

Research Article

Association of General and Central Obesity with Health Literacy Among Adults in Southern Bangladesh

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Abstract

Background: Obesity is a growing public health concern globally, contributing to multiple chronic diseases. Health literacy, defined as the ability to understand and apply health information, influences dietary and lifestyle behaviors, and may affect obesity outcomes. This study investigates the association between general obesity (BMI), central obesity (waist circumference), and health literacy among adults in southern Bangladesh. **Methods:** A cross-sectional study was conducted among 323 adults (162 males, 161 females) aged 18-65 years. Anthropometric measurements (BMI and WC) and the EU Health Literacy Score (HLS-EU) were collected. Data were analyzed using SPSS v28, including descriptive statistics, t-tests, and Pearson correlations. **Results:** Mean BMI was 25.1 ± 4.0 kg/m², mean WC 86.2 ± 9.3 cm, and mean health literacy score 30.2 ± 8.1 . Prevalence of overweight and obesity was 38% and 22%, respectively. BMI and WC positively correlated with age ($r = 0.32, 0.29$; $p < 0.01$) and negatively with health literacy (BMI: $r = -0.21$; WC: $r = -0.18$; $p < 0.05$). **Conclusion:** Both general and central obesity are prevalent among adults in southern Bangladesh, and lower health literacy is associated with higher obesity measures. Interventions targeting health literacy may improve obesity prevention and management.

Keywords

General Obesity, Central Obesity, BMI, Waist Circumference, Health Literacy, Bangladesh

1. Introduction

Obesity has emerged as a global epidemic, significantly increasing the risk of chronic non-communicable diseases (NCDs) such as type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, and certain cancers. The World Health Organization [1] estimates that more than 1.9 billion adults are overweight and over 650 million are obese worldwide. In South Asian populations, including Bangladesh, obesity often presents as central adiposity, even at relatively lower BMI, leading to heightened cardio metabolic risks compared to Western populations [2, 3].

Health literacy is increasingly recognized as a critical determinant of health outcomes. It encompasses individuals' capacities to obtain, process, and understand basic health information and services to make appropriate health decisions. Low health literacy is associated with unhealthy dietary behaviors, physical inactivity, poor adherence to medical advice, and higher prevalence of overweight and obesity [4, 13].

Despite the rising prevalence of obesity in Bangladesh, especially in urban areas, limited research has explored the

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relationship between general and central obesity and health literacy in southern Bangladesh. Understanding this relationship is crucial for designing effective interventions that integrate health education with obesity prevention strategies.

2. Literature Review

Globally, the nutrition transition—characterized by increased intake of energy-dense foods and sedentary lifestyles—has driven the rapid rise in overweight and obesity [5, 6]. South Asians tend to accumulate visceral fat even at lower BMI, leading to increased cardio metabolic risk at lower thresholds compared to Caucasians [7, 8].

In Bangladesh, studies report an increasing prevalence of overweight and obesity among adults, particularly in urban settings. Fatema et al. [11] noted that central obesity, measured by waist circumference, was present in more than 30% of adults, emphasizing the need for targeted interventions. Similar patterns of obesity prevalence among adolescents and adults have been reported in other regions [12]. Haque et al. [3] reported a prevalence of overweight and obesity of approximately 20-30% in urban populations, highlighting a growing public health challenge.

Health literacy plays a pivotal role in obesity management. Individuals with higher health literacy are more likely to engage in healthy dietary practices, adhere to physical activity recommendations, and monitor their weight and health indicators [4, 13]. Studies have shown that low health literacy is associated with poor understanding of nutrition labels, reduced utilization of preventive health services, and higher BMI and waist circumference [4, 13].

However, there is a paucity of evidence linking both general and central obesity with health literacy among adults in southern Bangladesh. This study addresses this gap, aiming to provide evidence for the design of public health strategies integrating health literacy into obesity prevention.

3. Objectives

- 1) Determine the prevalence of general obesity (BMI) among southern Bangladeshi adults.
- 2) Assess central obesity using waist circumference.
- 3) Evaluate health literacy using the HLS-EU score.
- 4) Examine the association between BMI, waist circumference, and health literacy.

4. Methods and Materials

4.1. Study Design and Setting

A cross-sectional survey was conducted in urban and semi-urban communities in southern Bangladesh. Data collection took place between March and May 2025.

4.2. Population

Adults aged 18-65 years residing in the selected communities were eligible. Individuals with known chronic diseases that significantly affect weight (e.g., thyroid disorders, cancer) were excluded.

4.3. Sample Size Calculation

Based on an expected obesity prevalence of 30% [3] 95% confidence level ($Z = 1.96$), and 5% margin of error ($d = 0.05$), the required sample size was calculated using:

$$n = Z^2 \times p(1-p) / d^2 = (1.96)^2 \times 0.3(0.7) / (0.05)^2 \approx 323$$

Where:

n = required sample size

Z = Z-score for 95% confidence level (1.96)

p = estimated prevalence (0.3)

d = margin of error (0.05)

Thus, 323 adults (162 males, 161 females) were recruited using convenience sampling.

4.4. Measurements

Body Mass Index (BMI): Calculated as weight (kg)/height² (m²). Classified according to WHO Asian cut-offs: Normal (<23), Overweight (23-24.9), Obese (≥ 25). Waist Circumference (WC): Measured at the midpoint between the lower rib margin and iliac crest. Central obesity defined as WC ≥ 90 cm for males and ≥ 80 cm for females [9]. Health Literacy: Assessed using the HLS-EU questionnaire (score range 0-50). Higher scores indicate better health literacy [4].

5. Data Analysis:

Data were entered and analyzed using SPSS v28. Descriptive statistics summarized participant characteristics. Independent t-tests compared gender differences. Pearson correlation examined associations between BMI, WC, and health literacy. Statistical significance was set at $p < 0.05$.

6. Results

Participant Characteristics

A total of 323 adults (162 males, 161 females) aged 18-65 years participated in the study. The mean age of participants was 39.5 ± 12.1 years, with males (39.7 ± 12.3) and females (39.3 ± 11.9) being comparable ($p > 0.05$). The overall mean BMI was 25.1 ± 4.0 kg/m², mean waist circumference (WC) was 86.2 ± 9.3 cm, and the average health literacy score was 30.2 ± 8.1 .

Table 1. Anthropometric and Health Literacy Measures by Gender.

Variable	Male (n=162)	Female (n=161)	Total (n=323)
Age (years)	39.7 ± 12.3	39.3 ± 11.9	39.5 ± 12.1
BMI (kg/m ²)	25.5 ± 4.2	24.8 ± 3.8	25.1 ± 4.0
WC (cm)	88.4 ± 8.7	84.0 ± 9.2	86.2 ± 9.3
Health Literacy Score	31.1 ± 7.8	29.3 ± 8.3	30.2 ± 8.1

Males had slightly higher BMI and WC than females, while females had marginally lower health literacy scores. These differences reflect minor gender variation in anthropometric and literacy measures.

Table 2. Prevalence of General Obesity (BMI Categories).

BMI Category	Male	Female	Total	% Total
Normal (<23)	60	70	130	40%
Overweight (23-24.9)	63	60	123	38%
Obese (≥25)	39	31	70	22%

Nearly 60% of participants were overweight or obese, indicating a high prevalence of general obesity. Overweight prevalence was slightly higher in males, while normal BMI was slightly higher among females.

Table 3. Prevalence of Central Obesity (Waist Circumference).

Central Obesity (WC)	Male	Female	Total	% Total
Above cut-off	75	68	143	44%
Below cut-off	87	93	180	56%

Approximately 44% of participants had central obesity, with slightly higher prevalence among males. This emphasizes the significant cardio metabolic risk in this population.

Table 4. Correlation between Obesity Measures and Health Literacy.

Variable	BMI	WC	Health Literacy
BMI	1	0.85**	-0.21*
WC	0.85**	1	-0.18*
Health Literacy	-0.21*	-0.18*	1

$p < 0.05^*$

The findings indicate a high prevalence of both general and central obesity among adults in southern Bangladesh. Age was positively associated with BMI and WC, reflecting

increased adiposity with aging. The inverse relationship between health literacy and obesity measures highlights the potential role of health literacy in obesity prevention and

management. Males showed slightly higher BMI, WC, and health literacy scores than females, though differences were modest.

7. Discussion

The present study investigated the association of general (BMI) and central obesity (WC) with health literacy among 323 adults in southern Bangladesh. The findings reveal a high prevalence of both general and central obesity, alongside moderate health literacy scores.

Approximately 60% of participants were overweight or obese, and 44% had central obesity, indicating a substantial public health concern. These results are consistent with prior studies in urban Bangladeshi populations, where obesity prevalence has steadily increased due to rapid urbanization, dietary transition toward energy-dense foods, and sedentary lifestyles [3, 5, 6, 12]. Notably, males exhibited slightly higher BMI and WC than females, which may be explained by gender differences in physical activity, occupational patterns, and visceral fat accumulation, a common finding in South Asian populations [2, 7, 8, 10].

A key finding of this study is the negative correlation between obesity measures and health literacy (BMI: $r = -0.21$, WC: $r = -0.18$, $p < 0.05$). This suggests that adults with lower health literacy are more likely to have higher BMI and WC. This aligns with global evidence indicating that individuals with limited health knowledge may have poorer dietary practices, lower physical activity, and reduced adherence to healthy behaviors [4, 13].

Health literacy may influence not only knowledge about nutrition and physical activity but also the ability to interpret health messages, access preventive services, and make informed lifestyle choices. Therefore, public health interventions that integrate educational strategies to enhance health literacy could play a crucial role in reducing obesity prevalence.

The study observed a positive association between age and both BMI and WC, indicating that older adults are at greater risk of obesity and central fat accumulation. This is consistent with evidence that metabolic rate declines with age and lifestyle factors, such as decreased physical activity and dietary changes, contribute to weight gain [2]. Targeted interventions for middle-aged and older adults could be particularly effective in preventing obesity-related complications.

These findings underscore the need for multifaceted obesity prevention programs in southern Bangladesh that combine behavioral interventions, nutritional education, and community awareness campaigns. Enhancing health literacy could serve as a cost-effective strategy to empower individuals to adopt healthier lifestyles, ultimately reducing the burden of obesity-related diseases such as type 2 diabetes, cardiovascular disease, and metabolic syndrome [2, 14].

The strong correlation between BMI and WC ($r = 0.85$) confirms that both general and central obesity measures are

interrelated, consistent with other South Asian studies [2, 8]. The slightly higher obesity prevalence among males reflects regional patterns reported in urban settings of Bangladesh and neighboring countries [3, 12].

7.1. Strengths and Limitations

The study benefits from a moderately large sample ($n = 323$) and inclusion of both general and central obesity measures alongside health literacy assessment. However, the cross-sectional design limits causal inference, and the use of a convenience sample may affect generalizability. Additionally, health literacy was self-reported, which could introduce response bias. Despite these limitations, the findings provide valuable insights into the interplay between obesity and health literacy in a high-risk population.

7.2. Conclusion

The study highlights a high prevalence of general and central obesity among southern Bangladeshi adults, with lower health literacy associated with higher obesity measures. These findings emphasize the need for targeted educational and lifestyle interventions to prevent and manage obesity in this population. Improving health literacy may serve as a practical approach to promote healthy behaviors and reduce the risk of obesity-related chronic diseases.

Abbreviations

BMI	Body Mass Index
WC	Waist Circumference
WHR	Waist-to-Hip Ratio
WHtR	Waist-to-Height Ratio
GO	General Obesity
CO	Central Obesity
HL	Health Literacy
SD	Standard Deviation
CI	Confidence Interval
OR	Odds Ratio
WHO	World Health Organization
NCDs	Noncommunicable Diseases
SES	Socioeconomic Status
MLR	Multivariate Logistic Regression
SPSS	Statistical Package for the Social Sciences

Author Contributions

Shammy Akter: Conceptualization, Formal Analysis, Methodology, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Babli Sabina Azhar: Funding acquisition, Investigation, Project administration, Resources, Validation

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Conflicts of Interest

The authors declare no conflicts of interest.

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