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Prevalence of Overweight and Obesity Among Allied Health Sciences Students: A Cross-Sectional Study

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Research Article

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Abstract

Background:

Obesity is a growing global public health concern characterized by excessive body fat accumulation that increases the risk of several non-communicable diseases such as cardiovascular diseases, diabetes mellitus, hypertension, and certain cancers. Sedentary lifestyle, unhealthy dietary patterns, and reduced physical activity have contributed to the rising prevalence of obesity among young adults. Assessing obesity among Allied Health Sciences students is particularly important as they represent future healthcare professionals responsible for promoting healthy lifestyle behaviors.

Objective:

To assess the prevalence of overweight and obesity among Allied Health Sciences students of Dehradun, Uttarakhand, India.

Methods:

A cross-sectional study was conducted among Allied Health Sciences students. Out of 150 eligible students, 141 participated in the study. Data were collected using a pretested structured questionnaire along with anthropometric measurements including height, weight, and Body Mass Index (BMI). Descriptive statistics were used to determine the prevalence of underweight, overweight, and obesity, and to examine their distribution in relation to demographic characteristics, dietary habits, and physical activity.

Results:

Among the 141 participants, 35 (24.82%) were males and 106 (75.18%) were females. The mean age of male and female students was 20.62 and 20.45 years, respectively. The prevalence of overweight and obesity was 6.38% (n = 9) and 2.83% (n = 4), respectively, while 25.53% (n = 36) of students were underweight. The mean BMI among males was 20.74 kg/m² and among females was 20.52 kg/m². Higher prevalence of overweight and obesity was observed among students belonging to the OBC category and among those from rural areas with lower levels of physical activity.

Conclusion:

The findings indicate the presence of overweight and obesity among Allied Health Sciences students, highlighting emerging lifestyle-related health concerns in this population. Awareness programs and

promotion of healthy dietary habits and regular physical activity are recommended to prevent obesity among healthcare students.

INTRODUCTION

Obesity is a complex and multifactorial disease characterized by excessive accumulation of body fat that poses a significant risk to health. It is no longer considered merely a cosmetic concern but a major medical condition associated with increased morbidity and mortality. Obesity is strongly linked with several chronic diseases, including cardiovascular diseases, type 2 diabetes mellitus, hypertension, dyslipidemia, and certain types of cancers[1]. The condition results from an imbalance between energy intake and energy expenditure, often influenced by genetic, physiological, behavioral, and environmental factors[2].

Body Mass Index (BMI) is widely used as a simple and reliable indicator to classify overweight and obesity in adults. According to the World Health Organization (WHO), individuals with a BMI of 25 kg/m² or greater are considered overweight, while those with a BMI of 30 kg/m² or greater are classified as obese[3]. Excessive body fat accumulation increases the risk of several metabolic and cardiovascular complications, thereby making obesity one of the most important public health challenges worldwide[4].

Rapid urbanization, technological advancements, and changes in lifestyle have significantly contributed to the increasing prevalence of obesity. Modern lifestyles are characterized by reduced physical activity, increased reliance on motorized transport, sedentary occupations, and consumption of energy-dense foods. Such lifestyle modifications have led to a decline in routine physical activity, thereby increasing the risk of overweight and obesity among young adults and students[5]. In addition, the increasing dependence on technology and convenience-oriented living has reduced opportunities for physical exertion in daily life.

According to global estimates by the World Health Organization, the prevalence of obesity has risen dramatically in recent decades. In 2016, more than 1.9 billion adults aged 18 years and above were overweight, of which over 650 million were obese. Approximately 39% of adults were overweight and about 13% were obese worldwide[6]. The global prevalence of obesity has nearly tripled between 1975 and 2016, highlighting the magnitude of this public health problem.

Childhood and adolescent obesity have also shown a substantial increase globally. In 2019, approximately 38.2 million children under five years of age were overweight or obese. Furthermore, more than 340 million children and adolescents aged 5–19 years were overweight or obese in 2016. The prevalence in this age group increased dramatically from 4% in 1975 to over 18% in 2016[7]. Once considered a problem of high-income countries, overweight and obesity are now rapidly increasing in low- and middle-income countries, particularly in urban populations.

Overweight and obesity are currently associated with more deaths worldwide than underweight, emphasizing the growing burden of this condition on global health systems[8]. Early identification of

obesity and associated risk factors among young adults, particularly students in healthcare-related fields, is essential for developing effective preventive strategies. Therefore, assessing the prevalence of obesity among Allied Health Sciences students is important, as they represent future healthcare professionals who can play a vital role in promoting healthy lifestyle practices within the community.

METHADOLOGY

Study Design and Setting

A cross-sectional observational study was conducted among undergraduate Allied Health Sciences students at Dehradun, Uttarakhand, India. The study was carried out over a period of three months from January to March 2026. Ethical approval for the study was obtained from the Institutional Ethics Committee prior to the commencement of the research. Written informed consent was obtained from all participants before their inclusion in the study.

Study Population and Sampling

The study population comprised undergraduate students enrolled in Allied Health Sciences courses. A total of 150 students were eligible for participation, out of which 141 students consented and were included in the study. Participants were selected using systematic random sampling. Students from all four academic years (1st to 4th year) who were present on the day of data collection were considered for inclusion. Efforts were made to ensure representation of both male and female students from each academic year.

Sample Size Calculation

The sample size was determined based on the available population of undergraduate Allied Health Sciences students enrolled in the institution during the study period. Considering the total eligible population of 150 students, all students were approached to participate in the study. A final sample of 141 students who provided consent and were available at the time of data collection was included for analysis.

Inclusion Criteria

- Undergraduate Allied Health Sciences students enrolled in the institution.
- Students present at the time of data collection.
- Students who voluntarily agreed to participate and provided written informed consent.

Exclusion Criteria

- Students who were absent during the data collection period.
- Students who declined to provide consent for participation.
- Students with incomplete questionnaire responses or missing anthropometric data.

Data Collection Tool

Data were collected using a pretested semi-structured questionnaire. The questionnaire included sections related to demographic information, lifestyle characteristics, dietary habits, and physical activity patterns during a typical week. The instrument was pilot-tested before the study to ensure clarity, relevance, and reliability of the questions.

Anthropometric Measurements

Anthropometric measurements were recorded following standard measurement procedures. Body weight was measured using a calibrated digital weighing scale, while height was measured using a stadiometer. The weighing machine was checked for zero error before the start of data collection and recalibrated, if required, after every tenth measurement to maintain accuracy.

Body Mass Index (BMI) was calculated using the standard formula:

BMI = Weight (kg) / Height (m^2)

Participants were categorized according to the World Health Organization BMI classification.

Operational Definitions

Body Mass Index (BMI):

BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

BMI Categories (WHO Classification):

- Underweight: BMI < 18.5 kg/m^2
- Normal weight: BMI 18.5–24.9 kg/m^2
- Overweight: BMI 25.0–29.9 kg/m^2
- Obesity: BMI ≥ 30 kg/m^2

Dietary Habit:

Participants consuming non-vegetarian food three or more times per week were categorized as non-vegetarians, whereas those consuming it less frequently or not at all were categorized as vegetarians.

Physical Activity:

Students performing physical activity for less than 60 minutes per week were categorized as non-performers, while those engaging in physical activity for more than 60 minutes per week were categorized as performers.

Data Management and Quality Control

All collected data were checked for completeness and consistency before entry into the database. Data were coded and entered into a spreadsheet for analysis. Anthropometric measurements were taken using standardized equipment and procedures to minimize measurement error. Periodic calibration of the weighing scale and verification of measurement accuracy were performed during the data collection process.

Statistical Analysis

The collected data were compiled, coded, and analyzed using appropriate statistical methods. Descriptive statistics such as frequencies, percentages, and mean values were calculated to summarize the data. The Chi-square test was applied to assess the association between obesity and selected demographic and lifestyle variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Participant Characteristics

A total of 141 undergraduate Allied Health Sciences students participated in the study, with ages ranging from 17 to 25 years. Among the participants, 35 (24.82%) were males and 106 (75.18%) were females. The mean age of male students was 20.62 years, while the mean age of female students was 20.45 years, with an overall mean age of 20.49 years.

The largest proportion of participants belonged to the 21-year age group (21.99%), followed by 19 years (17.02%) and 18 years (16.31%).

Table 1
WHO classification of Body Mass Index (BMI)

BMI (kg/m²)	Classification
< 18.5	Underweight
18.5–24.9	Normal
25–29.9	Overweight
≥ 30	Obese

Prevalence of Underweight, Overweight and Obesity

Based on WHO BMI classification, 91 students (65.24%) had normal BMI, while 36 (25.53%) were underweight, 9 (6.38%) were overweight, and 4 (2.83%) were obese.

The mean BMI among male students was 20.74 kg/m², while the mean BMI among female students was 20.52 kg/m².

Table 2
Gender-wise distribution of BMI categories (n = 141)

BMI Category	Male (n = 35)	Female (n = 106)	Total	%
Underweight	9	27	36	25.53
Normal	21	71	91	65.24
Overweight	4	5	9	6.38
Obese	1	3	4	2.83

A Chi-square test was performed to examine the association between gender and BMI category. The analysis indicated no statistically significant association between gender and BMI classification ($\chi^2 = 1.87$, $p = 0.60$).

Distribution of BMI by Social Category

When BMI distribution was examined across social categories, the OBC group demonstrated a relatively higher prevalence of overweight and obesity compared to UR, SC, and ST groups.

Table 3
BMI distribution according to social category

Category	Underweight	Normal	Overweight	Obese	Total
UR (n = 37)	7	26	3	1	37
OBC (n = 79)	23	50	4	2	79
SC (n = 21)	6	11	3	1	21
ST (n = 4)	0	4	0	0	4

However, the association between **social category and BMI classification was not statistically significant ($\chi^2 = 5.12$, $p = 0.74$)**.

Distribution of BMI by Religion

Religion-wise analysis revealed that all obese participants belonged to the Hindu group, accounting for 3.44% of the total participants.

Table 4
BMI distribution according to religion

Religion	Underweight	Normal	Overweight	Obese	Total
Hindu	28	75	9	4	116
Muslim	5	11	1	0	17
Sikh	1	1	0	0	2
Christian	2	4	0	0	6

No statistically significant association was observed between **religion and BMI category ($\chi^2 = 4.06$, $p = 0.67$)**.

Association of BMI with Lifestyle Factors

Lifestyle-related factors such as place of origin, dietary habits, and physical activity were analyzed to determine their association with BMI.

The mean BMI among rural students was 20.90 kg/m², while the mean BMI among urban students was 20.22 kg/m².

Table 5
BMI distribution according to lifestyle characteristics

Variable	Underweight	Normal	Overweight	Obese	Total
Rural (n = 73)	16	51	3	3	73
Urban (n = 68)	20	40	6	1	68
Vegetarian (n = 51)	14	32	3	2	51
Non-vegetarian (n = 90)	22	59	6	2	90
Physically active (n = 109)	27	71	8	2	109
Physically inactive (n = 32)	9	20	2	2	32

Students with **lower levels of physical activity showed a relatively higher proportion of obesity (6.25%)**, although the association between **physical activity and BMI was not statistically significant ($\chi^2 = 3.41$, $p = 0.33$)**.

Graphical Representation of BMI Distribution

Three graphical representations were generated to visualize the study findings:

Overall BMI Distribution Chart – showing the proportion of underweight, normal, overweight, and obese participants.

BMI Distribution by Gender – comparing BMI categories between male and female participants.

BMI Distribution by Place of Origin – illustrating differences between rural and urban students.

The graphical analysis further confirmed that **the majority of participants had normal BMI**, while **a smaller proportion fell into overweight and obese categories**.

DISCUSSION

The present cross-sectional study assessed the prevalence of overweight and obesity among undergraduate Nursing and Allied Health Sciences students. The findings revealed that **65.24% of the participants had normal BMI**, while **25.53% were underweight, 6.38% were overweight, and 2.83% were obese**. Although the overall prevalence of obesity was relatively low, the presence of overweight and obesity among healthcare students is noteworthy, as these individuals are expected to promote healthy lifestyle behaviors within the community.

Obesity has emerged as one of the most significant global public health challenges. According to global estimates, the prevalence of overweight and obesity has increased dramatically over the past few decades due to rapid urbanization, sedentary lifestyles, and changes in dietary patterns[9]. The World Health Organization reports that the global prevalence of obesity has nearly tripled since 1975, highlighting the growing burden of lifestyle-related diseases[10]. In this context, early detection of overweight and obesity among young adults is essential for preventing future health complications.

In the present study, the prevalence of overweight (6.38%) and obesity (2.83%) was lower compared to several studies conducted among university students in other regions of India and globally. For instance, a study among medical students in South India reported overweight and obesity prevalence rates of 15.6% and 6.3%, respectively[11]. Similarly, research conducted among healthcare students in North India reported that approximately 20% of participants were overweight or obese[12]. The comparatively lower prevalence observed in the present study may be attributed to differences in lifestyle patterns, physical activity levels, and dietary habits among the study population.

A notable finding of the study was the relatively high prevalence of **underweight (25.53%)** among students. This observation is consistent with previous studies conducted among young adults in India, where undernutrition remains prevalent despite increasing rates of overweight and obesity[13]. The coexistence of undernutrition and overnutrition reflects the concept of the **"double burden of malnutrition,"** which is increasingly recognized in developing countries undergoing rapid nutritional transition[14].

Gender-wise analysis revealed that the prevalence of overweight and obesity was slightly higher among female students compared to male students, although the association between gender and BMI classification was not statistically significant. Similar findings have been reported in several studies among university students where gender differences in BMI distribution were minimal[15]. However, some

studies have demonstrated a higher prevalence of obesity among males due to greater consumption of high-calorie diets and sedentary behaviors[16]. These variations may be influenced by cultural, behavioral, and socioeconomic factors.

The present study also examined BMI distribution across different social categories. The findings suggested that the prevalence of overweight and obesity was relatively higher among students belonging to the **Other Backward Classes (OBC)** compared to other categories. Although the association was not statistically significant, similar trends have been reported in studies investigating socioeconomic determinants of obesity. Socioeconomic status has been recognized as an important factor influencing dietary habits, access to healthcare, and lifestyle behaviors[17].

Religion-wise distribution indicated that all obese participants in the present study belonged to the Hindu group. However, this observation should be interpreted with caution because the majority of the participants belonged to this religious group, which may have influenced the distribution pattern. Previous studies have suggested that cultural practices and dietary patterns associated with religious beliefs may influence nutritional status and obesity prevalence[18].

Lifestyle factors such as **place of origin, dietary habits, and physical activity** were also evaluated in the present study. The average BMI was slightly higher among students from rural areas compared to urban students. Although urbanization is often associated with higher obesity prevalence due to sedentary lifestyles and increased availability of processed foods, recent evidence suggests that obesity is increasingly affecting rural populations as well[19]. The transition in dietary patterns and reduced physical activity in rural communities may contribute to this trend.

Dietary habits were also explored in the present study. Students who consumed non-vegetarian diets demonstrated a slightly higher prevalence of overweight compared to vegetarian students. However, the relationship between dietary pattern and BMI was not statistically significant. Previous research has indicated that dietary composition, portion size, and frequency of consumption play a more important role in determining body weight than the simple classification of vegetarian versus non-vegetarian diets[20].

Physical activity is widely recognized as one of the most important determinants of body weight and metabolic health. In the present study, students with lower levels of physical activity showed a relatively higher prevalence of obesity compared to those who were physically active. This finding is consistent with several studies demonstrating that regular physical activity plays a crucial role in maintaining healthy body weight and preventing obesity[21]. Sedentary behaviors such as prolonged screen time, increased use of digital devices, and reduced participation in sports have been identified as major contributors to obesity among young adults[22].

The findings of the present study highlight the importance of promoting healthy lifestyle behaviors among healthcare students. As future healthcare professionals, Allied Health Sciences and nursing

students have an important role in educating the community about preventive health practices. Improving awareness regarding balanced nutrition, regular physical activity, and healthy lifestyle choices during the early stages of adulthood can significantly reduce the risk of obesity and associated chronic diseases[23].

Despite providing valuable insights, the present study has certain limitations. First, the cross-sectional design limits the ability to establish causal relationships between lifestyle factors and obesity. Second, the study was conducted in a single institution with a relatively small sample size, which may limit the generalizability of the findings. Third, lifestyle factors such as dietary intake and physical activity were assessed through self-reported questionnaires, which may be subject to recall bias. Future studies with larger sample sizes and multicenter designs are recommended to provide a more comprehensive understanding of obesity patterns among healthcare students.

Overall, the findings of the present study indicate that although the prevalence of obesity among Allied Health Sciences students was relatively low, a considerable proportion of students were either underweight or overweight. These results emphasize the need for **institution-based health promotion programs**, including nutrition education, physical activity initiatives, and regular health screening. Such interventions can help in preventing obesity and improving the overall health status of students, thereby contributing to the development of a healthier future healthcare workforce.

CONCLUSION

The present study assessed the prevalence of overweight and obesity among undergraduate Nursing and Paramedical students and found that the majority of participants had a normal Body Mass Index (BMI). However, a considerable proportion of students were either underweight or overweight, indicating the presence of nutritional imbalance among healthcare students. The prevalence of overweight (6.38%) and obesity (2.83%) observed in this study, although relatively low, highlights the emerging risk of lifestyle-related health conditions among young adults. The study also identified associations between BMI and factors such as place of origin, dietary habits, and physical activity levels.

These findings emphasize the importance of early identification and preventive strategies targeting lifestyle modification among students pursuing healthcare professions. Since paramedical and nursing students are future healthcare providers, maintaining optimal health status among them is essential not only for their personal well-being but also for their role in promoting healthy behaviors within the community.

STRENGTHS OF THE STUDY

The present study has several strengths. First, it provides valuable baseline information regarding the prevalence of overweight and obesity among paramedical and nursing students in a higher education institution. Second, the study utilized **direct anthropometric measurements**, including height and weight, rather than relying solely on self-reported data, thereby improving measurement accuracy. Third, the

study explored multiple determinants of BMI, including demographic factors, dietary habits, physical activity, and place of origin, allowing for a broader understanding of lifestyle influences on nutritional status. Additionally, the inclusion of students from different academic years enhanced the representativeness of the study population.

LIMITATIONS

Despite its contributions, the study has several limitations. The **cross-sectional design** restricts the ability to establish causal relationships between lifestyle factors and obesity. The study was conducted in a **single institution with a relatively small sample size**, which may limit the generalizability of the findings to other student populations or geographic regions. Furthermore, certain lifestyle variables such as dietary intake and physical activity were assessed using **self-reported questionnaires**, which may be subject to recall bias or reporting bias. In addition, other potential determinants of obesity, such as socioeconomic status, sleep patterns, stress levels, and detailed dietary composition, were not explored in this study.

Future research should consider **multicenter longitudinal studies with larger sample sizes** to better understand the determinants and progression of overweight and obesity among healthcare students.

IMPLICATIONS FOR PRACTICE AND PUBLIC HEALTH

The findings of this study have important implications for both **student health promotion and public health policy**. Educational institutions should prioritize the implementation of **campus-based health promotion programs** that encourage regular physical activity, balanced dietary practices, and awareness regarding the prevention of obesity and related non-communicable diseases. Integrating **nutrition education and lifestyle counseling** into the academic curriculum for healthcare students may further enhance their knowledge and encourage the adoption of healthier behaviors.

In addition, institutions may consider establishing **regular health screening programs**, including BMI monitoring and lifestyle assessments, to identify students at risk of nutritional imbalance. Promoting a supportive environment that facilitates physical activity, such as access to sports facilities and structured fitness programs, can also contribute to improved health outcomes among students.

From a broader public health perspective, strengthening preventive strategies targeting young adults is essential to curb the rising burden of obesity and associated chronic diseases. Healthcare students, as future health professionals, can play a critical role in disseminating evidence-based health education and promoting healthy lifestyles within the community.

Declarations

Ethics Approval and Consent to Participate

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval for the study was obtained from the Institutional Ethics Committee of Uttaranchal P.G. College of Biomedical Sciences and Hospital, Dehradun, Uttarakhand, India. Written informed consent was obtained from all participants prior to their inclusion in the study.

Consent for Publication

Not applicable. The manuscript does not contain any individual person's data in any form.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

Dr. Jaishree Tiwari conceptualized the study, supervised the research work, and contributed to data interpretation.
Dr. Vikas Tiwari participated in study design, data analysis, manuscript preparation, and critical revision of the manuscript.
All authors read and approved the final manuscript.

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Figures

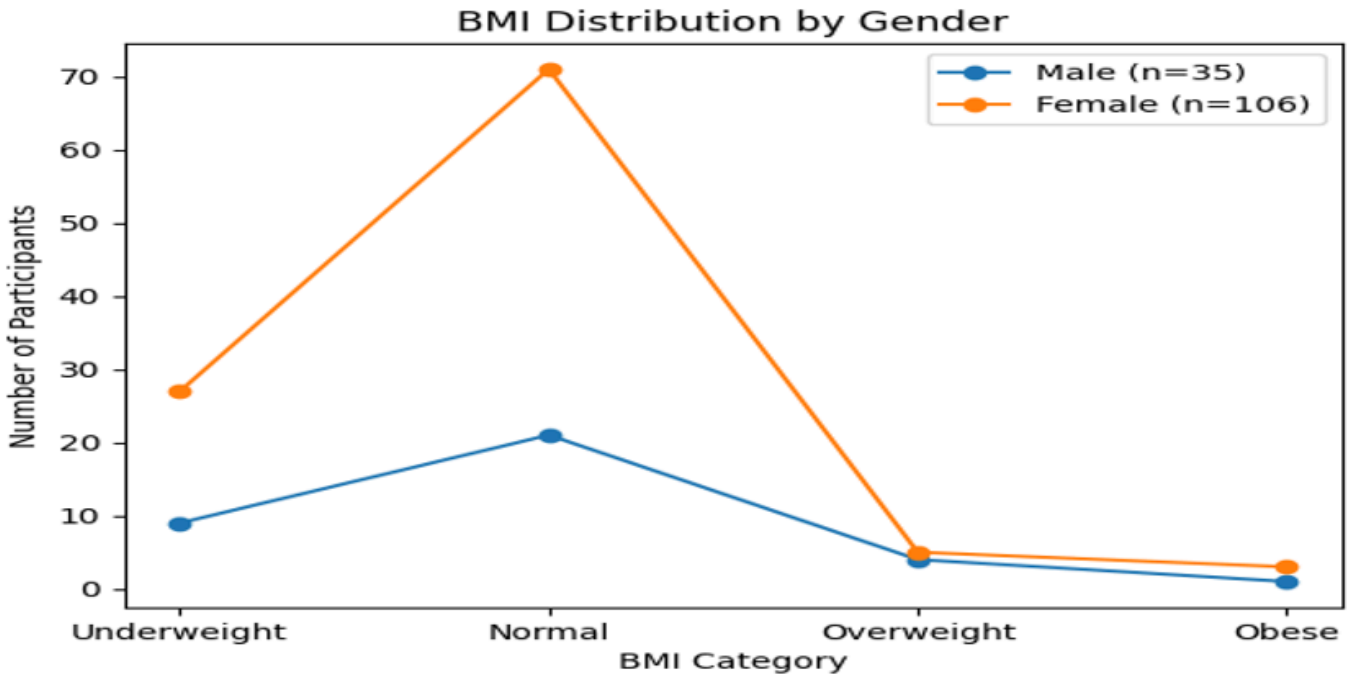


Figure 1

Gender-wise comparison of BMI categories among male and female Allied Health Sciences students.

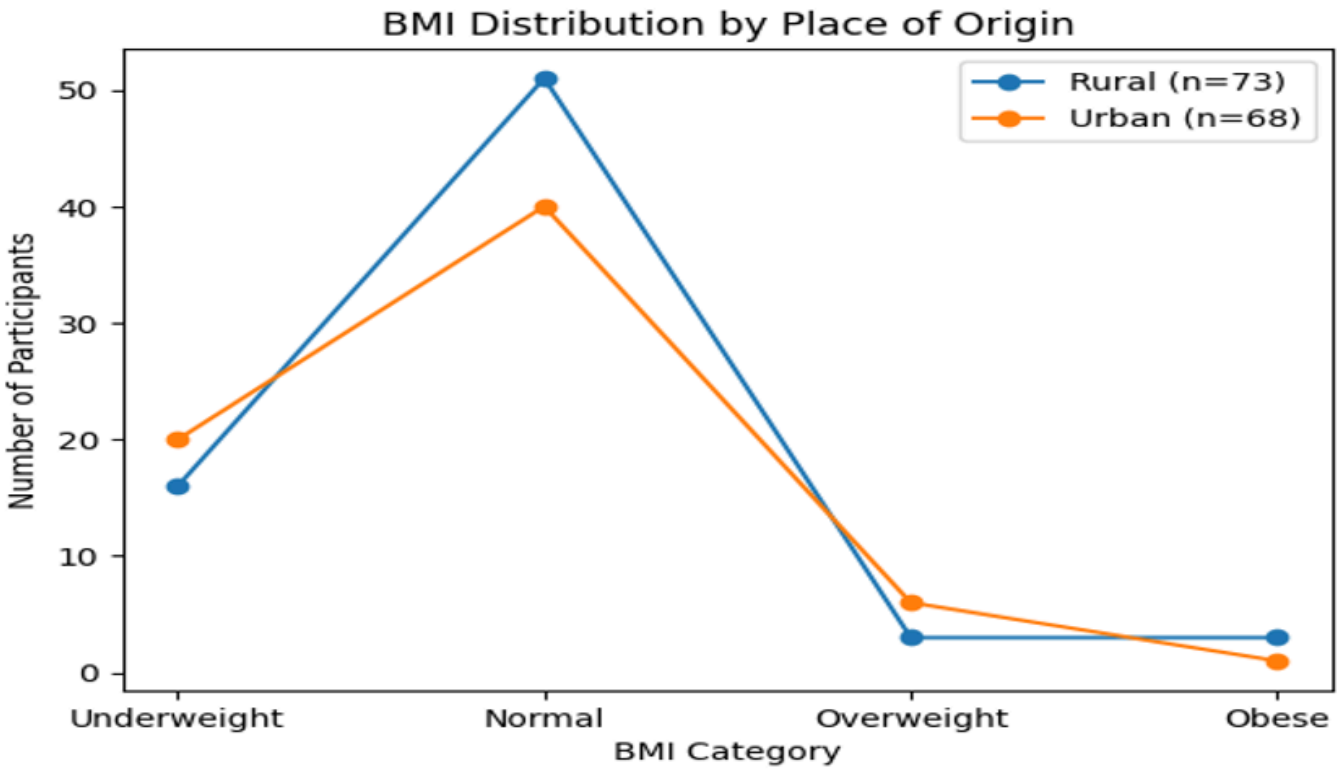


Figure 2

Distribution of BMI categories according to place of origin (rural vs. urban).