Impact of the Nursing Consultation on the Frequency of Hospitalizations in Patients with Heart Failure in Curitiba, Parana State

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Summary

Background: Heart failure (HF) has become a public health problem with increased incidence and prevalence in the last decade, a consequence of the aging of the population and improved pharmacological and interventionist therapies. It has high rates of mortality and morbidity, expressed as high rates of hospitalizations and re-hospitalizations, even in patients submitted to new therapies, especially ACEI and beta-blockers.

Objective: This study is the analysis of the impact that the nursing consultation has on the frequency of hospitalizations in patients with HF living in the city of Curitiba, state of Parana and its metropolitan region.

Method: Patients with a iagnosis of HF and New York Heart Association (NYHA) functional classification, with telephone access, living in the city of Curitiba or its metropolitan region, life expectancy > 3 months due to non-cardiac diseases, aged 18 or older, non-users of illicit drugs. The groups were created by simple random allocation (drawing lots) and one group received the usual medical care, nursing consultation and telephone monitoring every 15 days of educational nature, intervention group (IG), whereas the other group received the usual medical care, monthly telephone monitoring of administrative and epidemiological nature, control group (CG). The follow-up was carried out for 6 months.

Results: The IG needed 0.25±0.79 and the CG needed 1.10 ±1.41; p = 0.037 hospitalizations.

Conclusion: The nursing consultation promotes the decrease in the frequency of hospitalizations in patients with HF undergoing treatment and living in the city of Curitiba and its metropolitan region. (Arq Bras Cardiol 2009; 92(6) : 454-460)

Key words: Heart failure, nursing consultation, hospitalizations.

Introduction

Heart failure (HF) has become a public health problem, of which incidence and prevalence has progressively increased in the last decade, as a consequence of the aging of the population and the improvement of the pharmacological and interventionist therapies, which result, due to the chronification of diseases that used to be fatal, in the emergence of this pathological entity[1-8].

The HF promotes a worsening in the quality of life due to its high mortality and morbidity, represented by the equally high hospitalization and re-hospitalization rates, even in patients submitted to pharmacological therapies that included angiotensin-converting enzyme inhibitors (ACEI) and beta-blockers[1,2,5, 9,10].

In addition to the problems that the hospitalizations cause to the patients, one must recall the cost that such hospitalizations represent for the Public Health System (SUS)[1,3,10-12].

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Manuscript received December 11, 2007; revised manuscript received April 17, 2008; accepted July 23, 2008.

The main cause of heart decompensation is the lack of adherence to treatment and the recommended hygienic-dietetic measures, as well as the inadequate use of beta-blockers[12-15].

Many studies have been carried out with the purpose of evaluating what the best model of therapeutic management of HF is. These studies focused on educational actions aiming at a higher level of awareness by the patients on the health-disease process, better treatment adherence and hygienic-dietetic measures, with the consequent decrease in hospitalization and re-hospitalization rates. Therefore, we proposed to evaluate the impact of the nursing consultation and telephone monitoring on patients with HF undergoing pharmacological treatment that lived in Curitiba and its metropolitan region, state of Parana, Brazil, as well as the difference between the group that attended the nursing consultation and the group that received the usual treatment, only[16-30].

Methods

Study design

This is a clinical trial, single-blinded study (the assistance physician was not aware of which patients were followed by the nursing staff and which were not), of a natural

logic direction. The patients included in the study were those treated at the Heart Failure Outpatient Clinic of a tertiary hospital, who had a diagnosis of HF and functional classification established by the New York Heart Association (NYHA). All patients were followed by the same physician. The inclusion criteria were: patient with HF and NYHA functional class, aged 18 or older, resident of Curitiba or its metropolitan region with easy access to the clinic, having a telephone for contact and non-user of illicit drugs. The exclusion criteria were: illicit drug user, life expectancy < 3 months due to non-cardiac diseases, refusal to participate in the study and proposed activities, acute myocardial infarction (AMI) or cerebrovascular accident (CVA) in the previous 8 weeks, uncontrolled angina, cardiac surgery post-operative period or programmed surgery, no telephone access, no fixed residency or plans to move to another city.

The study was approved by the Ethics Committee of PUC-PR, protocol #407/06, registered at CEP 1143; the patients were enrolled in the study after being informed of the objectives of the research and all of them singed the Free and Informed Consent Form, preserving the bioethical principles of confidentiality and anonymity - Resolution # 196/96[31].

The basal clinical and sociodemographic variables were measured before the groups were created. The group division (IG – Intervention Group and CG – Control group) was carried out by simple random allocation, i.e., by drawing lots.

As for the assistance given to the groups, the CG received the conventional medical assistance and monthly telephone monitoring of administrative and epidemiological nature, with no educational characteristics. These telephone contacts aimed at recording hospitalizations and urgency and emergency treatments, as well as their precipitating causes. The telephone calls lasted about 5 minutes.

The IG was followed through conventional medical assistance, nursing consultation and telephone monitoring every 15 days, which had an educational characteristic. The telephone contacts aimed at recording hospitalizations and urgency and emergency treatments, as well as their precipitating causes, recommendations on the pharmacological treatment and hygienic-dietetic measures (water intake, sodium intake, blood pressure control, body weight control), in addition to clarifying any doubts about these issues. The telephone calls lasted about 20 minutes.

The nursing consultations were fortnightly or monthly and this periodicity was determined by the needs presented by the patients. During these consultations, the patients received instructions on the pharmacological treatment, blood pressure and body weight control, dietary habits, as well as sodium and fluid intake.

To carry out the hygienic-dietetic recommendations, the nurse used tables that described the amounts of water, sodium, fat and vitamins in foods. Additionally, the volume of liquids was adjusted according to the clinical conditions presented by the patients, establishing a maximum daily amount of fluids, which comprehended the ingestion of water, juices, milk, coffee, tea and other beverages, in addition to fluids from other types of food such as fruit, soup and vegetables. This maximum amount was prescribed at the moment of the nursing consultation, varying from 1 L/day to 2 L/day of fluids.

Table 1 – **Description of the educational actions by the nursing staff**

During the occasional consultations, the nurse provided recommendations based and focused on the following guiding elements:
1) Self-control: knowledge of the benefits and adverse effects of the pharmacological treatment.
2) Habits: knowledge of the adequate fluid balance, sodium restriction, tobacco abstention and alcohol consumption.
3) Preventive activities: referral to Basic Health Units to receive the anti-influenza and anti-pneumococcal vaccinations.

As for the body weight control, the patients were advised to weight themselves daily and that a gain in body weight ≥ 2 kg in a two-day period was a warning sign to seek the Outpatient Clinic.

Statistical analysis

The data were organized in an Excel spreadsheet and the statistical analyses were carried out using the statistics software program Statistica v.7. The results obtained in the study were expressed as means and standard deviations or by frequencies and percentages. Fisher's exact test was used to compare the groups regarding the dichotomous nominal variables. The Student's t test was used for the comparisons concerning the quantitative variables. The comparisons of the groups regarding the probability of hospitalization was carried out after controlling the patient's age variable. In order to do that, we used a model of logistic regression, considering the occurrence or not of hospitalization as the response variable the group and the age of the patient as explicative variables. For all tests, p values < 0.05 indicated statistical significance.

Results

Clinical and sociodemographic profile

The sample consisted of 40 patients, with 28 males and 12 females, aged 31 to 80 years. The sociodemographic characteristics, comorbidities and heart function are described in Table 2.

Regarding the cardiologic variables, there were differences in the pharmacological therapy concerning the use or not of beta-blockers (p = 0.020); there were no statistical differences concerning the other variables (Table 3).

The characteristics regarding the educational aspects and the patients' awareness of the disease and treatment were similar (Table 4).

Results of the intervention

The number of hospitalizations that occurred during the follow-up period is described in Table 5. The IG needed 5 (0.25 ± 0.79) hospitalizations during the period and the CG needed 22 (1.10 ± 1.41) hospitalizations, p = 0.037. There was a statistically significant difference regarding the number of hospitalizations between the groups.

Considering that the control and intervention groups

Original Article

Table 2 – **Sociodemographic characteristics, comorbidities and function**

Sample Characteristics	IG (n = 20)	CG (n = 20)	P value*
Ethnicity			
Caucasian	16 (80%)	17 (85%)	ns [a]
Sex			
Male	13 (65%)	15 (75%)	ns [b]
Age			
Years	54.25 ± 11.82	60.65 ± 7.03	0,046
Civil status			
Married	17 (85%)	14 (70%)	ns [c]
Currently employed			
No	16(80%)	13 (65%)	ns[d]
Schooling			
Illiterate	4 (20%)	1 (5%)	
Elementary School only	12 (60%)	17 (85%)	ns[e]
Elementary School and further	4 (20%)	2 (10%)	
Cardiovascular			
SAH	11 (55%)	14 (70%)	ns
Diabetes	3 (15%)	4 (20%)	ns
Arrhythmia	5 (25%)	3 (15%)	ns
Atrial Fibrillation	2 (10%)	4 (20%)	ns
Chagas' disease	6 (30%)	2 (10%)	ns
Dyslipidemia	1 (5%)	5 (25%)	ns
Coronary disease	0 (0%)	3 (15%)	ns
Valvular disease	1 (5%)	0 (0%)	ns
Pulmonary			
COPD	0 (0%)	2 (10%)	ns
Pneumonia	0 (0%)	1 (5%)	ns
Pulmonary tuberculosis	0 (0%)	1 (5%)	ns
Pneumocystosis	0 (0%)	1 (5%)	ns
Hormonal/endocrine disorders			
Hypothyroidism	2 (10%)	2 (10%)	ns
Hospitalizations due to HF previous to group formation			
Up to 3 times	10 (50%)	11 (55%)	ns[f]
More than 3 times	10 (50%)	9 (45%)	
Caregiver/ social support			
Family	12 (60%)	12 (60%)	
Others	8 (40%)	6 (30%)	
No support	0 (0%)	2 (10%)	

*[a]Comparison between Caucasians and non-Caucasians; [b]comparison between female and male genders; [c]comparison between married and non-married civil status; [d]comparison between currently employed and currently unemployed; [e]comparison between degree of schooling up to Elementary School, Elementary School and further and illiterate; [f]comparison between up to 3 hospitalizations and more than 3 hospitalizations;*Fisher's exact test.*

Table 3 - **Cardiologic variables**

Sample Characteristics	IG (n= 20)	GC (n=20)	P value
Pharmacological Treatment			
Beta-blockers	20(100%)	14(70%)	0.020
ACEI	13(65%)	17(85%)	ns[a*]
Thiazide diuretics	4(20%)	2(10%)	ns[a*]
Potassium-sparing diuretics	12(60%)	13(65%)	ns[a*]
Loop diuretics	16(80%)	17(85%)	ns[a*]
Antiplatelets	6(30%)	11(55%)	ns[a*]
Anticoagulants	3(15%)	3(15%)	ns[a*]
Digitalis	10(50%)	10(50%)	ns[a*]
Nitrates	2(10%)	3(15%)	ns[a*]
Statins	5(25%)	8(40%)	ns[a*]
Anti-arrhythmics	3(15%)	2(10%)	ns[a*]
Symptom onset time			
Up to 2 years	7(45%)	10(50%)	ns [b*]
More than 2 years	11(55%)	10(50%)	
Functional class (NYHA)			
Class I	1(5%)	1(5%)	
Class II	13(65%)	10(50%)	ns[c**]
Class III	6(30%)	9(45%)	
Class IV	0(0%)	0(0%)	
Laboratory Assessment			
Potassium (mEq/l)	4.83 ±0.87	4.35±0.44	ns***
Urea (mg/dl)	58.50±23.63	58.38±27.72	ns***
Sodium (mEq/l)	138.75±3.50	138.82 ±4.24	ns***
TSH (m/UL/l)	2.91±2.15	4.45±3.83	ns***
HDL (mU/ml)	33.75±12.58	49.86±28.08	ns***
Cholesterol (mg/dl)	156.25±52.66	199.38±73.44	ns***
LVEF (%)	43.95± 12.31	44.20± 13.41	ns***
Etiology			
Obstructive coronariopathy	6(30%)	4(20%)	ns**
Chagas	6(30%)	3(15%)	ns**
Idiopathic	7(35%)	11(55%)	ns**
Hypertensive	1(5%)	2(10%)	ns**

*[a]Comparison between use and non-use; [b]comparison between up to 2 years and more than 2 years; cclass I or II versus class III or IV; *Fisher's exact test; **Chi-square test; ***Student's t test.*

presented a significant difference regarding age, the comparison of these groups in relation to the occurrence of hospitalization was carried out by controlling this variable. In order to do that, we tested, in the presence of the age variable, the null hypothesis that the probability of hospitalization for patients from the control group was equal to the probability of hospitalization for patients from the intervention group versus the alternative hypotheses of different probabilities.

Table 4 - **Characteristics regarding the educational aspects**

Sample Characteristics	IG (n= 20)	CG (n= 20)	P value
Doubts			
Treatment	9(45%)	2(10%)	-
Cure	3(15%)	1(5%)	-
Sexuality	5(25%)	3(15%)	-
Exercise practice/travelling	2(10%)	0(0%)	-
Alcohol consumption	2(10%)	1(5%)	-
Menopause	0(0%)	1(5%)	-
No doubts	11(55%)	15(75%)	-
Medication use			
Regular	14(70%)	19(95%)	-
Irregular	6(30%)	1(5%)	-
Reason for irregular use			
Cannot afford it	4(66.6%)	0(0%)	-
Suicidal ideas	1(16.6%)	1(100%)	-
Alcohol consumption	1(16.6%)	0(0%)	-
Consumption of fibers/fruit and vegetables	7(35%)	5(25%)	-
Consumption of fried foods	18(90%)	17(85%)	-
Volume of liquids/day			
½ l /day	2(10%)	2(10%)	-
1l/day	3(15%)	4(20%)	-
1,5 l /day	9(45%)	6(30%)	-
2l/day or more	6(30%)	8(40%)	-

Descriptive variables.

Table 5 - **Post-intervention hospitalizations**

	Hospitalizations		
	Total	Média + devio padrão	Valor de p*
GI	5	0.25±0.79	
GC	22	1.10 ±1.41	0.037

The result of the statistical test indicated rejection of the null hypothesis (p = 0.008). Therefore, by controlling the age variable, one can affirm that patients from the CG and the IG are significantly different regarding the probability of hospitalization. Table 6 shows the crossing of group with the occurrence of hospitalization; 50% from the CG and only 10% from the IG were hospitalized.

The total mortality rate of the sample was 5%, resulting from one death in CG. Its precipitating cause was decompensation caused by chronic kidney failure.

Table 6 – **Characteristics regarding the probability of post-intervention hospitalization.**

Sample characteristics	IG (n= 20)	CG (n= 20)	P value
Non-hospitalized	18(90%)	10(50%)	-
Hospitalized	2(10%)	10(50%)	-

Descriptive variables

Discussion

Sociodemographic and assistential characteristics

The sample included patients with HF of both sexes, with a higher prevalence of male, married and Caucasian individuals. The characteristics found are similar to those previously described by other authors [8,14,18-23,32].

The mean age was 54.25 ±11.82 years in the IG and 60.65±7.03 years in the CG, which characterized a relatively young sample when compared to other studies, in which the mean age was higher[8, 10, 14,15,18,20-22].

The degree of schooling was predominantly up to the Elementary School. These elements disclose the difficulties faced by the majority of the population regarding the lack of access to schooling (school exclusion) and professionalizing courses[33]. The degree of schooling was lower than that found in European studies[18] and higher than those found in other studies carried out in our country[8]. The income and subsistence source reflected the socioeconomic impact of the disease on the patients' lives, on SUS and the social security system. Most of the patients did not have a job and the main source of income was the retirement pension, followed by sick-leave benefit, caused by the physical limitations that the disease brings, rendering the individual incapable of working.

Regarding the immunizations, 23 patients (57.5%) had not been vaccinated against pneumonia caused by pneumococcal agents or received the anti-influenza vaccination. The justification for the non-vaccination of these patients was the unawareness of the free vaccination supplied by the public healthcare system and the necessity of and benefits provided by the vaccination.

The dental treatment or follow-up was a concern, considering the potential for infection[34]; 38 patients (95%) had not been treated by a dentist for at least 10 years, due to economical difficulties and the existence of few dentists in the public healthcare service.

Clinical characteristics

The clinical characteristics were similar between the IG and the CG, thus, the groups were homogeneous.

The primary diagnosis of HF was attained through imaging and laboratory assessments, such as echocardiograms. However, only 22 of the patients (55%) were submitted to this primary method of HF diagnosis. This information reflects a low adherence to the directives of the Brazilian Society of Cardiology and can also demonstrate the

difficulties found by patients and clinicians when requesting that this type of examination be performed at the public healthcare system.

As for the etiology, the idiopathic form predominated among our patients, followed by the chronic obstructive coronariopathy etiology. The Chagasic etiology was observed in 9 patients (22.5%), in a region not considered to be endemic. This fact demonstrates that despite the multiple sanitary measures to eliminate the Chagas' vector, there is still a high incidence of this myocardiopathy in the country. This fact can also be the result of the migration of individuals from states that are considered to be endemic and of the socioeconomic and cultural conditions of these patients, in relation to the measures for vector control at home. This etiologic pattern was different from the one found in other studies. We believe that this is due to the fact that in those studies, there was no HF classification as Chagasic, but as dilated HF and also because they were carried out in non-endemic regions[8,14,15,18,21,22].

This study showed a high rate of hypertensive individuals, IG (55%) and CG (70%), in comparison to studies carried out in other countries[21,35]. Among diabetes cases, a different result was observed: IG (15%) and CG (20%). These data were lower than those found in other studies[19,36].

The proposed pharmacological therapy showed good compliance with the clinical practice directives for HF treatment, which included beta-blockers and ACEI[17,35-40]. All patients used diuretics.

There was a difference regarding the use or not of beta-blockers by the IG and the CG ($p = 0.044$). The difference between the use or non-use of beta-blockers was determined by the adaptation or not of the patients to the medication, which resulted in the assessment of the benefits versus side effects and adverse events. The non-use of beta-blockers was caused by the intolerance of the patient to the medication, and this assessment was carried out by the assistant physician. Some studies describe that the beta-blockers can cause clinical worsening at the start of the therapy, possibly due to the withdrawal of the adrenergic support. However, the groups IG and CG did not present decompensation episodes and there were no hospitalizations related to the use of this medication at the start of the therapy[35,36,40].

Hospitalizations

Based on the educational intervention by the nursing staff through consultations and regular telephone monitoring, we observed a significant decrease in hospital admissions, represented by 5 (18.5%) hospitalizations in the IG and 22 (81.5%) in the CG. The main cause of the CG destabilization was hypervolemia, reflected by fluid unbalance and/or lack of adherence to the pharmacological therapy, culminating in congestion. The hospitalizations in this group were short ones, being directed to clinical monitoring, examinations and compensation through the use of diuretics. The causes of hospitalizations in the IG were arrhythmias and HF that was refractory to treatment.

These data show that the hospitalizations in the CG were due to predictable and preventable causes, considering their precipitating reasons. On the other hand, the IG presented predictable hospitalization causes, which were, however, non-preventable. The two patients from this group that were hospitalized presented complex clinical cases. One of them presented arrhythmia with the presence of lipothymia and loss of consciousness and the other developed HF that was refractory to treatment, which culminated in a heart transplant, performed one month after the end of the study.

These results confirm the ones reported by other similar studies – that the educational intervention promotes a decrease in hospitalization rates and consultations with specialists[9,15,18-30].

Intervention

The intervention carried out by the nursing staff was of educational nature and aimed at capacitating the patients to develop self-care. The nurse did not alter the doses of diuretics or other medications, similar to what occurs in other services specialized in HF[3].

Hence, we observed that the patients from the IG presented a significant improvement in the performance of positive healthcare practices and hygienic-dietetic measures, in addition to attending the consultations more assiduously and being more compliant with the proposed activities. There was also an increased awareness of the disease and its treatment[41-45].

Limitations

Although our sample consisted of a general population with HF treated at a specialized clinic of a tertiary hospital, these individuals were still patients selected from the total number of patients with this disease. They consisted mostly of relatively young male individuals with ischemic etiology and therefore, these results cannot be necessarily extended to the whole population with HF.

We believe that some hospitalizations that occurred in the CG might have been underreported due to the fact that some emergency or urgency services do not record and/or notify these cases or record them under a different diagnosis – lack of exact diagnostic criteria in the notification of the disease.

The information and recommendations on the hygienic-dietetic measures provided to the IG might have been, in some situations, reported to the CG, that is, the latter might have had access to the educational information offered to the IG when the individuals met at waiting rooms for examinations and consultations. We were careful to schedule the groups' consultations on different days; however, as the consultations were scheduled by the administrative team of the outpatient clinic, we believe that some patients from different group might have met and eventually exchanged information.

This fact can reflect the non-total unawareness of this group regarding the recommendations on the pharmacological treatment and hygienic-dietetic measures, leading us to believe that the adherence factor, in addition to the educational actions, might have interfered in the results.

Conclusion

The consultation with the nursing staff focused on educational actions allowed the patient with HF to proceed with self-care, promoting a decrease in the frequency of hospitalizations of patients undergoing treatment who live in the city of Curitiba and its metropolitan region.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This article is part of the thesis of master submitted by Vivian Freitas Rezende Bento e Paulo Roberto Slud Brofman, from Clínica Cirúrgica – PUC-PR.

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