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Original article

Effectiveness of an educational program on adherence and quality of life in patients with heart failure

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ABSTRACT

Objective. To determine the effectiveness of an educational program on therapeutic adherence, quality of life, and satisfaction in heart failure patients treated at the nursing clinic. **Materials and methods.** A quasi-experimental, longitudinal, and prospective study was conducted with 42 patients treated at the National Cardiovascular Institute (INCOR-EsSalud). The intervention included five in-person educational sessions. Therapeutic adherence was assessed using the Morisky-Green test, and quality of life was assessed using the Minnesota Living with Heart Failure Questionnaire (MLHFQ) before and after the intervention. Pre-post comparisons were performed using McNemar's test. **Results.** In 42 patients, adherence according to the Morisky-Green test was 47.6% at baseline (20/42) and 83.3% post-intervention (35/42) (McNemar p=0.001). In the paired matrix, 18 patients improved from non-adherent to adherent, and 3 improved from adherent to non-adherent. In the MLHFQ, the "good" category was 26.2% at baseline (11/42) and 69.1% post-intervention (29/42); the "poor" category decreased from 7.1% (3/42) to 0%. 100% reported high satisfaction. **Conclusions.** The nurse-led educational program was associated with a significant improvement in therapeutic adherence and quality of life in patients with heart failure. Participants also reported high levels of satisfaction with the educational intervention and the care received. These findings suggest that the program is a viable and accepted strategy for strengthening self-care in this population.

Keywords: Heart Failure; Treatment adherence and compliance; Quality of Life; Education, Nursing (Source: MeSH-NLM).

RESUMEN

Efectividad de un programa educativo en la adherencia terapéutica y la calidad de vida en pacientes con insuficiencia cardíaca

Objetivo. Determinar la efectividad de un programa educativo en la adherencia terapéutica, la calidad de vida y la satisfacción del paciente con insuficiencia cardíaca atendido en el consultorio de enfermería. **Materiales y métodos.** Estudio cuasiexperimental, longitudinal y prospectivo realizado en 42 pacientes atendidos en el Instituto Nacional Cardiovascular (INCOR-EsSalud). La intervención incluyó cinco sesiones educativas presenciales. La adherencia terapéutica se evaluó mediante la prueba de Morisky-Green y la calidad de vida con el Minnesota Living with Heart Failure Questionnaire (MLHFQ), antes y después de la intervención. La comparación pre-post se realizó con la prueba de McNemar. **Resultados.** En 42 pacientes, la adherencia basal según Morisky–Green fue del 47,6% (20/42) y del 83,3% posintervención (35/42) (McNemar p=0,001). En la matriz pareada, 18 pasaron de no adherente a adherente y 3 de adherente a no adherente. En el MLHFQ, la categoría «buena» fue del 26,2% al basal (11/42) y del 69,1% posintervención (29/42); la categoría «mala» pasó del 7,1% (3/42) al 0%. El 100% reportó alta satisfacción. **Conclusiones.** El programa educativo liderado por enfermería se asoció con una mejora significativa en la adherencia terapéutica y la calidad de vida de los pacientes con insuficiencia cardíaca. Asimismo, los participantes reportaron altos niveles de satisfacción con la intervención educativa y la atención recibida. Estos hallazgos sugieren que el programa constituye una estrategia viable y aceptada para fortalecer el autocuidado en esta población.

Palabras clave: Insuficiencia Cardíaca; Cumplimiento y Adherencia al Tratamiento; Calidad de Vida; Educación en Enfermería (Fuente: DeCS-BIREME).

Introduction

Heart failure (HF) is a chronic clinical syndrome characterised by the inability of the heart to pump blood effectively, leading to debilitating symptoms, frequent hospitalisations, and high mortality [1]. Globally, it affects more than 64 million people and represents a growing public health concern [2]. In Latin America, its prevalence continues to rise due to population ageing and the high burden of hypertension and diabetes mellitus [3]. In Peru, mortality remains considerable, reaching 70% in the first year and 30% by the third year after diagnosis, particularly among older adults [4].

Adherence to treatment is a fundamental pillar in the management of HF, as its proper implementation reduces the risk of decompensation, recurrent hospitalisations, and disease progression [5]. The World Health Organization defines adherence as the extent to which a person's behaviour (taking medication, following a dietary regimen, and adopting lifestyle changes) corresponds with agreed recommendations from a healthcare professional [6]. In patients with HF, this concept is multidimensional and includes both pharmacological and non-pharmacological adherence, encompassing behaviours such as sodium and fluid restriction, weight monitoring, physical activity, and early recognition of warning signs [7]. Several studies have reported suboptimal adherence levels among patients with HF, with rates ranging from 30% to 60%, highlighting a significant challenge in the management of this chronic condition [8]. Non-adherence is associated with multiple social, economic, clinical, and health system-related factors [9], and is estimated to account for up to one-third of hospitalisations due to HF [10,11]. Furthermore, poor adherence is linked to a substantial decline in quality of life and a marked increase in healthcare costs [12].

Although non-pharmacological adherence is an essential component of comprehensive HF management, adherence to pharmacological treatment remains critical due to its direct association with clinical stability, reduction in adverse events, and survival [13]. Available evidence indicates that non-adherence to cardiovascular medications is associated with an increased risk of decompensation and hospitalisation, even among patients who partially adhere to non-pharmacological recommendations [14]. In addition, pharmacological adherence can be assessed using validated and specific instruments, allowing for more objective and reproducible measurement in clinical studies [15]. Recent literature highlights that therapeutic adherence is not solely dependent on the patient, but rather on a complex interplay of individual, educational, and contextual factors [14]. In this context, several studies have shown that nurse-led educational interventions improve disease knowledge, treatment adherence, and quality of life in patients with HF [15,16]. Health education promotes early recognition of warning signs, informed decision-making, and the adoption of self-care behaviours, all of which are essential to prevent exacerbations and improve clinical outcomes [17].

At the Instituto Nacional Cardiovascular (INCOR), the HF programme delivers structured educational sessions aimed at strengthening self-care and therapeutic adherence. However, there is limited local evidence systematically evaluating the effect of these interventions on pharmacological adherence and quality of life among patients attending nursing outpatient clinics.

Therefore, the aim of this study is to evaluate the effectiveness of a structured educational programme on pharmacological adherence, quality of life, and patient satisfaction among individuals with HF managed in the nursing outpatient clinic at INCOR. The findings will provide locally relevant evidence to inform clinical practice and contribute to the development of educational strategies that optimise comprehensive care for patients with HF.

Materials and methods

Study design

A quasi-experimental, longitudinal, and prospective study was conducted in the HF nursing outpatient clinic of the Instituto Nacional Cardiovascular Carlos Alberto Peschiera Carrillo (INCOR) in Lima, Peru. Data collection was carried out between June and August 2025.

Study population

The study population comprised 100 patients with HF with reduced ejection fraction registered in the ENFERMSOFT application. Patients aged over 18 years, haemodynamically stable, with adequate cognitive capacity, who voluntarily agreed to participate and completed the five educational sessions of the programme were included. Patients with advanced end-stage HF were excluded. The sample was obtained through non-probabilistic convenience sampling and consisted of 42 patients who met the inclusion criteria during the study period. Sample size was determined by the availability of patients who completed all five educational sessions.

Variables and definitions

Four main variables were analysed.

Treatment adherence: was assessed using the Morisky-Green test (4 items), administered at baseline and after the intervention; patients with a score of 4 were classified as adherent, and those with lower scores as non-adherent.

Health-related quality of life: was measured using the Minnesota Living with Heart Failure Questionnaire (MLHFQ), with scores ranging from 0 to 105 and classified as follows: good quality of life (0-24), moderate impairment (25-49), poor quality of life (50-75), and very poor quality of life (76-105).

For inferential analysis using McNemar's test, these categories were dichotomised into "good quality of life" and "not good quality of life", the latter grouping moderate, poor, and very poor categories. This recategorisation allowed comparison of changes in the proportion of patients with good quality of life between baseline and post-intervention assessments using paired analysis.

The number of educational sessions attended: corresponded to the total sessions completed by each patient, as recorded in ENFERMSOFT, and was analysed as a quantitative ratio variable.

Patient satisfaction: was assessed using a structured survey administered at the end of the programme, evaluating nursing care, educational aspects, follow-up, facilities, and overall perception, using a Likert scale from 1 to 4 points. Total scores were categorised as high satisfaction (31-40), moderate satisfaction (21-30), low satisfaction (11-20), or dissatisfaction (≤10).

Measurement instruments

Pharmacological treatment adherence was assessed using the Morisky-Green test, a self-reported instrument composed of four dichotomous (yes/no) items, widely used to measure medication adherence in chronic diseases. This questionnaire has demonstrated adequate construct and criterion validity, as well as acceptable reliability, with internal consistency values (KR-20/Cronbach's α) reported between 0.61 and 0.83 across studies. The Morisky-Green test has been extensively applied in patients with HF and other cardiovascular conditions, in both hospital and outpatient settings, showing adequate discriminatory capacity between adherent and non-adherent patients and usefulness in educational and clinical follow-up programmes [16].

Health-related quality of life was assessed using the MLHFQ, a disease-specific instrument for patients with HF, consisting of 21 items with a Likert-type scale. The MLHFQ has demonstrated high content, construct, and criterion validity, as well as excellent reliability, with internal consistency values reported above α = 0.90. This questionnaire has been widely used in international clinical studies and in Spanish-speaking populations, showing adequate sensitivity to detect changes in quality of life following therapeutic and educational interventions [13].

In the Latin American and Peruvian context, the MLHFQ has been applied in patients with chronic HF, demonstrating adequate comprehension, feasibility, and ability to discriminate between different levels of quality of life, supporting its suitability for the population of this study [21].

In this study, both instruments were administered in their Spanish versions, previously validated and widely used in the scientific literature. Given that these are standardised tools commonly employed in clinical research, no additional local psychometric validation was performed; however, their application under homogeneous conditions in pre- and post-intervention assessments supports internal consistency and comparability of results. In the study population (patients with HF treated at INCOR, Peru), the instruments demonstrated adequate comprehension, acceptability, and feasibility, with no difficulties reported during administration.

Procedures or interventions

The educational programme was designed and delivered by nurses specialised in HF from the INCOR nursing outpatient clinic, based on principles of health education and self-care in chronic diseases. The intervention was conducted face-to-face over a total period of five consecutive weeks, with one educational session per week (five sessions in total).

Each session lasted approximately 20-30 minutes and was conducted in a designated health education setting within the nursing outpatient clinic, with the joint participation of the patient and a family member or primary caregiver, considered an active part of the educational process.

The educational methodology was theoretical-practical and participatory, combining interactive lectures, demonstrations, question resolution, continuous feedback, and positive reinforcement. Pedagogical strategies aimed at meaningful learning were employed, including simple language, real-life clinical examples, guided questioning, comprehension checks, and reinforcement of key messages. Supporting materials included brief presentations, illustrative charts, and a printed educational leaflet provided to each participant at the start of the programme.

The content of each session was as follows:

Session 1. Understanding the disease

Definition of HF, causes, main symptoms, disease progression, and treatment goals, emphasising the patient's active role in self-care.

Session 2. Pharmacological treatment

Importance of medication adherence, types of drugs used in HF, dosing schedules, management of missed doses, common adverse effects, and consequences of non-adherence.

Session 3. Warning signs and prevention of decompensation

Early recognition of warning signs and symptoms (dyspnoea, oedema, weight gain, fatigue), recommended actions, and when to seek medical care.

Session 4. Healthy diet and fluid management

General dietary recommendations, sodium restriction, fluid control, interpretation of nutritional labels, and practical examples adapted to the local context.

Session 5. Physical activity and comprehensive self-care

Benefits of physical activity in HF, general recommendations for safe exercise, rest, healthy habits, and reinforcement of previous content.

At the end of the fifth session, a post-intervention evaluation was conducted, including re-administration of the Morisky-Green test and the MLHFQ. A structured survey was also administered to assess patient satisfaction with the educational programme and nursing care received. The total number of sessions completed by each patient was recorded in the ENFERMSOFT system as part of clinical follow-up.

This structure enabled a standardised, reproducible, and patient-centred intervention aimed at strengthening knowledge, therapeutic adherence, and self-care among individuals with HF.

Ethical aspects

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the INCOR (approval code: 0016/2025-CIEI). All participants received detailed information regarding the study objectives, procedures, benefits, and potential risks, and provided written informed consent prior to inclusion. Confidentiality was ensured through data coding and storage in secure repositories. Participation was voluntary, and patients were free to withdraw at any time without any impact on their care. The study did not receive external or internal funding.

Statistical analysis

Data were cleaned in Microsoft Excel and analysed using IBM SPSS Statistics version 17. Descriptive statistics were performed, using absolute and relative frequencies for categorical variables. Results are presented as frequency distribution tables.

To assess changes between baseline and post-intervention measurements, McNemar's test for paired data with Yates' continuity correction was applied, in order to compare proportions in dichotomous variables before and after the intervention.

For quality of life assessed using the MLHFQ, the four original categories were dichotomised into "good quality of life" and "not good quality of life" to enable paired analysis using McNemar's test.

Results

During the study period, 42 patients who met the inclusion criteria were evaluated; none met exclusion criteria at enrolment and all provided informed consent. The sample consisted predominantly of male patients (73.8%), with a mean age of 62.5 years. Regarding sociodemographic characteristics, single and married marital statuses predominated, as did primary and secondary education levels. From a clinical perspective, all participants had reduced left ventricular ejection fraction (LVEF) (100%), with a mean of 26.1%; ischaemic aetiology was the most common cause of HF, and New York Heart Association (NYHA) class II was the predominant functional class **(Table 1)**.

Baseline and post-intervention therapeutic adherence

At baseline, 20 patients (47.6%) were classified as adherent and 22 (52.4%) as non-adherent according to the Morisky-Green test. Following the educational intervention, the proportion of adherent patients increased to 35 (83.3%), while 7 (16.7%) were classified as non-adherent. Paired analysis using McNemar's test with Yates' continuity correction showed a statistically significant difference between baseline and post-intervention assessments.

The transition matrix for therapeutic adherence showed that 18 patients changed from non-adherent to adherent and 3 patients changed from adherent to non-adherent after the educational intervention. The pre-post comparison demonstrated a statistically significant difference (McNemar's test, $p = 0.001$).

Quality of life

At baseline, quality of life categories according to the MLHFQ were: good in 11 patients (26.2%), moderate in 13 (31.0%), poor in 15 (35.7%), and very poor in 3 (7.1%). Following the educational intervention, the categories were: good in 29 patients (69.1%), moderate in 9 (21.4%), and poor in 4 (9.5%); no patients remained in the very poor category **(Table 2)**.

For inferential analysis, MLHFQ categories were dichotomised into "good quality of life" and "not good quality of life". Of the 42 patients evaluated, 27 (64.2%) improved their quality-of-life category, 13 (31.0%) remained unchanged, and 2 (4.8%) worsened. McNemar's test with Yates' continuity correction demonstrated a statistically significant difference ($p = 0.001$).

Relationship between educational sessions and adherence

The changes in therapeutic adherence described above correspond to the comparison between the first (baseline assessment) and the fifth educational session (post-intervention assessment).

Patient satisfaction

At the end of the educational programme, 100% of patients reported a high level of satisfaction with the care received.

Regarding specific components of care, 59.5% rated kindness and respect as "excellent". Moreover, 69.1% of patients rated the clarity of explanations regarding their disease and treatment as "excellent"; with respect to responsiveness to questions and concerns, 54.8% rated the care as "excellent", 42.8% as "good", and 2.4% as "fair" **(Table 3)**.

Table 1. Sociodemographic and clinical characteristics of participants.

Variable	Category	n	%
Sex	Male	31	73.8
	Female	11	26.2
Age	Mean (range)	62 (29-101)	0
Marital status	Single	22	52.4
	Married	18	42.9
	Divorced	2	4.8
Educational level	Primary	17	40.5
	Secondary	15	35.7
	Technical	2	4.8
	Incomplete university	5	11.9
	Completed university	3	7.1
LVEF	Mean (range)	26 (11-44)	0
Aetiology	Ischaemic	19	45.2
	Valvular	2	4.8
	Idiopathic	0	0.0
	Hypertrophic	6	14.3
	Hereditary	1	2.4
	NIDCM	7	16.7
	Other	5	11.9
NYHA functional class	I	3	7.1
	II	32	76.2
	III	7	16.7
	IV	0	0.0
Devices	None	25	59.5
	ICD	13	30.9
	CRT	2	4.8
	Pacemaker	2	4.8

Note: Data are presented as absolute frequency (n) and percentage (%), calculated based on the total number of participants (n=42).
LVEF: left ventricular ejection fraction. **NIDCM:** non-ischaemic dilated cardiomyopathy. **NYHA:** New York Heart Association. **ICD:** implantable cardioverter-defibrillator. **CRT:** cardiac resynchronisation therapy.

Discussion

This study demonstrates that a structured nurse-led educational programme significantly improves therapeutic adherence and quality of life in patients with HF. Adherence increased from 47.6% to 83.3%, and a shift towards higher MLHFQ categories was observed, with no cases of very poor quality of life at the end of the intervention. These

Table 2. Baseline and post-intervention quality of life according to MLHFQ.

Category (MLHFQ)	Baseline n (%)	Post-intervention n (%)
Good	11 (26.2%)	29 (69.1%)
Moderate	13 (31.0%)	9 (21.4%)
Poor	15 (35.7%)	4 (9.5%)
Very poor	3 (7.1%)	0 (0.0%)
Total	42 (100%)	42 (100%)

MLHFQ: Minnesota Living with Heart Failure Questionnaire.

findings address the study objective and confirm the clinical effectiveness of the educational strategy.

The results are consistent with international and regional literature. Eimer *et al.* and Oscalices *et al.* reported improvements in adherence through educational interventions and structured follow-up [19,23], while García *et al.* demonstrated benefits even among patients with low educational attainment [18]. However, the magnitude of effect observed in our cohort was greater than that reported in some studies, which may be explained by the face-to-face modality, the structured weekly sequence, and the active involvement of family members, factors recognised in the literature as key determinants in consolidating self-care behaviours [15,17]. Moreover, the association between higher adherence and improved quality of life is consistent with findings reported by Huamán and by Salazar and Amesquita [21,22], reinforcing the interdependence between therapeutic adherence and perceived wellbeing.

Sociodemographic characteristics are particularly relevant for interpreting these findings. The predominance of patients with primary and secondary education suggests that structured educational interventions, using clear language and participatory strategies, can mitigate barriers associated with lower educational levels. This supports the notion that limited educational attainment is not an insurmountable barrier when the educational process is systematic and patient-centred. Additionally, the mean age and the high proportion of patients with severely reduced ejection fraction reflect a clinically vulnerable population, thereby enhancing the clinical relevance of the observed benefits.

From a clinical care perspective, these findings highlight the strategic role of nursing in the comprehensive management of HF. Nurse-led therapeutic education represents an evidence-based clinical intervention capable of modifying behaviours, strengthening self-care, and improving health outcomes. Continuity of care, therapeutic communication, and longitudinal follow-up, core components of nursing practice, favour sustained adherence in complex chronic conditions [14]. The fact that 100% of participants reported high satisfaction further supports the acceptability and feasibility of the programme.

Among the main limitations, the relatively short duration of instrument application is acknowledged, which may have influenced the results, as educational interventions often produce immediate favourable effects that may not be sustained over time. Furthermore, adherence assessment focused exclusively on pharmacological treatment, without incorporating relevant non-pharmacological components of self-care in HF. Finally, the quasi-experimental design without a control group and the use of convenience sampling limit the generalisability of the findings. Nevertheless, the paired pre-post analysis, the magnitude of change, and the standardised application of the protocol strengthen internal consistency. The use of self-reported instruments may introduce social desirability bias, although validated and widely used tools in clinical research were employed.

In conclusion, the structured nurse-led educational programme significantly improved therapeutic adherence and quality of life among patients, with meaningful improvements in medication-taking behaviours and high levels of satisfaction. These findings support the strategic importance of nursing in health education and continuous therapeutic support. It is recommended to institutionalise the programme within the INCOR, promote its expansion to other levels of care, complement it with technological tools such as ENFERMSOFT, encourage family involvement, and conduct multicentre studies with longer follow-up to evaluate its impact on major clinical outcomes and its integration into evidence-based policies and clinical guidelines.

Table 3. Patient satisfaction according to components of nursing care.

Component assessed	Category	n	%
Kindness and respect	Excellent	25	59.5%
	Good	17	40.5%
	Fair	0	0.0%
Clarity of information	Excellent	29	69.1%
	Good	13	30.9%
	Fair	0	0.0%
Willingness to address concerns	Excellent	23	54.8%
	Good	18	42.8%
	Fair	1	2.4%

Author contributions

RDBG, RGGP: conceptualisation, methodology, software. **MMTG, RDBG:** data curation, writing—original draft. **BBLA:** visualisation, investigation. **RGGP:** software, validation. **GFQP, RDBG:** writing, review and editing.

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