

Factors Affecting Treatment Adherence of Patients in a Cardiac Care Unit

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Abstract

Objective: To identify the factors that affect adherence to pharmacological and non-pharmacological treatment of patients in a cardiovascular unit.

Methods: Observational, cross-sectional study. A total of 43 patients attended in a cardiovascular unit in the city of Neiva (Colombia) and selected through non-probability, and convenience sampling participated. Data were collected from medical records and an instrument administered to assess the factors that influence adherence to pharmacological and non-pharmacological treatment in people at risk of cardiovascular disease. Data analysis was performed using SPSS software version 22.0.

Results: The participants were mainly men (62.8%), from low socioeconomic status (86%), and with no schooling or with incomplete secondary education (70%). Significant differences were found between adherence and the socioeconomic factor, the health-provider-and-health-team-related factor, the therapy-related factor, and the patient-related factor. Likewise, significant associations were found between the type of affiliation to the health system, the total treatment adherence degree, and the health-provider-and-health-team-related factor; the disease symptoms and limitations, and the patient's condition; and between the patient's antecedents and the total treatment adherence degree. Association was found between adherence advantage and a history of cardiac catheterization [OR = 0.07 (95% CI = 0.009 - 0.682), p = 0.007], or open myocardial revascularization [OR = 0.5 (95% CI = 0.364 - 0.687), p = 0.044].

Conclusion: Approximately half of the population was at risk or showed poor adherence, so it is necessary to carry out a follow-up that supports compliance with treatment, avoiding complications that represent a higher risk for patients.

Keywords: Treatment Adherence and Compliance; Cardiovascular Diseases; Therapeutics; Nursing Care

Abbreviations

CIV: Closure of Interventricular Communication; DM 2: Type 2 Diabetes Mellitus; HBP: High Blood Pressure; AMI: Acute Myocardial Infarction; PAHO: Pan American Health Organization; IR: Interquartile Range; MRV: Myocardial Revascularization

Introduction

Adherence to pharmacological and non-pharmacological treatments implies the commitment and compliance with the recommendations given by health professionals and depends on multiple factors that comprise biopsychosocial aspects in people. The Pan American Health Organization (PAHO) and the World Health Organization (WHO) defined it in 2004 as the degree to which a person's behavior (understood in terms of taking medications, following a diet, and changing lifestyles) corresponds to the recommendations provided by a health service provider [1]. Adherence is also defined as the degree to which patients follow treatment instructions and suggestions [2].

Cardiovascular diseases, according to the WHO, accounted for 31% of all deaths in 2015 and are estimated to be the cause of approximately a third of all deaths in subjects over 35 years of age [3]. Furthermore, the WHO states that 80% of Acute Myocardial Infarctions (AMI) and premature strokes are preventable [4].

In the United States, about 15.4 million people over the age of 20 have coronary heart disease with a prevalence of 6.4%, about 7.6 million have myocardial infarction with a prevalence of 2.9% and 7.8 million have angina with a prevalence of 3.2% [5]. In Latin America, heart diseases are among the leading causes of death, with 10.9% of all deaths, and cerebrovascular diseases with 8.2% [6]. This scenario shows the great challenge that Latin American countries must face, taking into account the high costs of treatment and rehabilitation that these diseases generate.

Colombia is no stranger to this situation. According to the Ministry of Health and Social Protection, in 2014, Colombia faced an epidemic of cardiovascular diseases, with AMI, thrombosis, high blood pressure (HBP) and diabetes, being the leading causes of death. These pathologies are characterized by a gradual onset of symptoms, long duration, and generally caused by unhealthy lifestyle habits, such as sedentary lifestyle, tobacco and alcohol consumption [7]. Likewise, non-adherence to treatment, especially in those who suffer from these pathologies, seriously compromises the effectiveness of treatment, represents risks and high costs not only for patients and their families but also for insurers and for the health system in general [8,9].

Some research has described the factors that affect treatment adherence. These include the failure of health providers in awareness-raising and training [10]; the complexity of pharmacological prescriptions, poor knowledge of the disease, and dissatisfaction with the health service [9,11]; the inadequate doctor-patient relationship [12]; high levels of emotional stress and depression and low levels of education [13]; being male [14]; the appearance of adverse drug reactions and the lack of health, social and family support [11].

Thus, treatment adherence of people with risk factors and cardiovascular disease is relevant in achieving the therapeutic goals proposed by different health professionals, including nurses. Taking into account that these are chronic diseases, it is understood that their treatment and control must last throughout life and not for a short period, which represents a challenge in itself. The nursing professional must establish an authentic therapeutic relationship with the care subject, allowing them to gain an in-depth understanding of the personal and environmental aspects necessary to generate intervention strategies that allow the person to decide to start or maintain pharmacological or non-pharmacological treatment. In this sense, the present study aimed to identify the factors that affect adherence to pharmacological and non-pharmacological treatment of patients treated in the cardiovascular unit of the Hospital Universitario de Neiva, Huila, Colombia.

Methodology

A quantitative, descriptive, and cross-sectional design was carried out in a population of 43 patients treated in the cardiovascular unit from June to December 2016. The inclusion criteria for the participants were to be over 18 years of age, to accept to participate in the study by signing the informed consent, to reside in the department of Huila, and to have entered the cardiovascular unit during the period of the study. Patients with cognitive impairments who did not have a specific caregiver were excluded.

A data collection form was used to measure the sociodemographic and clinical characteristics of the participants. These characteristics included the current medical diagnosis, the pathological and surgical history, the presence of physical limitations and the symptoms related to the disease.

Likewise, the instrument "Factors influencing adherence to pharmacological and non-pharmacological treatment in patients with cardiovascular risk" designed and validated by Bonilla and Gutiérrez was applied. [2,15]. It has 53 items with Likert-type responses divided into four factors, as the WHO proposes. The first factor with 14 items covers socioeconomic factors; the second factor with 21 items inquires into factors related to the health provider, the health system, and the health team; the third factor with 10 items covers therapy-related factors, and the fourth factor with 8 items covers patient-related factors. This instrument has facial and content validity of 0.91, reliability and internal consistency with Cronbach's alpha of 0.85. The author of the instrument authorized its use.

Descriptive statistics were used to analyze the data, with frequencies for the qualitative variables and measures of central tendency and dispersion for the quantitative variables, after checking the normality of their distribution using the Shapiro-Wilk test. Data without normal distribution were analyzed by applying measures of central tendency such as median and interquartile ranges. The comparison between categorical variables was made using the Pearson's Chi-square test, when the assumptions for its use were fulfilled (expected values in each box ≥ 5); otherwise, the Fisher's exact test was used. Bivariate odd ratios (OR) were used as an estimate of the association between the independent variables and the outcome of interest (adherence advantage). All tests were identified as significant at $p \leq 0.05$ and analyzes were performed using SPSS software version 22.0.

The international ethical principles for health research, set forth in the Declaration of Helsinki and the Belmont report, were followed, guaranteeing the principles of autonomy, beneficence, and justice. Likewise, the guidelines of the Colombian regulations specified in Resolution 8430 of 1993, Law 266 of 1996 and Law 911 of 2004 classified this research as a risk-free study. Therefore, the informed consent was taken from participants after informing them of the purpose of the study and the freedom to participate in and to withdraw from the study.

Results

The average age of the participants was 65.4 years, variable without normal distribution according to the Shapiro Wilk test (0.001), with a median of 70 years and an interquartile range (IR) between 18 and 89 years. Table 1 describes the general characteristics of the population. The majority were men, whose main occupation was housework, married, with a basic or incomplete education, and low socioeconomic status, which shows the vulnerability condition of the patients. However, most of them are affiliated to the special health regime, which in Colombia corresponds to a type of affiliation to the health system through state institutions that have differentiated health and pension services.

Some clinical variables related to the participants' health condition and described in table 1 were measured. It was found that the priority medical diagnoses of participants were heart failure and AMI, with an average time of illness of 31 months at the date of measurement of adherence (non-normal distributed variable according to the Shapiro Wilk test [0.000], with a mean of 6 months and IR between 1 and 360 months). Most of the patients had a history of hypertension, surgical cardiac catheterization, visual and mobility limitations, and chest pain.

Adherence to pharmacological and non-pharmacological treatment was measured using the instrument designed by Bonilla and Gutiérrez, through the factors that influence adherence. The total result reported that only 3 patients (7%) have a non-adherence behavior, 16 (37.2%) are at risk of non-adherence and 24 (55.8%) have an adherence advantage. Specific findings of each factor are described in table 2. The socioeconomic factor shows greater affectation since 60% of the patients were at risk of non-adherence or they presented non-adherence behavior, mainly in aspects such as insufficient financial resources to cover their basic needs (food, clothing and educa-

Variables and categories	n (%)	Variables and categories	n (%)
Sex		Current medical diagnosis	
Women	16 (37,2)	Heart failure	14 (32,6)
Men	27 (62,8)	Valve change	8 (18,6)
Occupation		AMI	10 (23,3)
Unemployed	1 (2,3)	Multivessel disease	7 (16,3)
Employee	1 (2,3)	Atrial fibrillation	3 (7,0)
Student	1 (2,3)	Open MRV	6 (14,0)
Housework	15 (34,9)	Pacemaker implant	1 (2,3)
Pensioner	13 (30,2)	CIV	1 (2,3)
Freelance	12 (27,9)	Pathological history	
Socioeconomic		HBP	24 (55,8)
Low low	17 (39,5)	DM 2	8 (18,6)
Low	20 (46,5)	None	13 (30,2)
Medium low	6 (13,9)	Others	10 (23,3)
Residence Area		Surgical history	
Rural	14 (32,6)	Cardiac catheterization	32 (74,4)
Urban	29 (67,4)	Valve change	6 (14,0)
Marital Status		MRV	5 (11,6)
Married	24 (55,8)	Others	14 (32,6)
Divorced	2 (4,7)	Disease limitations	
Single	5 (11,6)	Mobility	16 (37,2)
Domestic partnership	7 (16,3)	Hearing	5 (11,6)
Widow/widower	5 (11,6)	Vision	16 (37,2)
Schooling		None	16 (37,2)
None	2 (4,7)	Symptoms of the disease	
Incomplete primary	12 (27,9)	Fatigue	9 (20,9)
Complete primary	10 (23,3)	Headache	5 (11,6)
Incomplete secondary	6 (14)	Dizziness	7 (16,3)
Completed secondary	6 (14)	Palpitations	5 (11,6)
Technical or Technological	2 (4,7)	Numbness	8 (18,6)
University	5 (6,1)	Chest pain	17 (39,5)
Type of affiliation to the health system		None	8 (18,6)
Contributive	1 (2,3)		
Special regime	24 (55,8)		
Subsidized	18 (41,9)		

Table 1. Distribution of sociodemographic and clinical characteristics of the participants.
 Abbreviations: AMI: Acute Myocardial Infarction; CIV: Closure of Interventricular Communication;
 HBP: High Blood Pressure; DM 2: Type 2 Diabetes Mellitus; MRV: Myocardial Revascularization.

tion), transportation cost to attend their control appointments, inability to pay for medications and high costs in the diet. However, significant support was found from family members of the participants.

Factor	Outcome	N (%)
Socioeconomic	Non-adherence behavior	9 (20,9)
	Risk of non-adherence	17 (39,5)
	Adherence Advantage	17 (39,5)
Related to the health system and equipment	Non-adherence behavior	2 (4,79)
	Risk of non-adherence	8 (18,6)
	Adherence Advantage	33 (76,7)
Therapy related	Non-adherence behavior	3 (7)
	Risk of non-adherence	6 (14)
	Adherence Advantage	34 (79,1)
Patient related	Non-adherence behavior	1 (2,3)
	Risk of non-adherence	13 (30,2)
	Adherence Advantage	29 (67,4)

Table 2: Results of the factors that influence pharmacological and non-pharmacological adherence of people with cardiovascular disease.

On the other hand, regarding the patients’ perception related to the health team, in general, their perception is positive. The participants stated that the health team provided kindly care, encouraged them to attend check-ups, gave them clear information, and showed interest in clarifying concerns regarding treatment, aspects that were reflected in the result of this factor, as shown in table 2. The association analysis between the variables and the adherence advantage showed a positive association with not having a diagnosis of heart failure [OR = 0.11 (95% CI = 0.024 - 0.565), p = 0.007, according to Fisher’s exact test], and not experiencing palpitation symptoms [OR = 0.047 (95% CI = 0.004 - 0.496), p = 0.007, Fisher’s exact test].

Likewise, the therapy-related factor had the highest number of patients with adherence advantage, since the patients stated that there was no interruption of the pharmacological treatment due to the improvement, they recognized the importance of compliance with the recommendations and indicated that they were highly willing to comply with the treatment. However, it is important to highlight that 51.2% of the patients reported having difficulties in changing their diet, due to financial issues. An association was found between the adherence advantage in this factor and having no pathological history of hypertension [OR = 0.11 (95% CI = 0.012 - 0.988), p = 0.027, Fisher’s exact test].

Regarding the patient-related factor, the majority of the participants stated that they were the ones directly responsible for their health and for giving continuity to the treatment, demonstrating a sense of appropriation of their health condition. They added that they received adequate support from their family, and they did not feel any discrimination for their pathology. Of the group of patients who were at risk of non-adherence in this factor, they reported experiencing feelings of anguish and discontent about the discomforts of their pathology and little interest in knowing about their disease. The association analysis between independent variables and the adherence advantage in this factor showed a positive association with not experiencing symptoms of palpitations [OR = 0.08 (95% CI = 0.009 - 0.897), p = 0.032, Fisher’s exact test].

The possible relationship between the participants’ sociodemographic and clinical characteristics and the factors influencing adherence was analyzed. We found that there are statistically significant differences between non-adherence behavior, the risk of non-adherence and the adherence advantage in the socioeconomic factor, the factor related to the health team, the factor related to the patient and the total degree of adherence to treatment, with the level of education, the type of affiliation to the health system, symptoms such as palpitations, limitations in mobility, surgical history of cardiac catheterization and open myocardial revascularization (MRV) (See table 3).

Sociodemographic characteristic Non-adherence behaviors n (%)		Socioeconomic factor analysis			
		Risk of non-adherence	Adherence advantages	p*	
		n (%)	n (%)		
Schooling					
Complete secondary		1 (11,1)	1 (5,9)	4 (23,5)	0,044
Incomplete secondary		0 (0,0)	5 (29,4)	1 (5,9)	
None		1 (11,1)	1 (5,9)	0 (0,0)	
Complete primary		3 (33,3)	5 (29,4)	2 (11,8)	
Incomplete primary		4 (44,4)	5 (29,4)	3 (17,6)	
Technical or Technological		0 (0,0)	0 (0,0)	2 (11,8)	
Complete university		0 (0,0)	0 (0,0)	4 (23,5)	
Incomplete university		0 (0,0)	0 (0,0)	1 (5,9)	
Type of affiliation to the health system					
Contributive		0 (0,0)	0 (0,0)	1 (5,9)	0,009
Special regime		2 (22,2)	9 (52,9)	13 (76,5)	
Subsidized		7 (77,8)	8 (47,1)	3 (17,6)	
Type of affiliation to the health system Non-adherence behaviors n (%)		Analysis of the health-provider-related factor: health system and health team			
		Risk of non-adherence	Adherence advantages	p*	
		n (%)	n (%)		
Contributive		1 (50,0)	0 (0,0)	0 (0,0)	0,032
Special regime		1 (50,0)	6 (75,0)	17 (51,5)	
Subsidized		0 (0,0)	2 (25,0)	16 (48,5)	
Disease-related symptoms and limitations Non-adherence behaviors n (%)		Analysis of the patient-condition-related factor			
		Risk of non-adherence	Adherence advantages	p*	
		n (%)	n (%)		
Palpitations	Yes	0 (0)	4 (80,0)	1 (20,0)	0,034
	No	1 (2,6)	9 (23,7)	28 (73,7)	
Mobility	Yes	0 (0)	8 (50,0)	8 (50,0)	0,037
	No	1 (3,7)	5 (18,5)	21 (77,8)	
Variable Non-adherence behaviors n (%)		Total degree of adherence to treatment			
		Risk of non-adherence	Adherence advantages	p*	
		n (%)	n (%)		
Type of affiliation to the health system					
Contributive		1 (33,3)	0 (0,0)	0 (0,0)	0,000
Special regime		1 (33,3)	5 (31,3)	18 (75,0)	
Subsidized		1 (33,3)	11 (68,8)	6 (25,0)	
History					
Cardiac catheterization	Yes	3 (100)	15 (93,8)	14 (58,3)	0,024
	No	0 (0,0)	1 (6,3)	10 (41,7)	
MRV	Yes	0 (0,0)	0 (0,0)	5 (20,8)	0,042
	No	3 (100)	16 (100)	19 (79,2)	

Table 3: Description of statistical significance between the patients' characteristics and factors affecting adherence.
Abbreviations: MRV: Myocardial Revascularization. *: Value calculated using Pearson's chi square.

Likewise, statistically significant differences were found between the results of the four factors that influence adherence and the total treatment adherence degree (See table 4).

Factor	Total treatment adherence degree			p*
	Non-adherence behavior	Risk of non-adherence	Adherence advantages	
	n (%)	n (%)	n (%)	
Socioeconomic factor				
Non-adherence behavior	1 (33,3)	8 (50,0)	0 (0,0)	0,000
Risk of non-adherence	0 (0,0)	8 (50,0)	9 (37,5)	
Adherence advantages	2 (66,7)	0 (0,0)	15 (62,5)	
Health-provider-related factor and healthcare team				
Non-adherence behaviors	2 (66,7)	0 (0,0)	0 (0,0)	0,000
Risk of non-adherence	1 (33,3)	5 (31,3)	2 (8,3)	
Adherence advantages	0 (0,0)	11 (68,8)	22 (91,7)	
Therapy-related factor				
Non-adherence behavior	2 (66,7)	1 (6,3)	0 (0,0)	0,000
Risk of non-adherence	0 (0,0)	5 (31,3)	1 (4,2)	
Adherence advantages	1 (33,3)	10 (62,5)	23 (95,8)	
Patient-related factor				
Non-adherence behavior	0 (0,0)	1 (6,3)	0 (0,0)	0,000
Risk of non-adherence	3 (100)	9 (56,3)	1 (4,2)	
Adherence advantages	0 (0,0)	6 (37,5)	23 (95,8)	

* Value calculated using Pearson's Chi square

Table 4: Relationship between the results of the factors influencing adherence and the total degree of adherence to pharmacological and non-pharmacological treatment.

The patients who had adherence advantage were characterized by having an average age of 63.4 years, being men (62.5%), retired (41.6%), residing in an urban area (79.1%), belonging to the low socioeconomic status (58.3%), married (66.6%), affiliated to the health special regime (75%), and having a surgical history of cardiac catheterization (58.3%). Of these characteristics, an association was found between the adherence advantage and the surgical history of cardiac catheterization [OR = 0.07 (95% CI = 0.009 - 0.682), p = 0.007 using Fisher's exact test] and MRV [OR = 0,5 (95% CI = 0.364 - 0.687), p = 0.044, Fisher's exact test].

Discussion

Regarding the patients' sociodemographic characteristics, we found that the male sex was the most frequent in those who showed greater adherence advantage to treatment. This finding differs from that reported by Sandoval, *et al.* in 2014 [14], who found that men had a higher risk of non-adherence. This may be due to differences in the characteristics of the sample or to the fact that the participants in Huila, Colombia, overvalued their performance following treatment. These results also differ from those reported by Lv, *et al.* in China who found that women were more adherent to treatment than men [16].

Likewise, concerning age, we observed that the participants who had an adherence advantage, despite belonging to a wide age range (between 18 and 89 years), had an average age of 63.4 years. This agrees with that reported by Zambrano, *et al.* [13] who point out in their study that people between the ages of 50 and 70 also had better adherence. Although in the study by Lv, *et al.* [16] greater adherence was found in the young population, it is important to consider that the younger people needed more support from health professionals to achieve therapeutic adherence goals.

In the studies carried out by Núñez, *et al.* in 2014 [17], it was shown that non-adherence to treatment falls on patients who live alone. It coincides with what was found in the present research since most of the patients who participated had a stable partner, domestic partnership, or marriage, and showed adherence to treatment (87%).

On the other hand, schooling was associated with patients' adherence to treatment, taking into account that those who had no formal education or had incomplete secondary education, presented a risk of non-adherence or non-adherence behaviors ($p = 0.04$). These results are similar to those published by Salcedo in 2014 [9], Sidney in 2016 [18], Lynggaard, *et al.* in 2017 [19] and Mena Díaz in 2017 [20] who found that patients with low education and low family income had less adherence to treatment. Similarly, in Turkey, Karakurt and Kasikçi [10] found a significant difference between educational attainment and taking prescribed medications. However, this aspect is susceptible to intervention by health professionals if educational strategies are used for patients and their family or support groups, according to their educational level.

Regarding the participants' socioeconomic factor, in the research carried out by Salcedo [9] and Benavides [11], where socioeconomic strata 1 and 2 had a higher prevalence of non-adherence in their study population, they determined that the patients were at greater risk by not having sufficient resources to ensure treatment follow-up and healthcare team recommendations. Within the analysis carried out on each of the factors affecting adherence to pharmacological and non-pharmacological treatment, we found that the socioeconomic factor was the most altered, since 60% of the participants were at risk of non-adherence or presented non-adherence behaviors in this factor, focusing on the patients' financial difficulties to meet their needs in food, health, housing and education. This coincides with that described by Akhu-Zaheya and W Shiyab [12] who pointed out that there was little assistance to rehabilitation programs due to transportation difficulties and financial costs. However, in the present study, despite the fact that the majority of the population belonged to the lower socioeconomic status, no statistically significant relationship was found between the socioeconomic level and the treatment adherence degree.

Likewise, in this study, it was possible to identify that the results of the factors related to the healthcare team and the patient had high percentages in the adherence advantage, with statistically significant differences compared to the total adherence degree. This was consistent with the reported by Shehab *et al.* [21] in United Arab Emirates population, where after intervening patients, health providers, and the health system, they improved adherence to cardiovascular medications. However, the results differ from those shown by De Jager, *et al.* [22] in the Dutch population who, after the intervention and follow-up, found that medication adherence was very low if the participants were unaware that they were being monitored.

The results of the total adherence degree in this study were similar to those described by Schmieder, *et al.* [23] in the German population, where they found complete adherence in 56% of the participants, partial adherence in 28% and non-adherence in 16%; however, these were specific about pharmacological adherence to antihypertensive medication.

Conclusion

The present study shows the pharmacological and non-pharmacological adherence of patients in a cardiovascular unit in Neiva, Colombia. The results allow establishing specific patient conditions that must be considered in the planning of nursing and health team interventions in the approach and monitoring of these patients in the cardiovascular unit.

The adherence degree to pharmacological and non-pharmacological treatments had a positive evaluation, but it should be noted that almost half of the population had risk or poorly adherent behaviors, so it is necessary to monitor these patients to avoid complications of the disease.

The cardiovascular risk monitoring programs carried out by both the nursing staff and the entire health team should include the assessment and promotion of adherence to treatment, highlighting the need to include the patient's entire family to achieve better results.

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