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Original Article

Medication Compliance Among Sehat Sahulat Insured Patients Following Percutaneous Coronary Intervention in a Tertiary Care Hospital of Peshawar

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Abstract

Background: Medication compliance following percutaneous coronary intervention (PCI) is essential for preventing recurrent cardiovascular events and improving long-term outcomes. However, non-compliance remains a major challenge, particularly in low- and middle-income populations where socioeconomic barriers may limit access to long-term therapy.

Objective: To determine medication compliance among Sehat Sahulat insured patients after PCI and evaluate factors associated with medication compliance in a tertiary care hospital in Peshawar.

Methodology: This descriptive cross-sectional study was conducted at the Peshawar Institute of Cardiology from 1st October 2025 to 31st December 2025. A total of 310 patients aged 19–75 years who had undergone PCI within the previous one to three months under the Sehat Sahulat program were recruited through non-probability consecutive sampling. Medication compliance was assessed using the validated 4-item Morisky Medication Compliance Scale (MMAS-4). Demographic and clinical characteristics including age, gender, educational status, socioeconomic status, and family history of coronary artery disease (CAD)/PCI were recorded.

Results: The mean age of participants was 56.70±8.49 years, and most were male (85.16%). Overall medication compliance was observed in only 80 (25.81%) participants, while 230 (74.19%) were non-adherent. Educational status showed a significant association with compliance in univariable analysis (OR=0.52, p=0.02) but lost significance after adjustment (aOR=0.43, p=0.73). Participants in the medium socioeconomic group demonstrated significantly lower odds of compliance in both univariable and multivariable analyses (p<0.001). Family history of PCI/CAD was not independently associated with compliance after adjustment.

Conclusion: Medication compliance among Sehat Sahulat insured patients following PCI was considerably low. Socioeconomic status significantly influenced compliance, highlighting the need for targeted interventions to improve long-term medication compliance and cardiovascular outcomes.

Keywords: Medication compliance, Medication compliance, Percutaneous coronary intervention, Sehat Sahulat Program.

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Introduction

Coronary artery disease (CAD) is one of the leading causes of morbidity and mortality worldwide and represents a major public health challenge due to its increasing prevalence and economic burden on healthcare systems [1]. Cardiovascular diseases account for a substantial proportion of global deaths, with CAD contributing nearly half of cardiovascular-related mortality worldwide [2]. CAD encompasses a spectrum of clinical conditions including stable angina, unstable angina, myocardial infarction, and sudden cardiac death, all primarily resulting from progressive atherosclerotic narrowing of the coronary arteries [3]. Although CAD predominantly affects middle-aged and elderly individuals, early-onset disease is increasingly being reported among younger populations with multiple cardiovascular risk factors such as diabetes, hypertension, obesity, smoking, and dyslipidemia [4]. Importantly, modification of cardiovascular risk factors and compliance to evidence-based medical therapy can substantially reduce morbidity, mortality, and recurrence of cardiovascular events among patients diagnosed with CAD [5].

Acute myocardial infarction (MI), one of the most severe manifestations of CAD, occurs due to sudden obstruction of coronary blood flow resulting in myocardial ischemia and necrosis [6]. Clinical manifestations commonly include chest pain, shortness of breath, sweating, nausea, and hemodynamic instability. Based on electrocardiographic findings, acute MI is broadly categorized into ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI) [7]. Percutaneous coronary intervention (PCI) has emerged as one of the most effective and commonly performed revascularization procedures for the treatment of obstructive coronary artery disease and acute coronary syndromes. Despite technological advancements and improved procedural outcomes, the long-term success of PCI depends heavily on compliance to prescribed pharmacological therapy after intervention [8].

Patients undergoing PCI are commonly prescribed multiple cardiovascular medications including antiplatelet agents, statins, beta-blockers, anticoagulants, and antihypertensive drugs to prevent stent thrombosis, recurrent ischemic events, and disease progression [8]. Compliance to these medications is essential for symptom control, reduction in cardiovascular complications, improved quality of life, and long-term survival. However, medication non-compliance remains a major challenge globally and is influenced by numerous factors including socioeconomic status, depression, educational level, medication affordability, health literacy, treatment complexity, and access to healthcare services [9]. Previous studies have demonstrated that poor medication compliance after PCI is associated with adverse cardiovascular outcomes, recurrent hospitalization, increased healthcare expenditures, and mortality [10]. A study conducted in Iran reported that approximately 72% of patients remained adherent to medications following PCI [11], whereas several other studies from low- and middle-income settings have reported considerably lower compliance rates due to financial and healthcare access barriers.

Medication compliance is particularly important in resource-limited settings such as Pakistan, where healthcare inequalities, financial limitations, and inadequate long-term follow-up may negatively affect cardiovascular outcomes. The Sehat Sahulat Program is a relatively recent healthcare initiative launched in Khyber Pakhtunkhwa to facilitate access to healthcare services for low- and middle-income families through government-supported health insurance coverage. Although the program significantly improves access to hospital-based interventions such as PCI, long-term medication costs after discharge are not comprehensively covered, potentially affecting continuity of therapy and compliance among vulnerable populations. Limited evidence is currently available regarding medication compliance among Sehat Sahulat insured patients after PCI, particularly in tertiary care settings of Pakistan.

Understanding the prevalence of medication non-compliance and identifying associated socioeconomic and demographic determinants are essential for designing targeted interventions and healthcare policies aimed at improving long-term cardiovascular outcomes. Therefore, the present study was conducted to determine medication compliance among Sehat Sahulat insured patients following PCI in a tertiary care hospital in Peshawar and to evaluate factors associated with medication compliance in this population.

Methodology

Study Design

This descriptive cross-sectional study was conducted to assess medication compliance among Sehat Sahulat insured patients after undergoing percutaneous coronary intervention (PCI) at a tertiary care hospital in Peshawar. The study was carried out at the Peshawar Institute of Cardiology over a three-month period from 1st October 2025 to 31st December 2025 using a non-probability

consecutive sampling technique. The study was designed to evaluate the prevalence of medication compliance and to identify demographic and socioeconomic factors associated with compliance among post-PCI patients enrolled under the Sehat Sahulat insurance program.

Ethics

Ethical approval for the study was obtained from the Advanced Studies and Research Board (ASRB) and the Ethical Board of Khyber Medical University. Subsequently, permission was granted by the hospital Ethical Review Committee under reference number ERC/11/09/152 dated 15th September 2025. All participants were informed in detail about the objectives and procedures of the study, and written informed consent was obtained prior to participation. Confidentiality and privacy of participant information were strictly maintained throughout the study process in accordance with ethical research principles.

Setting

The study was conducted at the cardiology outpatient department (OPD) of the Peshawar Institute of Cardiology, a tertiary care hospital serving a large population of patients with cardiovascular diseases in Khyber Pakhtunkhwa, Pakistan. The hospital receives patients enrolled under the Sehat Sahulat program, which provides healthcare support to low- and middle-income families through both public and private healthcare facilities. The OPD setting allowed recruitment of patients presenting for routine follow-up after PCI procedures.

Participants

The study included patients of either gender aged between 19 and 75 years who had undergone PCI within the previous one to three months under the Sehat Sahulat program and were attending follow-up visits at the cardiology OPD. The selected post-PCI duration represented a clinically important period associated with increased risk of stent thrombosis and medication discontinuation. Patients with documented contraindications to continuation of dual antiplatelet therapy were excluded from the study. Exclusion criteria included severe bleeding risk such as thrombocytopenia, active peptic ulcer disease, severe coagulopathy, advanced renal or hepatic failure, previous hemorrhagic cerebrovascular accident, physician-advised discontinuation of antiplatelet therapy, and dementia or Alzheimer's disease that could impair informed participation or medication compliance. Detailed clinical history and relevant examinations were conducted for all participants fulfilling the inclusion criteria.

Variables

The primary outcome variable of the study was medication compliance following PCI. Independent variables included demographic and clinical characteristics such as age, gender, educational status, socioeconomic status, and family history of coronary artery disease (CAD) or PCI. Additional variables related to medication-taking behavior included forgetfulness, carelessness in taking medications, discontinuation of medications after symptom improvement, discontinuation after adverse feelings following medication intake, and financial ability to purchase medications regularly.

Data Sources/Measurement

Data were collected using a structured questionnaire and patient interviews conducted during follow-up visits. Demographic and clinical information including age, gender, educational level, socioeconomic level, and family history of CAD/PCI were recorded. Medication compliance was assessed using the validated 4-item Morisky Medication Compliance Scale (MMAS-4).

The MMAS-4 evaluated four domains including forgetfulness, carelessness, stopping medication when feeling better, and stopping medication when feeling worse. Responses were recorded in a dichotomous yes/no format, with each "yes" response assigned a score of 1 and each "no" response assigned a score of 0, resulting in a cumulative score ranging from 0 to 4. Participants scoring 0 were categorized as adherent, whereas those scoring ≥1 were considered non-adherent according to previously established MMAS-4 methodology [11].

In addition to the standard MMAS-4 items, one supplementary question regarding affordability of medications was included to assess financial barriers affecting medication continuation. This additional question was analyzed descriptively and was not incorporated into the original MMAS-4 scoring structure. The questionnaire was translated into Urdu and Pashto to improve participant understanding and accessibility. Prior to data collection, the translated instrument was pilot tested in a similar patient population and demonstrated acceptable internal consistency with a Cronbach's alpha value of 0.78.

Bias

Several measures were implemented to minimize potential bias and confounding. Selection bias was reduced by applying predefined inclusion and exclusion criteria consistently across all participants. Information bias was minimized through the use of a validated medication compliance assessment tool (MMAS-4) and standardized

interview procedures. Translation of the questionnaire into local languages further improved comprehension and reduced response inaccuracies. Pilot testing ensured the reliability and cultural appropriateness of the questionnaire. Confounding variables were addressed through stratification and multivariable logistic regression analysis during statistical evaluation.

Study Size
The sample size was calculated using a 95% confidence level and a 5% margin of error based on a previously reported medication compliance prevalence of 72% among patients undergoing coronary angioplasty for prevention of disease recurrence [11]. Using these assumptions, the final calculated sample size was 310 participants.

Quantitative Variables
Continuous quantitative variables included participant age, which was summarized using mean and standard deviation (SD). Categorical variables included gender, educational status, socioeconomic status, family history of PCI/CAD, and medication compliance status. Educational level and socioeconomic status were categorized into predefined groups for comparative analysis. Medication compliance was categorized dichotomously into adherent and non-adherent groups based on MMAS-4 scoring criteria.

Statistical Methods
Data analysis was performed using R software version 4.33. Continuous variables such as age were expressed as mean ± standard deviation, whereas categorical variables were summarized using frequencies and percentages. Stratification was performed to evaluate medication compliance across demographic and clinical subgroups including gender, age categories, educational level, socioeconomic status, and family history of PCI/CAD.

Pearson's chi-square test was applied to assess associations between categorical variables and medication compliance. Binary logistic regression analysis was conducted to estimate odds ratios (ORs) along with 95% confidence intervals (CIs) for factors associated with medication compliance. Medication compliance served as the dependent variable, while age, gender, educational level, socioeconomic status, and family history of PCI/CAD were included as independent variables in the regression model.

Multivariable analysis was further performed to adjust for potential confounding factors. A p-value of ≤0.05 was considered statistically significant throughout the analysis. Additionally, multicollinearity among independent variables was evaluated using variance inflation factors (VIF), and model discrimination was assessed using the receiver operating characteristic (ROC) curve and area under the curve (AUC).

Results

Participants
A total of 310 participants who had undergone percutaneous coronary intervention (PCI) under the Sehat Sahulat insurance program within the previous one to three months were included in the final analysis. All recruited participants fulfilled the predefined inclusion criteria and completed the medication compliance assessment. The study population consisted predominantly of male participants, reflecting the higher burden of coronary artery disease among men presenting for PCI in the study setting. Participant recruitment and analysis were completed without major missing data, allowing inclusion of all enrolled patients in the final statistical analysis.

Descriptive Data
The mean age of the participants was 56.70±8.49 years. Most participants were male (n=264, 85.16%), while females constituted 46 (14.84%) of the study population. Regarding educational status, the majority of participants were illiterate (n=191, 61.61%), followed by matric-level education in 78 (25.16%) participants. Intermediate education was reported in 21 (6.77%) participants, graduate/postgraduate education in 17 (5.48%), and only 3 (0.97%) participants had higher educational qualifications.

Socioeconomic assessment demonstrated that most participants belonged to the poor socioeconomic group (n=184, 59.35%), followed by the medium socioeconomic group (n=116, 37.42%), whereas only 10 (3.23%) participants belonged to the high socioeconomic group. Age stratification revealed that the majority of participants were between 41–60 years of age (n=204, 65.81%), while 95 (30.65%) participants were aged ≥61 years, and only 11 (3.55%) belonged to the 27–40 years age group (Table 1).

A positive family history of coronary artery disease (CAD) and PCI was present in 108 (34.84%) participants, whereas the remaining participants reported no family history of CAD/PCI (Figure 1).

Outcome Data
Medication compliance was evaluated using the 4-item Morisky Medication Compliance Scale (MMAS-4). Assessment of individual compliance components demonstrated that most participants denied forgetfulness in taking medications, with 258 (83.23%) responding "No"

and only 52 (16.77%) responding "Yes." Similarly, 262 (84.52%) participants reported that they were not careless regarding medication intake, whereas 48 (15.48%) admitted occasional carelessness. Regarding discontinuation of medications after symptom improvement, 272 (87.74%) participants denied stopping medication when feeling better, while 38 (12.26%) acknowledged this behavior. Likewise, 275 (88.71%) participants denied stopping medications when they felt worse after taking them, whereas 35 (11.29%) reported doing so.

Financial affordability was also explored descriptively, revealing that 201 (64.84%) participants had sufficient financial resources to purchase medications regularly, while 109 (35.16%) experienced financial constraints affecting medication affordability (Table 2).

Medication compliance was observed in only 80 (25.81%) participants, whereas the majority of the study population was classified as non-compliant (n=230, 74.19%), indicating a high burden of medication non-compliance among post-PCI patients enrolled under the Sehat Sahulat program (Figure 2).

Main Results

The association between medication compliance and demographic or clinical variables is presented in Table 3. Gender was not significantly associated with medication compliance (p=0.337), with comparable compliance patterns observed between males and females. Similarly, age group did not demonstrate a statistically significant relationship with compliance status (p=0.136). However, educational level showed a statistically significant association with medication compliance in stratified analysis (p=0.028). A greater proportion of compliant participants were illiterate compared with literate participants, although this finding required further evaluation in multivariable analysis.

Socioeconomic status demonstrated a highly significant association with medication compliance (p<0.001). Participants belonging to the medium socioeconomic group exhibited markedly lower compliance rates compared with those in the poor socioeconomic group. Family history of PCI/CAD was also significantly associated with compliance status (p=0.011), with participants having a positive family history showing comparatively higher rates of non-compliance (Table 3).

Multicollinearity analysis showed variance inflation factor (VIF) values ranging from 1.21 to 2.68 for all independent variables, indicating the absence of problematic multicollinearity and supporting the stability of the regression model. Furthermore, the receiver operating characteristic (ROC) curve analysis demonstrated an area under the curve (AUC) of 0.79 (95% CI: 0.73–0.85), suggesting acceptable to good discriminatory performance of the multivariable logistic regression model in differentiating compliant from non-compliant participants (Figure 3).

Binary logistic regression analysis is summarized in Table 4. In univariable analysis, literate participants had significantly lower odds of medication compliance compared with illiterate participants (OR=0.52, 95% CI: 0.30–0.91, p=0.02). However, after adjustment for potential confounders, this association lost statistical significance (aOR=0.43, 95% CI: 0.20–1.93, p=0.73), indicating that educational status was not an independent predictor of medication compliance.

Socioeconomic status remained strongly associated with medication compliance in both univariable and multivariable analyses. Participants in the medium socioeconomic group had significantly lower odds of compliance compared with the poor socioeconomic group in univariable analysis (OR=0.10, 95% CI: 0.04–0.21, p<0.001) as well as after adjustment (aOR=0.10, 95% CI: 0.04–0.23, p<0.001). Although participants in the high socioeconomic group also demonstrated lower compliance, this association did not remain statistically significant following adjustment, likely due to the small subgroup sample size.

Family history of PCI/CAD was associated with lower medication compliance in univariable analysis (OR=0.45, 95% CI: 0.25–0.80, p=0.008); however, this relationship was attenuated after multivariable adjustment and did not retain statistical significance (aOR=0.54, 95% CI: 0.27–1.05, p=0.076) (Table 4).

Table 1: Baseline characteristics of Sehat Sahulat insured patients following percutaneous coronary intervention

Variable	Characteristic	n (%)
Gender	Female	46 (14.84)
	Male	264 (85.16)
Educational level	Illiterate	191 (61.61)
	Higher education	3 (0.97)
	Intermediate	21 (6.77)
	Graduate/Postgraduate	17 (5.48)
	Matric	78 (25.16)
Socioeconomic level	High	10 (3.23)
	Medium	116 (37.42)
	Poor	184 (59.35)
Age group (years)	27–40	11 (3.55)
	41–60	204 (65.81)
	≥61	95 (30.65)

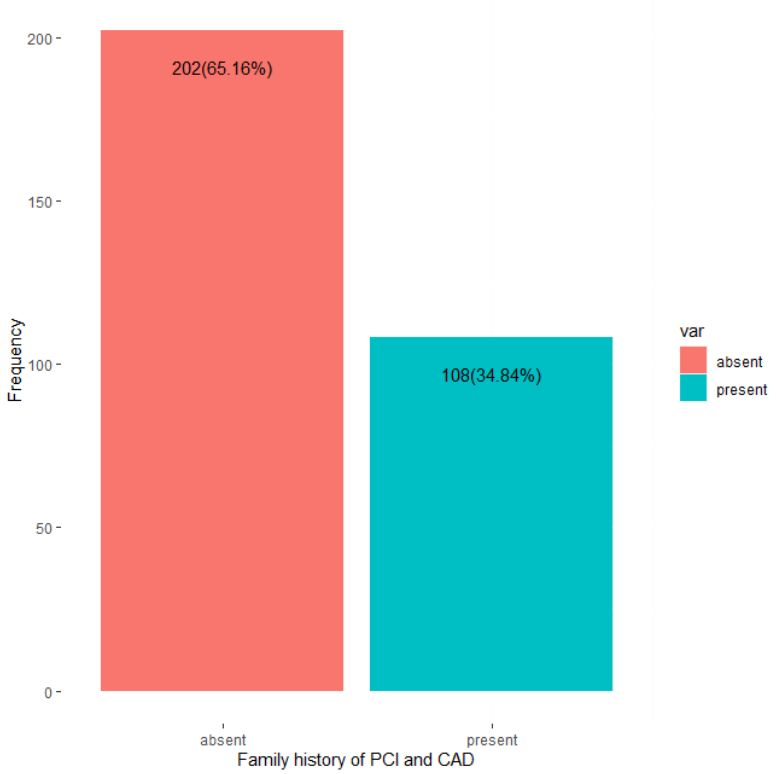


Figure 1: Family history of coronary artery disease and percutaneous coronary intervention

Table 2: Responses to the Morisky Medication Compliance Scale (MMAS-4) and medication affordability

Medication compliance	Characteristic	n (%)
Do you ever forget to take your medicine	No	258 (83.23)
	Yes	52 (16.77)
Are you careless at times about taking your medicine	No	262 (84.52)
	Yes	48 (15.48)
When you feel better do you sometimes stop taking your medicine	No	272 (87.74)
	Yes	38 (12.26)
Sometimes if you feel worse when you take your medicine do you stop taking it	No	275 (88.71)
	Yes	35 (11.29)
Do you have enough money to buy your medication regularly	No	109 (35.16)
	Yes	201 (64.84)

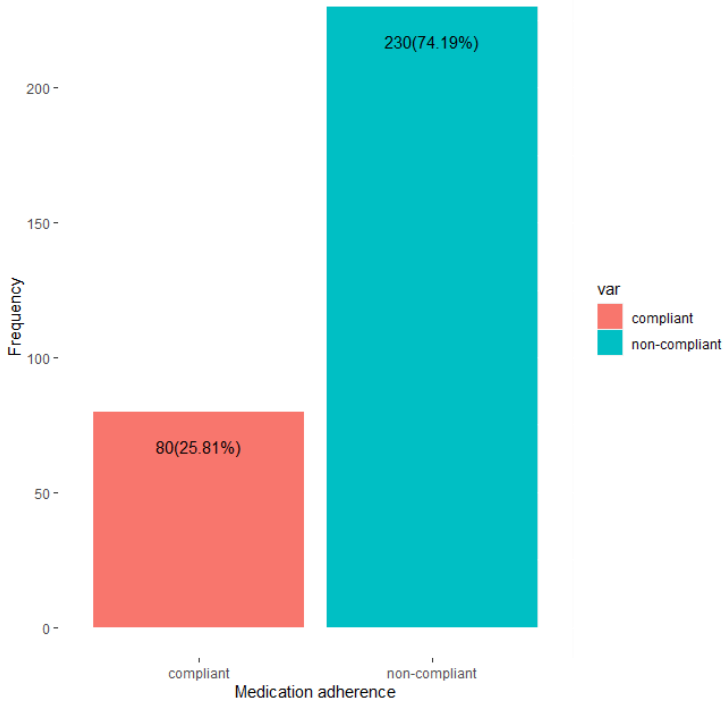


Figure 2: Frequency of medication compliance and non-compliance among study participants following PCI

Table 3: Association between medication compliance and demographic among study participants

Variable	Characteristic	Compliant n (%)	Non-compliant n (%)	p-value*
Gender	Female	15 (18.75)	31 (13.48)	0.337
	Male	65 (81.25)	199 (86.52)	
Educational level	Illiterate	58 (72.50)	133 (57.83)	0.028
	Literate	22 (27.50)	97 (42.17)	
Socioeconomic level	Poor	72 (90.00)	112 (48.70)	<0.001
	High	1 (1.25)	9 (3.91)	
	Medium	7 (8.75)	109 (47.39)	
Family history of PCI/CAD	Absent	62 (77.50)	140 (60.87)	0.011
	Present	18 (22.50)	90 (39.13)	
Age group (years)	27–40	0 (0.00)	11 (4.78)	0.136
	41–60	54 (67.50)	150 (65.22)	
	≥61	26 (32.50)	69 (30.00)	

*Pearson's Chi-squared test

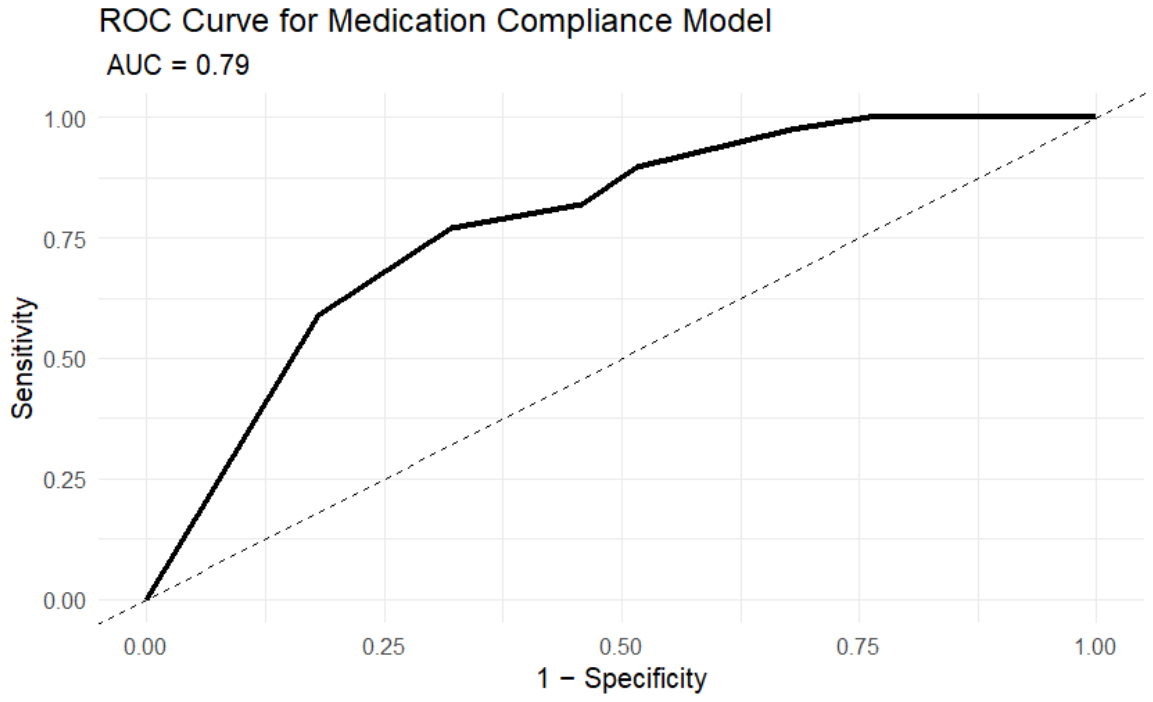


Figure 3: Receiver operating characteristic (ROC) curve showing multivariable logistic regression model for medication compliance

Table 4: Uni and multivariable logistic regression analysis of factors associated with medication compliance

Predictor	Characteristics	Medication compliance n (%)	Univariable OR (95% CI, p-value)	Multivariable OR (95% CI, p-value)
Educational level	Illiterate	58 (30.4) / 133 (69.6)	Reference	Reference
	Literate	22 (18.5) / 97 (81.5)	0.52 (0.30–0.91, p=0.02)	0.43 (0.20–1.93, p=0.73)
Socioeconomic level	Poor	72 (39.1) / 112 (60.9)	Reference	Reference
	High	1 (10.0) / 9 (90.0)	0.17 (0.02–0.95, p=0.044)	0.16 (0.01–1.61, p=0.198)
	Medium	7 (6.0) / 109 (94.0)	0.10 (0.04–0.21, p<0.001)	0.10 (0.04–0.23, p<0.001)
Family history of PCI/CAD	Absent	62 (30.7) / 140 (69.3)	Reference	Reference
	Present	18 (16.7) / 90 (83.3)	0.45 (0.25–0.80, p=0.008)	0.54 (0.27–1.05, p=0.076)

*Binary logistic regression

Discussion

The present study evaluated medication compliance among Sehat Sahulat insured patients following percutaneous coronary intervention (PCI) in a tertiary care hospital in Peshawar. The findings demonstrated a considerably low overall medication compliance rate, with only 25.81% of participants classified as adherent according to MMAS-4 criteria. The study further identified socioeconomic status as a significant determinant of medication compliance, whereas educational status and family history of CAD/PCI did not remain independently associated after multivariable adjustment. These findings highlight the growing challenge of maintaining long-term compliance to cardiovascular medications in resource-limited healthcare settings despite successful interventional procedures.

Medication compliance is a critical component of secondary prevention after PCI because discontinuation or irregular use of prescribed medications, particularly dual antiplatelet therapy, may increase the risk of stent thrombosis, recurrent myocardial infarction, repeat hospitalization, and mortality [10]. The World Health Organization defines compliance as the extent to which an individual's behavior corresponds with agreed recommendations from a healthcare provider, including medication use, lifestyle modification, and dietary practices [12]. Non-compliance has been recognized as a major public health issue worldwide and is particularly concerning among patients with chronic cardiovascular conditions requiring prolonged treatment [13].

In the present study, although most participants denied behaviors such as forgetfulness, carelessness, or stopping medications when symptoms improved or worsened, the overall compliance rate remained low. This finding suggests that self-perceived medication-taking behavior may not always translate into optimal compliance patterns. Similar findings have been reported in previous cardiovascular studies where patients expressed awareness regarding the importance of medications but failed to maintain consistent long-term compliance due to financial, psychological, and healthcare-related barriers [10,14].

The demographic profile of the study population showed that most participants were middle-aged or older males, which is consistent with the established epidemiology of coronary artery disease [15,16]. Previous studies evaluating post-PCI compliance have similarly reported male predominance among patients undergoing coronary interventions [14]. The higher prevalence of CAD among older adults may be attributed to cumulative exposure to cardiovascular risk factors such as hypertension, diabetes mellitus, smoking, dyslipidemia, obesity, sedentary lifestyle, and chronic stress over time [17-20]. Additionally, aging itself is associated with progressive atherosclerosis and increased severity of coronary artery lesions requiring invasive intervention [21,22].

Educational status demonstrated a significant association with medication compliance in univariable analysis; however, this relationship did not remain statistically significant after multivariable adjustment. These findings indicate that educational level alone may not independently predict compliance behavior. The observed unadjusted association may reflect the influence of confounding factors including healthcare accessibility, medication affordability, health literacy, and social support systems. Similar variability

in the relationship between education and medication compliance has been reported in previous studies [15,16]. While some studies suggest that lower educational levels are associated with poor compliance [23,24], others indicate that practical understanding of disease management and access to healthcare services may be more important than formal education itself [16]. Therefore, educational interventions should focus not only on literacy but also on improving patient counseling, communication, and individualized medication understanding.

One of the most important findings of this study was the significant association between socioeconomic status and medication compliance. Participants belonging to the medium socioeconomic group demonstrated significantly lower compliance compared with participants in the poor socioeconomic group, and this relationship remained statistically significant even after adjustment for other variables. Financial barriers are widely recognized determinants of medication non-compliance, particularly in low- and middle-income countries where patients often bear out-of-pocket expenses for long-term therapy [17,18]. Although the Sehat Sahulat Program provides support for hospital-based treatment and interventional procedures, long-term medication costs after discharge remain inadequately covered. Consequently, patients may experience difficulties purchasing expensive cardiovascular medications regularly, leading to interrupted treatment and poor compliance.

The present findings are supported by previous literature demonstrating that socioeconomic deprivation, medication cost, transportation difficulties, inadequate follow-up, and reduced healthcare access significantly influence compliance to chronic cardiovascular therapies [18,19]. Interestingly, the lower compliance observed in the medium socioeconomic group compared with the poor group may reflect complex socioeconomic dynamics, including inconsistent healthcare support, variable medication affordability, and differing health-seeking behaviors. Further qualitative and longitudinal studies may help explore these patterns more comprehensively.

Family history of CAD/PCI was associated with medication compliance in univariable analysis but did not retain statistical significance after adjustment. This finding suggests that although family history may influence patient perception of disease severity and health behavior, its independent contribution to compliance may be limited when socioeconomic and demographic variables are considered simultaneously. Previous studies have also shown inconsistent findings regarding the role of family history in influencing cardiovascular treatment compliance [10].

The compliance rate observed in the present study was lower than several previously reported international studies. A study conducted in Iran reported medication compliance of approximately 72% among patients following PCI [11], whereas a retrospective cohort study reported overall compliance rates of approximately 28.4%, which is relatively comparable to the present findings [14]. In contrast, studies from China have demonstrated substantially higher compliance rates ranging from 71.9% to 81.8% for cardiovascular medications [23]. These differences may reflect variations in healthcare infrastructure, medication affordability, insurance coverage, patient education systems, and follow-up mechanisms across different countries and healthcare settings.

The present study also demonstrated acceptable discriminatory performance of the multivariable logistic regression model, with an AUC of 0.79, suggesting reasonable predictive ability for identifying compliance patterns. Moreover, the absence of problematic multicollinearity among independent variables strengthened the reliability and stability of the regression analysis. These methodological strengths enhance the validity of the study findings and provide meaningful insight into factors influencing medication compliance among post-PCI patients.

Limitations

This study has several limitations that should be considered while interpreting the findings. The cross-sectional design limits the ability to establish causal relationships between demographic or socioeconomic factors and medication compliance. Since the study was conducted at a single tertiary care hospital, the findings may not be generalizable to other healthcare settings or populations across Pakistan. Medication compliance was assessed using a self-reported questionnaire (MMAS-4), which may be affected by recall bias and social desirability bias, potentially leading to overestimation or underestimation of compliance rates. Additionally, important factors such as psychological status, medication side effects, physician-patient communication, treatment complexity, and social support were not evaluated in the present study. The relatively small number of participants in some subgroups, particularly the high socioeconomic group, may also have affected the statistical power of subgroup analyses.

Conclusion

The present study demonstrated that medication compliance among Sehat Sahulat insured patients following percutaneous coronary intervention was considerably low, with the majority of participants classified as non-adherent to prescribed cardiovascular therapy. Educational status was not independently associated with compliance after adjustment for confounding factors, whereas socioeconomic status demonstrated a significant association with medication compliance. Participants from the medium socioeconomic group showed particularly lower compliance rates, highlighting the substantial impact of financial and healthcare accessibility barriers on long-term cardiovascular treatment compliance.

These findings emphasize the urgent need for targeted interventions aimed at improving medication compliance among post-PCI patients in Pakistan. Strategies such as enhanced patient counseling, structured discharge education, regular follow-up systems, financial assistance for long-term medications, improved healthcare accessibility, and community-based compliance support programs may help reduce non-compliance and improve cardiovascular outcomes. Policymakers and healthcare providers should also consider expanding insurance coverage to include long-term cardiovascular medications under programs such as Sehat Sahulat to ensure continuity of care after PCI. Further multicenter longitudinal studies are recommended to better understand compliance behavior and develop effective interventions tailored to resource-limited populations.

Authors' Contributions:

All authors meet the ICMJE criteria for authorship.

Author 1: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 2: Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 3: Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 4: Analysis and interpretation of data, critical revision, final approval, agreed to be accountable for all the work.
Author 5: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.

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