Monaldi Archives for Chest Disease

eISSN 2532-5264 https://www.monaldi-archives.org/

Monaldi Arch Chest Dis 2024 [Online ahead of print]

To cite this Article:
Mudgal SK, Ranjan A, Patidar V, et al. **Quality of life, compliance with treatment, and challenges among patients undergoing cardiac intervention.** *Monaldi Arch Chest Dis* doi: 10.4081/monaldi.2024.3178

Quality of life, compliance with treatment, and challenges among patients undergoing cardiac intervention

Shiv Kumar Mudgal,[1] Ashis Ranjan,[2] Vipin Patidar,[1] Rakhi Gaur,[1] Rajat Agarwal[3]

[1]College of Nursing, All India Institute of Medical Sciences, Deoghar, Jharkhand; [2]Department of Cardiology, Patna Medical College and Hospital, Patna, Bihar; [3]Department of Cardiothoracic Surgery, All India Institute of Medical Sciences, Deoghar, Jharkhand, India

Correspondence: Rajat Agarwal, Department of Cardiothoracic Surgery, All India Institute of Medical Sciences, Deoghar, Jharkhand, India -814152.
Tel.: +919654461829. E-mail: drrajat77@gmail.com

Contributions: all authors contributed to initiate the study, as well as prepare and finalize the research paper. SKM, RA, were in charge of conceptualization, design, draft writing, and critical evaluation; AR, VP, supervised and handled data collecting; RG, VP, SKM, oversaw the analysis, interpretation, and literature search. Every author has reviewed and approved the final article and agree to accept responsibility for every component of the work.

Conflict of interest: the authors declare no conflicting interests and confirm the work's accuracy.

Ethics approval and consent to participate: the study received approval from the Institute Ethics Committee (AIIMS-DEO/RC-IEC-Full committee/2022-71-IND-02).

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.

Funding: none.

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

Abstract

Cardiovascular disease is the leading cause of mortality and disability worldwide, with important economic and quality-of-life implications. Effective treatment relies on drug adherence, which is impacted by a variety of factors; noncompliance increases morbidity, mortality, and healthcare costs. This study examines the quality of life, treatment adherence factors, and challenges that cardiac patients encounter during their treatment regimen. A cross-sectional study among 111 cardiac patients through purposive sampling was done at the All India Institute of Medical Sciences Deoghar between January 2023 and April 2024. Data on demographics, clinical characteristics, quality of life, and treatment adherence were gathered and analyzed using descriptive and inferential statistics while adhering to ethical guidelines and participant privacy. The research of 111 cardiac patients (76.6% male, mean age 56.45 years) revealed that the majority had undergone coronary artery bypass grafting surgery (83.8%), with many preferring private hospitals (58.6%). High medication adherence (82.0%) and regular follow-up (71.2%) were noted, although lifestyle improvements such as smoking cessation were less prevalent. Significant concerns in barriers were reported, including financial difficulties (35.1%) and accessibility of prescribed drugs (45.9%). Quality of life was generally reported as high, with most patients reporting no significant problem. This study reveals excellent adherence to medications and regular follow-up among participants. However, significant impediments such as financial constraints and accessibility issues for prescribed drugs continue to have an influence on treatment. Despite these limitations, patients often report a high quality of life, underscoring the complex interplay of medical, economic, and lifestyle aspects in cardiovascular health management.

Key words: challenges, health-related quality of life, post cardiac intervention, treatment adherence.

Introduction

Cardiovascular diseases (CVD) are the leading cause of death and disability, globally [1,2]. In 2017, it was responsible for 31.8% of all fatalities and 14.7% of Disability Adjusted Life Years (DALYs) globally. According to the Global Burden of Disease (GBD) study group, there were roughly 422 million prevalent CVD cases worldwide in 2015, with South Asia being the most impacted region [3]. The worldwide mortality impact from CVD grew from 12.4 million in 1990 to 19.8 million in 2022, indicating global population rises [4]. According to a 2014 World Economic Forum and Harvard School of Public Health report, cardiovascular disease is expected to cost India around $2.17 trillion in economic losses between 2012 and 2030 [5]. Cardiovascular disease is the major cause of mortality, frequently requiring surgical intervention. Cardiac surgery, such as cardiac valve replacement or coronary artery bypass grafting (CABG), can have a significant impact on patients' physical and mental well-being. Post-disease complications and surgical recovery frequently result in impaired health-related quality of life (HRQOL) [6]. The American Heart Association (AHA) defined "Health-Related Quality of Life" (HRQoL) as the gap between present and desired functional status, as well as the total impact of health on well-being. They stressed the need for measuring HRQoL as a fundamental therapeutic aim in cardiovascular health initiatives [7]. The assessment of Health-Related Quality of Life (HRQoL) is frequently viewed as an important indication of progress in healthcare and illness treatment, which is critical for increasing the life expectancy of people with chronic illnesses such as CVDs [8].

Adherence is an important component in determining the efficacy of a treatment plan, particularly for drugs administered for chronic diseases such as cardiovascular conditions. As per the World Health Organization, medication Adherence is defined as "the extent to which the patient follows medical instructions" [9]. According to previous research, failure to take medicine is associated with higher morbidity and death among those suffering from chronic conditions such as coronary heart disease. Furthermore, individuals with reduced quality of life (QOL) exhibited lower drug adherence rates [10,11]. Non-adherent patients pose a threat to healthcare systems since they frequently require more intense treatment, and their symptoms can lead to higher hospital admissions or even death [12]. The impacts on treatment adherence are usually complex, as adherence is impacted by several factors and challenges rather than a single determinant. Understanding the elements that influence treatment adherence can help guide the development of adherence-enhancing measures. As a result, more studies into factors influencing treatment adherence are important.

Materials and Methods

Study design and participants

The cross-sectional survey research was conducted at All India Institute of Medical Sciences Deoghar from January 2023 to April 2024, with a focus on persons with cardiac disease who had undergone any cardiac surgery. Researchers contacted 134 eligible individuals through purposive sampling who were reported to Cardiac OPD at AIIMS Deoghar between March 1st, 2023, and February 28th, 2024, seeking them to participate in the study. Out of these, 111 (82.8%) consented to take part in the study. The sample size for this research was computed using a prior study's values of $\sigma = 3.6$, $\alpha = 0.05$, $\beta = 0.2$, and $\mu 1 - \mu 0 = 1$. Due to a 10% non-response rate, the sample size was 111 individuals.

The study recruited both male and female individuals over the age of 18, as well as participants who had undergone any of the specified cardiac surgeries. Individuals who refused to participate, had a cognitive problem (mental retardation, stroke, or an untreated psychiatric illness), or were seriously sick were excluded.

Data collection procedure and instruments

Data collection included demographic information such as age, gender, educational level, employment, and place of residence, as well as clinical characteristics such as the duration after surgery, name of cardiac surgery, and facility where heart surgery was performed, as well as any existing comorbidities. Once registered, individuals were scheduled for a structured face-to-face interview with researchers. Throughout these interviews, participants were carefully questioned about their demographic and clinical profile, quality of life experiences, factors influencing treatment adherence, and challenges encountered throughout their treatment regimen.

The measurement of health-related quality of life assessed by the EQ-5D-5L standardized scale, which includes five dimensions that reflect different aspects of health: mobility, self-care, usual activities, pain, and anxiety/depression. Each dimension has five severity levels: no problems (level 1), minor problems (level 2), moderate problems (level 3), severe problems (level 4), and extreme problems/inability to execute (level 5). The EQ-5D-5L scoring and analysis involve describing the frequency and percentage of patients experiencing each difficulty level across the dimensions, as well as the mean and standard deviation of the indexed value.

A self-structured validated instrument with 13 items on a 3-point rating scale (never = 1, sometimes/often= 2, and regular = 3) was used to explore factors influencing treatment adherence. Similarly, another self-structured validated tool with 13 questions on a 3-point rating scale (never = 1, sometimes/often = 2, and regular = 3) was used to assess the challenges faced by participants during their treatment regimens. Researchers developed these scales,

which were then verified by nursing experts. Cronbach's alpha was used to determine the reliability of the research tools, and the results were 0.86 for the treatment adherence instrument and 0.82 for the challenges assessment tool, showing strong internal consistency and reliability.

Statistical analysis

The data obtained from the questionnaire was first be entered into Excel. Following data cleaning processes, the cleaned dataset was uploaded into IBM SPSS (version 23.0) for analysis. The socio-demographic variables were analysed using descriptive statistics such as frequencies and percentages. Inferential analysis used statistical tests such as chi-square tests, as well as binary univariate and multivariate logistic regression analyses, to explore relationships and associations in the data. All statistical analyses were carried out with a two-sided significance level of 0.05.

Ethical considerations

The Institute Ethics Committee approved the study (2022-71-IND-02), proving that it followed the ethical standards specified in the Declaration of Helsinki (2013) and good clinical practice recommendations and does not raise any ethical problems as it does not include interventions, obtains consent in writing before the data collection, maintains total anonymity of participants, and safeguards their privacy throughout the research process.

Results

Participant demographic and clinical characteristics

Table 1 provides a comprehensive overview of the study participants demographic and clinical characteristics. Among 111 individuals (76.6% male; mean age of 56.45 years with a standard deviation of 15.93). A significant proportion of participants were employed as government servants (24.3%), completed secondary education (37.8%), resided in urban areas (39.6%), and indicated no concurrent co-morbidities (45.9%).

Notably, 52 participants (46.8%) suffered from cardiac disease less than five years, majority 93 patients (83.8%) underwent CABG as cardiac intervention/surgery, and a considerable number i.e. 65 participants (58.6%), chose private hospital for cardiac intervention. The survey commenced 48 months post cardiac surgery, spanning an interquartile range of 24 to 84 months.

Health-related quality of life

The distribution of Health-Related Quality of Life (HRQoL) issues reported by participants for each dimension of the EQ-5D-5L scale is visually depicted in Figure 1A. The analysis highlights that a significant number of participants reported an absence of problems, representing a healthy state, across the various dimensions. Specifically, the numbers of individuals indicating no problems in the domains of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression were 60, 79, 74, 61, and 59, respectively. Figure 1B visually depicts the mean utility index of HRQoL among post-cardiac surgery patients, The mean utility index was 0.15 (SD, 0.212), ranging from 0.017 to 0.04 presented in Figure 1B.

Factors affecting compliance of treatment

Table 2 reveals that a notable portion (44.1%) reported being educated about prevention and treatment of cardiac disease regularly, and 41.4% received reading material or printed medicine prescriptions regularly. When it comes to medication adherence, a sizable majority (82.0%) stated that they take their medicine on a regular basis. Medication adherences was higher (84.6%) among females than the males (shown in Figure 2). With regards to attend regular checkups as per their doctor's orders approximately three-fourth of participants (71.2%) showed compliance. Majority 69.4% of participants reported never discontinuing medicine because they feel better, and 78.4% of participants never changed the schedule of medication without a doctor’s advice. In terms of lifestyle changes, a significant proportion (55.9%) reported following recommended dietary guidelines regularly, and 45% of participants sometimes engaged in regular exercise as advised by their doctor. Discussions with doctors about suitable exercise were also fairly common (51.4% sometimes/often).

Additionally, a notable percentage (52.3%) never stopped smoking/tobacco chewing and alcohol consumption habits (56.8%) after cardiac intervention, but 39.6% of participants sometime/often started or continued with meditation/yoga.

Challenges experienced during their treatment regimen

Table 3 shows participants' responses to various portions of their healthcare experience and the challenges they experienced during their treatment regimen. Regarding the healthcare experience, a significant majority (60.4%) reported being seen by their operating doctor or team during hospital visits regularly, and most of them (79.3%) felt that they were clearly explained about treatment and precautions during these visits regularly. However, a notable proportion (49.5%) reported making emergency visits sometimes/often, and their queries between visits were never adequately addressed (43.2%).

Challenges affecting treatment adherence were also noted. A substantial number of

participants (70.3%) reported that they never discontinued medication due to the fear of disturbed body image but sometime/often felt difficulty in availing transport to visit a doctor (43.2%). Most of them (49.5%) reported that their financial problem never affected their treatment regimen (visit/purchase of medication/investigation, etc.). Additionally, issues such as the availability of prescribed drugs (45.9%), accessibility of investigations (51.4% sometime/often), and the impact of family problems (44.1%, sometimes/often) on treatment regimens were highlighted as areas of concern for some participants.

Discussion

Cardiovascular diseases (CVD) are the major cause of mortality and morbidity globally, affecting both global health and economic systems. The prevalence of CVD has risen dramatically, with South Asia being particularly affected. The present research sought to assess quality of life (QoL), compliance of treatment, and challenges among patients who had undergone cardiac interventions. The findings provide vital insights into the numerous variables impacting these dimensions, which may assist healthcare professionals and policymakers in identifying possible areas for intervention and support.

Health-related quality of life

The research findings indicate that cardiac interventions have a mixed impact on patients' HRQoL. While a substantial proportion of participants reported no problems in various dimensions of the EQ-5D-5L scale, there were considerable proportions who indicated moderate to severe impairments, notably in mobility and pain/discomfort. These findings are consistent with prior studies [13-15] demonstrating that, while life-saving cardiac interventions frequently result in long-term physical and mental issues that impair patients' everyday lives. The mean utility score of HRQoL (0.15, SD = 0.212) indicates that, despite successful interventions, many patients continue to experience significant quality of life concerns, demanding continuous assistance and rehabilitation.

Compliance of treatment

Adherence to treatment plans is critical for controlling chronic diseases such as CVD. The study found that the majority of individuals adhered to their medication (82.0%) and follow-up regimens (71.2%). These high adherence rates are promising and consistent with recent research [16-19] highlighting the importance of adherence in lowering mortality and morbidity from chronic illnesses. However, lifestyle changes such as regular exercise and smoking cessation have lower adherence rates [20,21]. This disparity underlines the need for more patient education and support systems to induce comprehensive lifestyle changes that

can considerably improve cardiovascular health outcomes. Regular follow-ups, clear communication about the significance of continued treatment, and effective side effect management can all contribute to good adherence rates.

Challenges

Despite of improvements in treatment adherence, patients address a number of challenges that can affect their entire treatment experience and health outcomes. The research identified significant challenges such as healthcare access issues like transport issues (43.2%), financial constraints (49.5%), family problems, a lack of local availability of prescribed medication and diagnostic services. These difficulties were more severe among rural and semi-urban patients, emphasizing regional inequities in healthcare availability. These challenges are in line with previous findings [22-26]. Addressing these hurdles involves a multidimensional strategy that includes policy initiatives to increase healthcare access, patient financial support mechanisms, and community-based programs to assist with transportation and other logistical requirements. Improving telemedicine services and patient follow-up systems might close these gaps, delivering timely care and lowering the burden on healthcare institutions.

Limitations

One of our study's major limitations is the small sample size, which may not be fully representative of wider demographic trends. A larger sample size would provide more comprehensive data on the variability and generalizability of our findings. Another significant limitation is the availability of the drugs being studied. Certain drugs may be more difficult to get due to geographic availability, supply chain issues, or socioeconomic restraints. These limits may have affected the adherence rate among populations under study.

Recommendations

The study recommends that healthcare practitioners should prioritize complete discharge planning and use systematic follow-up services, such as telemedicine to improve treatment adherence. Policymakers should improve healthcare infrastructure in rural and semi-urban regions to improve access to treatment, as well as explore subsidizing transportation and giving local access to critical pharmaceuticals and diagnostic services.

Conclusions

Cardiac interventions have a substantial influence on patients' quality of life, treatment adherence, and the challenges that they encounter. While medicine adherence rates are quite good, there is a need for more assistance in lifestyle changes and ongoing patient involvement.

Addressing healthcare access gaps and offering comprehensive patient information can improve treatment results and quality of life for patients after cardiac interventions. Future research should concentrate on longitudinal studies that track long-term results and the efficacy of therapies targeted at increasing adherence and QoL.

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Table 1. Demographic and clinical characteristics of the participants (N=111).

Variables	Category	N (%)
Age (Mean ± SD)	----------	56.45±15.93
Gender	Male	85 (76.6)
	Female	26 (23.4)
Educational status	Illiterate	23 (20.7)
	Secondary	42 (37.8)
	Graduation	37 (33.3)
	Post graduation/professional	9 (8.1)
Occupation	Housewife	21 (18.9)
	Labour Work/daily wages	14 (12.6)
	Business/ shopkeeper	26 (23.4)
	Govt service	27 (24.3)
	Unemployed	23 (20.7)
How long are you suffering from cardiac disease?	<5 year	52 (46.8)
	5-10 years	32 (28.8)
	10-15 year	9 (8.1)
	> 15 years	18 (16.2)
Name of Cardiac Surgery	CABG	93 (83.8)
	Valvular surgery	18 (16.2)
Centre where surgery was done (If any)	Government Hospital	46 (41.4)
	Private Hospital	65 (58.6)
Duration after cardiac surgery in months, median (IQR)		48 (24-84)
Place of residence	Urban	44 (39.6)
	semi-urban	25 (22.5)
	Rural	42 (37.8)
History of any other chronic illness	No History	51 (45.9)
	Hypertension	29 (26.1)
	DM	20 (18.0)
	Others	11 (9.9)
Duration of any other chronic illness	None	51 (45.9)
	<5 year	23 (20.7)
	6-10 years	22 (19.8)
	more than 10	15 (13.5)

N, number of participants; SD, standard deviation; IQR, interquartile range.

Table 2. Factors affecting compliance of treatment among client with post cardiac surgery.

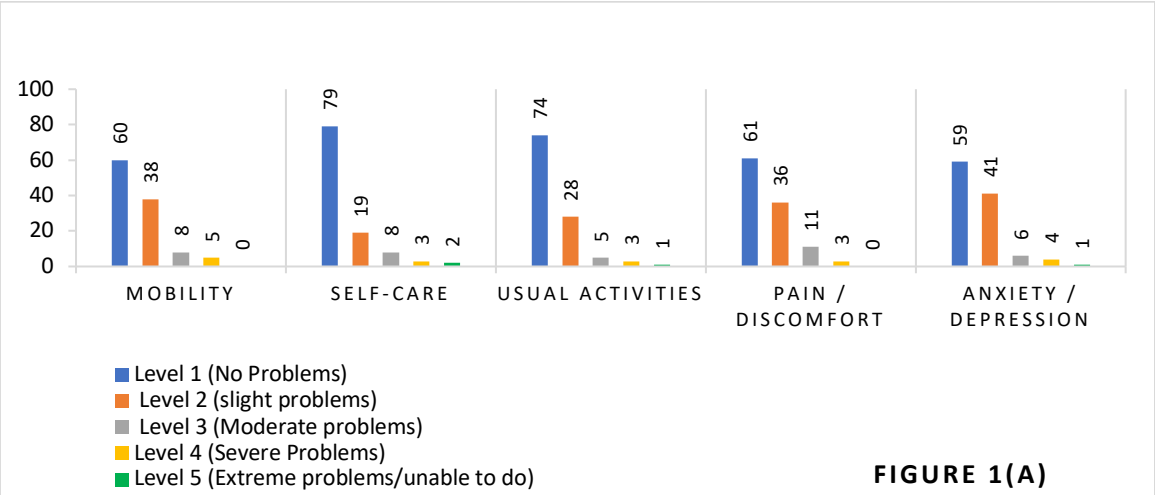
Statements	Never N (%)	Sometime/often N (%)	Regular N (%)
Have you been educated regarding prevention & treatment of cardiac disease?	25 (22.5)	37 (33.3)	49 (44.1)
Have you been provided reading material OR printed medicine prescriptions regarding the treatment regimen?	28 (25.2)	37 (33.3)	46 (41.4)
Do you take your medicine regularly?	3 (2.7)	17 (15.3)	91 (82.0)
Do you come for the regular checkup as per Doctor's order?	2 (1.8)	30 (27.0)	79 (71.2)
Do you ever discontinue the prescribed medications due to feeling better?	77 (69.4)	21 (18.9)	13 (11.7)
Do you have any side effect of the medication?	86 (77.5)	16 (14.4)	9 (8.1)
Have you ever changed the schedule of medication without Doctor's advice?	87 (78.4)	20 (18.0)	4 (3.6)
Do you take the recommended diet prescribed by the Doctor?	12 (10.8)	37 (33.3)	62 (55.9)
Do you exercise regularly as recommended by the Doctor??	28 (25.2)	50 (45.0)	33 (29.7)
Do you discuss about suitable exercise with your doctor's?	29 (26.1)	57 (51.4)	25 (22.5)
Have you stop smoking/tobacco chewing habit after cardiac intervention (if any)?	58 (52.3)	15 (13.5)	38 (34.2)
Have you stop Alcohol consumption habit after cardiac intervention (if any)?	63 (56.8)	8 (7.2)	40 (36.0)
Have you start/continue with meditation/yoga after cardiac intervention?	38 (34.2)	44 (39.6)	29 (26.1)

N, number of participants.

Table 3. Challenges among client with post cardiac surgery.

Statements	Never N (%)	Sometime/often N (%)	Regular N (%)
Are you seen by your operating doctor/team during your visit to hospital?	4 (3.6)	40 (36.0)	67 (60.4)
Are you explained clearly about treatment and precautions at every visit?	3 (2.7)	20 (18.0)	88 (79.3)
How frequently you have to make emergency visits?	39 (35.1)	55 (49.5)	17 (15.3)
Any query between visits is addressed?	48 (43.2)	33 (29.7)	30 (27.0)
Do you ever discontinue the medication due to the fear of disturbed body image?	78 (70.3)	26 (23.4)	7 (6.3)
Do you feel difficulty in availing transport to visit a doctor?	44 (39.6)	48 (43.2)	19 (17.1)
Do you think that your financial problem is affecting your treatment regimen (visit/purchase of medication/investigation, etc.)?	55 (49.5)	39 (35.1)	17 (15.3)
Do you require more than one day for a visit?	63 (56.8)	40 (36.0)	8 (7.2)
Do you feel that investigations advised are not available at native place?	42 (37.8)	52 (46.8)	17 (15.3)
Is it easy to carry out investigations at distant place?	26 (23.4)	57 (51.4)	28 (25.2)
Prescribed drugs are available at native place	10 (9.0)	50 (45.0)	51 (45.9)
Do you think that your family problem affects your treatment regimen (visit/purchase of medication/investigation, etc.)?	49 (44.1)	49 (44.1)	13 (11.7)
Do you think your Job profile is affect your treatment regimen (visit/purchase of medication/investigation, etc.)?	63 (56.8)	33 (29.7)	15 (13.5)

N, number of participants.



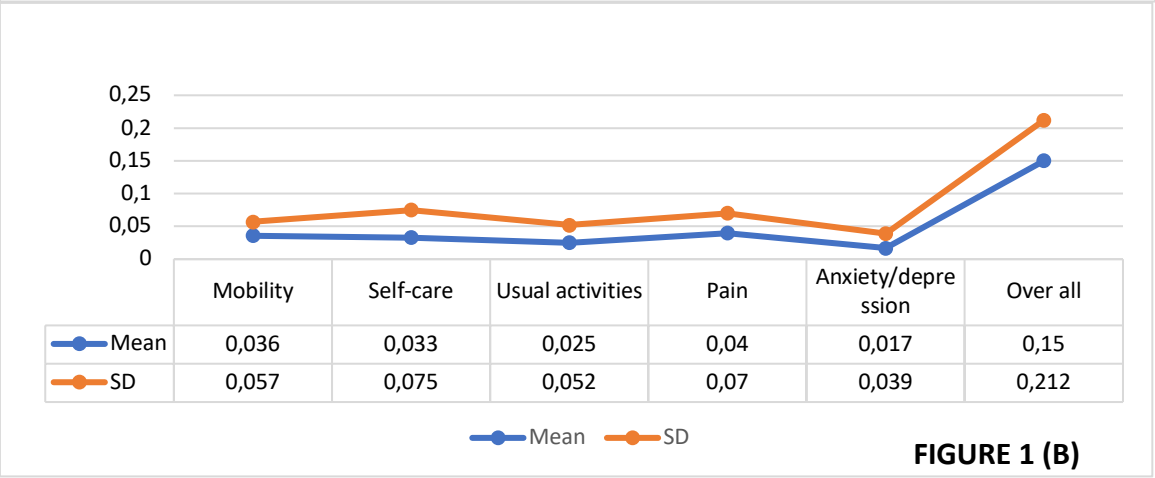


Figure 1. A) Frequency and percentage; B) mean and standard deviation index value of the component of quality of life (EQ-5D-5L) among cardiac patients.

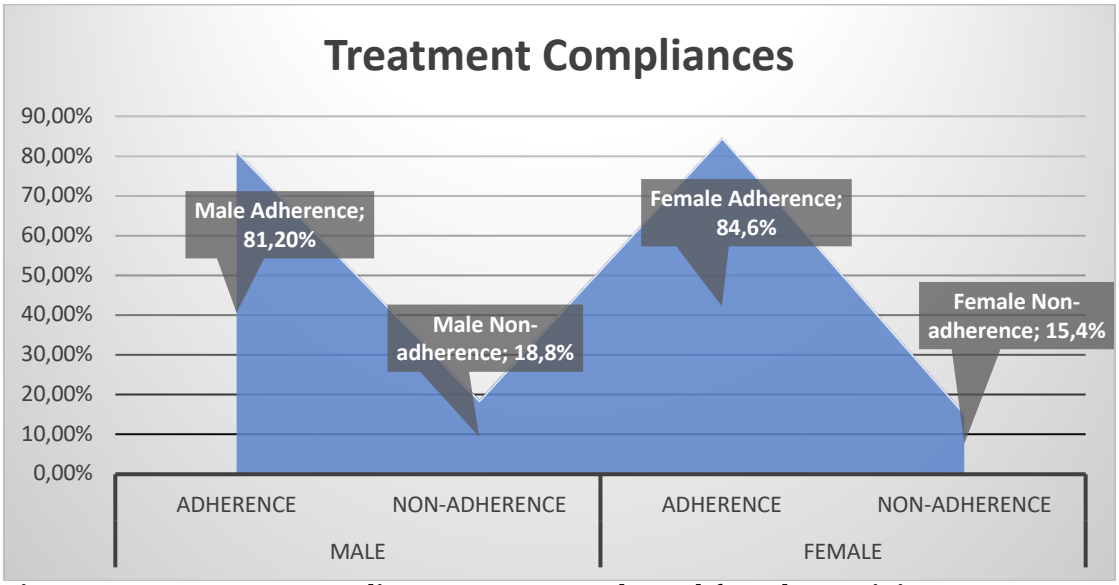


Figure 2. Treatment compliances among male and female participants (N=111).