

Dietary Habits and Nutritional Status of Undergraduate Students at the University of Labé, Republic of Guinea: A Descriptive and Analytical Cross-Sectional Study

Eric Ghigo¹, Mamadou Oury Diallo², Lanan Wassy Soromou², Abdoulaye Oury Barry²

¹Training and Research Unit BioHafia, Department of Applied Biology, Faculty of Science and Technology, University of Labé, BP 210, Labé, Republic of Guinea

²University of Labé, BP 210, Labé, Republic of Guinea

Abstract: Objective University students in higher education, and in the Labé region of Guinea in particular, remain understudied from a nutritional standpoint. This study set out to describe dietary habits and assess the nutritional status of undergraduate students at the Faculty of Science and Technology (FST), University of Labé, and to identify the factors associated with it. Methods We conducted a descriptive, analytical cross-sectional study among 129 undergraduate students (years 1-3), recruited through stratified systematic random sampling. For each participant we collected socio-demographic, anthropometric (weight, height, body mass index [BMI], mid-upper arm circumference [MUAC]), behavioural and dietary data, together with clinical and biological parameters (blood pressure, capillary glycaemia, haemoglobin level). Nutritional status was classified using WHO BMI cut-offs and anaemia using sex-specific WHO haemoglobin thresholds. Associations were tested with Pearson's Chi-square test, Student's t-test and Pearson correlation, at a significance threshold of $P < 0.05$. Results The 129 participants comprised 80 men (62.0%) and 49 women (38.0%), with a mean age of 22.5 ± 1.9 years. Mean BMI was 20.8 ± 3.5 kg/m², closely correlated with MUAC ($r = 0.77$; $P < 0.001$). Just over a third of students (38.0%) showed some form of malnutrition: 26.4% were thin, 10.9% overweight and 0.8% obese. Women carried a heavier double burden than men, combining more thinness (28.6% vs 25.0%) and more overweight/obesity (20.4% vs 6.2%; $\chi^2 = 7.43$; $P = 0.059$). More than half the sample (57.4%) skipped breakfast, and 69.0% ate only two meals a day. Fruit, pulses and dairy products were eaten daily by only 36.4%, 13.2% and 10.1% of students respectively, whereas cereals (93.8%) and fats (85.3%) were consumed almost universally. Anaemia affected 28.7% of students (36.7% of women vs 23.8% of men; $P = 0.167$), and 13.4% had hypertension. Conclusion Students at the University of Labé face a double nutritional burden, combining thinness and overweight, compounded by a notable prevalence of anaemia, against a backdrop of unbalanced eating habits: skipped breakfasts, too few meals, and too little fruit, pulses or dairy. These findings point to a clear need for nutrition education and better-adapted catering within Guinean universities.

Keywords: dietary habits, nutritional status, body mass index, anaemia, mid-upper arm circumference, university students, Guinea.

1. Introduction

Across sub-Saharan Africa, the nutrition transition has produced an uneasy overlap: undernutrition and overweight now coexist within the same populations, sometimes even within the same person at different points in life. This phenomenon is called the "double burden of malnutrition" by experts, and it is an increasing problem that now includes populations that were once thought of as low-risk, such as university students [1,2]. Starting college usually means a sudden change in eating habits. Young adults leave their family

homes, take charge of their own meals for the first time, handle tight budgets, and adapt to intense academic schedules that offer little time for organised eating. It's no surprise that many end up skipping meals, relying on snacks, and consuming few fruits and vegetables [2,3]. A large study across 28 countries involving 21,958 students revealed that about 48% regularly skipped breakfast, a behaviour tied to feeling overweight and lack of physical activity [3]. In Cameroon, a survey at three public universities found 29.4% of medical students faced some form of malnutrition, with 4.9% underweight, 21.6%

overweight, and 3.0% obese [2]. Similarly, students in coastal Kenya showed a disconnect between knowledge and practice: despite understanding good nutrition, their actual diets lacked sufficient animal-source foods, fruits, and vegetables [4]. Body weight is only part of the picture, though. Micronutrient deficiencies, and anaemia in particular, are a persistent problem among young adults on African university campuses. In one striking example, a cohort of Ghanaian students saw anaemia prevalence more than double over a single academic year, rising from 20% to 45%, as their eating habits deteriorated on campus [5]. Guinea's own nutrition data are largely focused on young children, pregnant women and, more recently, older adults [12]. The first nationally representative survey of older persons showed a distinct regional pattern of undernutrition in the Labé region, at nearly double the national average (standardised prevalence ratio of 1.97) [6]. That finding raises an obvious question: is this regional susceptibility confined to the elderly or does it extend to other groups, including students? At the University of Labé, no data existed to answer this before the present study. We therefore set out to assess how dietary habits relate to the nutritional status of undergraduate students at the Faculty of Science and Technology, University of Labé. More specifically, we aimed to: (i) describe the socio-demographic, anthropometric and behavioural profile of the study population; (ii) determine the prevalence of the different BMI-based nutritional categories; (iii) describe dietary habits, including meal patterns and food-group consumption frequency; (iv) describe key clinical and biological parameters, namely blood pressure, glycaemia and haemoglobin; and (v) identify the socio-demographic and behavioural factors associated with nutritional status.

2. Materials And Methods

2.1. Study Design, Setting and Period

This was a descriptive and analytical cross-sectional study conducted within the Department of Applied Biology, Faculty of Science and Technology (FST), University of Labé, Republic of Guinea. Data collection took place from 1 June to 31 July 2026, in the department's teaching laboratory, as part of a doctoral research project.

2.2. Study Population and Sampling

The source population comprised all undergraduate students regularly enrolled at the FST, a total of 1,290 students, comprising 872 men (67.5%) and 418 women (32.5%). To ensure representativeness of both sexes and to limit selection bias, a stratified systematic random sampling technique was used, with the source population divided into two homogeneous strata by sex (male and female strata). Within each stratum, a fixed sampling fraction of 1/10 (10% sampling rate) was applied: the list of students in each stratum was divided into consecutive blocks of 10 individuals, from which one individual was randomly drawn. This procedure yielded a theoretical sample of 129 students, comprising 87 men (from the 872 men) and 42 women (from the 418 women). Each

sub-sample was then allocated across the faculty's five departments (approximately 17 students per department for the male sub-sample), and each head of department was asked to mobilise the designated students, who were received individually in the data-collection room. Upon completion of field recruitment, the final sample analysed comprised, as planned, 129 students, although with a sex distribution slightly different from the theoretical target (80 men and 49 women instead of 87 men and 42 women), possibly related to differences in availability or response rate between departments and by sex at the time of recruitment. The final sample composition was therefore: 80 men and 49 women, comprising 72 year-1 students (55.8%), 33 year-2 students (25.6%) and 24 year-3 students (18.6%).

2.3. Variables and Data Collection Instruments

Data were collected using a structured questionnaire and anthropometric and biological measurements, covering four domains: (i) Socio-demographic characteristics: age, sex, marital status, year of study, type of accommodation, source of income, perceived living conditions; (ii) Anthropometric characteristics: weight (kg), height (m), body mass index (BMI = weight/height², kg/m²), and mid-upper arm circumference (MUAC, cm); (iii) Behavioural and dietary habits: practice and frequency of physical activity, alcohol, tobacco, tea/coffee consumption, number of meals per day, breakfast consumption, frequency of consumption (daily, weekly, monthly, never) of nine food groups (milk and dairy products, cereals and starches, pulses, meat/fish/eggs, fruit, vegetables, fats, sugary products, carbonated drinks); (iv) Clinical and biological parameters: blood pressure (mmHg), capillary glycaemia (g/L), and haemoglobin level (g/dL), measured at the time of the survey. The Anthropometric and the clinical instruments were calibrated before data collection. Weight and height were measured with a combined scale-stadiometer (ADE), zeroed before each measurement session. Mid-upper arm circumference was measured with a Shakir tape (FEFA), read on its plain white (non-colour-coded) ribbon. Blood pressure was measured with a calibrated electronic blood pressure monitor (Shanghai Brother Medical Manufacturer Co., Ltd., model BME001). Capillary glycaemia was measured with an electronic glucometer (SD-Chek), calibrated beforehand, on a fasting capillary blood sample. Haemoglobin was measured with a HemoCue Mission Hb point-of-care analyser, with automatic device calibration, on a capillary blood sample.

2.4. Operational Definitions

Operational definitions are defined as follows: (i) Nutritional status by BMI (WHO criteria): thinness for BMI < 18.5 kg/m²; normal weight for 18.5 ≤ BMI < 25 kg/m²; overweight for 25 ≤ BMI < 30 kg/m²; obesity for BMI ≥ 30 kg/m² [7]. (ii)

Anaemia: haemoglobin < 12 g/dL in women and < 13 g/dL in men using the WHO thresholds [8]. (iii) Hypertension: systolic blood pressure $\geq$ 140 mmHg and/or diastolic $\geq$ 90 mmHg; hypotension if systolic < 90 mmHg or diastolic < 60 mmHg. (iv) Glycaemic abnormality: hypoglycaemia if glycaemia < 0.70 g/L; hyperglycaemia if glycaemia > 1.10 g/L; values between these thresholds considered normal.

2.5. Statistical Analysis

Data were extracted, cleaned and analysed using Python (pandas, SciPy) and Microsoft Excel. Quantitative variables were described as mean $\pm$ standard deviation (SD) and compared using Student's t-test; qualitative variables were described as frequencies and percentages and compared using Pearson's Chi-square test (or exact test where expected cell counts were < 5). Pearson's correlation coefficient (r) was employed to assess the relationships between quantitative variables. Statistical significance was set at $P < 0.05$. Two biologically implausible values, one for blood pressure and one for glycaemia, were identified as potential data entry errors and recoded as missing. The sample size (n) for each affected variable is clearly indicated. Confidence intervals for proportions were calculated using Wilson score method. 95% CIs are presented in brackets throughout the results tables. To assess whether the association between sex and nutritional status persisted after accounting for other socio-demographic and behavioural factors, we additionally fitted a multivariable logistic regression model (malnutrition, i.e. any BMI category other than normal weight, as the binary outcome), adjusting for sex, age, breakfast consumption, physical activity, type of accommodation and year of study; results are reported as adjusted odds ratios (aOR) with 95% confidence intervals. All analyses are fully reproducible from the raw data (**supplementary Data S1**): the Python script implementing every statistical test and the regression model is provided as **Supplementary Data S2**.

2.6. Ethical Considerations

Data collection was formally authorised by the Vice-Dean for Research of the Faculty of Science and Technology, University of Labé (Data Collection Authorisation Note No. 008/UL/FST/VD-R/2026, dated 30 May 2026), as part of the corresponding author's [sic, first author's] doctoral research. Student participation was voluntary and preceded by informed consent; data were handled anonymously and confidentially, in strict accordance with research ethics rules. Full details are provided in the Declarations section.

3. Results

3.1. Socio-demographic Characteristics

Of the 129 students included, 80 were male (62.0%) and 49 were female (38.0%), a male-to-female ratio of 1.6. The mean age of the whole sample was 22.5 ± 1.9 years (range: 18-27 years); men were significantly older than women (23.0 ± 1.9 years vs 21.8 ± 1.7 years; $t = 3.81$; $P < 0.001$). Detailed socio-demographic characteristics are presented in Table 1. Most students were single, making up 91.5% of the group, and the age distribution followed a predictable pattern: over half were in their first year, with much smaller numbers in the second and third years, showing how student numbers tend to drop as people progress through the programme. The most frequently used housing option was off-campus rentals, which was used by 58.1% of the students. A high percentage lived with their families and only 14% lived in university dormitories. This shows a lack of on-campus housing or preference for other housing. Most were financially supported by their families - 80.6% were supported by parents with a maintenance grant. Some managed to scrape by with money from both parents and money they earned themselves. But a small minority, just 7.8 per cent, survived on their own income and a grant without any parental support. Feelings about their living situations varied. Less than half thought their conditions were acceptable, around a third described them as average, and a notable 6.2% felt they were in a precarious situation, underscoring that financial pressure is a real and ongoing challenge for some students alongside their academic workload.

This table presents the socio-demographic characteristics of the 129 students included in the study, as number (n) and percentage (%) of the total sample. Values in square brackets are 95% confidence intervals (95% CI) for each proportion, calculated using the Wilson score method. N: total number of students analysed.

Table 1 Socio-demographic characteristics of the students (N = 129)

Variable	n	%
Sex -- Male	80	62.0 [95% CI 53.4-69.9]
Sex -- Female	49	38.0 [95% CI 30.1-46.6]
Year of study -- Year 1	72	55.8 [95% CI 47.2-64.1]
Year of study -- Year 2	33	25.6 [95% CI 18.8-33.7]
Year of study -- Year 3	24	18.6 [95% CI 12.8-26.2]
Marital status -- Single	118	91.5 [95% CI 85.4-95.2]
Marital status -- Married	10	7.8 [95% CI 4.3-13.7]
Marital status -- Divorced	1	0.8 [95% CI 0.1-4.3]
Accommodation -- Rented	75	58.1 [95% CI 49.5-66.3]
Accommodation -- Family home	36	27.9 [95% CI 20.9-36.2]
Accommodation -- University dormitory	18	14.0 [95% CI 9.0-21.0]

Variable	n	%
Income source -- Parents and maintenance grant	104	80.6 [95% CI 73.0-86.5]
Income source -- Parents and personal income	12	9.3 [95% CI 5.4-15.6]
Income source -- Personal income and grant	10	7.8 [95% CI 4.3-13.7]
Income source -- Other	3	2.3 [95% CI 0.8-6.6]
Perceived living conditions -- Acceptable	59	45.7 [95% CI 37.4-54.3]
Perceived living conditions -- Average	46	35.7 [95% CI 27.9-44.2]
Perceived living conditions -- Good	16	12.4 [95% CI 7.8-19.2]
Perceived living conditions -- Precarious	8	6.2 [95% CI 3.2-11.8]

3.2. Anthropometric Characteristics and Nutritional Status

Mean weight was 59.3 ± 10.0 kg (range: 36-87 kg) and mean height was 1.69 ± 0.08 m (range: 1.48-1.86 m); men were, unsurprisingly on biological grounds, heavier (61.0 ± 8.7 kg vs 56.6 ± 11.3 kg; $P = 0.024$) and taller (1.73 ± 0.06 m vs 1.62 ± 0.07 m; $P < 0.001$) than women (Table 2). Mean BMI for the whole sample was 20.8 ± 3.5 kg/m² (range: 13.7-38.7 kg/m²), with no statistically significant difference between men (20.3 ± 2.5 kg/m²) and women (21.5 ± 4.6 kg/m²; $t = -1.65$; $P = 0.104$), the weight-to-height ratio broadly compensating between sexes. Mean MUAC was 26.2 ± 2.9 cm, with no significant difference between men (26.5 ± 2.5 cm) and women (25.6 ± 3.6 cm; $P = 0.110$), and was strongly and positively correlated with BMI ($r = 0.77$; $P < 0.001$), confirming its relevance as a complementary anthropometric indicator in this setting, consistent with data reported in other African populations [9][10]. According to WHO BMI cut-offs, 80 students (62.0%) had normal weight, while 34 (26.4%) had thinness, 14 (10.9%) were overweight and 1 (0.8%) had obesity, giving an overall malnutrition prevalence (thinness + overweight + obesity) of 38.0%. The distribution differed by sex (**Figure 1**): women showed both more thinness (28.6% vs 25.0% in men) and more overweight/obesity (20.4% vs 6.2% in men), reflecting a more marked double nutritional burden among female students; this difference in distribution between sexes was borderline statistically significant ($\chi^2 = 7.43$; $df = 3$; $P = 0.059$). **Table 2** is really more interesting for what it hides behind the averages than for the averages themselves. Mean BMI looked unremarkable on paper, and barely different between men and women, yet individual values ranged from 13.7 kg/m² to 38.7 kg/m², everything from severe thinness to class II obesity, sitting side by side in the same dataset. Weight, height and MUAC told the same story: close on average across

sexes, but pulling apart the moment students are split into WHO categories. Averages, in other words, would have hidden the double burden completely; it only shows up once you look at the breakdown, which is really the point of **Table 2** and **Figure 1**.

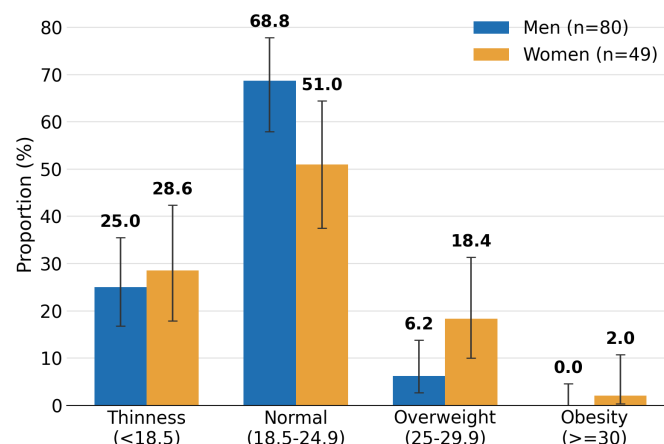


Figure 1 Distribution of nutritional status (BMI, WHO criteria) by sex among FST students, University of Labé (N = 129)

Percentage distribution of students by nutritional status, assessed by body mass index (BMI, World Health Organization [WHO] criteria), shown separately for men (n = 80) and women (n = 49). Error bars represent 95% confidence intervals (95% CI) for each proportion, calculated using the Wilson score method. BMI: body mass index; WHO: World Health Organization.

This table compares anthropometric characteristics and nutritional status between men and women. Continuous variables are expressed as mean $\pm$ standard deviation (SD) and compared using Student's t-test; categorical variables are expressed as number and percentage n (%), with 95% confidence intervals (95% CI, Wilson score method) in square brackets, and compared using Pearson's chi-square test. SD: standard deviation; BMI: body mass index; MUAC: mid-upper arm circumference; P: statistical significance. * Overall P-value of the Chi-square test across 4 categories (nutritional status $\times$ sex), $df = 3$.

Table 2 Anthropometric characteristics and nutritional status by sex

Parameter	Overall (N=129)	Men (n=80)	Women (n=49)	P
Weight (kg), mean $\pm$ SD	59.3 $\pm$ 10.0	61.0 $\pm$ 8.7	56.6 $\pm$ 11.3	0.024
Height (m), mean $\pm$ SD	1.69 $\pm$ 0.08	1.73 $\pm$ 0.06	1.62 $\pm$ 0.07	<0.001
BMI (kg/m ²), mean $\pm$ SD	20.8 $\pm$ 3.5	20.3 $\pm$ 2.5	21.5 $\pm$ 4.6	0.104
MUAC (cm), mean $\pm$ SD	26.2 $\pm$ 2.9	26.5 $\pm$ 2.5	25.6 $\pm$ 3.6	0.110

Parameter	Overall (N=129)	Men (n=80)	Women (n=49)	P
Thinness, n (%)	34 (26.4) [95% CI 19.5-34.6]	20 (25.0) [95% CI 16.8-35.5]	14 (28.6) [95% CI 17.8-42.4]	0.059*
Normal weight, n (%)	80 (62.0) [95% CI 53.4-69.9]	55 (68.8) [95% CI 57.9-77.8]	25 (51.0) [95% CI 37.5-64.4]	0.059*
Overweight, n (%)	14 (10.9) [95% CI 6.6-17.4]	5 (6.2) [95% CI 2.7-13.8]	9 (18.4) [95% CI 10.0-31.4]	0.059*
Obesity, n (%)	1 (0.8) [95% CI 0.1-4.3]	0 (0.0) [95% CI 0.0-4.6]	1 (2.0) [95% CI 0.4-10.7]	0.059*

3.3. Lifestyle and Dietary Habits

Physical activity was reported by 115 students (89.1%), described as regular by 57 of them (44.2%), irregular by 41 (31.8%) and occasional by 17 (13.2%); 14 students (10.9%) reported no physical activity at all. Alcohol consumption concerned 11 students (8.5%) and tobacco use 9 students (7.0%), while tea or coffee consumption concerned the majority of the sample (74.4%). Regarding meal patterns, 1 student (0.8%) ate only one meal per day, 89 (69.0%) ate two, 35 (27.1%) ate three, and 4 (3.1%) ate four or more. Breakfast was skipped by 74 students, i.e. 57.4% of the sample. Analysis of consumption frequency by food group (Figure 2) revealed a diet dominated by starchy staples, with daily consumption of cereals and starches in 93.8% of students, fats in 85.3%, and vegetables in 84.5%. Conversely, daily consumption of micronutrient-dense food groups remained low: fruit (36.4%), pulses (13.2%) and milk/dairy products (10.1%). Daily consumption of sugary products (41.1%) and, to a lesser extent, carbonated drinks (6.2%) was also noted. Figure 2 makes the imbalance easy to see at a glance, indeed the food groups students eat daily cluster almost entirely among the starchy, energy-dense options, cereals, fats and vegetables, while fruit, pulses and dairy barely register. That pattern is worth reading alongside the meal habits described above. Skipping breakfast in more than half the sample, and eating only two meals a day for seven in ten students, does not leave much room to fit in the food groups already in short supply; when a student's day narrows to two meals, whatever is quickest and most filling, rice, bread, oil, tends to win out over fruit or dairy, which read more as extras here than as staples. Physical activity, for its part, was reported by the large majority of students (89.1%), though only 44.2% described it as regular, so the picture on the exercise side looks somewhat more reassuring than the one on diet.

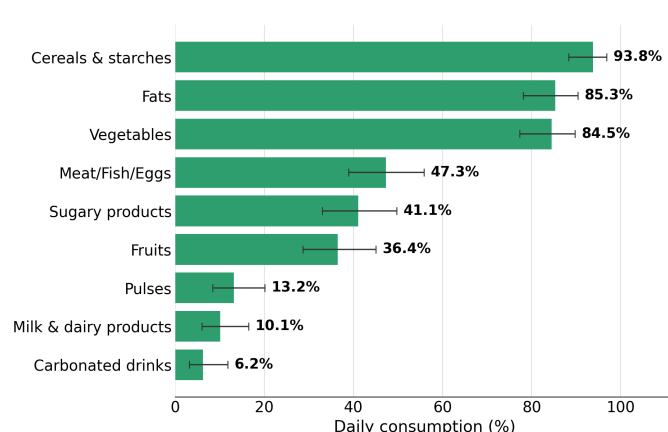


Figure 2 Proportion of students consuming each food group daily (N = 129)

Proportion of students (N = 129) reporting daily consumption of each food group, assessed from a food-frequency questionnaire. Food groups are ranked in descending order of daily consumption frequency. Error bars represent 95% confidence intervals (95% CI) for each proportion, calculated using the Wilson score method.

3.4. Clinical and Biological Parameters

Mean systolic blood pressure was 115.0 ± 12.8 mmHg and mean diastolic pressure was 73.3 ± 8.8 mmHg (n = 127, two non-usable values excluded) (**Table 3**). Hypertension was found in 17 students (13.4%) and hypotension in 3 (2.4%), with 107 students (84.3%) having normal blood pressure readings. Mean capillary glycaemia was 0.91 ± 0.10 g/L (n = 127, one outlier and one missing value excluded); it was normal in 122 students (96.1%), with 3 cases of hyperglycaemia (2.4%) and 2 cases of hypoglycaemia (1.6%). Mean haemoglobin level was 13.2 ± 2.7 g/dL. Using sex-specific WHO thresholds, anaemia was observed in 37 students, an overall prevalence of 28.7%. This prevalence was higher among women (18/49, 36.7%) than men (19/80, 23.8%), although the difference did not reach statistical significance ($\chi^2 = 1.91$; P = 0.167). **Table 3** brings these three clinical and biological domains together, and what stands out is less any single abnormal value than how often findings clustered near normal on average while still leaving a meaningful minority outside it. Blood pressure and glycaemia were both essentially normal for the great majority of students, with hypertension, hypotension, hyperglycaemia and hypoglycaemia each affecting only a handful of participants, generally well under one in ten. Anaemia broke that pattern: nearly three in ten students were affected, rising to closer to one in three among women, a scale of difference that puts anaemia in a different category from the other parameters, less an isolated finding than a burden layered on top of the nutritional-status picture already described in section 3.2.

This table presents the students' clinical (blood pressure) and biological (capillary glycaemia, haemoglobin) parameters,

together with the prevalence of associated abnormalities. Continuous variables are expressed as mean $\pm$ SD; categorical variables are expressed as number and percentage n (%), with 95% CI (Wilson score method) in square brackets. n: number of participants with valid data for the variable concerned; two biologically implausible values (one blood pressure reading and one glycaemia reading) were excluded and treated as missing (see Section 2.5).

Table 3 Clinical and biological parameters of the students

Parameter	n analysed	Result
Systolic blood pressure (mmHg), mean $\pm$ SD	127	115.0 $\pm$ 12.8
Diastolic blood pressure (mmHg), mean $\pm$ SD	127	73.3 $\pm$ 8.8
Hypertension, n (%)	127	17 (13.4) [95% CI 8.5-20.4]
Hypotension, n (%)	127	3 (2.4) [95% CI 0.8-6.7]
Capillary glycaemia (g/L), mean $\pm$ SD	127	0.91 $\pm$ 0.10
Hyperglycaemia (> 1.10 g/L), n (%)	127	3 (2.4) [95% CI 0.8-6.7]
Hypoglycaemia (< 0.70 g/L), n (%)	127	2 (1.6) [95% CI 0.4-5.6]
Haemoglobin (g/dL), mean $\pm$ SD	129	13.2 $\pm$ 2.7
Anaemia (WHO, sex-specific thresholds), n (%)	129	37 (28.7) [95% CI 21.6-37.0]
-- of whom, women with anaemia, n (%)	49	18 (36.7) [95% CI 24.7-50.7]
-- of whom, men with anaemia, n (%)	80	19 (23.8) [95% CI 15.8-34.1]

3.5. Factors Associated with Nutritional Status

Table 4 summarises the bivariate analyses exploring socio-demographic and behavioural factors associated with nutritional status (BMI). Sex was the factor closest to the significance threshold ($P = 0.059$). No statistically significant association was found between nutritional status and age, breakfast consumption, physical activity, type of accommodation, year of study, or number of daily meals. Likewise, nutritional status was not significantly associated with anaemia status ($\chi^2 = 1.25$; $P = 0.741$), nor was breakfast consumption significantly associated with anaemia status ($\chi^2 = 0.00$; $P = 1.000$). None of the associations was statistically significant at the conventional level but the sex difference was close ($P = 0.059$) and deserves to be revisited in conjunction with Table 2, which indicates that women have higher rates of both thinness and overweight or obesity than men. With only 129 students, spread across three or four groups for each variable, even a meaningful difference may not achieve statistical significance simply because of low power; not finding an effect does not mean there isn't one. In a multivariable logistic regression model adjusting for age,

breakfast consumption, physical activity, type of accommodation and year of study, female sex remained associated with higher odds of malnutrition (aOR = 2.50, 95% CI: 1.04-6.02; $P = 0.041$); physical activity showed a similar upward trend that did not reach significance after adjustment (aOR = 3.86, 95% CI: 0.86-17.24; $P = 0.077$). The overall model did not significantly exceed the null model (likelihood-ratio $P = 0.255$; pseudo- $R^2 = 0.06$), so the adjusted estimates should be interpreted as a small, hypothesis-generating improvement of the bivariate results, not as a conclusive result given the sample size. It is also interesting that nutritional status did not correlate significantly with anaemia (Table 4) in spite of the high prevalence of both problems in this group. It implies that the two conditions are not closely associated in this population but that there are several different factors that contribute to students' nutritional health.

This table summarises the bivariate analyses exploring the association between nutritional status (BMI) and various socio-demographic and behavioural factors. df: degree(s) of freedom; r: Pearson correlation coefficient. Statistical significance threshold: $P < 0.05$.

Table 4 Socio-demographic and behavioural factors associated with nutritional status

Factor	Statistical test	Value	P
Sex	Chi2 (df=3)	7.43	0.059
Age (correlation with BMI)	Pearson r	-0.10	0.283
Breakfast consumption	Chi2 (df=3)	2.21	0.531
Physical activity (active/inactive)	Chi2 (df=3)	2.66	0.446
Type of accommodation	Chi2 (df=6)	5.11	0.529
Year of study (1/2/3)	Chi2 (df=6)	5.08	0.534
Number of meals/day (correlation)	Pearson r	0.02	0.852
Nutritional status $\times$ anaemia	Chi2 (df=3)	1.25	0.741

4. Discussion

Among the 129 students we surveyed at the FST, University of Labé, 38.0% showed some form of malnutrition, including 26.4% thin and 11.7% carrying excess weight. Seeing both ends of the spectrum in the same student population is not unusual; it fits the double nutritional burden already documented on other African campuses [1,2,4]. Our overall figure sits close to the 29.4% reported by Fala Bede et al. among medical students at three Cameroonian universities [2], but the balance within that figure looks different: their sample leaned more toward overweight and obesity (24.6% combined, against just 4.9% thinness), whereas ours leans the other way. Part of the explanation may lie in Labé's specific socio-economic context.

The same region already stood out for a high burden of undernutrition among older adults, nearly double the national average [6], which hints at a vulnerability that is not confined to any one age group. The double burden was more pronounced among women in our sample, who combined higher rates of both thinness and overweight/obesity than their male classmates. This mirrors a pattern often described in the African literature, where women in the same populations tend to be exposed to both ends of the malnutrition spectrum simultaneously [1]. The sex difference we observed only reached a statistical trend ($P = 0.059$) rather than significance in the unadjusted comparison, plausibly a question of sample size rather than a true absence of effect. Reassuringly, after adjusting for age, breakfast consumption, physical activity, type of accommodation and year of study in a multivariable logistic regression model, the association between female sex and malnutrition strengthened to conventional significance ($aOR = 2.50$, 95% CI: 1.04-6.02; $P = 0.041$), reinforcing rather than overturning this pattern, even though the overall model itself was not a significant improvement over the null ($P = 0.255$) and the finding should still be confirmed in larger samples. One of our more reassuring findings was the strong correlation between MUAC and BMI ($r = 0.77$; $P < 0.001$), which lines up with correlations of similar strength (0.56 to 0.68) reported elsewhere in African and Asian adult populations [9,10]. This is of practical importance: MUAC is a rapid, inexpensive and scale- or stadiometer-free screening approach, making it a feasible screening option for university health services that are not always well equipped. The documented eating patterns are very concerning. More than half of the students (57.4 per cent) skipped breakfast, and most (69.0 per cent) ate only twice a day. These two findings are very similar to the international picture: a 28-country study found 48.0% of students skipping breakfast, again associated with living away from home and eating too little fruit and vegetables [3], exactly the pattern we see here. Daily intake of fruit, pulses and dairy was low across the board (36.4%, 13.2% and 10.1% respectively), while cereals and fats were eaten by nearly everyone. That combination, heavy on starch and fat and light on micronutrients and quality protein, echoes what has been reported among coastal Kenyan students, who also ate poorly despite knowing, in principle, what a balanced diet should look like [4][11]. It's a reminder that nutrition education alone rarely changes behaviour; it needs to be paired with something more concrete, like affordable, accessible food options on campus [4]. Anaemia affected close to three in ten students (28.7%), a figure comparable to the 20.0% recorded at the start of the academic year among Ghanaian students in Cape Coast, though well below the 45.1% those same students reached by year's end, after months of deteriorating campus diets [5]. We only captured a single point in time, so we cannot say whether Guinean students follow a similar downward trajectory over the year. That question, though, seems worth answering: a longitudinal study tracking nutritional and iron status across a full academic year would tell us whether the picture here gets worse the same way it did in Ghana. Hypertension in 13.4% of a population this young (mean age 22.5) is not a trivial number. The high daily intake of

fats (85.3%) and sugary foods (41.1%) that we observed is a plausible contributor, but our data cannot establish a direct statistical link. Either way, this fits a wider worrying trend: non-communicable diseases are creeping into younger age groups across the continent as the epidemiological transition speeds up [1]. No association was observed between nutritional status and breakfast habits, physical activity, year of study or type of accommodation, in the bivariate and adjusted analysis. That does not necessarily mean these factors are irrelevant: with only 129 participants, and several variables coded as simple yes/no categories, our analysis may simply have lacked the power to detect real but modest associations. One adjusted estimate deserves a cautious mention: physical activity showed an upward, non-significant trend towards higher malnutrition odds ($aOR = 3.86$; $P = 0.077$), the opposite direction from the simple protective effect often assumed. Given the small numbers in the least active subgroups and the borderline P -value, we regard this as hypothesis-generating rather than conclusive, and would caution against over-interpreting it without replication in a larger sample.

4.1. Limitations

The cross-sectional design cannot establish causality between dietary habits and the nutritional status we observed.

Recruitment was limited to one faculty (FST) at one university, so these findings may not generalise to other Guinean students, or even to the rest of the University of Labé.

Dietary intake was self-reported via a consumption-frequency questionnaire, which is prone to recall and social-desirability bias and does not capture precise energy or nutrient quantities.

Nutritional status was assessed only through indirect markers, namely BMI, MUAC, blood pressure, capillary glycaemia and haemoglobin, with no protein or lipid work-up available to gauge cardiometabolic risk more directly.

With only 129 participants, statistical power for detecting associated factors was limited, particularly for the sex comparison, which fell just short of significance; the sex ratio we ultimately achieved in the field (80 men/49 women) also drifted somewhat from the sampling design's target (87 men/42 women).

5. Conclusion

Undergraduate students at the FST, University of Labé, carry a double nutritional burden: 26.4% are thin and 11.7% overweight or obese, alongside a notable prevalence of anaemia (28.7%) and hypertension (13.4%). Behind these numbers sit some clearly identifiable habits: frequent breakfast-skipping, too few meals, and not enough fruit, pulses or dairy in the daily diet. A few practical steps follow from these findings: (a) Nutrition education within Guinean universities should specifically target breakfast, dietary diversity, and the consumption of fruit, pulses and dairy products; (b) University catering needs to be both affordable and nutritionally balanced,

especially for students renting accommodation or living in dormitories, who may face tighter budgets; (c) University health services should screen routinely for anaemia and hypertension, with a clear pathway to treatment when needed; (d) Future research should move beyond a single faculty and a single time point; multicentre, longitudinal studies with fuller biological work-ups (protein and lipid profiles) and more precise dietary intake data would help clarify what really drives students' nutritional status, and whether targeted interventions can shift it.

Declarations

Ethics approval and consent to participate

Data Collection Authorisation No. 008/UL/FST/VD-R/2026, dated 30 May 2026. The study was conducted in accordance with the principles of the Declaration of Helsinki. Written/verbal informed consent was obtained from all participants prior to enrolment; participation was voluntary, and data were handled anonymously and confidentially.

Consent for publication

Not applicable (no identifiable individual data or images are presented).

Conflict of interest

The authors declare no conflict of interest in relation to this article.

Data availability

Anonymised individual-level data supporting the findings of this study are provided as supplementary material (**Supplementary Data S1**), together with the Python analysis script used to compute every statistic and model reported in the manuscript (**Supplementary data S2**).

Funding

This study did not receive any specific external research funding. Mamadou Oury Diallo, Lanan Wassy Soromou, Abdoulaye Oury Barry and Eric Ghigo are employed by the Ministry of Higher Education and Scientific Research (MESRS).

Author contributions

Mamadou Oury Diallo: conceptualisation, data collection, formal analysis, writing - original draft. Lanan Wassy Soromou and Abdoulaye Oury Barry: data analysis and interpretation, writing - review and editing. Eric Ghigo: supervision, conceptualisation, writing - review and editing, corresponding author. All authors read and approved the final manuscript.

Use of Artificial Intelligence (AI) tools

During the preparation of this manuscript, the authors used an AI-based large language model assistant (Claude, Anthropic) to assist with statistical data analysis and English-language editing. All AI-assisted output was reviewed, verified against

the source dataset, and edited by the authors, who take full responsibility for the accuracy, integrity and scientific content of the final manuscript. No AI tool is credited as an author.

Acknowledgements

The authors thank the students of the FST, University of Labé, who agreed to take part in this study, as well as the faculty's academic and administrative staff.

References

1. Gouda HN, Charlson F, Sorsdahl K, Ahmadzada S, Ferrari AJ, Erskine H, et al. Burden of non-communicable diseases in sub-Saharan Africa, 1990-2017: results from the Global Burden of Disease Study 2017. *Lancet Glob Health*. 2019;7(10):e1375-e1387. 10.1016/S2214-109X(19)30374-2
2. Fala Bede, Cumber SN, Nkfusai CN, Venyuy MA, Ijang YP, Wepngong EN, et al. Dietary habits and nutritional status of medical school students: the case of three state universities in Cameroon. *Pan Afr Med J*. 2020;35:15. 10.11604/pamj.2020.35.15.18818
3. Pengpid S, Peltzer K. Prevalence and associated factors of skipping breakfast among university students from 28 countries: a cross-sectional study. *Int J Adolesc Med Health*. 2022;34(2):97-103. 10.1515/ijamh-2019-0256
4. Mogeni BK, Ouma LO. Dietary patterns, behaviours, and their associated factors among university students in coastal Kenya. *Cogent Food Agric*. 2022;8(1):2132873. 10.1080/23311932.2022.2132873
5. Amoaning RE, Amoako ES, Kyiire GA, Owusu DD, Bruce H, Simpong DL, et al. Anaemia prevalence more than doubles in an academic year in a cohort of tertiary students: a repeated-measure study in Cape Coast, Ghana. *Adv Hematol*. 2022;2022:4005208. 10.1155/2022/4005208
6. Millimono TM, Camara A, Mabiama G, Daffé M, Boumediene F, Preux PM, et al. État nutritionnel des personnes âgées en Guinée : 1re étude transversale nationale représentative. *Nutr Clin Métab*. 2022;36(Suppl 1):S73. 10.1016/j.nupar.2021.12.142
7. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO Consultation. WHO Technical Report Series No. 894. Geneva: WHO; 2000.
8. World Health Organization. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System (VMNIS). Geneva: WHO; 2011. 10.1017/s1368980008002401
9. Musa IR, Omar SM, Adam I. Mid-upper arm circumference as a substitute for body mass index in the assessment of nutritional status among adults in eastern Sudan. *BMC Public Health*. 2022;22(1):2056. 10.1186/s12889-022-14536-4
10. Negi S, Srinath N, Akshay M. Comparing mid-upper arm circumference with body mass index for assessing

nutritional status in Indian adults: evidence from the National Family Health Survey 2015-16 (NFHS-4). *Cureus*. 2024;16(5):e59629. 10.7759/cureus.59629

11. Nyanchoka MA, van Stuijvenberg ME, Tambe AB, Zuma MK, Mbhenyane XG. Fruit and vegetable consumption patterns and risk of chronic diseases of lifestyle among university students in Kenya. *Int J Environ Res Public Health*. 2022;19(12):6965. 10.3390/ijerph19126965
12. Institut National de la Statistique (INS), ICF. Enquête Démographique et de Santé en Guinée 2018. Conakry, Guinée et Rockville, Maryland, USA: INS et ICF; 2019.

Appendix

Supplementary Material Legend

Dietary Habits and Nutritional Status of Undergraduate Students at the University of Labé, Republic of Guinea: A Descriptive and Analytical Cross-Sectional Study

Supplementary data S1

This file holds the de-identified dataset behind the results in the manuscript: one record per participant, 129 in total. The data come from a structured questionnaire together with direct anthropometric and clinical measurements, collected between 1 June and 31 July 2026 from undergraduate students (Years 1-3) at the Faculty of Science and Technology (FST), University of Labé, Republic of Guinea. Participants were recruited by stratified systematic random sampling by sex, with a 1/10 sampling fraction. The Vice-Dean for Research at FST authorised the data collection (Authorisation Note No. 008/UL/FST/VD-R/2026, dated 30 May 2026); participation was voluntary, and every student gave informed consent beforehand. Data were anonymised at the point of collection, so nothing in this file can identify a participant.

The file is a Microsoft Excel workbook (.xlsx) with three sheets:

ReadMe -- a short overview of the study, how the data were collected, the ethical approval, and a few notes on missing values and how the confidence intervals were calculated.

Raw_Data -- the dataset itself, one row per participant (Participant_ID 1 to 129) and 39 columns, spanning socio-demographics, anthropometric measurements and nutritional status, lifestyle and dietary habits (including how often each of nine food groups was eaten), and clinical/biological parameters (blood pressure, capillary glycaemia, haemoglobin, anaemia status).

Codebook -- a variable-by-variable guide to the Raw_Data sheet, explaining what each column means and its unit or coding.

A blank cell means the value is missing. Two readings were dropped from the analysis because they were biologically implausible -- one blood pressure measurement and one

glycaemia measurement (see Section 2.5 of the manuscript) -- and those cells are left blank rather than filled with a placeholder. We did not assay albumin, total cholesterol or triglycerides in this study, so they simply do not appear in the file. The 95% confidence intervals reported in Tables 1-3 of the manuscript were calculated from this same dataset, using the Wilson score method for binomial proportions.

Supplementary data S2

Supplementary data S2 is provided to allow independent verification and re-execution of every statistic reported in the manuscript directly from Raw_Data sheet: descriptive statistics (Tables 1-3), Wilson score 95% confidence intervals, bivariate tests (Welch's t-test, Pearson's chi-square test, Pearson correlation) underlying Table 4, and the multivariable logistic regression model referenced in Sections 2.5, 3.5 and 4. The script requires Python 3.9+ with pandas, numpy, scipy, statsmodels and openpyxl.

Supplementary Data S1: Anonymised Raw Data

International Journal of Scientific Research and Management (IJSRM)

Dietary Habits and Nutritional Status of Undergraduate Students at the University of Labé, Republic of Guinea: A Descriptive and Analytical Cross-Sectional Study

Description

This file contains the de-identified, participant-level dataset (N = 129) underlying the results reported in the manuscript. Data were collected by structured questionnaire and direct anthropometric/clinical measurement, between 1 June and 31 July 2026, from undergraduate students (Years 1-3) at the Faculty of Science and Technology (FST), University of Labé, Republic of Guinea, following stratified systematic random sampling by sex (1/10 sampling fraction). Data collection was authorised by the Vice-Dean for Research, FST, University of Labé (Authorisation Note No. 008/UL/FST/VD-R/2026, dated 30 May 2026). Participation was voluntary and preceded by informed consent; data were anonymised at collection.

Contents

Part A - Raw data: one row per participant (Participant_ID), all variables analysed in the manuscript. For legibility, the 39 variables are presented in four column blocks (A1-A4); Participant_ID is repeated in each block.

Part B - Codebook: description, unit and/or coding of every variable.

The same data are provided in machine-readable form in IJSRM_Supplementary_Raw_Data06102026.xlsx.

Notes

Blank cells denote missing data (see manuscript Section 2.5 for the two data points excluded as biologically implausible: one blood pressure reading and one glycaemia reading).

Albumin, total cholesterol and triglycerides were not assayed in this study and are not included.

95% confidence intervals reported in the manuscript tables were calculated from these data using the Wilson score method for binomial proportions.

Physical_activity_yn is derived from Physical_activity_frequency (No when frequency = None, Yes otherwise) for consistency with the manuscript; the raw yes/no questionnaire item disagreed with the frequency item for 4 participants.

Part A - Raw data (N = 129)
Block A1 of 4 - variables: Sex to Height_m
Table 5 Caption...

Participa nt_I D	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
1	Fem ale	20	Singl e	L1	Rent ed	FST	Pare nts and guar dian	Acce ptabl e	73	1.59
2	Male	24	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Aver age	74	1.83
3	Male	25	Singl e	L1	Univ ersit y dor mitory	FST	Pare nts and main tena nce grant	Aver age	74	1.84
4	Male	23	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Goo d	63	1.77
5	Fem ale	21	Singl e	L1	Rent ed	FST	Pers onal inco me and grant	Acce ptabl e	61	1.62
7	Fem ale	20	Singl e	L2	Fami ly ho me	FST	Pare nts and main tena nce grant	Acce ptabl e	71	1.69

Participa nt_I D	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
8	Fem ale	21	Marr ied	L2	Fami ly ho me	FST	Pare nts and main tena nce grant	Aver age	76	1.64
9	Male	24	Singl e	L1	Fami ly ho me	FST	Pare nts and main tena nce grant	Aver age	54	1.63
10	Fem ale	24	Singl e	L1	Fami ly ho me	FST	Pare nts and main tena nce grant	Aver age	60	1.68
11	Male	22	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Aver age	53	1.68
12	Fem ale	22	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Aver age	71	1.65
16	Fem ale	21	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Aver age	66	1.69
17	Male	23	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Prec ariou s	69	1.73
18	Male	23	Singl e	L1	Rent ed	FST	Pare nts and main tena nce grant	Acce ptabl e	63	1.77
19	Male	20	Singl e	L1	Rent ed	FST	Pare nts and pers onal inco me	Aver age	57	1.82

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odation	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condition s	Wei ght_ kg	Heig ht_ m
22	Male	22	Singl e	L1	Univ ersit y dor mitory	FST	Parents and main tenance grant	Prec arious	63	1.76
23	Female	20	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Good	41	1.67
24	Female	20	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Good	87	1.50
25	Female	22	Singl e	L1	Univ ersit y dor mitory	FST	Parents and main tenance grant	Acceptabl e	49	1.54
26	Male	26	Singl e	L1	Rented	FST	Parents and main tenance grant	Acceptabl e	65	1.73
27	Female	19	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Acceptabl e	44	1.61
28	Female	22	Singl e	L1	Rented	FST	Parents and main tenance grant	Good	55	1.77
29	Female	20	Singl e	L1	Rented	FST	Parents and main tenance grant	Acceptabl e	58	1.59
30	Male	20	Singl e	L1	Fami ly home	FST	Personal income and grant	Average	50	1.72

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odation	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condition s	Wei ght_ kg	Heig ht_ m
31	Male	23	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Acceptabl e	82	1.74
32	Male	23	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Acceptabl e	60	1.70
33	Male	22	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Acceptabl e	59	1.76
34	Male	20	Singl e	L1	Rented	FST	Parents and main tenance grant	Acceptabl e	50	1.74
35	Male	25	Singl e	L1	Rented	FST	Personal income and grant	Prec arious	57	1.74
36	Male	24	Singl e	L1	Univ ersit y dor mitory	FST	Personal income and grant	Average	67	1.79
37	Male	24	Singl e	L1	Rented	FST	Parents and main tenance grant	Average	43	1.69
38	Male	21	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Average	61	1.75
39	Female	19	Singl e	L1	Fami ly home	FST	Parents and main tenance grant	Acceptabl e	69	1.73

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eiv e_d_liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
40	Male	22	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	85	1.81
41	Male	21	Singl e	L1	Rent ed	FST	Per sonal inco me and grant	Acce ptabl e	57	1.71
42	Male	27	Singl e	L1	Univ ersit y dor mito ry	FST	Par ents and main tena nce grant	Prec ariou s	65	1.77
43	Male	23	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	60	1.72
44	Male	25	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	56	1.66
45	Male	26	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	82	1.82
48	Male	26	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	62	1.70
49	Male	19	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	64	1.65
50	Male	24	Singl e	L1	Univ ersit y dor mito ry	FST	Par ents and main tena nce grant	Acce ptabl e	59	1.75

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eiv e_d_liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
53	Male	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	52	1.72
55	Male	25	Divo rced	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	57	1.66
56	Male	24	Singl e	L1	Univ ersit y dor mito ry	FST	Par ents and main tena nce grant	Aver age	62	1.73
57	Male	23	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	55	1.69
58	Fem ale	20	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	60	1.67
59	Fem ale	21	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	58	1.51
60	Fem ale	21	Singl e	L1	Univ ersit y dor mito ry	FST	Par ents and main tena nce grant	Acce ptabl e	63	1.55
61	Male	23	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	48	1.63
62	Male	18	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	66	1.81

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
63	Fem ale	21	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	36	1.62
64	Male	23	Singl e	L1	Rent ed	FST	Per sonal inco me and grant	Aver age	59	1.73
65	Fem ale	19	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	46	1.53
66	Fem ale	20	Singl e	L2	Fami ly ho me	FST	Par ents and main tena nce grant	Prec ariou s	43	1.57
69	Fem ale	22	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	53	1.66
71	Fem ale	23	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	62	1.57
74	Fem ale	24	Marr ied	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	66	1.56
76	Fem ale	24	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Aver age	52	1.73
79	Male	25	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Prec ariou s	54	1.78

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
80	Male	21	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Prec ariou s	63	1.80
83	Fem ale	23	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	59	1.67
87	Male	22	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	76	1.68
89	Fem ale	23	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	59	1.67
95	Fem ale	24	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Goo d	63	1.66
97	Fem ale	23	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	42	1.59
107	Fem ale	24	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Aver age	43	1.55
109	Male	24	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Acce ptabl e	73	1.82
111	Fem ale	23	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	67	1.70

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condi tion s	Wei ght_ kg	Heig ht_ m
112	Fem ale	21	Singl e	L3	Rent ed	FST	Par ents and pers onal inco me	Aver age	55	1.63
118	Fem ale	23	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	62	1.68
123	Male	21	Singl e	L3	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Acce ptabl e	59	1.71
130	Fem ale	24	Marr ied	L3	Fami ly ho me	FST	Pers onal inco me and grant	Good	62	1.60
133	Fem ale	23	Singl e	L3	Fami ly ho me	FST	Par ents and main tena nce grant	Acce ptabl e	49	1.60
140	Fem ale	19	Singl e	L1	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Acce ptabl e	56	1.57
142	Fem ale	19	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	80	1.74
143	Fem ale	23	Singl e	L1	Fami ly ho me	FST	Par ents and main tena nce grant	Aver age	42	1.75
144	Male	24	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	69	1.80

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condi tion s	Wei ght_ kg	Heig ht_ m
145	Fem ale	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	43	1.54
146	Male	20	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	57	1.77
147	Male	20	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Prec arious	65	1.86
148	Male	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	63	1.73
149	Fem ale	25	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	54	1.74
150	Male	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	67	1.72
151	Male	23	Singl e	L3	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	61	1.81
152	Male	24	Singl e	L3	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Acce ptabl e	54	1.72
153	Fem ale	23	Singl e	L3	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Acce ptabl e	42	1.61

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eiv e_d_ liv ing_ con dition s	Wei ght_ kg	Heig ht_ m
154	Male	23	Singl e	L2	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	53	1.73
155	Male	22	Singl e	L2	Fami ly ho me	FST	Par ents and pers onal inco me	Acce ptabl e	74	1.77
156	Male	24	Singl e	L2	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	54	1.71
157	Male	22	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Aver age	58	1.71
158	Male	23	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Goo d	56	1.74
159	Male	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Goo d	74	1.69
160	Male	23	Singl e	L2	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	51	1.56
161	Male	23	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Acce ptabl e	60	1.81
162	Male	24	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Acce ptabl e	79	1.78

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eiv e_d_ liv ing_ con dition s	Wei ght_ kg	Heig ht_ m
163	Male	25	Marr ied	L2	Fami ly ho me	FST	Par ents and main tena nce grant	Goo d	64	1.73
164	Male	25	Singl e	L2	Fami ly ho me	FST	Par ents and main tena nce grant	Acce ptabl e	64	1.72
165	Fem ale	21	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	47	1.48
166	Fem ale	21	Marr ied	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	55	1.62
167	Fem ale	24	Marr ied	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	70	1.60
168	Male	25	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	55	1.75
169	Male	23	Singl e	L1	Univ ersit y dor mitor y	FST	Par ents and main tena nce grant	Aver age	61	1.67
171	Male	22	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	62	1.57
172	Male	20	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Acce ptabl e	61	1.74

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of stud y	Acco mm odation	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condi tions	Wei ght_ kg	Heig ht_ m
176	Fem ale	24	Singl e	L1	Univ ersit y dor mitory	FST	Par ents and main tenance grant	Acce ptabl e	55	1.57
181	Male	22	Marr ied	L2	Rent ed	FST	Par ents and pers onal inco me	Go od	50	1.66
182	Male	22	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Acce ptabl e	53	1.69
183	Male	25	Singl e	L2	Rent ed	FST	Pers onal inco me and grant	Acce ptabl e	55	1.70
184	Male	21	Singl e	L2	Fami ly ho me	FST	Par ents and main tenance grant	Acce ptabl e	48	1.75
185	Male	27	Marr ied	L3	Fami ly ho me	FST	Par ents and main tenance grant	Aver age	64	1.70
186	Male	25	Singl e	L2	Fami ly ho me	FST	Par ents and main tenance grant	Aver age	58	1.73
187	Male	24	Singl e	L2	Rent ed	FST	Pers onal inco me and grant	Acce ptabl e	68	1.79
188	Male	26	Singl e	L2	Rent ed	FST	Pers onal inco me and grant	Acce ptabl e	64	1.73

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of stud y	Acco mm odation	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ condi tions	Wei ght_ kg	Heig ht_ m
189	Fem ale	22	Singl e	L2	Rent ed	FST	Par ents and main tenance grant	Acce ptabl e	51	1.62
190	Fem ale	22	Singl e	L2	Rent ed	FST	Par ents and main tenance grant	Aver age	56	1.62
191	Male	21	Singl e	L2	Rent ed	FST	Par ents and main tenance grant	Acce ptabl e	64	1.82
192	Male	23	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Acce ptabl e	69	1.78
193	Male	23	Singl e	L2	Rent ed	FST	Par ents and pers onal inco me	Aver age	74	1.81
194	Male	25	Singl e	L2	Rent ed	FST	Par ents and main tenance grant	Acce ptabl e	46	1.58
195	Male	23	Singl e	L2	Univ ersit y dor mitory	FST	Par ents and main tenance grant	Acce ptabl e	58	1.63
196	Male	21	Singl e	L2	Fami ly ho me	FST	Par ents and main tenance grant	Acce ptabl e	54	1.69
197	Male	24	Marr ied	L2	Rent ed	FST	Par ents and main tenance grant	Aver age	47	1.61

Participa nt_ID	Sex	Age _years	Mar ital_ statu s	Year _of_ stud y	Acco mm odat ion	Facu lty_ depa rtme nt	Inco me_ sour ce	Perc eive d_ liv ing_ cond ition s	Wei ght_ kg	Heig ht_ m
198	Fem ale	20	Singl e	L1	Rent ed	FST	Par ents and main tena nce grant	Aver age	47	1.61
199	Fem ale	25	Marr ied	L2	Rent ed	FST	Par ents and pers onal inco me	Acce ptabl e	42	1.63
200	Fem ale	20	Singl e	L3	Rent ed	FST	Main tena nce grant and pers onal inco me	Aver age	54	1.57
201	Male	21	Singl e	L2	Univ ersit y dor mitory	FST	Main tena nce grant and pers onal inco me	Acce ptabl e	62	1.72
202	Male	24	Singl e	L2	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Aver age	47	1.66
203	Male	25	Singl e	L2	Univ ersit y dor mitory	FST	Par ents and main tena nce grant	Aver age	56	1.66

Block A2 of 4 - variables: BMI_kg_m2 to Tea_coffee_frequency

Table 6 Caption...

Participa nt_ID	BMI _kg_ m2	BMI _cat egor y_ WHO	MU AC_ cm	Phys ical_ activ ity_ yn	Phys ical_ activ ity_ type	Phys ical_ activ ity_ frequency	Alco hol_ cons ump tion_ yn	Tob acco _use _yn	Tea_ coffe e_ co nsu mpti on_ yn	Tea_ coffe e_ fr equen cy
1	28.87	Over weight	29	Yes	Wal king and gym nastics	Regu lar	No	No	Yes	Occa siona l
2	22.9	Normal weight	29	Yes	Wal king and footb all	Irregu lar	Yes	No	Yes	Occa siona l
3	21.85	Normal weight	32	Yes	Wal king and footb all	Irregu lar	Yes	No	Yes	Occa siona l
4	20.1	Normal weight	25	Yes	Wal king	Regu lar	No	No	Yes	Dail y
5	23.24	Normal weight	27	Yes	Wal king	Occa siona l	No	No	Yes	Wee kly
7	24.85	Normal weight	33	Yes	Wal king	Occa siona l	No	No	No	
8	28.25	Over weight	29	Yes	Wal king and footb all	Regu lar	No	No	No	
9	20.32	Normal weight	23	Yes	Wal king and footb all	Regu lar	No	No	Yes	Occa siona l
10	21.25	Normal weight	26	Yes	Wal king	Regu lar	No	No	Yes	Occa siona l
11	18.77	Normal weight	26	Yes	Wal king and footb all	Regu lar	No	No	Yes	Wee kly
12	26.07	Over weight	30	Yes	Wal king	Irregu lar	No	No	Yes	Occa siona l
16	23.1	Normal weight	28	Yes	Wal king	Regu lar	No	No	Yes	Occa siona l
17	23.05	Normal weight	28	Yes	Wal king and footb all	Regu lar	No	No	Yes	Occa siona l

Participa nt_ID	BMI _kg_m2	BMI _cat egor y_WHO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
18	20.1	Normal weight	29	Yes	Jogging	Irregular	No	No	Yes	Occasional
19	17.2	Thinness	24	Yes	Walking and gymnastics	Irregular	No	No	Yes	Occasional
22	20.33	Normal weight	26	Yes	Walking and football	Regular	No	No	No	
23	14.7	Thinness	22	Yes	Walking	Regular	No	No	No	
24	38.66	Obesity	37	Yes	Walking	Regular	No	No	Yes	Occasional
25	20.66	Normal weight	27	Yes	Walking	Regular	No	No	Yes	Occasional
26	21.71	Normal weight	26	Yes	Football	Regular	No	No	Yes	Daily
27	16.97	Thinness	21	Yes	Walking	Regular	No	No	Yes	Daily
28	17.55	Thinness	23	Yes	Walking	Occasional	No	No	Yes	Daily
29	22.99	Normal weight	27	Yes	Walking and football	Occasional	No	No	Yes	Occasional
30	16.9	Thinness	23	Yes	Walking and football	Regular	No	Yes	Yes	Occasional
31	27.08	Overweight	30	Yes	Football	Regular	No	No	Yes	Occasional
32	20.76	Normal weight	25	Yes	Football	Regular	No	No	Yes	Occasional
33	19.04	Normal weight	25	Yes	Football	Regular	No	No	Yes	Occasional
34	16.51	Thinness	24	Yes	Walking and football	Irregular	No	No	No	

Participa nt_ID	BMI _kg_m2	BMI _cat egor y_WHO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
35	18.82	Normal weight	27	Yes	Walking and football	Irregular	No	No	Yes	Occasional
36	20.91	Normal weight	26	Yes	Walking and football	Regular	No	No	Yes	Occasional
37	15.05	Thinness	25	Yes	Walking	Regular	No	No	Yes	Weekly
38	19.91	Normal weight	27	Yes	Football	Regular	No	No	Yes	Weekly
39	23.05	Normal weight	27	Yes	Walking	Occasional	No	No	Yes	Occasional
40	25.94	Overweight	30	Yes	Gymnastics	Irregular	No	No	Yes	Weekly
41	19.49	Normal weight	26	Yes	Walking and gymnastics	Occasional	No	No	Yes	Occasional
42	20.74	Normal weight	27	Yes	Football	Irregular	No	No	No	
43	20.28	Normal weight	26	Yes	Gymnastics	Irregular	No	No	Yes	Daily
44	20.32	Normal weight	26	Yes	Walking and football	Irregular	No	No	Yes	Daily
45	24.75	Normal weight	33	Yes	Walking and football	Regular	No	No	Yes	Occasional
48	21.45	Normal weight	28	Yes	Football	Regular	No	No	No	
49	23.5	Normal weight	28	Yes	Walking and football	Regular	Yes	No	Yes	Occasional
50	19.26	Normal weight	26	Yes	Walking	Regular	Yes	No	Yes	Occasional

Participa nt_ID	BMI _kg_m2	BMI _cat egory_W HO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
53	17.57	Thin ness	22	Yes	Foot ball	Regu lar	No	No	Yes	Occa siona l
55	20.68	Nor mal weight	26	Yes	Wal king	Regu lar	Yes	Yes	Yes	Dail y
56	20.71	Nor mal weight	27	Yes	Wal king	Regu lar	Yes	No	Yes	Occa siona l
57	19.25	Nor mal weight	26	Yes	Foot ball	Occa siona l	No	No	Yes	Occa siona l
58	21.51	Nor mal weight	25	Yes	Wal king	Occa siona l	No	No	Yes	Dail y
59	25.43	Over weight	28	Yes	Gym nasti cs	Occa siona l	No	No	Yes	Occa siona l
60	26.22	Over weight	29	Yes	Wal king and footb all	Regu lar	No	No	Yes	Occa siona l
61	18.06	Thin ness	24.4	Yes	Wal king	Regu lar	Yes	No	Yes	Occa siona l
62	20.14	Nor mal weight	25	Yes	Gym nasti cs	Irregu lar	No	No	Yes	Occa siona l
63	13.71	Thin ness	18.0	Yes	Jogging	Irregu lar	No	No	Yes	Occa siona l
64	19.71	Nor mal weight	26	Yes	Gym nasti cs	Regu lar	No	No	No	
65	19.65	Nor mal weight	24	Yes	Wal king	Regu lar	No	No	No	
66	17.44	Thin ness	22	Yes	Wal king	Regu lar	No	No	No	
69	19.23	Nor mal weight	26	Yes	Wal king	Regu lar	No	No	Yes	Occa siona l
71	25.15	Over weight	24	Yes	Wal king	Regu lar	Yes	Yes	No	
74	27.12	Over weight	31	Yes	Wal king	Regu lar	No	No	No	
76	17.37	Thin ness	23	Yes	Wal king	Occa siona l	No	No	Yes	Dail y

Participa nt_ID	BMI _kg_m2	BMI _cat egory_W HO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
79	17.03	Thin ness	23	Yes	Wal king and footb all	Irregu lar	No	No	Yes	Wee kly
80	19.44	Nor mal weight	27	Yes	Wal king	Regu lar	No	No	Yes	Wee kly
83	21.14	Nor mal weight	24	Yes	Wal king and joggi ng	Irregu lar	No	No	Yes	Occa siona l
87	26.92	Over weight	34	Yes	Wal king and footb all	Irregu lar	No	No	Yes	Dail y
89	21.14	Nor mal weight	24	Yes	Wal king and joggi ng	Irregu lar	No	No	Yes	Occa siona l
95	22.86	Nor mal weight	27	Yes	Wal king	Occa siona l	No	No	Yes	Dail y
97	15.82	Thin ness	23	Yes	Wal king	Irregu lar	No	No	Yes	Dail y
107	17.89	Thin ness	23	Yes	Wal king	Irregu lar	No	No	No	
109	22.03	Nor mal weight	28	Yes	Foot ball	Regu lar	No	Yes	Yes	Dail y
111	23.18	Nor mal weight	29	Yes	Wal king and joggi ng	Occa siona l	No	No	Yes	Occa siona l
112	20.7	Nor mal weight	26	Yes	Wal king	Irregu lar	No	No	Yes	Occa siona l
118	21.96	Nor mal weight	27	Yes	Wal king	Irregu lar	No	No	Yes	Occa siona l
123	20.17	Nor mal weight	29	Yes	Wal king and footb all	Regu lar	Yes	No	Yes	Occa siona l
130	24.21	Nor mal weight	28	No			No	No	Yes	Occa siona l

Participa nt_ID	BMI _kg_m2	BMI _cat egor y_W HO	MU AC_ cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
133	19.44	Normal weight	24	Yes	Walking	Irregular	No	No	Yes	Occasional
140	22.71	Normal weight	24	Yes	Walking	Regular	No	No	No	
142	26.42	Overweight	31	Yes	Walking	Regular	No	No	Yes	Occasional
143	13.71	Thinness	22	Yes	Walking	Occasional	No	No	Yes	Occasional
144	21.29	Normal weight	28	Yes	Walking and football	Regular	No	No	Yes	Daily
145	18.13	Thinness	21	Yes	Walking	Irregular	No	No	Yes	Occasional
146	18.19	Thinness	28	Yes	Walking and football	Regular	No	No	Yes	Occasional
147	18.78	Normal weight	27	Yes	Walking	Regular	No	Yes	Yes	Occasional
148	21.04	Normal weight	27	Yes	Walking and football	Regular	No	Yes	Yes	Daily
149	17.83	Thinness	24	No			No	No	No	
150	22.64	Normal weight	28	Yes	Walking and football	Irregular	No	No	Yes	Daily
151	18.61	Normal weight	28	Yes	Football	Regular	No	No	No	
152	18.25	Thinness	24	Yes	Football	Regular	No	No	Yes	Occasional
153	16.2	Thinness	20.0	Yes	Walking	Regular	No	No	No	
154	17.7	Thinness	22	Yes	Walking	Irregular	No	No	Yes	Occasional
155	23.62	Normal weight	28	Yes	Walking and football	Occasional	No	Yes	Yes	Occasional

Participa nt_ID	BMI _kg_m2	BMI _cat egor y_W HO	MU AC_ cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
156	18.46	Thinness	22	Yes	Walking and football	Regular	No	No	Yes	Occasional
157	19.83	Normal weight	25	Yes	Walking and football	Irregular	No	No	No	
158	18.49	Thinness	24	Yes	Walking and football	Regular	No	No	Yes	Daily
159	25.9	Overweight	29	Yes	Football	Irregular	No	No	No	
160	20.95	Normal weight	27	Yes	Football	Irregular	No	No	Yes	Weekly
161	18.31	Thinness	27	Yes	Jogging	Irregular	No	No	Yes	Occasional
162	24.93	Normal weight	28	Yes	Football	Regular	No	No	Yes	Weekly
163	21.38	Normal weight	25	Yes	Football	Irregular	No	No	Yes	Weekly
164	21.63	Normal weight	26	Yes	Walking	Regular	No	No	Yes	Weekly
165	21.45	Normal weight	21	Yes	Walking	Regular	No	No	No	
166	20.95	Normal weight	25	Yes	Walking	Regular	No	No	No	
167	27.34	Overweight	26	Yes	Walking	Regular	No	No	No	
168	17.95	Thinness	24	Yes	Football	Irregular	No	No	No	
169	21.87	Normal weight	27	Yes	Football	Irregular	No	No	Yes	Daily
171	25.15	Overweight	31	Yes	Football	Occasional	No	No	Yes	Occasional
172	20.84	Normal weight	26	Yes	Football	Irregular	No	Yes	Yes	Occasional

Participa nt_I D	BMI _kg_m2	BMI _cat egor y_W HO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
176	22.31	Normal weight	27	Yes	Walking	Occasional	No	No	No	
181	18.14	Thinness	23	Yes	Walking and football	Irregular	No	No	Yes	Daily
182	18.55	Normal weight	24	Yes	Football	Irregular	No	No	Yes	Weekly
183	19.03	Normal weight	25	No			No	No	Yes	Daily
184	15.67	Thinness	22	No			No	Yes	No	
185	22.14	Normal weight	28	Yes	Walking	Irregular	No	No	No	
186	19.37	Normal weight	26	No			No	No	Yes	Occasional
187	21.22	Normal weight	29	No			No	No	Yes	Weekly
188	21.38	Normal weight	28	No			No	No	Yes	Occasional
189	19.43	Normal weight	26	No			No	No	No	
190	19.43	Normal weight	27	No			No	No	No	
191	19.32	Normal weight	28	Yes	Football	Irregular	Yes	No	Yes	Occasional
192	21.77	Normal weight	28	No			No	No	Yes	Occasional
193	22.58	Normal weight	30	No			No	No	Yes	Occasional
194	18.42	Thinness	23	Yes	Football	Irregular	No	No	Yes	Occasional

Participa nt_I D	BMI _kg_m2	BMI _cat egor y_W HO	MU AC_cm	Phys ical_ activ ity_y n	Phys ical_ activ ity_t ype	Phys ical_ activ ity_f requency	Alco hol_ cons ump tion _yn	Tob acco _use _yn	Tea_ coffe e_co nsu mpti on_y n	Tea_ coffe e_fr equency
195	21.82	Normal weight	28	No			No	No	No	
196	18.9	Normal weight	25	Yes	Football	Irregular	No	No	No	
197	18.13	Thinness	24	No			No	No	Yes	Daily
198	18.13	Thinness	22	Yes	Walking	Regular	No	No	No	
199	15.81	Thinness	22	Yes	Football	Regular	No	No	Yes	Occasional
200	21.9	Normal weight	24	No			No	No	Yes	Weekly
201	20.95	Normal weight	28	Yes	Football	Irregular	No	No	No	
202	17.05	Thinness	25	Yes	Walking	Occasional	No	No	No	
203	17.05	Thinness	28	Yes	Football	Irregular	Yes	No	Yes	Occasional

Block A3 of 4 - variables: Meals_per_day to Sugary_products_frequency

Table 7 Caption...

Participa nt_I D	Mea ls_p er_d ay	Brea kfast _con sumpti on_y n	Milk _dai ry_f requency	Cere als_s tarch es_ frequenc y	Puls es_fr equency	Mea t_fis h_eg gs_f requency	Fru it_fr equency	Vege table s_fr equency	Fats _fr equency	Suga ry_p rodu cts_f requency
1	2	No	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily	Weekly
2	2	No	Weekly	Daily	Monthly	Weekly	Daily	Daily	Daily	Daily
3	2	Yes	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily	Daily
4	2	No	Monthly	Daily	Weekly	Monthly	Daily	Weekly	Daily	Daily
5	2	Yes	Weekly	Daily	Daily	Weekly	Daily	Weekly	Daily	Daily
7	2	No	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily	Weekly
8	2	Yes	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily	Daily
9	3	Yes	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily	Daily
10	2	No	Weekly	Daily	Monthly	Daily	Daily	Daily	Daily	Weekly

Participa nt_ID	Mea ls_p er_d ay	Brea kfast _con sumptio n_yn	Milk _dai ry_f requency	Cere als_s tarc hes_f requency	Puls es_fr equency	Mea t_fis h_eg gs_f requency	Fru it_fre quency	Vege table s_fre quency	Fats _fre quency	Suga ry_p rodu cts_f requency
11	2	No	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y	Wee kly	Dail y
12	3	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
16	2	Yes	Dail y	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y
17	2	Yes	Wee kly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
18	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
19	2	No	Mon thly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
22	2	Yes	Mon thly	Dail y	Wee kly	Mon thly	Dail y	Wee kly	Wee kly	Wee kly
23	2	No	Wee kly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Wee kly
24	2	No	Mon thly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Mon thly
25	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Mon thly
26	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Mon thly	Wee kly	Wee kly
27	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
28	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
29	2	Yes	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
30	2	No	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Wee kly	Dail y
31	3	Yes	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y
32	3	Yes	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
33	2	No	Wee kly	Dail y	Dail y	Dail y	Wee kly	Dail y	Dail y	Wee kly
34	2	Yes	Wee kly	Dail y	Mon thly	Wee kly	Dail y	Dail y	Dail y	Dail y
35	2	No	Neve r	Dail y	Wee kly	Mon thly	Wee kly	Dail y	Dail y	Mon thly
36	2	No	Wee kly	Dail y	Mon thly	Wee kly	Wee kly	Mon thly	Dail y	Wee kly
37	2	Yes	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
38	2	No	Mon thly	Dail y	Mon thly	Wee kly	Mon thly	Dail y	Dail y	Wee kly
39	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
40	2	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Mon thly	Dail y	Dail y
41	2	No	Mon thly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Mon thly
42	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Dail y
43	2	No	Wee kly	Dail y	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y

Participa nt_ID	Mea ls_p er_d ay	Brea kfast _con sumptio n_yn	Milk _dai ry_f requency	Cere als_s tarc hes_f requency	Puls es_fr equency	Mea t_fis h_eg gs_f requency	Fru it_fre quency	Vege table s_fre quency	Fats _fre quency	Suga ry_p rodu cts_f requency
44	2	No	Mon thly	Dail y	Dail y	Wee kly	Dail y	Dail y	Dail y	Wee kly
45	2	No	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y	Dail y
48	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Wee kly	Mon thly	Neve r
49	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
50	2	No	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
53	3	Yes	Mon thly	Dail y	Wee kly	Mon thly	Dail y	Dail y	Dail y	Dail y
55	2	Yes	Neve r	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
56	2	Yes	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y
57	2	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Wee kly	Dail y
58	2	Yes	Mon thly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Mon thly
59	2	No	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y
60	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
61	2	No	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
62	3	Yes	Dail y	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y
63	3	Yes	Dail y	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y
64	2	Yes	Wee kly	Dail y	Mon thly	Wee kly	Dail y	Dail y	Dail y	Wee kly
65	2	Yes	Wee kly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y
66	2	Yes	Wee kly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Wee kly
69	2	No	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y	Wee kly
71	3	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
74	3	Yes	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
76	3	Yes	Wee kly	Wee kly	Mon thly	Dail y	Wee kly	Dail y	Dail y	Mon thly
79	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
80	2	No	Wee kly	Dail y	Dail y	Wee kly	Wee kly	Dail y	Neve r	Wee kly
83	4	Yes	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y
87	2	Yes	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
89	4	Yes	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y
95	3	Yes	Dail y	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Wee kly

Participa nt_ID	Mea ls_p er_d ay	Brea kfast _con sum ptio n_yn	Milk _dai ry_f requ ency	Cere als_s tarc hes_frequ ency	Puls es_fr equen cy	Mea t_fis h_eg gs_frequ ency	Fru it_fre quen cy	Vege table s_fre quen cy	Fats _fre quen cy	Suga ry_p rodu cts_frequ ency
97	3	Yes	Mon thly	Dail y	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y
107	3	Yes	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y	Wee kly
109	2	No	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y
111	3	No	Wee kly	Dail y	Mon thly	Dail y	Dail y	Dail y	Dail y	Wee kly
112	2	No	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Wee kly
118	3	No	Dail y	Dail y	Wee kly	Wee kly	Dail y	Wee kly	Dail y	Dail y
123	2	No	Wee kly	Dail y	Mon thly	Wee kly	Dail y	Dail y	Dail y	Wee kly
130	3	Yes	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y	Wee kly
133	3	Yes	Mon thly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
140	3	Yes	Wee kly	Dail y	Mon thly	Dail y	Dail y	Dail y	Dail y	Wee kly
142	3	No	Mon thly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Mon thly
143	2	No	Wee kly	Dail y	Wee kly	Dail y	Neve r	Mon thly	Dail y	Wee kly
144	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
145	3	Yes	Dail y	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Mon thly
146	2	No	Wee kly	Dail y	Mon thly	Mon thly	Dail y	Dail y	Wee kly	Wee kly
147	2	No	Wee kly	Dail y	Wee kly	Mon thly	Dail y	Mon thly	Dail y	Mon thly
148	2	No	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y	Wee kly
149	2	No	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Wee kly	Dail y	Mon thly
150	2	No	Wee kly	Dail y	Dail y	Dail y	Mon thly	Dail y	Wee kly	Wee kly
151	2	No	Wee kly	Neve r	Wee kly	Mon thly	Dail y	Dail y	Wee kly	Dail y
152	2	Yes	Mon thly	Dail y	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y
153	4	Yes	Dail y	Dail y	Mon thly	Dail y	Dail y	Dail y	Mon thly	Dail y
154	2	No	Mon thly	Dail y	Wee kly	Mon thly	Mon thly	Dail y	Dail y	Wee kly
155	2	No	Mon thly	Wee kly	Mon thly	Mon thly	Wee kly	Dail y	Dail y	Dail y
156	2	No	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Wee kly	Wee kly
157	2	No	Wee kly	Wee kly	Mon thly	Dail y	Mon thly	Wee kly	Dail y	Wee kly
158	2	No	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y
159	3	Yes	Neve r	Dail y	Neve r	Dail y	Wee kly	Wee kly	Dail y	Wee kly

Participa nt_ID	Mea ls_p er_d ay	Brea kfast _con sum ptio n_yn	Milk _dai ry_f requ ency	Cere als_s tarc hes_frequ ency	Puls es_fr equen cy	Mea t_fis h_eg gs_frequ ency	Fru it_fre quen cy	Vege table s_fre quen cy	Fats _fre quen cy	Suga ry_p rodu cts_frequ ency
160	3	Yes	Mon thly	Dail y	Mon thly	Wee kly	Mon thly	Dail y	Dail y	Wee kly
161	2	No	Wee kly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Dail y
162	2	No	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Wee kly
163	2	No	Mon thly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Mon thly
164	3	Yes	Mon thly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
165	3	Yes	Dail y	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
166	3	Yes	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
167	3	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Dail y
168	2	Yes	Wee kly	Mon thly	Dail y	Dail y	Wee kly	Dail y	Dail y	Dail y
169	2	No	Mon thly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Wee kly
171	1	No	Wee kly	Dail y	Wee kly	Mon thly	Dail y	Wee kly	Dail y	Dail y
172	2	No	Mon thly	Dail y	Wee kly	Wee kly	Mon thly	Dail y	Wee kly	Wee kly
176	4	Yes	Dail y	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Wee kly
181	3	No	Mon thly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Wee kly
182	2	Yes	Mon thly	Dail y	Mon thly	Wee kly	Mon thly	Dail y	Wee kly	Wee kly
183	3	No	Mon thly	Dail y	Mon thly	Wee kly	Mon thly	Dail y	Wee kly	Wee kly
184	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y
185	2	Yes	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y	Dail y	Wee kly
186	2	No	Wee kly	Dail y	Dail y	Dail y	Dail y	Dail y	Dail y	Wee kly
187	3	Yes	Mon thly	Dail y	Dail y	Wee kly	Wee kly	Dail y	Dail y	Wee kly
188	2	No	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y	Dail y	Dail y
189	3	No	Wee kly	Dail y	Wee kly	Mon thly	Mon thly	Dail y	Dail y	Wee kly
190	3	No	Wee kly	Dail y	Mon thly	Dail y	Wee kly	Wee kly	Dail y	Wee kly
191	2	Yes	Wee kly	Dail y	Dail y	Wee kly	Dail y	Dail y	Wee kly	Wee kly
192	2	No	Dail y	Dail y	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y
193	2	No	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Wee kly	Dail y	Dail y
194	3	Yes	Wee kly	Dail y	Wee kly	Dail y	Wee kly	Dail y	Dail y	Dail y
195	3	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Dail y	Wee kly

Participa nt_ID	Mea ls_p er_d ay	Brea kfast _con sumptio n_yn	Milk _dai ry_f requency	Cere als_s tarc hes_f requency	Puls es_fr equency	Mea t_fis h_eg gs_f requency	Frui t_fre quency	Vege table _s_fre quency	Fats _fre quency	Suga ry_p rodu cts_f requency
196	2	No	Wee kly	Wee kly	Wee kly	Wee kly	Mon thly	Dail y	Wee kly	Dail y
197	3	Yes	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Dail y	Neve r	Wee kly
198	3	Yes	Wee kly	Dail y	Mon thly	Wee kly	Dail y	Dail y	Dail y	Dail y
199	2	No	Mon thly	Dail y	Mon thly	Wee kly	Wee kly	Dail y	Dail y	Neve r
200	2	No	Mon thly	Dail y	Mon thly	Wee kly	Dail y	Dail y	Dail y	Wee kly
201	2	Yes	Wee kly	Dail y	Wee kly	Wee kly	Mon thly	Dail y	Wee kly	Wee kly
202	2	No	Wee kly	Dail y	Wee kly	Wee kly	Wee kly	Wee kly	Dail y	Dail y
203	2	No	Mon thly	Dail y	Mon thly	Mon thly	Wee kly	Wee kly	Dail y	Mon thly

Block A4 of 4 - variables: Carbonated_drinks_frequency to Anaemia_status_WHO

Table 8 Caption...

Partic ipant_ID	Carbo nated _drin ks_fre quency	Systol ic_BP _mm Hg	Diasto lic_BP _mm Hg	BP_ca tegory	Capill ary_gl ycaem ia_g_L	Glyca emia_ catego ry	Haem oglobi n_g_d L	Anae mia_s tatus_ WHO
1	Weekl y	120	80	Norma l	0.97	Norma l	10.1	Anae mia
2	Month ly	120	80	Norma l	0.92	Norma l	14.3	No an aemia
3	Weekl y	100	70	Norma l	0.95	Norma l	13.3	No an aemia
4	Month ly	140	100	Hypert ension	1.04	Norma l	17.9	No an aemia
5	Never	100	70	Norma l	0.7	Norma l	14.8	No an aemia
7	Weekl y	110	80	Norma l	0.86	Norma l	12.5	No an aemia
8	Daily	110	70	Norma l	0.92	Norma l	13.3	No an aemia
9	Weekl y	130	90	Hypert ension	0.9	Norma l	14.9	No an aemia
10	Weekl y	130	90	Hypert ension	0.97	Norma l	9.04	Anae mia
11	Month ly	110	70	Norma l	0.92	Norma l	16.1	No an aemia
12	Weekl y	110	70	Norma l	0.95	Norma l	16.3	No an aemia
16	Weekl y	120	80	Norma l	0.92	Norma l	13.8	No an aemia
17	Month ly	110	80	Norma l	0.86	Norma l	14.5	No an aemia
18	Weekl y	120	70	Norma l	0.86	Norma l	15.9	No an aemia
19	Month ly	120	70	Norma l	0.9	Norma l	13.3	No an aemia

Partic ipant_ID	Carbo nated _drin ks_fre quency	Systol ic_BP _mm Hg	Diasto lic_BP _mm Hg	BP_ca tegory	Capill ary_gl ycaem ia_g_L	Glyca emia_ catego ry	Haem oglobi n_g_d L	Anae mia_s tatus_ WHO
22	Weekl y	120	80	Norma l	1.17	Hyper glycae mia	10.8	Anae mia
23	Month ly	120	90	Hypert ension	1.08	Norma l	8.5	Anae mia
24	Month ly	130	80	Norma l	0.9	Norma l	13.9	No an aemia
25	Month ly	110	90	Hypert ension	0.86	Norma l	12.7	No an aemia
26	Weekl y	120	70	Norma l	0.81	Norma l	17.6	No an aemia
27	Weekl y	100	80	Norma l	0.97	Norma l	13.0	No an aemia
28	Weekl y	100	80	Norma l	0.94	Norma l	12.5	No an aemia
29	Weekl y	100	80	Norma l	0.9	Norma l	12.9	No an aemia
30	Weekl y	100	70	Norma l	0.95	Norma l	13.9	No an aemia
31	Weekl y	110	70	Norma l			12.1	Anae mia
32	Weekl y	110	70	Norma l	0.94	Norma l	14.7	No an aemia
33	Weekl y	110	70	Norma l	0.85	Norma l	15.4	No an aemia
34	Weekl y	100	80	Norma l	0.72	Norma l	15.3	No an aemia
35	Month ly	120	70	Norma l	0.85	Norma l	16.1	No an aemia
36	Weekl y	100	70	Norma l	0.83	Norma l	15.5	No an aemia
37	Month ly	100	70	Norma l	0.81	Norma l	15.6	No an aemia
38	Month ly	120	80	Norma l	0.86	Norma l	16.5	No an aemia
39	Weekl y	110	80	Norma l	0.79	Norma l	12.5	No an aemia
40	Weekl y	110	70	Norma l	0.72	Norma l	15.3	No an aemia
41	Weekl y	120	70	Norma l	0.83	Norma l	14.9	No an aemia
42	Month ly	110	70	Norma l	0.9	Norma l	15.9	No an aemia
43	Weekl y	130	90	Hypert ension	0.88	Norma l	17.8	No an aemia
44	Month ly	120	70	Norma l	0.86	Norma l	16.9	No an aemia
45	Weekl y	130	80	Norma l	0.7	Norma l	15.6	No an aemia
48	Month ly	110	70	Norma l	1.03	Norma l	13.0	No an aemia
49	Weekl y	130	70	Norma l	1.1	Norma l	16.4	No an aemia
50	Weekl y	100	70	Norma l	0.68	Hypog lycae mia	13.1	No an aemia

Participant_ID	Carbонатед_drinks_frequency	Systolic_BP_mmHg	Diastolic_BP_mmHg	BP_category	Capillary_glycaemia_g_L	Glycaemia_category	Haemoglobin_g_dL	Anaemia_status_WHO
53	Monthly	100	60	Normal	0.83	Normal	17.4	No anaemia
55	Weekly	120	70	Normal	0.86	Normal	13.8	No anaemia
56	Weekly	150	70	Hypertension	0.79	Normal	15.2	No anaemia
57	Weekly	120	70	Normal	0.83	Normal	14.2	No anaemia
58	Monthly	110	70	Normal	0.9	Normal	13.0	No anaemia
59	Weekly	100	70	Normal	0.7	Normal	13.8	No anaemia
60	Monthly	100	70	Normal	0.97	Normal	13.7	No anaemia
61	Monthly	140	70	Hypertension	0.63	Hypoglycaemia	17.8	No anaemia
62	Weekly	110	60	Normal	0.79	Normal	15.0	No anaemia
63	Weekly	90	70	Normal	0.83	Normal	12.8	No anaemia
64	Monthly				0.72	Normal	17.2	No anaemia
65	Weekly	110	70	Normal	0.97	Normal	8.7	Anaemia
66	Weekly	120	80	Normal	0.9	Normal	13.5	No anaemia
69	Weekly	110	70	Normal	0.81	Normal	12.6	No anaemia
71	Monthly	100	70	Normal	0.99	Normal	13.7	No anaemia
74	Monthly	100	60	Normal	0.9	Normal	11.9	Anaemia
76	Monthly	120	80	Normal	0.89	Normal	9.8	Anaemia
79	Monthly	100	50	Hypotension	0.88	Normal	12.4	Anaemia
80	Monthly	120	70	Normal	0.92	Normal	14.2	No anaemia
83	Never	140	90	Hypertension	0.99	Normal	11.9	Anaemia
87	Daily	120	70	Normal	1.0	Normal	13.3	No anaemia
89	Never	140	90	Hypertension	0.92	Normal	11.9	Anaemia
95	Monthly	120	70	Normal	0.99	Normal	9.2	Anaemia
97	Weekly	120	70	Normal	0.81	Normal	12.8	No anaemia
107	Weekly	120	70	Normal	0.89	Normal	12.3	No anaemia
109	Weekly	110	70	Normal	1.03	Normal	11.3	Anaemia
111	Weekly	110	70	Normal	0.98	Normal	9.4	Anaemia
112	Weekly	120	40	Hypotension	1.0	Normal	13.3	No anaemia

Participant_ID	Carbонатед_drinks_frequency	Systolic_BP_mmHg	Diastolic_BP_mmHg	BP_category	Capillary_glycaemia_g_L	Glycaemia_category	Haemoglobin_g_dL	Anaemia_status_WHO
118	Weekly	110	70	Normal	0.91	Normal	13.9	No anaemia
123	Monthly	100	70	Normal	0.92	Normal	14.7	No anaemia
130	Weekly	110	50	Hypotension			12.4	No anaemia
133	Weekly	120	80	Normal	0.97	Normal	12.6	No anaemia
140	Monthly				0.99	Normal	6.0	Anaemia
142	Monthly	160	70	Hypertension	0.87	Normal	10.4	Anaemia
143	Monthly	110	70	Normal	0.96	Normal	13.0	No anaemia
144	Monthly	120	70	Normal	0.97	Normal	15.1	No anaemia
145	Never	100	60	Normal	0.88	Normal	13.8	No anaemia
146	Monthly	100	60	Normal	0.92	Normal	13.5	No anaemia
147	Never	120	70	Normal	0.91	Normal	10.8	Anaemia
148	Monthly	100	60	Normal	1.1	Normal	14.1	No anaemia
149	Monthly	100	70	Normal	1.11	Hyperglycaemia	10.5	Anaemia
150	Monthly	120	70	Normal	1.01	Normal	15.8	No anaemia
151	Daily	120	80	Normal	1.01	Normal	15.4	No anaemia
152	Weekly	130	80	Normal	0.96	Normal	15.9	No anaemia
153	Daily	120	80	Normal	0.95	Normal	13.8	No anaemia
154	Weekly	110	70	Normal	0.92	Normal	13.4	No anaemia
155	Weekly	100	70	Normal	0.97	Normal	12.7	Anaemia
156	Weekly	120	80	Normal	0.88	Normal	15.5	No anaemia
157	Monthly	120	80	Normal	0.89	Normal	14.7	No anaemia
158	Weekly	120	80	Normal	1.0	Normal	14.7	No anaemia
159	Weekly	130	80	Normal	0.92	Normal	14.4	No anaemia
160	Weekly	100	60	Normal	0.87	Normal	12.9	Anaemia
161	Weekly	100	70	Normal	0.92	Normal	14.6	No anaemia
162	Weekly	130	70	Normal	0.87	Normal	14.1	No anaemia
163	Monthly	110	70	Normal	0.9	Normal	12.4	Anaemia
164	Weekly	140	80	Hypertension	0.98	Normal	15.9	No anaemia

Participant_ID	Carbонатед_drinks_frequency	Systolic_BP_mmHg	Diastolic_BP_mmHg	BP_category	Capillary_glycaemia_g_L	Glycaemia_category	Haemoglobin_g_dL	Anaemia_status_WHO
165	Monthly	130	70	Normal	0.89	Normal	14.4	No anaemia
166	Monthly	110	80	Normal	0.92	Normal	13.7	No anaemia
167	Weekly	120	80	Normal	0.88	Normal	12.4	No anaemia
168	Weekly	100	70	Normal	0.95	Normal	15.3	No anaemia
169	Weekly	130	70	Normal	1.03	Normal	13.2	No anaemia
171	Never	110	70	Normal	0.91	Normal	11.2	Anaemia
172	Weekly	100	70	Normal	0.77	Normal	15.3	No anaemia
176	Weekly	120	80	Normal	0.88	Normal	10.0	Anaemia
181	Weekly	120	70	Normal	0.95	Normal	13.0	No anaemia
182	Weekly	100	70	Normal	1.0	Normal	6.2	Anaemia
183	Weekly	110	60	Normal	0.92	Normal	14.2	No anaemia
184	Weekly	110	70	Normal	1.04	Normal	12.4	Anaemia
185	Weekly	110	70	Normal	1.2	Hyperglycaemia	18.8	No anaemia
186	Weekly	130	80	Normal	0.96	Normal	9.5	Anaemia
187	Weekly	110	70	Normal	1.08	Normal	7.7	Anaemia
188	Weekly	120	80	Normal	0.85	Normal	5.9	Anaemia
189	Weekly	110	70	Normal	0.82	Normal	6.8	Anaemia
190	Monthly	110	70	Normal	0.78	Normal	5.7	Anaemia
191	Monthly	120	90	Hypertension	0.96	Normal	12.4	Anaemia
192	Daily	130	90	Hypertension	0.93	Normal	6.8	Anaemia
193	Weekly	120	70	Normal	0.96	Normal	10.4	Anaemia
194	Daily	150	90	Hypertension	1.08	Normal	13.4	No anaemia
195	Weekly	120	70	Normal	0.92	Normal	13.1	No anaemia
196	Monthly	110	70	Normal	0.99	Normal	12.3	Anaemia
197	Weekly	100	70	Normal	0.9	Normal	8.2	Anaemia
198	Weekly	90	70	Normal	0.76	Normal	10.6	Anaemia
199	Never	100	70	Normal	0.85	Normal	10.8	Anaemia
200	Weekly	130	90	Hypertension	0.98	Normal	13.5	No anaemia

Participant_ID	Carbонатед_drinks_frequency	Systolic_BP_mmHg	Diastolic_BP_mmHg	BP_category	Capillary_glycaemia_g_L	Glycaemia_category	Haemoglobin_g_dL	Anaemia_status_WHO
201	Daily	110	70	Normal	0.95	Normal	14.4	No anaemia
202	Weekly	120	70	Normal	0.97	Normal	15.9	No anaemia
203	Daily	130	90	Hypertension	0.87	Normal	13.3	No anaemia

Part B - Codebook

Table 9 Caption...

Variable	Description	Unit / Coding
Participant_ID	Anonymous participant identifier (original survey form number; not renumbered, hence non-contiguous)	integer, 1-203 (129 participants)
Sex	Biological sex	Male / Female
Age_years	Age at time of survey	years
Marital_status	Self-reported marital status	Single / Married / Divorced
Year_of_study	Undergraduate year of study	L1 / L2 / L3 (Year 1/2/3)
Accommodation	Type of accommodation	Rented / Family home / University dormitory
Faculty_department	Department within the Faculty of Science and Technology	text
Income_source	Main reported source of income	categorical, see manuscript Table 1
Perceived_living_conditions	Self-rated living conditions	Acceptable / Average / Good / Precarious
Weight_kg	Body weight	kg
Height_m	Standing height	m
BMI_kg_m2	Body mass index = weight/height ²	kg/m ²
BMI_category_WHO	Nutritional status per WHO BMI cut-offs	Thinness (<18.5) / Normal weight (18.5-24.9) / Overweight (25-29.9) / Obesity (>=30)
MUAC_cm	Mid-upper arm circumference	cm
Physical_activity_yn	Practises any physical activity	Yes / No
Physical_activity_type	Type of physical activity reported	free text
Physical_activity_frequency	Frequency of physical activity	Regular / Irregular / Occasional / None
Alcohol_consumption_yn	Reports alcohol consumption	Yes / No
Tobacco_use_yn	Reports tobacco use	Yes / No
Tea_coffee_consumption_yn	Reports tea or coffee consumption	Yes / No
Tea_coffee_frequency	Frequency of tea/coffee consumption	Daily / Weekly / Occasional / None
Meals_per_day	Number of meals eaten per day	integer, 1-4+

Variable	Description	Unit / Coding
Breakfast_consumption_yn	Eats breakfast	Yes / No
Milk_dairy_frequency	Consumption frequency: milk & dairy products	Daily / Weekly / Monthly / Never
Cereals_starches_frequency	Consumption frequency: cereals & starches	Daily / Weekly / Monthly / Never
Pulses_frequency	Consumption frequency: pulses (legumes)	Daily / Weekly / Monthly / Never
Meat_fish_eggs_frequency	Consumption frequency: meat/fish/eggs	Daily / Weekly / Monthly / Never
Fruit_frequency	Consumption frequency: fruit	Daily / Weekly / Monthly / Never
Vegetables_frequency	Consumption frequency: vegetables	Daily / Weekly / Monthly / Never
Fats_frequency	Consumption frequency: fats/oils	Daily / Weekly / Monthly / Never
Sugary_products_frequency	Consumption frequency: sugary products	Daily / Weekly / Monthly / Never
Carbonated_drinks_frequency	Consumption frequency: carbonated drinks	Daily / Weekly / Monthly / Never
Systolic_BP_mmHg	Systolic blood pressure (blank = excluded as implausible, n=2 missing)	mmHg
Diastolic_BP_mmHg	Diastolic blood pressure (blank = excluded as implausible, n=2 missing)	mmHg
BP_category	Blood pressure category (systolic ≥ 140 and/or diastolic ≥ 90 = Hypertension; systolic < 90 or diastolic < 60 = Hypotension)	Normal / Hypertension / Hypotension
Capillary_glycaemia_g_L	Capillary blood glucose (blank = one outlier + one missing excluded)	g/L
Glycaemia_category	Glycaemia category (< 0.70 g/L = Hypoglycaemia; > 1.10 g/L = Hyperglycaemia)	Normal / Hyperglycaemia / Hypoglycaemia
Haemoglobin_g_dL	Haemoglobin concentration	g/dL
Anaemia_status_WHO	Anaemia status per WHO sex-specific thresholds (Hb < 12 g/dL women; < 13 g/dL men)	No anaemia / Anaemia

Supplementary Data S2: Python Analysis Script

International Journal of Scientific Research and Management (IJSRM)

Dietary Habits and Nutritional Status of Undergraduate Students at the University of Labé, Republic of Guinea: A Descriptive and Analytical Cross-Sectional Study

Description

This script reproduces, from the anonymised raw data (Supplementary File 1, sheet "Raw_Data"), every statistic reported in the manuscript: descriptive statistics (Tables 1-3), bivariate association tests (Table 4; Welch's t-test, Pearson's chi-square test, Pearson correlation), Wilson score 95%

confidence intervals, and the multivariable logistic regression model (Sections 3.5 and 4).

Requirements: Python ≥ 3.9 ; pandas, numpy, scipy, statsmodels, openpyxl.

Usage: python IJSRM_Analysis_Script06102026.py --input IJSRM_Supplementary_Raw_Data06102026.xlsx

The executable script is also provided as IJSRM_Analysis_Script06102026.py.

Source code

```
1 #!/usr/bin/env python3
```

```
2 # -*- coding: utf-8 -*-
```

```
3 """
```

```
4 IJSRM_Analysis_Script06102026.py
```

```
5
```

```
6 Reproducible analysis script for:
```

```
7 "Dietary Habits and Nutritional Status of Undergraduate
Students at the
```

```
8 University of Labe, Republic of Guinea"
```

```
9
```

```
10 This script reproduces, from the openly shared raw data
(Supplementary
```

```
11 File 1, sheet "Raw_Data"), every statistic reported in the
manuscript:
```

```
12 - Descriptive statistics (Tables 1-3)
```

```
13 - Bivariate association tests (Table 4): Welch's t-test,
Pearson's
```

```
14 chi-square test, Pearson correlation coefficient
```

```
15 - Wilson score 95% confidence intervals for all reported
proportions
```

```
16 - The multivariable logistic regression model (Section 3.5
/ 4)
```

```
17
```

```
18 Requirements:
```

```
19 python  $\geq 3.9$ 
```

```
20 pandas, numpy, scipy, statsmodels, openpyxl
```

```
21
```

```
22 Usage:
```

```
23 python IJSRM_Analysis_Script06102026.py --input
IJSRM_Supplementary_Raw_Data06102026.xlsx
```

```
24
```

```
25 Author: corresponding author's analysis team
```

```
26 """
```

```
27
```

```

28 import argparse
29 import numpy as np
30 import pandas as pd
31 from scipy import stats
32 import statsmodels.formula.api as smf
33
34
35 # -----
-----
36 # 1. Utility functions
37 # -----
-----
38
39 def wilson_ci(k, n, z=1.959963985):
40 """Wilson score 95% confidence interval for a binomial
proportion.
41
42 Parameters
43 -----
44 k : int
45 Number of "successes" (events).
46 n : int
47 Total number of observations.
48 z : float
49 Critical value of the standard normal distribution for the
50 desired confidence level (default: 1.959963985 for 95%).
51
52 Returns
53 -----
54 (p, low, high) : tuple of floats
55 Observed proportion and lower/upper bounds of the 95%
CI,
56 all expressed as percentages.
57 """
58 if n == 0:
59 return (np.nan, np.nan, np.nan)
60 p_hat = k / n
61 denom = 1 + z ** 2 / n
62 centre = p_hat + z ** 2 / (2 * n)
63 adj = z * np.sqrt((p_hat * (1 - p_hat) + z ** 2 / (4 * n)) /
n)
64 low = (centre - adj) / denom
65 high = (centre + adj) / denom
66 return (p_hat * 100, max(0, low) * 100, min(1, high) *
100)
67
68
69 def describe_prop(series, value, label=None):
70 """Print n, %, and 95% Wilson CI for `series ==
value`."""
71 n_total = series.notna().sum()
72 k = (series == value).sum()
73 p, lo, hi = wilson_ci(k, n_total)
74 label = label or f"{series.name} = {value}"
75 print(f" {label}: {k}/{n_total} ({p:.1f}%) [95% CI
{lo:.1f}-{hi:.1f}]")
76 return k, n_total, p, lo, hi
77
78
79 def welch_ttest(a, b, label=""):
80 """Welch's (unequal-variance) t-test, as used throughout
the manuscript."""
81 a = a.dropna()
82 b = b.dropna()
83 t, p = stats.ttest_ind(a, b, equal_var=False)
84 print(f" {label}: mean_1={a.mean():.2f} (SD
{a.std():.2f}, n={len(a)}), "
85 f"mean_2={b.mean():.2f} (SD {b.std():.2f}, n={len(b)}),
"
86 f"t={t:.2f}, P={p:.3f}")
87 return t, p
88
89
90 def chi2_test(df, col1, col2, label=""):
91 """Pearson's chi-square test of independence between two
categorical columns."""
92 ct = pd.crosstab(df[col1], df[col2])
93 chi2, p, dof, _ = stats.chi2_contingency(ct)
94 print(f" {label}: chi2({dof}) = {chi2:.2f}, P = {p:.3f}")
95 return chi2, p, dof
96
97
98 def pearson_r(a, b, label=""):
99 tmp = pd.concat([a, b], axis=1).dropna()
100 r, p = stats.pearsonr(tmp.iloc[:, 0], tmp.iloc[:, 1])

```

```

101 print(f" {label}: r = {r:.2f}, P = {p:.3g}")
102 return r, p
103
104
105 # -----
-----
106 # 2. Load and prepare data
107 # -----
-----
108
109 def load_data(path):
110 df = pd.read_excel(path, sheet_name="Raw_Data")
111
112 # Derived binary/analysis variables (see manuscript
Section 2.4 for
113 # operational definitions and Section 2.5 for the
statistical model).
114 df["malnutrition"] = (df["BMI_category_WHO"] !=
"Normal weight").astype(int)
115 df["sex_female"] = (df["Sex"] == "Female").astype(int)
116 df["active"] = (df["Physical_activity_yn"] ==
"Yes").astype(int)
117 df["breakfast_yes"] = (df["Breakfast_consumption_yn"]
== "Yes").astype(int)
118
119 return df
120
121
122 # -----
-----
123 # 3. Descriptive statistics (Tables 1-3)
124 # -----
-----
125
126 def descriptive_statistics(df):
127 print("\n" + "=" * 70)
128 print("DESCRIPTIVE STATISTICS (Tables 1-3)")
129 print("=" * 70)
130
131 n = len(df)
132 print(f"\nTotal sample: n = {n}")
133
134 print("\n-- Sex distribution --")

135 describe_prop(df["Sex"], "Male", "Male")
136 describe_prop(df["Sex"], "Female", "Female")
137
138 print("\n-- Age --")
139 print(f" Mean +/- SD: {df['Age_years'].mean():.1f} +/-
{df['Age_years'].std():.1f} "
140 f"years (range
{df['Age_years'].min()}-{df['Age_years'].max()})")
141 welch_ttest(df.loc[df.Sex == "Male", "Age_years"],
142 df.loc[df.Sex == "Female", "Age_years"],
143 "Age, men vs women")
144
145 print("\n-- Accommodation --")
146 for cat in df["Accommodation"].dropna().unique():
147 describe_prop(df["Accommodation"], cat, cat)
148
149 print("\n-- Anthropometric characteristics --")
150 print(f" Weight: {df['Weight_kg'].mean():.1f} +/-
{df['Weight_kg'].std():.1f} kg")
151 print(f" Height: {df['Height_m'].mean():.2f} +/-
{df['Height_m'].std():.2f} m")
152 welch_ttest(df.loc[df.Sex == "Male", "Weight_kg"],
153 df.loc[df.Sex == "Female", "Weight_kg"],
154 "Weight, men vs women")
155
156 print("\n-- Nutritional status (BMI, WHO categories
--")
157 for cat in ["Thinness", "Normal weight", "Overweight",
"Obesity"]:
158 describe_prop(df["BMI_category_WHO"], cat, cat)
159 print(f" Malnutrition (any non-normal category): "
160 f"{df['malnutrition'].sum()}/{n} "
161 f"({100*df['malnutrition'].mean():.1f}%)")
162
163 print("\n-- MUAC vs BMI correlation --")
164 pearson_r(df["MUAC_cm"], df["BMI_kg_m2"],
"MUAC vs BMI")
165
166 print("\n-- Clinical and biological parameters --")
167 print(f" Systolic BP:
{df['Systolic_BP_mmHg'].mean():.1f} +/- "
168 f"{df['Systolic_BP_mmHg'].std():.1f} mmHg
(n={df['Systolic_BP_mmHg'].notna().sum()})")

```

```

169         print(f"           Diastolic      BP:
{df['Diastolic_BP_mmHg'].mean():.1f} +/- "
170 f"{df['Diastolic_BP_mmHg'].std():.1f} mmHg")
171     describe_prop(df["BP_category"], "Hypertension",
"Hypertension")
172     describe_prop(df["BP_category"], "Hypotension",
"Hypotension")
173         describe_prop(df["Glycaemia_category"],
"Hyperglycaemia", "Hyperglycaemia")
174         describe_prop(df["Glycaemia_category"],
"Hypoglycaemia", "Hypoglycaemia")
175         print(f"           Haemoglobin:
{df['Haemoglobin_g_dL'].mean():.1f} +/- "
176 f"{df['Haemoglobin_g_dL'].std():.1f} g/dL")
177         describe_prop(df["Anaemia_status_WHO"],
"Anaemia", "Anaemia (overall)")
178     describe_prop(df.loc[df.Sex == "Female",
"Anaemia_status_WHO"], "Anaemia", "Anaemia, women")
179     describe_prop(df.loc[df.Sex == "Male",
"Anaemia_status_WHO"], "Anaemia", "Anaemia, men")
180
181 print("\n-- Dietary and behavioural habits --")
182 describe_prop(df["Breakfast_consumption_yn"], "No",
"Breakfast skipping")
183 describe_prop(df["Meals_per_day"], 2, "2 meals/day")
184     describe_prop(df["Physical_activity_yn"], "Yes",
"Physically active")
185 for col, label in [
186 ("Fruit_frequency", "Fruit - Daily"),
187 ("Pulses_frequency", "Pulses - Daily"),
188 ("Milk_dairy_frequency", "Dairy - Daily"),
189 ("Fats_frequency", "Fats - Daily"),
190 ("Sugary_products_frequency", "Sugary products -
Daily"),
191 ]:
192 if col in df.columns:
193 describe_prop(df[col], "Daily", label)
194
195
196 # -----
-----
197 # 4. Bivariate analyses (Table 4)
198 # -----
-----
199
200 def bivariate_analyses(df):
201 print("\n" + "=" * 70)
202 print("BIVARIATE ANALYSES (Table 4)")
203 print("=" * 70)
204
205 print("\n-- Nutritional status vs sex --")
206 chi2_test(df, "BMI_category_WHO", "Sex", "Sex")
207
208 print("\n-- Nutritional status vs age (BMI as continuous,
correlation) --")
209 pearson_r(df["Age_years"], df["BMI_kg_m2"], "Age vs
BMI")
210
211 print("\n-- Nutritional status vs breakfast consumption
--")
212     chi2_test(df, "BMI_category_WHO",
"Breakfast_consumption_yn", "Breakfast consumption")
213
214 print("\n-- Nutritional status vs physical activity --")
215     chi2_test(df, "BMI_category_WHO",
"Physical_activity_yn", "Physical activity")
216
217 print("\n-- Nutritional status vs accommodation --")
218     chi2_test(df, "BMI_category_WHO",
"Accommodation", "Type of accommodation")
219
220 print("\n-- Nutritional status vs year of study --")
221 chi2_test(df, "BMI_category_WHO", "Year_of_study",
"Year of study")
222
223 print("\n-- Nutritional status vs number of meals/day --")
224 pearson_r(df["Meals_per_day"], df["BMI_kg_m2"],
"Meals/day vs BMI")
225
226 print("\n-- Nutritional status vs anaemia --")
227     chi2_test(df, "BMI_category_WHO",
"Anaemia_status_WHO", "Nutritional status x anaemia")
228
229 print("\n-- Breakfast consumption vs anaemia --")
230     chi2_test(df, "Breakfast_consumption_yn",
"Anaemia_status_WHO", "Breakfast x anaemia")
231

```

```

232
233 # -----
-----
234 # 5. Multivariable logistic regression (Section 3.5 / 4)
235 # -----
-----
236
237 def multivariable_model(df):
238     print("\n" + "=" * 70)
239     print("MULTIVARIABLE      LOGISTIC
REGRESSION")
240     print("=" * 70)
241     print("\nOutcome: malnutrition (1 = any BMI category
other than 'Normal weight')")
242     print("Covariates: sex, age, breakfast consumption,
physical activity, "
243 "type of accommodation, year of study\n")
244
245 model = smf.logit(
246     "malnutrition ~ sex_female + Age_years +
breakfast_yes + active + "
247     "C(Accommodation) + C(Year_of_study)",
248     data=df,
249     ).fit(dis=0)
250
251 print(model.summary())
252
253 # Odds ratios and 95% confidence intervals
254 conf = model.conf_int()
255 conf.columns = ["2.5%", "97.5%"]
256 conf["coef"] = model.params
257 or_table = np.exp(conf[["coef", "2.5%", "97.5%"]])
258     or_table.columns = ["OR", "95%CI_low",
"95%CI_high"]
259 or_table["P"] = model.pvalues
260
261 print("\n-- Adjusted odds ratios (95% CI) --")
262 print(or_table.round(3))
263
264     print(f"\nLikelihood-ratio      test      P-value:
{model.llr_pvalue:.3f}")
265     print(f"Pseudo      R-squared      (McFadden):
{model.prsquared:.3f}")
266
267 return model
268
269
270 # -----
-----
271 # 6. Main
272 # -----
-----
273
274 def main():
275     parser =
=
argparse.ArgumentParser(description=__doc__)
276     parser.add_argument(
277         "--input",
278         default="IJSRM_Supplementary_Raw_Data06102026.xlsx",
279         help="Path to the Supplementary raw data Excel file
(sheet 'Raw_Data').",
280     )
281     args = parser.parse_args()
282
283     df = load_data(args.input)
284     descriptive_statistics(df)
285     bivariate_analyses(df)
286     multivariable_model(df)
287
288
289 if __name__ == "__main__":
290     main()

```