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# Evaluating The Dietary Patterns And Health Implications Of Students Of Anambra State University, Uli

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**ABSTRACT**

The study was designed to evaluate the dietary patterns and health implications of students of Anambra State University, Uli. Two research questions and one hypothesis guided the study. Survey research method design was employed for the study. The population consisted of undergraduate students of Anambra State University, Uli. The sample of the study was 160 respondents. Multi-stage sampling techniques were employed to derive the sample of the study. Data was collected from the respondents using a structured questionnaire. One hundred and five (66 %) out of the 160 copies of the questionnaire administered were duly completed and retrieved. The research questions were analysed with mean and standard deviations while Pearson Product Moment Correlation Coefficient were used to test the hypothesis. The results of the analysis revealed that most of the respondents ate two or three main meals a day, either skip breakfast or eat in-between meals. The high DDS of the respondents ensures balanced nutrition. BMI of the respondents indicate that majority of them had a normal BMI or good health. The study recommended that undergraduate female students (respondents) of Anambra State University, Uli need health education on the benefits of good dietary practices to achieve optimal health.

**Keywords:** dietary patterns, health, nutrition, students

## INTRODUCTION

Nutrition as the science of food and its relationship to health has been recognized in recent years as the cornerstone of socioeconomic development (Parks, 2009). Adequate nutrition is important for a variety of reasons, including optimal cardiovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing and psychological well-being (Martin, 2006). Adequate nutrition entails a diet that contains the constituents (carbohydrate, fats, proteins, vitamins and minerals) that are required for body building, energy supply, body defense and regulatory functions in quantities commensurate with the body need.

One relevant group of individuals that needs to ensure that their nutrition is adequate because their physiological and cognitive needs are students especially those in tertiary institutions which are majorly adolescents. Adolescence is a period of accelerated growth and change, bridging the complex transition from childhood to adulthood. A wide variety of changes occur during the adolescent age which results in young people adopting behaviours that might have long term effects on their health and well-being. Due to physiological, emotional and social changes, the teenage years can be described as a period of exploration, adventure and formation of personal ideologies. Adolescents have remarkable creativity, energy, and potential. There is no better time to begin adopting healthy dietary pattern that will enable them contribute positively to their communities.

Dietary pattern (DP) is the general profile of food and nutrient consumption which is characterized on the basis of the usual eating habits. The analysis of dietary patterns gives a more comprehensive impression of the food consumption habits within a population. It may be better at predicting the risk of diseases than the analysis of isolated nutrients or foods because the joint effect of various nutrients involved would be better identified (Hu, 2002). Also, since nutrient intakes are often associated with certain dietary patterns (Kant, Schatzkin, Block, Ziegler, & Nestle, 2011; Randall, Marshall, Graham, & Brasure, 2015) single-nutrient analysis may be confounded by the effect of dietary patterns (Ursin et al., 2013). Patterns of nutritional behaviors adopted in childhood and adolescents are mostly continued in adult life and increase the risk of development of many chronic diseases (Kapka-Skrzypczak et al., 2017). Diets in childhood and adolescents have public health implications due to evidence relating poor nutrition in childhood to subsequent obesity and elevated risks for type 2 diabetes, metabolic syndrome, and cardiovascular diseases (Canete, Gil-Campos, Aguilera, & Gil, 2017), which are increasing in prevalence (WHO, 2014).

The transition from adolescence to adulthood is an important period for establishing behavioral patterns that affect long-term health and chronic disease risk (Meg, Small, Bailey-Davis, & Maggs, 2012). University students seem to be the most affected by this nutritional transition (Baldini, Pasqui, Bordoni, & Maranesi, 2019). Studies have shown that adolescence leaving their parents and living away from home to attend college experience numerous health-related behavioral changes, which includes adoption of unhealthy dietary habits (Cluskey & Grobe, 2009; Strong, Parks, Anderson, Winett, & Davy, 2008; Wengreen & Moncur, 2009). These adopted habits are mostly attributed to drastic changes in the environment and resources available, frequent exposure to unhealthy foods and habits (Huang et al., 2013).

Many undergraduate students are adolescents who encounter numerous health risks along the path to adulthood, many of which affect quality of life and life expectancy. Studies have shown that youths are particularly vulnerable to poor eating habits and are said to be in the habit of eating "junks" (Papadaki & Scott, 2012). These poor eating habits may likely arise from lack of knowledge of the cumulative effects of their eating habits. In Nigeria, where there is an increase in fast food centers in its urban cities, it is a major concern (Ajala, 2006; Akinwusi & Ogundele, 2015). Most undergraduates are likely to be responsible for their diets for the first time away from home, therefore they need guidance on how to make informed dietary choices (Satia, Galanko, & Siega-Riz, 2014). Other studies have linked the lifestyle of students, especially breakfast consumption, to their mental abilities which is reflected in their academic performance (Lisa, 1998; Pollit, Watkins & Husaini, 2018). However, most of these studies have excluded young adults in the tertiary institution.

Food habits and nutritional status of undergraduates are among the principal public health problems in large areas of the world. University students have been described as individuals admitted into the university who have not yet obtained first bachelor degree (World English Dictionary, 2011) and these group are mostly adolescents and young adults. Generally, the bulk of this group in the universities are adolecences. Adolescents as a vulnerable group require special attention and nutritional care because of the negative nutritional consequences that may occur among them as a result of inadequate consumption of healthy foods and physical inactivity. Overweight and obesity in childhood and in adolescents are emerging as one of the major public health of concern in the last few decades. Overweight and obesity conditions develop when there is an imbalance between calories consumed and calories expended mostly due to inadequate consumption of healthy foods.

In Anambra State University, Uli it has been observed by the researchers that students frequently neglect entire meals during the day, and as a result, resort to late-night binge eating. Some dietary pat-terns which include snacking (usually on energy dense foods), meal skipping (particularly breakfast), irregular and wide use of fast foods appear quite common among the students. Some of these factors have been associated with health status such as overweight and obesity. Dietary diversity is a useful indicator of nutrient adequacy and it is usually assessed by the use of a tool known as diversity scores where the number of food groups consumed over a reference period is scored (Rathnayake, Madushani & Silva, 2012). These scores have been validated as a good proxy for indicating dietary quality (Azadbakht, Mirmiran & Azizi, 2015). Also, much of the work on population group has been on the secondary school

students. There has not been much information on the dietary pattern and its implication health status of university students. It is against this backdrop the study seeks to evaluate dietary patterns and health implications of students of Anambra State University, Uli

**Objectives of the Study**

The purpose of this study was to evaluate dietary patterns and health implications of students of Anambra State University, Uli. Specifically, the study sought to:

1. Determine the dietary consumption patterns of students in Anambra State University, Uli
2. Establish prevalence of overweight and obesity among students in Anambra State University, Uli

**Research Questions**

The following research questions guided the study:

1. What are the dietary consumption patterns of students in Anambra State University, Uli?
2. What is prevalence of overweight and obesity among students in Anambra State University, Uli?

**Hypothesis**

$H0_1$: There is no relationship between dietary consumption patterns and prevalence of overweight and obesity among students in Anambra State University, Uli

## RESEARCH METHODOLOGY

**Design of the Study**

The research work adopted descriptive survey research design. Olaitan, Ali, Eyo and Sowande (2000) stated that descriptive survey research method is a plan, structure and strategy that an investigator adopts in order to obtain information to research problems using questionnaire in collecting, analyzing and interpreting the data.

**Population of the Study**

The study population included all undergraduate students of Anambra State University, Uli.

**Inclusion Criteria**

The full-time undergraduate students attending the University who agreed to participate in the study and signed the consent form.

**Sampling Technique**

The study applied a multistage sampling method

**Stage 1**: Four (4) faculties were randomly selected from the seven (7) faculties in the school, using simple random sampling technique.

**Stage 2: Selection of departments**

Two (2) departments each were randomly selected from the selected faculties using simple random sampling technique, giving a total of eight (8) departments.

**Stage 3: Selection of respondents**

Twenty (20) respondents (undergraduate students) were selected from each selected department by simple random sampling method. Making the total sample one hundred and sixty respondents

**Exclusion Criteria**

The undergraduate students excluded from the study were those who were pregnant (for females), on any form of medication, acutely ill or with known chronic diseases.

**Instrument for Data collection**

Data were collected using a structured dietary pattern questionnaire. Information on dietary pattern and prevalence of overweight and obesity were obtained using self-administered questionnaires to respondents. Each questionnaire was coded with a unique number representing each respondent.

**Dietary Pattern**

Data were collected on the number of meals consumed daily, meal patterns, snacking habits, source of meals taken while in school, alcohol intake, and weekly food frequency consumption of nine food groups among the 8‑12 recommended (FAO/WHO, 2003). The evaluation for the number of meals consumed in a day was based on recommendation by World Health Organization (FAO/WHO, 2003).

Twelve food groups were used for the dietary diversity score (DDS). The food groups were namely; cereals, roots and tubers, vegetables, fruits, meat, eggs, fish/sea food, legumes/nuts and seeds, milk and

milk products, oils and fats, condiments, and soft drinks. The DDS (a factor which indicates the different food groups and varieties consumed) was classified as low DDS (≤3 food groups), medium DDS (4‑5 food groups), and high DDS (≥6 food groups) (FAO/WHO, 2003). This was calculated based on the number of food groups consumed by the correspondents within the study period.

**Methods for assessing anthropometric characteristics**

**Weight and height measurements**

Weight and height measurements were obtained as described in the Food and Nutrition Technical Assistance Guide (Cogill, 2003). Weight measurements were taken with minimal number of clothes and no shoes on. A digital weighing scale was used. The height measurements taken to the nearest 0.1m was obtained with the volunteers having no shoes on using a manual standiometer with a maximum height of 2m.

**Determination of body mass index (BMI)**

Body Mass Index (BMI) for Age is a commonly accepted index for classifying nutritional status in adolescents. It is defined as body weight in kilograms divided by the square of the height, in meters squared (Kuczmarski, Sreekumar & Sanjeevi, 2008).

BMI = weight (kg) / height ($m^2$)

Simple steps to work out BMI:

Step 1: Multiply height in meters ($m^2$) by itself;

then Step 2: divide weight in kilograms (kg) by height in $m^2$

Thus, BMI < 18.5 $kg/m^2$ = underweight, BMI ≥ 18.5–24.99 $kg/m^2$ = normal, BMI ≥ 25–29.99 $kg/m^2$ = overweight, while BMI ≥ 30 $kg/m^2$ = obese (WHO, 2011)

**Validation of Instrument**

Two experts from Department of Vocational Education (Home Economics Unit), Delta State University, Abraka were requested to review the questionnaire items to: determine the accuracy; relevance; clarity and total coverage of the content; determine the appropriateness of the instruction to the respondents; and evaluate the suitability and adequacy of the questionnaire in line with research variables. The corrections were incorporated into the final version of the instrument.

**Reliability of the Instrument**

Data for testing the reliability of the instrument was generated through administration of the instrument to a sample of the respondents comprising of 30 students from Delta State University, Abraka, Delta State. The results were collated and separated using split half method while Cronbach alpha statistical package was used to establish the reliability coefficient of 0.91. The high coefficient showed that the instrument designed for the study measured what it was intended to measure and therefore reliable for the study.

**Method of Data Collection**

Students within the schools were invited for seminar on instruction of Nutrition Education on how to control weight. Students who attended the seminar were handed the questionnaire to find out their response on the spot. Anthropometric data was collected with the help of three research assistants. The assistants were trained on how to collect data with standiometer and weighing scale. One hundred and five (66 %) out of the 160 copies distributed were duly completed and retrieved.

**Method of Data analysis**

Data analysis was performed using SPSS statistical package. The data collected was also analyzed using simple description analysis such as percentages and frequency counts. Statistical significance was set at $p < 0.05$.

## RESULTS AND DISCUSSION

**Table 1: Characteristics of respondents in the Students (N=105)**

| Variables | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| Female | 59 | 56.19 |
| Male | 46 | 43.81 |
| **Age (Years)** | | |
| 16 – 18 | 03 | 2.86 |
| 19 – 21 | 62 | 59.04 |
| 22 – 24 | 17 | 16.19 |
| 25 – 27 | 05 | 4.76 |
| 28 and Above | 18 | 17.14 |
| **Marital Status** | | |
| Single | 84 | 80.00 |
| Married | 21 | 20.00 |
| Divorced | -- | -- |
| Widowed | -- | -- |

**Source: Field Work, 2020**

The result in Table 1 showed that over half (56.19%) of the respondents were females while 43.81 % were males. Responses on age indicated that 2.86 of the students were between the age of 16 – 18 years, 59.04% were within the age of 19 – 21 years, 16.19% were between the age of 22 – 27 years, 4.76% were between the age of 25 – 27 years and 17.14% were above the age of 28 years. Responses on marital status indicated that most (80%) of the students were single while 20.00% were married.

**Table 2: Dietary consumption patterns of students in Anambra State University, Uli**

| Variables | Frequency | Percentages |
|---|---|---|
| **Number of main meals in a day** | | |
| 1 | 21 | 20 |
| 2 | 58 | 55.23 |
| 3 | 14 | 13.33 |
| >3 | 12 | 11.43 |
| **Usual source of food** | | |
| Prepared only | 25 | 23.81 |
| Purchased only | 12 | 11.43 |
| Both | 68 | 64.76 |
| **Breakfast skipping** | | |
| Yes | 76 | 72.38 |
| No | 29 | 27.61 |
| **Eat in between meals** | | |
| Yes | 80 | 76.19 |
| No | 25 | 23.81 |
| **Eat snacks** | | |
| Yes | 74 | 70.47 |
| No | 31 | 29.52 |
| **Take alcohol** | | |
| Yes | 44 | 41.90 |
| No | 61 | 58.09 |
| **Tobacco Smoking** | | |
| Yes | 11 | 10.47 |
| No | 94 | 89.52 |

**Source: Field Work, 2020**

The result in Table showed that 55.23% of the respondents ate two main meals in a day and 11.43% age more than three main meals in a day. The usual source of food for a higher proportion of the respondents

64.76% was both prepared and purchased. Over half of the respondents 70.38% skipped breakfast and 76.19% ate in between meals. Majority of the respondents 70.47% ate snacks, 58.09% and 89.52% did not take alcohol and did not smoke tobacco respectively (Table 2).

**Table 3: Frequency of intake of different food groups by respondents in the week preceding survey**

| **Food groups** | **Frequency (N=105)** | |
|---|---|---|
| | **<3 times Frequency (%)** | **≥3 times Frequency (%)** |
| Cereals | 46 (43.81) | 59 (56.19) |
| Roots and Tubers | 47 (44.76) | 58 (55.23) |
| Vegetables | 74 (70.48) | 31 (29.52) |
| Fruits | 51 (48.57) | 54 (51.42) |
| Meat | 32 (30.47) | 73 (69.52) |
| Eggs | 63 (60) | 42 (40) |
| Fish/sea foods | 65 (62) | 40 (38) |
| Legumes/nuts/seeds | 61 (58.10) | 44 (41.90) |
| Milk/milk products | 46 (43.80) | 59(56.20) |
| Oil and fats | 29 (27.62) | 76 (72.38) |
| Soft drinks | 45 (42.86) | 60 (57.14) |

**Field Work, 2020**

**Note: figures in brackets are percentages**

In the week preceding the survey, two-thirds of the respondents 56.19% and 55.23% ate cereals and foods belonging to the roots and tubers food group ≥3 times. Five hundred and twenty 70.48% and 51.42% ate vegetables and eggs, respectively, <3 times. Over half of the respondents 69.52% and 51.42% ate fruits and meat, respectively, ≥3 times (Table 3).

**Table 3: Prevalence of overweight and obesity among students in Anambra State University, Uli**

| **Anthropometric Characteristics** | **Male (Mean)** | **Female (mean)** | **Final (mean)** |
|---|---|---|---|
| Body weight (kg) | 66.7 | 63.9 | 65.3 |
| Height ($m^2$) | 1.67 | 1.56 | 1.62 |
| Body mass index ($Kg/m^2$) | 24.00 | 26.29 | 25.14 |

**Source: Field Work, 2020**

The result in Table 3 showed that male students (66.7 kg) have higher body mean weight than female students (63.9 kg). The male students have higher height ($1.67m^2$) than female students ($1.56m^2$). However, female students had higher BMI (26.29 $kg/m^2$) when compared to male students (24.00 $kg/m^2$). The final mean (25.14) indicated that most of the students had normal BMI as it between the range of 25 – 29.99 $kk/m^2$

**Hypothesis 1**

$HO_1$: There is no relationship between dietary consumption patterns and prevalence of overweight and obesity among students in Anambra State University, Uli

**Table 4: Pearson's Product Moment Correlational coefficient analysis on responses on relationship between dietary consumption patterns and prevalence of overweight and obesity among students in Anambra State University, Uli (N=105)**

| Variables | | Dietary consumption patterns ($X_1$) | Anthropometric characteristics ($X_2$) |
|---|---|---|---|
| **Dietary consumption patterns ($X_1$)** | Pearson Correlation(r)<br>Sig. (2-tailed)<br>N | 1<br><br>105 | 0.66**<br>0.00<br>105 |
| **Anthropometric characteristics ($X_2$)** | Pearson Correlation(r)<br>Sig. (2-tailed)<br>N | 0.66**<br>0.00<br>105 | 1<br><br>105 |

**. Correlation is significant at the 0.05 level (2-tailed)

Table 4 presents Pearson's Product Moment Correlational analysis of responses on relationship between dietary consumption patterns of students and their anthropometric characteristics. The result indicated that there a positive relationship between dietary consumption patterns and anthropometric characteristics of students with r=0.66. This shows that dietary consumption patterns of students significantly influenced their anthropometric characteristics of the students in area of study.

## DISCUSSION OF THE FINDINGS

Adolescence is one of the fastest growth periods of a person's life. During this time, physical changes affect the body's nutritional needs, while changes in one's lifestyle may affect eating habits and food choices. University students (undergraduates), within the age range of 17‑30 years in every country constitute a large proportion of the total population.

The result in Table 2 showed that the dietary pattern of the respondents shows that most of them ate two or three main meals a day which is necessary for good health. This is similar to findings from a study carried out among university students in South-South states of Nigeria (Achinihu, 2009). However, majority of them either skip breakfast or eat in-between meals. Majority of the respondents sometimes skip breakfast while minority of them sometimes skips lunch or dinner. Skipping of meals is a very common practice among undergraduates (Juan et al., 2013; Kurubaran et al., 2012; Moy et al., 2009). Although breakfast is very important for the health and well-being of the body, students may find it difficult to take as they are always in a hurry to go for their classes. Some may deliberately skip breakfast because of the consciousness of their body weight and appearance. This is more common among females who are more conscious of their diet (Carmel & Camilleri, 2011). Majority of the respondents ate snacks in-between meals, possibly to enable them cope with the energy needs of the body as they go about their normal academic activities. The pattern also shows a high intake of snacks among them, just as observed among the university students in the South-Eastern states of Nigeria (Achinihu, 2009), but smoking and intake of alcohol was very low. Majority of the students do not take alcohol or smoke, however, those who take alcohol or smoke, do so occasionally or rarely. The knowledge of the health implications of alcohol consumption and smoking may be responsible for avoidance of such practices among the respondents. The dietary pattern assessments of the undergraduate students (respondents) also indicates

that majority of the students mostly prepare their food. Those who purchase their food do so in the canteen, although they seem not to be satisfied eating out. Lunch is often eaten out in the canteen while breakfast and dinner were mainly prepared. Eating out in canteens is a common practice among undergraduate students (Achinihu, 2009; Hayda & Maria, 2017). This may be because more time is spent outside their halls of residence during lunch periods usually in classrooms

The result in Table 3 showed that meal pattern of the respondents. Majority of them consumed more of foods belonging to the cereals, roots and tubers, fruits, meats, oils and fats groups and less of foods belonging to the vegetables and eggs group. This may affect the availability of the nutrients (i.e., minerals and proteins) inherent in these food groups, to the respondents. The DDS of the respondents shows that more of them ate more than six food groups, which makes available necessary nutrients for optimal health. The dietary diversity of the respondents may be a reflection of better knowledge of basic nutritional values of the different food groups. High dietary diversity includes food from many food groups (≥6) which makes available balanced nutrients for optimal health. The high DDS of the respondents indicates their consumption of wide varieties of food which ensures availability of useful and balanced nutrients. This guarantees optimal nutrition which has a positive impact on their nutritional and health status.

The result in table 4 showed that male students had higher weight and height than females in the Schools. However, Female students had higher Body Mass Index (26.29k/$m^2$) than male (24.00 kg/$m^2$). This implied that the female students were overweight while the male students had normal weight. The results negated the findings of Lin, Cobiac and Skrzypiec (2002) who found out that One-fifth of university students in Malaysia can be classified as underweight or chronic energy deficient (BMI <18.5 kg/$m^2$), with more females (24.4%) than males (15.6%) in this category. The study however, is in line with that of Huxley, Mendis and Zheleznyakov, (2010) who reported that females usually have higher BMI and overweight values compared to males. Most of the undergraduate students of Anambra State University, Uli who participated in the study had normal BMI, and therefore seem to be well nourished. The proportion of overweight respondent increased despite meal skipping and avoidance of certain food groups. Prevalence of overweight and obesity among the females may result from excessive consumption of selected food groups which are mostly energy-dense or refined and avoidance of food groups with low energy and necessary vitamins and minerals. This may be true as those who had medium dietary diversity were more obese and overweight than those who had high dietary diversity. This is dangerous for their health as obesity or overweight predisposes them to risk of NCDs (Van den Berg, Abera, Nel, & Walsh, 2013).

The result in Table 4 showed that dietary consumption patterns of students significantly influenced their anthropometric characteristics of the students in area of study. This implied that consumption pattern of ensured the normal BMI or health of students

## CONCLUSION AND RECOMMENDATION

In conclusion, the study reveals that most of the respondents ate two or three main meals a day, either skip breakfast or eat in-between meals. The high DDS of the respondents ensures balanced nutrition. BMI of the respondents indicate that majority of them had a normal BMI or good health. However, the undergraduate female students (respondents) of Anambra State University, Uli need health education on the benefits of good dietary practices to achieve optimal health.

## REFERENCES

Akinwusi, A. T & Ogundele, B. O. (2015). Influence of economy, society and personal beliefs on nutritional habits. *The Nigerian School Health, 17,* 143‑149.

Azadbakht, L., Mirmiran, P & Azizi, F. (2015). Variety scores of food groups contribute to the specific nutrient adequacy in Tehranian men. *Eur J Clin Nutr*, **59**, 1233–40.

Baldini, M., Pasqui, F., Bordoni, A., & Maranesi, M. (2019). Is the Mediterranean lifestyle still a reality? Evaluation of food consumption and energy expenditure in Italian and Spanish university students. *Public Health Nutrition*, *12*(2), 148‑155. https://doi.org/10.1017/S1368980008002759

Canete, R., Gil-Campos, M., Aguilera, C., & Gil, A. (2017). Development of insulin resistance and its relation to diet in the obese child. *European Journal of Nutrition*, *46*, 181‑187. https://doi.org/10.1007/s00394-007-0648-9

Cluskey, M., & Grobe, D. (2009). College weight gain and behavior transitions: Male and female differences. *Journal of the American Dietetic Association*, *109*(2), 325‑329. https://doi.org/10.1016/j.jada.2008.10.045

FAO/WHO (2003). Diet, nutrition and the prevention of chronic diseases: Report of a Joint FAO/WHO Expert Consultation. WHO

Hayda, J. A., & Maria, C. F. B. (2017). Food behavior in student residence halls: A setting for health promotion. *Revista de Saúde Pública*, *41*(2).

Hu, F. B. (2018). Dietary pattern analysis: A new direction in nutritional epidemiology. *Current Opinion in Lipidology*, *13*, 3‑9. https://doiorg/10.1097/00041433-200202000-00002

Huang, T. T., Harris, K. J., Lee, R. E., Nazir, N., Born, W., & Kaur, H. (2013). Assessing overweight, obesity, diet, and physical activity in college students. *Journal of American College Health*, *52*(2), 83‑86. https://doi.org/10.1080/07448480309595728

Huxley, R., Mendis, S & Zheleznyakov, E. (2010). Body mass index, waist circumference and waist:hip ratio as predictors of cardiovascular risk—a review of the literature. *Eur J Clin Nutr*, 64, 16–22. https://doi.org/10.1038/ejcn.2009.68

Juan, S., He, Y., Zhiyue, L., Yan, W., Jiang, B., Yanyan, W & Ying, Y. (2013). Factors associated with skipping breakfast among Inner Mongolia Medical students in China. *BMC Public Health*, *13*, 42

Kant, A. K., Schatzkin, A., Block, G., Ziegler, R. G., & Nestle, M. (2011). Food group intake patterns and associated nutrient profiles of the US population. *Journal of the American Dietetic Association*, *91*, 1532‑1537.

Kurubaran, G., Sami, A., Ahmad, M. Q., Al-abed, A. A., Rizal, A. M., & Syed, M. A. (2017). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: A cross-sectional study. *Nutrition Journal*, *11*, 48.

Lisa, M. S. (2018). The correlation between eating breakfast and school performance. *American Journal of Clinical Nutrition*, *65*, 7795‑9845.

Meg, L., Small, N. M., Bailey-Davis, L., & Maggs, J. L. (2012). The protective effects of parent college student communication on dietary and physical activity behaviors. *Journal of Adolescent Health*, *53*(2), 300‑302.

Moy, F. M., Surin, J., Ismail, Y., Mahad, R., Tie, F. H., & Wan Ismail, W. M. A. (2019). Breakfast skipping and its associated factors among undergraduates in a public university in Kuala Lumpur. *Malaysian Journal of Nutrition*, *15*(2), 165‑174.

Papadaki, A., & Scott, J. A. (2012). The impact on eating habits of temporary translocation from a Mediterranean to a Northern European environment. *European Journal of Clinical Nutrition*, *56*, 455‑467. https://doi.org/10.1038/sj.ejcn.1601337

Randall, E., Marshall, J. R., Graham, S., & Brasure, J. (2015). Patterns in food use and their associations with nutrient intakes. *American Journal of Clinical Nutrition*, *52*, 739‑745. https://doi.org/10.1093/ajcn/52.4.739

Rathnayake K.M, Madushani, P.A & Silva, KD. (2012). Use of dietary diversity score as a proxy indicator of nutrient adequacy of rural elderly people in Sri Lanka. *BMC Research Notes*. **5**, 469.

Satia, J. A., Galanko, J. A., & Siega-Riz, A. M. (2014). Eating at fast food restaurants is associated with dietary intake, demographic, psychosocial and behavioural factors among African Americans in North Carolina. *Public Health Nutrition*, *7*, 1089‑1096

Strong, K. A., Parks, S. L., Anderson, E., Winett, R., & Davy, B. M. (2008). Weight gain prevention: Identifying theory-based targets for health behavior change in young adults. *Journal of the American Dietetic Association*, *108*(10), 1708‑1715. https://doi.org/10.1016/jjada.2008.07.007

Ursin, G., Ziegler, R. G., Subar, A. F., Graubard, B. I., Haile, R. W., & Hoover, R. (2013). Dietary patterns associated with a low-fat diet in the National Health Examination Follow-up Study: Identification of potential confounders for epidemiologic analyses. *American Journal of Epidemiology, 137, 916‑927. https://doi.org/10.1093/oxfordjournals. aje.a116753*

Van den Berg, V. L., Abera, B. M. M. , Nel, M. , & Walsh, C. M. (2013). Nutritional status of undergraduate healthcare students at the University of the Free State. *South African Family Practice*, 55(5), 445–452. 10.1080/20786204.2013.10874394

World Health Organization (2014). *Global strategy on diet, physical activity and health*. Geneva, Switzerland: WHO Press