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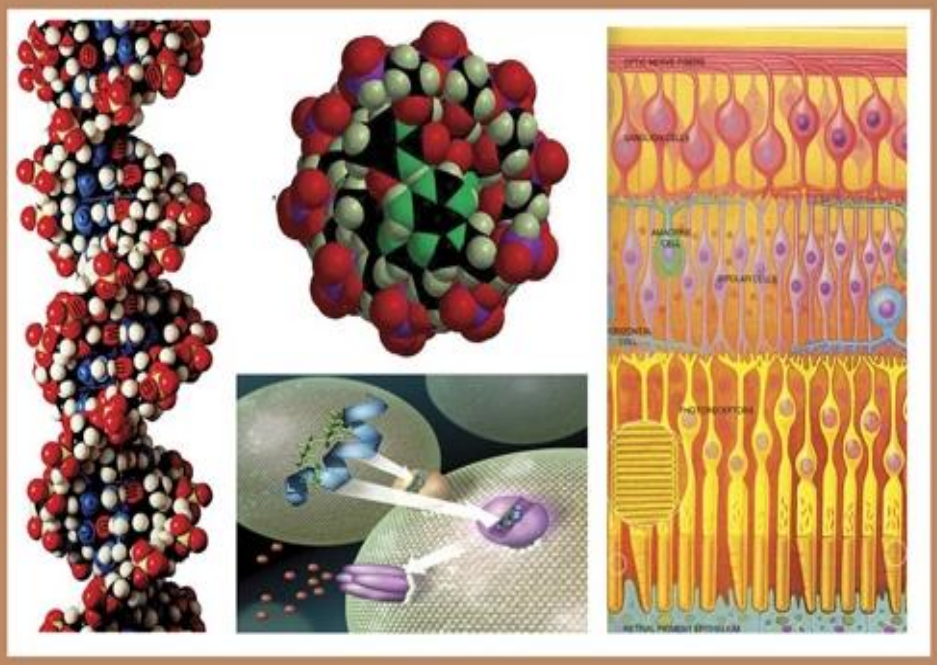

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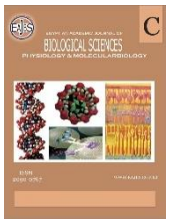

Assessing the Knowledge of Lifestyle Modifications Among Patients with Coronary Artery Disease

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ABSTRACT

Coronary artery disease (CAD) is a leading cause of death worldwide, and lifestyle modifications play a vital role in managing and preventing it. The purpose of this study was to assess awareness levels among patients with CAD regarding lifestyle changes.A cross-sectional study was conducted on 201 CAD patients receiving treatment at the Sudan Heart Center in Khartoum State, Sudan. A structured questionnaire was used to interview participants and assess their knowledge of lifestyle modifications, including adopting a healthy diet, participating in exercise, quitting smoking, and handling stress in a productive manner.The results indicated that CAD patients had inadequate knowledge of lifestyle modifications. Only 36.3% of the participants were aware of the benefits of a healthy diet, while 27.4% knew about the importance of physical activity. Furthermore, only 17.9% of the participants were aware of the risks associated with smoking, and 18.4% knew about stress management techniques.

This study emphasizes the importance of increasing patient education and awareness about the role of lifestyle modifications in managing and preventing CAD. Healthcare providers should provide targeted education and counseling to CAD patients to promote healthy habits and prevent the progression of the disease. Further research is necessary to evaluate the effectiveness of educational interventions in improving awareness and knowledge among CAD patients.

INTRODUCTION

Coronary artery disease (CAD) poses a significant public health challenge worldwide, with approximately 17.9 million deaths attributed to it each year (Benjamin *et al.*, 2019; Suliman, 2018). In Africa, heart disease remains a significant public health problem, with non-communicable diseases being the second most common cause of death after maternal, neonatal, and nutritional illnesses, accounting for 34.6% of all deaths (Ezzati and Riboli, 2019; Yuyun *et al.*, 2020).

According to reports from the Sudan federal ministry of Health in 2017, heart disease had a prevalence of 2.6%, with (CAD) being the most prevalent type (Benjamin *et al.,* 2019; Virani *et al.,* 2018).

Atherosclerotic disease, an inflammatory condition, is the leading cause of death worldwide (Naghavi *et al.,* 2018; Ross, 2017), including congenital heart defects (CHDs). Along with medical management, adopting healthy behaviors such as maintaining a balanced diet, engaging in regular physical activity, quitting smoking, and managing stress levels is essential (Alvarez *et al.,* 2019). However, individuals with (CAD) often have limited knowledge of the benefits of lifestyle modifications. (CAD) is a chronic condition that can be managed through lifestyle changes, but studies have shown that patients with (CAD) often lack awareness of the significance of lifestyle modifications, which may lead to poor outcomes and an increased risk of complications (Shivashankar *et al.,* 2019).

Assessing the level of awareness among patients with (CAD) regarding lifestyle modifications is essential in developing effective educational programs and interventions to promote healthy habits (Brinks *et al.,* 2017). Studies have shown that patient education and counseling can improve outcomes and reduce the risk of (CAD) related complications (Alvarez *et al.,* 2019). There is a constant need to raise awareness among (CAD) patients regarding lifestyle modifications, particularly in developing countries. A previous study found that the awareness level of (CAD) patients regarding lifestyle modifications was inadequate, with only a minority of participants aware of the benefits of lifestyle modifications (Kotseva et al., 2019). These findings highlight the need for increased patient education and awareness of the importance of lifestyle modifications in managing and preventing (CAD). Healthcare providers should offer targeted education and counseling to promote healthy habits and prevent the progression of the disease. This can include providing clear information on the benefits of lifestyle modifications and offering practical tips and support to help patients make sustainable changes.

In addition to individual-level interventions, broader public health initiatives are also necessary to promote healthy habits and reduce the burden of (CAD). These initiatives can include policies and programs to improve access to healthy foods, safe and walkable communities, and resources for smoking cessation and stress management (Babu *et al.,* 2021). Assessing the level of awareness among (CAD) patients regarding lifestyle changes is crucial in developing effective interventions to promote healthy habits and reduce the burden of the disease (AlHabib *et al.,* 2014). Therefore, the objective of this study is to assess the level of awareness among patients with (CAD) regarding lifestyle modifications.

MATERIALS AND METHODS

The objective of this investigation was to evaluate the level of awareness among patients with (CAD) regarding lifestyle modifications. A cross-sectional research approach was used to collect data from 201 (CAD) patients receiving treatment at the Sudan Heart Center in Khartoum State, Sudan, between January and March 2021. Participants were selected through convenience sampling. The researchers utilized a structured questionnaire to gather demographic information and assess participants' comprehension of lifestyle modifications, including adopting nutritious eating patterns, engaging in regular physical exercise, quitting smoking, and effectively managing stress. To suit the characteristics of the study population, the authors modified and customized a questionnaire used in a previous study (Memon et al., 2021; Amoah et al., 2018), which underwent a pre-test on a small sample of (CAD) patients to ensure its accuracy and consistency. The final version of the questionnaire contained 21 questions and took approximately 25-30 minutes to complete.

The reliability of the data collection tools was confirmed by using Cronbach's

alpha and the result was (α= 0.80) which indicates the accuracy of the performance reliability.

The collected data were entered into a spreadsheet and analyzed using descriptive statistics, with findings expressed in percentages and frequencies. Chi-square tests were employed to evaluate the association between the participants' demographic characteristics and their knowledge of lifestyle modifications.

The sample size for this study was determined using a statistical formula that considers factors such as the desired level of precision, confidence level, and population size. The final sample size was determined to be 201, which was considered sufficient to achieve the study's objectives. The equation employed to calculate the sample size, according to (Arshad et al., 2017), is as follows: The equation used to determine the sample size was $N = N/1 + N(d)^2 2$, where n represents the sample size, N represents the population size, and d represents the degree of accuracy sought (with an accepted margin of error of 0.05).

$n \approx 201$, $n = 570/1+570\ (0.05)^{2,}$ $n = 201$,

$n \approx 201$

Ethical Consideration:

The study was approved by the ethics committee of Khartoum University: KHU:19/R/1/20). Written and verbal informed consent was obtained from each participant and from a next of kin and/or legal guardian. after an explanation of the study proposes, assuring them that their participation was voluntary.

Statistical Analysis:

To analyze the data in this study, we utilized the statistical software package of social sciences (SPSS) version 25, descriptive statistical analyses, including frequencies, mean, and standard deviation, were used to present details about the sample's features. Additionally, the Chi-square tests were employed to assess the relationship between the participants' demographic characteristics and their awareness of lifestyle modifications.

RESULTS

Table 1 shows the distribution of participants by gender, age, and education level. In terms of gender, the majority of participants were male (68.7%) compared to female participants (31.3%). Regarding age, the largest percentage of participants fell within the 60-69 age range (41.3%). Participants aged 50-59 years accounted for 27.9%, while those aged ≥70 years and <50 years accounted for 19.4% and 12.4%, respectively. In terms of education level, the majority of participants had an elementary education (44.3%), while 24.4% had a high school education. A smaller proportion of participants were illiterate (17.4%) or had a college education or above (13.9%).

Table 1: Provides an overview of the demographic features of the study population.

	Variables	Frequency	Percentage
Gender	Males	138	68.7%
	Females	63	31.3%
	(SD=10.4)		
Age (years)	<50	25	12.4%
	50-59	56	27.9%
	60-69	81	41.3%
	≥70	39	19.4%
Education	Illiterate	35	17.4%
	Elementary	89	44.3%
	High school	49	24.4%
	College or above	28	13.9%

Table 2 shows the percentage of participants' awareness regarding lifestyle modifications. The results indicate that the highest proportion of participants (36.3%) were aware of the importance of a healthy diet in managing and preventing coronary artery disease (CAD). Meanwhile, (27.4%) were aware of the significance of regular physical activity for CAD management. In contrast, the awareness levels of smoking cessation (17.9%) and stress management (18.4%) were relatively low. These findings suggest that there is a need for increased patient education and awareness regarding lifestyle modifications, particularly in the areas of smoking cessation and stress management. Healthcare providers should provide targeted education and counseling to (CAD) patients to promote healthy habits and prevent the progression of the disease. This can include providing clear and concise information about the benefits of lifestyle modifications, as well as offering practical tips and support to help patients make sustainable changes.

Table 2: Percentage of participants' awareness of lifestyle modifications.

Percentage of participants' awareness of lifestyle modifications	Lifestyle modification
Healthy diet	36.3 %
Physical activity	27.4 %
Smoking cessation	17.9 %
Stress management	18.4 %

Table 3 shows the relationship between education level and awareness of different lifestyle modifications among (CAD) patients. The results indicate a notable correlation was found between the level of education and the extent of awareness of a healthy diet ($\chi2=9.67$, $p<0.05$) and smoking cessation ($\chi2=5.45$, $p<0.05$). Individuals with a greater level of education were more prone to have knowledge of the benefits of a healthy diet and the risks of smoking than those with a lower education level. However, A notable correlation was detected between the degree of education and awareness of physical exercise ($\chi2=4.27$, $p>0.05$) or stress management ($\chi2=2.25$, $p>0.05$). The Chi-square tests indicated a significant association between education level and awareness of lifestyle modifications. Participants with a higher education level were more likely to be aware of lifestyle modifications than those with a lower education level ($p<0.05$).

Table 3: The relationship between the education level of participants and their awareness of lifestyle modifications.

Education Level	Healthy Diet	Physical Activity	Smoking Cessation	Stress Management
Illiterate	14 (7 %)	10 (5 %)	5 (2.5 %)	6 (3 %)
Elementary	36 (8 %)	25 (12.4 %)	14 (7 %)	14 (7 %)
High School	16 (8 %)	13 (6.5 %)	8 (4 %)	12 (6 %)
College or above	7 (3.5 %)	7 (3.5 %)	9 (4.5 %)	5 (2.5 %)
Total	73 (36.3 %)	55 (27.4 %)	36 (17.9 %)	37 (18.4 %)
Chi-Square Value	9.67	4.27	5.45	2.25
p- value	< 0.05	> 0.05	< 0.05	> 0.05

Table 4 shows the sources of information on coronary artery disease (CAD) reported by participants. The majority of participants (59.7%) reported healthcare providers as their primary source of information on CAD, which highlights the important role of healthcare providers in patient education and counseling. In contrast,

a smaller proportion of participants reported obtaining information from family or friends (19.9%), the internet (12.9%), television or radio (4%), and print media (3.5%). The findings suggest that healthcare providers remain the most important source of information on (CAD) and should continue to play a leading role in educating and counseling (CAD) patients. However, the results also highlight the potential value of other sources of information, such as the Internet, which could be utilized more effectively to provide accessible and relevant information to (CAD) patients.

Figure 1 shows the participants' responses regarding their exposure to passive smoking. The results indicate that a significant proportion of participants reported being exposed to passive smoking. Specifically, (41%) of participants reported being exposed to passive smoking often, while (12%) reported being exposed always. However, the majority of participants (47%) reported never being exposed to passive smoking. These findings suggest that exposure to passive smoking is a common issue among (CAD) patients and highlights the need for increased awareness and education on the health risks associated with passive smoking. Healthcare providers should provide targeted education and counseling to (CAD) patients on the importance of avoiding exposure to passive smoking. This could include providing information on strategies for avoiding exposure in various settings, such as the workplace or at home.

Table 4: Source of Information about coronary artery disease (CAD).

Source of Information about coronary artery disease (CAD)	Frequency	Percentage
Healthcare providers	120	59.7 %
Family or friends	40	19.9 %
Internet	26	12.9 %
Television or radio	8	4%
Print media	7	3.5 %

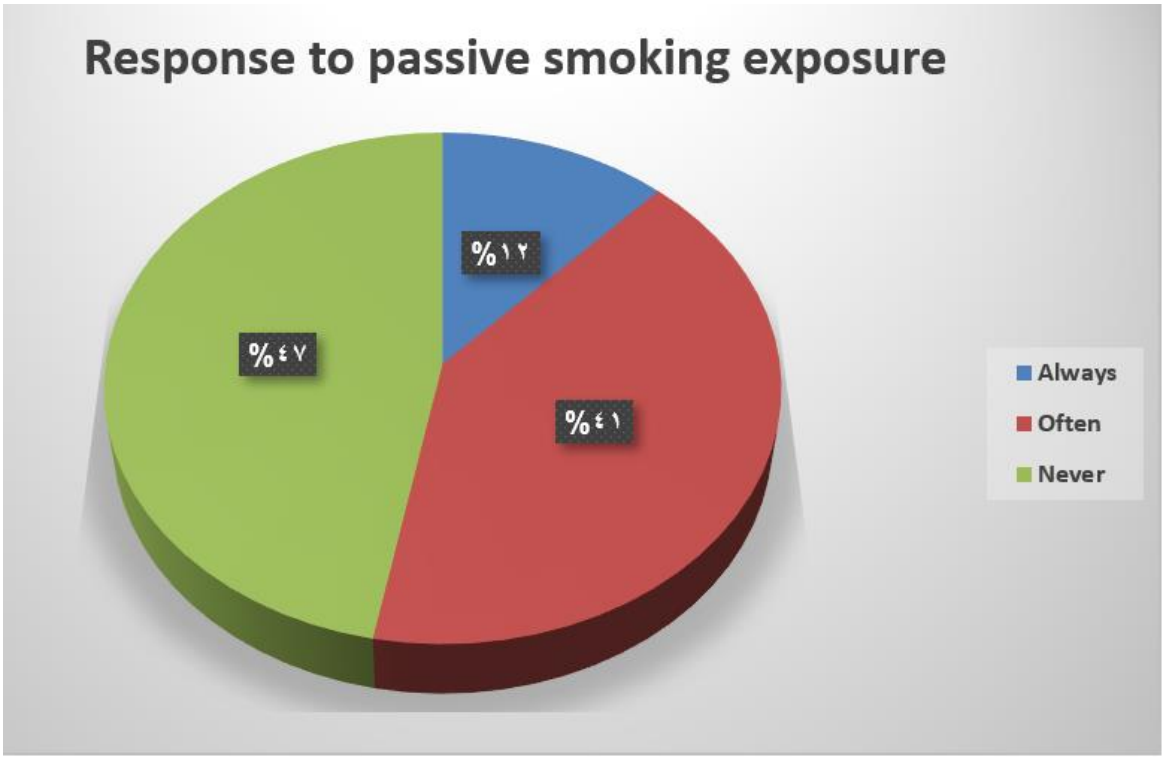

Fig. 1: Response to passive smoking exposure.

DISCUSSION

The findings of this study indicate that patients with coronary artery disease (CAD) had insufficient awareness of lifestyle modifications. Specifically, only 36.3% of participants were aware of the benefits of a healthy diet, while 27.4% knew about the importance of physical activity. Moreover, only 17.9% of participants were aware of the risks associated with smoking, and 18.4% knew about stress management techniques. These results are consistent with prior research that has reported low levels of knowledge and awareness among (CAD) patients regarding lifestyle modifications (Babu *et al.,* 2021). The lack of knowledge and awareness among (CAD) patients regarding lifestyle modifications can lead to poor outcomes and an increased risk of complications (Kotseva *et al.,* 2019).

The findings of this study emphasize the need for increased patient education and awareness regarding the importance of lifestyle modifications in managing and preventing coronary artery disease (CAD). Patient education and counseling can play a crucial role in improving patient outcomes and reducing the risk of CAD-related complications (Alvarez *et al.,* 2019).

In addition, the study found that education level was a significant factor associated with awareness of lifestyle modifications. Participants who had attained a higher level of education were more likely to have knowledge of the benefits of a healthy diet and the risks of smoking than those with a lower level of education. This finding is consistent with previous studies that have also reported an association between education level and awareness of lifestyle modifications (Shivashankar *et al.,* 2018).

Public health initiatives are essential to promote healthy lifestyle habits and reduce the burden of coronary artery disease (CAD). These initiatives can include policies and programs aimed at improving access to healthy foods, creating safe and walkable communities, and providing resources for smoking cessation and stress management.

The demographic characteristics of the study participants revealed that the majority of respondents were male (68.7%) and had an average age of 59 years (SD=10.4). The educational level of participants was also assessed, with 44.3% having an elementary education and 17.4% being illiterate. These findings are consistent with previous research on coronary artery disease (CAD) patients, which has reported a higher prevalence of (CAD) among males and older adults (Lloyd-Jones *et al.,* 2017). Studies have also reported lower levels of education among (CAD) patients, particularly in developing countries (Shivashankar *et al.,* 2019; Babu *et al.,* 2021). These demographic characteristics are important to consider when developing patient education and counseling strategies for (CAD) patients. Healthcare providers should tailor their approach to the specific needs and characteristics of their patients, taking into account factors such as age, gender, and educational background. This can help ensure that the information provided is appropriate and understandable for the patient, ultimately improving the effectiveness of patient education and counseling.

This study also assessed the relationship between the level of education and the degree of awareness about lifestyle modifications. The results showed a significant correlation between education level and awareness of a healthy diet ($\chi 2=9.67$, $p<0.05$) and smoking cessation ($\chi 2=5.45$, $p<0.05$). Individuals who had attained a higher level of education were more likely to have knowledge of the benefits of a healthy diet and the risks of smoking compared to those with a lower level of education. This finding is consistent with prior research that has reported an association between education level and awareness of lifestyle modifications (Shivashankar *et al.,* 2019). Education level is an important social determinant of health that can influence health behaviors and outcomes (Braveman *et al.,* 2018). In addition to education level, other demographic factors such as income,

race/ethnicity, and access to healthcare may also impact awareness and knowledge of lifestyle modifications among CAD patients (Lloyd-Jones *et al.,* 2017). For instance, individuals with lower income may have limited access to healthy foods and exercise facilities, which can affect their ability to adopt healthy lifestyle habits (Braveman *et al.,* 2018).

Regarding the source of information about CAD, the finding that healthcare providers were the most common source of information is consistent with previous research that has reported the crucial role of healthcare providers in educating patients about cardiovascular disease (Shivashankar *et al.,* 2019; Babu *et al.,* 2021). Healthcare providers can provide patients with accurate and personalized information about their condition and help them make informed decisions about their health. The Internet was also a prevalent source of information about (CAD) among study participants, which is consistent with the increasing use of the internet as a source of health information among the general population (Tang & Chen, 2020). However, the reliability and accuracy of health information on the internet can vary widely, and patients should exercise caution when seeking health information online. Family and friends were also reported as a means of obtaining information about (CAD) by a significant proportion of the participants, highlighting the importance of social support in managing chronic conditions such as (CAD) (Barrera *et al.,* 2019; Virani *et al.,* 2021). Family and friends can provide emotional and practical support, as well as information about the condition and its management. The low percentage of participants who reported television or radio and print media as a source of information about (CAD) suggests that traditional media may be less effective in reaching (CAD) patients with health information compared to healthcare providers and the internet.

limitation of this study is the use of convenience sampling, which may restrict the generalizability of the findings. Another limitation is that the study was conducted in a single hospital, which may not be representative of all (CAD) patients in the country.

CONCLUSION

In conclusion, the findings of this investigation highlight the importance of increasing patient education and awareness about the significance of lifestyle modifications in managing and preventing (CAD). Healthcare providers and policymakers should prioritize the promotion of healthy lifestyle habits and the development of targeted educational interventions to improve patient outcomes and alleviate the impact of the disease. By educating patients about the benefits of healthy habits such as a balanced diet, regular exercise, smoking cessation, and stress management, healthcare providers can help prevent the development and progression of CAD. Policymakers can also play a crucial role in promoting healthy lifestyle habits by implementing policies and programs that improve access to healthy foods and safe environments for physical activity.

Overall, these efforts can help reduce the burden of (CAD) and improve the overall health and well-being of the population.

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