

Medical Student Perception on Relationship Between Body Mass Index and Outcomes of Coronary Artery Bypass Grafting surgery

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Abstract— Introduction: Obesity is an increasingly growing universal health issue. Due to the prevalence of obesity and its association with an increased risk of cardiovascular disease requiring surgical intervention, it is important that the medical students have a good knowledge of these two correlated conditions. **Aim:** To assess the students' perception on the relationship between body mass index (BMI) classes and the outcomes of coronary artery bypass grafting (CABG) surgery among medical student in King Faisal University in Alahsa, Saudi Arabia. **Method:** This is a cross-sectional study, participants underwent An 11-item questionnaire that included three sections. The first section included questions about demographic data in the form of gender and study year, the second section included questions about CABG surgery complications e.g. renal failure and respiratory failure, and the last section investigated the relationship between BMI classes and CABG complications. **Results:** One hundred and fifty-three student were evaluated in this study, Out of the total number of participants, 33.3% (n=51) were having high perception of CABG complications (score 11-15), 45.8% (n=70) were having medium perception (score 6-10), and 20.9% (n=32) with low perception (score 0-5). We found that there's a statistically significant relationship between academic level and CABG complication awareness in which the P-value is $0.001 < 0.05$. Out of the total number of participants, 19% (n=29) were having high perception of the relationship between BMI classes and CABG complications (score 9-12) , 52.3% (n=80) were having medium perception (score 5-8), and 28.8% (n=44) with low perception (score 0-4). **Conclusion:** CABG is a major procedure that is associated with many complications, Therefore, it is important to raise the level of awareness for both present and future doctors about this relationship in order to improve the overall patient care and the outcomes for these patients.

Keywords: Obesity, coronary artery bypass grafting surgery, body mass index.

Abbreviations and Acronyms:

Body Mass Index (BMI),
Coronary Artery Disease (CAD),
Coronary Artery Bypass Grafting (CABG).

Introduction and Background:

Obesity is an increasingly growing universal health issue.¹ Body mass index (BMI) is a measure of weight in relation to the individual's height which has been consistently used. BMI has 6 classes: underweight (BMI $< 18.5 \text{ kg/m}^2$), normal weight (BMI $18.5 - < 25 \text{ kg/m}^2$), overweight (BMI $25 - < 30 \text{ kg/m}^2$), obese class I (BMI $30 - < 35 \text{ kg/m}^2$), obese class II (BMI $35 - < 40 \text{ kg/m}^2$), and obese class III (BMI $\geq 40 \text{ kg/m}^2$).²

According to World Atlas data, Saudi Arabia (SA) has an obesity rate of 33.7% and it ranks 15th among the most obese counties in the world.³ Obese individuals are at higher risk of developing some metabolic disorders such as diabetes mellitus, hypertension, and hyperlipidemia. As a result, they are

at increasing risk of developing cardiovascular diseases i.e. coronary artery disease (CAD).⁴ Thus, a high rate of obese patients are undergoing coronary artery bypass grafting (CABG) surgery.⁵ Yet, the association between BMI and the outcomes of CABG surgery remains indefinite.

Several studies linked obesity with higher risk of developing postoperative respiratory failure, renal failure⁴, surgical site infections⁴⁻⁸, and long ICU and in-hospital stays.⁸ However, there is an ongoing debate whether or not obesity is linked to increase mortality after cardiac surgery.^{4,7-10} Furthermore, there it is not yet clear whether an underweight BMI affects the outcomes of CABG surgery. Some studies correlate underweight BMI with higher chances of mortality^{10,11} and complications.¹¹ Other studies concluded that underweight BMI have more affirmative outcomes.¹² Due to the prevalence of obesity and its association with an increased risk of cardiovascular disease requiring surgical intervention, it is important that the medical students have a good knowledge of these two correlated conditions. However, there is little literature which aimed to assess this knowledge. Therefore, our study aims to assess the students' perception on the relationship between BMI classes and the outcomes of CABG surgery among medical student in King Faisal University in Alahsa, Saudi Arabia.

Method:

This study is a cross-sectional study and it aimed to assess students' perception on the relationship between BMI classes and outcomes of CABG surgery among medical student in King Faisal University in Alahsa, Saudi Arabia. Participants were medical students from the first year up to internship year (7th year) for both males and females. Students from other universities and colleges were excluded. The purpose of the study was explained to the participants and consent was taken.

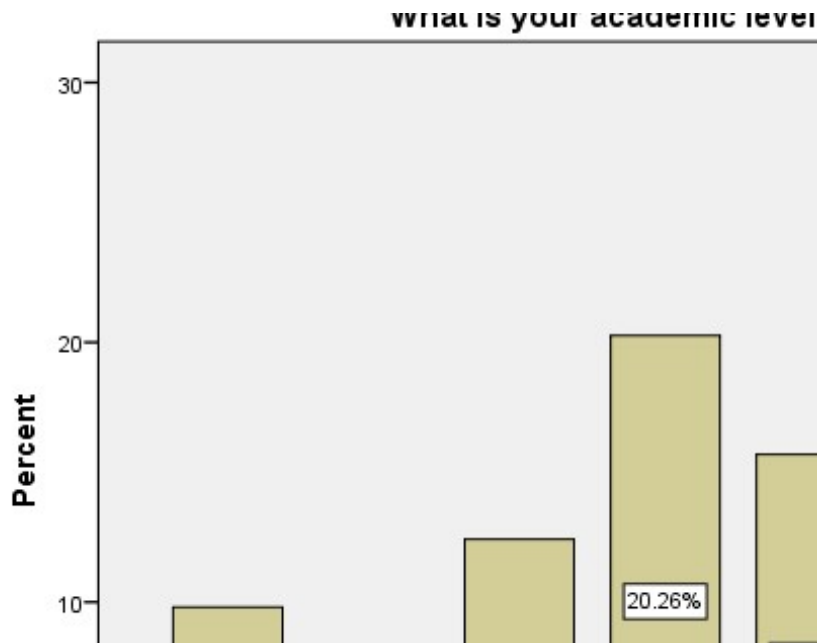
Participants underwent An11-item questionnaire that included three sections. The first section included questions about demographic data in the form of gender and study year, the second section included questions about CABG surgery complications e.g. renal failure and respiratory failure, and the last section investigated the relationship between BMI classes and CABG complications. Perception questions in the second and third section were scale questions with answers that ranged between strongly agree to strongly disagree. To test the student's perception, a score was assigned to each right answer, strongly agree (three points), agree (two points), unknown (one point), and disagree and strongly disagree (zero point). And three perception groups were made depending on the participants score. For CABG surgery complication section, high perception account for (score 11-15), medium perception (6-10), low perception (0-5). Similarly, for the last section high perception group account for (score 9-12), medium perception (5-8), and low perception (0-4).

Data was collected and analyzed using the International Business Machines (IBM) Statistical Package for the Social Sciences version 21 (SPSS). The descriptive analysis was applied to calculate the mean value and the Standard deviation (SD) for quantitative data. The categorical data were analyzed, and chi-square test was used to assess any association among the different variables. A P-value of 0.05 was considered significant for the statistical procedure.

Results:

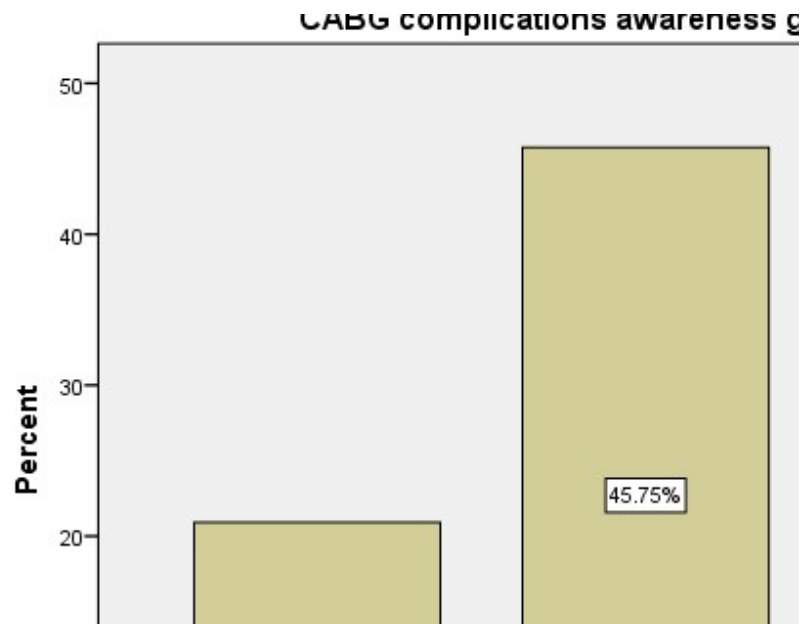
One hundred and fifty-three student were evaluated in this study, among them 30.1% (n=46) were males and 69.9% (n=107) were females. Out of the total number internship students represent 28.76% (n=44), sixth year is 12.42% (n=19), fifth year is 15.69% (n=24), fourth year 20.26% (n=31), third year 12.42%(n=19), second year 0.65%(n=1) and first year represent 9.8% (n=15) of the total sample (Figure 1).

Figure 1, percentage of participants from each year.



CABG complication awareness had a maximum score of 15 and a minimum score of 0, with a mean score of 8.86 ± 3.53 . Out of the total number of participants, 33.3% (n=51) were having high perception of CABG complications (score 11-15), 45.8% (n=70) were having medium perception (score 6-10), and 20.9% (n=32) with low perception (score 0-5) (Figure 2).

Figure 2: percentage of CABG awareness groups



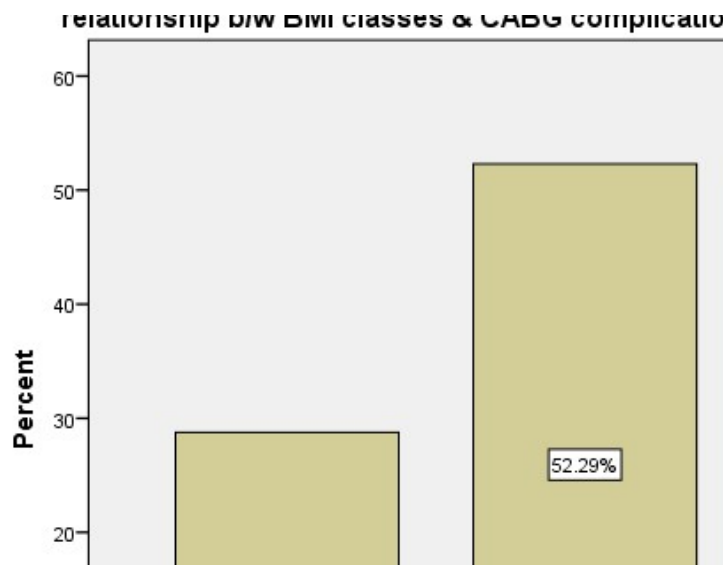
Out of the total number of participants, 33.3% (n=51) were having high perception of CABG complications, among them 51% (n=26) were in internship and 19.6% (n=10) were in fourth year. In order to assess the statistical significance, Chi square test was applied to test the null hypothesis for

categorical variables. We found that there's a statistically significant relationship between academic level and CABG complication awareness in which the P-value is $0.001 < 0.05$ (table 1).

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.305 ^a	12	.001
Likelihood Ratio	33.471	12	.001
Linear-by-Linear Association	15.060	1	.000
N of Valid Cases	153		

Relationship between BMI classes and CABG complication awareness maximum score was 12, and the minimum was 0, with a mean score of 6.19 ± 2.71 . Out of the total number of participants, 19% (n=29) were having high perception of the relationship between BMI classes and CABG complications (score 9-12), 52.3% (n=80) were having medium perception (score 5-8), and 28.8% (n=44) with low perception (score 0-4) (Figure 3).

Figure 3: percentage of relationship b/w BMI classes and CABG complication awareness groups.



Out of the total number of participants, 19% (n=29) were having high perception of the relationship between BMI classes and CABG complications, among them 37.9% (n=11) were in fourth year and 31% (n=9) was in internship respectively. And out of 52.3% (n=80) with medium perception, 26.3% (n=21) were in internship. However, Chi square test was used, and we found that there was no statistically significant relationship between the academic level and the relationship between BMI classes and CABG complication awareness in which the P-value was $0.054 > 0.05$ (table 2).

Table 2: Chi-Square Tests: academic level and relationship b/w BMI classes and CABG complication awareness

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.744 ^a	12	.054
Likelihood Ratio	24.212	12	.019
Linear-by-Linear Association	1.323	1	.250
N of Valid Cases	153		

Discussion:

To our knowledge, this study is the first study to assess the students' perception on the relationship between BMI classes and the outcomes of CABG surgery. Due to the lack of research in this topic, we were not able to compare the findings of our study to the literature. This highlights the need to conduct more research into this topic. Moreover, our findings indicated that only a third of our participants had high awareness on CABG complications, and about half of them had medium awareness 45.8% (n=70). Surgical site infection was the most commonly known complication among our study participants, and renal failure was the least known complication. We found an association between academic level and the level of awareness, therefore, as the academic level increases, the level of awareness becomes higher and vice versa, which is predictable because as the students grows and get more knowledge and clinical experientheir perceptionis expected to increase.

Our study showed that around half of the participants 52.3% (n=80) had medium perception on the relationship between body mass index (BMI) and CABG complications. Additionally, the level of awareness was poorly correlated with gender and study year, which indicate that there's no difference in level of perceptionamong different study level or between male and female groups. Interestingly, class III obesity was thought to be mostly related to CABG complications among the participants, and underweight BMI was thought to be the least related to CABG complications. However, despite this common belief, most studies reported that underweight BMI is more associated with poor outcomes following cardiac surgery.^{10,11}

Conclusions:

This study was the first study with the aim of assessing the students' perception on the relationship between BMI classes and the outcomes of CABG surgery among medical student. Coronary artery bypass grafting surgery (CABG) is a major procedure that is associated with many complications, half of our study participants were moderately aware of them and the level of awareness was related to their academic level. Similarly, half of the participants had moderate awareness on the relationship between these complications and BMI classes. Therefore, it is important to raise the level of awareness for both present and future doctors about this relationship in order to improve the overall patient care and the outcomes for these patients.

Some of the limitations might influence the results of our study. First, the absence of previous studies in the same topic which prevented us from comparing our results with the previous ones. Second, the sample size was small for accurate measurement of perception among college students, also the response rate from the first two years was very low which makes it difficult to test the association between perception and study year. Third, we tested perception in relation to academic level and

gender, yet, other factors may also affect the perception such as age and the state of residency, so we recommend further researches in this topic.

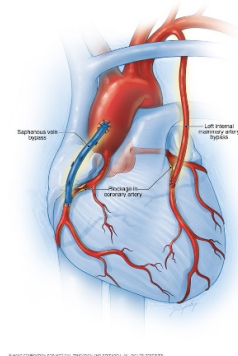
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Conflict of interest: No conflict of interest to be disclosed.

Appendix one: 11-item questionnaire

1. What is your sex? A. male. B. female
2. What is your academic level? A. 1st year b. 2nd year c. 3rd year d. 4th year e. 5th year f. 6th year g. internship

coronary artery bypass grafting surgery (CABG) is a form of bypass surgery that can create new routes around narrowed and blocked coronary arteries. Coronary artery bypass graft is an option for selected patients with significant narrowing and blockages of the heart arteries¹.



3. Respiratory failure is one of the severe complications of CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
4. Renal failure is one of the severe complications of CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
5. Surgical site infection is one of the complications of CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
6. Long ICU stay is one of the severe complications of CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
7. Death is one of the severe complications of CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree

Body mass index (BMI) is a measure of weight in relation to individual's height. BMI has 6 classes²:



8. Patient with class I obesity has increased risk of complications following CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
9. Patient with class II obesity has increased risk of complications following CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
10. Patient with class III obesity has increased risk of complications following CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree
11. Patient who is underweight has increased risk of complications following CABG surgery: 5) strongly agree 4) agree 3) unknown 2) disagree 1) strongly disagree

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Medical Student Perception on Relationship Between Body Mass Index and Outcomes of Coronary Artery Bypass Grafting surgery



What is students perception regarding the relationship between obese BMI and outcomes of CABG surgery?



Half of the participants 52.3% had medium perception on the relationship between BMI and CABG complications, and class III obesity was thought to be mostly related to CABG complications among the participants.



CABG is a major procedure that is associated with many complications, Therefore, it is important to raise the level of awareness for both present and future doctors about this relationship in order to improve the overall patient care and the outcomes for these patients.

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