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Changes in Dietary Habits and Reported Barriers to Healthy Eating Amongst UK University Students

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Abstract: Attendance at university often presents significant personal, environmental, and social changes to an individual. Such changes are likely exacerbated in young students given the transition from living at home, and the increased independence that attendance at university often requires. These factors may influence the dietary habits of students, which is important to consider for long-term health and maturation, as well as academic performance. In this study, a survey was cross-sectionally distributed was distributed to obtain both qualitative and quantitative data to explore perceived barriers to healthy eating and changes to nutritional habits from students at a single higher education institution in the United Kingdom. In total, 590 students completed the survey. A total of 295 (50%) students reported that their dietary habits had changed since starting university. Barriers to healthy eating were reported by 45% of students, with the most selected barriers being "food cost" (n = 205), "lack of time" (n = 119) and "stress" (n = 112). Undergraduate students were more likely to report experiencing barriers to healthy eating (p = 0.009); less motivation to eat properly (p < 0.001) and less likely to report being able to afford the food they want to consume regularly (p = 0.009), compared to postgraduate students. Poorer nutrition habits since starting university were reported in 22% of students. This study highlights the important role higher education institutions can play in supporting the promotion of dietary habits, which may positively influence health, growth, maturation, and academic success amongst university students.

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Introduction

Poor nutrition habits and obesity are significant risk factors for the development of non-communicable diseases (World Health Organisation, 2009). Whilst public health policies often aim to address these issues at population level (Birch et al, 2019), some populations may be at an elevated risk of engaging in behaviours that can increase the risk of developing chronic diseases. One such population that may present unique risk factors are university students. Attendance at university is often characterised by increased levels of independence (Campbell et al, 2022), with 62% of full-time students living away from home in 2018/19 (House of Commons Library, 2020) and thus being responsible for their domestic and academic lifestyle (Thompson, Pawson and Evans, 2021). This is often paired with the transition from adolescence into adulthood for many attending university (Poobalan et al, 2014), a point of the lifespan associated with a decline in engagement with healthy behaviours, such as fruit and vegetable consumption (Winpenny et al, 2018), eating breakfast, exercising, and avoiding binge drinking and smoking (Frech, 2012). Given that health behaviours during adolescence and early adulthood can influence non-communicable disease risk (Mikkelsen et al, 2019) and health later in life (Lawrence, Mollborn and Hummer, 2017; World Health Organization, 2005), the university student population, approximately 4.2% of the UK population (Higher

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Education Statistics Agency, 2023), is important to consider for public health research, practice, and policy.

Dietary intake can be influenced by various internal and external factors, with socioeconomic status and cultural background (Enriquez and Archila-Godinez, 2022), affordability, availability, and convenience (Pinho et al, 2017; Belogianni et al, 2022), nutrition knowledge and skills (Worsley, 2002), and peer influence (Belogianni et al, 2022) all intersecting to influence an individual's food choice and behaviours. With this, there is the potential for barriers to be present that negatively impact the food choices an individual makes. Adults who experience barriers to healthy eating are less likely to report consuming healthy foods such as fruit, vegetables, and fish, and more likely to report consuming fast food (Pinho et al, 2017). In the context of this study, the university setting presents unique risk factors for engaging in suboptimal eating behaviours. Increased independence can often result in poorer dietary choices. For example, Sharma et al. (2009) reported that moving away from the family home resulted in lower fruit and vegetable intake in German university students. A poor selection of healthy food options on-campus is described as a university-specific barrier to healthy eating (Hilger, Loerbroks and Diehl, 2017; Hilger-Kolb and Diehl, 2019). Collectively, university students may be at risk of generic and population-specific barrers that can negatively influence dietary habits.

Costs associated with higher education and an increased cost of living may result in food insecurity (Bruening et al, 2017) and disrupted eating patterns and meal frequencies in university students (Shi, Davies and Allman-Farinelli, 2021), which may be predictive of chronic disease development and negative health outcomes (Laraia, 2013). This is likely exacerbated by the current cost-of-living crisis in the United Kingdom (UK), with food and non-alcoholic beverages prices being 16.2% higher in the year to October 2022 compared to the previous year (Francis-Devine et al, 2022). During the initial COVID-19 lockdown, university students in the United Kingdom appeared to demonstrate low and food insecurity to a greater extent when living alone and living with other students when compared to living with parents and other adults (Defeyter et al, 2020). Additionally, a lack of time and stress due to university commitments has been reported as major barriers to healthy eating in university students in Germany (Hilger, Loerbroks and Diehl, 2017), with the planning and preparation of healthy meals being described as "really time consuming" (Hilger-Kolb and Diehl, 2019).

Taken together, current literature suggests that university students may be susceptible to engaging in sub-optimal nutrition habits. There is a need to monitor nutrition status, views, attitudes, and motivations within each university to implement known effective interventions across the ecological model to enable health enhancing nutrition behaviours. Due to the university setting having unique risk factors for the development of health-negating behaviours, the health of university students is a contemporary and important public health issue. Given the current cost-of-living crisis in the UK, contemporary investigation into the eating behaviours and barriers to healthy eating in UK university students is warranted. As such, the aim of this cross-sectional study was to explore changes to dietary habits and barriers to healthy eating in students from a single UK university. The objective was to collate self-reported habits and barriers through open and closed questions within an online survey.

Methods

Study Design

This cross-sectional exploratory mixed-methods study was conducted with students at a single university in the East Midlands, UK. A web-based survey was developed by the research team, which was trialed and refined through piloting with a sample of students to establish face validity. The survey was part of a wider project exploring general health and well-being in university students (Roberts et al, 2023; Roberts et al, 2024; Hardwicke and Roberts, 2024). Data collection took place during the 2022/23 academic year from April – June 2023, with distribution targeted prior to students'

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academic assessment periods. Ethical approval for the project was granted by the Faculty's Research Ethics Committee (212214).

Participants and Recruitment

All students currently enrolled at the university were eligible to participate in the present study. A convenience sampling strategy was used. Programme leaders across the institution were contacted for permission to post an announcement on their course page within the universities virtual learning environment, which would have students from level 4-6 for undergraduate courses and level 7 for postgraduate taught courses enrolled. The survey was advertised on 42 programme course pages, with a total of 5,279 students enrolled on these courses representing 42.1% of the total student population (n = 12,554) at the time of the survey. Furthermore, the survey was promoted in Student Union communications sent directly to students. Upon completion, participants could enter a prize draw to win one of two £100 supermarket vouchers.

Survey

The survey was hosted on and distributed using an online survey hosting software package (Microsoft Forms, Microsoft, Redmond, Washington, USA). On starting the survey, individuals were presented with the participant information sheet and informed consent form. If individuals did not wish to provide informed consent, they were then taken to the end of the form and were unable to proceed to the main survey. In the first section of the survey broader demographic questions were included to enable analysis of associations of reported behaviours with demographic factors. These included age, gender, sexuality, ethnicity, year of study, programme of study, and current living situation.

The question 'Do you feel that your dietary habits have changed since coming to university? E.g. consuming more of a certain food type or a change in the amounts of food consumed.' was asked with a binary 'Yes' or 'No' option provided. Those that reported a change were then asked to select whether the change had been 'Overall positive', 'Neither negative or positive' or 'Overall negative'. Finally, an open-text question then asked participants to provide a description of changes to their dietary habits.

Participants were asked if they felt they experienced any barriers to healthy eating, with a binary option of 'Yes' or 'No'. Those that reported 'Yes', were provided a pre-selected list of 12 barriers commonly reported in similar populations (Hilger, Loerbroks and Diehl, 2017) and reflective of the student body, with no limit on barriers respondents could select. An open-text box was provided for students to expand on any reported barriers to healthy eating. The statements 'I can motivate myself to eat properly' and 'I am able to afford the food, beverages and meals that I want to consume regularly' were provided with responses on a 5-point Likert Scale: Strongly agree, Agree, Neutral, Disagree and Strongly disagree.

Data Analysis

Barriers to healthy eating, motivation to eat and affording food responses were analysed between age, level of study, and living situation using the chi-squared test and the and Fisher-Freeman-Halton exact test. Data were analysed using IBM SPSS Statistics for Windows (Version 28, IBM Corp., Armonk, NY, USA) with statistical significance set at 5% ($p < 0.05$).

Data from open-text questions were collated and analysed using qualitative content analysis. A directed, deductive, approach (Hsieh & Shannon, 2005) was used whereby analysis was directed by the quantitative findings and previous research in the area highlighting common barriers to healthy eating reported by university students (LaCaille et al, 2011; Hartman et al, 2013; Deliens et al, 2014; Sogari et al, 2018; Vélez-Toral et al, 2020). As such, analysis was guided by our aim to understand perceived barriers reported by the students and factors which influenced changes to dietary habits,

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with data coded around these aims and key categories formed to describe the determinants of changes to dietary habits and reported barriers amongst the students.

Results

Initially, 591 individuals accessed the survey. Of these, 590 individuals provided informed consent and complete responses to the survey, representing 5% of the total student population of the university (n = 12,554) at the time of data collection. Demographic responses are displayed in Table 1. The most recent (2020/21 academic year) full-time undergraduate student population demographics are predominately female, 67% (male, 33%), white, 51% (Black or Black British, 25%; overseas, 12%; Asian or Asian British, 6%; other/mixed, 6%; not known, 1%) and report no known disability, 86.3% (other disability, 10%; specific learning disability, 4%).

Table 1. Participant demographics.

Self-reported characteristics	**Responses**	
	n	**%**
Age		
18-24	292	49
25-34	199	34
35-44	65	11
45-44	29	5
55-64	4	1
65+	1	0
Sex		
Female	400	68
Male	173	29
Other	14	2
Prefer not to say	3	1
Ethnicity		
Asian, Asian British, Asian Welsh	182	31

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Black, Black British, Black Welsh, Caribbean or African	158	27
Mixed or multiple	8	1
White	230	39
Other	12	2
Study commitment		
Full time	576	98
Part time	14	2
Level of study		
Undergraduate	339	57
Postgraduate	242	41
Other	9	2
Living situation during term time		
University managed accommodation	110	19
Private accommodation in Northampton	343	58
At home with parents or caregivers	94	16
Other	43	7

Changes to Dietary Habits

Responses to the question "Do you feel that your dietary habits have changed since coming to university? E.g. consuming more of a certain food type or a change in the amounts of food consumed." were equally split between "yes" and "no" (n = 295; 50%). Of those who responded "yes", 66 students (22%) reported an overall positive change, 129 (44%) reported an overall negative change, and 100 (34%) reported a change that was neither positive or negative.

Barriers to Healthy Eating

When asked "Do you feel that you experience any barriers to healthy eating?", participants responded "yes" (n = 268; 45%) and "no" (n = 322; 55%). Of those that reported experiencing barriers,

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the most frequently selected barriers to healthy eating were "food cost" (n = 205; 76%), "lack of time" (n = 119; 44%), and "stress" (n = 112; 42%). Undergraduate students (χ^2 = 6.8; df = 1; p = 0.009) were more likely to agree they experienced barriers to healthy eating than postgraduate students, with no significant difference reported for age and living situation.

Significant differences were observed in response to the statement 'I can motivate myself to eat appropriately' with postgraduate students compared to undergraduate students (χ^2 = 46.1; df = 4; p < 0.001) and those living in private or other accommodation compared to living at home or in university-managed accommodation (χ^2 = 16.9; df = 8; p = 0.031) more likely to agree with the statement. There was no significant difference reported for age.

There were significant differences in the responses to the statement 'I am able to afford the food, beverages and meals that I want to consume regularly' in level of study (χ^2 = 13.4; df = 4; p = 0.009) with post-graduate students reporting a greater likelihood of being able to afford the things that they want to consume regularly than undergraduate students, with no significant difference observed for age and living situation.

Determinants of Negative Changes to Dietary Habits and Reported Barriers

Analysis of open-text responses to understand the determinants of negative changes to dietary habits and any reported barriers to healthy eating found financial influences, time, stress, and cultural influences as the main areas reported by the students. Each are reported in turn with examples of supporting data.

Firstly, financial influences were highlighted as impacting dietary choices and eating behaviours across the sample. Example responses include:

"My dietary habits has absolutely changed since I came to the university because of high cost of living and there is no support financially"

"Convenience has become a priority and food has become more expensive as I would love to eat fresh and organic food but I just can't warrant spending that amount of money"

"Not able to afford healthier foods for meal prep"

"No money to buy vegetables and fruits"

"I was used to eat foods 3 or 4 times a day. But after reaching here I eat 2 times a day. breakfast is very light and less quantity most of the day, but dinner is little more heavy quantity than breakfast. Due to the increasing cost of some food products we can't afford that much what we want."

"I can't afford proper food so I rarely Cook real meals I now mainly consume microwave meals or frozen foods"

"Before uni' I was eating a healthy balanced diet but now, due to food costs, I have to limit what I can buy and so end up not having a balanced diet with limited fruit"

"I can no longer afford the fresh food I used to get to cook home made meals everyday, I now use microwave meals as its cheaper and faster but it does make me feel sad as I miss cooking and having proper meals."

Next, students reported how perceptions of time availability influenced their eating habits negatively with examples including:

"Snacking more as no time to cook a proper meal, or grab a snack to continue studying"

"Due to lack of time, now I consume packaged food more"

"Lack of time to prepare what I want"

"I have less time to plan and prepare meals"

Alongside time, stress was identified as a factor which influenced eating habits. Examples include:

"Eating less due to stress"

"I stress eat and university gives you lots to stress about"

"Connivence means crisp breakfast, lunch and dinner some days or being too stressed about deadlines to get up to prepare food"

"Eating unhealthy due to exam stress"

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"Eating unhealthily from stress"

Finances, time, and stress are not necessarily distinct and likely intersect to influence student eating behaviours. A range of responses highlighted how a combination of these factors had an influence. Examples include:

"I eat more, I ate more takeaways due to stress, lack of money, time and energy"

"It's negatively affected my habits because I don't have time to cook around a flexible timetable, I don't always have the facilities because I share a kitchen with 9 other people and I don't have the money to always buy the ingredients to cook the meals I want. I also find that I get really tired and just want to eat something convenient"

"I eat worse due to stress and time"

Finally, analysis of the open-text data found cultural differences for international students to be an influential factor in changes to their eating habits. These changes varied from being perceived as negative or restrictive due to unavailability of certain foods, or just highlighted as a change but not deemed as positive or negative. Examples include:

"Not having access to my local diets is quite challenging to me"

"The food I eat here are quite different from what I eat while in Africa"

"In my country it is easily to get freshly cooked meals at any time of the day but here I have to rely on frozen item more."

"Eating more of more food from the United Kingdom and consuming average amount of African food because of environmental changes"

"Different country different environment definitely makes changes in routines and behaviours"

"The diet of the diverse backgrounds of the students is not considered."

"Please keep halal food for Asian students as all doesn't consume from the [on campus eating establishment]"

Taken together, the directed analysis of the open-text responses reflected determinants of student habits previously reported in the literature, namely costs, time, and stress. A further category was created following coding to include the influence of cultural differences frequently reported amongst international students within the sample.

Discussion

The aim of this cross-sectional study was to explore changes to dietary habits and barriers to healthy eating in students from a single UK university. The objective was to collate self-reported habits and barriers through open and closed questions within an online survey. Overall, 50% of the students reported that their dietary habits had changed since starting university, with 22% of all respondents describing the change as overall negative. Moreover, 45% of all students reported experiencing barriers to healthy eating. Both findings suggest that the university setting has an influence on considerable numbers of students regarding changes in dietary habits and present barriers which are perhaps unique to this population.

Whilst limited and not conducted in the UK, previous research has highlighted food cost, financial situation of students, a lack of time, unstructured schedules, and stress as major barriers to healthy eating and cooking in university students (LaCaille et al, 2011; Hartman et al, 2013; Deliens et al, 2014; Sogari et al, 2018; Vélez-Toral et al, 2020; Proctor et al, 2025). In our study, food cost presented as the main barrier to healthy eating with 34.7% of total respondents selecting this option. Previous research from Pinho et al (2017) explored whether perceived barriers to healthy eating influenced the consumption of different food groups. The authors observed that both "busy lifestyle" and "price of healthy food" was associated with a reduced consumption of fruit, vegetables, fish, and home-cooked meals, and an increased consumption of fast food. Additionally, respondents were less likely to report consuming breakfast daily when "busy lifestyle" (odds ratio: 0.64; 95% confidence interval: 0.55 – 0.74) and "price of healthy food" (odds ratio: 0.70; 95% confidence interval: 0.59 – 0.82) were barriers, respectively (Pinho et al, 2017). Multiple studies with university students in the United States indicate that a 43-60% of respondents "could not afford to eat balanced meals" (Broton and

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Goldrick-Rab, 2018) and that students often report that "junk food is way cheaper than getting healthy food" (Sogari et al, 2018). Similarly, Australian university students experiencing food insecurity reported poor diet quality than those who were food secure (Shi, Grech and Allman-Farinelli, 2022).

Collectively, the cost of consuming nutrient-dense food appears to be a major barrier for university students. The current study adds further empirical evidence to support this proposition and novelty. Food and non-alcoholic beverages prices were 16.2% higher in the year to October 2022 compared to the previous year in the UK (Francis-Devine et al, 2022). Given that government support in the form of loans and grants in the UK is unlikely to fully cover living costs for a university student (GOV.UK, 2021) our reporting of food costs being the most selected barrier to healthy eating is not surprising. Following a survey of 4,201 higher education students in the UK in distributed in 2022, 91% of respondents reported both that their cost of living had increased in the past year and that they were worried about the rising cost of living, 50% reporting experiencing financial difficulties, and 93% reporting that the price of their food shop had increased (Office for National Statistics, 2022). With the increased participation in UK higher education of students from a wider range of socio-economic backgrounds (GOV.UK, 2023), it is important to consider how the cost-of-living crisis may be unevenly impacting students from lower social-economic backgrounds who may be disadvantaged in their access to foods to promote optimal health and well-being.

Time was highlighted as another barrier to healthy eating in the present sample. This is in accordance with previous research in university students, healthy meal consumption requires greater time investment due to food preparation and processing than consuming processed or pre-cooked food, and that class schedules may negatively influence a students' ability to spend time cooking (LaCaille et al, 2011; Vélez-Toral et al, 2020). Additionally, individuals may allocate more time to studying during assessment periods, which impacts the availability of time for cooking, as reported from a sample of students in Belgium (Deliens et al, 2014). Stress was another barrier to healthy eating in our study. Different stressors have previously reported as determinants of sub-optimal dietary intake, with both academic and social stress influencing eating habits (Deliens et al, 2014). In the open-text questions in our study, stressors related to university and exams were highlighted. As such, it would be worthwhile for education providers to account for the unique barriers students may face and ensure resources and support are provided to assist students in managing their dietary habits appropriately, particularly around high-risk times such as examination periods.

Analysis of the open-text questions also highlighted cultural differences for international students as a common reason for dietary habit changes since coming to university in the current cohort. This is important to consider given the increase in international students attending UK higher education institutions, with a 49% and 99% increase in EU and other overseas applications, respectively, compared to a 4% increase in home students for the period 2021-2022 (House of Commons Library, 2023). Changes to dietary habits are likely in students moving overseas for university, with 85% of international students in a Belgian higher education institution reporting changing their eating habits (Perez-Cueto et al, 2009). An inability to find culturally familiar food was highlighted in qualitative findings in international students studying in Norway, with both students from European and non-European countries reporting a lack of familiar food availability in supermarkets or specialist stores (Bauch et al, 2023). Similarly, international students in the United States reported that the availability, quality, and price of culturally familiar foods that would typically be consumed at home were worse in the United States (Alakaam et al, 2015). The analysis of open-text questions in our study is in agreement with the findings in other student cohorts globally, and suggest that it is important for higher education institutions to consider cultural differences in any provision of food-related support or health based initiatives.

Strengths and Limitations

This study provides insight into changes to dietary habits since attending university and reported barriers to healthy eating amongst UK students. A notable strength of our study is the large

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sample size, which represents 5% of the university population at the time of data collection. Another strength is the range of programmes represented in the cohort, which ensures a more representative dataset without being restricted to students on programmes with a bias towards those interested in nutrition or general health-related behaviours.

There are, however, limitations of note. The survey was cross-sectional and thus only a single time point for participants is presented, with the time of distribution chosen to account for level 4 students adjusting to university living, and to avoid examination and assessment periods. Despite the survey being anonymous and participants not required to provide any identifiable information, there is the potential for misreporting and social desirability bias to influence the results. Additionally, the results presented here are from a cohort of students from a single university and as such, caution should be applied in generalising findings to students across other higher education institutions in the UK.

Practical Recommendations

The findings of this study highlight how the transition to university can influence negative changes in dietary habits and present barriers to healthy eating. Based on the findings from this study, we share the following recommendations:

- Greater financial assistance or food provision for university students, particularly considering the current cost-of-living crisis in the UK.
- The development of resources to inform students of cost-effective, quick meal options that require little preparation encouraging the consumption of nutrient-dense foods.
- Support for international students regarding food provision, either directly or indirectly, ensuring that this is mindful of the variety of cultural backgrounds to promote inclusive and accessible food environments.

Conclusions

In conclusion, many university students at a single higher education institution in the UK indicated that they faced barriers to healthy eating, with food cost, time and stress being the most prevalent. Given the unique transitional period that university represents for most students, at a time of life when nutritional habits are formed that can be predictive of health in later life, ensuring that appropriate support is provided within these settings is of the utmost importance. Future research is needed to fully understand the current dietary practices of university students by employing direct qualitative assessment of food and nutrient intake. Qualitative research would allow for a greater understanding of the barriers and facilitators to appropriate dietary habits, accounting for the specific contextual factors within both the UK education system, and within individual institutions. Finally, research and theoretically informed interventions exploring how eating habits and behaviours may be improved would be beneficial for supporting future implementation of initiatives and policies towards promoting optimal dietary patterns.

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