

Psychological Determinants of Smoking Cessation Intentions Among Patients with Chronic Cardiovascular Disease: A Cross-Sectional Study

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Abstract

Objective: The objective of this study was to this study provides valuable insights into the psychological determinants of smoking cessation intentions among patients with chronic cardiovascular disease.

Material and Methods: In this cross-sectional study, 384 participants post-acute myocardial infarction (MI) were recruited through random sampling to explore the associations between smoking status and intention to quit smoking. Data collection took place over a 6-month period at a tertiary care hospital.

Results: The majority of participants were male (59.9%) and fell into the age category of 46 to 50 years (37.5%). Heavy daily smokers comprised the largest smoking group (41.6%), and non-ST-elevated MI was the most common subtype (40.1%). Intention to quit smoking varied among participants, with the precontemplation stage having the highest representation (19.3%), followed by contemplation (25.8%). Notably, a significant proportion of participants expressed no intention to quit smoking (35.4%). Multinomial logistic regression analysis identified current smoking as a significant predictor of intention to quit in the preparation and contemplation stages.

Conclusion: In conclusion, overall, this study underscores the importance of considering smoking behavior when evaluating the intention to quit smoking post-MI and highlights the need for tailored interventions and support strategies to address smoking cessation in this population. These findings offer valuable insights for the development of effective strategies aimed at reducing persistent smoking following MI and improving patient outcomes.

Keywords: Smokers; Cross-Sectional Studies; Developed Countries; Heart Diseases; Infarction

How to cite: Barkhurdar W, Saqib M, Ehsan A, Naz F, Raham JD. Psychological Determinants of Smoking Cessation Intentions Among Patients with Chronic Cardiovascular Disease: A Cross-Sectional Study. Esculapio-JSIMS 2026;22(03): 193-198 **DOI:** <https://doi.org/10.5281/zenodo.20503140>

Introduction

Smoking remains a leading modifiable risk factor for the progression of chronic cardiovascular disease (CVD). Despite strong medical recommendations to quit, many patients with established CVD continue to smoke.¹ Understanding the psychological factors that influence smoking cessation intentions is critical for designing effective, patient-centered interventions. This study examined the psychological determinants of smoking cessation intentions among patients with chronic cardiovascular disease.²

Heart disease remains the leading cause of death in developed countries, and cigarette smoking contributes to a significant proportion of cardiovascular-related deaths. Despite this knowledge, a substantial percentage of individuals with heart disease in the United States continue to smoke.³ Moreover, there is evidence to suggest that the number of current smokers among individuals with heart disease is increasing over time, and those who have previously experienced a myocardial infarction (MI) are more likely to be current smokers. It is important to note that smoking after an MI is associated with higher risks of future mortality and morbidity.⁴ While experiencing an MI may prompt individuals to consider quitting and make attempts to do so, the success in achieving long-term abstinence may be limited.

Tobacco use is a major risk factor for various cardiovascular diseases, including acute myocardial infarction (AMI) and stroke. It is responsible for approximately 11% of cardiovascular deaths worldwide.⁵ Interestingly, several clinical studies have shown that smokers may have more

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Submission Date: 11-09-2025

1st Revision Date: 21-11-2025

Acceptance Date: 17-03-2026

favorable outcomes after experiencing an AMI compared to non-smokers. This phenomenon, known as the "smoker's paradox," describes the observation that short-term mortality rates following an AMI tend to be more favorable for smokers.⁶

A study by Symons et al.⁷ found that tobacco use was associated with negative effects on the remodeling of the left ventricle after an AMI, consistent with the smoker's paradox. Similarly, a large study conducted in China involving patients with coronary artery disease who underwent percutaneous coronary intervention (PCI) showed comparable two-year outcomes between persistent smokers and those who never smoked. Another study from Taiwan suggested that the smoker's paradox may extend to long-term outcomes in patients with stable coronary artery disease who underwent PCI.

Smoking is a significant risk factor for a wide range of cardiovascular diseases (CVDs), including acute myocardial infarction (AMI), cerebrovascular disease (such as stroke), and heart failure. The risk of developing these CVD subtypes is substantially increased in current smokers, with some risks being more than doubled compared to non-smokers.⁸

Smoking cessation is considered one of the most effective strategies for secondary prevention following an acute myocardial infarction (AMI). The intention to quit smoking can be influenced by health issues, as well as other factors such as age, gender, nicotine dependence, motivation, self-efficacy, and previous quit attempts. These factors play a role in determining an individual's intention to quit and the success of their cessation efforts. Understanding a patient's intention to quit and the factors that predict it can assist healthcare professionals in selecting an appropriate smoking cessation method, leading to improved treatment outcomes⁹.

Material and Methods

A cross-sectional study was conducted to explore the associations between smoking status and intention to quit smoking in participants post-acute myocardial infarction (AMI). The study aimed to provide insights so that effective strategies to reduce the incidence of persistent smoking following AMI can be developed in future. Random sampling method was used to sample study participants. A sample size of 384 participants was calculated using the OpenEpi (www.OpenEpi.com) online program. OpenEpi is a free, Web-based, open-source, program that can aid researchers in calculating an appropriate sample size for cross-sectional studies. Sample size calculation was performed assuming and alpha (α) level = 0.05 (two-tailed) with a power ($1-\beta$) = 0.80 and the calculation formula is shown in Table 1. Expected prevalence of persistent smoking after AMI = 50%, based on previous studies.

Data collection was carried out over a period of 6 months at

a tertiary care hospital site. The study adhered to all ethical standards. Informed written consent was obtained from all participants before enrollment. Permission to publish the findings was also obtained. 384 Participants were recruited to the study. Inclusion criteria included individuals who presented to the hospital emergency department with acute MI and aged 35 years or above after a written informed consent was obtained. Exclusion criteria included individuals with a history of severe cognitive impairment, those presenting to the emergency department for a complaint other than acute MI, nonsmokers, ex-smokers, participants with a recurrent MI and those unable to provide informed consent. Acute myocardial infarction was defined as myocardial infarction specified as acute or with a stated duration of 4 weeks (28 days) or less from onset as per the international classification of diseases-10 (ICD) version 19 code I21. Participant age, gender, body mass index, type of acute MI (ST-elevated MI or non ST-elevated MI) were collected from their records. Data was entered and analyzed using IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). In the present study, a comprehensive statistical analysis was conducted to investigate various factors related to smoking behavior in smokers following acute myocardial infarction (MI) and their intention to quit smoking.

Results

A total of 384 participants (n=384) were included in the study. The majority of the participants were male (n=230, 59.9%), while the remaining participants were female (n=154, 40.1%). Regarding the age category, the largest group consisted of participants aged 46 to 50 years (n=144, 37.5%), followed by those aged 51 to 55 years (n=106, 27.6%). The least represented age group was participants aged 71 to 75 years (n=2, 0.5%). In terms of smoking status, the highest proportion of participants were heavy daily smokers (n=161, 41.6%), followed by light daily smokers (n=79, 20.6%). Among the participants, the majority experienced a non ST-elevated myocardial infarction (n=154, 40.1%), while the rest had an ST-elevated myocardial infarction (n=230, 59.9%). The intention to quit smoking varied among the participants, with the largest group being in the precontemplation stage (n=74, 19.3%), followed by contemplation (n=99, 25.8%). A substantial proportion of participants had no intention to quit smoking (n=136, 35.4%). In terms of educational level, the majority of participants had completed junior high school (n=260, 67.7%), while smaller proportions had completed high school (n=88, 22.9%) or university (n=36, 9.4%). Regarding income level, the highest percentage of participants fell into the low-income category (n=287, 74.7%), followed by the high-income category (n=54, 14.1%), with the middle-income category being the smallest

(n=43, 11.2%) as shown in Table 2. Bar charts denoting frequencies of different variables have also been shown in Figures 1–6.

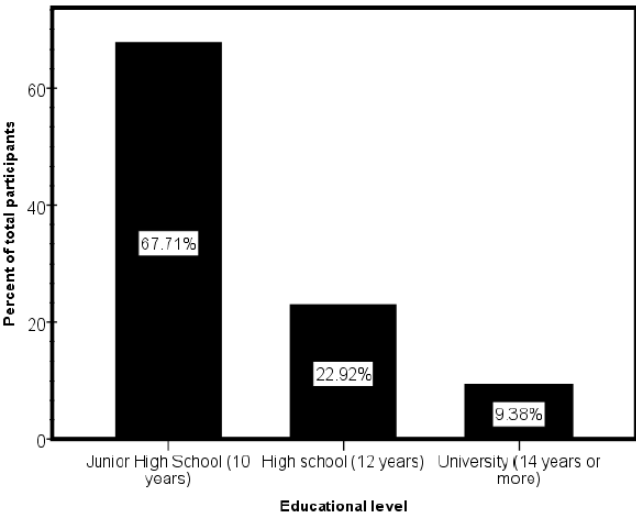
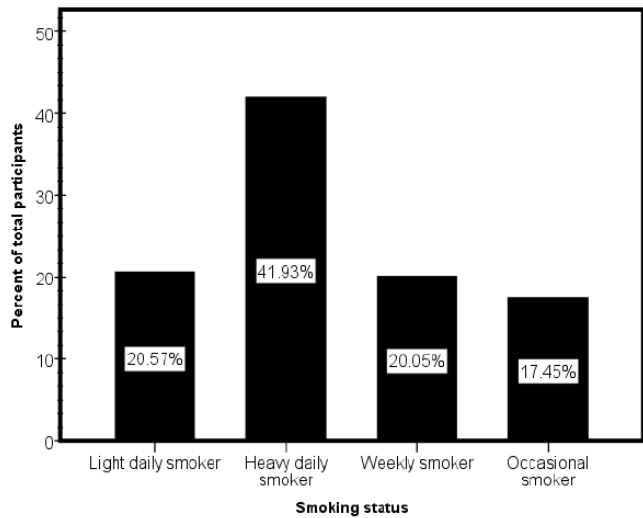
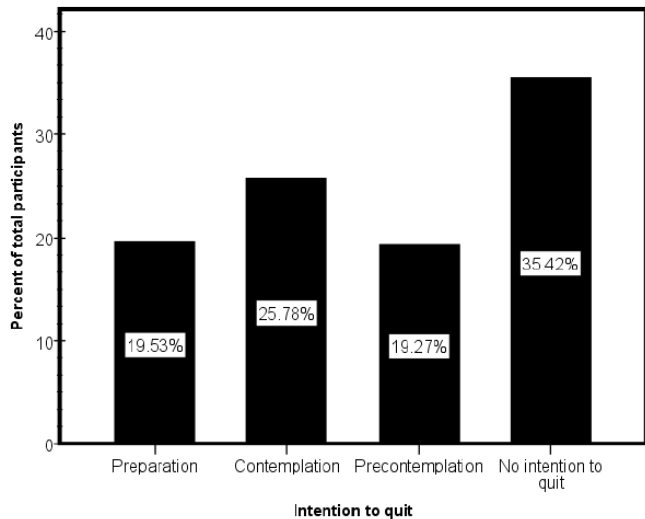
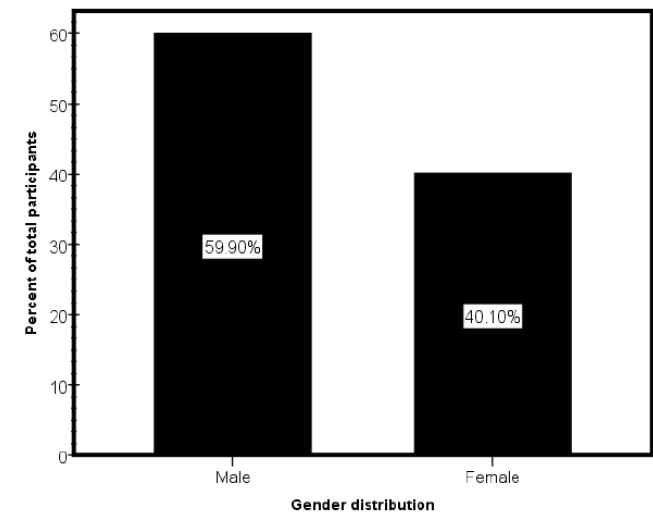
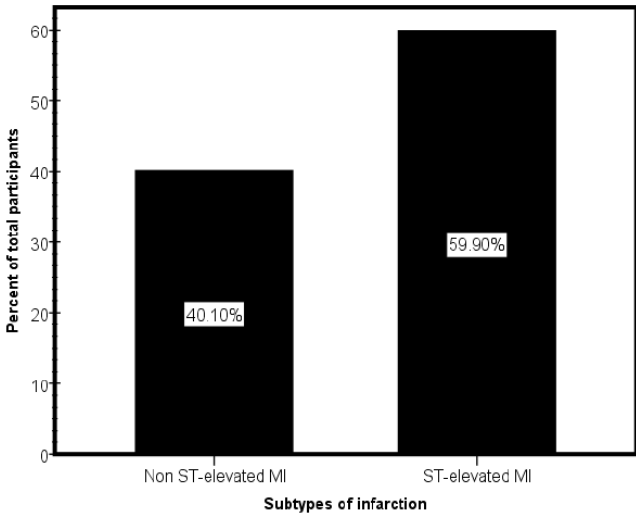
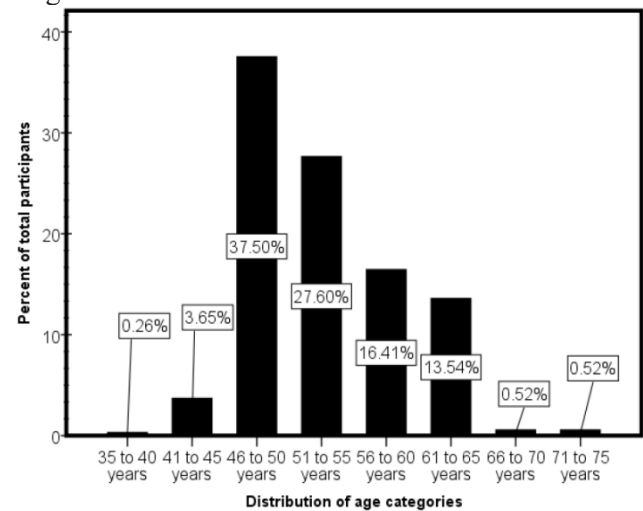


Table 1: Table 5: Results of multinomial logistic regression analysis that examined the predictors of intention to quit smoking post-MI across different categories: "Preparation," "Contemplation," and "Precontemplation," with the reference category being "No intention to quit."

Variables	Odds ratio	Wald	df	Std. Error	p-value
Preparation					
Current smoker	197.731	0.527	100.478	5.287	<0.01
Contemplation					
Current smoker	17.982	0.390	54.927	2.889	<0.01
Precontemplation					
Current smoker	.008	0.529	82.584	4.807	-<0.01

The multinomial logistic regression analysis examined the predictors of intention to quit smoking post- MI across different categories: "Preparation," "Contemplation," and "Precontemplation," with the reference category being "No intention to quit." The analysis revealed several significant findings. For individuals in the "Preparation" category, being a current smoker significantly increased the likelihood of intending to quit smoking ($p < .001$), with current smokers being approximately 197.731 times more likely to be in the "Preparation" category compared to those with no intention to quit. Similarly, in the "Contemplation" category, being a current smoker significantly increased the likelihood of intending to quit smoking ($p < .001$), with current smokers being approximately 17.982 times more likely to be in the "Contemplation" category compared to those with no intention to quit. However, in the "Precontemplation" category, being a current smoker significantly decreased the likelihood of intending to quit smoking ($p < .001$), with current smokers being approximately 1/0.008 times (or 125 times) less likely to be in the "Precontemplation" category compared to those with no intention to quit. These findings highlight the importance of smoking status in influencing intention to quit smoking post-MI across different stages of change as shown in table 5. None of the other variables significantly predicted the intention of quitting smoking.

Discussion

The presented research aimed to investigate the associations between smoking behavior, myocardial infarction (MI) subtypes, and the intention to quit smoking post-MI. The study included 384 participants, with the majority being male. The findings revealed that regardless of smoking status, the "No intention to quit" group was the largest,

indicating a lack of motivation to quit smoking among most individuals. However, interesting variations emerged when analyzing different smoking status categories. Heavy daily smokers showed a significant proportion in the "Preparation" and "Contemplation" groups, suggesting a stronger intention to quit compared to other groups. Light daily smokers and occasional smokers exhibited a higher motivation to quit, particularly in the "Preparation" stage. Weekly smokers had a relatively stronger intention to quit compared to other groups, mainly falling into the "Contemplation" category. These results highlight the importance of considering smoking behavior when assessing individuals' intention to quit smoking after experiencing a myocardial infarction. Furthermore, the study examined the associations between smoking behavior, MI subtypes, and intention to quit smoking using chi-square tests. Significant associations were found between smoking behavior and intention to quit, as well as between smoking behavior and MI subtypes. Specifically, the analysis showed that light daily smokers and occasional smokers had a higher likelihood of being in the "Preparation" stage, while heavy daily smokers had the majority in the "No intention to quit" category. Regarding MI subtypes, light daily smokers and heavy daily smokers were more likely to experience ST-elevated MI, whereas weekly smokers predominantly experienced non-ST-elevated MI, and occasional smokers exclusively had ST-elevated MI. Finally, multinomial logistic regression analysis examined the predictors of intention to quit smoking post-MI across different categories. The results indicated that being a current smoker significantly increased the likelihood of intending to quit smoking in both the "Preparation" and "Contemplation" categories, while it decreased the likelihood in the "Precontemplation" category. This suggests that current smokers were more motivated to quit smoking, especially in the earlier stages of change. No other variable (including education and income levels) other than smoking status was found to significantly predict intention to quit smoking after acute MI. We weren't able to assess the information on participation in cardiac rehabilitation (CR) within 2 weeks after hospital discharge but that has been shown to be a determinant of smoking cessation ¹⁰⁻¹². Our study findings align with the results of the EUROASPIRE IV survey, a multi-center study, which reported that a significant proportion of acute myocardial infarction (AMI) survivors in Europe, ranging from 40% to 60%, continue to smoke after experiencing an AMI. Similarly, our study also observed comparable results regarding the persistence of smoking among AMI survivors ¹³. Several European countries, such as Spain, Turkey, Serbia, and Cyprus, exhibit notably high rates of smoking prevalence among patients who have experienced a myocardial infarction (MI), with percentages ranging from 41% to 57% and we observed similar results as well ¹³. Our study uncovered interesting findings regarding

the baseline clinical characteristics of the participants. As mentioned earlier, smokers tended to be more often male and younger in age. These results align with existing evidence of the male predominance in smoking, which supports our findings as expected¹⁴. Furthermore, we conducted additional analysis to examine the relationship between smoking intensity and gender within the different smoking groups, as mentioned previously. As previously mentioned, further examination was conducted on the smoking subgroups divided based on their smoking frequency revealed increased association with male gender. This has been reported previously as well and our findings are in line with previous studies¹⁵.

Conclusion

In conclusion, this study provides valuable insights into the associations between smoking behavior, myocardial infarction (MI) subtypes, and the intention to quit smoking post-MI. The findings highlight the varying levels of motivation to quit among different smoking groups, with heavy daily smokers showing a stronger intention to quit compared to other groups. The study underscores the importance of considering smoking behavior when assessing post-MI individuals' intention to quit smoking and suggests the need for tailored interventions and support strategies for smoking cessation in this population. The study's strengths, including sample size calculation, standardized questionnaire use, and clinical relevance, contribute to the robustness of the research and enhance its potential impact on addressing the gap in knowledge regarding smoking behavior in post-MI patients.

Funding source: None

Conflict of interest: None

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Author's contribution:

BW, SM: Conceptualization of Project

EA, NF: Data Collection

BW, SM: Literature Search

SM: Statistical Analysis

EA, NF: Drafting, Revision

BW, SM: Writing of Manuscript