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Breakfast consumption and its relationship to sociodemographic and lifestyle factors of undergraduate students in the School of Health Sciences at the University of KwaZulu-Natal

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Objectives: A study was undertaken to investigate breakfast consumption and the sociodemographic and lifestyle profile of undergraduate students in the School of Health Sciences at the University of KwaZulu-Natal (UKZN), and to determine if these factors are related to body mass index (BMI).

Design: This was a cross-sectional, descriptive study.

Setting: The venue for the study was the School of Health Sciences, UKZN, Westville campus.

Methods: Data were collected in 2016, using a self-administered questionnaire, to obtain information on breakfast consumption and sociodemographic and lifestyle factors. Weight and height measurements were taken, using standardised procedures.

Results: Of the 353 participants, 93% (*n* = 27) were between 17 and 22 years old, and 75.6% were female. First-year students made up 43.6% of the sample, with fewer students in the second (26.1%), third (20.1%) and fourth years (8.8%). Participants self-reported their health status to be very poor (1.1%), poor (4.0%), fair (27.5%), good (47.3%) and excellent (19.3%). Only 4.5% (*n* = 16) smoked and 24.4% (*n* = 86) consumed alcohol, while 58.4% were physically active. Breakfast was consumed by 80.5%; however, only 50.7% consumed it daily. Breakfast was consumed for its health benefits, to satisfy hunger, to keep alert, prevent fatigue, and keep up energy levels. Participants who lived at home, and whose parents or families bought the groceries, consumed breakfast daily, while more third-year students skipped breakfast. The most commonly consumed breakfast items were ready-to-eat cereals or instant cereals (60.1%), tea or coffee (50.4%), eggs (46.2%) and leftovers (32.0%). The BMI was higher among females, correlating positively with age and negatively with self-reported health status. There was no relationship between BMI and breakfast consumption and any other sociodemographic or lifestyle factors.

Conclusion: Breakfast was consumed for its perceived health and well-being benefits. Barriers to consumption were a lack of time and lack of appetite. Given its health and nutritional benefits, regular breakfast consumption should be encouraged among university students.

Keywords: breakfast consumption, health sciences UKZN, lifestyle factors, sociodemographic factors, undergraduate students

Introduction

Breakfast is an important part of the diet that contributes significantly towards daily nutrient intake.[1] It is linked to an improved intake of energy, protein, iron, vitamin A and vitamin C.[2] The consumption of breakfast leads to positive health behaviour, improved stress management, feeling energetic and making fewer unhealthy snack choices.[3] Skipping breakfast results in fatigue and suboptimal concentration levels,[4] as well as the increased risk of developing obesity.[3,5] The South African National Health and Nutrition Examination Survey (SANHANES-1) of 2012 found that there was a high prevalence of overweight and obesity amongst South African adults.[6] It was noted that there was an increase in the prevalence of obesity in both men and women in South Africa between 2003 and 2013.[6,7] The overweight and obesity rates among women were 24.8% and 39.2%, respectively, while they were 20.1% and 10.6%, respectively, among men.[6] Considering that skipping breakfast is positively correlated with the risk of obesity,[3,5] it may be beneficial to improve breakfast consumption amongst the South African population. University students are particularly prone to skipping breakfast and having poor dietary habits. Several studies have illustrated a high prevalence of skipping breakfast amongst university students.[4,8] The reasons given by students for skipping breakfast include a desire to lose weight, a lack of time, waking up too late, not having any food to eat and not

being hungry.[2] The lifestyle and behavioural habits of future healthcare professionals are an area of interest amongst researchers. Many studies have been conducted worldwide to determine whether students who are studying towards a health-related qualification follow a healthy lifestyle. At a Malaysian university, the majority of students studying in the Health Sciences consumed breakfast between one and three times per week.[9] At the Saudi Arabian College of Health Sciences, most students consumed only two main meals a day, with breakfast being eaten three to four times a week by 38.7% of the students and daily by 49.9%.[10] In Ghana, the prevalence of breakfast-skipping among medical students was 72%,[4] and it was 52% among Iranian female students at the Isfahan University of Medical Sciences.[11] The prevalence of breakfast-skipping among male and female students was 41.7% and 23.5%, respectively, among Mongolian medical students.[12] Similar results for breakfast-skipping amongst students were found in separate studies in Turkey (47.7%)[13] and Bangladesh (46.7%).[14]

At the University of the Free State (UFS), in South Africa, the majority of Health Science students (93.2%) consumed breakfast regularly. However, food items such as bread, porridge and cereal were not commonly eaten.[15] In comparison, research conducted among Health Science students at the Nelson Mandela Metropolitan University (NMMU), South Africa, indicated that 51%

consumed breakfast less than five times per week.[16] The daily nutritional intake of most university students has been found to be suboptimal with a poor intake of fruit and vegetables,[10,15,16] a low intake of milk and dairy products[15,16] and a high frequency of food and beverage purchases from vending machines.[17] A high intake of sweets, chocolates, crisps, cakes, biscuits, soft drinks[15] and convenience foods has been reported.[16] It could be assumed that students studying towards a qualification in the Health Sciences would be more inclined towards regular breakfast consumption, as part of a healthy lifestyle; however, further research is required in this area. Given the important role of breakfast in the prevention of obesity, and the subsequent chronic diseases of lifestyle, this study aimed to investigate the breakfast consumption and the sociodemographic and lifestyle profile of undergraduate students in the School of Health Sciences at UKZN. This study also aimed to determine if these factors were related to the BMI.

Methods

Research design and setting
A cross-sectional study was conducted at the UKZN School of Health Sciences in 2016 and included the following disciplines: Audiology, Dental Therapy, Occupational Therapy, Optometry, Pharmacy, Physiotherapy, Speech Language Pathology and Sports Science. With the permission of the Dean and the Head of School, the researcher was permitted to address students at the start of one of their lecture periods. The researcher took the opportunity to inform the students about the aims and objectives of the study. A data collection station was set up close to the School of Health Sciences at the UKZN Westville campus. Students were randomly approached to determine whether they met the inclusion criteria for the study. Those who met the inclusion criterion of being a registered undergraduate student in the School of Health Sciences at UKZN at the time of the study were given more information on the study and invited to participate. Given the total student population of 1 492, and using a margin of error of 0.05 and a significance level of 0.05, the statistician determined that a minimum of 306 participants would be needed for a representative sample. In the end, a total of 353 students participated. However, the sample was not representative of gender and all race groups.

Questionnaire
A self-administered questionnaire was used to collect data. It comprised four sections: Section A collected the sociodemographic data; Section B covered lifestyle factors, such as self-reported health status, smoking, alcohol consumption and physical activity; Section C obtained data on food purchasing and food preparation; and Section D covered breakfast and dietary habits. Participants were also asked to choose the items that they consumed for breakfast, as well as their reasons for consuming breakfast. A list of food items was provided and the participants were also given the opportunity to add other food items that did not appear on the list. For the purposes of this study, breakfast was defined as any food or beverage consumed between the time of awakening and 09h00. The researcher and trained field workers assisted the participants with the questionnaire when it was required. The questionnaire was validated by conducting a pilot study prior to the main study. The pilot study was conducted on 15 randomly-selected Dietetics students from UKZN, who consented to participate. Dietetics students were used because they fall under the School of Agricultural, Earth and Environmental Sciences, and did not meet the criteria for participating in the main study. After the pilot study the questionnaire was modified to improve its clarity and to improve readers' understanding. The questionnaire was also validated by a professional statistician who checked that the questionnaire met the objectives of the study, that there was a logical flow to the questions and that there were no leading, ambiguous or confusing questions.

Anthropometry
Weight and height measurements were taken in triplicate, and used to calculate the mean values. The procedure for taking weight and height measurements was explained to each participant prior to taking the measurements. Participants were requested to remove additional items, such as jackets, hats, jewellery, accessories, bags and shoes, as well as items from their pockets, prior to being weighed. Their weight was measured in kilograms, using a calibrated, digital scale (Seca 874; Seca GmbH, Hamburg, Germany). Participants stepped onto the scale and stood still with their hands to the side and their feet correctly positioned. Their height was measured in metres, using a portable stadiometer (Seca 213). Participants stood on the stadiometer with their feet together, their heels touching the base of the stadiometer and their hands by their sides. They took a deep breath as the headpiece was lowered and the reading was taken.

Statistical analysis
The IBM Statistical Package for the Social Science (SPSS) Version 24.0 (IBM Corp, Armonk, NY, USA) was used to analyse the data. The weight, height and BMI were analysed, using descriptive statistics. A one-sample t-test was used to identify the reasons for the consumption and non-consumption of breakfast. An analysis of variance (ANOVA) was used to determine if sociodemographic and lifestyle factors were related to BMI. If the conditions were not met for ANOVA, Welch's test was used. A chi-square test of independence was used to analyse the relationship between categorised items. When conditions were not met, Fisher's exact test was used. Spearman's rank correlation coefficient was used to test for the correlation between the ordinal variables. Histograms as well as the Kolmogorov–Smirnov test were generated for relevant variables in the data and to check for normality. While some were considered to be normal, others showed some skewness. When applying the one-sample t-test, which requires approximate normality, results were checked, using the non-parametric equivalent Wilcoxon signed rank test. Both tests resulted in the same conclusions, thus indicating that the deviations from normality were not severe enough to affect the validity of the results from the one-sample t-test. A Likert scale was used to determine the reasons for consuming and not consuming breakfast (1 = strongly disagree; 5 = strongly agree). If a Likert scale has at least five points and the response options are ordinal (so that the gaps between the options are approximately equal in meaning), it is permissible to treat the variable as continuous and to test on the mean score.[18,19] A p-value of less than 0.05 was considered to be statistically significant.

Ethical considerations
The Biomedical Research Ethics Committee of the University of KwaZulu-Natal approved this study (Reference number: BE280/16). The Registrar of UKZN also granted approval for the study to be conducted at UKZN. Participants were required to give their written consent before participating in the study. Participants were informed that their participation was voluntary and that they could withdraw from the study at any point.

Results

Sample characteristics

The total number of students registered in the School of Health Sciences in 2016 was 1 492. A total of 353 students participated, representing 23.7% of the total students registered. About 93% ($n = 327$) of the sample were between 17 and 22 years old, while 7.4% ($n = 26$) were older than 22 years of age. Females made up 75.6% ($n = 267$) of the sample. The majority of the sample (98.6%; $n = 348$) were single and four (1.1%) married; 93.2% ($n = 329$) were unemployed, while 5.9% ($n = 21$) had part-time employment.

Table 1 gives the data on university studies, finances, accommodation and access to household appliances. Some 26% of the participants were registered for the Pharmacy degree ($n = 92$), followed by Occupational Therapy (21.8%; $n = 77$) and Physiotherapy degrees (17.8%; $n = 63$). Approximately 43.6% were in their first year of study ($n = 154$), 32.6% ($n = 115$) were on financial aid and 61.2% ($n = 216$) lived in a university residence.

Table 1: Background on university studies, finances, accommodation and access to household appliances

Variables	n (%)[a]	Total number in Health Sciences (n = 1492) (%)
Degree (n = 351):[b]		
Audiology	11 (3.1)	113 (7.6)
Dental Therapy	39 (11.0)	119 (8.0)
Occupational Therapy	77 (21.8)	144 (9.7)
Optometry	42 (11.9)	170 (11.4)
Pharmacy	92 (26.1)	436 (29.2)
Physiotherapy	63 (17.8)	218 (14.6)
Speech Language Pathology	12 (3.4)	108 (7.2)
Sports Science	15 (4.2)	184 (12.3)
Academic year of study (n = 348):[b]		
First	154 (43.6)	431 (28.9)
Second	92 (26.1)	388 (26.0)
Third	71 (20.1)	369 (24.7)
Fourth	31 (8.8)	304 (20.4)
Finance of studies (n = 351):[b]		
Self-funded	57 (16.1)	
Parent/guardian	88 (24.9)	
Bursary/scholarship	80 (22.7)	
Loan	11 (3.1)	
Financial aid	115 (32.6)	
Accommodation (n = 351):[b]		
University residence (self-catering)	216 (61.2)	
Home	91 (25.8)	
Commune	26 (7.4)	
Private accommodation	18 (5.1)	
Access to household appliances (n = 353):		
Refrigerator	338 (95.8)	
Stove	339 (96.0)	
Kettle	311 (88.1)	
Microwave oven	310 (87.8)	
Oven	227 (64.3)	

Notes: [a]Percentages were calculated using the total sample ($n = 353$). [b]Some participants did not answer; percentages therefore do not add up to 100%.

The majority of the participants had access to a refrigerator (95.8%; $n = 338$) and a stove (96.0%; $n = 339$); however, fewer participants had access to an oven (64.3%; $n = 227$).

Table 2 shows the lifestyle profile, food purchasing, food expenditure and breakfast consumption of the participants. A total of 47% of the participants self-reported that their health was good ($n = 167$) or fair (27.5%; $n = 97$). Only 4.5% ($n = 16$) smoked and 24.4% ($n = 86$) consumed alcohol. Just over half (58.4%; $n = 206$) of the sample indicated that they were physically active. Overall, 71% reported that they were responsible for purchasing their own food and groceries ($n = 252$). Of the sub-sample that purchased their own food and groceries, 50.4% ($n = 127$) spent between R500 and R1000 per month. About 80% ($n = 284$) of the participants consumed breakfast, and, of these, 50.7% ($n = 144$) consumed it daily (Table 2).

Lifestyle profile, food purchasing, food expenditure and breakfast consumption

The most commonly consumed breakfast items, expressed as a percentage of the total sample ($n = 353$), were ready-to-eat cereals or instant cereals (60.1%), tea or coffee (50.4%), eggs (46.2%) and leftovers (32.0%) (Figure 1).

The following reasons were given for consuming breakfast: the health benefits, to satisfy hunger, to be alert and prevent fatigue, and for energy, while a lack of time and lack of appetite were the main reasons for not consuming breakfast (Table 3).

Table 2: Lifestyle profile, food purchasing, food expenditure and breakfast consumption

Factor	n (%)
Self-reported health status (n = 350):[a]	
Very poor	4 (1.1)
Poor	14 (4.0)
Fair	97 (27.5)
Good	167 (47.3)
Excellent	68 (19.3)
Participant smokes (n = 350)[a]	16 (4.5)
Participant consumes alcohol (n = 351)[a]	86 (24.4)
Participant is physically active (n = 351)[a]	206 (58.4)
Person mainly responsible for buying food/groceries (n = 346):[a]	
Participant him/herself	252 (71.4)
Parents or family	91 (25.8)
Housemates	3 (0.8)
Amount of money spent on food per month (n = 250):[b]	
< R200	4 (1.6)
R200–R499	98 (38.9)
R500–R1 000	127 (50.4)
> R1 000	11 (4.4)
Don't know	10 (4.0)
Participant consumes breakfast (n = 346)	284 (80.5)
Frequency of breakfast intake (n = 284):[c]	
Daily	144 (50.7)
1–2 times a week	43 (15.1)
3–6 times a week	97 (34.2)

Notes: [a]Some participants did not answer; percentages therefore do not add up to 100%. [b]Expressed as a percentage of those who purchased their own food/groceries ($n = 252$). [c]Expressed as a percentage of those who do eat breakfast ($n = 284$).
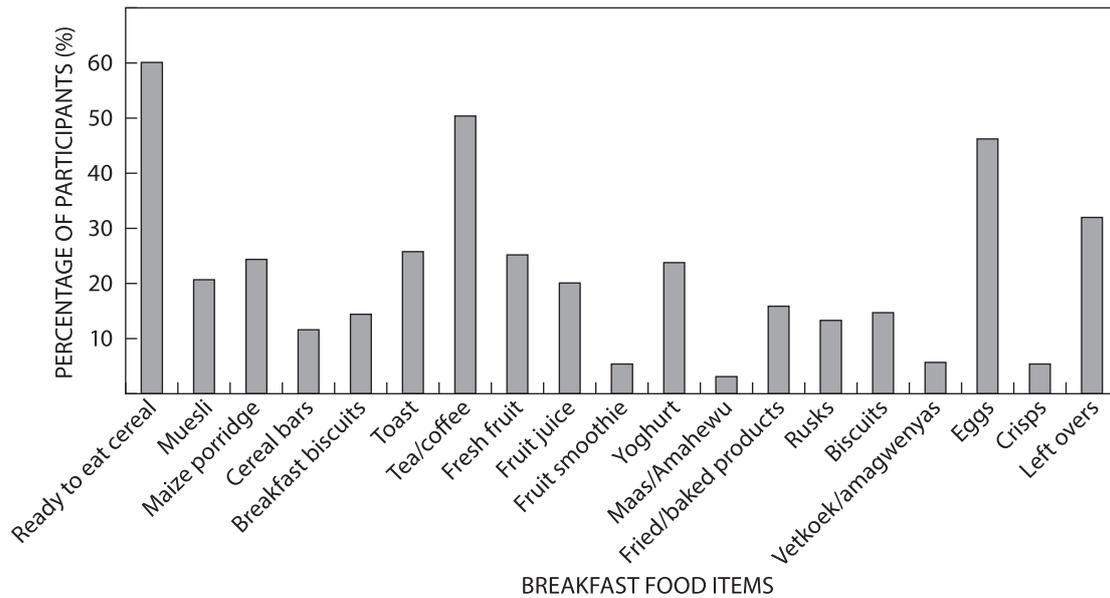
Figure 1: Commonly consumed breakfast food items (*n* = 353).

Table 4 shows the relationship between sociodemographic and lifestyle factors and breakfast consumption. A significant number of those who did not eat breakfast were in their third year of study (29.4%) (*p* = 0.018) and were smokers (37.5%) (*p* = 0.045). A significant number of students who consumed breakfast daily lived at home during the academic term (66.7%) (*p* = 0.002) and had food/groceries bought by parents or family (67.1%) (*p* = 0.002) (Table 4).

Anthropometry
Table 5 shows the anthropometric characteristics of the participants. The mean BMI for the sample was 23.45 kg/m^2 (normal), and 63.5% (*n* = 224) had a normal BMI. However, 19.5% (*n* = 69) were classified as overweight and 7.9% (*n* = 28) were obese.

There was a significant difference in the BMI across gender (*p* = 0.001); females had a higher BMI than males. A positive correlation was observed between age and the BMI (*r* = 0.139; *p* = 0.009). A negative correlation was observed between BMI and self-reported health status (*r* = −0.207; *p* = 0.000). A higher BMI was associated with a poorer self-reported health status. No

significant relationships were found between the BMI and breakfast consumption or non-consumption, frequency of consumption or any other sociodemographic and lifestyle factors.

Discussion
This study aimed to investigate breakfast consumption and the sociodemographic and lifestyle profiles of undergraduate students in the School of Health Sciences at UKZN, and to determine whether these factors were related to BMI. Just over 80% of the participants usually consumed breakfast, and about half of the participants who consumed breakfast consumed it daily. The most commonly consumed breakfast items were ready-to-eat cereals or instant cereals, tea or coffee, eggs and leftovers. Participants who lived at home during the academic term and whose parents or family bought the groceries consumed breakfast daily, while a significant number of those in their third year of study did not consume breakfast. A significant number of those who did not consume breakfast were smokers, and they consumed fast-foods or take-away foods frequently. Breakfast was consumed for health benefits, to satisfy hunger, to be alert and prevent fatigue, and for energy, while a lack of time and a lack of appetite were the main reasons for not consuming breakfast. The BMI increased with age and was higher among females, while a higher BMI was associated with a poorer self-reported health status. Just over 30% of the females were overweight or obese.

The majority of the sample were females (75.6%), which is in line with a similar study done at the NMMU (75.4% female)[16] and the UFS (75.8% females).[15] In the current study, only 8.8% of the participants were in their fourth year of study. The lower participation of the senior students was most likely due to their busier schedules, which included their participation in off-campus clinic and hospital sessions. Some participants (19.3%) self-reported their health status to be excellent, while just under half of the sample self-reported their health status to be good (47.3%). Most participants did not smoke (94.6%) or consume alcohol (75.1%) and were physically active (58.4%). This is somewhat different from the findings of other studies. A high rate of alcohol consumption (83%), physical inactivity (78%) and weekly alcohol consumption was noted among

Table 3: Reasons for consuming and not consuming breakfast

Reasons for consuming breakfast	Mean (SD)	*p*-value[a]
Health benefits	3.78 (1.02)	< 0.001
To satisfy hunger	4.30 (0.85)	< 0.001
To be alert and prevent fatigue	3.87 (0.96)	< 0.001
For energy	4.21 (0.85)	< 0.001
Reasons for not consuming breakfast		
Lack of time	3.88 (1.28)	< 0.001
Lack of appetite	3.63 (1.31)	0.003
Too early to eat	3.40 (1.36)	0.061
High cost of food	2.17 (1.34)	< 0.001
Wake up too late	3.00 (1.40)	1.000
Lack of facilities to prepare	2.00 (1.23)	< 0.001
Breakfast is not important	1.83 (1.00)	< 0.001

Notes: SD = standard deviation. Mean (SD) refers to the five-point Likert scale. [a]One sample *t*-test.

Table 4: Relationship between sociodemographic and lifestyle factors and breakfast consumption

| Sociodemographic factors | Breakfast consumed (%) | Breakfast not consumed (%) | p-value | Frequency of breakfast consumption (%) | | | p-value |
				1–2 times/week	3–6 times/week	Daily	
Gender (n = 346):			0.168				0.501
Male (n = 85)	74 (87.1)	11 (12.9)		9 (12.2)	29 (39.2)	36 (48.6)	
Female (n = 261)[a]	210 (80.5)	51 (19.5)		34 (16.3)	68 (32.5)	107 (51.2)	
Age, years (n = 346):			0.198				0.295
17–18 (n = 71)[a]	63 (88.7)	8 (11.3)		11 (17.7)	27 (43.5)	24 (38.7)	
19–20 (n = 148)	115 (77.7)	33 (22.3)		20 (17.4)	32 (27.8)	63 (54.8)	
21–22 (n = 102)	84 (82.4)	18 (17.6)		10 (11.9)	29 (34.5)	45 (53.6)	
> 22 (n = 25)	22 (88.0)	3 (12.0)		2 (9.1)	9 (40.9)	11 (50.0)	
Place of residence (n = 344):			0.986[b]				0.002
University residence (n = 212)[a]	175 (82.5)	37 (17.5)		33 (19.0)[c]	67 (38.5)	74 (42.5)	
Home (n = 89)	72 (80.9)	17 (19.1)		3 (4.2)	21 (29.2)	48 (66.7)[c]	
Commune (n = 25)	21 (84.0)	4 (16.0)		6 (28.6)[c]	4 (19.0)	11 (52.4)	
Flat (n = 18)	15 (83.3)	3 (16.7)		1 (6.7)	4 (26.7)	10 (66.7)	
Current year of study (n = 342):			0.018				0.151
First (n = 152)[a]	134 (88.2)	18 (11.8)		26 (19.5)	44 (33.1)	63 (47.4)	
Second (n = 92)	74 (80.4)	18 (19.6)		11 (14.9)	28 (37.8)	35 (47.3)	
Third (n = 68)	48 (70.6)	20 (29.4)[c]		6 (12.5)	12 (25.0)	30 (62.5)	
Fourth (n = 30)	24 (80.0)	6 (20.0)		0 (0)	10 (41.7)	14 (58.3)	
Participant smokes (n = 16)	10 (62.5)	6 (37.5)[c]	0.045[b]	2 (20.0)	3 (30.0)	5 (50.0)	0.823[b]
Participant consumes alcohol (n = 86)	76 (88.4)	10 (11.6)	0.079	12 (15.8)	25 (32.9)	39 (51.3)	0.954
Participant is physically active (n = 204)[a]	168 (82.4)	36 (17.6)	0.874	23 (13.8)	59 (35.3)	85 (50.9)	0.710
Person mainly responsible for buying food/groceries (n = 346):			0.381[b]				0.002[b]
Participant him/herself (n = 249)[a]	208 (83.5)	41 (16.5)		39 (18.8)[c]	74 (35.7)	94 (45.4)	
Parents or family (n = 90)	70 (77.8)	20 (22.2)		3 (4.3)	20 (28.6)	47 (67.1)[c]	
Housemates (n = 3)	3 (100.0)	0 (0)		0	2 (66.7)	1 (33.3)	

Notes: [a]Some participants did not answer on frequency of breakfast consumption. [b]When conditions for a chi-Square test are not met, Fisher's exact test is used. [c]Significantly more than expected.

Health Science students at the NMMU.[16] In the current study, fewer participants (58.4%) were physically active, compared with a previous study that was conducted among students at the Education Faculty at UKZN, where 63% of students were involved in regular physical activity.[17] A lower monthly

Table 5: Anthropometric characteristics of the participants

Characteristics	Total (n = 350)[a]	Males (n = 85) Mean (SD)	Females (n = 265)
Weight (kg)	61.67 (12.57)	65.24 (11.89)	60.53 (12.58)
Height (m)	1.62 (0.08)	1.71 (7.17)	1.59 (6.31)
BMI (kg/m^2)	23.45 (4.59)	22.19 (3.74)	23.86 (4.76)
	n (%)		
Underweight (< 18.5 kg/m^2)	29 (8.2)[a]	8 (9.4)	21 (7.9)
Normal (18.5–24.9 kg/m^2)	224 (63.5)[a]	62 (72.9)	162 (61.1)
Overweight (25.0–29.9 kg/m^2)	69 (19.5)[a]	11 (12.9)	58 (21.9)
Obese (≥ 30.0 kg/m^2)	28 (7.9)[a]	4 (4.7)	24 (9.1)

Notes: [a]Percentages do not add up to 100% as they were calculated by using the total sample (n = 353), and some participants did not want to be weighed. SD = standard deviation; BMI = body mass index.

household income and food insecurity has been linked to the skipping of breakfast.[20] A considerable level of food insecurity was previously reported among UKZN students.[21] Although this study did not directly investigate food insecurity, food-purchasing factors were investigated. Most participants reported that they purchased their own food and groceries (71.4%) and 50.4% of the sub-sample who purchased their own food and groceries spent between R500 and R1000 per month. This is in line with the average household expenditure on food and beverages in South Africa, which is R1 057.25.[22] The low monthly expenditure on food by some students may indicate a lack of dietary diversity and a high reliance on starch-based foods.

A large proportion of the participants (80.5%) consumed breakfast, while a small proportion (17.6%) did not consume breakfast at all. About half of the sub-sample (50.7%) who consumed breakfast consumed it daily. Similar results were reported among learners in the North-West province, where 81% consumed breakfast,[23] and Health Science students at the UFS, where breakfast was consumed by 93.2%.[15] However, an earlier study at the UKZN Education Faculty found that only 21% of students consumed breakfast regularly,[17] while only 51% of Health Science students at the NMMU had a regular breakfast.[16] The prevalence of breakfast consumption in this study was higher than that previously reported among South African students, with the exception of the study conducted at

the UFS.[15] The reason for the high consumption of breakfast could be attributed to increased knowledge and awareness about health amongst students studying towards Health Science-related degrees.

The reasons given for breakfast consumption included the following: to satisfy hunger, for energy, to be alert, to prevent fatigue and for health benefits. Skipping breakfast has been associated with hunger and reduced satiety,[24–26] while the consumption of breakfast has been significantly associated with improved cognitive ability[27] and the ability to concentrate.[4] The reasons for not consuming breakfast included a lack of time and a lack of appetite, which have been previously reported.[27] In a study conducted on Ghanaian medical students, their busy schedule and lack of time were the main reasons for skipping breakfast, followed by financial constraints.[4] In the present study, the high cost of foods, the lack of food preparation facilities and the perception that breakfast is not important were not significant reasons for skipping breakfast. Most participants indicated that they had access to common household appliances, such as a refrigerator, stove, kettle and microwave oven. At UKZN, all the student residences are self-catering, with students having access to shared kitchens that contain household appliances for food preparation. The availability of basic household equipment should facilitate food preparation and regular meal consumption, including breakfast consumption.

The most commonly consumed breakfast items in the current study were ready-to-eat cereals or instant cereals (60.1%), tea or coffee (50.4%), eggs (46.2%) and leftovers (32.0%). Ready-to-eat or instant cereals were also the most commonly consumed breakfast items among adolescents[23] and university students.[28] These are popular breakfast items due to their convenience, their desirable taste, and their perceived nutritional value and fibre content.[28] Previous research has reported that food insecurity is a serious threat among university students[21] and that those students who lived away from home, and on campus, exhibited poor dietary practices, such as a lower consumption of fruit and vegetables.[29] A significant relationship was found between breakfast consumption and year of study. A significant number of those who did not eat breakfast were in their third year of study. This could be attributed to their busy schedules and increased travelling to hospitals and clinics, which are part of the academic programme. This finding is similar to that of a Lebanese study, where students in the fifth semester of study consumed breakfast less regularly, compared with those in their first semester of study.[30]

A significant number of those who did not consume breakfast were smokers and consumed fast-foods or take-away foods frequently (between four and six times a week). This is consistent with previous studies, where breakfast-skipping was linked to undesirable lifestyle behaviour, such as smoking[31,32] and alcohol consumption.[29] Those who skipped breakfast were also more likely to eat take-away foods, or at restaurants.[32] In this study, one in three females were overweight or obese. This is a concern, given that the BMI increases with age amongst South African females.[6] In addition, these students are studying towards a career in Health Sciences and will be expected to counsel patients on the importance of having a healthy BMI. A higher prevalence of overweight and obese females, compared with males, has been previously reported among South African university students.[3,15] A significant negative correlation was found between BMI and self-reported health status: a higher BMI was associated with a poorer self-reported health status. This suggests that participants associated their higher BMI with being less healthy, which is similar to the findings among Korean university students.[33]

Study limitations
The health status of the participants was self-reported and may be subjective. Besides the weight and height, no other measurements were taken to define their health status objectively. Convenience sampling was used in this study, rather than random sampling, to increase participation. This could have led to the under-representation of some groups in this study. The sample was not representative of gender and all race groups, thus limiting the generalisation of the findings. The data collection was also partly disrupted by the 'Fees must Fall' protests, which affected the UKZN Westville campus. This may have deterred some students from participating in the study.

Conclusion
This study demonstrated that the majority of students in the School of Health Sciences at UKZN consumed breakfast; however, only a small proportion consumed it daily. Despite the reported benefits of breakfast consumption to health and well-being there were barriers to breakfast consumption, which included time constraints and a lack of appetite. Breakfast-skipping was also linked to other unhealthy diet and lifestyle practices, such as smoking and fast-food consumption. Regular breakfast consumption should be encouraged among university students, particularly among future healthcare professionals, who are expected to practise what they preach.

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