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A correlational study to assess the levels of adherence to treatment, illness perception and acceptance of illness in patients with coronary artery disease attending the outpatient departments at a tertiary care hospital

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Contributions: all authors contributed to initiate the study, as well as prepare and finalize the research paper. Shiv Kumar Mudgal, Binita Mishra, Vipin Patidar: conceptualization, design, draft writing, and critical evaluation. Rishita Som, Shivani Bhatt, Gareema Kumari, Rani Kumari: supervision and data collecting. Neha Gurjar, Anu Yadav, Sunita Saini, Payal Kumawat, Sumitra Bishnoi: analysis, interpretation, and literature search. Every author has reviewed and approved the final article and agreed to accept responsibility for every component of the work.

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Informed consent: participants were thoroughly educated on the study's objectives and given a participant information brochure. The study was explained in the local language, and participants had the option to ask questions. Every participant provided informed consent. They were also informed that they might withdraw their permission and stop participating at any point throughout the trial. The privacy and confidentiality of all obtained information were scrupulously enforced throughout the procedure.

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Availability of data and materials: data and materials are accessible from the corresponding author on reasonable request.

Abstract

Coronary artery disease (CAD) continues to be a major global health burden, and its effective management depends on optimal treatment adherence, realistic illness perception, and adequate acceptance of illness. However, evidence examining these psychosocial and behavioral factors remains limited. This study assessed treatment adherence, illness perception, and acceptance of the illness and explored their associations among CAD patients. A descriptive correlational cross-sectional study was conducted among 250 CAD patients selected through convenience sampling. Data were collected using standardized tools: the Morisky Medication Adherence Scale (MMAS-8), the Brief Illness Perception Questionnaire (IPQ-B), and the Acceptance of Illness Scale (AIS) with the relative ranges (MMAS-8: 0-8, IPQ-B: 0-80, AIS: 8-40). Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarize the data, Pearson's correlation was applied to examine relationships among variables, and the chi-square test was used to assess associations between outcome variables and selected sociodemographic factors. Treatment adherence was predominantly low (59%), with a mean score of 5.69±1.58. Illness perception scores indicated that most participants (82%) experienced a high perceived illness threat (mean = 54.93±8.78). Acceptance of illness was moderate in 57.6% of participants, with a mean score of 25.09±6.07. A weak but statistically significant positive correlation was observed between acceptance of illness and treatment adherence ($r=0.245$, $p<0.001$). Illness perception showed no significant relationship with other variables. Significant associations were identified between treatment adherence and socioeconomic status ($\chi^2=19.97$, $p=0.003$); acceptance of illness and educational status ($p<0.001$), physical activity ($\chi^2=12.98$, $p=0.011$), and past medical history ($\chi^2=29.51$, $p=0.003$); and illness perception with socioeconomic status ($\chi^2=16.18$, $p=0.013$) and area of residence ($\chi^2=16.88$, $p=0.002$). CAD patients showed low treatment adherence, high perceived illness threat, and moderate illness acceptance. Strengthening patient education, addressing illness perceptions, and enhancing psychological support may improve adherence and long-term disease management.

Key words: coronary artery disease, treatment adherence, illness perception, acceptance of illness, correlational study.

Introduction

One of the main causes of death worldwide, coronary artery disease (CAD) significantly increases the overall burden of disease [1]. Epidemiological research in India reveals an alarming rise in the incidence of CAD in both rural and urban areas [2]. Coronary artery disease (CAD) is increasingly being observed at younger ages, largely due to lifestyle changes and shifting population demographics, and it often results in disability, financial burden, and reduced productivity [3].

Lifelong adherence to pharmaceutical regimens, such as antiplatelets, statins, beta-blockers, and ACE inhibitors, is necessary for effective secondary prevention of CAD. However, research continuously shows that CAD patients have poor adherence, often as a result of treatment-related, psychological, and monetary challenges [4,5]. Higher mortality, recurrent hospital stays, and poor clinical outcomes are all consequences of non-adherence [6].

Adherence and coping are significantly impacted by how patients perceive their medical condition, both emotionally and cognitively. Leventhal's Common-Sense Model states that coping mechanisms and health practices are influenced by the perception of illness [7]. Research indicates that poor perceptions of illness lead to lower adherence, psychological distress, and denial [8,9].

In similar ways, patients integrate their diagnoses and adjust to lifestyle changes through the psychological process of accepting their medical condition. Improved self-management, decreased anxiety, and better adherence are all attributed to higher acceptance of illness [10]. Research shows that treatment compliance in chronic conditions, such as CAD, is negatively impacted by low acceptability of the illness [11,12].

Few Indian studies have concurrently looked at adherence, illness perception, and illness acceptance in CAD patients, although a large body of literature on adherence in chronic illness. Examining these relationships is best done in outpatient settings, when stable CAD patients receive long-term treatment [13,14]. Health care providers will be better able to develop specific treatment plans if they are aware of these determinants and relationship between them. Therefore, the current study intends to evaluate treatment adherence, illness perception, and acceptance of illness among CAD patients who visit outpatient departments (OPDs) of a tertiary care hospital and ascertain the relationship between these variables.

Materials and Methods

Design and setting

A descriptive correlational cross-sectional research design carried out over a period of three months between 1st June 2025 and 31st August 2025. The research study was conducted in the

general medicine and cardiology outpatient departments of a tertiary care hospital that frequently serves patients with CAD for follow-up.

Sample and sampling

The study included 250 adult CAD patients selected through convenience sampling. Sample size estimation followed methods used in similar correlational studies on chronic illness (14,15). The sample size was determined using an estimated correlation coefficient of 0.2, with a 95% confidence level and 80% power using the following formula [$n = ((z_1 + z_2)^2 \times (1 - r^2)) / r^2 + 3$]. The minimum required sample size was 212 participants. To account for potential non-response or dropout, the sample size was rounded and set close to 250, which was deemed adequate for achieving the study's intended statistical power.

Inclusion and exclusion criteria

Patients who were 18 years of age or older, had been diagnosed with CAD and on treatment for at least three months, and could understand the study's instructions were included. Those who were critically ill, had a serious mental disease, or had cognitive impairment and not provided informed consent for participation were excluded from the study.

Data collection procedure and tool

Data was collected in an isolated OPD cubicle using structured in-person face-to-face interviews to ensure anonymity. The questionnaire used in this study consisted of four sections.

Sociodemographic and clinical variables

This section included items assessing participants' socio-demographic and background characteristics such as age, gender, education level, occupation, income, socioeconomic status, marital status, place of residence, diet, past medical conditions, and smoking history.

Morisky Medication Adherence Scale (MMAS-8)

The 8-item Morisky Medication Adherence Scale (MMAS-8), a validated and widely utilized instrument for people with chronic illnesses, was used to measure treatment adherence. The MMAS-8 provides a total score between 0 and 8: a score of 8 signifies high adherence, scores of 6 or 7 indicate moderate adherence, and scores below 6 suggest poor adherence [15].

Brief Illness Perception Questionnaire (IPQ-B)

This was nine-item instrument to assesses cognitive and emotional representations of illness, was used to evaluate illness perception. Each item was scored on a scale from 0 to 10,

examining areas such as understanding the illness, perceived consequences, and emotional responses like anxiety or anger. Higher scores (56–80) represent a more threatening perception of illness; lower scores (0–27) reflect a more positive outlook; and scores from 28 to 55 indicate a moderate perception level [16].

Acceptance of Illness Scale (AIS)

The standardized Acceptance of Illness Scale (AIS), which was eight items instrument to measures the level of psychological adaptation to chronic illness, was used to assess acceptance of illness. Respondents evaluated their condition on a five-point Likert scale, where 1 43 represents "strongly agree" and 5 indicates "strongly disagree." Lower scores (closer to 1) denote greater difficulty in adapting to illness, whereas higher scores (closer to 5) indicate greater acceptance. The total AIS score can range from 8 to 40. Scores under 20 were considered with low illness acceptance and typically accompany considerable emotional strain, whereas scores from 20 to 30 imply moderate acceptance. Scores above 30 reflected a high level of adjustment to the illness [17].

Validity, reliability and pilot study

All three instruments demonstrated satisfactory psychometric properties. A panel of 7 experts from the fields of cardiology, Community and family medicine, and nursing evaluated each item for relevance, clarity, and simplicity. The MMAS-8 showed acceptable reliability with a Cronbach's alpha of 0.87, and S-CVI was 0.89. The AIS exhibited strong content validity, with S-CVI scores 0.90, and demonstrated high internal consistency ($\alpha = 0.87$). The Indian IPQ-B likewise showed acceptable validity with S-CVI scores 0.83 and acceptable reliability with a Cronbach's alpha of 0.82.

The pilot study involved 15 CAD patients, was undertaken to assess the clarity, structure, and relevance of the questionnaire. Minor revisions were made based on participant feedback to address ambiguous phrasing and enhance comprehensibility, ensuring the instrument's suitability for the main study.

Plan for data analysis

The collected data have been analysed using the Statistical Package for the Social Sciences (SPSS) software package version 20.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the sample characteristics and outcome variable. The scores of outcome variables (treatment adherence, illness perception, and acceptance of illness) were categorized into low, moderate, and high levels based on standard cut-off values of the respective instruments. Inferential statistics including Pearson's correlation

coefficients was applied to evaluate the relationships among the key variables. The chi-square (χ^2) test was used to determine the association between categorical outcome variables and selected sociodemographic and clinical variables. A p-value of less than 0.05 will be considered statistically significant for all analyses.

Results

Description of demographic variables

Table 1 displays the participants' sociodemographic characteristics, which demonstrate that the mean age of the participants was 60.85 ± 11.69 years. The vast majority of the participants were married (84.4%). The highest percentage of participants were illiterate (27.2%), followed by those with only a primary education (22.4%). The majority (94%) lived in their own residences and were either employed (36%) or retired (32%). The largest group in terms of socioeconomic level was those who earned less than ₹10,000 per month (32%), closely followed by those who earned between ₹10,001 and ₹25,000 (31.6%). Geographically, the majority lived in semi-urban areas (58.4%), followed by rural areas (30.8%) and urban areas (11.2%). The majority reported moderate physical activity (62.8%), 74% of people had a non-vegetarian diet, 39.6% had no prior medical history, and 59.6% of family members reported no serious diseases.

Treatment adherence

Figure 1 displays the level of treatment adherence among study participants. It reveals that the majority of respondents (59%) exhibited low adherence, followed by moderate adherence in 40% of participants. Only a very small proportion, 1%, demonstrated high adherence. The mean score of the treatment adherence was 5.69 ± 1.582 (Table 2).

Brief illness perception

Figure 2 displays the illness perception among study participants. It reveals that the majority of participants (n=205) exhibited high experienced threat, followed by moderate experienced threat in 26 participants. Only a very small proportion demonstrated low experience threat (n=19). The mean score of the brief illness perception was 54.93 ± 8.785 (Table 2).

Acceptance of illness

Figure 3 displays the acceptance of illness among study participants. It reveals that the majority of participants (n=144) exhibited moderate acceptance, followed by poor

acceptance in 55 participants. 51 participants showed high acceptance. The mean score of the acceptance of illness was 25.09 ± 6.068 (Table 2).

Correlation between outcome variables

The data presented in Table 3 focuses on the correlation between treatment adherence, illness perception, and acceptance of illness. The correlation coefficient between acceptance of illness and treatment adherence is 0.245, which is statistically significant ($p<0.001$), indicating a weak positive correlation. The other correlation values are very small and not significant.

Association between outcome variables and socio-demographic variables

Treatment adherence demonstrated a significant association with only one sociodemographic variable i.e. socio-economic status ($\chi^2 = 19.97$, $p = 0.003$). This suggests that financial resources and living conditions play a key role in maintaining consistent adherence to treatment.

Acceptance of illness showed significant associations with several sociodemographic factors. Educational status ($p = 0.00$), physical activity level ($\chi^2 = 12.98$, $p = 0.011$), and past medical history ($\chi^2 = 29.51$, $p = 0.003$) were all significantly associated to participants' level of illness acceptance.

Illness perception was significantly associated with socio-economic status ($\chi^2 = 16.18$, $p = 0.013$) and area of residence ($\chi^2 = 16.88$, $p = 0.002$).

Discussion

The current study examined how sociodemographic factors, illness perception, acceptance of illness, and treatment adherence interrelate in a population. The findings reveal that acceptance of illness is positively correlated with treatment adherence, and that certain variables (educational status, physical activity, past medical history, socioeconomic status) significantly influence acceptance and adherence. These results reinforcing the multifactorial nature of chronic disease management.

A weak but statistically significant positive correlation between acceptance of illness and treatment adherence ($r = 0.245$, $p < 0.001$) in our sample is consistent with studies in chronic illness populations. For example, among patients with coronary artery disease, a positive relationship was reported between acceptance of illness and adherence ($r = 0.435$, $p < 0.01$) [11]. Similarly, in patients with atrial fibrillation, illness acceptance significantly influenced treatment adherence. These findings support the idea that

psychological acceptance plays a key role in how well patients follow prescribed regimens [18].

Illness perception also emerged as an important factor influencing adherence. Our results parallel findings among type II diabetes patients in Iran, where illness perception particularly dimensions of understanding and personal control was significantly 58 associated with adherence [19]. This suggests that interventions aiming to improve patients' perception of their illness may enhance treatment compliance.

Sociodemographic Variables such as physical activity, past medical history, socioeconomic status, educational status was significantly associated with acceptance of illness in our results. Previous research has shown that higher levels of education are correlated with better acceptance of illness and higher adherence, particularly in hypertensive patients [20]. Physical activity was another factor significantly associated with acceptance of illness. Lifestyle factors such as exercise have been linked to positive illness perceptions and higher self-efficacy, improving coping and adaptation [21]. Past medical history also influenced acceptance in our study. Patients with prior health experiences may have developed stronger coping mechanisms. Similar patterns were observed in patients with multiple sclerosis, where psychological variables and past disease experiences were found to impact acceptance and adherence [22].

Socioeconomic status (SES) was significantly associated with treatment adherence (χ^2 = 19.97, p = 0.003). This finding aligns with global research showing that income strongly influences the ability to adhere to treatment regimens. In heart failure patients, both income and education were significantly linked with adherence and health-related quality of life [23,24]. The influence of socio-economic and socio-cultural determinants on treatment adherence observed in this study is consistent with international evidence. Studies from low- and middle-income countries highlight financial constraints, low education, and limited healthcare access as key barriers, while research from high-income settings emphasizes health literacy and system-level support [25]. Cultural beliefs, illness perceptions, and family support also play an important role in shaping adherence behaviors across regions. These findings suggest that although socioeconomic status consistently affects adherence globally, the underlying mechanisms vary by context, underscoring the need for culturally sensitive and context-specific interventions [26].

Comparison with Previous Studies The correlation between acceptance of illness and treatment adherence in this study is in line with results from coronary artery disease populations [18]. Likewise, the association of educational status with illness acceptance parallels findings in hypertensive patients [20]. Our results regarding socioeconomic

status and adherence also reflect prior findings in heart failure and metabolic syndrome patients [23,25].

A major strength of the study lies in its use of validated, standardized instruments (MMAS-8, IPQ-B, AIS), enhancing the reliability and comparability of the findings. The study also provides a comprehensive assessment of behavioral and psychological dimensions of CAD management within an Indian outpatient context, a setting in which limited data exist. The inclusion of a relatively large sample (n = 250) further strengthens the robustness of the analyses.

The study is limited by its cross-sectional design, which restricts the ability to infer causal relationships among the variables. Convenience sampling may introduce selection bias and limit generalizability to broader CAD populations. Self-reported measures, although validated, may be influenced by recall and social desirability biases. Additionally, illness perception was assessed using a brief tool that may not capture the full complexity of cognitive and emotional representations.

The findings highlight the importance of integrating psychological support and patient education into routine CAD care. Interventions aimed at improving illness acceptance—such as counselling, motivational interviewing, and self-management training—may enhance treatment adherence and overall disease management. Given the significant influence of socioeconomic status, targeted strategies to reduce financial barriers and strengthen social support mechanisms are warranted. Public health initiatives should also consider residence-related disparities and promote community-based programs to improve health literacy and illness understanding. Future research should employ longitudinal or interventional designs to further elucidate the causal pathways linking illness perception, acceptance, and adherence.

Conclusions

Patients with coronary artery disease attending the OPDs showed low treatment adherence, perceived their illness as highly threatening, and moderate acceptance of illness. Significant correlations among the variables indicate that modifying illness perception and enhancing acceptance can improve treatment adherence. Targeted psychological and educational interventions are recommended to improve long-term outcomes in CAD.

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Table 1. Socio-demographic variables of the study (n=250).

VARIABLE	CATEGORIES	n	%
Age (Mean ± SD)	**-------**	60.85 ± 11.69 years	
Gender	Male	145	58
	Female	105	42
Marital status	Single	02	0.8
	Married	211	84.4
	Widow	37	14.8
Educational status	Illiterate	68	27.2
	Primary	56	22.4
	Secondary	69	27.6
	Higher secondary	30	12.0
	Graduation	24	9.6
	Post graduation	03	1.2
Employment status	Employed	92	36.8
	Unemployed	47	18.8
	Retired	31	12.4
	Homemaker	80	32.0
Socio-economic status (Rs.)	Below 10,000	79	31.6
	10,001-25,000	125	50
	25,001-50,000	43	17.2
	50,000 and above	03	1.2
Area of residence	Urban	44	17.6
	Semiurban	146	58.4
	Rural	60	24.0
History of smoking/ tobacco chewing	Yes	77	30.8
	No	173	69.2
History of alcohol consumption	Yes	48	19.2
	No	202	80.8
Physical Activity	Sedentary	88	35.2
	Moderate	157	62.8
	High	05	2
Dietary habits	Vegetarian	65	26.0
	Non vegetarian	185	74.0
Past medical history	No	99	39.6
	HTN	81	32.4
	Diabetes (DM)	25	10.0
	HTN and DM both	30	12
	Others	15	6
Family history	No	149	59.6
	CAD	06	2.4
	Diabetes	24	9.6
	HTN	33	13.2
	Others	38	15.2

SD, standard deviation; n, number of participants; Rs., Indian Rupees.

Table 2. Descriptive analysis of the outcome variables (n=250).

VARIABLE	MEAN ± SD	RANGE SCORE
Treatment adherence score	5.69±1.582	0-8
Brief illness perception score	54.93±8.785	18-73
Acceptance of illness score	25.09±6.068	8-40

Table 3. Correlation between treatment adherence, illness perception, and acceptance of illness (n=250).

Correlation among outcome variable	Acceptance of illness	Treatment adherence	Illness perception
Acceptance of Illness	1	0.245**	-0.065
Treatment adherence	0.245**	1	-0.020
Illness perception	-0.065	-0.020	1

**p<0.001 level of significance; Pearson's correlation coefficient was used for correlational analysis.

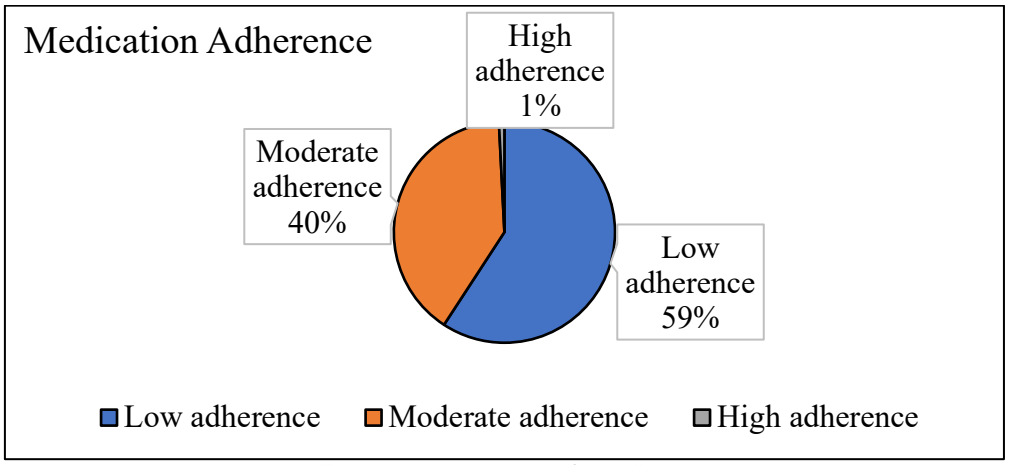

Figure 1. Treatment adherence among of study participant (n=250).

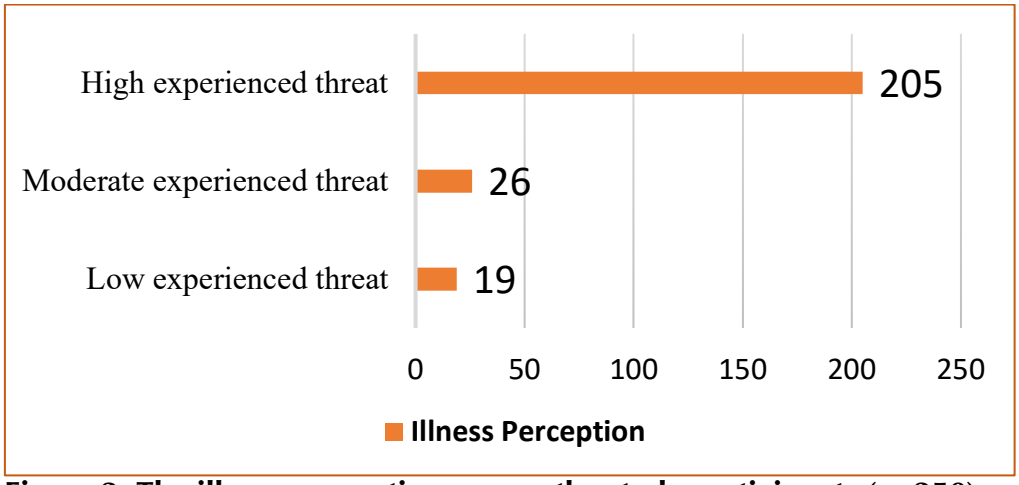

Figure 2. The illness perception among the study participants (n=250).

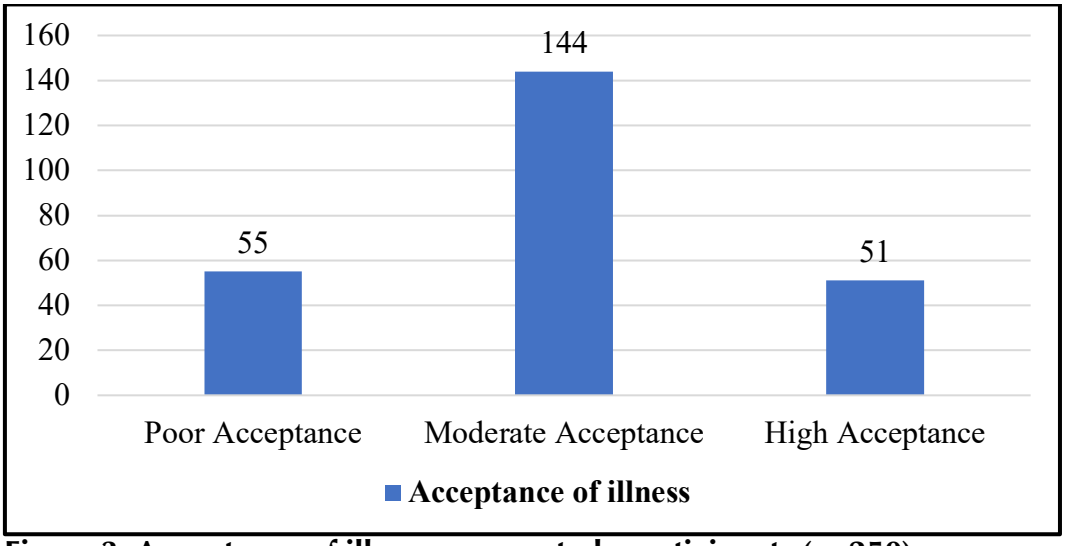

Figure 3. Acceptance of illness among study participants (n=250).