FREQUENCY OF PATIENT UNDERGOING GENERAL SURGERY HAVING HIGH BODY MASS INDEX-A GENDER BASED STUDY

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Abstract

Introduction: *Obesity is a significant risk factor influencing surgical outcomes, with gender-specific variations in prevalence. This study examines the frequency of patients undergoing general surgery with high body mass index (BMI) and its association with gender and hypertension at Gulab Devi Teaching Hospital, Lahore.*

Methodology: *A cross-sectional study was conducted on 245 patients undergoing general surgery. BMI categories were determined, and associations with gender and hypertension were assessed using the chi-square test. Statistical significance was set at p < 0.05.*

Results: *Among the patients, 68.2% were female and 31.8% were male. The mean BMI was 25.9 (14.9–53.8). A significant association was found between BMI and gender (χ^2 = 228.488, p = 0.005), with a higher proportion of females having an elevated BMI. Additionally, BMI showed a strong association with hypertension (χ^2 = 31.195, p < 0.000), indicating increased risk among obese individuals.*

Conclusion: *High BMI is prevalent among surgical patients, with a higher proportion of affected females. The strong association between BMI and hypertension highlights the need for preoperative risk assessment. Preventive strategies should target obesity management to improve surgical outcomes.*

INTRODUCTION

The accuracy of obesity diagnosis is essential for understanding its epidemiology and associated health risks. One commonly used measure for diagnosing obesity is the body mass index (BMI), but its reliability as the best diagnostic tool remains a topic of debate[1]. While dual-energy X-ray absorptiometry (DEXA) is considered a precise method for assessing adipose tissue distribution, its use is limited due to its complexity and high cost[6]. Consequently, BMI continues to be widely utilized as a practical and accessible approach for obesity measurement[2].

Obesity is a well-established risk factor for various diseases, including gastroenterological cancers[3]. Research conducted by the World Cancer Research Fund and the American Cancer Society has highlighted a strong correlation between obesity and cancers such as esophageal adenocarcinoma, colorectal cancer, pancreatic cancer, gallbladder

cancer, and liver cancer[1]. Moreover, obesity has significant implications for surgical outcomes, with evidence suggesting that obese patients experience higher rates of wound infections, increased intraoperative blood loss, and prolonged operative times[4].

General surgery encompasses a wide range of procedures involving the abdominal organs, including the esophagus, stomach, liver, gallbladder, pancreas, intestines, appendix, and bile ducts[5]. Additionally, it extends to surgical interventions related to trauma, breast surgery, soft tissues, and vascular conditions[3]. Among these, bariatric surgery has emerged as an effective intervention for obesity management and its associated comorbidities, reflecting its growing significance in clinical practice[6]. Understanding the relationship between obesity and surgical outcomes is crucial for improving patient care and optimizing surgical strategies[7, 8].

MATERIAL & METHODS
Study Design and Setting
This research employed a descriptive cross-sectional study design. It was conducted at Gulab Devi Teaching Hospital, Lahore, which is a prominent healthcare facility. Specifically, the study was carried out across the pre-operative anesthesia units, operation theatre, and post-operative units within the general surgery department of the hospital.

Nature of Data
The study gathered quantitative data related to patient demographics, medical history, and surgical details. The variables examined included age, gender, height, weight, body mass index (BMI), the presence of diabetes or hypertension, and the surgical procedure undergone. This data was collected through patient interviews and recorded via a specifically designed questionnaire.

Study Participants
The study participants included male and female patients who were undergoing general surgery at Gulab Devi Teaching Hospital. The inclusion criteria required participants to be aged between 18 and 65 years undergoing general surgery. Participants were required to be non-critically ill and able to provide informed consent. Patients who refused to participate in or cooperate with the study were excluded.

Sample Size and Sampling Technique
The sample size was calculated based on the WHO sample size formula. The initial sample size was estimated to be 348 participants. However, due to the six-month duration of the study, the sample size was adjusted to 245 participants.

$$n = z^2{}_{\alpha/2} pq / \rho^2$$

where, n=sample size, P=prevalence, q=1-p, Z=1.96, P=0.5[9], ρ or occurrence of error =0.05 and then the sample calculated was (n=348). A non-probability purposive sampling technique was used to select participants. This technique was chosen because it allows the researcher to select specific individuals based on predefined criteria, ensuring that the sample accurately reflects the characteristics of the population under study.

Tools of Data Collection
Data were collected using a specifically designed questionnaire, which included both closed and open-ended questions. The questionnaire was tailored to gather relevant demographic and medical information from the participants. The data collection process involved structured interviews with the patients, which ensured that consistent information was obtained across all participants.

Ethical Considerations
Ethical considerations were paramount throughout the study. The research was conducted in accordance with ethical guidelines to ensure the protection and respect of participants. Informed consent was obtained from all participants before data collection began. Participation in the study was voluntary, and no participants experienced any harm, risk, or discomfort as a result of their involvement. All information gathered during the study was kept strictly confidential, and the data were anonymized to protect the privacy of the participants. Ethical approval for the study was granted by the Institutional Review Board (IRB) of the hospital.

Data Analysis

Data analysis was performed using the latest version of SPSS software (version 26). Descriptive statistics were presented as frequency and percentage. The primary statistical technique used was the chi-square test, which was employed to assess associations between categorical variables. The results were presented in the form of tables to clearly depict the findings and facilitate interpretation.

RESULTS

The descriptive statistics of patients undergoing general surgery indicate that the majority (52.7%) fall within the 18–35 age group, with fewer patients in older categories. Females constitute a larger proportion (68.2%) of the sample compared to males (31.8%). The mean weight of the patients is 66.16 kg, with most individuals (19.5%) falling within the 52–71 kg range. In terms of height, the majority (83.3%) have a height between 2.4–3.1 m². Regarding BMI distribution, the mean BMI is 25.9, ranging from 14.9 to 53.8. A significant proportion (44.7%) falls within the normal BMI range (20–25), while 25.4% are classified as obese (BMI 26–30), and 16.3% have BMI values indicative of Class I or II obesity. These findings highlight a notable prevalence of high BMI among patients undergoing general surgery, with gender differences potentially influencing these trends.

Table 1: Descriptive Statistics of Patients Undergoing General Surgery Based on BMI and Gender at Gulab Devi Teaching Hospital Lahore Pakistan.

Variable	Frequency (%)
Age 18-35 36-53 54 and above	 129(52.7) 92(37.5) 24(9.8
Gender Male Female	 78(31.8) 167(68.2)
Weight (kg) Mean$\pm S.D$ 32-51 52-71 72-91 92-111 112-131	 66.16$\pm$16 46(7.9) 113(19.5) 73(12.6) 10(1.7) 3(0.5)
Height (m²) Mean$\pm S.D$ 1.4-2.3 2.4-3.1 3.2 and above	 2.56$\pm$.35 24(9.8) 202(83.3) 17(6.9)
BMI **Mean (Min-Max)** 14-19 (underweight) 20-25 (normal) 26-30 (obesity) 31-35 (class I) 36 and above (class II)	 25.9(14.9-53.8) 33(13.6) 107(44.7) 57(25.4) 34(14.8) 14(1.5)
Hypertension Yes No	 90(36.7) 155(63.3)

The table 2 summarizes the distribution of common general surgery procedures performed at Gulab Devi Teaching Hospital, Lahore. Gastrointestinal surgeries, including appendicitis, cholelithiasis, and hernia repairs, were the most frequent (34.7%), followed by breast surgeries (27.3%). Soft tissue and abscess-related procedures accounted for 17.1%, while thyroid and neck surgeries made up 11.8%. Obesity-related and miscellaneous cases represented a smaller proportion (9.0%), highlighting the diverse range of surgical interventions in the study population.

Table 2: Frequency and Percentage of Common General Surgery Procedures at Gulab Devi Teaching Hospital, Lahore	
Variable	Frequency (%)
Gastrointestinal Surgeries (Appendicitis, Cholelithiasis, Hernia, Colostomy)	85(34)
Breast Surgeries (Fibroadenoma, Breast Lump, CA Breast)	67(27.3)
Soft Tissue & Abscesses (Gluteal Abscess, Pilonidal Sinus, Perianal Fistula)	42(17.1)
Thyroid & Neck Surgeries (Thyroid Nodule, Cervical Lymphadenopathy)	29(11.8)
Obesity-Related & Miscellaneous (Morbid Obesity, Abdominal Mass)	22(9. 0)

The chi-square test for association between gender and BMI (Table 3) shows a statistically significant relationship (p = 0.005), with obesity being more prevalent among female patients undergoing general surgery. This suggests that a higher BMI is more commonly associated with female patients in this hospital setting. Similarly, the chi-square test for association between BMI and hypertension (Table 4) reveals a highly significant result (p = 0.000). Hypertension is notably more common in patients with a higher BMI, reinforcing the well-established link between obesity and increased risk of hypertension.

Table 3: Association Between Gender and Body Mass Index (BMI)					
Gender	Underweight (BMI < 18.5)	Normal (BMI 18.5–24.9)	Overweight (BMI 25–29.9)	Obese (BMI ≥ 30)	Total
Male	10 (4.1%)	32 (13.1%)	18 (7.3%)	18 (7.3%)	78 (31.8%)
Female	23 (9.5%)	75 (30.6%)	39 (15.9%)	30 (12.2%)	167 (68.2%)
Total	33 (13.6%)	107 (43.7%)	57 (23.2%)	48 (19.5%)	245 (100%)

Chi-Square Value: 228.488, p-value: 0.005

Table 4: Association Between Body Mass Index (BMI) and Hypertension			
BMI Category	Hypertension (Yes)	Hypertension (No)	Total
Underweight (BMI < 18.5)	5 (2.0%)	28 (11.4%)	33 (13.4%)
Normal (BMI 18.5–24.9)	27 (11.0%)	80 (32.7%)	107 (43.7%)
Overweight (BMI 25–29.9)	23 (9.4%)	34 (13.9%)	57 (23.3%)
Obese (BMI ≥ 30)	35 (14.3%)	13 (5.3%)	48 (19.6%)
Total	90 (36.7%)	155 (63.3%)	245 (100%)

Chi-Square Value: 31.195, p-value: 0.000

DISCUSSION

Obesity has become a significant global health concern in recent decades, posing challenges to healthcare systems worldwide. The increased prevalence of obesity has been linked to a variety of chronic diseases, including cardiovascular diseases, kidney disorders, liver dysfunction, and gastrointestinal complications[10]. This study aimed to examine the relationship between high body mass index (BMI) and patients undergoing general surgery at Gulab Devi Teaching Hospital, Lahore, and to explore gender differences in the prevalence of obesity among these patients.

Several studies have highlighted the association between obesity and various health complications. For instance, Ooi et al. (2019) identified liver dysfunction as one of the primary metabolic abnormalities related to obesity, especially in individuals with a high BMI[11]. Similarly, Ouyang et al. (2021) found that obesity contributes to the formation of gallstones, which in turn impacts body fat accumulation[12]. These findings resonate with the current study, which also observed that obesity is linked to gastrointestinal disorders, particularly within the liver, stomach, and gallbladder. In this study, a significant proportion of patients undergoing surgery had elevated BMIs, indicating that obesity is indeed prevalent among surgical patients, particularly those undergoing abdominal and gastrointestinal surgeries.

When comparing this study to other research on obesity rates in surgical populations, a clear pattern emerges. For instance, a study by Tariq et al. (2020) indicated that approximately 30-40% of surgical patients in a hospital setting were categorized as obese[9]. In contrast, this study found that 34% of patients were moderately obese (BMI 30-35), with an additional 14% classified as severely obese (BMI > 40). This highlights the increasing prevalence of obesity in surgical populations and its growing impact on healthcare outcomes. The increased prevalence of obesity in this study may be attributed to local socio-economic factors, including dietary habits and reduced physical activity, as seen in other regions[13].

Moreover, this study also revealed a notable association between gender and obesity, with female patients being more likely to be obese compared to their male counterparts. This finding is in line with other studies, including Pareek et al. (2019), who reported that females are more prone to obesity due to socio-economic and lifestyle factors[14]. In the current study, the chi-square test confirmed that there is a strong correlation between gender and BMI, with females exhibiting higher obesity rates. The study noted that lower levels of physical activity and poor dietary habits, particularly in rural and urban areas, may contribute to this gender disparity. A key finding here is the impact of socio-economic status on obesity, particularly in women, as lower economic conditions often limit access to healthier food choices and exercise opportunities[15, 16].

Furthermore, this study's results are consistent with earlier research indicating that obesity significantly contributes to the development of various comorbid conditions such as hypertension, diabetes, and sleep apnea[16]. As noted by previous studies, obesity is often a precursor to hypertension, and this study supports this finding by showing a strong association between high BMI and hypertension, especially in female patients. This aligns with the findings of Pareek et al. (2019), which emphasized the heightened risk of hypertension among obese individuals, particularly females[12]. However, this study did not find a significant gender-based difference in the prevalence of diabetes, suggesting that while obesity may worsen the condition, it does not necessarily exhibit a gender-specific association[17].

In summary, the findings of this study align with existing literature regarding the link between obesity and various health complications, particularly in surgical populations. However, the study also adds new insights into the significant gender differences in obesity rates, with female patients being more prone to obesity than male patients. The socio-economic factors contributing to these gender disparities, along with the strong association between obesity and conditions like hypertension, further underscore the urgent need for targeted public health interventions to address obesity, especially among women[18].

CONCLUSION

This study concludes that obesity, as defined by a high body mass index (BMI), is significantly more prevalent among female patients undergoing general surgery. A strong association was found between BMI and hypertension, highlighting obesity as a critical risk factor for surgical and long-term health complications.

The findings emphasize the need for targeted interventions to address obesity-related risks, particularly in female patients. Preventive strategies focusing on obesity management and preoperative risk assessment are essential to improve surgical outcomes and overall patient health.

Limitations

The study was limited by a short duration, which resulted in a reduced sample size from the initially calculated number. Data collection was based on an interview method, which may have introduced biases or inaccuracies. Additionally, many patients were unaware of the significance of their body mass index (BMI) and the associated health risks, which may have affected the quality and accuracy of the information provided.

Recommendations

To reduce the growing incidence of obesity, health measures must be implemented to raise awareness and educate the public on its risks. Healthcare systems should focus on addressing the factors contributing to obesity and implement precautionary measures. In surgical procedures involving obese patients, efforts should be made to minimize post-operative complications. Preventive measures should also be adopted to educate the younger population on the importance of maintaining a healthy BMI. Physical activity and regular exercise should be promoted as key components of a healthy lifestyle.

Consent to participate

Written consent had been taken from patients.

Conflict of interest

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Authors contibutions

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