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SOCIO-DEMOGRAPHIC FACTORS AND DIETARY PRACTICES ASSOCIATED WITH OVERWEIGHT AND OVERFAT NUTRITIONAL STATUS AMONG KYAMBOGO UNIVERSITY STUDENTS IN UGANDA

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ABSTRACT

Globally, the prevalence of non communicable diseases is rising, with overweight and obesity as major contributors, particularly among young adults. However, evidence on predictors of overweight, overfat, and obesity among young adults in resource-constrained settings remains limited, despite links to unhealthy dietary patterns established in early life. This study assessed socio-demographic factors and dietary practices associated with overweight and overfat, nutritional status among Kyambogo university students in Uganda. A cross-sectional study was conducted among 273 undergraduate students selected through convenience sampling. Quantitative data were collected using structured questionnaires capturing socio-demographic characteristics, dietary practices, lifestyle behaviors, and nutritional status. Qualitative data were obtained through six focus group discussions and six in-depth interviews. Quantitative data were analyzed using chi-square tests and binary logistic regression in SPSS version 20, while qualitative data were analyzed thematically. Nutritional status was determined using BMI and TBF% indicators based on WHO (2004) and TANITA cut-offs. Most participants were aged 18-23 years, with more females (190) than males (83). The prevalence of overweight and overfat was 20.1% and 46.2%, respectively. Overweight (defined here as including both overweight and obesity) was significantly associated with sex ($p = 0.004$) and marital status ($p = 0.004$). Male students had 69.3% lower odds of being overweight than female students (OR = 0.307). Likewise, single students had 83.8% lower odds of being overweight than married students (OR = 0.162). Students who routinely skipped breakfast were 3.3 times more likely to be overweight, and 2.2 times more likely to be overfat than those who consumed breakfast regularly. Usual breakfast consumption was significantly associated with both overweight ($p = 0.005$) and overfat status ($p < 0.001$). Overfat status was also associated with consuming fewer than three meals per day ($p = 0.014$), and perceptions of meal preparation costs ($p = 0.032$). Female students more frequently consumed deep-fried snacks ($p = 0.002$), and unhealthy combinations of deep-fried snacks and soda ($p = 0.016$). Weekly alcohol consumption was significantly associated with both overweight ($p=0.043$) and overfat ($p=0.045$). Qualitative findings revealed these unhealthy dietary practices were driven by financial limitations, time constraints, and limited access to affordable healthy foods on and around campus. In conclusion, overweight and overfat are prevalent among Kyambogo university students in Uganda, particulary among females and married students. These are influenced by socio-demographic and modifiable dietary factors. Targeted interventions, including nutrition education, improved access to affordable healthy foods, and supportive campus food environments, are needed to promote optimal nutritional status in this population.

Key words: overweight, overfat, obesity, adiposity, diet, breakfast, snacks, alcohol, students, Uganda

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INTRODUCTION

Non-communicable diseases (NCDs) account for about 90% and 25% of morbidity in developing and developed countries, respectively [1]. In 2016, one in three deaths in Uganda was attributable to NCDs [2], with overweight and obesity being major contributing factors [1]. According to the 2016 Uganda Demographic and Health Survey (UDHS), 24% of women and 9% of men aged 15–49 years were overweight or obese [3]. More recent data from the 2022 UDHS showed an increase to 26% among women and 12% among men in the same age group [4]. Among women, the prevalence increased with age, rising from 8% among those aged 15–19 years to 42% among those aged 40–49 years [4].

The growing burden of NCDs has largely been linked to unhealthy dietary practices. For example, increasing NCD cases in South Africa have been associated with poor dietary patterns [5]. Diets high in sugar, saturated fats, and trans fats, but low in dietary fibre, significantly contribute to the development of NCDs and related health complications [6]. Such practices are often acquired during adolescence and early adulthood [7] and tend to persist into later life [8]. In Uganda, NCD prevalence remains high at about 36%, with the age-standardized death rates estimated at 709 per 100,000 for males and 506 per 100,000 for females in 2021 [9].

Unhealthy dietary habits reported among university students include low dietary diversity in Italy [10], frequent intake of sugary but low nutrient dense food, low consumption of fruits and vegetables and skipping meals in Malaysia [11]. Excessive alcohol drinking has also been reported among university students in Ireland [12], while a strong preference for junk foods has been reported in Uganda [13].

Public universities in Uganda have both privately and government sponsored students. With a population of over 40,000 students, Kyambogo is the second largest public university in Uganda. Privately sponsored students must bear the cost of feeding and welfare in addition to paying tuition fees. Previously, government-funded students were provided meals by the university and private students could also access these meals at a fee. In 2018 however, all public universities abolished the provision of meals. Instead, government-sponsored students started receiving an allowance of Uganda shillings 476,000 (approx.134USD) per semester. As both government- and privately-sponsored students independently meet their feeding needs, their socio-demographic characteristics and dietary practices are likely to affect their nutritional status.

The nutritional status of university students is important as they comprise the future productive force of nations. Despite the global increase in overweight and obesity among adults, evidence on the predictors of these conditions among university students in resource-constrained countries remains limited. Although BMI is widely

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used to assess overweight and obesity, it may not accurately reflect body fatness. Therefore, this study used both BMI and Total Body Fat Percentage (TBF %) to provide a more comprehensive assessment of nutritional status among university students.

The main objective of this study was therefore to evaluate the sociodemographic factors and dietary practices associated with overweight and overfat nutritional status among university students in Uganda, with a focus on Kyambogo University.

MATERIALS AND METHODS

Study design and sampling

The study used a cross-sectional design. Respondents were obtained from a convenience sample of students enrolled in the Department of Human Nutrition and Home Economics at Kyambogo University. Students from five of the eight programs in the department self-selected to participate. All students in the selected programs were invited and 273 students (83 men and 190 women) participated. Data collection was done October 2018. Convenience sampling and voluntary participation may have introduced selection bias and limited the generalizability of the findings.

Assessments and measures

Determination of socio-demographic characteristics and dietary practices with questionnaires: Students completed self-administered questionnaires, socio-demographic characteristics and dietary practices. The questionnaire elicited students' perception of the affordability and healthiness of their diet.

Focus group discussions: Focus group discussions (FGDs) were conducted among students to elicit their opinions on drivers of their dietary practices. Six FGD sessions of 15 students each were conducted. To maximize openness, three sessions were for males and three for females alone, respectively.

In-depth interviews: The in-depth interviews included six students (three men and three women). Of these, three were on government sponsorship and three on private sponsorship in a nutrition course in Kyambogo University.

Nutritional status with a stadiometer and a body composition meter: Body mass index (BMI) and total body fat percentage (TBF %) were determined following procedures [14]. Height was measured to the nearest 0.1 cm using the SECA213 stadiometer. Age, sex and height were entered into the TANITA BC-202-WH scale. Each participant stood (barefooted) on the TANITA, and BMI and TBF% were recorded.

Data management and analysis

For dietary practices, responses were assigned numbers as shown below: number of meals taken on a typical day during the semester (1=adequate number of meals

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eaten–took three meals a day; and 0=inadequate number of meals taken–took less than three meals a day. It is recommended that adults consume at least three meals a day for a healthy lifestyle [15]. Frequent consumption of deep-fried snacks and soda was defined as consumption more than three times per week.

Dietary diversity was assessed using a 24-hour dietary recall, in which participants reported all foods and beverages consumed during the previous day. Dietary Diversity Scores (DDS) were then calculated using the standard FAO guideline [16], which classifies foods consumed over the preceding 24 hours into 10 food groups and sums the number of food groups consumed. The dietary intake of male and female students was therefore categorized into the following 10 food groups: one: grains, white roots and tubers, and plantains; two: pulses (beans, peas and lentils); three: nuts and seeds; four: dairy; five: meat, poultry and fish; six: eggs; seven: dark green leafy vegetables; eight: other vitamin A-rich fruits and vegetables; nine: other vegetables, and ten: other fruits. DDS were categorized as follows: <5 food groups (minimum DDS not attained) and ≥5 food groups (minimum DDS attained).

Quantitative data were analyzed using SPSS version 20. Nutritional status was assessed using BMI and total body fat percentage (TBF %). Obesity was defined as BMI ≥30 kg/m², while overfat/obesity based on TANITA cut-offs was defined as TBF% ≥20% in males and ≥33% in females based on WHO [17] cutoff and TANITA [18] respectively (Table 1 and Table 2). The existence of associations was determined using Pearson's chi-square test. Binary regression analysis was used to establish the predictors of nutritional status.

Body mass index and TBF% were recoded into binary categories as follows: BMI Category 1: (BMI ≤ 24.99 – "not overweight" that is., underweight or normal weight), and BMI Category 2: (BMI ≥ 25.00 – "overweight" that is, overweight, or obese). Total Body Fat percentage (TBF %) data were also recoded into binary categories: TBF% Category 1: (TBF% classified as "not overfat" that is, underfat or healthy: males 0-19.9%; females 0-32.9%) and TBF% Category 2: (TBF% classified as "overfat" that is, overfat: males ≥ 20%; females ≥ 33%).

Body mass index underweight and normal-weight categories were combined as "not overweight", while overweight and obese categories were combined as "overweight" [19, 20]. Similarly, TBF% underfat and normal categories were combined as "not overfat", whereas overfat and obese categories were combined as "overfat" for the chi-square analysis.

Dietary practices were cross tabulated against sex using chi-square analysis. The socio-demographic factors and dietary practices were further cross tabulated with BMI and TBF% categories to identify any associations. Binary regression determined statistically significant predictors of nutritional status.

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RESULTS AND DISCUSSION

Socio-demographic characteristics of the students

Sociodemographic characteristics of all 273 students who consented and participated in the study, with complete data sets are summarized in Table 3. Mean age was 21.3±2.5 and majority 243 (89.0%) were aged 18-23 years. A total of 190 (69.6%) were female. About half 130 (47.6%) were in their first year while 117 (42.9%) were in their second year. Most students 262 (96.0%) were single/unmarried. The majority, 233 (85.3%) used other accommodation besides the university halls. A total of 1,428 (less than 5%) of the whole population of students lived in halls of residence, of whom about 976 (68%) were government-sponsored, while 452 (32%) were privately sponsored [21], although some government sponsored students lived in private accommodation facilities due to the limited hall capacity (1,444 spaces out of over 32,724 students) [22].

In-depth interviews revealed that those in university halls received a living allowance of UGX 476,000 (about USD 134) per 15-week semester. Those living out received UGX 730,000 (about USD 200). Most students indicated this was insufficient.

Dietary practices of the students and the association with sex

Number and regularity of meals

Slightly more than two thirds 190 (69.6%) of the students consumed fewer than 3 meals daily during the semester (table 4), and many did not usually have breakfast 123 (45.1%) (Table 4). Meal skipping was common: 232 (85.0%) skipped at least one meal daily; only 41 (15%) did not. Breakfast was the most skipped meal as reported by 138 (50.5%) of the students. Focus Group Discussions results also indicated that most students skipped breakfast, prioritizing lunch or dinner.

In-depth interviews revealed that, students had to wake up before 7 am to have breakfast, get ready for school and arrive in time for the first lecture which typically started at 8 am. Majority woke up about 7 am due to staying up late. This made it difficult to have breakfast before heading to school, if they had to prepare it themselves. The students' lunch break was between 1-2 pm. Students reported that they normally walked to a nearby trading center (Banda) and ate from eateries and restaurants in the area. Government sponsored students in halls had their meals prepared from the university kitchens. Afternoon lectures ended at about 4 pm. The evening meal was usually about 7 pm for those that lived in the halls of residence but could be much later for the majority who lived in other kinds of accommodation and depended on whether they made it themselves of bought it already prepared.

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Most important energy source and consumption frequency of 'healthy foods'– fruits and vegetables

Table 4 shows that rice, matooke (steamed green bananas) and posho (mingled maize flour) were the most important food sources of energy as reported by 108 (39.6%), 70 (25.6%) and 55 (20.1%) of the students respectively. Rice was particularly important for the women 88 (46.3%). For the men, the most important source of energy was posho 37 (44.6%). By the students' standard, rice and posho were the more affordable alternatives. Posho was more common for men because it was perceived as more energy dense and more filling.

Majority of the students did not consume fruits and vegetables daily, 245 (89.7%) and 234 (85.7%), respectively. In fact, majority of the students 218 (79.9%) consumed neither a fruit nor a vegetable daily. Focus groups indicated that fruits were rare due to cost and seasonality. Consistent with these findings, more than half of the students (52%) did not achieve the minimum recommended dietary diversity score of five food groups per day. This reflects limited variation in food intake and reliance on a narrow range of staple foods.

Consumption frequency of 'unhealthy foods'– deep-fried snacks, soda, and alcohol

Most students, 207 (75.8%) frequently consumed deep-fried snacks, significantly more common among women 154 (81.1%) than among men 53 (63.9%), $X^2(1, N =273) =9.3$, $p =.002$. In addition, 112 (41.0%) frequently consumed soda, and 221 (81.0%) frequently consumed at least either a deep-fried snack or a soda. This combined practice was more common among women, 161 (84.7%), than men 60 (72.3%), $X^2 (1, N =273) =5.8$, $p =.016$ (Table 4). Most students 247 (90.5%) did not take alcohol at all throughout the week (Table 4). These results were supported by findings from FGDs, where consumption of deep-fried snacks was also reported more among the females than males.

Asked for reasons for frequent snacking, FGDs revealed that deep-fried snacks were cheap, convenient and less time consuming. Male students reportedly did not "snack" because snacks were light and less satisfying. They preferred more 'solid' meals such as kikomando (a plate mixture of beans stew and chapati - a kind of fried bread). This meal was cheaper, more filling with higher satiety value.

Other common snacks mentioned were Rolex (chapati rolled with an omelette and often vegetables), chips and chicken, daddies (deep-fried dough snacks), mandazi (doughnuts) and deep-fried cassava. Female students indicated taking more soda because it was satisfying.

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Perception of the healthiness and affordability of diets, and the diet diversity of the students

A total of 164 students (60.1%) disagreed that they ate a healthy diet all the time, while 202 (74.0%) agreed that meals accounted for the largest share of their weekly expenditure (Table 4). In the FGDs, students further expressed difficulties with balancing food and non-food expenditures.

Lastly, slightly over a half of the students 142 (52.0%) did not achieve the recommended diet diversity score of five food groups per day. In the FGDs, most students preferred buying already prepared food rather than cooking, as it was perceived to be cheaper and allowed them to include a greater variety of food groups in their diet.

Nutritional status of the students

Prevalence of BMI-defined non-normal nutritional status among the students was found to be 82 (30%) of which underweight accounted for 27 (9.9%), 41 (15.0%) for overweight, and 14 (5.1%) for obesity respectively. Prevalence of TBF%-based non-normal nutritional status was even higher at 134 (49.1%) of which 8 (2.9%) were classified as under-fat, 69 (25.3%) for overfat, and 57 (20.9%) for obesity respectively. The prevalence of BMI-defined distribution of underweight, overweight and obesity among women was 11.6%, 17.9% and 6.8% respectively, while that among men was 6.0%, 8.4% and 1.2%, respectively. The prevalence of TBF%-defined distribution of under-fat, overfat and obesity among women was 2.6%, 28.9% and 18.9% respectively, and 3.6%, 16.9% and 25.3% respectively among men. The prevalence of underweight and under-fat categories were comparatively less common than overweight, overfat, and obese body classifications. The analysis focused on evaluation of the determinants of overweight and obesity (BMI) as well as overfat and obese (TBF %).

Table 4 demonstrates the prevalence of the dichotomous variables as defined here of nutritional status: underweight and normal weight (not-overweight), overweight/obese (overweight) for BMI. BMI results indicate that 55 (20.1%) of the students were overweight and 218 (79.9%) were not-overweight.

Table 4 demonstrates the prevalence of the dichotomous variables of fat status: not overfat, and overfat for TBF%. Basing on the TBF% result, 126 (46.2%) were classified as overfat while 147 (53.8%) of the students were classified as not-overfat.

Notably, there was a marked discrepancy between BMI-based and TBF%-based classifications. While 55 (20.1%) of students were classified overweight based on BMI, 126 (46.2%) were classified as overfat using TBF%. This indicates that TBF% identified a substantially higher proportion of students with excess adiposity than with above-normal BMI in this population.

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Prevalence of overweight and overfat nutritional status

The results of this study revealed an overweight prevalence of 20.1% with a higher proportion of females (24.7%) being overweight than males (9.6%). These results are quite comparable to the national statistics reported for Uganda (23.8% women aged 15-49 years and 8.9% of men age 15-49 years) [3]. When examined by age, overweight prevalence among females was 11% in the 15-19 age group and increased to 22.4% in the 20-29 age group. Among males, the corresponding prevalences were lower, at 0.9% and 7.3% respectively. This pattern indicates that the prevalence of overweight among females was higher than previously reported among similar age groups in Uganda and above estimates reported among school going children and adolescents aged 7-17 years in Mbarara where the prevalence of overweight and obesity was (12%) among females and (8%) among males [23]. This indicates that the burden of overweight increases during the transition from adolescence to young adulthood.

In comparison with other population-based studies, the prevalence of overweight in this study remains lower than that reported in rural western Uganda (25.8%) and in peri-urban and rural eastern Uganda (35.8%) [24 ,25]. However, these studies included older participants, including adults above 65 years, which likely contributes to the higher estimates. This difference is likely due to the younger age structure and urban residence of the student population. Overweight has consistently been found to be associated with age [24,26,27], being more prevalent in older adults [27], being 42% among women in their 30s, 47% among women in their 40s, 15% among men in their 30s and 14% among men in their 40s [28]. Overweight has also associated with place of residence, being more prevalent among those resident in urban areas [28 - 30].

Factors associated with, and the predictors of, overweight or overfat nutritional status

Table 5 shows the socio-demographic factors associated with the overweight nutritional status of the students. Overweight was significantly associated with sex, X^2 (1, N = 273) =8.2, p =.004; and marital status, X^2 (1, N =273) =8.4, p = .004. Women were more likely to be overweight than men and married students were more likely to be overweight than the single students. Overfat nutritional status was not significantly associated with the students' socio-demographic characteristics, Table 6.

Table 7 shows significant associations between dietary practices and students' nutritional status. Skipping breakfast was significantly associated with both overweight (χ^2(1, N = 273) = 7.8, p = .005) and overfat status (χ^2(1, N = 273) = 13.8, p = .000), with higher proportions of breakfast skippers classified as overweight or overfat. Consuming fewer than three meals per day was also significantly associated

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with overfat status ($\chi^2(1, N = 273) = 6.0$, $p = .014$). In addition, students who did not perceive home meal preparation as cheaper were more likely to be overfat ($\chi^2(1, N = 273) = 4.6$, $p = .032$). Weekly alcohol intake was significantly associated with both overweight ($p = 0.0043$) and overfat nutritional status ($p = 0.0045$).

Table 8 presents binary logistic regression results (odds ratios at 95% confidence intervals) for socio-demographic factors associated with weight and fat nutritional status. Men had significantly lower odds of being overweight than women (OR = 0.307; 95% CI: 0.128–0.734; $p < 0.01$). Similarly, single students were less likely to be overweight compared to married students (OR = 0.162; 95% CI: 0.044–0.597; $p < 0.01$). Students who did not usually consume breakfast had higher odds of being overweight (OR = 3.3; 95% CI: 1.4–7.7; $p < 0.01$) and overfat (OR = 2.2; 95% CI: 1.1–4.4; $p < 0.05$) than those who usually consumed breakfast.

Marital status and sex are associated with, and predict overweight nutritional status

Marital status and sex were significant predictors of overweight in this study (Table 8). The higher likelihood of overweight among married students may reflect more regular meal patterns and increased economic stability as well as age-related and reproductive factors previously reported in similar settings [25,27,31]. Although the number of married participants was small, the direction of the association is consistent with the findings from Uganda, Canada, and the USA [29,31].

Sex differences were also observed, with women more likely to be overweight than men (Table 8), a pattern widely documented in other populations [33,35]. This may be partly explained by the higher consumption of energy-dense snacks and sugar-sweetened beverages among female students, as shown in the present study. Qualitative findings further suggested that such foods were preferred due to affordability, convenience, and time constraints, particularly among women.

Frequent breakfast skipping was also a significant predictor of both overweight and overfat status (Table 8). This finding aligns with studies from other low and middle-income countries where irregular meal patterns and breakfast skipping have been associated with increased adiposity [37,40]. In the present study, students reported skipping breakfast mainly due to early morning class schedules and late-night studying, which may contribute to energy imbalance and weight gain overtime

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Dietary factors that are associated with and/or predict overweight and overfat status

Usual consumption of breakfast was associated with both an overfat and an overweight nutritional status. This finding aligns with studies from Nigeria and India that also found a positive association between meal skipping and overweight [37,38]. Although meal skipping, particularly breakfast, has been widely reported among university students in Malaysia and Nigeria, this appears to be the first study to report it in Uganda and East Africa [39,40]. It has been attributed to heavy workloads, poor time management, cost, and low prioritisation of healthy eating [9].

Dietary guidelines recommend that the largest share of daily energy intake be consumed earlier in the day, with smaller meals toward the evening [14,15]. Evidence also shows that higher food intake later in the day is associated with overweight and obesity [39,40]. However, participants in this study followed the opposite pattern, with dinner being the most frequently consumed meal, which may help explain the observed prevalence of overweight and overfat statuses.

Limited financial and time resources were reported to influence the consumption of deep-fried snacks and sweetened beverages instead of wholesome home-cooked meals. Students expressed difficulties with balancing food and non-food expenditures as a reason for skipping meals.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

This study found that overweight and overfat nutritional status were prevalent among students at Kyambogo university, with prevalence rates of 20.1% and 46.2% respectively. BMI defined overweight was significantly associated with sex and marital status, with higher prevalence among female and married students. Breakfast skipping was associated with both overweight and overfat status, while eating fewer than three meals per day and perception of the cost of home prepared meals per day were associated with overfat status. Although consumption of deep-fried snacks and soda was common, particularly among female students, these practices were not significantly associated with nutritional status.

These findings highlight the need for university-based nutrition education programmes promoting regular breakfast consumption and healthier, affordable food choices. Universities should also strengthen access to nutritious meals, while further research should investigate other lifestyle factors associated with students' nutritional status.

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Ethical approval

The study was approved by the Research Ethics Committee, School of Social Sciences, Makerere University (MAKSS REC 10.18.2018) and by the Uganda National Council for Science and Technology (Registration number: SS 5058). All students gave written informed consent to participate in the study and received a token of appreciation of UGX2500 (USD 0.7) upon completion of the self-administered questionnaire and after body composition assessment.

Conflict of interest declaration

The authors declare no conflict of interest. This study was funded by Kyambogo University under the Competitive Research Grants Scheme (CRGS), and the authors are all affiliated to Kyambogo University, the institution from which the study participants were drawn. Neither the funder nor the institution had any role in the study design, in the collection, analysis or interpretation of the data, writing of the manuscript, or in the decision to submit it for publication.

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Table 1: Cut offs for nutritional status using BMI

Range	Classification
<18.50	Underweight
18.50–24.99	Normal
25.00–29.99	Overweight
≥30	Obese

Sources: WHO [17]

Note that in the analysis here, overweight refers to both overweight and obese categories

Table 2: Cut offs for nutritional status using TBF%

Gender	Age	Body fat percentage cut off and classification		
		Underfat	Healthy	Overfat
Male	18	0–9.9	10–19.9	≥20
	19	0–8.9	9–19.9	≥20
	20–39	0–7.9	8–19.9	≥20
	40–59	0–9.9	10–21.9	≥22
Female	18	0–16.9	17–30.9	≥31
	19	0–18.9	19–31.9	≥32
	20–39	0–20.9	21–32.9	≥33
	40–59	0–22.9	23–33.9	≥34

Source: Delisle NC, Henriksson P, Alexandrou C, and M Löf, 2016
Note that throughout the present paper, the overfat category refers to the top two fat categories combined

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Table 3: Socio-demographic characteristics of the students

Characteristics	n (%)
Age of students (years)	
Mean(SD)	21.3±2.5
18-23	243 (89.0)
24-29	27 (9.9)
≥ 30	3 (1.1)
Sex	
Men	83 (30.4)
Women	190 (69.6)
Year of study in the university	
One	130 (47.6)
Two	117 (42.9)
Three	26 (9.5)
Marital status	
Single	262 (96.0)
Married	11 (4.0)
Place of residence	
University halls	40 (14.7)
Other form of accomodation	233 (85.3)
Total	273 (100%)

Note: Values are presented as n (%) unless otherwise indicated. Age is presented as mean ± standard deviation (SD). Percentages may not sum to exactly 100% due to rounding

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Table 4: Association between dietary practices and perceptions and BMI status, by sex

Parameter	Men	Women	Total
	83 (100%)	190 (100%)	273 (100%)
Most important energy source for the day			
Posho	37 (44.6)	18 (9.5)	55 (20.1)
Rice	20 (24.1)	88 (46.3)	108 (39.6)
Matooke	17 (20.5)	53 (27.9)	70 (25.6)
Chapati	3 (3.6)	5 (2.6)	8 (2.9)
Irish Potatoes	4 (4.8)	23 (12.1)	27 (9.9)
Cassava	1 (1.2)	0 (0.0)	1 (0.4)
Others	1 (1.2)	3 (1.6)	4 (1.5)
Daily consumption of fruits (p=0.512)			
No	76 (91.6)	169 (88.9)	245 (89.7)
Yes	7 (8.4)	21 (11.1)	28 (10.3)
Daily consumption of vegetables (p=0.420)			
No	69 (83.1)	165 (86.8)	234 (85.7)
Yes	14 (16.9)	25 (13.2)	39 (14.3)
Daily consumption of fruits or vegetables (p=0.927)			
No	66 (79.5)	152 (80.0)	218 (79.9)
Yes	17 (20.5)	38 (20.0)	55 (20.1)
Cheaper to prepare own meal than to buy in a restaurant/ canteen (p=0.131)			
Disagree	23 (27.7)	37 (19.5)	60 (22.0)
Agree	60 (72.3)	153 (80.5)	213 (78.0)
Eats healthy diet all time (p=0.300)			
Disagree	46 (55.4)	118 (62.1)	164 (60.1)
Agree	37 (44.6)	72 (37.9)	109 (39.9)
Meals make the biggest part of my weekly expenditures (p=0.860)			
Disagree	21 (25.3)	50 (26.3)	71 (26.0)
Agree	62 (74.7)	140 (73.7)	202 (74.0)
Dietary practices of the students and the association with sex			
Meals per day during semester time (p=0.053)			
Three meals or more	32 (38.6)	51 (26.8)	83 (30.4)
Less than 3 Meals	51 (61.4)	139 (73.2)	190 (69.6)
Usually has breakfast (p=0.154)			

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No	32 (38.6)	91 (47.9)	123 (45.1)
Yes	51 (61.4)	99 (52.1)	150 (54.9)
Meals usually skipped			
None	16 (19.3)	25 (13.2)	41 (15.0)
Breakfast	44 (53.0)	94 (49.5)	138 (50.5)
Lunch	14 (16.9)	52 (27.4)	66 (24.2)
Supper	9 (10.8)	19 (10.0)	28 (10.3)
Frequent consumption of deep-fried snacks (p=0.002**)			
No	30 (36.1)	36 (18.9)	66 (24.2)
Yes	53 (63.9)	154 (81.1)	207 (75.8)
Frequent consumption of soda (p=0.177)			
No	54 (65.1)	107 (56.3)	161 (59.0)
Yes	29 (34.9)	83 (43.7)	112 (41.0)
Frequent consumption of deep-fried snacks or soda (p=0.016*)			
No	23 (27.7)	29 (15.3)	52 (19.0)
Yes	60 (72.3)	161 (84.7)	221 (81.0)
Weekly consumption of alcohol (p=0.754)			
Never	74 (89.2)	173 (91.1)	247 (90.5)
Once a week	9 (10.8)	17 (8.9)	26 (9.5)
Association of the students' nutritional status with sex			
Body Mass Index (p=0.004**)			
Underweight/Normal (not-overweight)	75 (90.4)	143 (75.3)	218 (79.9)
Overweight/Obese (overweight)	8 (9.6)	47 (24.7)	55 (20.1)
Total Body Fat Percentage (p=0.383)			
Under-fat/Normal (not-overfat)	48 (57.8)	99 (51.2)	147 (53.8)
Overfat/obese (overfat)	35 (42.2)	91 (47.9)	126 (46.2)

Note: ** p<0.01, *p<0.05. Values are presented as n (%). Associations between sex and dietary practices/nutritional status were assessed using the Chi-square test of independence (χ^2). Fisher's Exact Test was used where expected cell frequencies were less than 5. Independent samples t-tests were used for continuous variables

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Table 5: Association between socio-demographic characteristics and BMI status

Characteristics		Not-overweight 218 (100)	Overweight 55 (100)	Total 273 (100)
Sex (p=0.004**)	Men	75 (90.4)	8 (9.6)	83 (100)
	Women	143 (75.3)	47 (24.7)	190 (100)
Marital status (p=0.004**)	Single	213 (81.3)	49 (18.7)	262 (100)
	Married	5 (45.5)	6 (54.5)	11 (100)
Year of study (p = 0.035)	One	106 (81.5)	24 (18.5)	130 (100)
	Two	87 (74.4)	30 (25.6)	117 (100)
	Three	25 (96.2)	1 (3.8)	26 (100)
Place of residence (p=0.651)	University hall	33 (82.5)	7 (17.5)	40 (100)
	Others	185 (79.4)	48 (20.6)	233 (100)
Age category (p = 0.129)	18-23	195 (80.2)	48 (19.8)	243 (100)
	24-29	22 (81.5)	5 (18.5)	27 (100)
	≥ 30	1 (33.3)	2 (66.7)	3 (100)

Note: *p<0.05, **p<0.01.Values are presented as frequency (percentage) using the Chi-square test of independence

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Table 6: Association between socio-demographic characteristics and TBF% status

Characteristics		Not-overfat	Overfat	Total
		147 (100)	126 (100)	273 (100)
Sex (p=0.383)	Men	48 (57.8)	35 (42.2)	83 (100)
	Women	99 (52.1)	91 (47.9)	190 (100)
Marital status (p=0.235)	Single	143 (54.6)	119 (45.4)	262 (100)
	Married	4 (36.4)	7 (63.6)	11 (100)
Year of study	One	71 (54.6)	59 (45.4)	130 (100)
	Two	57 (48.7)	60 (51.3)	117 (100)
	Three	19 (73.1)	7 (26.9)	26 (100)
Place of residence (p=0.235)	University hall of residence	25 (62.5)	15 (37.5)	40 (100)
	Others	122 (52.4)	111 (47.6)	233 (100)
Agecat (p=0.62)	18-23	129 (53.1)	114 (46.9)	243 (100)
	24-29	17 (63.0)	10 (37.0)	27 (100)
	≥ 30	1 (33.3)	2 (66.7)	3 (100)

Note: *p<0.05, **p<0.01. Values are presented as n (%). Associations between socio-demographic characteristics and total body fat percentage (TBF%) status were assessed using the Chi-square test of independence (χ^2). Fisher's Exact Test was used where expected cell frequencies were less than 5

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Table 7: Association between dietary practices and nutrition status of the students

Variable	Overweight	Overfat
Number of meals	0.061	0.014*
Usually eat breakfast	0.005**	0.000**
Skipping meals	0.601	0.055
Most important source of energy	0.009	0.047
Daily consumption of fruits	0.858	0.975
Daily consumption of vegetables	0.218	0.488
Daily consumption of fruits or vegetables	0.434	0.274
Frequent consumption of deep-fried snacks	0.648	0.206
Frequent consumption of soda	0.660	0.414
Frequent consumption of either deep fried snacks or soda	0.341	0.216
Weekly consumption of alcohol	0.043	0.045
It's cheaper to prepare own meals	0.740	0.032*
Eat healthy all the time	0.990	0.118
Meals make a biggest part of expenditure	0.917	0.624
Price is the most important determinant of food choice	0.587	0.220
DDS Achieved/not achieved	0.854	0.400

Note: *p < 0.05, **p < 0.01. Values are presented as p-values from tests of association between dietary practices and nutritional status. Associations were assessed using the Chi-square test of independence (χ^2) where assumptions were met and Fisher's Exact Test where expected cell frequencies were less than 5

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Table 8: Predictors of overweight and overfat nutritional status of the students

Characteristics	Category	Overweight	Overfat
Marital status	Single vs Married (Ref)	0.162** (0.044-0.597)	0.466 (0.125-1.735)
Sex	Male vs Female (Ref)	0.307** (0.128-0.734)	0.840 (0.476-1.481)
Usual breakfast consumption	No vs Yes (Ref)	3.343** (1.447-7.721)	2.244* (1.148-4.383)

Note: *p < 0.05, **p < 0.01. Results are presented as Odds Ratios (OR) and 95% Confidence Intervals (CI) obtained from binary logistic regression analysis. The reference category (Ref) is indicated for each predictor

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REFERENCES

1. **World Health Organization.** Non-communicable diseases country profiles 2018. World Health Organization, 2018. https://www.who.int/publications/i/item/ncd-country-profiles-2018 *Accessed April 2026.*

2. **Ministry of Health.** Ministry of Health strategic plan 2020/21–2024/25. Ministry of Health, Republic of Uganda. 2020. https://www.afro.who.int/sites/default/files/2023-08/Uganda.pdf *Accessed May 2026.*

3. **UBOS.** Uganda Demographic and Health Survey 2016. UBOS and ICF, Kampala, Uganda.

4. **UBOS**. Uganda Demographic and Health Survey 2022. UBOS and ICF, Kampala, Uganda.

5. **Swapnil G, Hema K and A Jeyakumar** Processed food consumption and risk of non-communicable diseases (NCDs) in South Africa: evidence from Demographic and Health Survey (DHS) VII. *Journal of Nutritional Science*. 2024; **13(4):** 1-9. https://doi.org/10.1017/jns.2024.13

6. **World Health Organisation.** Healthy diet. World Health Organization. 2026. https://www.who.int/news-room/fact-sheets/detail/healthy-diet *Accessed April 2026.*

7. **Derrick S, Amina A, Anneloes VB, Patrick NM and CR Newton** Perspectives on Underlying Factors for Unhealthy Diet and Sedentary Lifestyle of Adolescents at a Kenyan Coastal Setting. *Frontiers in Public Health*. 2018; **6:** 11. https://doi.org/10.3389/fpubh.2018.00011

8. **Elizabeth L, Stefanie M, Joshua G and F Pampel** Health Lifestyles and the Transition to Adulthood. *American Sociological Association*. 2020; **6:** 1-17. https://doi.org/10.1177/2378023120942070

9. **World Health Organisation.** Country Disease Outlook Uganda. World Health Organisation. 2023.

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10. **Cinzia F, Beatrice B, Giovanni S, Rungsaran W, Giulia A, Miguel IG, Davide M, Cristina M, Francesca S and A Rosi** A Nationwide Survey of Italian University Students: Exploring the Influences of Sustainable Dietary Behaviors, Lifestyle, and Sociodemographic Factors on Adherence to the Mediterranean Diet. *Nutrients*. 2025; **17(12):** 1988. https://www.mdpi.com/2072-6643/17/12/1988

11. **Yi LL, Siew SL and S Cheng** Inadequate fruits and vegetables consumption among Malaysian adults during the COVID-19 pandemic. *Nutrition and Health.* 2022; **28(4):** 741–750. https://journals.sagepub.com/doi/pdf/10.1177/02601060221099782 *Accessed April 2026.*

12. **Susan C and MP Davoren** College students' perspectives on an alcohol prevention programme and student drinking - A focus group study. *NAD Nord. Stud. Alcohol Drugs.* 2022; **39(3):** 301–321. https://doi.org/10.1177/14550725211007078

13. **Clifton JH and SB Racette** The Utility of Body Composition Assessment in Nutrition and Clinical Practice: An Overview of Current Methodology. *Nutrients*. 2021; **13(8):** 1-16. https://doi.org/10.3390/nu13082493

14. **Mudondo DK** Dietary behaviour and knowledge on eating disorders among university students in Kampala, Uganda (Doctoral dissertation, Makerere University). Makerere University. (2022). https://dissertations.mak.ac.ug/items/770f96cb-8584-4187-9ff0-957557318b23 *Accessed May 2026.*

15. **Antonio P, Grant T, Antonino B and T Moro** The Influence of Meal Frequency and Timing on Health in Humans: *The Role of Fasting. Nutrients.* 2019; **11(4):** 1–19. https://doi.org/10.3390/nu11040719

16. **Giles TH, Simone MG, Juan PP and BA Holmes** Minimum Dietary Diversity for Women: precision of national surveys and accuracy of brief data collection instruments. *BMC Nutrition.* 2025; **11(1):** 104. https://doi.org/10.1186/s40795-025-01065-7

17. **World Health Organisation.** The World Health Report 2004 changing history. World Health Organization. 2004. https://iris.who.int/server/api/core/bitstreams/b7167a91-2223-40e8-8acb-af986b0648b4/content *Accessed April 2026.*

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18. **Ponti F, Plazzi A, Guglielmi G, Marchesini G and A Bazzocchi** Body composition, dual-energy X-ray absorptiometry and obesity: the paradigm of fat (re) distribution. *BJR Case Reports.* 2019; **5(3):** 20170078. https://doi.org/10.1259/bjrcr.20170078

19. **Samera AQ, Melanie S and AA Gele** Associations of socio-demographic factors with adiposity among immigrants in Norway: a secondary data analysis. *BMC Public Health.* 2020; **20(1):** 1–10. https://doi.org/10.1186/s12889-020-08918-9

20. **Stefan K and L Petrov** The Body Mass Index: A Systematic Review. *Journal of Exercise Physiology and Health.* 2020; **3(2):** 21-27. https://www.researchgate.net/profile/Stefan-Kolimechkov/publication/342927347_The_Body_Mass_Index_A_Systematic_Review/links/5f20069a45851515ef504c72/The-Body-Mass-Index-A-Systematic-Review.pdf Accessed April 2026.

21. **Kyambogo University Project Information Memorandum(PIM).** Development of students accommodation on ppp basis. Kyambogo University. 2024. https://ppp-projects.kyu.ac.ug/wp-content/uploads/2024/09/KyU-Students-Accomodation-PPP-Project-PIM-1.pdf. *Accessed April 2026.*

22. **Kyambogo University Kyambogo.** University Main Dashboard. Kyambogo university. 2023. https://kyudashboard.ac.ug/dashboard *Accessed April 2026.*

23. **Benedict T and AM Birungi** Prevalence and Associated Factors of Overweight and Obesity among Primary School Children Aged 7-17 Years in Urban Mbarara, Uganda. *Advances in Public Health.* 2024; **2024(1):** 12. https://doi.org/10.1155/2024/5175550

24. **Mondo CK, Otim MA, Akol G, Musoke R and J Orem** The prevalence and distribution of non-communicable diseases and their risk factors in Kasese district, Uganda: cardiovascular topics. *Cardiovascular Journal of Africa,* 2013; **24(3):** 52-57. https://hdl.handle.net/10520/EJC135137

25. **Kirunda BE, Fadnes LT, Wamani H, Van den Broeck J and T Tylleskär** Population-based survey of overweight and obesity and the associated factors in peri-urban and rural Eastern Uganda. *BMC Public Health.* 2015; **15(1):** 1168. https://doi.org/10.1186/s12889-015-2506-7

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26. **Olga A, Konstantinos P, Exakousti P A, Sousana KP, Myrsini P, Apostolia N, Aspasia S, Konstantina A, Theophanis V and C Giaginis** The Relationship Between Obesity , Overweight , and the Prevalence of Depression and Anxiety Among University Students : Evidence from a Nationally Representative Cross-Sectional Study in Greece. *Diseases.* 2026; **14(4):** 136. https://www.mdpi.com/2079-9721/14/4/136

27. **Khaleghi AA, Salari N, Darvishi N, Bokaee S, Jafari S, Hemmati M and M Mohammadi** Global prevalence of obesity in the older adults: A meta-analysis. Public Health in Practice. 2025; **9:** 100585. https://doi.org/10.1016/j.puhip.2025.100585

28. **Adeoluwa A, Robert S, Mary KG, Joseph S, Godfrey K, Aishat M, Steven JR, Anna ME, Helena N, Rocio E, Ronald HG, Maria JW, Joseph K, Wendy SP and LW Chang** Overweight and obesity in south central Uganda: A population-based study. *PLOS Global Public Health.* 2022. https://doi.org/10.1371/journal.pgph.0001051

29. **Gabriele P** The Relationship Between Rural-Urban Place of Residence and Subjective Well-Being is Nonlinear and its Substantive Significance is Questionable. *International Journal of Applied Positive Psychology.* 2024; **9(1):** 27-43. https://doi.org/10.1007/s41042-023-00117-2

30. **David K, Henry B, Henry K and JN Kalyango** Overweight and obesity among female undergraduate students of Makerere University , Uganda : knowledge , prevalence and associated factors : a cross-sectional study. *BMJ Public Health.* 2026; **4(1):** e003383. https://doi.org/10.1136/bmjph-2025-003383

31. **Tamara NT, Vladimir J, Zulfiya S, Nikita P, Dmitry R, Mariia K, Margarita K, Valeriia K and V Reshetnikov** The Association between Marital Status and Obesity: A Systematic Review and Meta-Analysis. *Diseases*. 2024; **12(7):** 1-20. https://doi.org/10.3390/diseases12070146

32. **Poshan D, Reema S and E Kahana** Gender and Marital Status are Associated with Healthy Diet Among the Oldest Old. *Journal of Applied Gerontology*. 2026; **45(3):** 559–569. https://doi.org/10.1177/07334648251343329

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33. **Demiss MG, Kaleab MA, Yawkal T, Abel E, Wubshet DN, Amare MW, Lamrot Y, Mihret G, Nigusu W, Adina YB, Lakew A, Hiwot TA, Misganaw GT, Asebe H, Melak J, KA Demissie** Pooled prevalence and factors of overweight/ obesity among women of reproductive age in low and middle-income countries with high maternal mortality: A multi-level analysis of recent demographic and health surveys. *PLoS One.* 2025; **20(10):** 1–20. https://doi.org/10.1371/journal.pone.0316962

34. **Alessandra F, Andrea A, Isaac A, Elena G, Elisabetta C, Stefania G, Rocky S, Elvira P, Massimiliano C and M Lombardo** Assessing gender differences in food preferences and physical activity: a population-based survey. *Frontiers in Nutrition.* 2024; **11:** 1-11. https://doi.org/10.3389/fnut.2024.1348456

35. **Foluke AO, Oyetola OO, Oluwafunmilayo FA and EO Amu** Association Between Breakfast Consumption and Anthropometrically Determined Nutritional Status of Secondary-School Adolescents in Lagos, Southwest Nigeria. 2022; **11(1):** 503. https://doi.org/10.21106/ijma.503

36. **Pagliai G, Dinu M, Madarena MP, Bonaccio M, Iacoviello L and S Francesco** Consumption of ultra-processed foods and health status: A systematic review and meta-analysis. *British Journal of Nutrition.* 2021; **125**(3): 308-318. https://doi.org/10.1017/S0007114520002688

37. **Sivagami J, Norlida MD and HA Rahman** Breakfast consumption patterns, knowledge, attitude, practice and barriers among malaysian university students. *Malaysian Applied Biology.* 2021; **50(1):** 205-216. https://doi.org/10.55230/mabjournal.v50i1.1510

38. **Chinyere CA, Chiamaka AC and EK Ogbonnaya** Breakfast Meal Skipping Practices of Undergraduate Students of University of Nigeria, Nsukka. *Journal of Family and Society Research.* 2022; **1(1):** 71-82. https://doi.org/10.66043/jfsr.v1i1.9

39. **Pengpid S and K Peltzer** Breakfast skipping and its associated factors among university students from 28 countries. *Journal of Nutrition and Health*. 2020; **26(3):** 1–12. https://doi.org/10.2147/DMSO.S241670.

40. **Chika O, Hironori I, Isao M, Keiko Y and H Iso** The Association of Having a Late Dinner or Bedtime Snack and Skipping Breakfast with Overweight in Japanese Women. *Journal of Obesity.* 2019: 2439571. https://doi.org/10.1155/2019/2439571

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