An Analytical Video-Dependent Study to Explore Awareness and Knowledge of the Relationship between Obesity and Coronary Heart Disease among Students Residing in Paying Guest Accommodations

Gyanendri Tomar[1], Kirti Verma[2], Richa Bhogal[3]

[1]Associate Professor, Graphic Era (Deemed to be University) Dehradun, Uttarakhand, India
[2]Assistant Professor, Akal College of Nursing, India
[3]Akal College of Nursing, India

*Corresponding author: **Gyanendri Tomar**

Abstract

Introduction:
The global rise in overweight and obesity poses a major health threat, linked to millions of annual deaths and various cardiac complications. This study delves into the association between obesity and coronary heart disease, emphasizing the role of adipose tissue and its impact on cardiovascular health. **Methods:** A mixed-methods approach assessed awareness of the obesity-coronary heart disease link among 61 students in guest accommodations. Pretest and post-test questionnaires, coupled with a self-instructed video intervention, aimed to enhance awareness. Sociodemographic variables were considered to explore baseline awareness influences. **Results:** Pretest data showed diverse awareness (range 4-12, mean 7.64), significantly improving post-intervention (range 7-14, mean 10.57). The wilcoxon signed-rank test (p=6.872e-12) and effect size (r=0.8784) highlighted substantial impact. A weak positive correlation with age (r=-0.0166) and no significant associations with gender or diet type indicated universal efficacy. **Conclusion:** The educational intervention significantly increased awareness of the obesity-coronary heart disease link among students, regardless of demographic factors. These findings underscore the intervention's universal efficacy and provide valuable insights for future health education initiatives.

Keyword: obesity, coronary heart disease, awareness, educational intervention, student health, analytical video-dependent study, demographic influences, guest-accommodation, metabolic diseases, cvd.

Introduction

The world health organization characterizes overweight and obesity as the accumulation of abnormal or excessive fat that poses a health risk. A bmi above 25 indicates overweight, while over 30 is considered obese. In 2017, the global burden of disease reported over 4 million annual deaths due to these conditions, reaching epidemic proportions.[1] obesity is becoming a global epidemic in both children and adults, and it is associated with numerous co-morbidities such as cardiovascular diseases (cvd), type 2 diabetes, hypertension, certain cancers, and sleep apnea/sleep-disordered breathing. In fact, is an independent risk factor for cvd and cvd risks have been also documented in obese children, and is associated with reduced life expectancy. A variety of adaptations/alterations in cardiac structure and function occur in the individual as adipose tissue accumulates in excess amount. As a

whole, overweight/obesity predispose or is associated with numerous cardiac complications such as coronary heart disease, heart failure, and sudden death through its impact on the cardiovascular system.[2]

In a global study of 27,098 participants from 52 countries, bmi displayed a modest association with myocardial infarction. However, waist-to-hip ratio and waist and hip circumferences maintained a significant association with myocardial infarction ($p<0.0001$), even after adjusting for other risk factors. The population-attributable risk for myocardial infarction was notably higher for increased waist-to-hip ratio in the top two quintiles (24.3%, 95% ci 22.5-26.2) compared to the top two quintiles of bmi (7.7%, 95% ci 6.0-10.0).[3] obesity, a significant risk factor for atherosclerosis, is linked to complex mechanisms. Originally viewed as an energy store, adipose tissue is now acknowledged as an active endocrine organ. Adipokines, including leptin, tumor necrosis factor-α (tnf-α), resistin, and adiponectin, play crucial roles in influencing metabolic diseases associated with obesity.[4] excessive adiposity impacts cardiac function directly by affecting the myocardium and vasculature and indirectly through associated comorbidities. This leads to hemodynamic shifts, elevated blood pressure, and myocardial fat accumulation, potentially contributing to conditions such as left ventricular diastolic dysfunction and heart failure with preserved ejection fraction.[5]

The analysis consolidates results from 23 longitudinal studies conducted until june 2015, demonstrating a notable positive correlation between childhood obesity and adult cardiovascular risk factors, including elevated systolic and diastolic blood pressure, as well as increased levels of triglycerides.[6] a study investigates the long-term impact of a multidisciplinary intervention on cardiovascular disease (cvd) risk factors in obese children. Over 2 years, 203 children engaged in a comprehensive program. Significant improvements in body mass index (bmi) standard deviation score (sds-bmi), blood pressure, lipids, insulin resistance, and insulin levels were observed. The findings underscore the effectiveness of a prolonged, multidisciplinary approach in reducing bmi and improving cvd risk factors in obese children.[7]

Overall, overweight and obesity contribute to or are linked with various cardiac complications such as coronary heart disease, heart failure, and sudden death, exerting profound effects on the cardiovascular system.[8] the way body fat is distributed plays a crucial role in the risk of obesity-related diseases. Having an excess of fat around the abdomen, referred to as central or upper-body fat, is linked to a heightened susceptibility to cardiometabolic diseases.[9] excess visceral abdominal tissue (vat) is a key contributor, associated with elevated triglycerides, reduced hdl cholesterol, high blood pressure, and increased fasting glucose. Even with normal ldl cholesterol, excess vat may elevate cardiovascular risk due to small, dense ldl particles.[10] in a study of 1532 young individuals (ages 15 to 34) undergoing autopsy due to external causes, atherosclerosis in the aorta and right coronary artery was examined. Elevated glycohemoglobin levels (>8%) were associated with more extensive lesions, particularly in the right coronary artery for those over 25. Additionally, greater thickness of the panniculus adiposus and a higher body mass index were linked to increased lesions in the right coronary artery. Study reveal a link between atherosclerosis in young adults, early diabetic conditions, and obesity.[11]

Material and method

Study design:
This study employed an analytical video-dependent approach to assess awareness of the link between obesity and coronary heart disease among students residing in guest accommodations. The research design integrated both quantitative and educational intervention components. The quantitative aspect involved the administration of a pretest and post-test questionnaire, utilizing google forms with "yes" or "no" responses to gauge students' awareness levels. The educational intervention consisted of a self-instructed video, strategically designed to impart knowledge on the obesity-coronary heart disease link. The video was administered after the pretest, and a post-test was conducted two weeks later to evaluate the intervention's impact. The study design facilitated the collection of quantitative data on awareness scores, allowing for a comparative analysis before and after the intervention.

Additionally, the inclusion of sociodemographic variables such as age, gender, and diet type enriched the study design, enabling exploration of potential associations with baseline awareness levels. This mixed-methods approach provides a comprehensive understanding of the effectiveness of the educational intervention and its demographic influences on initial awareness levels among students in guest accommodations.

Participants:

The study involved a participant sample consisting of students residing in guest accommodations, aiming to assess their awareness of the link between obesity and coronary heart disease. A total of 60 students actively participated in the study. The inclusion of students from diverse backgrounds and accommodations adds a level of heterogeneity to the participant pool, contributing to the generalizability of the study's findings. The participants engaged in a video-dependent educational intervention, which included a pretest, an educational video, and a post-test to measure changes in awareness levels. Sociodemographic variables, including age, gender, and type of diet, were considered to explore potential associations with baseline awareness levels. The inclusion of these variables enhances the study's ability to identify demographic influences on initial awareness. Participants' active involvement in the educational intervention provides valuable insights into the effectiveness of such interventions among students residing in guest house.

Statistical analysis

Descriptive analysis (pre-test):

Minimum (min) = 4	Maximum (max) = 12	Range (R) = 8
Size (n) = 61	Sum = 466	

Mean ($\bar{x}$) = 7.63934426	Median ($\tilde{x}$) = 7	Mode = 6
Deviation (s) = 2.00858812	Variance (s2) = 4.03442623	Mid-Range (MR) = 8

Quartiles	Interquartile Range (IQR)	Outliers
Q1 --> 6	3	none
Q2 --> 7		
Q3 --> 9		

Sum of Squares(SS) = 242.065574	Mean Absolute Deviation (MAD) = 1.73179253	Root Mean Square (RMS) =7.89480011
Standard Error of Mea ($SE\bar{x}$) = 0.257173356	Coefficient of Variation CV = 0.262926771	Relative Standard Deviation RSD = 26.2926771%
Skewness γ1 = 0.120715259	Kurtosis β2 = 2.15693748	Kurtosis Excess (α4) = -0.999111612

Tab.1. Descriptive Analysis of Pre-test Data

The descriptive analysis of the pretest data offers a comprehensive overview of essential statistical measures, providing valuable insights into the baseline comprehension of students regarding the correlation between obesity and coronary heart disease. The dataset, comprising 61 observations, showcases awareness scores ranging from 4 to 12, underscoring the diversity of responses. The mean awareness score, approximately 7.64, along with a

median of 7 and a mode at 6, signifies a central tendency toward moderate awareness levels. Quartile analysis discloses Q1 at 6, Q2 at 7, and Q3 at 9, contributing to a nuanced understanding of the data distribution. The absence of outliers indicates a uniform dataset. Standard deviation (around 2.01) and variance (around 4.03) quantify data variability. Additional measures, including skewness (0.12), kurtosis (2.16), and kurtosis excess (-0.99), provide insights into the distribution's shape. The coefficient of variation (0.26) and relative standard deviation (26.29%) offer perspectives on variability relative to the mean. In its entirety, this descriptive analysis forms the basis for evaluating the impact of the subsequent intervention on students' awareness levels.

Frequency Table:

Value	Frequency	%
4	2	3.28
5	8	13.11
6	11	18.03
7	10	16.39
8	7	11.48
9	9	14.75
10	10	16.39
11	3	4.92
12	1	1.64

Tab.2. Pre-test Frequency Table of Awareness Level

This Pre-test frequency table shows how many students had different levels of awareness about the link between obesity and coronary heart disease before any intervention. The most common score was 6, with 11 students, and the least common was 12, with only one student. In total, 61 students participated in the survey.

Descriptive Analysis (Post-test):

Minimum (min) = 7	Maximum (max) = 14	Range (R) = 7
Size (n) = 61	Sum = 645	

Mean ($\bar{x}$) = 10.5737705	Median ($\tilde{x}$) = 11	Mode = 11
Standard Deviation (s) = 1.97871184	Variance (s2) = 3.91530055	Mid-Range (MR) = 10.5

Quartiles	Interquartile Range (IQR)	Outliers
Q1 --> 9	3	none
Q2 --> 11		
Q3 --> 12		

Sum of Squares (SS) = 234.918033	Absolute Deviation(MAD) = 1.64633163	Root Mean Square (RMS) =10.7543358
Standard Error of Mea ($SE\bar{x}$) = 0.25334809	Coefficient of Variation CV = 0.187133988	Relative Standard Deviation RSD = 18.7133988%

Skewness γ1 = 0.0602997774	Kurtosis β2 = 2.26158042	Kurtosis Excess (α4) = -0.894468677

Tab.3. Descriptive Analysis of Post-test Data

After the intervention, a post-test analysis was conducted to assess the impact on students' awareness of the relationship between obesity and coronary heart disease. The dataset, consisting of 61 observations, reflected a range from 7 to 14, with a mean awareness score of approximately 10.57. Notably, the median and mode were identified at 11, suggesting a central tendency towards heightened awareness. Quartile analysis revealed values of 9, 11, and 12, providing insights into the distribution of post-intervention awareness levels. The absence of outliers and a relatively low standard deviation (approximately 1.98) and variance (approximately 3.92) indicated a consistent and focused dataset. The sum of squares, mean absolute deviation (MAD), and root mean square (RMS) further highlighted the dispersion and average deviations within the data. Skewness (0.06) and kurtosis (2.26) indicated a slightly right-skewed distribution with moderate tailing. The coefficient of variation (0.19) and relative standard deviation (18.71%) provided perspectives on the variability relative to the mean.

Frequency Table:

Value	Frequency	%
7	3	4.92
8	8	13.11
9	8	13.11
10	11	18.03
11	12	19.67
12	6	9.84
13	8	13.11
14	5	8.20

Tab.4. Post-test Frequency Table of Awareness Level

This table shows the number of students and the percentage of the total who scored different awareness levels in the post-test after the intervention. For instance, 3 students (about 4.92% of the total) scored 7, and 8 students each (making up approximately 13.11% each) scored 8 and 9. The most common awareness scores were 10 and 11, with 11 students each, representing 18.03% and 19.67% of the total, respectively. Six students (about 9.84%) scored 12, 8 students (around 13.11%) scored 13, and 5 students (approximately 8.20%) scored 14.

Inferential Statistics:

1) To assess the statistical significance of the change in awareness levels before and after the intervention (Wilcoxon Signed Rank):

P-value=6.872e-12	S-value=37.0823	Effect Size(r)=0.8784
Average of differences ($\bar{xd}$) =2.9344	SD of differences (Sd) 1.0307	Normality p-value 0.0002575

Tab.5. Result of the Wilcoxon Signed-Rank Test

The results of the Wilcoxon Signed-Rank Test suggest a positive and highly significant change in awareness levels following the intervention. The very small p-value (6.872e-12) indicates strong evidence against the null hypothesis, suggesting that the intervention had a statistically significant effect on awareness scores. The Effect Size (r) of 0.8784 further emphasizes the substantial magnitude of the change. Additionally, the positive average difference (2.9344) in awareness scores indicates an overall improvement. In summary, the results strongly support the notion that the intervention positively influenced awareness levels regarding the relationship between obesity and coronary heart disease among the study participants.

2)To assess the association with sociodemographic Variable:

Age: Pearson Correlation Coefficient

The value of R is: 0.0166

The calculated correlation coefficient (r = 0.0166) suggests a very weak positive correlation between age and pre-test scores in the given dataset. This implies that as age increases, there is a slight tendency for pre-test scores to also increase, but the association is minimal.

Gender: Unpaired independent T-test

The t-value is -0.41578. The p-value is .33954. The result is not significant at $p < .05$.

The t-value of -0.41578 and the corresponding p-value of 0.33954 indicate that there is no statistically significant association between gender and pretest scores among the students in this study.

Since the p-value (0.33954) is greater than the commonly used significance level of 0.05, we do not have enough evidence to reject the null hypothesis. In practical terms, this suggests that any observed differences in pretest scores between male and female students could likely be due to random chance, and there is no clear and statistically significant association between gender and pretest scores in this study.

Type of Diet: Unpaired independent T-test

The t-value is 0.45278. The p-value is .326394. The result is not significant at $p < .05$.

The analysis revealed a non-significant association between diet type (vegetarian and non-vegetarian) and pretest scores among the students, as indicated by a t-value of 0.45278 and a p-value of 0.326394. This suggests that there is no statistically significant difference in the mean pretest scores between vegetarian and non-vegetarian groups. The findings imply that any observed variations in pretest scores between the two diet types are likely due to random chance, and there is no robust statistical evidence supporting a significant association between dietary preferences and initial awareness levels of students regarding the relationship between obesity and coronary heart disease in the study.

Result:

The results indicate that the educational intervention significantly improved awareness levels among students regarding the association between obesity and coronary heart disease. The pretest data revealed a moderate baseline awareness, with scores ranging from 4 to 12 and a mean of 7.64. Following the intervention, the post-test demonstrated a substantial increase in awareness, with scores ranging from 7 to 14 and a mean of 10.57, supported by a highly significant Wilcoxon Signed-Rank Test result (p-value = 6.872e-12, Effect Size r = 0.8784). Sociodemographic variables such as age, gender, and diet type showed no significant associations with initial

awareness levels, emphasizing the intervention's universal efficacy. These findings underscore the success of targeted educational initiatives in enhancing awareness among diverse student populations.

Conclusion:

In conclusion, the comparative analysis of pre-test and post-test data, encompassing 61 student observations on awareness of the link between obesity and coronary heart disease, unequivocally demonstrates the substantial impact of the educational intervention. The intervention effectively elevated awareness levels, as evidenced by the significant increase in the mean awareness score from 7.64 in the pre-test to 10.57 in the post-test. The concentrated distribution around values like 11 further underscores the heightened awareness achieved through the intervention. The Wilcoxon Signed-Rank Test results provide robust evidence of the intervention's efficacy, with a very small p-value (6.872e-12), a substantial Effect Size (r) of 0.8784, and a positive average difference (2.9344) in awareness scores. Moreover, the study reveals that age, gender, and diet type do not significantly impact initial awareness levels, emphasizing the intervention's universal effectiveness across demographic variables. These findings collectively emphasize the success of the intervention in enhancing participant awareness, contributing valuable insights for future health education initiatives among student populations.

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