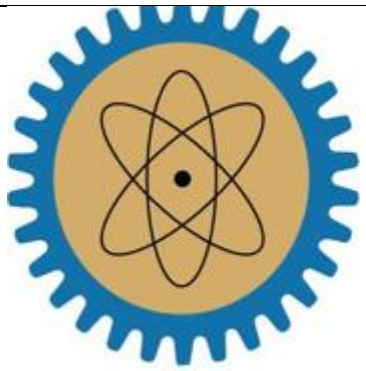

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DEPARTMENT OF BIOLOGY

DIETARY PRACTICES AND NUTRITIONAL STATUS OF UNDERGRADUATE STUDENTS AT BUSITEMA UNIVERSITY, NAGONGERA CAMPUS

BY

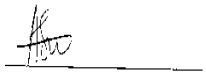
ASUMANI SSEBUNYA
BU/UP/2023/1851

A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF BIOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE AND EDUCATION OF BUSITEMA UNIVERSITY

JULY, 2026

DECLARATION

I, ASUMANI SSEBUNYA (BU/UP/2023/1851), declare that this research report entitled "Dietary Practices and Nutritional Status of Undergraduate Students at Busitema University, Nagongera Campus" is my original work and has not been submitted for any other degree award to any other university before.

Student Signature: 

Date: 17th/07/2026

APPROVAL

The undersigned certify that this research report titled "Dietary Practices and Nutritional Status of Undergraduate Students at Busitema University, Nagongera Campus" has been developed under their supervision as the candidate's University Supervisor and is now approved for submission.

MR. RICHARD KIFUKO

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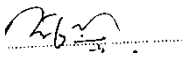
Signature: 

Date: 08/09/2026

DEDICATION

This research report is dedicated to my beloved mother, Naisanga Fatima, whose sacrifices, prayers, and unwavering love have been the foundation of my strength throughout this academic journey. Your encouragement remains my greatest motivation. To my dear sisters, Nakitto Rahma, Nabugenyi Haddija, Nalukenge Marian, Nagayi Sumaya, and Nambirige Zirifah, for your constant support, patience, and belief in me. You are my pillars of strength. To my father, Kibirige Muhammad, for your guidance and for instilling in me the value of education and

perseverance. To my loving partner, Nangobi Mirembe Phoebe, for your endless encouragement, understanding, and steadfast presence during the most challenging moments of this research. Your belief in me kept me going. To my sponsors, FAWEUG and Foeberg, for your generous financial support, which made my education and this research possible. Your investment in my future will never be forgotten. May God abundantly bless you all.

ACKNOWLEDGEMENTS

We thank the Almighty God for granting us good health, strength, wisdom and guidance throughout the preparation and completion of this research study.

We sincerely express our gratitude to Busitema University, Faculty of Science and Education, Department of Biology, for providing us with the academic environment and support that enabled us to undertake this study.

We are deeply grateful to our supervisor, Mr. Richard Kifuko, for his valuable guidance, constructive comments, patience and professional support throughout the research process. His advice greatly contributed to the successful completion of this work.

We also appreciate the administration, lecturers and staff of Busitema University, Nagongera Campus, for their cooperation and assistance during the study. We are particularly grateful to the students who participated in the study and willingly provided the information and measurements required for this research.

We extend our sincere appreciation to our families, friends and fellow students for their encouragement, moral support and assistance throughout the research period.

Finally, we thank everyone who contributed directly or indirectly to the successful completion of this research. May God bless you all abundantly.

Contents

LIST OF ABBREVIATIONS

BMI — Body Mass Index

BSCE — Bachelor of Science in Education

BIT — Bachelor of Information Technology

BELS — Bachelor of Education in English and Literature

BSS — Bachelor of Science in Statistics

DBM — Double Burden of Malnutrition

df — Degrees of freedom

FFQ — Food Frequency Questionnaire

NCD — Non-Communicable Disease

p — Probability value

SD — Standard Deviation

UGX — Ugandan Shilling

WHO — World Health Organization

χ^2 — Pearson chi-square test statistic

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ABSTRACT

Background: University students are vulnerable to dietary practices that may contribute to both undernutrition and over nutrition. However, localized evidence on dietary practices and nutritional status among students at Busitema University, Nagongera Campus, is limited.

Objective: This study assessed dietary practices and nutritional status among undergraduate students at Busitema University, Nagongera Campus, with specific focus on food group consumption frequency, meal skipping, snacking, number of daily meals, BMI category, and factors influencing food choices.

Methods: A descriptive cross-sectional study was conducted among 164 third-year undergraduate students. Participants were selected using stratified simple random sampling. Weight and height were measured and BMI was classified using WHO adult cut-offs. Dietary practices were assessed using a pre-tested Food Frequency Questionnaire. Pearson chi-square tests at $\alpha = 0.05$ were used to assess associations between dietary variables and BMI category.

Results: Of the 164 participants, 54.3% had normal BMI, 28.0% were overweight, 10.4% were obese and 7.3% were underweight. Snacking frequency was significantly associated with BMI category ($\chi^2 = 18.672$, df = 9, $p = 0.005$), as was meal skipping frequency ($\chi^2 = 12.452$, df = 9, $p = 0.043$). None of the eight food group consumption frequencies or number of daily meals was significantly associated with BMI category. Cost and affordability, campus food environment, taste, hunger and academic stress were important influences on food choices.

Conclusion: The study demonstrates a double burden of malnutrition among the students. Snacking and meal skipping were associated with BMI category, while the food-group frequency measures and number of daily meals were not. Campus-level interventions should improve access to affordable nutritious foods and promote healthier meal and snacking practices.

Keywords: dietary practices, nutritional status, BMI, food frequency, meal skipping, snacking, university students, Uganda

CHAPTER ONE: INTRODUCTION

1.1 Background

Nutritional complications, poor health, and rising morbidity from diet-related diseases represent persistent global public health challenges (Oti & Eshun, 2020). Poor dietary practices have been consistently identified as a major modifiable risk factor for these outcomes. Globally, non-communicable diseases (NCDs) now constitute approximately 43% of the worldwide disease burden, and their toll is disproportionately concentrated in low and middle income countries (LMICs), where over 80% of NCD-related deaths occur(Van Den Berg et al., 2012). These disorders such as obesity and diseases such as cardiovascular disease, hypertension, type 2 diabetes, and certain cancers are projected to surpass infectious diseases as the leading cause of morbidity and mortality in LMICs by 2030 (Oti & Eshun, 2020).

Uganda and many developing countries are simultaneously experiencing a dual burden of malnutrition (DBM), characterized by persisting undernutrition alongside a rapid rise in over nutrition and obesity (Oti & Eshun, 2020). This shift is principally driven by the nutrition transition: the progressive replacement of traditional, plant-rich diets with Westernized eating patterns high in refined carbohydrates, saturated fats, and ultra-processed products (WHO, 2020).

University students are a particularly critical target population for nutritional intervention. These young adults, typically aged 18 to 26 years, are in a formative life stage during which dietary behaviors become fixed and strongly influence long-term chronic disease risk (Gan et al., 2011). Transitioning into university life involves sharp personal autonomy, departure from family food systems, and exposure to significant academic and social pressures (Van Den Berg et al., 2012). The resulting constraints on time, finances, and food preparation skills frequently lead to reliance on convenient, energy-dense, and nutrient-poor foods (Omage & Omuemu, 2018b).

Cross-sectional evidence consistently documents poor dietary behaviors among university undergraduates worldwide. Meal skipping is highly prevalent, with breakfast most frequently omitted (Kadir et al., 2024). In a major Nigerian study, 56% of undergraduates skipped breakfast and 76% consumed inter-meal snacks (Omage & Omuemu, 2018b). Fruit and vegetable intake is commonly inadequate (Oti & Eshun, 2020), while consumption of sugary drinks, fast foods,

cakes, and deep-fried items is elevated (Migacz-Bodziony et al., 2025). These patterns collectively elevate the risk of both under- and over-nutrition, creating conditions conducive to NCD development (Ismail et al., 2022).

BMI is the most widely used indicator of nutritional status in large-scale cross-sectional studies due to its practicality and established validity (Omage & Omuemu, 2018b). Overweight and obesity rates among university students are rising globally: 38.4% in a Polish study (Migacz-Bodziony et al., 2025), 32.5% in Northern Kerala, and India (Kaithery et al., 2025). Undernutrition simultaneously persists, with 19.1% underweight prevalence among Malaysian students(Gan et al., 2011), illustrating the double burden of malnutrition characteristic of nutrition-transition settings.

1.2 Problem Statement

University students are exposed to dietary challenges such as meal skipping, frequent snacking, limited dietary diversity and dependence on affordable convenience foods. These practices may contribute to both undernutrition and overweight or obesity. Dietary behaviour is strongly influenced by the local food environment, affordability, culture and academic demands; therefore, evidence from other countries cannot automatically be applied to students at Busitema University, Nagongera Campus.

There is limited contemporary evidence describing dietary practices and nutritional status among students at Busitema University, Nagongera Campus. Without localized evidence, the magnitude of nutritional risk and the dietary practices associated with BMI cannot be adequately characterized, making it difficult to design appropriate campus nutrition interventions. The current study was therefore undertaken to assess dietary practices and nutritional status among undergraduate students at the campus and to generate evidence that can guide practical nutrition and health-promotion interventions.

1.3 Objectives

1.3.1 Main Objective

To assess the dietary practices and nutritional status of undergraduate students at Busitema University, Nagongera Campus.

1.3.2 Specific Objectives

1. To examine the association between food group consumption frequency and BMI category among undergraduate students at Busitema University, Nagongera Campus.
2. To determine the relationship between meal skipping frequency and BMI category among undergraduate students at Busitema University, Nagongera Campus.
3. To evaluate the association between snacking frequency and BMI category among undergraduate students at Busitema University, Nagongera Campus.
4. To investigate the association between the number of daily meals and BMI category among undergraduate students at Busitema University, Nagongera Campus.
5. To identify and describe the factors influencing food choices among undergraduate students at Busitema University, Nagongera Campus

1.4 Research Questions and Hypotheses

1. Is there a statistically significant association between food group consumption frequency and BMI category?

H_0 There is no association between food group consumption frequency and BMI category.

H_1 There is a significant association between food group consumption frequency and BMI category.

2. Is there a statistically significant association between meal skipping frequency and BMI category?

H_0 There is no association between meal skipping frequency and BMI category.

H_1 There is a significant association between meal skipping frequency and BMI category.

3. Is there a statistically significant association between snacking frequency and BMI category?

H_0 There is no association between snacking frequency and BMI category.

H_1 There is a significant association between snacking frequency and BMI category.

4. Is there a statistically significant association between the number of daily meals and BMI category?

H_0 There is no association between the number of daily meals and BMI category.

H_1 There is a significant association between the number of daily meals and BMI category.

1.5 Significance of the Study

This study generates localized, empirical evidence on the nutritional health status of students at Busitema University, Nagongera Campus, filling a critical contextual and geographic gap in the literature. Findings are designed to inform the university administration, health board, and academic board in designing evidence-based, campus-specific nutrition education programmes and health promotion strategies. Data may also support curriculum development, particularly the integration of practical nutrition literacy modules into health-related degree programmes. For students, the study raises awareness of how current dietary habits directly shape long-term health outcomes. Students in health-related fields are expected to model healthy behaviors in their communities. Regionally, this study contributes original data from the Ugandan university context, supporting the refinement of East African nutrition research frameworks.

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1.6 Justification

Young adulthood is a formative period during which dietary habits become entrenched and chronic disease trajectories are established (Omage & Omuemu, 2018a). The global and regional burden of NCDs, combined with the documented vulnerability of university students to poor dietary practices, makes this a critical window for primary prevention intervention (Kadir et al., 2024). Comparative evidence from West African settings confirms that poor dietary practices

and elevated abnormal BMI prevalence are widespread among African university students (Oti & Eshun, 2020). However, dietary behaviour is profoundly context-specific, shaped by local food culture, affordability, and campus food environments. Results from Ghana or Nigeria cannot be directly transposed to a Ugandan setting, necessitating local investigation (Omage & Omuemu, 2018b).

1.7 Limitations

The cross-sectional design captures associations at a single time point, excluding causal inference. Dietary frequency data rely on participant recall and may be influenced by social desirability, leading to over reporting of healthy behaviors and under reporting of unhealthy ones. BMI does not measure body composition, micronutrient status, or physical activity; the important confounders of the diet and BMI relationship. Findings are specific to third-year students at Nagongera Campus and may not generalize to other year groups, campuses, or institutions.

Portion sizes were not assessed in the FFQ, limiting the ability to quantify total energy intake from each food group. Physical activity levels were not measured, which is a major confounder of the diet and BMI relationship that may obscure or exaggerate associations. Social desirability bias may have influenced self-reported dietary data, with potential underreporting of unhealthy foods and over reporting of healthy foods. Biochemical markers of nutritional status (e.g., blood glucose, lipid profile, micronutrient levels) were not assessed. The study did not assess alcohol consumption, which can significantly contribute to total caloric intake and affect BMI.

1.8 Scope of Study

This study was confined to third-year undergraduates at Busitema University, Nagongera Campus, Tororo District, Eastern Uganda. BMI was used as the indicator of nutritional status and was examined in relation to the consumption frequency of eight food groups, meal skipping, snacking and number of daily meals. The study was conducted from February to April 2026. Descriptive statistics and Pearson chi-square tests were used for analysis.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews literature on dietary practices and nutritional status among university students. It covers nutritional status, food group consumption, meal skipping, snacking and meal frequency, and concludes with the research gap addressed by the study.

2.1 Nutritional Status of University Students

BMI is the most widely used proxy measure for nutritional status in cross-sectional research, reflecting the cumulative balance of dietary intake and energy expenditure (Omage & Omuemu, 2018a). University student populations exhibit a double burden of malnutrition manifested through concurrent undernutrition and over nutrition. This has been driven by complex socioeconomic, cultural, and behavioral determinants (Oti & Eshun, 2020). Kuwaiti college students showed overweight prevalence of 28.7% among males and 19.9% among females, with obesity at 23.8% and 12.1% respectively (Alkazemi, 2019a). Polish students demonstrated a combined overweight/obesity rate of 38.4% (Migacz-Bodziony et al., 2025), while Northern Kerala medical students showed 32.5% (Kaithery et al., 2025). Among female students at Makerere University in Uganda, Ainembabazi et al., (2025) reported that most participants had normal weight, while underweight, overweight and obesity were also present.

Undernutrition persists alongside over nutrition in many settings. Among Malaysian university students, 19.1% were underweight, with female students more affected (Gan et al., 2011), and 15.6% of Bangladeshi students fell below the healthy BMI threshold (Oti & Eshun, 2020). Uganda, characterized by rapid urbanization and a nutrition transition, is experiencing rising overweight prevalence alongside persistent undernutrition in rural and pre-urban populations (Uganda Bureau of Statistics, 2024).

2.2 Food Group Consumption Frequency and BMI

2.2.1 Sugary Drinks

Sugar-sweetened beverage (SSB) consumption is one of the most consistently documented dietary contributors to overweight and obesity in young adult populations. Frequent SSB intake was positively correlated with BMI among Yemeni students in Saudi Arabia (Sami et al., 2026),

and this relationship was corroborated by food frequency validation research in Bangladesh . Polish data showed that daily sugary drink consumers had significantly higher mean BMI than infrequent consumers (Migacz-Bodziony et al., 2025). Physiologically, SSBs contribute excess fructose, impair satiety signaling, and promote de novo lipogenesis, driving positive energy balance(WHO, 2020).

2.2.2 Fast Foods

Frequent fast-food consumption elevates total energy intake and is associated with higher BMI. Nigerian students consuming fast foods more than three times per week had higher overweight prevalence (Omage & Omuemu, 2018b), and Indian medical students consuming fast foods four or more times per week faced double the overweight risk (Kaithery et al., 2025). However, some studies show no independent association after physical activity adjustment (Alkazemi, 2019a). Processed foods encompassing a broader category encompassing most fast foods, have been independently linked to elevated mortality risk in prospective cohort data (Perez Arredondo & Bender, 2026).

2.2.3 Fruits

Fruit intake falls below recommended levels in most university student populations and is variably associated with BMI. Low fruit intake correlated with elevated BMI among South African nursing students(Van Den Berg et al., 2012), while higher fruit consumption was inversely related to BMI in Bangladesh (Oti & Eshun, 2020). Other cross-sectional studies found no direct fruit-BMI association, likely because insufficient variation between frequency groups limits statistical power (Omage & Omuemu, 2018b).

2.2.4 Vegetables

Vegetable consumption is low among university students globally. Polish students showed 76% consuming vegetables less than once daily, with low intake positively associated with BMI among males (Migacz-Bodziony et al., 2025). Ghanaian students with daily vegetable intake had lower overweight prevalence than occasional consumers (Oti & Eshun, 2020). When total energy intake is controlled, the independent association may attenuate (Oti & Eshun, 2020).

2.2.5 Legumes

Legumes are staple protein and fiber sources across East African diets. Regular legume consumption was associated with lower BMI in South India (Omage & Omuemu, 2018a), but

Nigerian university data found no significant BMI difference by legume frequency, likely due to near-universal consumption limiting statistical contrast (Omage & Omuemu, 2018a).

2.2.6 Animal Products

Higher animal product consumption particularly red meat and full-fat dairy in particular was associated with elevated BMI among Kuwaiti students (Alkazemi, 2019b), and Yemeni students consuming animal products five or more times weekly showed higher overweight rates (Ismail et al., 2026). Fish consumption has demonstrated inverse BMI associations in some populations, attributed to long-chain omega-3 fatty acids.

2.2.7 Roots and Tubers

Roots and tubers (cassava, sweet potato, Irish potato, yam) are staple carbohydrate sources in East Africa. Ghanaian research found no significant BMI association with high root consumption after physical activity adjustment (Oti & Eshun, 2020), and South Indian data showed comparable root consumption across all BMI groups (Omage & Omuemu, 2018a).

2.2.8 Cereals

Cereals are the primary energy source for most Ugandan university students. Near-universal cereal consumption in Nigerian studies eliminated BMI differences between frequency groups (Omage & Omuemu, 2018b). Bangladeshi research found refined cereal intake positively associated with BMI, while whole-grain intake was inversely associated (Oti & Eshun, 2020), highlighting processing as a key moderator.

2.3 Meal Skipping Frequency and BMI

Meal skipping that is particularly breakfast omission is prevalent among university students globally and linked to elevated BMI through compensatory hyperphagia, impaired glycemic regulation, and reduced overall dietary quality (Kadir et al., 2024). A multi-country COVID-19 era study found that 48.5% of undergraduates regularly skipped breakfast, with skippers having significantly higher mean BMI (Kadir et al., 2024). Northern Kerala medical students showed 42.3% frequent meal skipping associated with higher overweight prevalence (Kaithery et al., 2025), and Malaysian breakfast-skippers were more likely to be overweight or obese (Gan et al., 2011). Reverse causality could be overweight students skipping meals as a weight-loss strategy may attenuate cross-sectional associations (Omage & Omuemu, 2018a).

2.4 Snacking Frequency and BMI

Snacking is near-universal among university students, and its BMI impact depends primarily on snack energy density. Polish data showed students snacking more than three times per day had significantly elevated BMI (Migacz-Bodziony et al., 2025), while Kuwaiti research linked energy-dense snack consumption to overweight but found no significant association for fruit- and nut-based snacking (Alkazemi, 2019b). Among Nigerian undergraduates, 93% snacked between meals, with fried and high-sugar snack consumers showing higher overweight rates (Omage & Omuemu, 2018a). A Ghanaian study found snacking frequency alone was not significantly associated with BMI, emphasizing snack quality over quantity (Oti & Eshun, 2020).

2.5 Number of Daily Meals and BMI

Evidence on meal frequency and BMI is mixed. Malaysian students eating three or more meals daily had lower overweight prevalence(Gan et al., 2011), and Bangladeshi research found four or more small daily meals associated with lower BMI (Oti & Eshun, 2020). Conversely, Nigerian data found no significant between meal frequency and BMI association, potentially because fewer meals are offset by larger portions, neutralizing energy balance differences (Kadir et al., 2024).

2.6 Research Gap

Evidence from Uganda on dietary practices and BMI among university students remains limited. Recent Ugandan evidence has focused on specific student groups at other institutions, leaving a need for campus-specific evidence from Nagongera Campus.

Few studies have simultaneously examined food group consumption frequency, meal skipping, snacking and number of daily meals in relation to BMI among students in a Ugandan public university. The present study addresses this gap using a structured FFQ and anthropometric assessment.

Without campus-specific evidence, university health and administrative stakeholders have limited information for planning affordable healthy-food options, nutrition education and targeted health-promotion activities. The present study provides evidence to support these actions.

CHAPTER THREE: METHODOLOGY

3.1 Study Area

The location of Nagongera Campus within Tororo District, Eastern Uganda, is shown in Figure 3.1 (map of the study area). The map illustrates the campus's proximity to Tororo town and its position along the Tororo-Busolwe road, highlighting its location within the Lake Victoria Crescent Agro-ecological zone.

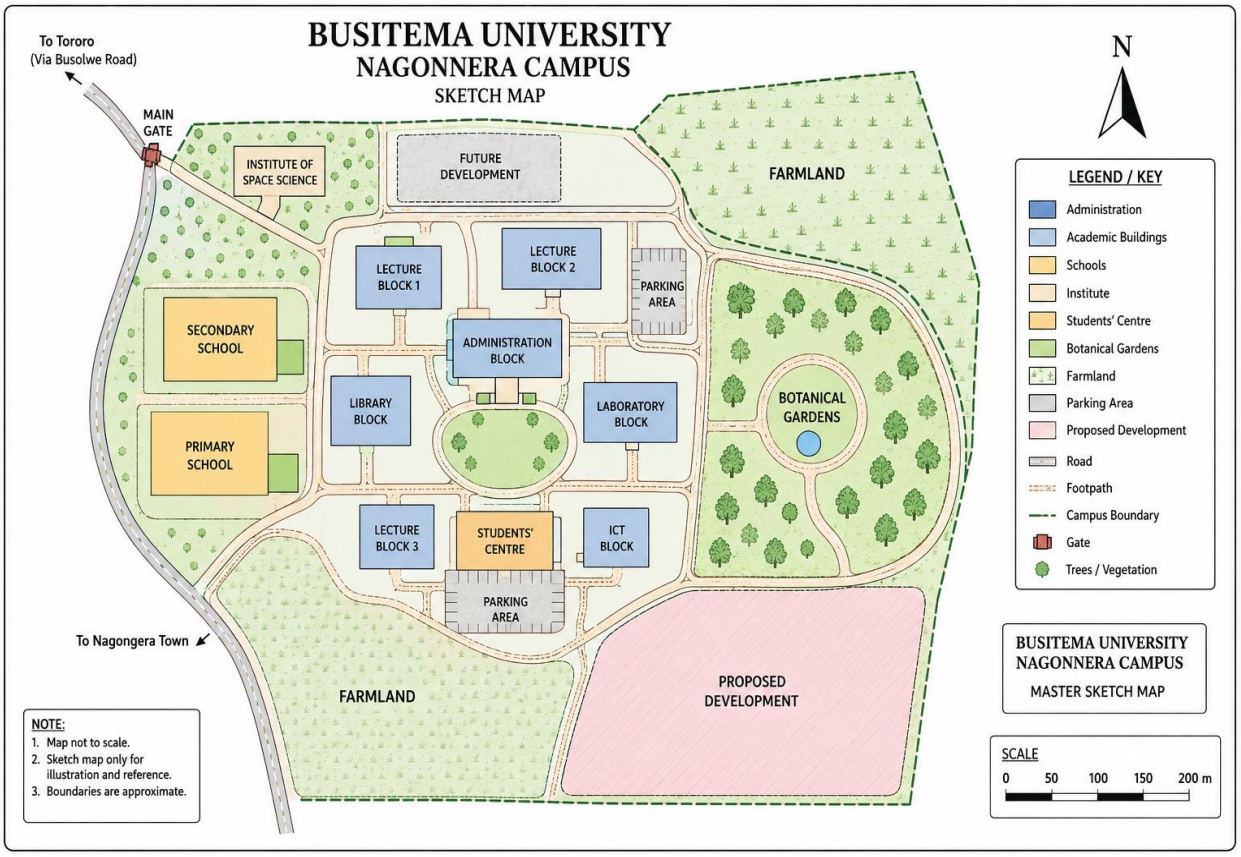

Figure 3.1: Map of the study area, Busitema University Nagongera Campus

The study was conducted at Busitema University, Nagongera Campus, located in Nagongera Town Council, West Budama Constituency, Tororo District, Eastern Uganda (0°46'12.0"N, 34°01'34.0"E). The campus lies approximately 17 km from Tororo town along the Tororo-Busolwe road and forms part of the broader Busitema University system, which was established

by statutory instrument in 2007 with a mandate to provide science and technology oriented higher education to the people of Uganda and the East African region. The location of the campus is shown in Figure 3.1.

Nagongera Campus is situated within the Lake Victoria Crescent Agro-ecological zone, an area characterized by bimodal rainfall, fertile soils, and relatively high agricultural productivity. Despite this agricultural abundance, pre-urban communities in Tororo District experience significant dietary transitions driven by urbanization, market integration, and changes in food culture(Uganda Bureau of Statistics, 2024). Local food markets supply a mix of traditional staples foods such as maize, cassava, beans, and green vegetables in addition to the processed food items.

The Faculty of Science and Education at Nagongera Campus hosts multiple undergraduate degree programmes across the sciences, education, library studies, information technology, and social sciences. During the 2025/2026 academic year, the campus enrolled several hundred undergraduate students across all year groups, with third year students constituting the target stratum for this study. The campus food environment is characterized by privately operated canteens on campus and food vendors in the markets. This directly shapes the dietary options available to students and constitutes a key contextual factor in interpreting the dietary findings of this study (Oti & Eshun, 2020).

3.2 Research Design

A descriptive cross-sectional study design was employed for this investigation. The design is widely recognized as the most practical and efficient approach for simultaneously examining the prevalence of dietary behaviors and nutritional outcomes across a defined population at a single point in time (Kadir et al., 2024). In this design, exposure variables (dietary practices) and the outcome of interest (BMI-based nutritional status) are measured concurrently in the same participants, enabling the quantification of associations without requiring longitudinal follow-up (Omage & Omuemu, 2018a).

Cross sectional designs are the standard approach in university-based nutrition research globally, having been employed in comparable studies across Nigeria (Omage & Omuemu, 2018a), Ghana (Oti & Eshun, 2020), Kuwait (Alkazemi, 2019b), Bangladesh (Oti & Eshun, 2020), Poland (Migacz-Bodziony et al., 2025), India (Kaithery et al., 2025), and Malaysia (Gan et al., 2011).

The design is particularly appropriate for a resource-constrained academic setting because it is cost-efficient, logistically feasible within a single academic semester, and does not expose participants to experimental interventions (Oti & Eshun, 2020). It enables the generation of prevalence data and the testing of hypothesized associations through inferential statistical methods.

The study adopted both descriptive and analytical dimensions. The descriptive component characterized the distribution of BMI categories and dietary practice frequencies within the sample. The analytical component tested for statistically significant associations between each dietary variable and BMI category using Pearson chi-square tests, consistent with the analytical framework employed in comparable university nutrition studies (Ismail et al., 2026). Data were collected during February and March 2026, a period selected to coincide with a stable academic phase midway through the first semester, when students' dietary routines are presumed to have settled into characteristic patterns rather than being disrupted by examination stress or semester transitions.

3.3 Study Population

The target population for this study comprised all third year undergraduate students enrolled at Busitema University, Nagongera Campus, during the February to March 2026 data collection period. This group was selected because university students represent a distinct population subgroup facing unique nutritional risks arising from the convergence of personal autonomy, financial limitations, academic pressure, and departure from family food provision systems (Van Den Berg et al., 2012). Research consistently identifies the university years as a critical window during which dietary habits crystallize and exert long-term influence on chronic disease trajectories (Kadir et al., 2024).

Both students residing at campus and those residing in private hostels outside campus were eligible for inclusion (Oti & Eshun, 2020). Students residing on campus tend to rely on food served from the canteens and also some cook their own food, while students residing outside campus can use small kiosks.

The study population was stratified by year of study, with third-year students selected as the study stratum. This decision was made on the grounds that third-year students have been exposed to at least two full years of campus dietary conditions, allowing their dietary behaviors to reflect

entrenched patterns rather than the transitional adjustments typical of first-year students (Oti & Eshun, 2020). Third-year students are also more likely to be in a stable academic routine and therefore accessible for data collection. The accessible population comprised all third-year students from the Faculty of Science and Education enrolled across 13 registered degree programmes during the study period. Inclusion criteria required students to be currently enrolled, physically present at the campus during the data collection window, and willing to provide written informed consent. Students who were pregnant, had a diagnosed medical condition known to affect body weight or dietary intake, or who had been on medical leave for more than four consecutive weeks in the preceding semester were excluded to reduce confounding influences on BMI classification (Gan et al., 2011).

3.4 Sampling Design and Procedure

The sampling strategy employed in this study was stratified simple random sampling. Stratification was applied at the level of year of study, restricting the sampling frame to third-year undergraduates, as detailed in Section 3.3. Within this stratum, simple random sampling was used to select individual participants from across the 13 registered degree programmes offered at the Faculty of Science and Education. Simple random sampling ensures that every eligible individual within the sampling frame has an equal and independent probability of selection, minimizing systematic selection bias and producing a sample that is statistically representative of the target population (Yamane, 196).

The sampling frame was constructed using the official university student register for the 2025/2026 academic year, obtained with institutional permission from the Faculty of Science and Education administrative office. All eligible third-year students across the 13 degree programmes were assigned unique sequential identification numbers. A random number table was then used to select the required number of participants from each programme proportionally, ensuring that degree programmes with larger enrolments contributed more participants to the final sample while all programmes retained representation. This proportionate allocation approach prevents the over-representation of smaller programmes and the under representation of larger ones, thereby maintaining the internal validity of the sample (Omage & Omuemu, 2018b).

Selected participants were contacted through their respective programme coordinators and invited to participate. Those who could not be reached, declined to participate, or did not meet

inclusion criteria were replaced by the next randomly selected eligible student from the same programme, ensuring that the target sample size was achieved without compromising the integrity of the random selection process. The final sample comprised 164 students distributed across all 13 degree programmes, as detailed in Table 4.0 of Chapter Four. The sampling procedure is consistent with methodological standards employed in comparable cross-sectional dietary studies at African universities (Oti & Eshun, 2020).

3.5 Sample Size Determination

Sample size was determined using the Yamane (1967) finite population correction formula, which is the standard and widely validated approach for calculating minimum adequate sample sizes in cross-sectional social and health sciences research involving finite, bounded populations (Yamane, 1967). The formula is particularly appropriate where the total eligible population size is known and relatively small, as is the case with a defined university student cohort. The population size, N is 281. The formula is expressed as,

$$n = \frac{N}{[1 + Ne^2]}$$

where n is the required minimum sample size, N is the total size of the eligible finite population and e is the acceptable margin of error, set at 0.05, equivalent to a 95% confidence level. This margin of error is the conventional standard in health and nutrition research, representing an acceptable level of sampling uncertainty while maintaining statistical rigor (Oti & Eshun, 2020).

Applying the formula to the eligible population of third-year students at the Nagongera Campus yielded a minimum required sample of 164 students. This sample size is consistent with, and in several cases exceeds, the sample sizes employed in comparable cross-sectional dietary and nutritional status studies at African and Asian universities: 210 (W. Gan et al., 2011), 165 (Oti & Eshun, 2020), 155 (Omage & Omuemu, 2018a), and (Oti & Eshun, 2020). A sample of 164 therefore provides adequate statistical power to detect moderate associations between dietary variables and BMI category using the Pearson chi-square test at the conventional alpha level of 0.05. All 164 selected participants completed the questionnaire and anthropometric measurements, yielding a 100% response rate and eliminating the need for imputation of missing data.

3.6 Data Collection Tools and Procedures

Data were collected using two complementary instruments: (1) a structured, pre-tested, coded self-administered questionnaire; and (2) standardized direct anthropometric measurements conducted by trained research assistants. The dual-instrument approach is consistent with methodological best practices in cross-sectional nutrition research, where combining self-reported dietary data with objective biometric measurements strengthens the validity and reliability of findings (Ismail et al., 2026). The questionnaire was pilot-tested on 15 students from a comparable campus programme who were not included in the final study sample. Pilot testing assessed item clarity, response option completeness, logical flow, and average administration time. Minor wording ambiguities identified during piloting were corrected before final deployment. The average time to complete the questionnaire was approximately 18 minutes. Research assistants received standardized training on questionnaire administration and anthropometric measurement protocols prior to data collection commencement.

Plate A; measurement of the height of the study participants.

Plate B: measurement of the weight of the study participants.

Plate C; filling of interviews by study participants

3.6.1 Socio-demographic Data

Section A of the questionnaire captured key socio-demographic and socioeconomic variables known from the literature to be significant correlates of dietary behaviour and nutritional status among university students. Variables recorded included age (in years), gender (male or female), degree programme and year of study, residential arrangement (on campus halls vs. off campus housing), living arrangement (alone, with housemates, or with family), and estimated monthly food expenditure in Ugandan Shillings (UGX). These variables were selected because they reflect the principal structural determinants of food access and dietary choice in the university context (Gan et al., 2011).

Gender is a well-established determinant of dietary behavior and BMI distribution, with males and females showing systematically different food preferences, meal patterns, and weight status outcomes in university populations (Alkazemi, 2019b). Residential status differentiates students who depend entirely on campus catering and on-campus vendors from those who have access to private kitchens and off-campus markets, producing meaningfully different dietary environments (Oti & Eshun, 2020). Monthly food expenditure serves as a proxy for the financial capacity to access a diverse, adequate diet, with lower expenditure consistently associated with reduced dietary diversity and increased reliance on cheap, energy-dense foods (Oti & Eshun, 2020). Degree programme was recorded to enable programme-level subgroup description, as reported in Table 4.0.

3.6.2 Anthropometric Assessment

Anthropometric measurements were conducted by trained research assistants following standardized WHO protocols to ensure accuracy, consistency, and comparability with published literature. Body weight was measured to the nearest 0.1 kg using a calibrated digital weighing scale. Participants were requested to remove shoes and heavy outer garments and to stand in an erect, relaxed posture with weight distributed equally across both feet before the measurement was recorded. The scale was calibrated using a known standard weight at the beginning of each data collection session and after every 20 measurements to detect and correct any instrumental drift (Ismail et al., 2026).

Standing height was measured to the nearest 0.1 cm using a portable stadiometer mounted on a firm, flat surface. Participants stood barefoot with heels, buttocks, and upper back in contact with

the stadiometer board, and with the head held in the Frankfort horizontal plane which is a standardized anatomical reference position in which the lower margin of the eye socket and the uppermost point of the external auditory canal are horizontally aligned (see Plate A). The moveable headboard was gently lowered to the crown of the head at the end of a normal inspiration, and the measurement was read to the nearest 0.1 cm (Ismail et al., 2026). Each measurement was taken twice, with the mean of the two readings recorded; measurements that differed by more than 0.5 cm or 0.5 kg were repeated.

Body Mass Index (BMI) was computed for each participant using the standard formula

$$BMI = \frac{weight(kg)}{height\ squared(m^2)}$$

BMI was classified using the World Health Organization (2024) adult cut-off thresholds: underweight (BMI below 18.5 kg/m²), normal weight (18.5 to 24.9 kg/m²), overweight (25.0 to 29.9 kg/m²), and obese (30.0 kg/m² and above). These WHO cut-offs are internationally validated, widely used in cross-sectional nutrition studies, and provide a consistent, comparable framework for BMI classification across diverse populations (Omage & Omuemu, 2018a). Although BMI does not directly measure adiposity or body composition and cannot distinguish lean mass from fat mass, it remains the most practical and broadly validated proxy indicator of nutritional status in large-scale cross-sectional research, particularly where more sophisticated body composition technologies are unavailable (Van Den Berg et al., 2012).

3.6.3 Dietary Assessment

Dietary assessment was conducted using a structured Food Frequency Questionnaire (FFQ), which is the most commonly employed instrument for capturing habitual dietary intake patterns in cross-sectional university nutrition research (Omage & Omuemu, 2018b). The FFQ approach is well suited to this study because it captures usual dietary patterns over an extended reference period rather than a single day, making it less susceptible to day-to-day dietary variability than 24-hour dietary recall methods. FFQs have been extensively validated as dietary assessment tools in sub-Saharan African and South Asian university populations (Oti & Eshun, 2020).

The FFQ used in this study assessed the consumption frequency of eight food groups: (1) sugary drinks, including soda, bottled juices, and sweetened teas; (2) fast foods, including samosas, chips, chapatti, and deep-fried items; (3) fruits; (4) vegetables, including green leafy and other non-starchy vegetables; (5) legumes, including beans, groundnuts, lentils, and peas; (6) animal products, including meat, fish, eggs, and dairy; (7) roots and tubers, including cassava, sweet potatoes, Irish potatoes, and yam; and (8) cereals, including maize, rice, millet, sorghum, and bread. These food group categories were selected based on their nutritional significance in the Ugandan diet, their documented relevance to BMI outcomes in comparable African university settings, and their alignment with food groups examined in prior studies (Omage & Omuemu, 2018b). Each food group was rated using a four-point ordinal frequency scale: Never, 1 to 2 times per week, 3 to 4 times per week, and 5 or more times per week (Omage & Omuemu, 2018b).

In addition to the eight food group frequency items, three meal behaviour variables were assessed using single ordinal-response items. Meal skipping frequency was assessed using the question: “How often do you skip a meal during a typical week?” with response options Never, Rarely, Sometimes, and Often. This approach mirrors the meal skipping assessment methodology used in Nigerian, Malaysian, and multi-country COVID-19 era university studies (Omage & Omuemu, 2018b). Snacking frequency was assessed using the question: “How often do you consume snacks between your main meals?” with the same four-category ordinal response scale. Number of daily meals was assessed using the question: “On a typical day, how many main meals do you consume?” with response options 1 meal, 2 meals, 3 meals, and 4 or more meals, consistent with the meal frequency categorization employed by (Oti & Eshun, 2020).

The questionnaire was administered in English, which is the official medium of instruction at Busitema University and is proficiently read and written by all enrolled undergraduate students. Participants completed the questionnaire independently in a supervised setting to minimize peer influence on responses. Research assistants were available to clarify item wording upon request without guiding participants toward specific responses. Completed questionnaires were reviewed immediately upon submission for completeness, and participants were requested to supply missing responses before leaving the data collection venue. The complete Food Frequency Questionnaire used in this study is provided in Appendix A.

3.6.4 Factors Influencing Food Choices

Factors influencing food choices were assessed using a structured Likert-scale section of the questionnaire. Eighteen factors were grouped into socioeconomic, campus food-environment, psychosocial, individual and cultural domains. Participants rated each factor as 0 = no effect, 1 = low effect, 2 = moderate effect or 3 = strong effect. Frequencies and percentages were used to summarize the level of influence of each factor. The results are presented descriptively in Chapter Four.

3.7 Data Processing and Statistical Analysis

All raw data collected from completed questionnaires and anthropometric measurement sheets were first reviewed for completeness and legibility before being entered into a structured Microsoft Excel spreadsheet. Each participant was identified by a unique numeric code to maintain anonymity throughout the data management process. Double entry and cross-checking were performed on a 10% random subsample of questionnaires to detect and correct data entry errors before analysis. Continuous variables such as age, weight, height, and computed BMI were summarized using descriptive statistics comprising means and standard deviations. Categorical and ordinal variables, including BMI category, dietary frequency responses, meal skipping frequency, snacking frequency, and number of daily meals, were summarized as absolute frequencies (n) and percentage distributions, with results stratified by gender where analytically relevant (Omage & Omuemu, 2018b).

The Pearson chi-square test of independence was used to examine associations between each dietary variable and BMI category. The test compares observed and expected frequencies in a contingency table. Each cross-tabulation contained four dietary frequency levels and four BMI categories, giving 9 degrees of freedom. Statistical significance was assessed at $\alpha = 0.05$.

Statistical significance was assessed using the Pearson chi-square test at $p < 0.05$. Before applying the test, expected cell frequencies were checked to ensure that the assumptions for the chi-square procedure were satisfied. All calculations were checked through independent recalculation to improve accuracy and consistency.

3.8 Ethical Considerations

Ethical approval was obtained from the relevant Busitema University authority before data collection. Written informed consent was obtained from all participants after the study purpose;

procedures, voluntary participation and right to withdraw were explained. Participation was voluntary and no coercion or incentives were used. Confidentiality was maintained by assigning numeric codes and excluding names from the dataset. Completed questionnaires and electronic data were securely stored and accessed only by the researcher and supervisor. Anthropometric measurements were non-invasive, and participants with abnormal BMI were advised to seek appropriate health guidance.

CHAPTER FOUR: RESULTS

This chapter presents the results of the cross-sectional study among 164 third-year undergraduate students at Busitema University, Nagongera Campus. All dietary variable associations with BMI category were assessed using Pearson chi-square tests ($\alpha = 0.05$).

4.1 Socio-demographic Characteristics

A total of 164 third-year undergraduate students participated in the study. The mean age was 24.1 years (SD = 1.8), ranging from 21 to 30 years. There were 96 males (58.5%) and 68 females (41.5%). The largest programme group was BSCE (CHM/MAT) with 44 participants (26.8%), while BSS had the smallest representation with 5 participants (3.1%).

Table 4.0: Socio-demographic Characteristics of Participants (n = 164)

Variable	Category/summary	Frequency or statistic
Age	Mean ± SD	24.1 ± 1.8 years
Age	Range	21–30 years
Gender	Male	96 (58.5%)
Gender	Female	68 (41.5%)

Table 4.0a: Distribution of Participants by Degree Program (n = 164)

Degree Program	**N**	**%**
BSCE(CHM/MAT)	44	26.8
BSCE(MAT/ICT)	26	15.9
BSCE(BIO/CHM)	22	13.4
BSCE(AGRIC)	15	9.1
BSCE(PHY/MAT)	15	9.1
BELS	10	6.1
BSCE(BIO/PE)	9	5.5
BIT	6	3.7
BSS	5	3.1
Other programs	12	7.3
Total	**164**	**100.0**

Table 4.0b: Monthly Food Expenditure Distribution (n = 163)

Monthly Food Expenditure	**N**	**Percentage (%)**
< 50,000 Ugx	33	20.2
50,000 – 100,000 Ugx	80	49.1
101,000 – 200,000 Ugx	34	20.9
> 200,000 Ugx	16	9.8
Total	**163**	**100.0**

Monthly food expenditure was reported by 163 participants. Most participants (49.1%) spent UGX 50,000–100,000 per month, followed by 20.9% who spent UGX 101,000–200,000, 20.2% who spent less than UGX 50,000 and 9.8% who spent more than UGX 200,000.

4.2 Nutritional Status

BMI was calculated for all 164 participants. As shown in Table 4.1, 89 participants (54.3%) had normal BMI, 46 (28.0%) were overweight, 17 (10.4%) were obese and 12 (7.3%) were underweight. Thus, 63 participants (38.4%) were in the combined overweight/obesity category.

Table 4.1: BMI Classification of Participants (n = 164)

BMI Category	**BMI Range (kg/m^2)**	**Frequency (n)**	**Percentage (%)**
Underweight	< 18.5	12	7.3
Normal	18.5 – 24.9	89	54.3
Overweight	25.0 – 29.9	46	28.0
Obese	≥ 30.0	17	10.4
Total		**164**	**100.0**

Note. BMI classified per World Health Organization (2024) cut-offs.

4.2.1 BMI by Gender

As shown in Table 4.2, 51.2% of male participants had normal BMI, 30.1% were overweight, 12.2% were obese and 6.5% were underweight. Among females, 59.3% had normal BMI, 24.4% were overweight, 7.4% were obese and 8.9% were underweight. The combined overweight/obesity prevalence was 42.3% among males and 31.8% among females.

Table 4.2: BMI Category by Gender

Gender	**Underweight (%)**	**Normal (%)**	**Overweight (%)**	**Obese (%)**
Male	6.5	51.2	30.1	12.2
Female	8.9	59.3	24.4	7.4

4.3 Food Group Consumption Frequency and BMI Category

The eight food groups were analyzed using four consumption-frequency categories and cross-tabulated with the four BMI categories. None of the eight food groups showed a statistically significant association with BMI category at $\alpha = 0.05$.

4.4.1 Sugary Drinks

Table 4.4a: Observed Counts for Sugary Drink Frequency vs. BMI Category

Frequency	**Underweight**	**Normal**	**Overweight**	**Obese**	**Row total**
Never	4	18	6	2	30
1–2x/week	3	24	10	3	40
3–4x/week	2	22	14	4	42
≥5x/week	3	25	16	8	52
Total	12	89	46	**17**	**164**

Table 4.4b: Chi-square Values for Sugary Drink Frequency Vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.236	9	0.716
Likelihood Ratio	5.992	9	0.741
N of Valid Cases	164		

4.4.2 Fast Foods

Table 4.5a: Observed Counts for Fast Food Frequency vs. BMI Category

Fast food frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**6**	**40**	**12**	**4**	**62**
1-2x/week	**4**	**32**	**18**	**5**	**59**
3-4x/week	**1**	**11**	**10**	**5**	**27**
≥5x/week	**1**	**6**	**6**	**3**	**16**
total	**12**	**89**	**46**	**17**	**164**

Table 4.5b: Chi-square Tests for Food Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.963	9	0.278
Likelihood Ratio	10.843	9	0.287
N of Valid Cases	164		

As shown in Table 4.5a, 62 participants never consumed fast foods, 59 consumed them 1–2 times/week, 27 consumed them 3–4 times/week and 16 consumed them at least five times/week. The chi-square test in Table 4.5b showed no statistically significant association with BMI category ($\chi^2 = 10.963$, df = 9, p = 0.278).

4.4.3 Fruits

Table 4.6a: Observed Counts for Fruit Consumption Frequency Vs. BMI Category

Fruit frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**3**	**18**	**8**	**3**	**32**
1-2x/week	**5**	**30**	**14**	**4**	**53**
3-4x/week	**3**	**25**	**14**	**6**	**48**
≥5x/week	**1**	**16**	**10**	**4**	**31**
total	**12**	**89**	**46**	**17**	**164**

Table 4.6b: Chi-square Statistic for Fruit Consumption Frequency Vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.666	9	0.976
Likelihood Ratio	2.829	9	0.971
N of Valid Cases	164		

As shown in Table 4.6a, the largest fruit-consumption group was 1–2 times/week (n = 53). The chi-square test in Table 4.6b showed no statistically significant association with BMI category ($\chi^2 = 2.666$, df = 9, p = 0.976).

4.4.4 Vegetables

Table 4.7a: Observed Counts for Vegetable Consumption Frequency Vs. BMI Category

Vegetable frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**1**	**6**	**2**	**1**	**10**
1-2x/week	**2**	**14**	**8**	**3**	**27**
3-4x/week	**5**	**35**	**18**	**6**	**64**
≥5x/week	**4**	**34**	**18**	**7**	**63**
total	**12**	**89**	**46**	**17**	**164**

Table 4.7b: Chi-squared Statistic for Vegetable Consumption Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.665	9	1.000
Likelihood Ratio	0.683	9	1.000
N of Valid Cases	164		

As shown in Table 4.7a, most participants consumed vegetables 3–4 times/week (n = 64) or at least five times/week (n = 63). The chi-square test in Table 4.7b showed no statistically significant association with BMI category ($\chi^2 = 0.665$, df = 9, p = 1.000).

4.4.5 Legumes

Table 4.8a: Observed Counts for Legume Consumption Frequency vs. BMI Category

Legume frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**2**	**12**	**4**	**2**	**20**
1-2x/week	**4**	**20**	**10**	**4**	**38**
3-4x/week	**4**	**32**	**18**	**6**	**60**
≥5x/week	**2**	**25**	**14**	**5**	**46**
total	**12**	**89**	**46**	**17**	**164**

Table 4.8b: Chi-squared Statistic for Legume Consumption Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.170	9	0.988
Likelihood Ratio	2.226	9	0.987
N of Valid Cases	164		

As shown in Table 4.8a, most participants consumed legumes 3–4 times/week (n = 60), followed by at least five times/week (n = 46). The chi-square test in Table 4.8b showed no statistically significant association with BMI category ($\chi^2 = 2.170$, df = 9, p = 0.988).

4.4.6 Animal Products

Table 4.9a: Observed Counts for Animal Product Frequency vs. BMI Category

Animal product frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**3**	**12**	**6**	**2**	**23**
1-2x/week	**5**	**32**	**14**	**5**	**56**
3-4x/week	**3**	**28**	**16**	**6**	**53**
≥5x/week	**1**	**17**	**10**	**4**	**32**
total	**12**	**89**	**46**	**17**	**164**

As shown in Table 4.9a, the largest frequency category was 1–2 times/week (n = 56), followed by 3–4 times/week (n = 53). The chi-square test in Table 4.9b showed no statistically significant association with BMI category ($\chi^2 = 3.110$, df = 9, p = 0.960).

Table 4.9b: Chi-square test for Animal products vs BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.110	9	0.960
Likelihood Ratio	3.130	9	0.959
N of Valid Cases	164		

4.4.7 Roots and Tubers

Table 4.10a: Observed Counts for Root/tuber Frequency vs. BMI Category

Roots frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**4**	**28**	**12**	**4**	**48**
1-2x/week	**5**	**30**	**16**	**6**	**57**
3-4x/week	**2**	**18**	**10**	**4**	**34**
≥5x/week	**1**	**13**	**8**	**3**	**25**
total	**12**	**89**	**46**	**17**	**164**

Table 4.10b: Chi-squared Statistic for Root/tuber Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.555	9	0.997
Likelihood Ratio	1.629	9	0.996
N of Valid Cases	164		

As shown in Table 4.10a, 48 participants never consumed roots and tubers, 57 consumed them 1–2 times/week, 34 consumed them 3–4 times/week and 25 consumed them at least five times/week. The chi-square test in Table 4.10b showed no statistically significant association with BMI category ($\chi^2 = 1.555$, df = 9, p = 0.997).

4.4.8 Cereals

Table 4.11a: Observed Counts for Cereal Consumption Frequency vs. BMI Category

Cereal frequency	Underweight	Normal	Overweight	Obese	Row total
Never	**0**	**2**	**0**	**0**	**2**
1-2x/week	**1**	**5**	**2**	**1**	**9**
3-4x/week	**5**	**30**	**14**	**5**	**54**
≥5x/week	**6**	**52**	**30**	**11**	**99**
total	**12**	**89**	**46**	**17**	**164**

Table 4.11b: Chi-squared Statistic for Cereal Consumption Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.926	9	0.967
Likelihood Ratio	3.660	9	0.932
N of Valid Cases	164		

As shown in Table 4.11a, cereal consumption was concentrated in the higher-frequency categories, with 99 participants consuming cereals at least five times/week and 54 consuming them 3–4 times/week. The chi-square test in Table 4.11b showed no statistically significant association with BMI category ($\chi^2 = 2.926$, df = 9, p = 0.967).

4.5 Meal Skipping Frequency and BMI Category

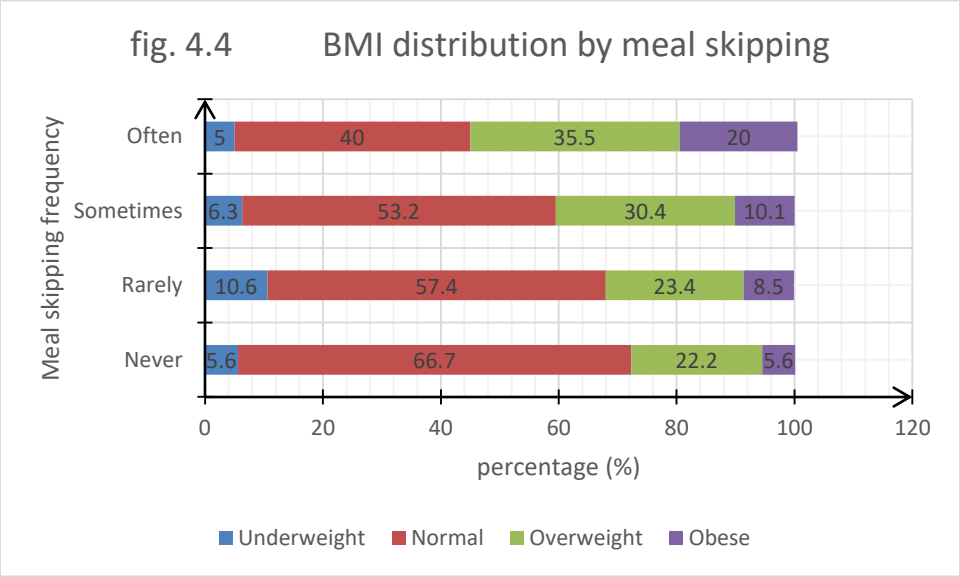

Figure 4.1: BMI Distribution by Meal Skipping Frequency

Table 4.12b: Chi-squared Statistic for Meal Skipping Frequency vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.452	9	0.043
Likelihood Ratio	11.983	9	0.050
N of Valid Cases	164		

As shown in Figure 4.1, combined overweight/obesity increased from 27.8% among students who never skipped meals to 55.0% among those who often skipped meals. The chi-square test in Table 4.12b showed a statistically significant association between meal skipping frequency and BMI category ($\chi^2 = 12.452$, df = 9, p = 0.043).

4.6 Snacking Frequency and BMI Category

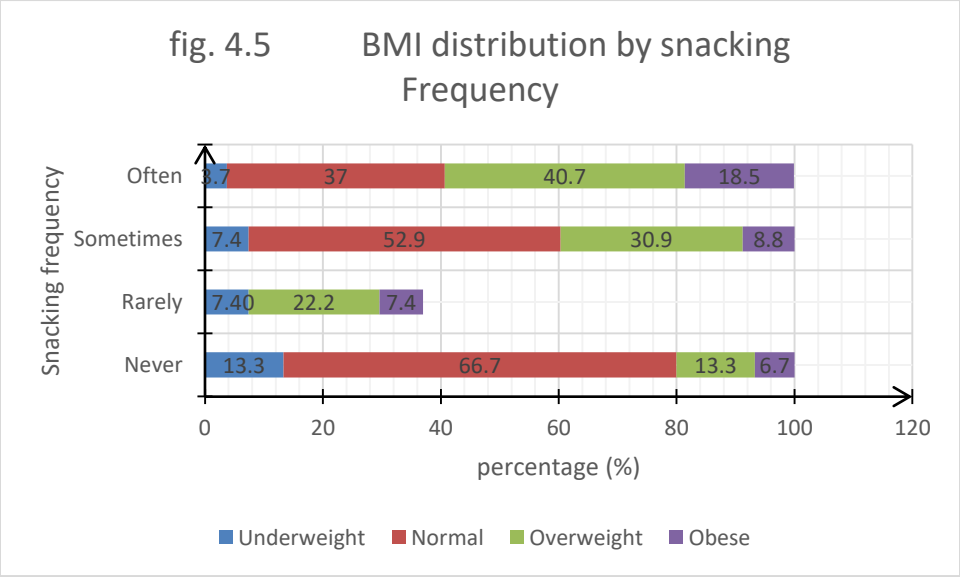

Figure 4.2: BMI Distribution by Snacking Frequency

Table 4.13b: Chi-squared Statistic for Snacking Vs. BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.672	9	0.005
Likelihood Ratio	18.104	9	0.006
N of Valid Cases	164		

As shown in Figure 4.2, combined overweight/obesity increased from 20.0% among students who never snacked to 59.2% among those who often snacked. The chi-square test in Table 4.13b showed a statistically significant association between snacking frequency and BMI category ($\chi^2 = 18.672$, df = 9, p = 0.005).

4.7 Number of Daily Meals and BMI Category

Table 4.14a: Number of Daily Meals Vs. BMI Category

Meals per day	Underweight	Normal	Overweight	Obese	total
1 meal	**2**	**4**	**1**	**0**	**7**
2 meals	**4**	**28**	**12**	**3**	**47**
3 meals	**5**	**48**	**28**	**10**	**91**
≥4 **meals**	**1**	**9**	**5**	**4**	**19**
Total	**12**	**89**	**46**	**17**	**164**

As shown in Table 4.14a, 91 participants (55.5%) consumed three main meals per day, 47 (28.7%) consumed two meals, 19 (11.6%) consumed four or more meals and 7 (4.3%) consumed one meal. The chi-square test in Table 4.14b showed no statistically significant association between number of daily meals and BMI category ($\chi^2 = 10.234$, df = 9, p = 0.332).

Table 4.1b: Chi-square test for Number of Daily Meals vs BMI Category

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.234	9	0.332
Likelihood Ratio	10.587	9	0.305
N of Valid Cases	164		

4.8 Factors Influencing Food Choices

Table 4.15: Factor Domains Influencing Food Choices among Participants (n = 164)

Factor Domain	Specific Factors	Domain Percentage (%)	Influence Level
SOCIOECONOMIC	Cost and affordability; Monthly food budget constraints	76.2%	STRONG
PSYCHOSOCIAL	Academic stress; Time pressure; Peer influence; Emotional eating	57.3%	MODERATE
CAMPUS FOOD ENVIRONMENT	Canteen food availability; Vendor food options; Limited variety of nutritious options; Accessibility of food outlets	55.6%	MODERATE
CULTURAL	Traditional food norms; Religious food practices; Dietary habits from home	50.0%	MODERATE
INDIVIDUAL	Taste preferences; Hunger; Nutrition knowledge; Food literacy; Personal health beliefs	47.6%	MODERATE

Table 4.15a: Classification Ranges for Influence Levels

Domain Influence Level	Domain Percentage Range
STRONG	≥ 65%
MODERATE	40% - 64.9%
LOW	< 40%

Table 4.15 presents the five domains of factors influencing food choices among undergraduate students, with percentages representing the proportion of participants who rated factors within each domain as having a moderate or strong influence. The Socioeconomic domain had the strongest influence (76.2%), while the Individual domain had the lowest overall influence (47.6%). Table 4.15a provides the classification ranges used to determine these influence levels: Strong (≥65%), Moderate (40%-64.9%), and Low (<40%), based on participants' ratings on a 0-3 scale (0=No effect, 1=Low effect, 2=Moderate effect, 3=Strong effect).

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Nutritional Status

The first objective was to assess the nutritional status of undergraduate students using BMI. The study found that 54.3% of participants had normal BMI, while 28.0% were overweight, 10.4% were obese and 7.3% were underweight. Therefore, 38.4% had combined overweight or obesity, demonstrating a double burden of malnutrition. The prevalence of overweight/obesity was higher than the 24.1% reported among Kenyatta University students by Agraib et al.,(2025), but comparable to the substantial burden reported among university students in other settings. Ismail et al. (2022) reported a high prevalence of overweight and obesity among university students in the United Arab Emirates, while van den Berg et al. (2012) documented overweight, obesity and underweight among university nursing students in South Africa. Ainembabazi et al. (2025), studying female students at Makerere University in Uganda, similarly found that most participants had normal weight while underweight, overweight and obesity were also present. Differences in prevalence between studies may reflect variations in food environment, physical activity, socioeconomic circumstances, sex composition and study setting. The findings at Nagongera Campus therefore support interventions that address both excess weight and underweight rather than focusing on obesity alone.

5.1.2 Gender Differences in BMI Distribution

The combined overweight/obesity prevalence was 42.3% among males compared with 31.8% among females. Although the study did not test gender as an independent predictor of BMI, the descriptive difference is noteworthy. Alkazemi (2019) reported higher overweight and obesity prevalence among male college students than females in Kuwait, which is consistent with the direction observed at Nagongera Campus. Gan et al. (2011), however, reported differences in body-weight status between male and female Malaysian university students, showing that gender patterns can vary between populations. Migacz-Bodziony et al. (2025) also found significant gender differences in food consumption patterns and nutritional status among students in Poland. The observed difference at Nagongera may therefore reflect gender-related differences in eating behaviour, physical activity and food selection. Because the analysis was descriptive, the finding should not be interpreted as evidence that gender caused the BMI differences.

5.1.3 Food Group Consumption Frequencies and BMI

None of the eight assessed food groups showed a statistically significant association with BMI category. This suggests that frequency of consumption of individual food groups, when considered alone, did not explain BMI differences in this sample. Omage and Omuemu (2018) reported varied dietary patterns among Nigerian undergraduates and showed that dietary practices and nutritional status do not always have a simple one-to-one relationship.
Oti and Eshun (2020) similarly reported diverse dietary practices among Ghanaian university students, while Agraib et al.,(2025) showed that food-processing patterns and barriers to healthy food consumption are more complex than the frequency of one food group. The lack of significant associations in the present study may reflect the broad food-group categories, limited variation in some staple foods and the absence of portion-size and total-energy measures. Thus, the finding should not be interpreted as evidence that diet is unrelated to BMI; rather, the measured frequency of individual food groups was not independently associated with BMI in this study.

5.1.4 Fast Foods

Fast-food consumption was not significantly associated with BMI in the present study (χ^2 = 10.963, df = 9, p = 0.278). This differs from Ndung'u et al. (2025), who reported a significant association between daily fast-food consumption and BMI among Kenyatta University students. Kaithery et al. (2025) found that junk-food intake was very common among medical students in Northern Kerala, although their study did not establish the same BMI association. Omage and Omuemu (2018) also documented energy-dense food consumption among Nigerian undergraduates, showing that fast-food exposure is common in university populations even when BMI associations differ. The difference may reflect the small number of participants in the highest fast-food frequency category, differences in portion size and food type, and the absence of adjustment for physical activity. The present finding therefore means that no statistically significant association was detected with the frequency measure used, not that fast foods are nutritionally harmless.

5.1.5 Meal Skipping Frequency and BMI

Meal-skipping frequency was significantly associated with BMI category (χ^2 = 12.452, df = 9, p = 0.043), with combined overweight/obesity increasing from 27.8% among students who never skipped meals to 55.0% among those who often skipped meals. (Pendergast et al., 2016) found

that lack of time was a consistent correlate of meal skipping among young adults, while (Ma et al. (2020) reported that lower breakfast frequency was associated with higher odds of overweight/obesity in a meta-analysis of observational studies. However, Kadir et al. (2024) found no statistically significant association between breakfast skipping and BMI among a large sample of undergraduate students. The difference may be because the present study assessed meal skipping generally rather than breakfast alone and was conducted in a different student food environment. Because the design was cross-sectional, the direction of the relationship cannot be established; students with higher BMI may also skip meals as part of attempts to control weight.

5.1.6 Snacking Frequency and BMI

Snacking frequency showed the strongest dietary association with BMI category ($\chi^2 = 18.672$, df = 9, p = 0.005), with combined overweight/obesity increasing from 20.0% among students who never snacked to 59.2% among those who often snacked. Alamri (2020) reported associations between snacking patterns and anthropometric measures among female Saudi undergraduates. Evidence from US college students also indicates that greater availability and accessibility of unhealthy snacks is associated with higher BMI, although snack frequency itself was not independently associated with BMI after adjustment (Prapkree et al., 2023). The present finding therefore agrees with the broader literature that snacking and the food environment deserve attention, while also showing that frequency alone does not establish the mechanism. The association may reflect differences in snack type, portion size and energy density. Campus interventions should therefore improve access to affordable healthier snacks rather than simply advising students to avoid all snacking.

5.1.7 Number of Daily Meals

The number of main meals consumed per day was not significantly associated with BMI category ($\chi^2 = 10.234$, df = 9, p = 0.332), with three meals per day being the most common pattern. This agrees with research among university students showing that meal frequency does not always have a consistent relationship with BMI. Conversely, House et al. (2018) found that infrequent eating was associated with higher BMI and greater adiposity among Hispanic college freshmen. The difference may be explained by the present study measuring the number of main meals rather than total eating occasions and by not measuring portion size or total energy intake. Therefore, the number of meals alone may be insufficient to explain nutritional status. Future

studies should assess meal frequency together with snacks, meal composition, portion size and energy intake.

5.1.8 Factors Influencing Food Choices

Cost and affordability, food-budget constraints, academic stress, taste preferences and hunger were the strongest reported influences on food choice. This finding is consistent with Ismail et al. (2022), who identified psychosocial influences on dietary habits among university students, and with Agyei et al. (2025), who identified barriers within the food environment as important determinants of healthy food consumption among university students in Ghana. Pendergast et al. (2016) also identified lack of time as a consistent correlate of meal skipping among young adults, supporting the relevance of academic pressure and time constraints in the present study. The prominence of affordability is particularly important because most participants reported relatively low monthly food expenditure. The findings suggest that nutrition education alone may be insufficient when healthier foods are perceived as less affordable or less accessible. University interventions should therefore combine nutrition education with measures that improve the availability and affordability of nutritious meals and snacks.

5.2 Conclusions

The study concludes that undergraduate students at Nagongera Campus experience a double burden of malnutrition, with 38.4% classified as overweight or obese and 7.3% underweight. This indicates an important need for interventions addressing both excess weight and undernutrition.

The study found no statistically significant association between the frequency of consumption of the eight assessed food groups and BMI category. However, meal-skipping and snacking frequencies were significantly associated with BMI category, while the number of main meals consumed per day was not significantly associated with BMI.

Food choices were influenced mainly by affordability, food-budget constraints, academic stress, taste preferences and hunger. These findings show that student nutrition is shaped not only by individual choices but also by the campus food environment and socioeconomic circumstances.

5.3 Recommendations

University Administration

The University should improve the availability, affordability and visibility of nutritious meals and snacks on campus. Canteens and vendors should be encouraged to provide healthier

alternatives, including fruits, vegetables, legumes and less energy-dense snacks. Nutrition education activities should be integrated into student welfare programmes.

Students

Students should aim for balanced and varied diets, avoid unnecessary meal skipping, choose healthier snacks where possible and engage in regular physical activity. They should also plan food expenditure so that healthier options are prioritized within available resources.

Future Research

Future studies should use longitudinal designs and objective physical-activity assessment, include portion-size and total-energy measurements, and assess the nutritional quality and affordability of foods sold by campus vendors. Similar studies should also be conducted in other Ugandan universities and among different year groups to improve generalizability.

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BUSITEMA UNIVERSITY – NAGONGERA CAMPUS

FACULTY OF SCIENCE AND EDUCATION

DEPARTMENT OF BIOLOGY

DIETARY PRACTICES AND NUTRITIONAL STATUS QUESTIONNAIRE

(Busitema University Students – 2026)

Questionnaire Code: _____

Date: ____ / ____ / 2026

INTRODUCTION & CONSENT

This study assesses dietary practices and nutritional status of students at Busitema University, Nagongera Campus. Participation is voluntary and confidential. Information collected will be used strictly for academic purposes.

I consent to participate:

Signature: _____ Date: _____

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

Age: _____ years

Gender: ☐ Male ☐ Female

Course: _____

Programme: _____-
_____

Year of Study:
_____

Residence: ☐On campus ☐Off campus

Living arrangement: ☐ University hostel ☐ Private hostel ☐ Renting ☐ With family

Monthly food expenditure: ☐ <50,000 UGX ☐ 50,000–100,000 ☐ 101,000–200,000 ☐ >200,000

SECTION B: ANTHROPOMETRIC ASSESSMENT (Researcher Only)

Weight (kg): _____

Height (m): _____

BMI (kg/m²): _____

SECTION C: MEAL PATTERN & DIETARY PRACTICES

Number of meals per day: ☐ 1 ☐ 2 ☐ 3 ☐ ≥4

Do you skip meals? ☐ Never ☐ Rarely ☐ Sometimes ☐ Often

Most skipped meal: ☐ Breakfast ☐ Lunch ☐ Dinner ☐ None

Snack consumption: ☐ Never ☐ Rarely ☐ Sometimes ☐ Often

Main source of meals: ☐ Self-prepared ☐ Cafeteria ☐ Street vendors ☐ Restaurants

Alcohol consumption: ☐ Never ☐ Occasionally ☐ Weekly ☐ Daily

SECTION D: FOOD FREQUENCY

Food Group	Never	1–2x/week	3–4x/week	≥5x/week
Cereals and grains (posho, rice, matooke, bread)				
Roots and tubers				
Legumes and nuts				
Vegetables (especially green leafy)				
Fruits				
Animal-source foods (meat, fish, eggs, milk)				
Fast foods (chips, fried snacks, rolex)				
Sugary drinks				

SECTION E: 24-HOUR DIETARY RECALL

Breakfast: _____

Lunch: _____

Dinner: _____

Snacks/Drinks: _____

SECTION F: FACTORS INFLUENCING FOOD CHOICE

Level of agreement: (0=No effect, 1= Low effect, 2=Moderate effect, 3=strong effect.)

A. Individual Factors

Attribute	**0**	**1**	**2**	**3**
1. My cooking skills influence what I eat				
2. Taste (color, smell, texture) influences my food choices				
3. I prefer specific types of food (e.g., spicy, sweet, salty) when choosing meals				
4. Religious or cultural restrictions influence my food choices				
5. Stress or exam pressure affects my eating habits				
6. My emotions influence what or how much I eat				
7. My family eating habits influence what I eat at university				
8. My rural/urban background influences my food preferences				
9. I consider the nutritional value of food before choosing it				
10. I believe balanced nutrition is important at my age				
11. My level of physical activity influences how much or what I eat				

B. Societal Factors

Attribute	**0**	**1**	**2**	**3**
12. Friends/roommates influence my food choices				
13. I eat differently when I am with friends compared to when I am alone				

14. Eating in groups or visiting restaurants with friends influences my food choices				

C. Environmental Factors

Attribute	**0**	**1**	**2**	**3**
1. Availability of fresh foods affects my food choices				
2. Seasonal availability of food affects what I eat				
3. Cost influences my food choices				
4. Food prices limit my ability to choose healthy foods				
5. Accessibility of food vendors and campus shops influences what I eat				

D. University-Related Factors

Attribute	**0**	**1**	**2**	**3**
1. Campus lifestyle influences my eating habits				
2. Cooking facilities in my residence affect what I eat				
3. My hall/hostel environment influences my food choices				
4. Academic workload affects my eating pattern				
5. Exam schedules influence my meal timing and food choices				

From; Kabir, A., Miah, S., & Islam, A. (2018). Factors influencing eating behavior and dietary intake among resident students in a public university in Bangladesh: A qualitative study. PLoS ONE, 13(6), e0198801. https://doi.org/10.1371/journal.pone.0198801

SECTION G: HEALTH & LIFESTYLE

Physical activity (≥30 min): ☐ Never ☐ 1–2 days/week ☐ 3–4 days/week ☐ ≥5 days/week

Average sleep per night: ☐ <6 hrs ☐ 6–7 hrs ☐ 7–8 hrs ☐ >8 hrs

Self-rated health: ☐ Excellent ☐ Good ☐ Fair ☐ Poor

END OF QUESTIONNAIRE

Thank you for your participation.

APPENDIX B: BMI CLASSIFICATION REFERENCE

Underweight: <18.5 kg/m²; Normal weight: 18.5–24.9 kg/m²; Overweight: 25.0–29.9 kg/m²; Obesity: ≥30.0 kg/m². Source: World Health Organization (2024).

APPENDIX C: RAW DATA SERIES

ID	Meals/day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
1	3	Sometimes	Rarely	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	Never	(7-8)	Good
2	3	Rarely	Often	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	>=5 x/week	3-4days/week	(7-8)	Excellent
3	3	Never	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	never	never	3-4x/week	>=5 x/week	never	>=5 x/week	Never	(7-8)	Good
4	2	Rarely	Rarely	Self-prepared	Occasionally	1-2x/week	never	3-4x/week	never	1-2x/week	>=5 x/week	>=5 x/week	>=5 x/week	3-4days/week	< 6	good
5	1	Often	Often	Self-prepared	Never	1-2x/week	never	1-2x/week	3-4x/week	never	never	never	never	Never	(6-7)	good
6	2	Sometimes	Never	Self-prepared	Never	1-2x/week	never	1-2x/week	1-2x/week	never	never	never	1-2x/week	1-2days/week	< 6	good
7	3	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	>=5 x/week	1-2days/week	< 6	good
8	2	Sometimes	Never	Self-prepare	Never	3-4x/week	3-4x/week	>=5 x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	never	Never	(6-7)	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
				d												
9	3	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	Never	< 6	Excellent
10	1	Often	Never	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	>=5 x/week	1-2days/week	< 6	Excellent
11	2	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	(6-7)	good
12	3	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	>=5 x/week	>=5 x/week	1-2days/week	(6-7)	good
13	2	Never	Never	Self-prepared	Never	never	never	1-2x/week	3-4x/week	1-2x/week	never	1-2x/week	3-4x/week	1-2days/week	(6-7)	good
14	2	Sometimes	Never	Self-prepared	Never	>=5 x/week	never	1-2x/week	>=5 x/week	never	never	never	1-2x/week	3-4days/week	(7-8)	Excellent
15	>=4	Rarely	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	< 6	good
16	3	Sometimes	Often	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2days/week	(6-7)	Fair
1	2	So	so	Self	Nev	>=5	1-	3-	1-	1-	1-	1-	1-	>=5d	(6	go

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
7		metimes	metimes	-prepared	er	x/week	2x/week	4x/week	2x/week	2x/week	2x/week	2x/week	2x/week	ays/ week	-7)	od
18	2	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	>=5 x/week	1-2days/week	(6-7)	good
19	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	3-4x/week	3-4x/week	1-2x/week	Never	> 8	Excellent
20	3	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	never	3-4x/week	1-2days/week	(6-7)	good
21	3	Never	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	Never	(6-7)	good
22	3	Rarely	Often	Self-prepared	Occasionally	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Excellent
23	3	Sometimes	Often	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4days/week	(7-8)	good
24	3	Rarely	Never	Self-prepared	Never	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4days/week	(6-7)	good
25	3	Sometime	sometime	Self-pre	Never	3-4x/wee	1-2x/wee	3-4x/wee	1-2x/wee	1-2x/wee	1-2x/wee	1-2x/wee	1-2x/wee	Never	(7-8)	good

ID	Meals/ day	Meal skippings	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
		s	s	pared		k	k	k	k	k	k	k	k			
26	2	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	Never	(7-8)	good
27	2	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	>=5 x/week	1-2days/week	(6-7)	Excellent
28	2	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	never	3-4x/week	1-2x/week	1-2x/week	Never	(6-7)	good
29	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4days/week	(6-7)	Excellent
30	2	Sometimes	sometimes	Self-prepared	Occasionally	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Fair
31	3	Sometimes	Never	Self-prepared	Never	>=5 x/week	never	1-2x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2days/week	(7-8)	Excellent
32	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4days/week	(6-7)	good
33	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	never	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2x/week	>=5 x/week	Never	(6-7)	Fair

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
34	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2days/week	<6	good
35	2	Rarely	sometimes	Self-prepared	Never	3-4x/week	never	3-4x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	>=5days/week	(6-7)	good
36	2	Sometimes	Never	Self-prepared	Never	>=5x/week	1-2x/week	>=5x/week	1-2x/week	1-2x/week	1-2x/week	never	3-4x/week	Never	<6	Excellent
37	2	Sometimes	Rarely	Self-prepared	Never	>=5x/week	never	>=5x/week	1-2x/week	never	>=5x/week	1-2x/week	1-2x/week	Never	>8	good
38	2	Sometimes	sometimes	Self-prepared	Never	>=5x/week	never	1-2x/week	>=5x/week	1-2x/week	never	never	3-4x/week	Never	(6-7)	Fair
39	2	Sometimes	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	1-2x/week	never	1-2x/week	1-2x/week	>=5x/week	3-4days/week	<6	Fair
40	3	Rarely	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	>=5x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	<6	Excellent
41	3	Rarely	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	>=5x/week	1-2x/week	>=5x/week	Never	(7-8)	Fair
42	3	Somet	somet	Self-	Never	3-4x/	never	1-2x/	1-2x/	1-2x/	never	1-2x/	1-2x/	Never	(7-	Excel

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
		imes	imes	prepared		week		week	week	week		week	week		8)	lent
43	3	Rarely	Rarely	Self-prepared	Never	1-2x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2days/week	(6-7)	Fair
44	2	Rarely	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	3-4x/week	>=5x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	Never	< 6	good
45	>=4	Sometimes	Often	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	>=5x/week	>=5x/week	3-4x/week	>=5x/week	1-2x/week	1-2days/week	(7-8)	good
46	3	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	never	never	3-4days/week	(7-8)	good
47	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	never	3-4x/week	1-2x/week	1-2x/week	>=5days/week	< 6	good
48	3	Never	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	>=5x/week	>=5x/week	never	1-2x/week	1-2x/week	1-2x/week	Never	> 8	good
49	2	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	>=5days/week	< 6	good
50	2	Never	sometimes	Self-prepare	Never	>=5x/week	1-2x/week	1-2x/week	>=5x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
				d												
51	3	Rarely	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	never	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	3-4x/week	Never	> 8	good
52	3	Sometimes	Often	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
53	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	< 6	good
54	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	>=5days/ week	< 6	Fair
55	2	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
56	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	3-4days/week	> 8	Excellent
57	2	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4days/week	< 6	good
58	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	< 6	good
5	2	Oft	Ne	Self	Nev	3-	1-	nev	3-	3-	1-	1-	1-	1-	(6	go

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Slep	Self-rated health
9		en	ver	-prepared	er	4x/week	2x/week	er	4x/week	4x/week	2x/week	2x/week	2x/week	2days/week	-7)	od
60	2	Rarely	Never	Self-prepared	Never	3-4x/week	never	1-2x/week	>=5 x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	< 6	good
61	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Excellent
62	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	never	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	Never	(6-7)	good
63	3	Rarely	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	Never	(6-7)	Fair
64	2	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	Never	< 6	good
65	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	Never	(6-7)	Excellent
66	1	Sometimes	Never	Self-prepared	Never	never	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	never	1-2x/week	1-2days/week	(6-7)	Excellent
67	1	Never	Never	Street ven	Never	1-2x/wee	never	1-2x/wee	>=5 x/week	3-4x/wee	3-4x/wee	3-4x/wee	never	1-2days/we	(6-7)	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
				dors		k		k		k	k	k		ek		
68	2	Often	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2days/week	(6-7)	Fair
69	2	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	>8	Excellent
70	3	Never	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	>=5 x/week	>=5 x/week	1-2x/week	Never	(7-8)	Fair
71	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Excellent
72	3	Never	Rarely	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	<6	good
73	2	Sometimes	Never	Self-prepared	Never	never	>=5 x/week	1-2x/week	3-4x/week	3-4x/week	never	never	1-2x/week	Never	<6	Excellent
74	3	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	never	1-2x/week	1-2x/week	1-2x/week	3-4x/week	>=5 x/week	>=5 x/week	1-2days/week	<6	Excellent
75	3	Sometimes	Rarely	Self-prepared	Never	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	never	3-4x/week	1-2x/week	Never	(6-7)	good
7	3	Rar	so	Self	Occ	>=5	1-	3-	>=5	3-	3-	nev	>=5	1-	(6	Ex

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
6		ely	metimes	-prepared	asionally	x/week	2x/week	4x/week	x/week	4x/week	4x/week	er	x/week	2days/week	-7)	cellent
77	2	Rarely	Rarely	Street vendors	WEEKLY	1-2x/week	never	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	never	3-4days/week	(6-7)	good
78	2	Rarely	Never	Street vendors	Never	3-4x/week	never	>=5 x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4days/week	(6-7)	good
79	3	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	>=5 x/week	1-2days/week	(7-8)	good
80	3	Rarely	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2days/week	(7-8)	good
81	2	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	never	1-2x/week	1-2days/week	(7-8)	good
82	2	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	never	never	never	never	never	1-2days/week	(6-7)	good
83	2	Sometimes	Never	Self-prepared	Never	>=5 x/week	never	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	never	3-4days/week	(6-7)	good
84	2	Rarely	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	< 6	Fair

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
85	2	Sometimes	Never	Self-prepared	Never	1-2x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	never	never	Never	< 6	good
86	3	Sometimes	sometimes	Self-prepared	Never	1-2x/week	never	3-4x/week	1-2x/week	1-2x/week	never	1-2x/week	3-4x/week	1-2days/week	< 6	Excellent
87	2	Sometimes	Never	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
88	2	Often	sometimes	Self-prepared	Never	>=5x/week	never	>=5x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	Never	< 6	good
89	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Excellent
90	3	Sometimes	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	>=5days/week	(7-8)	good
91	3	Sometimes	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	Fair
92	3	Never	Never	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	never	>=5x/week	3-4x/week	>=5x/week	>=5days/week	(7-8)	Excellent
93	3	Rarely	Rarely	Self-	Never	3-4x/	3-4x/	3-4x/	never	1-2x/	>=5x/w	>=5x/w	1-2x/	Never	(7-	Fair

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
				prepared		week	week	week		week	eek	eek	week		8)	
94	2	Sometimes	sometimes	Self-prepared	Never	1-2x/week	never	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	(6-7)	good
95	3	Sometimes	sometimes	Self-prepared	Never	1-2x/week	never	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	Never	> 8	good
96	2	Never	Rarely	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	>=5 x/week	>=5days/ week	(6-7)	Excellent
97	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	3-4days/week	> 8	Excellent
98	2	Sometimes	Never	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	>=5 x/week	never	1-2days/week	< 6	Fair
99	3	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4days/week	(7-8)	Fair
100	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
101	2	Rarely	sometimes	Self-prepare	Never	>=5 x/week	1-2x/week	1-2x/week	>=5 x/week	3-4x/week	never	3-4x/week	3-4x/week	Never	< 6	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Slee p	Self-rated health
				d												
102	2	Sometimes	Never	Self-prepared	Never	>=5 x/week	never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	never	1-2days/week	< 6	good
103	3	Rarely	sometimes	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2days/week	< 6	Excellent
104	2	Never	Never	Restaurants	Never	3-4x/week	never	1-2x/week	never	1-2x/week	1-2x/week	never	never	1-2days/week	(6-7)	good
105	3	Rarely	sometimes	Self-prepared	Occasionally	1-2x/week	1-2x/week	>=5 x/week	>=5 x/week	>=5 x/week	1-2x/week	never	3-4x/week	Never	< 6	Excellent
106	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	never	>=5days/ week	(6-7)	good
107	3	Rarely	Often	Self-prepared	Never	>=5 x/week	never	3-4x/week	never	never	1-2x/week	1-2x/week	1-2x/week	Never	(6-7)	Fair
108	2	Rarely	Never	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	1-2x/week	3-4x/week	1-2x/week	never	3-4x/week	1-2days/week	< 6	Excellent
109	2	Sometimes	Never	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	never	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
11	2	Somet	somet	Self-	Never	>=5 x/w	never	1-2x/	1-2x/	1-2x/	>=5 x/w	1-2x/	1-2x/	1-2day	(7-	Excel

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
0		imes	imes	pre pared		eek		week	week	week	eek	week	week	s/week	8)	lent
111	3	Rarely	sometimes	Self-prepared	Never	1-2x/week	never	never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	Never	(7-8)	good
112	2	Sometimes	Rarely	Self-prepared	Never	3-4X/week	never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	never	1-2x/week	Never	(6-7)	Excellent
113	3	Rarely	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	>=5x/week	1-2x/week	1-2x/week	never	1-2x/week	Never	(6-7)	Excellent
114	3	Rarely	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	< 6	good
115	2	Sometimes	Often	Cafeteria	Never	>=5x/week	1-2x/week	1-2x/week	3-4x/week	>=5x/week	3-4x/week	3-4x/week	>=5x/week	>=5days/week	(6-7)	good
116	2	Rarely	sometimes	Restaurants	Never	>=5x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	3-4x/week	>=5x/week	Never	< 6	good
117	3	Sometimes	Rarely	Self-prepared	Occasionally	>=5x/week	3-4x/week	>=5x/week	>=5x/week	3-4x/week	3-4x/week	>=5x/week	3-4x/week	>=5days/week	< 6	Excellent
118	2	Sometimes	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2days/week	(6-7)	good
1	2	Oft	so	Self	Nev	3-	nev	nev	1-	3-	nev	nev	nev	>=5d	<	po

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
19		en	metimes	-prepared	er	4x/week	er	er	2x/week	4x/week	er	er	er	ays/ week	6	or
120	>=4	Rarely	Rarely	Restaurants	Occasionally	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	never	>=5days/ week	>8	Fair
121	3	Rarely	Rarely	Self-prepared	Never	>=5x/week	never	1-2x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	never	Never	>8	Fair
122	3	Never	sometimes	Self-prepared	Never	>=5x/week	never	1-2x/week	1-2x/week	>=5x/week	3-4x/week	never	>=5x/week	Never	>8	good
123	2	Sometimes	Rarely	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	never	3-4x/week	>=5x/week	1-2x/week	never	3-4days/week	>8	Excellent
124	1	Often	sometimes	Self-prepared	Occasionally	>=5x/week	1-2x/week	3-4x/week	>=5x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	>=5days/ week	<6	good
125	>=4	Never	Often	Restaurants	Occasionally	>=5x/week	never	3-4x/week	3-4x/week	>=5x/week	>=5x/week	1-2x/week	1-2x/week	>=5days/ week	>8	good
126	3	Sometimes	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	>=5x/week	3-4x/week	1-2x/week	3-4days/week	<6	good
127	3	Rarely	Rarely	Self-prepared	Never	1-2x/week	3-4x/week	1-2x/week	never	3-4x/week	3-4x/week	1-2x/week	never	Never	(7-8)	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
128	2	Sometimes	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(6-7)	good
129	3	Sometimes	Rarely	Self-prepared	Occasionally	>=5x/week	never	1-2x/week	>=5x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	Never	>8	Fair
130	1	Often	Rarely	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	>=5x/week	3-4x/week	>=5x/week	Never	(6-7)	Excellent
131	1	Sometimes	Rarely	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	>8	Fair
132	2	Sometimes	sometimes	Self-prepared	Never	3-4x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	Never	(7-8)	good
133	>=4	Rarely	sometimes	Self-prepared	WEEKLY	>=5x/week	never	1-2x/week	1-2x/week	1-2x/week	never	1-2x/week	never	1-2days/week	<6	poor
134	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	never	3-4x/week	1-2x/week	3-4x/week	1-2x/week	>=5x/week	1-2days/week	(6-7)	Excellent
135	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	never	3-4x/week	3-4x/week	1-2x/week	1-2x/week	>=5x/week	3-4x/week	1-2days/week	(6-7)	Excellent
13	3	Never	somet	Self-	Never	3-4x/	never	3-4x/	3-4x/	1-2x/	1-2x/	1-2x/	1-2x/	1-2day	(6-	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
6			imes	pre pared		week		week	week	week	week	week	week	s/week	7)	
137	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	3-4x/week	>=5 x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	(7-8)	good
138	3	Never	Rarely	Self-prepared	Never	>=5 x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2days/week	(7-8)	good
139	2	Rarely	Often	Self-prepared	Never	>=5 x/week	3-4x/week	1-2x/week	>=5 x/week	>=5 x/week	3-4x/week	>=5 x/week	1-2x/week	1-2days/week	< 6	good
140	3	Sometimes	Rarely	Self-prepared	Never	>=5 x/week	never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	never	3-4x/week	1-2days/week	(6-7)	good
141	2	Rarely	Rarely	Self-prepared	Never	>=5 x/week	never	1-2x/week	3-4x/week	1-2x/week	1-2x/week	never	never	1-2days/week	(6-7)	Fair
142	3	Rarely	sometimes	Self-prepared	Never	3-4x/week	3-4x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	Never	(7-8)	good
143	2	Sometimes	Rarely	Self-prepared	Never	3-4x/week	1-2x/week	never	1-2x/week	3-4x/week	>=5 x/week	1-2x/week	1-2x/week	3-4days/week	< 6	good
144	3	Rarely	Rarely	Restaurants	Never	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	>=5 x/week	3-4x/week	1-2days/week	(6-7)	Excellent

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
145	1	Sometimes	Rarely	Self-prepared	Never	3-4x/week	never	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4days/week	< 6	Excellent
146	2	Sometimes	sometimes	Cafeteria	Never	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	never	Never	(7-8)	good
147	3	Sometimes	sometimes	Self-prepared	Never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	Never	< 6	Excellent
148	3	Sometimes	Rarely	Self-prepared	Never	>=5x/week	never	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	1-2x/week	Never	(6-7)	good
149	3	Never	Never	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2days/week	(6-7)	good
150	2	Sometimes	sometimes	Self-prepared	Never	>=5x/week	1-2x/week	1-2x/week	>=5x/week	>=5x/week	1-2x/week	1-2x/week	>=5x/week	Never	(7-8)	good
151	3	Sometimes	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	1-2x/week	3-4x/week	3-4x/week	1-2days/week	< 6	good
152	2	Sometimes	Rarely	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	never	1-2x/week	1-2x/week	Never	(7-8)	good
153	3	Sometime	sometime	Self-pre	Never	>=5x/week	never	3-4x/wee	1-2x/wee	1-2x/wee	>=5x/week	1-2x/wee	1-2x/wee	Never	> 8	good

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Slee p	Self-rated health
		s	s	pared				k	k	k		k	k			
154	1	Often	Often	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	>=5 x/week	3-4x/week	1-2x/week	>=5 x/week	never	Never	(6-7)	good
155	1	Often	Often	Restaurants	Never	1-2x/week	3-4x/week	>=5 x/week	3-4x/week	>=5 x/week	>=5 x/week	3-4x/week	1-2x/week	>=5days/ week	< 6	good
156	2	Rarely	Rarely	Self-prepared	Never	>=5 x/week	1-2x/week	1-2x/week	never	3-4x/week	>=5 x/week	1-2x/week	>=5 x/week	1-2days/week	(6-7)	good
157	1	Often	Never	Self-prepared	Never	>=5 x/week	>=5 x/week	>=5 x/week	>=5 x/week	>=5 x/week	never	never	1-2x/week	>=5days/ week	> 8	good
158	2	Sometimes	sometimes	Self-prepared	Never	>=5 x/week	never	never	1-2x/week	never	never	never	never	Never	(6-7)	Fair
159	2	Often	sometimes	Self-prepared	Never	3-4x/week	1-2x/week	1-2x/week	never	1-2x/week	1-2x/week	1-2x/week	3-4x/week	1-2days/week	(6-7)	good
160	2	Sometimes	Rarely	Self-prepared	Never	3-4x/week	1-2x/week	>=5 x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	3-4x/week	>=5days/ week	< 6	Excellent
161	2	Rarely	Rarely	Self-prepared	Never	3-4x/week	never	1-2x/week	3-4x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2days/week	(6-7)	good
1	3	Oft	Rar	Self	Nev	>=5	1-	1-	>=5	1-	1-	nev	>=5	Neve	<	go

ID	Meals/ day	Meal skipping	Snacks	Meal source	Alcohol	Cereals	Roots	Legumes	Vegetables	Fruits	Animal foods	Fast foods	Sugary drinks	Physical activity	Sleep	Self-rated health
62		en	ely	-prepared	er	x/week	2x/week	2x/week	x/week	2x/week	2x/week	er	x/week	r	6	od
163	3	Sometimes	Never	Self-prepared	Never	>=5 x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	3-4x/week	1-2x/week	>=5 x/week	1-2days/week	< 6	Fair
164	3	Sometimes	sometimes	Restaurants	Occasionally	>=5 x/week	1-2x/week	>=5 x/week	1-2x/week	1-2x/week	>=5 x/week	1-2x/week	>=5 x/week	>=5days/ week	< 6	good