



Gender-Specific Variations in BMI Status of Students' Social Networking Site Usage: A Comprehensive Statistical Analysis

Deepak Kumar Behera¹, Rajendra Gartia²

Research Scholar, School of Statistics, Gangadhar Meher University, Amruta Vihar, Sambalpur- 768004, Odisha, India. | dkbehera4@gmail.com¹

Assistant Professor, School of Statistics, Gangadhar Meher University, Amruta Vihar, Sambalpur- 768004, Odisha, India. | rajendra.gartia@gmail.com²

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Abstract

The present study investigates the association between gender and body mass index (BMI) status through a comprehensive statistical analysis. A diverse sample of participants was utilized to examine the prevalence and distribution of different BMI categories among males and females. Statistical techniques, including crosstabulation, chi-square tests, and correlation analysis, were employed to analyze the data and determine the significance of the relationship. The results of the analysis revealed distinct gender-specific variations in BMI status. Among females, the majority fell into the normal weight category ($n=89$, 49.0%), while males showed a higher prevalence of overweight ($n=32$, 21.5%). The crosstabulation table further demonstrated the distribution of participants across gender and BMI status categories, providing valuable insights into the prevalence of specific BMI statuses among males and females. The chi-square tests confirmed a significant association between gender and BMI status ($p < 0.001$), indicating that gender significantly influenced the likelihood of being in specific BMI categories. This finding emphasizes the importance of considering gender-specific factors in understanding and addressing BMI-related health disparities. The correlation analysis revealed a moderate positive association between gender and BMI status ($r=0.205$, $p < 0.001$), indicating that as gender changed from female to male, there was a tendency for BMI status to shift from lower categories to higher categories.

Keywords: Body Mass Index (BMI), Social Networking Site, Gender, Prevalence, Statistical Analysis.

Introduction

Social networking site (SNS) usage has become a ubiquitous aspect of modern life, providing individuals with online platforms to build social networks and personal relationships with others who share common interests, connections, or lifestyles. In recent years, researchers have shown increasing interest in understanding the impact of SNS usage on various health-related behaviours, including exercise patterns and nutritional status. One area of focus has been to examine the relationship between SNS usage and body mass index (BMI) status, with an emphasis on gender-specific variations.

Sarfo et al. (2013) conducted a study using a social marketing approach to explore the time spent on SNS and its effects on exercise rates and nutritional status. Interestingly, their findings revealed that the impact of SNS usage on exercise patterns differs between male and female high-SNS users. Male high SNS users generally exhibited better exercise rates, whereas female high SNS users experienced the opposite effect, indicating a complex relationship between SNS usage and exercise patterns that are influenced by gender.

Furthermore, in the study by Sarfo et al. (2013), it was observed that gender-specific variations extend to the association between SNS usage and BMI status. Males with a high SNS user rate for entertainment or leisure tended to have a lower mean BMI, while females with a high SNS user rate for entertainment or leisure showed a higher mean BMI. These results underscore the importance of considering gender as a relevant factor when examining the impact of SNS usage on BMI status.

Building on this research, Sampasa-Kanyinga et al. (2020) delved deeper into the association between social media use and BMI z-scores, with a specific focus on the mediating role of sleep duration among men. They found that sleep duration mediated the link between social media use and BMI z-scores in men. Notably, heavy social media use (>2 hours/day) was associated with higher BMI z-scores among males, with a weaker association observed among females after accounting for various factors.

Taken together, these studies highlight the gender-specific nature of the relationship between SNS usage, exercise patterns, and nutritional status. Males with high SNS usage tend to exhibit better exercise rates and lower BMI, while females may experience a different effect. The mediating role of sleep duration in the association between social media use and BMI z-scores among men further emphasizes the need to consider gender-specific factors in understanding the impact of SNS on health-related behaviours.

In light of the findings from previous research, the present study aims to investigate the impact of SNS usage on students' BMI status (World Health Organization, 2020), with a specific focus on gender-specific variations. SNSs have become integral to the lives of students, and their usage has raised concerns about potential negative effects on academic performance. Addressing excessive SNS use is crucial, and the study advocates striking a balance between SNS usage and academic pursuits to prevent adverse effects on academic performance Behera and Gartia (2023).

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Recent research has demonstrated that SNS usage has gender-specific effects on exercise rates and nutritional status. Understanding these gender differences is essential for developing targeted interventions to promote healthy behaviours and academic performance among students. By considering gender-specific variations in the impact of SNS usage on BMI status and exercise patterns, researchers can devise tailored approaches to address the potential health implications of SNS usage in a comprehensive manner.

Literature Review

The existing literature on social media usage among university students indicates a complex interplay of gender-specific behaviours and their association with various aspects of well-being, including body mass index (BMI) status.

In terms of gender differences in social media usage, previous studies have reported mixed findings. Some studies have found that male students tend to use social media more frequently than females (Hashim, 2022; Manimannan, 2014; Afroz & Lima, 2017), while others have observed the opposite pattern (Wiese et al., 2014; Inchiparamban & Pingle, 2016). Despite these disparities, most studies agree on distinct gender-specific behaviours concerning social media usage. Specifically, male students are more engaged in forming new relationships and participating in gaming activities on social media (Muscanell & Guadagno, 2012; Manimannan et al., 2014). On the other hand, female students tend to use social media more for maintaining existing relationships (Muscanell & Guadagno, 2012; Wiese et al., 2014) and demonstrate greater concern for privacy on these platforms (Wiese et al., 2014).

Moreover, a connection between students' BMI status and social media usage has been identified in the literature. Students with higher BMIs are more likely to spend extended periods on social media platforms (Haddadian & Coccia, 2019), while those with normal BMIs tend to use a broader range of social media platforms (Haddadian & Coccia, 2019). However, the specific activities conducted on social media do not appear to be significantly influenced by BMI (Haddadian & Coccia, 2019).

Zieglmeier (2012) explored the relationship between self-esteem, body image, and online impression management on Facebook among 103 female college students. Higher BMI users had fewer profile pictures, engaged less in impression management, and had fewer friends.

Pop et al., (2021) found that women scored higher in body consciousness, based on the Private and Public Body Consciousness scales. The study emphasized the importance of physical activity, fruit and vegetable consumption, water intake, and quality of sleep for a healthy lifestyle.

Thompson & Loughheed (2012) observed that females tended to spend more time on Facebook than intended, hinting at potential addictive behaviour, but no other gender differences were found.

Furthermore, academic majors or education levels may also influence social media use among students. Some studies suggest differences in social media usage based on these factors (Manimannan et al., 2014; Inchiparamban & Pingle, 2016), while others do not find significant associations (Afroz & Lima, 2017).

The impact of social networking sites (SNSs) on university students' psychosomatic health has also been studied, revealing that females are more susceptible to psychosomatic health issues related to SNS usage (Kumar Behera et al., 2022). The association between health and time spent on SNS platforms highlights the need to investigate gender-specific variations in SNS usage and its implications for students' well-being.

Given the gender-specific disparities in social media usage and its potential impact on student's health, this study aims to examine the relationship between SNS usage and BMI status among university students. With data collected from students in western Odisha, the study seeks to shed light on the gender-specific variations in SNS usage and its potential effects on BMI status and academic performance (Behera et al., 2022).

Objectives

The objectives of this study are as follows:

1. To examine the association between gender and body mass index (BMI) status.
2. To explore gender-specific variations in BMI status.
3. To assess the statistical significance of the association between gender and BMI status.

Hypotheses

1. (H_0): There is no significant association between gender and body mass index (BMI) status. Gender does not influence the distribution of individuals across different BMI categories.
(H_1): There is a significant association between gender and BMI status. Gender influences the distribution of individuals across different BMI categories.
2. (H_0): There is no difference in the prevalence of specific BMI categories between males and females. The distribution of underweight, normal weight, overweight, and obesity categories is the same for both genders.
(H_1): There are gender-specific differences in the prevalence of specific BMI categories. The distribution of underweight, normal weight, overweight, and obesity categories differs between males and females.
3. (H_0): There is no significant correlation between gender and BMI status. Gender is not associated with variations in BMI categories.
(H_1): There is a significant correlation between gender and BMI status. Gender is associated with variations in BMI categories.

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Research Method

This study utilized cross-sectional data from a diverse sample of participants (n= 300). BMI status was determined by categorizing individuals into underweight, normal weight, overweight, and obesity groups. Gender-specific data on BMI status, along with relevant demographic and health-related variables, were collected. Statistical analyses included crosstabulation, chi-square tests, and correlation analysis.

Results

The results include tabulations and tables to provide a comprehensive overview of the association between gender and BMI status.

Crosstabulation Table:

The crosstabulation table presents the distribution of participants across gender and BMI status categories, shedding light on the prevalence of different BMI categories among males and females.

Table 1: Crosstabulation of Gender and BMI Status

	Underweight	Normal Weight	Overweight	Obesity	Total
Female	39	89	11	12	151
Male	12	93	32	12	149
Total	51	182	43	24	300

Source: Processed primary data

The crosstabulation Table 1, reveals that among females, the majority falls into the normal weight category (n=89, 59.0%). In contrast, males show a higher prevalence of overweight (n=32, 21.3%). These differences suggest gender-specific variations in BMI status.

Chi-square Tests:

Chi-square tests were conducted to determine the statistical significance of the association between gender and BMI status.

Table 2: Chi-square Tests for Gender and BMI Status

Test	Chi-Square	df	p-value
Pearson Chi-Square	24.626	3	< .001
Likelihood Ratio Chi-Square	25.833	3	< .001
Linear-by-Linear Association	12.574	1	< .001

Source: Processed primary data

The results of the chi-square tests indicate a statistically significant association between gender and BMI status. The p-values obtained for all three tests are less than .001, suggesting that the observed association is unlikely due to chance alone.

Table 3: Association Measures for Nominal Variables

Measure	Value
Contingency coefficient	0.275
Cramer's V	0.287

Source: Processed primary data

Table 3 presents the association measures for the nominal variables under consideration. The contingency coefficient is calculated to be 0.275, indicating a moderate level of association between the variables. This suggests that there is a discernible relationship between the nominal variables being examined. The Cramer's V value of 0.287 also indicates a moderate level of association. Both measures suggest that there is a statistically significant association between the nominal variables.

The contingency coefficient ranges from 0 to 1, where a value of 0 indicates no association and a value of 1 represents a perfect association. In this case, the value of 0.275 suggests that the nominal variables are moderately associated. Similarly, Cramer's V ranges from 0 to 1, with 0 indicating no association and 1 representing a perfect association. The value of 0.287 for Cramer's V further supports the presence of a moderate association between the variables.

These measures provide valuable insights into the strength and magnitude of the association between the nominal variables. They serve as quantitative indicators of the relationship, allowing for a more objective interpretation of the association. While the association is moderate, it is statistically significant and should not be ignored.

Correlation Analysis:

Correlation analysis was performed to assess the strength and direction of the relationship between gender and BMI status.

Table 4: Correlation Analysis between Gender and BMI Status

Correlation Measure	Correlation Coefficient	p-value
Pearson's R	0.205	< .001

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Spearman Correlation	0.243	< .001
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Source: Processed primary data

From Table 4, both Pearson's R and Spearman correlation coefficients indicate a moderate positive association between gender and BMI status. The p-values obtained for both coefficients are less than .001, suggesting a statistically significant relationship. This implies that as gender changes from female to male, there is a tendency for BMI status to shift from lower categories (underweight or normal weight) to higher categories (overweight or obesity).

In conclusion, the crosstabulation table reveals gender-specific variations in BMI status, with females predominantly falling into the normal weight category and males showing a higher prevalence of overweight. The chi-square tests confirm a statistically significant association between gender and BMI status. The correlation analysis further supports this association, indicating a moderate positive relationship. These findings emphasize the importance of considering gender-specific factors in understanding and addressing BMI-related health disparities.

Discussion

The discussion of our comprehensive statistical analysis reveals significant gender differences in BMI status, with females showing a higher prevalence of normal weight and males having a higher prevalence of overweight. However, no clear pattern or significant association was observed between the number of social networking site (SNS) accounts and BMI status. This suggests that SNS usage alone may not directly influence BMI status, and other factors such as lifestyle behaviours, socio-cultural influences, and psychological factors may play a more prominent role. The lack of significant relationships or patterns when examining the combined influence of gender, SNS usage, and BMI status indicates that the impact of SNS usage on BMI status may not differ significantly between males and females. This study highlights the need for gender-specific interventions targeting healthy weight management and emphasizes the importance of interdisciplinary approaches to understanding the complex relationship between gender, SNS usage, and BMI status. Further research is warranted to explore additional social and environmental factors and their influence on BMI status among SNS users.

Conclusion

In conclusion, this comprehensive statistical analysis provides strong evidence of gender-specific variations in BMI status. The findings highlight significant gender differences in the distribution of BMI categories, with females being more likely to fall into the normal weight category and males having a higher prevalence of overweight. The statistical significance of

the association between gender and BMI status, as well as the moderate positive correlation, further supports these findings. These results underscore the importance of considering gender-specific factors in understanding and addressing BMI-related health disparities. Tailored interventions, health education programs, and policy measures should be developed to address the unique needs and challenges associated with gender-specific BMI status. By promoting healthy weight management and addressing gender-specific barriers, efforts can be made to reduce BMI-related health disparities and improve overall health outcomes.

The findings provide strong evidence of a significant association between gender and BMI status. The crosstabulation table revealed distinct patterns in the distribution of participants across gender and BMI status categories. The chi-square tests confirmed a statistically significant association, indicating that gender plays a crucial role in determining BMI status. The analysis revealed notable gender differences in BMI status. Females were more likely to fall into the normal weight category, while males showed a higher prevalence of overweight. These disparities highlight the importance of considering gender-specific factors in understanding and addressing BMI-related health disparities. The correlation analysis demonstrated a moderate positive association between gender and BMI status. This implies that as gender changes from female to male, there is a tendency for BMI status to shift from lower categories (underweight or normal weight) to higher categories (overweight or obesity). The statistical significance of the correlation coefficients further supports the existence of this relationship. The significant association between gender and BMI status has important implications for interventions aimed at promoting healthy weight management. Tailored interventions that consider gender-specific needs and challenges can be developed to address the varying distribution of BMI categories among males and females. Such interventions can focus on promoting positive body image, healthy lifestyle behaviours, and gender-specific barriers to weight management. The findings underscore the importance of considering gender disparities in BMI status when developing policies and initiatives. Policy development should prioritize equitable access to healthcare resources, screening programs, and weight management support services for individuals of all genders. By addressing gender-specific factors, policies can contribute to reducing BMI-related health disparities.

In overall, the statistical analysis conducted in this study provides robust evidence of a significant association between gender and BMI status. The findings highlight gender differences in the prevalence and distribution of BMI categories, emphasizing the need for gender-specific interventions and policy considerations. By targeting gender-specific needs and promoting equitable access to healthcare resources, efforts can be made to address BMI-related health disparities and improve overall health outcomes.

Recommendations and Implications

Based on the findings of our study, several recommendations and implications can be drawn:

1. **Gender-Specific Interventions:** The significant gender differences in BMI status emphasize the need for gender-specific interventions targeting healthy weight management. Tailored interventions should take into account the unique challenges and

factors influencing BMI status among males and females. These interventions can focus on promoting healthy eating habits, regular physical activity, and body image satisfaction specific to each gender.

2. **Health Education Programs:** Implementing comprehensive health education programs that address the role of lifestyle behaviours, including diet and physical activity, is crucial. These programs should target both males and females and provide evidence-based information on maintaining a healthy BMI. Raising awareness about the importance of a balanced diet, portion control, and the benefits of regular physical activity can contribute to preventing and managing overweight and obesity.
3. **Social Support and Peer Influence:** Recognizing the influence of social networks, including social networking sites, in shaping individuals' behaviours, it is important to leverage social support and peer influence for promoting healthy lifestyles. Encouraging positive peer support through online communities, forums, and social media platforms can provide a supportive environment for individuals striving to achieve and maintain a healthy BMI.
4. **Policy Interventions:** Policymakers should consider the findings of this study when formulating public health policies and initiatives related to obesity prevention and management. Gender-specific policy interventions can address disparities in access to healthy food options, physical activity resources, and healthcare services. Policies that promote healthier environments in schools, workplaces, and communities can contribute to improved BMI status among both males and females.
5. **Further Research:** This study provides a foundation for future research in the field of gender, BMI status, and social networking sites. Future studies could delve deeper into the specific mechanisms through which gender influences BMI status and explore additional social and environmental factors that may mediate this relationship. Longitudinal studies and qualitative research can provide a more comprehensive understanding of the complex interactions between gender, SNS usage, and BMI status.

Implementing these recommendations can have positive implications for public health by addressing gender-specific disparities in BMI status and promoting healthier lifestyles. By adopting a multifaceted approach that combines individual-level interventions, community support, and policy changes, we can work towards reducing the burden of overweight and obesity and improving overall health outcomes.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

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Ethical Approval

The present study adhered to the ethical guidelines and principles set forth by the Institutional Ethics Committee (IEC) at Gangadhar Meher University, Sambalpur. Ethical clearance for the research was granted by the Institutional Ethics Committee (IEC) at Gangadhar Meher University, Sambalpur, under reference number 9861, on January 7, 2023.

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