



Non-pharmacological management of patients with decompensated heart failure: a multicenter study – EMBRACE*

Manejo não farmacológico de pacientes com insuficiência cardíaca descompensada: estudo multicêntrico – EMBRACE

Manejo no farmacológico de pacientes con insuficiencia cardíaca descompensada: estudio multicéntrico – EMBRACE

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ABSTRACT

Objective: To identify the prescription and execution of non-pharmacological care in the medical or nursing prescriptions in three reference centers for the treatment of patients with heart failure. **Methods:** A study using a quantitative, cross-sectional approach of a multicenter cohort. It included: patients admitted for decompensated heart failure, New York Heart Association function III / IV; any etiology; age of 18 years or older; and both genders. **Results:** The study included 562 patients; among non-pharmacological care, salt restriction was the most prescribed (95.4%), followed by the control of diuresis (48%). The proportion of treatment prescribed and performed was higher in the third, and in the other two centers the difference between the prescribed and the performed was higher than 20%. **Conclusions:** Non-pharmacological care interventions are not fully incorporated into clinical practice. Strategies that can mobilize the multidisciplinary team with a view to the interventions and achievements of this care merit study.

Keywords: Heart failure/therapy; Multicenter study; Questionnaires

RESUMO

Objetivo: Identificar a prescrição e execução dos cuidados não farmacológicos nas prescrições médicas ou de enfermagem em três centros de referência no atendimento de pacientes com insuficiência cardíaca. **Métodos:** Estudo de abordagem quantitativa, transversal de uma coorte multicêntrica. Incluíram-se pacientes admitidos por IC descompensada, classe funcional III/IV; de qualquer etiologia; idade ≥ 18 anos; de ambos os gêneros. **Resultados:** Foram incluídos 562 pacientes, dentre os cuidados não farmacológicos, a restrição de sal foi o mais prescrito (95,4%), seguido pelo controle de diurese (48%). A proporção de cuidados prescritos e realizados foi maior no terceiro, e nos outros dois a diferença entre o prescrito e o realizado foi superior a 20%. **Conclusões:** Os cuidados não farmacológicos não estão totalmente incorporados à prática clínica. Estratégias que possam mobilizar a equipe multiprofissional com vistas às prescrições e realizações desses cuidados merecem ser estudadas.

Descritores: Insuficiência cardíaca/terapia; Estudo multicêntrico; Questionário

RESUMEN

Objetivo: Identificar la prescripción y ejecución de los cuidados no farmacológicos en las prescripciones médicas o de enfermería en tres centros de referencia en la atención de pacientes con insuficiencia cardíaca. **Métodos:** Estudio de abordaje cuantitativo, transversal de una cohorte multicéntrica. Se incluyeron pacientes admitidos por IC descompensada, clase funcional III/IV; de cualquier etiología; edad ≥ 18 años; de ambos géneros. **Resultados:** Fueron incluídos 562 pacientes, de los cuidados no farmacológicos, la restricción de sal fue el más prescrito (95,4%), seguido por el control de diuresis (48%). La proporción de cuidados prescritos y realizados fue mayor en el tercero, y en los otros dos la diferencia entre el prescrito y el realizado fue superior a 20%. **Conclusiones:** Los cuidados no farmacológicos no están totalmente incorporados a la práctica clínica. Merecen ser estudiadas estrategias que puedan mobilizar al equipo multiprofesional con miras a las prescripciones y realizaciones de esos cuidados.

Descriptor: Insuficiencia cardíaca/terapia; Estudio multicéntrico; Questionários

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INTRODUCTION

Heart failure (HF) is a complex syndrome associated with high readmission rates, low quality of life, increased risk of early death, and a high economic burden related to hospital charges, despite major advancements in care over the last decades⁽¹⁾. The leading causes of readmission in HF are associated with inadequate care, whether due to poor adherence or to a lack of awareness of non-pharmacological management measures; these are considered preventable causes^(2,3).

Non-pharmacological management has come to play a major role in the treatment of HF patients, and has proven benefit in this population^(4,5). Despite a wealth of evidence demonstrating positive outcomes, non-pharmacological management has yet to be fully integrated into clinical practice⁽²⁾. A previous study of patients admitted to a university hospital with decompensated HF showed substantial gaps in the prescription and implementation of non-pharmacological management strategies. These findings reveal a need for strategies to enhance the adherence of multidisciplinary care providers to the recommendation, prescription, and implementation of non-pharmacological interventions⁽²⁾.

However, research on non-pharmacological management of patients admitted for decompensated HF in Brazil is still incipient. Within this context, the objective of this study was to identify the prescription and implementation of non-pharmacological care measures in medical and nursing prescriptions.

METHODS

This was a quantitative, cross-sectional, multicenter cohort study, the *Estudo Multicêntrico Brasileiro para Identificar os Fatores Precipitantes de Internação e Reinternação de Pacientes com Insuficiência Cardíaca*, or EMBRACE trial. The study was carried out at three centers of excellence in the management of HF patients, two in Southern Brazil (Centers 1 and 2) and one in the Northeast region of the country (Center 3).

The study population comprised patients of both genders who had been admitted for decompensated HF, whether through the Brazilian Unified Health System or privately insured; with an established diagnosis of New York Heart Association (NYHA) functional class III or IV HF, regardless of etiology; an ejection fraction $\leq 45\%$; and age ≥ 18 years. All patients who agreed to take part in the study provided written informed consent.

Patients with HF developing after acute myocardial infarction within 3 months of admission, those with HF secondary to sepsis, those with a history of coronary

bypass artery grafting (CABG) surgery within 30 days of admission, and those with cognitive impairments were excluded from the sample.

Data were extracted from patient records with a standardized structured questionnaire designed to collect information on patient identifiers, demographic and clinical variables, and a variety of parameters concerning the prescription and implementation of non-pharmacological management measures.

This study was approved by the relevant Research Ethics Committees with judgment number -06-032.

For statistical analysis, continuous variables were expressed as means and standard deviations or medians and interquartile ranges as appropriate. Categorical variables were expressed as absolute and relative frequencies. Analysis of variance (ANOVA), the chi-squared test, and the Kruskal–Wallis test were used as appropriate for comparisons among the three study centers. All analyses were performed in the *Statistical Package for the Social Sciences* software environment. The significance level was set at $P < 0.05$ (two-tailed).

RESULTS

The study sample comprised 562 patients, most from Center 1 (53.9%), followed by Centers 2 (27.2%) and 3 (18.9%). Patients were recruited predominantly from emergency departments (68.1%), and most had NYHA class III disease (55.3%). Comparison of sociodemographic characteristics showed significant differences among the subsamples of each center, particularly between Center 3, in Northeast Brazil, and Centers 1 and 2, in the South region of the country. Patients 1 and 2 were older, had higher educational attainment and household income, and were more likely to be white. Nonadherence was the leading cause of HF decompensation in Centers 1 and 2, but was less common in Center 3. These data are shown in Table 1.

The main signs and symptoms identified on admission are described in Table 2. The most frequent signs and symptoms were dyspnea, paroxysmal nocturnal dyspnea, fatigue, and lower extremity edema.

Most patients (69.9%) reported having experienced at least one (23.5%) admission for the same heart condition during the 12 months preceding the study admission. Likewise, 87.5% of patients had received or were presently receiving treatment for HF.

Of the various non-pharmacologic care measures prescribed, sodium restriction was the most common (95.4% of prescriptions), followed by urine output monitoring (47.7%), body weight monitoring (43.1%), fluid restriction (33.2%), and fluid balance (26.7%). In just over half of prescriptions (54.6%), sodium intake was restricted to 2 g (Figure 1).

Table 1 – Sociodemographic and clinical characteristics of patients admitted with decompensated heart failure, Porto Alegre, 2012.

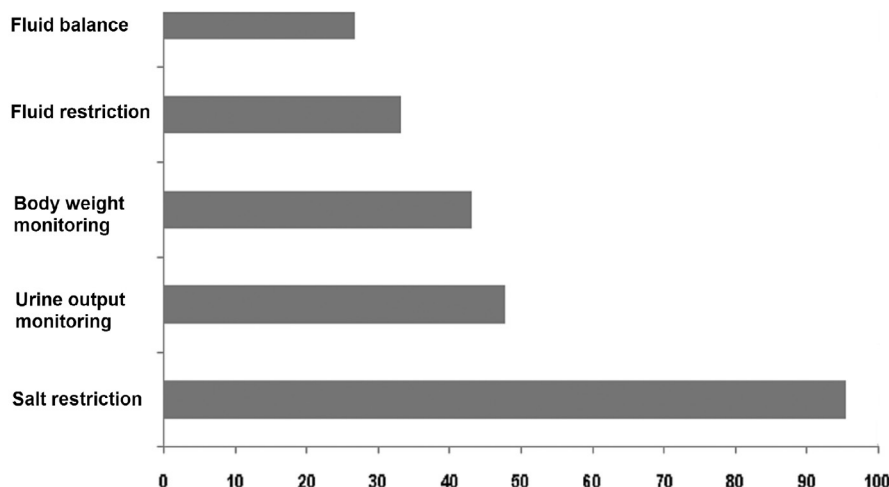
Variable	Overall n=562	Center 1 n=303	Center 2 n=153	Center 3 n=106	p-value
Age (years) *	61±14	63±139	62±14	54±16	<0.001
Sex					
Male†	366(65.1)	166(61.4)	108(70.6)	72(67.9)	0.120
Does not live alone	489(87)	250(82.8)	137(89.5)	102(96.2)	0.001
Household income					
One minimum wage‡	191(34.1)	107(35.5)	17(11.1)	67(63.2)	<0.001
Educational attainment (years)*	5(2-8)	5(2-8)	7(3-8)	4(1-5)	<0.001
Ethnicity/Skin color					
White‡	373 (66.4)	231(76.2)	118(77.1)	24(22.6)	<0.001
Etiology					
Ischemic heart disease‡	206 (36.7)	103(34.0)	69(45.1)	34(32.1)	0.054
LVEF (%)*	29±8	29±9	30±7	29±8	0.108
Reason for decompensation					
Nonadherence‡	375(66.7)	209(69.0)	117(76.5)	49(46.2)	<0.001

*Mean ± standard deviation, ANOVA; † n (%), chi-squared test; ‡ median (interquartile range), Kruskal–Wallis test; LVEF, left ventricular ejection fraction.

Table 2 – Key signs and symptoms of patients admitted for decompensated heart failure, Porto Alegre, 2012.

Variable	n (%)
Symptoms	
Dyspnea	495 (88.1)
Paroxysmal nocturnal dyspnea	477 (84.9)
Fatigue	395 (70.3)
Orthopnea	347 (61.7)
Chest pain	88 (15.7)
Signs	
Edema	353 (62.8)
Jugular venous distention	190 (33.8)

Figure 2 illustrates prescription of non-pharmacological care measures at each of the three study centers. Analysis of prescriptions at each hospital showed that, with the exception of urine output monitoring, non-pharmacological care measures were not prescribed equally commonly across the three centers. Furthermore, some measures were not always implemented, despite having been prescribed. Figure 2 also shows that fluid balance and fluid restriction were prescribed less frequently in Center 3, whereas body weight monitoring was prescribed most frequently at Center 1. However, comparison between measures prescribed and measures actually implemented by the nursing team shows that a higher proportion of prescribed procedures were actually implemented at Center 3, whereas at Centers 1 and 2, the proportion of patients in whom prescribed measures were not implemented by the nursing team sometimes exceeded 20%.

**Figure 1** – Non-pharmacological care measures prescribed.

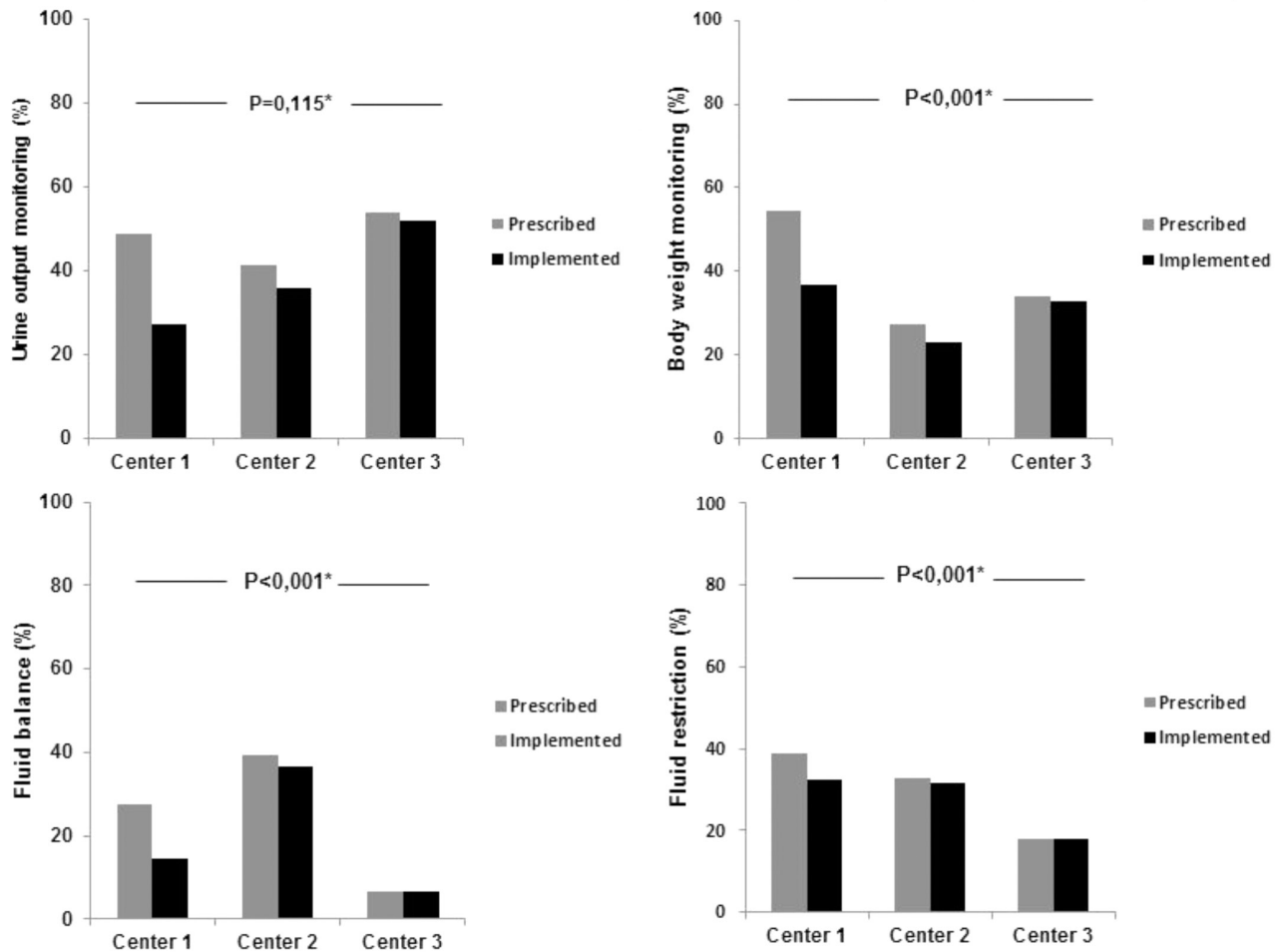


Figure 2 – Prescription and implementation of non-pharmacological care measures.

*Comparison between measures prescribed, by Center †Comparison between measures implemented, by Center (chi-squared test).

DISCUSSION

This study constitutes the first multicenter assessment of non-pharmacological management of patients admitted with decompensated HF in Brazil. The most commonly prescribed care measure was sodium restriction. The other measures of interest were recorded in less than 60% of prescriptions. Furthermore, implementation of most non-pharmacological care measures was poor.

The mean age of the sample approached that of other studies, as did the predominance of male subjects^(2,3,6); however, the proportion of patients under the age of 65 fell short of that reported in international registries, which are usually of geriatric populations⁽⁷⁾.

The study sample included patients with low educational attainment and low household income. These sociodemographic characteristics are known to be risk and/or aggravating factors both for the development

of HF and for readmission⁽⁸⁾. The majority of patients in the study group claimed not to live alone, which may be considered a positive aspect. Family and social support networks play a very important role in recovery and maintenance of clinical stability in these patients. During hospitalization, nurses should include caregivers in the process of educating patients for self-care. Guidance on non-pharmacological measures and, particularly, on early recognition of the signs and symptoms of HF decompensation should be provided daily, so that patients and their caregivers can incorporate these measures into their daily routines and not take them for granted⁽⁹⁾. It bears stressing that inadequate social support has been considered a contributing factor for readmission in HF patients⁽¹⁰⁾.

A comparative study of the profile of patients admitted to public versus private hospitals for decompensated HF found a predominance of black patients in public hospitals (65%) and a predominance of non-black

patients in the private health sector (80%)⁽¹¹⁾. These findings are not consistent with those of the present study, and may be related to ethnic diversity within and among the various regions of Brazil. This difference is also found in U.S. studies, which also report divergent findings with respect to ethnicity^(10,12).

One-third of HF cases in our sample were of ischemic origin. This is consistent with previous studies^(2,6,10,13), in which the frequency of HF secondary to ischemic heart disease ranged between 23 and 37%.

The most frequent signs and symptoms of congestion at the time of admission were edema, dyspnea and paroxysmal nocturnal dyspnea, and fatigue. These findings are consistent with the clinical data of patients admitted for decompensated HF, which report clinical congestion as the leading cause of readmission⁽³⁾. In a previous study conducted at a university hospital, dyspnea (91.4%), paroxysmal nocturnal dyspnea (87.5%), fatigue (67.3%), edema (63.7%), orthopnea (55.4%), and jugular vein distention (28.7%) were the most common signs and symptoms of decompensated HF on admission⁽¹⁴⁾.

Nonadherence to treatment was identified as the leading cause of decompensation of HF. This fact may be attributable to a variety of factors, including deficient knowledge of HF, failure to receive specialized follow-up with a multidisciplinary team, and lack of systematized guidance. Patient adherence to an adequate diet (with restriction of sodium and, in more severe cases, fluid intake) and to pharmacotherapy play an essential role in the management of HF, and nonadherence has been associated with a twofold risk of hospital admission and mortality⁽¹²⁾. In a study of medication adherence in 252 patients, 118 (47%) reported high adherence, and 45 (18%) were adherent to non-pharmacological treatment. A prior knowledge of non-pharmacological care measures, ability to identify the symptoms of clinical congestion, and a history of current HF treatment were associated with adherence. As in the present study, poor treatment adherence was reported as the leading cause of decompensation⁽¹⁵⁾.

The impact of systematic nurse-led education and improved knowledge on disease and self-care was assessed in a prospective experimental study. This approach, coupled with other non-pharmacological measures such as sodium restriction, monitoring of body weight and urine output, and fluid restriction, can minimize the frequency of HF decompensation episodes and readmissions, and, consequently, improve patient quality of life (QoL)⁽¹⁶⁾. A study of health-related quality of life (HR-QoL) among elderly patients with HF concluded that management of this condition requires a multidisciplinary team, due to the complexity of treatment regimens. Nurses play a leading role in these teams, with their scope of practice including patient education on the disease, on self-care, and on treatment⁽¹⁷⁾.

This study showed that non-pharmacological management has yet to be fully integrated into physician and nurse prescribing practices, even though it is recommended by Brazilian and international guidelines⁽¹⁸⁾. Sodium restriction was the only measure recorded in the majority of prescriptions, many of which met recommendations for daily sodium intake limits (2–3 g), particularly at the more advanced stages of HF⁽¹⁸⁾.

Urine output monitoring and fluid balance are directly associated with nursing care, but were infrequently prescribed. Likewise, body weight monitoring was not carried out. Weight monitoring is a simple task that can help monitor the progression of fluid status and diuretic responsiveness in patients with HF⁽¹⁸⁾. In addition to weight monitoring during hospitalization, it is essential that patients be given guidance on this aspect, i.e., be taught that rapid weight gain is indicative of fluid overload⁽¹⁹⁾.

As in a previous study⁽²⁾, fluid restriction was one of the least popular measures. According to clinical practice guidelines, fluid restriction should be adjusted in accordance with the patient's clinical condition and diuretic regimen; the mean recommended fluid intake ranges from 1000 to 1500 mL in symptomatic patients at risk of fluid overload⁽¹⁸⁾.

However, the discrepancy between prescription and actual implementation of these care measures is remarkable. A similar finding was reported in a previous study⁽²⁾ for the variables "fluid balance" and "urine output monitoring", but the frequency of implementation was higher. The authors believe these findings may be due to underestimation of the importance of non-pharmacological measures by providers and patients alike⁽²⁾. Another factor which may have been associated with failure to implement prescribed care measures is the combination of a high workload and understaffing, although this was not assessed in the study.

Non-pharmacological care measures have become indispensable in the management of HF. However, these measures have yet to be fully integrated into clinical practice; clinicians may fail to prescribe them, or providers fail to implement them to the extent prescribed.

CONCLUSIONS

The results of this multicenter study show that sodium restriction was the non-pharmacological management measure most commonly prescribed to patients admitted for decompensated HF, followed by urine output and body weight monitoring. Fluid restriction was the least commonly prescribed non-pharmacological measure.

Finally, this study showed that implementation of prescribed measures was more effective in two of the study centers. Strategies meant to encourage multidisciplinary teams to prescribe and institute these care measures should be studied and, if effective, implemented.

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