Cross-sectional Study

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Smoking behaviour in post-acute myocardial infarction patients: cross-sectional study

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Introduction: Heart disease remains the leading cause of death in developed countries, and cigarette smoking contributes to a significant proportion of cardiovascular-related deaths. Abstaining from tobacco use is associated with a significant reduction in the risk of recurrent myocardial infarctions.

Methodology: 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, Islamabad, Pakistan.

Results: The majority of participants were male (59.9%) and fell into the age category of 46–50 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 pre-contemplation 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%).

Conclusion: Multinomial logistic regression analysis identified current smoking as a significant predictor of intention to quit in the preparation and contemplation stages. Overall, this study underscores the importance of considering smoking behaviour 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: cross-sectional studies, developed countries, heart diseases, infarction, smokers

Introduction

Heart disease continues to be the number one killer of men and women in the developed world. In the United States, 33% of cardiovascular-related deaths are attributable to cigarette smoking. Unfortunately, 20–26% of people in the US with heart disease report current smoking. National-level data suggest that the proportion of people with heart disease who are current smokers is increasing over time and that those with a history of myocardial infarction (MI) are more likely to be current smokers than those without such a history. It is important to note that smoking after an MI is associated with higher risks of future mortality and morbidity. 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[1]. Tobacco use is a major risk factor for various cardiovascular diseases, including acute myocardial infarction (AMI) and stroke. It is responsible for ~11% of cardiovascular deaths worldwide[2]. Interestingly, several clinical studies have shown that smokers may have more favourable outcomes after experiencing an AMI compared to non-smokers. This phenomenon, known as the "smoker's

HIGHLIGHTS

- The study provides valuable insights into the associations between smoking behaviour, myocardial infarction (MI) subtypes, and the intention to quit smoking post-MI.
- Heavy daily smokers exhibit a stronger intention to quit compared to other smoking groups, emphasizing varying levels of motivation to quit among different smokers.
- Smoking behaviour should be considered when assessing post-MI individuals' intention to quit smoking, highlighting the need for tailored interventions and support strategies for smoking cessation in this population.
- The study's strengths, such as standardized sample size calculation, standardized questionnaire use, and clinical relevance, contribute to the robustness of the research and enhance its potential impact on addressing the knowledge gap concerning smoking behaviour in post-MI patients.

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paradox," describes the observation that short-term mortality rates following an AMI tend to be more favourable for smokers. A study by Symons and colleagues found that tobacco use was associated with negative effects on the remodelling 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. PCI or the administration of thrombolytics may be used if the ECG reveals alterations that are diagnostic of myocardial infarction (ST elevation in particular leads, a new left bundle branch block, or a true posterior MI pattern). In the former, a drug that induces fibrinolysis is administered; this breaks up blood clots that are blocking the coronary arteries. In the latter, obstructions in the coronary arteries are found using a flexible catheter that is advanced to the heart via the femoral or radial artery. If it is determined that a lesion, known as the culprit lesion, is responsible for the myocardial damage, the occlusions can be mechanically treated by angioplasty and typically stent deployment. The data indicate that prompt triage, transfer, and treatment are crucial. The American College of Cardiology (ACC) recommends a door-to-needle thrombolytic administration time of no more than 30 minutes and a door-to-balloon percutaneous coronary intervention (PCI) time of no more than 90 minutes. According to a 2009 case-control study, patients with STEMI are more likely to receive thrombolysis than PCI within the bounds of the published ACC guidelines. When possible, an atherectomy should be avoided in PCI patients with diabetes since there is a higher risk of angiographic restenosis six months after the procedure. Intracoronary irradiation is used to stop stents from restrenosing[2]. It showed a reduction in-stent restenosis in BMS, but after DESs were introduced, in-stent restenosis decreased, and so did the use of brachytherapy. Smoking is a significant risk factor for a wide range of cardiovascular diseases (CVDs), including 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. Another risk factor for smoking is acute coronary syndrome (ACS) syndrome, a collection of signs and symptoms brought on by reduced blood flow in the coronary arteries, causing a portion of the heart muscle to become dysfunctional or even die. The most typical symptom is a central pressure-like chest ache that is accompanied by nausea and perspiration and frequently radiates to the left shoulder or angle of the jaw. Particularly in women, the elderly, and those with diabetes mellitus, many persons with acute coronary syndromes also experience symptoms other than chest discomfort[3]. Smoking cessation is considered one of the most effective strategies for secondary prevention following an AMI[4]. 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 outcomes[5]. Among individuals who smoke and experience a myocardial infarction (MI), quitting smoking after the event is considered the most effective preventive measure. Moreover, abstaining from tobacco use is associated with a significant reduction in the risk of recurrent MI by 30-40% and a 45% decrease in mortality. As a result, assisting patients in quitting smoking after an MI and maintaining long-term abstinence are primary objectives of cardiac rehabilitation programs[6]. Therefore, this study aimed to explore the associations between smoking status and intention to quit smoking in participants post-acute myocardial infarction (AMI). This study also focuses on non-myocardial infarction parameter; however, several ACS parameter such as Killip class, length of stay, cost spent, are important parameter to produce deterrent effect regarding intention to quit smoking. The study aimed to provide insights for developing effective strategies to reduce the incidence of persistent smoking following AMI.

Methods

A cross-sectional study was conducted to explore the associations between smoking status and intention to quit smoking in participants post-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. A 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-β) = 0.80 and the calculation formula is shown in Table 1. Expected prevalence of persistent smoking after AMI = 50%, based on previous studies[4].

Data collection was carried out over a period of 6 months at a tertiary care hospital Islamabad, Pakistan.

The study adhered to all ethical standards. Informed written consent was obtained from all participants before enrolment. Permission to publish the findings was also obtained.

Three hundred eighty-four participants who are currently smokers 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 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, non-smokers, 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

Table 1

Sample size calculation formula in detail; Results from OpenEpi, Version 3, open-source calculator.

Population size(for finite population correction factor or fpc)(*N*):	1 000 000
Hypothesized % frequency of outcome factor in the population (*p*):	50% ± 5
Confidence limits as % of 100 (absolute ± %)(*d*):	5%
Design effect (for cluster surveys-*DEFF*):	1
Confidence level (%)	Sample size
95%	384

Equation used for sample size calculation: $n = [DEFF*Np(1-p)]/[(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$.

(28 days) or less from onset as per the international classification of diseases-10 (ICD) version 19 code I21 [available online from https://icd.who.int/browse10/2019/en#/I20-I25]. Participant age, gender, body mass index, and type of acute MI (ST-elevated MI or non-ST-elevated MI) were collected from their records.

A structured and standardized questionnaire was developed to collect data on the participants' education level, income level, smoking status and intentions of quitting smoking after acute MI. The questionnaire was adapted with modifications for our region from questionnaires used in similar studies in other regions[7]. The questionnaire was administered through face-to-face interviews conducted by trained personnel. The questionnaire used in our study comprised four sections to gather relevant information from participants.

In the first section of the questionnaire, participants were asked to provide their smoking status by selecting options such as heavy daily smoker (i.e. persons smoking 1 pack per day), light daily smoker (i.e. persons smoking less than 1 pack per day), weekly smoker (i.e. persons smoking 1 pack per week) and occasional smoker (i.e. persons who smoked in the last month). This section aimed to capture the participants' smoking habits.

The second section focused on educational attainment and was divided into two parts. Participants who had completed their schooling were asked to indicate their highest level of educational attainment, with options including junior high school (10 years of education), high school (12 years of education), and university (more than 14 years of education). This section aimed to gather data on participants' educational backgrounds and its correlation with smoking behaviour analyzed in this study.

The third section aimed to assess participants' income levels. Participants were requested to provide an estimate of their monthly income in USD and choose from three income ranges: low (less than $150 per month), middle ($150–$400 per month), or high (more than $400 per month). This section aimed to gather information on participants' income statuses.

The fourth part of the questionnaire aimed to assess participants' intention to quit smoking based on the well-known Transtheoretical Model[8]. According to the model, participants' intentions were categorized into four categories. The first category was the "preparation category," indicating an intention to quit smoking within the next month. The second category was the "contemplation category," reflecting an intention to quit within the next 6 months. The third category was the "precontemplation category" indicating participants who expressed an intention to quit someday but not within the next 6 months. The fourth category was the "no intention of quitting category" indicating participants who had no intention to quit smoking. By capturing these intentions, this part of the questionnaire sought to understand participants' readiness to quit smoking and their current stage of change.

A STROCCS[9] checklist has been added as a supplementary file, http://links.lww.com/MS9/A415.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics for Windows, version 20 (IBM Corp.). In the present study, a comprehensive statistical analysis was conducted to investigate various factors related to smoking behaviour in smokers following AMI and their intention to quit smoking.

Descriptive analysis was performed to provide a thorough overview of the variables of interest, including age, gender, smoking status, intention to quit smoking, and MI subtypes (STEMI and NSTEMI). Frequencies and percentages were calculated for categorical variables. As there were no continuous variables, summary statistics such as mean and standard deviation were not computed.

To examine the association between smoking behaviour and the intention to quit smoking post-MI, correlation analysis utilizing Cramer's V and Phi coefficient was conducted. This analysis yielded valuable insights into the strength and direction of the relationship between these variables.

Further exploration of the associations between smoking behaviour, MI subtypes, and intention to quit smoking was carried out using χ^2 tests. These tests allowed for the determination of significant associations between these categorical variables. Separate chi-square tests were performed to evaluate the relationships between smoking status and MI subtypes, smoking status and intention to quit smoking, as well as MI subtypes and intention to quit smoking.

Multinomial logistic regression analysis was employed to assess the predictors of intention to quit smoking post-MI. The intention to quit smoking, categorized based on stages of change, served as the dependent variable, while the independent variables, smoking status, age, sex, and MI subtypes, educational levels and income levels, were included in the analysis. This statistical technique enabled the estimation of odds ratios and determination of the significance of these predictors in relation to the 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 46–50 years ($n=144$, 37.5%), followed by those aged 51–55 years ($n=106$, 27.6%). The least represented age group was participants aged 71–75 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 pre-contemplation 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.

Cramer's V and Phi coefficient analysis to examine the association between smoking behaviour and the intention to quit smoking post-MI revealed that the majority of individuals,

Table 2

Study participant characteristics.

Variable	Total number of participants ($n = 384$)							
Sex	Males			Females				
n (%)	230 (59.9)			154 (40.1)				
Age categories	35–40 years	41–45 years	46–50 years	51–55 years	56–60 years	61–65 years	66–70 years	71–75 years
n (%)	1 (0.3)	14 (3.6)	144 (37.5)	106 (27.6)	63 (16.4)	52 (13.5)	2 (0.5)	2 (0.5)
Smoking status	Light daily smoker			Heavy daily smoker	Weekly smoker		Occasional smoker	
n (%)	79 (20.6)			161 (41.6)	77 (20.1)		67 (17.4)	
Subtype of infarction	Non-ST-elevated MI				ST-elevated MI			
n (%)	154 (40.1)				230 (59.9)			
Intention to quit	Preparation		Contemplation		Pre-contemplation		No intention to quit	
n (%)	75 (19.5)		99 (25.8)		74 (19.3)		136 (35.4)	
Educational level	Junior high school (10 years)		High school (12 years)				University (14 years or more)	
n (%)	260 (67.7)		88 (22.9)				36 (9.4)	
Income level	Low (less than $150 per month)				Middle ($150-$400 per month)		High (more than $400 per month)	
n (%)	287 (74.7)				43 (11.2)		54 (14.1)	

MI, myocardial infarction.

irrespective of their smoking status, fell into the "No intention to quit" group, indicating a lack of motivation to quit smoking. However, upon closer examination, variations among the smoking status categories emerged. Among heavy daily smokers, a significant proportion fell into the "Preparation" and "Contemplation" groups, indicating a stronger intention to quit compared to other smoking status groups. This suggested that individuals who smoked heavily were more motivated to quit smoking after experiencing a myocardial infarction. On the other hand, light daily smokers and occasional smokers had a relatively higher percentage in the "Preparation" group, suggesting a greater motivation to quit compared to the "Contemplation" and "Precontemplation" groups. This indicated that even individuals with lower smoking frequency exhibited a higher intention to quit following an MI. Additionally, the analysis revealed that weekly smokers had a higher percentage in the "Contemplation" group, indicating a relatively stronger intention to quit compared to other smoking status groups. This suggested that individuals who smoked on a weekly basis were more likely to contemplate quitting smoking post-MI. The symmetric measures, Phi coefficient and Cramer's V, provided further evidence of the strength and direction of the relationship between smoking status and intention to quit. Both measures indicated a strong and highly significant association between these variables. The Phi coefficient of 1.514 and Cramer's V value of 0.874 confirmed a robust relationship, emphasizing the importance of considering smoking behaviour when assessing an individual's intention to quit smoking after experiencing a myocardial infarction as shown in Table 3.

A chi-square test was conducted to examine the associations between smoking behaviour, MI subtypes, and intention to quit smoking. The table presents the percentages of participants in each smoking status category based on their intention to quit. Among light daily smokers, 4.0% were in the preparation stage, 3.0% were in contemplation, 95.9% were in pre-contemplation, and 1.5% had no intention to quit. For heavy daily smokers, 8.0% were in the preparation stage, 20.2% were in contemplation, 1.4% was in pre-contemplation, and the majority (98.5%) had no intention to quit. Among weekly smokers, 1.3% was in the preparation stage, 97.4% were in contemplation, and 1.3% was in pre-contemplation, while none had no intention to quit. Occasional smokers showed a different pattern, with 86.7% in the preparation stage, 1.0% in contemplation and 1.4% pre-contemplation, and none having no intention to quit. The χ^2 test for smoking status and intention to quit yielded a significant result ($\chi^2 = 880.495$, df = 9, $P < 0.01$), indicating a significant association between smoking behaviour and intention to quit. Similarly, the associations between smoking status and MI

Table 3

Association between smoking behaviour and the intention to quit smoking post-MI, correlational analysis utilizing Cramer's V and Phi coefficients.

Smoking status	Intention to quit	% within Intention to quit ($n = 384$)
Light daily smoker	Preparation	4.0%
	Contemplation	3.0%
	Pre-contemplation	95.9%
	No intention to quit	1.5%
Heavy daily smoker	Preparation	8.0%
	Contemplation	20.2%
	Pre-contemplation	1.4%
	No intention to quit	98.5%
Weekly smoker	Preparation	1.3%
	Contemplation	75.8%
	Pre-contemplation	1.4%
	No intention to quit	0.0%
Occasional smoker	Preparation	86.7%
	Contemplation	1.0%
	Pre-contemplation	1.4%
	No intention to quit	0.0%
Symmetric measures	Value	*p* value
Phi	1.514	< 0.01
Cramer's V	0.874	< 0.01

Table 4

Associations between smoking behaviour, MI subtypes, and intention to quit smoking carried out using χ^2 tests for correlation analysis.

Status	Preparation	Contemplation	Pre-contemplation	No intention to quit
Light daily smoker	4.0%	3.0%	97.5%	2.5%
Heavy daily smoker	8.0%	20.2%	1.4%	98.5%
Weekly smoker	1.3%	97.4%	1.3%	0%
Occasional smoker	86.7%	1.0%%	1.4%	0%
Smoking status and intention to quit				
	χ^2 value	df	*p* value	
Pearson χ^2	880.495	9	< 0.01	
Smoking status	Non-ST-elevated MI	ST-elevated MI		
Light daily smoker	2.5%	97.5%		
Heavy daily smoker	47.8%	52.2%		
Weekly smoker	97.4%%	2.6%		
Occasional smoker	0%	100.0%		
Smoking Status and Subtype of Infarction				
	χ^2 value	df	*p* value	
Pearson χ^2	200.528	3	< 0.01	

df, degree of freedom; MI, myocardial infarction.

subtypes were examined, revealing that among light daily smokers, 2.5% experienced non-ST-elevated MI and 97.5% experienced ST-elevated MI. For heavy daily smokers, 47.8% had non-ST-elevated MI, and 52.2% had ST-elevated MI. Weekly smokers predominantly experienced non-ST-elevated MI (97.4%) compared to ST-elevated MI (2.6%), while occasional smokers exclusively had ST-elevated MI (100.0%). The χ^2 test for smoking status and MI subtypes was also significant ($\chi 2 = 200.528$, df = 3, $P < 0.01$). These findings demonstrate significant associations between smoking behaviour, MI subtypes, and intention to quit smoking as shown in Table 4.

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. With current smokers being ~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

AMI outcomes are adversely affected by diabetes mellitus (DM), but large-scale research comparing the effects of Type 1 DM (T1DM) and Type 2 DM (T2DM) on AMI outcomes are limited[10]. Two important factors can be used to explain the relationship between HTN and myocardial infarction in general: (2) Hypertension is linked to accelerated atherosclerosis, which accelerates the progression of myocardial infarction, and (3) hypertension is associated with inherited risk profiles, resistance to insulin, empathetic hyperactivity, and vasoactive agents (i.e. angiotensin II)[11]. Obesity and overweight are growing issues in many nations and are linked to chronic diseases[12]. The presented research aimed to investigate the associations between smoking behaviour, 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

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
Pre-contemplation					
Current smoker	0.008	0.529	82.584	-4.807	< 0.01

MI, myocardial infarction.

behaviour when assessing individuals' intention to quit smoking after experiencing a myocardial infarction.

Furthermore, the study examined the associations between smoking behaviour, MI subtypes, and intention to quit smoking using chi-square tests. Significant associations were found between smoking behaviour and intention to quit, as well as between smoking behaviour 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[13,14]. Our study findings align with the results of the EUROASPIRE IV survey, a multi-centre study, which reported that a significant proportion of 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[15]. 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[16]. 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 expected[17]. Furthermore, we conducted additional analysis to examine the relationship between smoking intensity and gender within the different smoking groups in Pakistan with less female smokers, 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 sex. This has been reported previously as well and our findings are in line with previous studies[18].

This study demonstrates several strengths that contribute to the robustness of the research. Firstly, the use of standardized sample size calculation ensures that the study has sufficient statistical power to draw meaningful conclusions. Additionally, the employment of a standardized questionnaire for data collection enhances the validity and reliability of the study by ensuring consistent and comparable responses from participants. The study's clear inclusion and exclusion criteria further improve internal validity, ensuring that the sample consists of individuals who meet specific characteristics relevant to the research question. By focusing specifically on post-acute myocardial infarction patients, the study provides valuable insights into the smoking behaviour and intention to quit within this specific population, offering a contextually relevant perspective. Furthermore, the potential for clinical relevance is significant, as the findings can inform tailored interventions and support strategies for smoking cessation in post-MI patients. Finally, the study contributes to the existing literature by addressing a gap in knowledge, thereby enriching the understanding of smoking behaviour in this specific population.

Limitations

While the study provides valuable insights, it is important to acknowledge its limitations. Firstly, the study design, which was cross-sectional, limits the ability to establish causality or determine the temporal relationship between smoking behaviour and post-MI outcomes. Longitudinal or interventional studies would be needed to better understand the impact of smoking behaviour on intention to quit and subsequent smoking cessation rates. Another limitation is the single-centre nature of the study, which may restrict the generalizability of the findings to other populations or settings. The characteristics and behaviours of patients at a single centre might not reflect the broader population of post-MI patients. The study's results should be interpreted with caution and further research in diverse settings is warranted to validate the findings. Additionally, the study's inclusion and exclusion criteria might have introduced selection bias. Excluding non-smokers and ex-smokers may have limited the representation of individuals who have successfully quit smoking following a myocardial infarction. Furthermore, the exclusion of patients with severe cognitive impairment may have influenced the study's findings by excluding a subset of post-MI patients who could have unique smoking behaviour patterns and intention to quit. Long-term follow-up and repeated assessments would provide a more comprehensive understanding of the changes in smoking behaviour and intention to quit over time.

Conclusion

In conclusion, this study provides valuable insights into the associations between smoking behaviour, MI subtypes, and the intention to quit smoking post-MI. Heavy smokers show a stronger intention not to quit smoking compared to other groups. The study underscores the importance of considering smoking behaviour 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 behaviour in post-MI patients. Most AMI survivors in the study were heavy smokers, and majority of these smokers showed no intention to quit. Most participants had low levels of education and income.

Ethics approval and consent to participate

Written informed consent was taken from all participants of the study. All procedures performed in studies involving human

participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent for publication

All participants consented to publication of findings from the research. All authors approve the submission and publication of the research.

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Conflicts of interest disclosure

None.

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Data access statement

Deidentified data will be made readily available upon reasonable request to the corresponding author.

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