / Method	Purpose
Anxiety sensitivity	ASI-3	Quantify threat appraisal of anxiety-related bodily sensations
Emotional eating	EEQ	Quantify tendency to eat in response to emotional state
UPF consumption	Semi-quantitative FFQ + NOVA classification	Quantify weekly frequency of ultra-processed food intake

3.3 Connecting and Qualitative Phases

Thirty-six participants were purposively selected to represent five contrasting profiles: high anxiety with high UPF intake, high anxiety with low UPF intake, low anxiety with high UPF intake, high emotional eating with low UPF intake, and a low-risk group. Semi-structured interviews explored academic stress, emotional triggers, features of the food environment, peer influence, protective strategies, and the gap between nutritional knowledge and actual practice. Data were analysed thematically,¹⁴ and trustworthiness was supported through an audit trail, peer debriefing, negative-case analysis, and researcher reflexivity.

3.4 Ethics

Ethical approval was obtained from the Institutional Ethics Committee (Approval No.

IEC/KMCH/2023/GR7). Written informed consent was obtained from all participants.

RESULTS

Quantitative analysis confirmed the expected associations: anxiety sensitivity correlated with emotional eating ($r = 0.512$, $p < 0.001$) and with UPF consumption ($r = 0.387$, $p < 0.001$), and emotional eating correlated with UPF consumption ($r = 0.462$, $p < 0.001$). In the regression model, emotional eating ($\beta = 0.338$) and anxiety sensitivity ($\beta = 0.214$) together explained 24.4% of the variance in UPF consumption ($R^2 = 0.244$, $p < 0.001$).

Table 3: Quantitative Associations Between Anxiety Sensitivity, Emotional Eating and UPF Consumption

Relationship	r	p-value
Anxiety sensitivity ↔ Emotional eating	0.512	< 0.001
Anxiety sensitivity ↔ UPF consumption	0.387	< 0.001
Emotional eating ↔ UPF consumption	0.462	< 0.001

Thematic analysis of the interviews produced six themes: academic stress and emotional states as triggers for eating; emotional eating as a short-term way of regulating emotion; the food environment as a determinant of choice; social and sensory

influences on UPF consumption; protective coping and contextual resources; and a knowledge–practice gap, in which nutritional knowledge did not reliably translate into eating behaviour.

Table 4: Qualitative Themes and Explanatory Meaning

Theme	Core finding
1. Academic stress and emotional states	Stress and academic pressure triggered eating
2. Emotional eating as emotion regulation	Food provided short-term comfort or relief
3. Food environment	Convenience and availability shaped choices
4. Social and sensory influences	Taste, cravings, and peers influenced UPF intake
5. Protective coping	Exercise, family support, and planning reduced reliance on UPFs
6. Knowledge–practice gap	Knowledge did not always translate into healthy behaviour

Comparing across profiles sharpened this picture further. Students with high anxiety and high UPF consumption described food as an immediate response to stress. Those with high anxiety but low UPF consumption instead emphasised exercise,

family support, and planning. Students with low anxiety but high UPF consumption pointed mainly to taste, convenience, and peer influence rather than to emotional state at all.

Table 5: Cross-Profile Qualitative Comparison

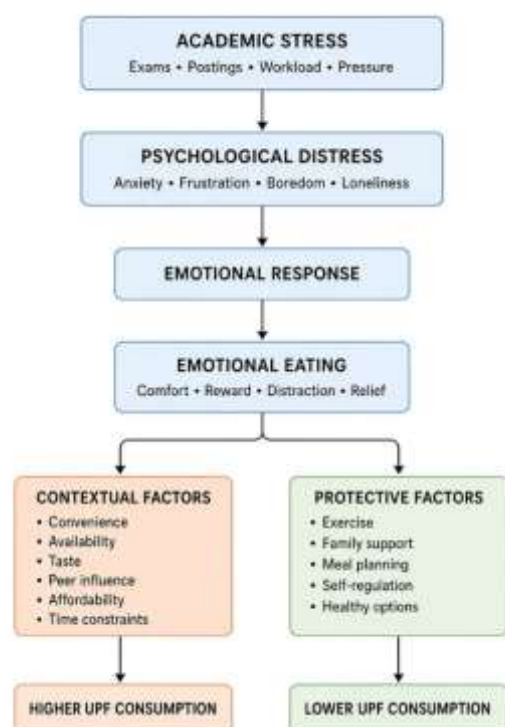
Theme	High anxiety + high UPF	High anxiety + low UPF	Low anxiety + high UPF
Academic stress	Prominent	Present	Less prominent
Emotional coping	Prominent	Controlled / alternative coping	Limited
Convenience	Prominent	Less prominent	Prominent
Taste / craving	Present	Present	Prominent
Peer influence	Present	Limited	Prominent
Exercise / planning	Limited	Prominent	Limited
Family support	Limited	Prominent	Variable

Table 6: Joint Display Integrating Quantitative and Qualitative Findings

Quantitative finding	Qualitative finding	Relationship	Integrated insight
Anxiety sensitivity ↔ emotional eating, $r = 0.512$	Students described eating for comfort during stress	Confirmed	Emotional eating may represent a behavioural response to psychological distress
Emotional eating ↔ UPF, $r = 0.462$	Convenience and palatability influenced food choices	Expanded	Emotional eating operates within a food environment
Anxiety sensitivity ↔ UPF, $r = 0.387$	Academic stress was linked with reliance on convenient foods	Expanded	Psychological and contextual factors interact
High anxiety + high UPF	Stress-related eating was prominent	Confirmed	Psychological vulnerability and UPF consumption converged
High anxiety + low UPF	Exercise, family support, and planning were described	Discordant → explained	Protective coping may interrupt the pathway
Low anxiety + high UPF	Taste, convenience, and peer influence predominated	Discordant → explained	UPF consumption can occur independently of high anxiety

Table 7: Relational Metainference Matrix

Integrated finding	Type	Meaning
Anxiety sensitivity associated with emotional eating + participants describe eating for comfort	Confirmed	Qualitative data support the quantitative finding
Emotional eating associated with UPF + convenience/taste influence food choice	Expanded	Qualitative data add context
High anxiety + low UPF	Discordant	Qualitative data explain the divergence through protective coping
Low anxiety + high UPF	Discordant	Qualitative data identify an alternative environmental/social pathway
High emotional eating + low UPF	Expanded	Emotional eating does not necessarily involve UPFs

**Figure 2: Integrated explanatory model generated from quantitative and qualitative findings**

Quantitative findings established associations among anxiety sensitivity, emotional eating, and UPF consumption. Qualitative findings identified the contextual and protective factors that may shape how psychological distress is expressed through dietary behaviour. The resulting model is an interpretive mixed-methods framework and does not imply causality.

Box 1. Global Metainference

GLOBAL METAINFERENCE

Psychological vulnerability is associated with unhealthy eating behaviour, but does not deterministically produce high UPF consumption. Emotional eating represents an important behavioural pathway, while the food environment and social context influence the foods selected. Conversely, protective coping strategies may interrupt this pathway. Thus, the quantitative data identify the association, whereas the qualitative data explain the heterogeneity and conditions underlying that association.

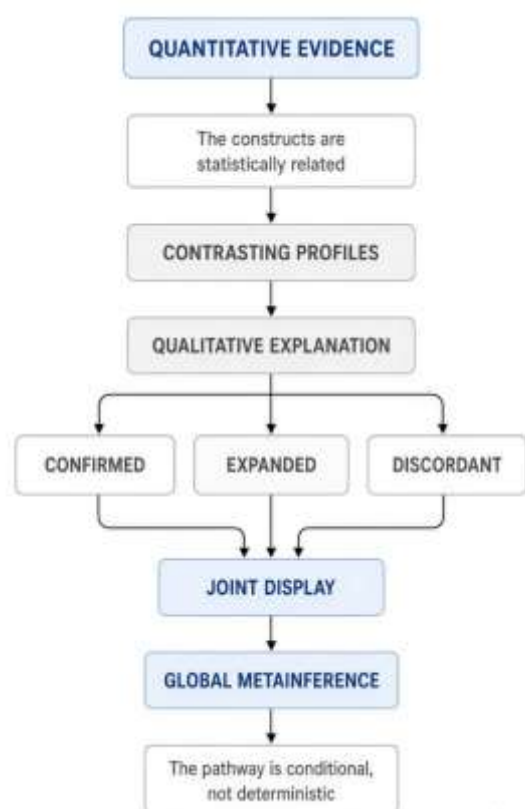


Figure 3: From quantitative association to mixed-methods metainference

DISCUSSION

This explanatory sequential mixed-methods study indicates that the relationship between anxiety sensitivity, emotional eating, and ultra-processed food (UPF) consumption is conditional rather than deterministic. The quantitative phase identified significant positive associations among all three variables, with emotional eating and anxiety sensitivity together explaining 24.4% of the variance in UPF consumption. These results are consistent with prior evidence linking anxiety-related vulnerability and emotional eating to less healthy dietary patterns.^[1,5,6,9,10] The qualitative phase, however, was essential for understanding why these associations did not translate uniformly into high UPF consumption across all students.

The interviews confirmed the quantitative association between psychological vulnerability and eating behaviour: students under academic stress, anxiety, or negative emotional states frequently described eating as an immediate response to distress, using food as a readily available source of temporary comfort or distraction. This supports the view of emotional eating as a short-term emotion-regulation strategy.^[7,15] The link between anxiety sensitivity and emotional eating was therefore not merely statistical — participants' own accounts offered a behavioural explanation for how psychological distress can translate into eating.

The qualitative data also expanded the quantitative findings by showing that emotional eating does not

operate in isolation. Students repeatedly pointed to convenience, availability, taste, peer influence, time pressure, and the surrounding food environment as determinants of what they actually ate. This helps explain why emotional eating was associated with UPF consumption without fully accounting for it: psychological vulnerability appears to increase susceptibility to eating in response to emotion, while the immediate environment determines whether that eating results in UPF consumption specifically. This is consistent with existing evidence on how food availability and environmental context shape dietary behaviour.^[9,10]

The discordant profiles were particularly informative and would have been difficult to interpret from the quantitative data alone. Students with high anxiety but low UPF consumption described alternative coping strategies — exercise, family support, planning, self-regulation. Students with low anxiety but high UPF consumption instead emphasised taste, convenience, availability, and peer influence. Taken together, these findings suggest that psychological distress is neither necessary nor sufficient for high UPF consumption: protective resources can interrupt the pathway from vulnerability to unhealthy eating, while environmental and social influences can drive UPF consumption even where psychological vulnerability is low. This behavioural heterogeneity is one of the principal contributions of the mixed-methods design.^[2,11]

These findings carry practical implications for medical-student health promotion. Interventions built solely around nutritional knowledge are unlikely to be sufficient when eating behaviour is driven by stress, emotion regulation, time pressure, and the accessibility of convenient food. A more effective approach would combine psychological coping and stress-management support with changes to the institutional food environment — for instance, wider availability of healthier convenient options — alongside efforts to strengthen protective factors such as physical activity, planning, and family or peer support, so that students have alternatives to food as a primary coping mechanism.

Several limitations should be kept in mind when interpreting these findings. The cross-sectional quantitative design precludes causal inference about the direction of the relationships among anxiety sensitivity, emotional eating, and UPF consumption. Dietary intake was self-reported and therefore subject to recall and reporting bias. The study was conducted at a single institution, which limits generalisability to medical students elsewhere. The qualitative sample was also nested within the quantitative sample and purposively selected to represent contrasting behavioural profiles, so the qualitative findings offer explanatory depth rather than population-level estimates. Even so, integrating the two datasets strengthens the overall interpretation by showing not just whether these variables were associated, but how and under what circumstances that association held.

Overall, the findings point to a conditional pathway from psychological vulnerability to food choice: anxiety sensitivity appears to increase susceptibility to emotional eating, but whether that emotional eating becomes high UPF consumption depends on environmental, social, and protective factors. The quantitative phase established the association; the qualitative phase explained the behavioural heterogeneity behind it. Together, they give a fuller picture of dietary behaviour in medical students than either method could have produced alone.

CONCLUSION

Psychological vulnerability creates susceptibility to altered eating behaviour, and emotional eating is a key pathway through which that susceptibility is expressed. Whether it ultimately translates into high UPF consumption, however, depends on contextual and protective factors. Effective interventions for medical students should therefore combine psychological support with changes to the surrounding food environment, rather than relying on nutrition education alone.

REFERENCES

1. Assessment of Anxiety Sensitivity, Emotional Eating Behaviour, and Processed Food Consumption Among Undergraduate Medical Students. *Int J Environ Sci*. 2025;11(24s):1454–1460.
2. Creswell JW, Plano Clark VL. *Designing and Conducting Mixed Methods Research*. 3rd ed. Thousand Oaks, CA: Sage; 2018.
3. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA*. 2016;316(21):2214–36.
4. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006;81(4):354–73.
5. Anestis MD, Holm-Denoma JM, Gordon KH, Joiner TE. The role of anxiety sensitivity in eating pathology. *Cogn Ther Res*. 2008;32:370–85.
6. Hearon BA, Quatromoni PA, Mascoop JL, Otto MW. The role of anxiety sensitivity in daily physical activity and food intake. *J Anxiety Disord*. 2014;28(3):321–9.
7. van Strien T. Causes of emotional eating and matched treatment of obesity. *Curr Diab Rep*. 2018;18(6):35.
8. Monteiro CA, Cannon G, Levy RB, Moubarac JC, Louzada ML, Rauber F, et al. Ultra-processed foods: what they are and how to identify them. *Public Health Nutr*. 2019;22(5):936–41.
9. Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, et al. Ultra-processed foods and the nutritional dietary profile in Brazil. *Rev Saude Publica*. 2015;49:38.
10. Arvilla-Salas L, Vazquez-Reyes S, de Santiago AS, Ramirez-Hernandez LA, Garza-Veloz I, Mollinedo-Montañón FE, et al. Dietary intake patterns, substance use and their association with anxiety and depression symptoms in medical students in Mexico: a cross-sectional study. *Nutrients*. 2026;18(1):104.
11. Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs—principles and practices. *Health Serv Res*. 2013;48(6 Pt 2):2134–56.
12. Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, et al. Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3. *Psychol Assess*. 2007;19(2):176–88.
13. Garaulet M, Canteras M, Morales E, López-Guimerà G, Sánchez-Carracedo D, Corbalán-Tutau MD. Validation of a questionnaire on emotional eating for use in cases of obesity: the Emotional Eater Questionnaire (EEQ). *Nutr Hosp*. 2012;27(2):645–51.
14. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101.
15. Macht M. How emotions affect eating: a five-way model. *Appetite*. 2008;50(1):1–11.