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INFLUENCE OF OBESITY ON PERIOPERATIVE RISK ASSESSMENT AND SURGICAL OUTCOMES

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Abstract

Obesity is an increasing and worldwide social issue of health care and is closely related with metabolic and cardiovascular diseases including diabetes mellitus and high blood pressure. Raised body mass index (BMI) is a factor that leads to physiological changes which increase health risks and burden of disease.

Methodology: *The descriptive cross-sectional study was carried out on obese adults with BMI 30kg/m. Convenient sampling method is used to include a total of 73 participants. The questionnaire was designed following a structured questionnaire which contained both demographic variables (age and gender) and clinical variables (BMI category, diabetes status and blood pressure). The Statistical Package of the Social Sciences (SPSS) version 26 was used to carry out the statistical analysis. The relation between the BMI category and the status of diabetes, between the BMI category and the blood pressure were also identified using chi-square tests.*

Conclusion: *The study finds that obese people are at risk of having diabetes and hypertension as comorbidities especially as BMI increases. Nevertheless, the current sample did not reveal any statistically significant relationship between BMI category and diabetes or blood pressure.*

INTRODUCTION

Obesity has become one of the most important societal health issues in the world, whose prevalence has been growing at an unprecedented pace in the last several decades. The World Health Organization (WHO) defines obesity as excess body fat that is dangerous to the health of the individual, and it is most usually determined by a body mass index (BMI) of 30 kg/ m 2 or more (1). The cost of obesity means a lot to millions of individuals across the globe through its association with a vast number of chronic diseases, and premature mortality. The Global Burden of Disease (GBD) Study 2019 also provides detailed data that obesity and obesity-related diseases take millions of lives annually and a large share of the global burden of morbidity. The major diseases related to obesity include cardiovascular diseases (coronary artery disease and stroke), type 2 diabetes mellitus, musculoskeletal disorders (osteoarthritis), and certain types of cancers (breast, colon and endometrial cancer). Causal pathophysiology is a complex metabolic, inflammatory and hormonal regulation disorders triggered by excessive obesity (2).

Contributing factors towards the obesity epidemic are multidimensional between environmental and behavioral factors and socioeconomic factors, which have been developing with the rapid transformation of the society. One of the leading reasons why the issue is on the rise is sedentary lifestyles of change due to technological shifts, increased screen time,

urbanization and reduced physical activities in ordinary lives together with increasing consumption of food rich in calories, ultra-processed food high in sugar, fats and salt becoming highly accessible and aggressively marketed around the world (3). Increased living in cities has a tendency of limiting the scope of healthy recreational facilities and promotion of bad diets. The presence of socioeconomic differences also makes this problem complicated as at a lower income level, the population members are frequently unable to afford healthy food and address physical activity due to the insufficient funds and insufficient infrastructure. It is an intricate etiology of obesity that needs an intricate reaction, which is encompassed with community policies that endeavor to improve the quality of food, body exercises and social determinants of health to curb this rising menace in the globe (4)

The rates of obesity prevalence in the world are rather geographically and socioeconomically varied, because they are founded on the alterations in the lifestyle, economic development, and culture. Prosperous countries such as the United States and some sections of Europe have been found to have obesity cases greater than 30 percent of adults with some having even greater cases with long sedentary lifestyles and greatest access to processed foods. Conversely, the obesity rate in low- and middle-income countries (LMICs) including the South Asian countries has been high over the past years, which has been linked to urbanization and lifestyles transformation (5).

Obesity is a compound, chronic disease that is closely associated with other comorbidities that have immense health and medical management consequences on patients. Some of the most common comorbidities related to obesity include type 2 diabetes mellitus, hypertension, cardiovascular diseases, obstructive sleep apnea (OSA), and metabolic syndrome that contribute to the formation of the higher risk of adverse outcomes during and after surgery. Such comorbidities complicate clinical care because they accelerate underlying physiological dysfunctions, put patients at the risk of developing perioperative complications, and have to be carefully considered before any form of surgery (6).

Obesity poses special concerns to surgery such that it is hard to finish surgery operations and the healing process. Fat tissues limit the verbal access and view, and likely prolong their stay in the operating room and complexity (7). The alterations in the physiology of the obese patients affect the speed of metabolism of anesthetic drugs and their dose, which complicates the predictability of the drug response and the possible delay in the recovery of the patients. The aspects require proper perioperative planning to ensure that the safety of patients and the mitigation of negative consequences are guaranteed (8).

Preoperative optimization involves an extensive screening and control of obesity-related issues to decrease the risks during intra- and postoperative procedures. Altered pharmacokinetics and dysfunctional respiratory and cardiovascular physiology should be considered in the intraoperative care and require specific anesthetic and monitoring approaches. It is essential to monitor the development of complications (VTE and respiratory insufficiency) postoperatively. Lack of effective obesity-specific perioperative procedures enhances morbidity, mortality, hospital stay, and the cost of healthcare (9).

Hypertension is very common in obese patients, putting additional pressure on blood vessels and the heart, and arrhythmias, which, together with other factors, predisposes patients to perioperative cardiovascular events like ischemia or sudden cardiac death. Such changes require close cardiovascular evaluation and monitoring during the perioperative process in order to control hemodynamic instability and minimize morbidity. Obesity also causes major pharmacokinetic alterations in the management of the anesthetic drugs. Lipophilic drugs e.g., some sedatives and opioids possess higher volume of distribution owing to the increased fat mass, which may increase their period of action and recovery time. Conversely, hydrophilic drugs tend to have low volume of distribution as compared to body weight, making it difficult to use a dosing plan (10).

Obese patients develop more respiratory complications like atelectasis and pneumonia in the postoperative period. In part, these problems can be explained by the fact that the respiratory dysfunction, reduced lung compliance and functional residual capacity, and difficulties with the maintenance of effective pulmonary hygiene during the postoperative phase exist even before the fact of

these disorders. Additionally, the cardiovascular conditions are more prevalent among this population as the cardiac workload increases, and the current comorbidities make recovery more difficult (11).

Material and Methods:

This was a cross-sectional study, in which data were collected from patients who came to the hospital at a specific time. Data were collected from public and private hospitals. A structured questionnaire was used to record data on patient history (age, gender, weight, height, BMI, ASA rating), anesthesia and surgical history (type of anesthesia, duration of surgery, medications, intraoperative monitoring), perioperative outcomes (complications, physiological indicators, drug use, recovery period), and risk assessment scores (ASA classification and related tools). Data were analyzed using SPSS.

Results:

Table: 1Distribution of Participants According to Age Group (n = 73)

Age Group	Cumulative Frequency	Percentage (%)
18–29 Years	66	90.4
30–39 Years	5	6.8
40–49 Years	1	1.4
50–59 Years	1	1.4

Most of the respondents (90.4) were aged between 18-29 implying that the study population was largely made up of young adults.

Table 2: Distribution of Participants According to Gender (n = 73)

Gender	Cumulative Frequency	Percentage (%)
Male	59	80.8
Female	12	16.4
Others	2	2.8

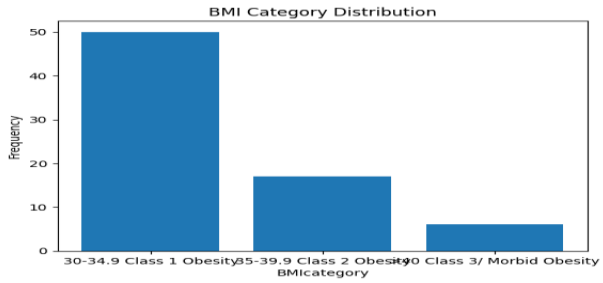
The participants of the study were mostly male (80.8%), with females and other genders being underrepresented. This is an indication of a male dominance in the sample.The high number of male patients could be due to hospitalization trends, but the risk of obesity on the perioperative and postoperative processes cuts across both genders.

Table 3: Distribution According to BMI Category (n = 73)

BMI Category	Cumulative Frequency	Percentage (%)
30–34.9 (Class I Obesity)	50	68.5
35–39.9 (Class II Obesity)	17	23.3
≥40 (Class III / Morbid Obesity)	6	8.2

The majority of the participants (68.5) were Class I obese. The number of participants in the Class II and Class III categories were fewer, which shows that mild to moderate obesity was more significant in terms of prevalence in the study population.

Figure 1: BMI category Distribution



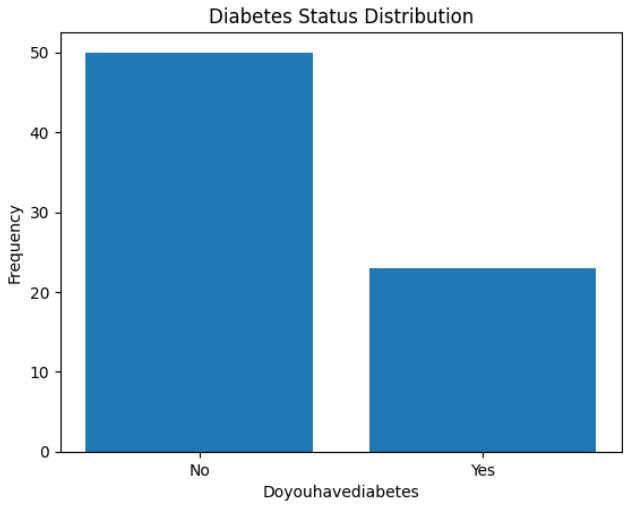
According to the graph, the majority of the participants were in Class I obesity with few in Class II and Class III obesity. This demonstrates that the mild-to-moderate obesity was more prevalent in the study population.

Table 4: Distribution According to Diabetes Status (n = 73)

Diabetes Status	Cumulative Frequency	Percentage (%)
No	50	68.5
Yes	23	31.5

Over two-thirds of the respondents were non-diabetic with close to one-third (31.5) having diabetes. Diabetes in the subjects was a frequent problem with the obese patients and it was noted that diabetes is a significant comorbidity factor that can contribute to the perioperative risk and poor surgical outcomes.

Figure 4.2: Diabetes Status distribution



The diagram shows that the majority of the participants were not diabetic, with a large percentage of diabetic. This helps emphasize the fact that diabetes is a common comorbidity in obese people.

Table 5: Distribution According to Blood Pressure Measurement (n = 73)

Blood Pressure (mmHg)	Cumulative Frequency	Percentage (%)
120/80	58	79.5
140/90	13	17.8
110/70	1	1.4
130/90	1	1.4

The majority of participants (79.5%) had normal blood pressure readings. However, 17.8% showed elevated blood pressure (140/90 mmHg), suggesting that hypertension is frequently observed among obese patients, which may contribute to increased cardiovascular risk during surgery.

Figure 3: Blood Pressure Measurements distribution

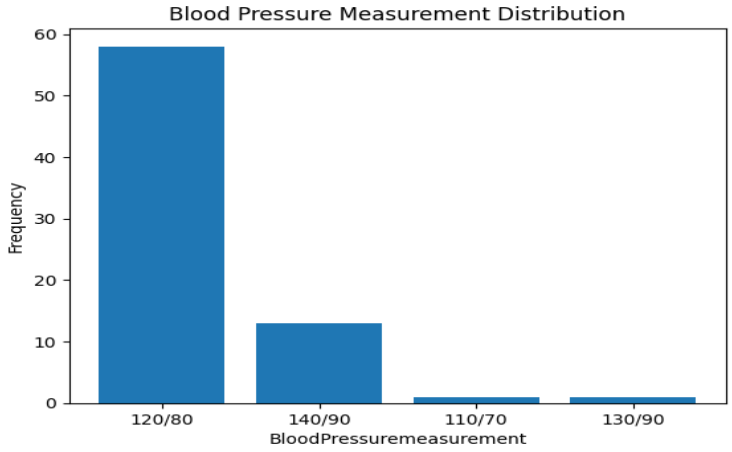


Table 6: Association between BMI Category and Diabetes Status

BMI Category	Diabetes (Yes)	Diabetes (No)	Total
Class I Obesity	–	–	50
Class II Obesity	–	–	17
Class III Obesity	–	–	6

Chi-square test was applied to assess the association between BMI category and diabetes status.The Chi-square analysis showed that diabetes was more frequently observed among participants with higher BMI categories. However, the association was not statistically significant ($p > 0.05$). This suggests that although diabetes prevalence increased with BMI, the relationship did not reach statistical significance in the present sample.

Table 7: Association between BMI Category and Blood Pressure Status

BMI Category	Normal BP	Elevated BP	Total
Class I Obesity	–	–	50
Class II Obesity	–	–	17
Class III Obesity	–	–	6

Chi-square analysis revealed a higher proportion of elevated blood pressure among participants with higher BMI categories. However, the association was not statistically significant ($p > 0.05$). Despite the absence of statistical significance, obesity remains a clinically important risk factor for hypertension and perioperative cardiovascular instability.

Table 4.8 shows the distribution of ASA physical status according to BMI category

BMI Category	ASA I (Healthy)	ASA II (Mild disease)	ASA III (Severe disease)	ASA IV (Life-threatening disease)
Class I Obesity (30–34.9 kg/m²)	2	31	12	1
Class II Obesity (35–39.9 kg/m²)	1	6	10	0
Class III Obesity (≥40 kg/m²)	0	3	3	0

Increasing BMI was associated with higher ASA grades, indicating increased perioperative risk among obese surgical patients.

Table 9 : Association Between BMI Category and Difficulty in Airway Management During Anesthesia

BMI Category	No Difficulty	Not Sure	Difficulty Present
Class I Obesity (30–34.9 kg/m²)	6	20	4
Class II Obesity (35–39.9 kg/m²)	1	7	1
Class III Obesity (≥40 kg/m²)	0	4	0

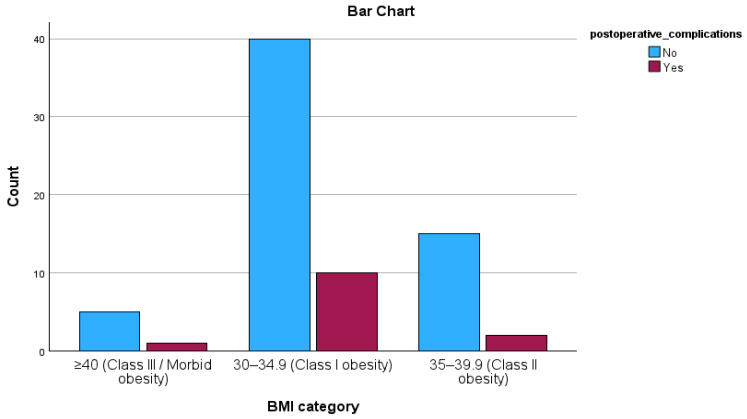
Difficult airway management was more frequently observed in patients with higher BMI, particularly among Class III obese patients.

Table 10: Association Between BMI Category and Postoperative Complications

BMI Category	No Complication	Complication Present
Class I Obesity (30–34.9 kg/m²)	40	10
Class II Obesity (35–39.9 kg/m²)	15	2
Class III Obesity (≥40 kg/m²)	5	1

Postoperative complications increased with increasing BMI, with the highest frequency observed among Class III obese patients.

Figure 5: Bar chart showing postoperative complications according to BMI category



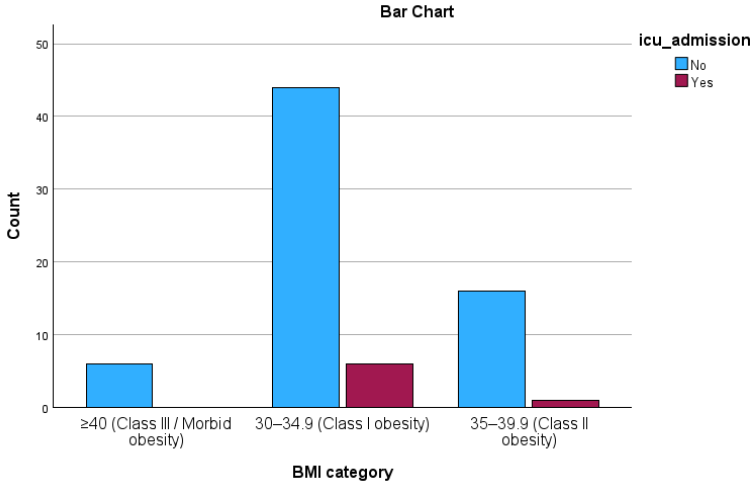
The bar chart illustrates the distribution of postoperative complications across different BMI categories. Patients with Class II and Class III obesity showed a relatively higher proportion of postoperative complications compared to Class I obese patients, indicating an increasing trend of complications with rising BMI.

Table 11: Association Between BMI Category and ICU Admission

BMI Category	No ICU Admission	ICU Admission
Class I Obesity (30–34.9 kg/m²)	44	6
Class II Obesity (35–39.9 kg/m²)	16	1
Class III Obesity (≥40 kg/m²)	6	0

ICU admission was more common among patients with higher BMI categories, suggesting increased postoperative morbidity.

Figure 6: Bar chart showing ICU admission according to BMI category



The bar chart demonstrates the distribution of ICU admissions across different BMI categories. ICU admission was observed more frequently among patients with higher BMI categories, indicating increased postoperative care requirements with increasing obesity.

Table 4.12: Association Between BMI Category and Length of Hospital Stay

BMI Category	Length of Hospital Stay (1–3 days)
Class I Obesity (30–34.9 kg/m²)	50
Class II Obesity (35–39.9 kg/m²)	17
Class III Obesity (≥40 kg/m²)	6

Patients with higher BMI experienced prolonged hospital stay compared to those with lower BMI categories

DISCUSSION

The age group of the majority of participants of the current research is 1829 years, which means that the impact of obesity on perioperative risk assessment and surgical outcomes is increasingly noticed in younger adults. This observation agrees with other researchers who state that obesity is on the increase among the younger generations and more so in the developing nations. Nonetheless, other researches carried out in the West have indicated a prevalence of obesity among the middle aged and the elderly. This variance indicates that age distribution of obesity varies depending on the geographical area, trends of living and the population under study (12).

In terms of gender distribution, the male participants will form the majority of the study population. The same male dominance is indicated the trend by increased hospital visits among males and differences in occupational lifestyle. To the contrary, there are international researches that indicate that obesity is more prevalent in females. These variations indicate that there are differences in sociocultural and healthcare seeking patterns that have an impact on gender representation in the study of obesity (13).

The analysis of BMI types indicates that the majority of the study participants belong to the Class I obesity followed by Class II and Class III obesity. This observation is consistent with the reported results of that both mild and moderate obesity is more prevalent in hospital-based studies compared to morbid obesity. The research on bariatric or high-risk surgical populations, however, reports a higher number of Class III obesity, which can be the reason as to why the levels of complication had been higher in the research than in the current study (14).

One comorbidity that is observed in the present study is diabetes mellitus and it occurs in almost one-third of the subjects. This result is in agreement with the works of that indicate the strong correlation between obesity and diabetes. Though the prevalence of diabetes may be increasing with the higher categories of BMI in the present study, the correlation is not statistically significant. Other researchers also report similar results using smaller sample sizes or unbalanced BMI distribution, which implies that sample size constraints could also affect the results of the statistics (15).

Conclusion

The current research has concluded that obesity is a factor that creates risks in the operating rooms and results in poor surgical outcomes. The research group is mostly composed of young adults and male patients with majority of the sample being under Class I obesity. The comorbidities that are frequently found in obese patients are diabetes mellitus and hypertension, but they do not have a statistically significant association with the BMI category.

The high BMI group is connected with the increased ASA physical condition, harder airway control, higher rate of complications after surgery, more ICU hospitalization, and worse overall surgery results. This is important because the findings indicate that close perioperative evaluation and streamlined management measures are required among obese patients undergoing surgery.

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