**Original Research Report**

# NUTRITIONAL KNOWLEDGE AND BODY MASS INDEX AMONG STUDENTS AT NOVENA UNIVERSITY, OGUME, NIGERIA

**Udi Onoriode Andrew [1], Okoro Ogheneyebrorue Godswill[1*], Enaowho Taniyowho Mamerhi[2], Douglas Boma[3]**

[1]Department of Human Anatomy, College of Basic Health Sciences, Achievers University, Owo, Nigeria
[2]Department of Human Anatomy and Cell Biology, Faculty of Basic Medical Sciences, Delta State University, Abraka, Nigeria
[3]Department of Public and Community Health, Novena University, Ogume, Nigeria

## ABSTRACT

Body mass index (BMI), which is calculated using height and weight, is a rough indicator of body fat. This study aimed to investigate whether there is a significant correlation between nutritional knowledge and BMI among students at Novena University, Ogume, Nigeria. This study was done using a cross-sectional survey. Interviews were conducted with 50 participants from the sample, whose nutritional knowledge and weight status were assessed. The results showed that the students' BMI ranged from 15 to 39, with a mean and standard deviation of 23.93±5.46 cm. There was a positive correlation between the students' nutritional knowledge and their BMI. In conclusion, the majority of Novena University students are knowledgeable about obesity, which likely accounts for their low obesity prevalence rate.

**Keywords:** Nutritional value; anthropometry; body mass index; Nigeria

***Correspondence:** Okoro Ogheneyebrorue Godswill, Department of Human Anatomy, College of Basic Health Sciences, Achievers University, Owo, Nigeria. Email: thomasgodswill23@gmail.com, okoro.go@achievers.edu.ng

**Article history**
●Submitted 30 Nov 2022 ● Revised 21 Jan 2023 ● Accepted 15 Feb 2023 ● Published 10 Mar 2023

**How to cite:** Andrew UO, Godswill OO, Mamerhi ET, et al (2023). Nutritional knowledge and body mass index among students at Novena University, Ogume, Nigeria. Folia Medica Indonesiana, 59 (1), 14-19. https://doi.org/10.20473/fmi.v59i1.39977


**pISSN: 2355-8393, eISSN: 2599-056x**

**Highlights:**

1. Interviews were conducted on the correlation between nutritional knowledge and BMI among students at Novena University, Ogume, Nigeria.
2. Most of the students had adequate nutritional knowledge and a low obesity prevalence rate.

## INTRODUCTION

Obesity has emerged as the most common dietary problem around the globe, and Nigeria is no exception. It is becoming more prevalent among Nigerians. Being overweight or obese shortens life expectancy, particularly in younger age groups, and increases the risk of various diseases and health conditions (e.g., hypertension, gallstones, coronary heart disease, and diabetes) (Munir et al. 2016, Nugroho & Martini 2020, Putri et al. 2022, Lysandra et al. 2022). Several of the underlying causes include individual behaviors, environmental factors, heredity, and being overweight due to a long-term energy imbalance. A healthy weight can be maintained by eating a variety of foods, such as plenty of fruits, vegetables, and whole grains (Pereira et al. 2012, Zhou et al. 2017, World Health Organization 2022).

Body mass index (BMI) can be used to estimate a person's body fat by measuring their height and weight. It is calculated by dividing the body mass (kg) by the squared body height (m) (Valmórbida et al. 2017, Hammond et al. 2022). The World Health Organization (2000), as cited by Hruby & Hu (2015), considered BMI as the most widely employed indicator of adult nutritional status and the only parameter with comparable data that are typically available. People who have poor nutritional knowledge and attitudes frequently engage in inappropriate eating behaviors; therefore,

implementing educational intervention programs could improve their nutritional awareness (Ilori & Sanusi 2022, De Craemer et al. 2022). Hence, this study investigated whether there was a significant correlation between nutritional knowledge and BMI among students at Novena University, Ogume, Nigeria.

## MATERIALS AND METHODS

This study employed a multistage cluster sampling technique to collect data from 50 students, consisting of 27 males and 23 females. First-year, second-year, third-year, and fourth-year students participated in this study. The inclusion criteria were healthy subjects with no physical deformities. Students enrolled in part-time, post-diploma, and post-graduate programs at the institution were excluded from this study. The students' body weights were assessed using Hammond's formula for calculating body weight (Peterson et al. 2016). The classification of body mass according to the BMI formula is as follows: 18.5 indicates underweight, 18.5-24.9 indicates normal weight, 25.0-29.9 indicates overweight, 30.0-34.9 indicates class I obesity, 35.0-39.9 indicates class II obesity, and ≥40 indicates class III extreme obesity.

BMI was utilized because it is a recognized indicator of body weight status in anthropometry (Widjaja et al. 2019). The weight was determined using a calibrated electronic platform scale with an accuracy closest to 100 grams. On a long platform, the height was determined using a measuring tape. The participants stood with their heels together, arms to the side, legs straight, shoulders relaxed, and heads in the Frankfort horizontal plane as instructed by the researchers. The interview questions were developed around the sociodemographic information and nutritional awareness of the participants, which may include the most and least frequently consumed food groups, the servings of each food group, and nutritional knowledge on foods with high and low fat, sugar, and fiber contents. The questions about nutritional knowledge should be answered with “correct”, “incorrect”, and “I do not know”. The data were analyzed using the IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics were generated as well as the Pearson’s correlation coefficient.

## RESULTS

Among the respondents in this study, 27 (54%) were male students and 23 (46) were female students (Table 1). The respondents were selected from different levels of study, i.e., 13 (26%) first-year students, 11 (22%) second-year students, 10 (20%) third-year students, and 16 (32%) final-year students. The majority of the students resided in the university hostel and the remainder lived elsewhere.

Table 2 presents the eating practices and nutritional knowledge of the students. Half of the students (50%) ate twice a day, 15 (30%) ate three times a day, and 9 (18%) ate four times a day. Only one of them ate once a day. Of the students who skipped meals in a day, 35 (70%) skipped breakfast, 10 (20%) skipped lunch, and 5 (10%) skipped dinner. The students gained nutritional knowledge from various sources, i.e., 4 (8%) from their friends, 23 (46%) from the media, 9 (18%) from their parents, 12 (24%) from the school, while 2 (4%) from other sources apart from the ones listed.

Table 1. Socio-demographic data from 50 students at Novena University participated in this study.

| | Frequency | % |
|---|---|---|
| Gender | | |
| Male | 27 | 54 |
| Female | 23 | 46 |
| Educational status | | |
| 1st year | 13 | 26 |
| 2nd year | 11 | 22 |
| 3rd year | 10 | 20 |
| 4th year | 16 | 32 |
| Place of residence | | |
| University hostel | 37 | 74 |
| Privately rented apartment | 12 | 24 |
| Other | 1 | 2 |

On the food groups that should be consumed less to have good health, 13 (26%) students mentioned carbohydrates, 6 (12%) mentioned proteins, 5 (10%) mentioned vegetables and fruits, 22 (44%) mentioned fats and oils, while 4 (8%) said they did not know. When asked how many servings of fruits should be consumed daily, 11 (22%) students said one, 13 (26%) said two, 10 (20%) said three, 3 (6%) said four, and 13 (26%) did not know. They provided a similar response when asked about the servings of fruits and vegetables that should be consumed daily for optimal health.

On the food groups that should be consumed most to be healthy, 5 (10%) students mentioned carbohydrates, 9 (18%) mentioned proteins, 1 (2%) mentioned fats and oils, 28 (56%) mentioned vegetables and fruits, while 7 (14%) said that they did not know regarding the answer to the question. The researchers also sought to know the advice the students would give to someone trying to lose weight. Nineteen (38%) students said increasing activity level and reduce energy intake, 6 (12%) said

Table 2. Eating practice and nutritional knowledge of 50 students at Novena University participated in this study.

| Questions | Response | Frequency | % |
|---|---|---|---|
| 1. How many meals do you usually eat in a day? | One | 1 | 2.0 |
| | Two | 25 | 50.0 |
| | Three | 15 | 30.0 |
| | Four | 9 | 18.0 |
| 28. If you skip a meal, which meal is it usually? | Breakfast | 35 | 70.0 |
| | Lunch | 10 | 20.0 |
| | Dinner | 5 | 10.0 |
| 28. Where do you mostly get nutritional information? | Friends | 4 | 8.0 |
| | Media | 23 | 46.0 |
| | Parents | 9 | 18.0 |
| | School | 12 | 24.0 |
| | Others | 2 | 4.0 |
| 4. Which food group should you eat less according to your nutritional knowledge? | Carbohydrates | 13 | 26.0 |
| | Proteins | 6 | 12.0 |
| | Fats and oils | 22 | 44.0 |
| | Vegetables and fruits | 5 | 10.0 |
| | Do not know | 4 | 8.0 |
| 5. Which food group should you eat the most? | Carbohydrates | 5 | 10 |
| | Proteins | 9 | 18.0 |
| | Fats and oils | 1 | 2.0 |
| | Vegetables and fruits | 28 | 56.0 |
| | Do not know | 7 | 14.0 |
| 6. How many servings of fruits and vegetables should you have daily? | One serving per day | 11 | 22.0 |
| | Two servings per day | 13 | 26.0 |
| | Three servings per day | 10 | 20.0 |
| | Four servings per day | 3 | 6.0 |
| | Do not know | 13 | 26.0 |
| 7. What advice would you give to someone trying to lose weight? | Increasing activity level and reducing energy intake | 19 | 38.0 |
| | Eating more food containing highly processed carbohydrates | 6 | 12.0 |
| | Replacing fat-free foods with whole grains | 9 | 18.0 |
| | Fasting all time | 2 | 4.0 |
| | Do not know | 14 | 28.0 |

eating foods with highly processed carbohydrates, 9 (18%) said replacing fat-free foods with whole grains, while 14 (28%) had no advice to give.

As seen in Table 3, the minimum weight recorded for the students was 45 kg and the maximum was 95 kg. The mean was 67.1 kg. In terms of height, the tallest student was 201 cm and the shortest was 135 cm,while the mean height recorded was 167.9 cm. The BMI of the students ranged from 15 to 39, with amean and standard deviation of 23.93±5.46.

Table 3. Anthropometric data of 50 students at NovenaUniversity participated in this study.

| Parameters | Min. | Max. | Mean | Standard deviation |
|---|---|---|---|---|
| Weight | 45.00 | 95.00 | 67.10 | 14.57 |
| Height | 135.00 | 201.00 | 167.99 | 15.49 |
| BMI | 15.00 | 39.00 | 23.94 | 5.46 |

A cross-tabulation analysis was conducted to determine the potential relationship between nutrition knowledge and BMI using the designed questionnaire and the BMI of the students (Table 4). The Pearson's Chi-square critical value of 144.171 was bigger than the tabulated value, indicating a positive correlation between the students' nutritional knowledge and their BMI results. There was no significant difference between the students' nutritional knowledge and their BMI (P>0.005).

Table 4. Association between nutritional knowledge and BMI among students at Novena University.

| | Value | df | Asymptotic significance (2-sided) |
|---|---|---|---|
| Pearson's Chi-square | 144.171 | 140 | 0.387 |
| Likelihood ratio | 112.776 | 140 | 0.956 |
| N of valid cases | 50 | | |

Table 5 presents the frequency and percentage of the students' BMI. There were 14% underweight students, 52% normal-weight students, and 22%

overweight students. Of the obese students, 8% had class I obesity and 4% had class II obesity.

Table 5. Classification of Novena University students' body weights according to the BMI formula.

| BMI categories | Frequency | % |
|---|---|---|
| Underweight | 7 | 14 |
| Normal weight | 26 | 52 |
| Overweight | 11 | 22 |
| Class I obesity | 4 | 8 |
| Class II obesity | 2 | 4 |

## DISCUSSION

As noted by Ilori & Sanusi (2022), it is known that a high level of nutritional knowledge influences nutritional intake and eating practices. Similar to the BMI, anthropometric indices are one of the various parameters used in determining an individual's health status (Kearns et al. 2014). In addition to weight and height, the waist circumference may indicate a systemic inflammatory state in persons with obesity (Widjaja et al. 2019). Thus, the correlation between BMI and the nutritional knowledge of the studentswas examined.

The majority of the students resided in the university hostel and were therefore responsible for their daily meal preparation. It was a significant factor in their food selection and eating habits. Many students might also be frequent visitors to food vendors, where they purchased foods that would likely not satisfy them at a higher price than if they prepared it themselves. Thus, it was not surprising that half of the students ate only twice a day. The percentage of students in this study who consumed three meals a day was lower than the percentage recorded by (van den Berg et al. 2012). This study also revealed that breakfast was the most frequently skipped meal. It is linear with a study by Shimokawa (2013), who reported that the majority of Japanese university students ate three meals a day but frequently skipped breakfast. Another study by Sila et al. (2019) found that university students in Croatia frequently skipped breakfast.

The majority of the students in this study acquired nutritional knowledge from the media. This result is consistent with the findings of a study by Roemling & Qaim (2012) that the media is the primary source of nutritional knowledge for the population studied. In contrast, Chen et al. (2018) discovered that 46% of college students gained the majority of their nutritional knowledge from lectures. The sample size of the study, as well as the fact that media exposure and amount of time spent in front of television among the respondents can influence the amount and type of food consumed, may be the factors contributing to the discrepancy in the results (Teixeira et al. 2016, Chen et al. 2018).

The majority of the students identified carbohydrates, fats, and oils as the food groups that should be consumed less in order to maintain good health, whichare the correct answers. In contrast, when asked about the food groups that should be most frequently consumed, the majority of the students identified vegetables and fruits, while only a few did not know. This indicated that the majority of the students had a solid understanding of nutrition in relation to the food groups that should be consumed the most.

This study discovered that nutritional knowledge was positively correlated with BMI. This finding corresponds with the number of students who correctly identified the food groups to consume less or more of. The majority of the students were unaware ofthe daily serving recommendations for fruits and vegetables groups. Consequently, despite the fact that more than half of the students were of normal weight, some were overweight and obese. Those who knew what to eat according to the nutritional recommendation were more likely to maintain a healthy weight.

### Strength and limitations

This study provides an insight of the correlation between nutritional knowledge and BMI. The findings of this study can help clinicians be aware that a healthy diet is vital, but so is nutritional knowledge. However, this study also has its limitations because the sample size is small compared to other studies andthe study population was not very diverse.

## CONCLUSION

A high level of nutritional knowledge has an influence on dietary intake or eating practices. This affected the BMI and the onset of obesity among students at Novena University, Ogume, Nigeria. This study provides valuable justification for developing public policies to educate individuals about healthy eating habits and self-care in order to prevent the onset of obesity.

### Acknowledgment

The authors sincerely appreciate the students, as well as the University Management of Novena University, Ogume, Nigeria, for providing a conduciveenvironment for this research.

**Conflict of interest**

None.

**Ethical consideration**

The Ethical and Research Committee of the Department of Anatomy, Novena University, Ogume, Nigeria, granted the ethical clearance for this study with the ethical code Novena/CHS/ANA/69/16 on 16/03/2020.

**Funding disclosure**

None.

**Author contribution**

UOA proofread the manuscript. OOG analyzed the data. ETM proofread the manuscript. DB collected the research data.

**REFERENCES**

Chen YT, Ahmad SR, Soo Quee DK (2018). Dietary habits and lifestyle practices among University Students in Universiti Brunei Darussalam. Malaysian Journal of Medical Sciences 25, 56–66. doi:10.21315/mjms2018.25.3.6.

De Craemer M, Van Stappen V, Brondeel R, et al (2022). Self-reported lifestyle behaviours in families with an increased risk for type 2 diabetes across six European countries: a cross-sectional analysis from the Feel4Diabetes-study. BMC Endocrine Disorders 22, 213. doi: 10.1186/s12902-022-01115-2.

Hammond LD, Farrington AP, Sivan M (2022). Verificationof the integrative model of adjustment to chronic conditions by mapping it onto the World Health Organization's international classification of function, disability and health. Rehabillitation Process and Outcome 11, 117957272211268. doi:10.1177/11795727221126891.

Hruby A, Hu FB (2015). The epidemiology of obesity: A big picture. Pharmacoeconomics 33, 673–89. doi: 10.1007/s40273-014-0243-x.

Ilori T, Sanusi R (2022). Nutrition-related knowledge, practice, and weight status of patients with chronic diseases attending a district hospital in Nigeria. Journal of Family Medicine and Primary Care 11, 1428. doi: 10.4103/jfmpc.jfmpc_607_21.

Kearns K, Dee A, Fitzgerald AP, et al (2014). Chronic disease burden associated with overweight and obesity in Ireland: the effects of a small BMI reduction at population level. BMC Public Health 14, 143. doi: 10.1186/1471-2458-14-143.

Lysandra AZ, Wairooy NAP, Ifadha RT, et al. (2022). Risk factor of dietary habit with cholelithiasis. Journal of Community Medicine and Public Health Res 3, 1–11. doi: 10.20473/jcmphr.v3i1.27931.

Munir M, Sutjahjo A, Sustini F (2016). Profile of type II diabetes mellitus with central obesity in Dr. Soetomo Hospital. Folia Medica Indonesiana 51, 177. doi: 10.20473/fmi.v51i3.2831.

Nugroho AS, Martini S (2020). The correlation betweenobesity and hypertension in young adults in Central Java, Indonesia. EurAsian Journal of Biosciences 14, 1645–50 [Journal].

Pereira DA, Costa NM da SC, Sousa ALL, et al (2012). The effect of educational intervention on the disease knowledge of diabetes mellitus patients. Revista Latino- Americana de Enfermagem 20, 478–85. doi: 10.1590/S0104-11692012000300008.

Peterson CM, Thomas DM, Blackburn GL, et al. (2016). Universal equation for estimating ideal body weight and body weight at any BMI. The American Journal of Clinical Nutrition 103, 1197–203. doi:10.3945/ajcn.115.121178.

Putri ESM, Soelistijo SA, Budiarto M (2022). Risk factorsof coronary heart disease in patients with type 2 diabetes mellitus. Majalah Biomorfologi 32, 13. doi: 10.20473/mbiom.v32i1.2022.13-17.

Roemling C, Qaim M (2012). Obesity trends and determinants in Indonesia. Appetite 58, 1005–13. doi: 10.1016/j.appet.2012.02.053.

Shimokawa S (2013). When does dietary knowledge matter to obesity and overweight prevention? Food Policy 38, 35–46. doi: 10.1016/j.foodpol.2012.09.001.

Sila S, Ilić A, Mišigoj-Duraković M, et al (2019). Obesity inadolescents who skip breakfast is not associated with physical activity. Nutrients 11, 2511. doi: 10.3390/nu11102511.

Teixeira J de F, Goulart MR, Busnello FM, et al (2016). Hypertensives' knowledge about high-sodium foods and their behavior. Arquivos Brasileiros Cardiologia. doi: 10.5935/abc.20160049.

van den Berg VL, Okeyo AP, Dannhauser A, et al. (2012). Body weight, eating practices and nutritional knowledge amongst university nursing students, Eastern Cape, South Africa. African Journal of Primary Health Care & Family Medicine. doi: 10.4102/phcfm.v4i1.323.

Valmórbida JL, Goulart MR, Busnello FM, et al. (2017). Nutritional knowledge and body mass index: A cross- sectional study. Revista da Associacao Medica Brasileira 63, 736–40. doi: 10.1590/1806-9282.63.09.736.

Widjaja NA, Irawan R, Hanindita MH, et al. (2019). Anthropometric measurements and inflammatory biomarkers in obese adolescents. Carpathian Journal of Food Science and Technology 87–93. doi: 10.34302/crpjfst/2019.11.5.13.

World Health Organization (2022). Non-communicable diseases. WHO. [Web Page]

Zhou L, Zeng Q, Jin S, et al. (2017). The impact of changes in dietary knowledge on adult overweight and obesity in China ed. Zhang H. PLoS One 12, e0179551. doi: 10.1371/journal.pone.0179551.