








Health literacy and adherence to treatment of patients with heart failure*

Literacia em saúde e adesão ao tratamento de pacientes com insuficiência cardíaca
Literacia en salud y adhesión al tratamiento de pacientes con insuficiencia cardíaca

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ABSTRACT

Objective: To relate the level of functional health literacy with adherence and barriers to non-adherence, rehospitalization, readmission and death in patients with heart failure. **Method:** A cross-sectional, analytical study with patients admitted to the emergency room with a diagnosis of heart failure. Literacy was assessed by the Newest Vital Sign. Patient adherence to medication treatment and barriers to non-compliance were assessed 90 days after discharge by the Morisky-Green test and the Brief Medical Questionnaire, respectively. **Results:** 100 patients participated in the study. The mean age was 63.3 years (± 15.2), with a predominance of white women. Medication adherence was low in 41.1% of participants, of which 55.9% presented inadequate literacy. Re-hospitalization and death were present in patients with inadequate literacy ($p < 0.001$). **Conclusion:** The low level of literacy was directly related to lower adherence and the presence of barriers to medication adherence, as well as higher rehospitalization rates and death.

DESCRIPTORS

Health Literacy; Health Education; Treatment Adherence and Compliance; Emergency Nursing.

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INTRODUCTION

Health literacy (HL) is understood as the degree of ability individuals possess to obtain, process, and understand basic health information in order to be able to make health-related decisions through the ability to understand and interpret numbers, texts and documents⁽¹⁾. Thus, HL has a strong social component related to the individual's ability to make fundamental decisions in taking responsibility for their health, and finally, how the patient can apply the necessary health care⁽²⁾.

The literature demonstrates that individuals with low HL may present problems in understanding diseases, reading package inserts and medication labels, recall of treatment and understanding doses and schedules, and difficulties in interpreting vital signs such as blood pressure, heart rate and capillary glycemia tests⁽²⁾. In addition, low HL is related to lower demand for health services for prevention, less knowledge about chronic disease, less healthy life choices, poor adherence to medications and poorer understanding of their use, lower self-management of the disease and a higher rate of hospital admission and mortality. This results in higher costs related to chronic disease care, in addition to influencing communication with health professionals⁽³⁻⁵⁾.

Communication is known for its relevance in the relationship between patients and the health team, and low literacy can affect this interaction, impacting the therapeutic process. It is an important factor in the effective understanding of information related to the disease, contributing to the individual being able to make the best decision regarding the proposed treatment⁽³⁾.

Among chronic diseases, decompensated Heart Failure (HF) is responsible for nearly 1 million annual hospitalizations in the US due to decompensation, and is directly related to medication treatment adherence and to significant changes in lifestyles involved in non-pharmacological care for the control of HF⁽⁶⁾. This study indicates that high health literacy is associated with a higher index of knowledge about HF by the patients, better medication adherence, as well as a better non-pharmacological management such as water and salt restriction. Thus, low literacy may be related to a higher mortality rate and hospitalizations due to decompensated HF⁽⁷⁾.

National studies have shown that the guidelines used by nurses are frequent practices for patients with HF⁽⁸⁻⁹⁾. It is important that the nurse knows the HL level of the individual, since the implementation of targeted interventions can increase patients' adherence to treatment and decrease the rates of rehospitalization and death⁽⁴⁻⁵⁾. In view of the above, the purpose of this study was to associate the functional literacy level in health with medication adherence, the barriers to non-adherence, rehospitalization and mortality in patients with heart failure.

METHOD

STUDY DESIGN

A cross-sectional and analytical study.

SCENARIO

Conducted in the emergency room of a public hospital specialized in cardiology.

DATA COLLECTION

The included patients were selected at the time of hospital discharge, were admitted to the emergency room with a diagnosis of decompensated heart failure according to a clinical-hemodynamic profile, during the period from January to December 2016, aged over 18 years, and had a phone number. A sample of 100 selected patients was aggregated, and the losses presented during the study period were exclusively due to death.

INSTRUMENTS

The sociodemographic variables studied were age, gender, education, occupation and family income. Three instruments were used; the first to evaluate literacy, the second to assess compliance with medication treatment, and the third to identify barriers to adherence.

The HL assessment was performed during hospitalization using the Newest Vital Sign (NVS), an instrument that provides patients with nutritional information on a label on an ice cream carton, which should be used to answer six questions. The questions are asked by the investigator, and one point is assigned for each correct answer and zero points for each wrong answer. When no response is achieved or only one response is correct, the patient is categorized as marginal literacy, between 2 and 3 correct responses indicate limited literacy, and 4 or more correct responses demonstrate high health literacy⁽¹⁰⁾. This instrument has an administration time of 6 minutes, is widely accepted for evaluating health literacy, and is translated into several languages, including Portuguese⁽¹⁰⁻¹¹⁾. Patient adherence to medication treatment was assessed by the Morisky-Green Test (MGT), which consists of four questions: "1) Do you sometimes have trouble remembering to take your medication? 2) Do you sometimes neglect to take your medicine? 3) When you are feeling better, do you sometimes stop taking your medicine? 4) If you sometimes feel worse while taking the medication, do you stop taking it?". The patient is classified in the high adherence group when the answers to the four questions are negative, when one or two responses are positive in the moderate adherence group, and if three or four responses are positive in the low adherence group. This instrument is considered the gold standard for evaluating medication adherence in the SAH population⁽¹²⁾ and has already been used for evaluating patients with HF⁽¹³⁾.

The Brief Medication Questionnaire (BMQ) was used to identify possible barriers to adherence to treatment by the patient. The instrument is composed of three domains, namely: Regimen Domain, which evaluates the patient behavior related to adherence to the prescribed treatment regimen; Belief Domain, which assesses the level of belief that the patient has regarding the efficacy of the treatment and opinions about unwanted side effects; and the Remembrance Domain, which identifies problems regarding difficulty of remembering to

medicate. The presence of positive response in the domains identifies a barrier to the prescribed treatment regimen. This instrument was successfully validated in patients with chronic diseases such as hypertension⁽¹⁴⁾.

The evaluation of adherence and barriers to adherence to medication treatment by the MGT and BMQ questionnaires was performed 90 days after hospital discharge through telephone contact from the researcher, who also identified the occurrence of readmissions and death.

The primary outcome considered was the relationship between literacy, adherence and barriers to medication adherence, and the relationship between literacy levels and readmission rates and death as secondary outcomes, being analyzed at 7, 30 and 90 days after hospital discharge by phone contact.

DATA ANALYSIS AND PROCESSING

An analysis of the continuous variables was performed by calculating the mean, standard deviation, median, minimum and maximum, while frequency and percentage were calculated for the categorical variables. The Generalized Estimating Equation Model (GEE) was used to associate literacy with medication adherence and barriers to adherence and to associate literacy with mortality and readmission in 90 days. A significance level of 5.0% (p-value < 0.05%) was considered.

ETHICAL ASPECTS

The data collection began after approval from the Research Ethics Committee of the proposing institutions under the protocol of opinion no. 922.744 of 2014, according to the precepts of Resolution no. 466/2012 of the National

Health Council. All study participants signed the Informed Consent Form (ICF).

RESULTS

A total of 100 patients, mean age 63.3 years (SD ± 15.2), with a female predominance of 57.0%, ethnically distributed among 41.0% white, 39.0% black, 19.0% mulatto and 1.0% Asian. Among the personal antecedents, 97.0% of the individuals had systemic arterial hypertension, 59.0% diabetes mellitus, 76.0% dyslipidemia, 29.0% were smokers, and 14.0% were obese. All patients were hospitalized with a diagnosis of decompensated heart failure, and classified in 60% HF profile B, 30% HF profile C, and 10% HF profile L.

In relation to the educational level of the population, 2.0% of the participants had more than 16 years of study, 18.4% between 8 and 15 years, 37.3% between 5 and 8 years, 36.3% had under to 4.9 years of study, and 6.0% had no formal study. Regarding occupation, most of the individuals performed household activities (26.0%) or were retired (26.0%). Medications were fully funded for 46% of patients, 35% received medications free of charge, and 19.0% were partially funded. Almost half of the population (48.0%) had income between one and two minimum salaries.

In the HL analysis during hospitalization using the NVS test, 11.0% of the patients presented adequate health literacy, 21.0% were categorized as having marginal health literacy, and 68.0% of the patients had inadequate health literacy.

The results showed that there is a significant relationship between education and literacy. Patients with less studying had a higher percentage of inadequate health literacy than the other education groups ($p \leq 0.001$), as observed in Table 1.

Table 1 – Education and literacy level in patients hospitalized in emergency for HF – São Paulo, SP, Brazil, 2016.

Education	Health Literacy			Total n=100 (%)	p-value
	Adequate n=11 (%)	Marginal n=21 (%)	Inadequate n=68 (%)		
0 to 4.9	1.0 (9.1)	2.0 (9.5)	37.0 (54.4)	40 (40.0)	<0.0001
5 to 8.9	1.0 (9.1)	18.0 (85.7)	17 (25.0)	36 (36.0)	
>9 to 11.9	9.0 (81.8)	1.0 (4.8)	14 (20.6)	24 (24.0)	

The evaluation of medication adherence and barriers to therapy was performed after 90 days of hospital discharge with 95 patients (Table 2), as five individuals from the total sample died in this period.

Regarding HL level and adherence and barriers for medication adherence, it is observed that a large part of the participants were classified as low adherence, and the majority of these is in patients with inadequate health literacy, as observed in Table 3.

When the level of functional literacy in health was associated with the occurrence of readmission and death at 7, 30 and 90 days, it was observed that patients with inadequate health literacy presented higher percentages of readmission ($p < 0.001$) and death ($p < 0.001$) after 30 and 90 days of discharge from the hospital, as can be seen in Table 4.

Table 2 – Adherence to treatment of patients with heart failure and barriers to adherence, according to the Morisky-Green Test and Brief Medical Questionnaire, respectively – São Paulo, SP, Brazil, 2016.

Medication Adherence	n (%)
Adherent	24 (25.3)
Moderate adherence	32 (33.7)
Low adherence	39 (41.1)
Barriers to medication adherence	
Regimen Barrier	56 (58.9)
Belief Barrier	15 (15.8)
Recall Barrier	37 (38.9)

Table 3 – Adherence of patients with heart failure to treatment and types of barriers to adherence according to levels of functional health literacy – São Paulo, SP, Brazil, 2016.

Medication adherence/Types of barriers	Health Literacy			Total n=95 (%)
	Adequate n=11 (%)	Marginal n= 21(%)	Inadequate n=63 (%)	
Morisky-Green Test				
High adherence	9.0 (81.8)	6.0 (28.6)	9.0 (13.2)	24.0 (24.0)
Moderate adherence	1.0 (9.1)	15.0 (71.4)	16.0 (23.5)	32.0 (32.0)
Low adherence	1.0 (9.1)	-	38.0 (55.9)	39.0 (39.0)
Brief Medication Questionnaire				
Regimen Barrier	2.0 (18.2)	11.0 (52.4)	43.0 (63.2)	56.0 (56.0)
Belief Barrier	-	-	15.0 (22.1)	15.0 (15.0)
Recall Barrier	1.0 (9.1)	-	36.0 (52.9)	37.0 (37.0)

Table 4 – Readmission and death of patients with heart failure according to levels of functional health literacy – São Paulo, SP, Brazil, 2016.

	Health Literacy			P-value
	Adequate n=11 (%)	Marginal n= 21(%)	Inadequate n=63 (%)	
Seven days				
Readmission	0	0	0	-
Death	0	0	0	-
30 days				
Readmission	0	0	2	0.4580
Death	0	0	0	-
60 days				
Readmission	0	0	26	0.0001
Death	0	0	5	0.0001

DISCUSSION

With the increase in HF patients and also the increase in health education strategies for the adherence of these patients to treatment, a reduction in readmissions and deaths are sought⁽⁸⁾, and health literacy can be an important instrument to evaluate and adapt the strategies and thus optimize the individualized therapeutic plan of each patient. In view of this scenario, this study proposed to evaluate the health literacy levels of patients with HF and to associate these levels with the rate of drug adherence and barriers to therapy, readmissions and death after discharge from the emergency department.

In the demographic and clinical profile of the patients in this study, older adults, hypertensive, diabetic and dyslipidemic women predominated; characteristics which are consistent with other studies and which present the following data: 5% of the older adults up to 75 years old and up to 20% older than 80 years have HF⁽¹⁵⁾. This situation may be associated with greater patient survival and a higher prevalence of comorbidities such as hypertension, diabetes and dyslipidemia. This corroborates findings in the literature⁽¹⁵⁾, which show that patients present multiple concomitant diseases with HF, mainly SAH, which is one of the main risk factors for developing HF⁽¹⁵⁻¹⁶⁾.

The majority of patients had 5 to 8 years of study, and 6% had no formal study, which is a similar result found in

a study that evaluated the epidemiological profile of older adults with HF in an Intensive Care Unit in the state of Bahia, demonstrating that these hospitalized patients mostly had incomplete secondary education⁽¹⁷⁾. Although there is no direct relationship between education and the occurrence of the disease, low education may be associated with a lack of understanding of the need to seek immediate medical attention at the first signs of decompensation⁽¹⁸⁾.

This study revealed that most of the participants (68.0%) had inadequate health literacy, which is a similar finding to another study⁽¹⁷⁾. Inadequate health literacy is a matter of concern and permeates health actions and strategies for disease and injury prevention and self-care promotion, and is directly related to the patient's knowledge about the control of their disease⁽³⁾. Nurses have an important role in this context because they can establish appropriate interventions for treatment through educational strategies, thus favoring understanding of the disease, greater therapeutic adherence and self-care in relation to HF⁽¹⁹⁾. The main objective of nursing education for patients with HF is that they understand the importance of adherence to treatment and the signs and symptoms of decompensation⁽¹⁹⁾. Health education can positively impact the adherence to HF treatment of patients with low HL, such as the use of adequate vocabulary to levels of literacy, visual communication and continuous feedback⁽²⁰⁾.

Literature reveals that the literacy level of the individual is related to their education^(8,21), and that the years of studies can be predictors of different levels of literacy⁽⁸⁾, confirming data observed in this study where patients with an adequate literacy level had more years of formal study, between 9 and 12 years. It is important to highlight the importance of this data when evaluating the low level of education of Brazilians, and the fact that this fact may be associated with the health of the population, especially with regard to understanding the disease and promoting health.

The highest percentage of medication adherence in the present study was also related to literacy levels, in which patients who had an adequate literacy level had greater adherence to drug treatment (88.1%). In a Dutch meta-analysis in which 17 publications were analyzed, results on literacy and medication adherence were divergent, as they did not obtain clarity regarding the association of a higher level of literacy and medication compliance⁽²²⁾. On the other hand, other studies on the subject refer to a positive link between higher level of literacy and greater adherence to treatment⁽⁸⁾. A randomized clinical trial with patients with HF aimed at analyzing the relationship between literacy, self-care and knowledge of HF, showed that a higher level of literacy was associated with greater medication adherence⁽²³⁾. Considering that HF is a chronic disease which requires frequent use of multiple medications and the need for continuous self-care, mainly related to changes in lifestyle, weight and food control, it is justifiable that a higher literacy level is associated with greater medication adherence, since the complexity of the treatment requires a greater understanding of the individual, and patients with lower degrees of literacy have a deficit in their comprehension and apprehension of content, making it difficult to learn management with the care that the HF requires. Although the medication adherence test used in the present study was developed and validated for patients with hypertension, there are already studies which used it for evaluating medication adherence in patients with heart failure⁽¹³⁻¹⁴⁾.

Regarding the barriers to medication adherence, those of regimen, belief and recall are more present in the individuals with inadequate health literacy, 63.2%, 22.1% and 52.9%, respectively. The regimen barrier, which suggests difficulty in understanding patients' prescriptions and treatment guidelines, is present in 56% of the patients, of whom 63.2% presented inadequate literacy, which reinforces the link between the level of literacy, the patient's understanding of their illness and their low adherence to treatment. Such a result is similar to that found in a study which used instruments for assessing adherence and barriers to medication adherence and concluded that the presence of the barrier regimen was associated with poor medication adherence⁽¹²⁾.

The relationship between patients' beliefs about treatment and self-care is well known⁽²⁴⁾. The belief barrier exposes patients' conviction regarding the proposed treatment and was presented in 22.1% of the patients with inadequate health literacy. For the recall barrier, this was observed in 52.9% of the patients who presented inadequate health literacy. Studies related to belief and recall barriers are scarce

in the literature, but the existence of a barrier to adherence to treatment may be related to inadequate literacy.

The present study showed a significant association between literacy level and readmission levels after 90 days ($p < 0.001$), and all patients who were readmitted had inadequate health literacy. Divergent results were obtained in an American cohort study which evaluated the relationship between health literacy and mortality outcomes and readmission of patients with HF, and revealed that there is no relationship between the literacy level and the readmission rate⁽²⁵⁾. The relationship between medication adherence and the self-care of HF patients with hospital readmission is well-known, justifying that patients with low literacy level and consequently lower understanding regarding medications and changes in lifestyle present higher levels of hospital readmission⁽⁷⁾.

The analysis of mortality after hospital discharge in up to 90 days showed that 5% of the patients died during this period, and all presented inadequate health literacy. A retrospective cohort study conducted in Colorado with 1,494 patients and published in 2015, correlated mortality and hospitalization of patients with literacy levels and showed a similar result regarding low literacy being related to higher rates of all-cause mortality in the study period⁽²⁶⁾.

A similar retrospective cohort study published in 2015 with a sample of 1,379 patients hospitalized for HF, analyzed the mortality and hospitalization of these patients over a period of 90 days and associated them with the levels of literacy⁽²²⁾, corroborating the data of the present study when evidencing that patients with lower levels of literacy had higher mortality rates 90 days after hospital discharge. These differences in the results found are justified by the high mortality of patients after hospitalization for HF and by the various factors which influence mortality, such as the presence of comorbidities, the number of hospitalizations due to decompensation, polypharmacy and non-pharmacological care⁽²⁷⁾.

Non-pharmacological care consists of adequate water restriction, correct salt intake and daily weight control, meaning that it is directly related to behavioral change and life habits⁽²⁸⁾. A systematic review article that analyzed 17 studies on self-care and chronic diseases, including HF, confirmed that the patient's actual self-care of the disease is directly related to the decrease in mortality and readmissions, thus constituting an important factor to be considered⁽²⁸⁾, mainly because literacy is defined as applied health care⁽¹⁾.

The clinical-hemodynamic profile proposed in the study evaluated clinical parameters for patient classification and has four profiles which can guide the chosen therapy and also the patient prognosis. Such an instrument is therefore extremely relevant regarding patient mortality, being that patients hospitalized with decompensated HF profile C are more likely to evolve to death⁽²⁹⁾.

This study presents limitations of being performed in a single center, the reduced sample size, the follow-up time and the evaluation and individual relationship of health literacy to the mortality data, considering the multimorbidity of the studied patients.

Nurses have an important role in health education, especially in patients with chronic diseases such as HF. HL is

related to health promotion and its high levels of adherence to treatment and decrease in the occurrence of readmissions and deaths in patients with HF. Given the above, and considering the scarcity of national literature, the importance of studies which subsidize elaborating health education strategies directed to the real needs of the population is evident⁽³⁰⁾.

CONCLUSION

The study concluded that patients with HF who had an inadequate level of functional health literacy had lower

medication adherence and a greater number of barriers to non-adherence when tested after hospital discharge. During the 3-month follow-up of patients after hospital discharge, those with inadequate functional health literacy had a higher number of readmissions and evolution to death. Although the study makes it possible to relate functional health literacy with medication adherence, hospital readmission and death of patients with HF, new studies evaluating other factors related to mortality and therapeutic adherence of these patients are necessary in order to better correlate functional literacy in patients with HF.

RESUMO

Objetivo: Relacionar o nível de literacia funcional em saúde com a adesão e barreiras para a não adesão medicamentosa, a reinternação e o óbito em pacientes com insuficiência cardíaca. **Método:** Estudo transversal, analítico, com pacientes internados em serviço de emergência, com diagnóstico de insuficiência cardíaca. A literacia foi avaliada na alta pelo *Newest Vital Sign*. A adesão do paciente ao tratamento medicamentoso e as barreiras para a não adesão foram avaliadas 90 dias após a alta por meio do teste de Morisky-Green e *Brief Medical Questionnaire*, respectivamente. **Resultados:** Participaram do estudo 100 pacientes. A média de idade foi 63,3 anos ($\pm 15,2$), com predomínio de mulheres brancas. Em 41,1% dos participantes a adesão medicamentosa foi baixa, destes, 55,9% apresentaram inadequada literacia. A reinternação e o óbito estavam presentes nos pacientes com inadequada literacia ($p < 0,001$). **Conclusão:** O baixo nível de literacia relacionou-se diretamente com menor adesão e presença de barreiras para a adesão medicamentosa, além de maiores índices de reinternação e óbito.

DESCRITORES

Alfabetização em Saúde; Educação em Saúde; Insuficiência Cardíaca; Cooperação e Adesão do Paciente; Enfermagem em Emergência.

RESUMEN

Objetivo: Relacionar el nivel de literacia funcional en salud con la adhesión y barreras para la no adhesión medicamentosa, el reingreso hospitalario y el fallecimiento en pacientes con insuficiencia cardiaca. **Método:** Estudio transversal, analítico, con pacientes hospitalizados en servicio de urgencias, con diagnóstico de insuficiencia cardiaca. La literacia fue evaluada en el alta por el *Newest Vital Sign*. La adhesión del paciente al tratamiento medicamentoso y las barreras para la no adhesión fueron evaluadas 90 días después del alta mediante la prueba de Morisky y el *Brief Medical Questionnaire*, respectivamente. **Resultados:** Participaron en el estudio 100 pacientes. El promedio de edad fue de 63,3 años, con predominio de mujeres blancas. En el 41,1% de los participantes, la adhesión medicamentosa fue baja, de esos el 55,9% presentaron inadecuada literacia. El reingreso y el fallecimiento estaban presentes en los pacientes con inadecuada literacia ($p < 0,001$). **Conclusión:** El bajo nivel de literacia se relacionó directamente con menor adhesión y presencia de barreras para la adhesión medicamentosa, además de mayores índices de reingreso y el fallecimiento.

DESCRIPTORES

Alfabetización en Salud; Educación en Salud; Insuficiencia Cardíaca; Cumplimiento y Adherencia al Tratamiento; Enfermería de Urgencia.

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