Original Article

Perceptions of Heart Failure Diagnosis and Management: Comparison between Clinical Cardiologists and Family Doctors

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Objective

To compare the perceptions of heart failure (HF) diagnosis and management between clinical cardiologists (CC) and family doctors (FD) in the city of Niterói.

Methods

A qualitative questionnaire, validated by the EURO-HF study, was submitted to 54 FD and 62 CC. These professionals supplied the following information: HF diagnosis; availability of complementary tests; which tests were used more often; names, dosages and adverse effects of the medications prescribed; and which pharmaceuticals reduced mortality.

Results

FD and CC reported that the most common signs and symptoms identified by HF patients were: dyspnea, edema and fatigue (96.3% vs. 100%, 74% vs. 58% and 22.2% vs. 67.7%). The HF classification method used most often by FD was mild/moderate/severe (53.8%) while the CC used the NYHA method (72.7%) more often. CC request echocardiograms more often than FD ($p < 0.001$). CC differentiate HF with preserved systolic function from HF with systolic dysfunction more often than FD ($p < 0.001$). CC use beta-blockers ($p < 0.001$), angiotensin-converting enzyme inhibitors ($p < 0.001$) and spironolactone ($p < 0.001$) more often than FD. The angiotensin-converting enzyme (ACE) inhibitor dosages used by CC are greater than those used by FD ($p < 0.001$) and the spironolactone dosages used by CC are closer to those recommended in medical literature.

Conclusion

CC use a more intensive investigative diagnosis and medications that are more effective in reducing morbidity and mortality rates for HF patients.

Key words

Heart failure, diagnosis, management.

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Heart failure (HF) is a major public health problem in western countries[1]. Its high prevalence and incidence rates[2]; elevated medical and hospital costs associated with frequent hospital re-admissions[3]; the need for strategies to promote multidrug therapies with proven efficiency[4] and multidisciplinary follow-up[5]; the high morbidity and mortality rates[6]; and the serious impact on quality of life[7,8] for HF patients prompted the World Health Organization to recommend that health organizations pay special attention to this syndrome.

Nearly five million North Americans have been diagnosed with HF and roughly 550 thousand new cases arise each year, causing more than 280 thousand deaths[9]. According to data from the Single Health Care System (Datasus – www.datasus.gov.br), approximately 398 thousand people in Brazil were admitted to the hospital in 2000 with HF and 26 thousand died. These admissions correspond to more than 30% of all hospital admissions and consume 33% of the expenditures for circulatory system diseases. HF is the primary cause of hospital admissions for patients older than 65 in the Single Health Care System (SUS).

It is estimated that the elderly population in Brazil in 2025 will be the sixth largest in the world, corresponding to roughly thirty million people or 15% of the total population, and that HF will be the primary cause of death due to cardiovascular diseases.

Many advances have been made in the last few decades through the publication of various studies that established the contemporary basis of HF treatment. The introduction of ACE inhibitors[10,11], beta-blockers[12,13], and spironolactone[14] in the therapeutic arsenal have produced a positive impact on HF patients by improving quality of life; delaying the progression of the disease; reducing symptoms; lowering the number of repeat hospital admissions – 70% of HF expenditures are related to hospital admissions – and decreasing mortality rates.

The use of multidrug therapies and lifestyle changes, especially cardiovascular conditioning, are the basis of current HF treatment. Specialized societies have been informing cardiologists of the need to identify these patients (with the objective of early treatment) along with the recommendations for appropriate diagnostic investigations and therapeutic approaches[15].

While the use of medication to reduce HF morbidity and mortality is important, it is equally important to use the proper dosages. It is known that low dosages of ACE inhibitors have a direct impact on patient outcomes[16], and that spironolactone prescribed in dosages higher than those recommended in literature can result in worse patient evolution[17].

Many HF patients, because they are elderly, present many comorbidities and have limited access to specialists, are frequently treated by general practitioners rather than cardiologists out of necessity[18]. The need to evaluate this reality, motivated various countries to compare the clinical practices for HF between general practitioners and cardiologists, with various outcomes. Comparisons were made by evaluating the clinical practice for each speciality[20], the different diagnostic aspects[19,20] and treatment results: medication usage rates[19,20], average hospitalization durations[21,22] and mortality[21,23].

There are no Brazilian studies that compare HF treatment between general practitioners and cardiologists. These data are of most importance in strategy planning in order to improve the disclosure of HF information. Awareness of the reality in Brazil will enable us to improve our weak points, continually focusing on the optimization of HF patient care.

Niterói is a city in the state of Rio de Janeiro, Brazil, with an approximate population of 500 thousand people and is ranked by the United Nations' Human Development Index as the third best city in Brazil for quality of life. A pioneer project in Brazil called the "Family Doctor" was developed in 1992, that trained general practitioners to offer complete medical assistance to one thousand inhabitants per doctor. This project was developed based on the Cuban model. In 1994, the Brazilian Ministry of Health developed a nationwide project called the "Family Health Program", an assistance model similar to that initiated in Niterói. Currently, ninety doctors are involved in the "Family Doctor" project and are exclusively dedicated to providing medical assistance to a population of roughly ninety thousand low income people.

Considering the lack of national data and the possibility to work with a group of general practitioners involved in a successful project with ten years of experience, we developed this study that compared the perceptions of the HF diagnosis and management between the family doctors (general practitioners) and clinical cardiologists in the city of Niterói.

Methods

The development of this study was based on a qualitative questionnaire that had been validated in an European study called EURO-HF[24]. This questionnaire was translated into Portuguese and adapted for Brazil, excluding the question related to the respondents opinion of HF prevalence in the country and a series of clinical cases. This question was removed since the study administrative committee deemed that no national data existed to validate the response. The case studies were excluded in order to eliminate external influences in the responses which would hinder the statistical analysis. The questions included topics such as: basis of the HF diagnosis; available HF tests; HF tests used most frequently; medications prescribed by the doctors for their patients; daily medication dosages; and the doctor's opinion regarding which medications reduced mortality.

The objective of the study was to compare the perceptions of diagnosis and management for HF patients

during outpatient follow-up, using the questionnaire responses from CC and FD.

The questionnaire was delivered to the ninety family doctors involved in the Niterói project and was completed by 54. Even though medical residencies in Family Medicine were available in Brazil when the local government implemented the project in Niterói, this specialty was not available at the Fluminense Federal University. Consequently, there is a wide range of medical specialties among the professionals involved in the "Family Doctor" project. In order to offset the differences between medical education and specialty areas that could affect the quality of care, the Niterói city government developed a continuous training program in association with the "Family Doctor" project to promote systemized training focused on the reality of their work. In regard to the specialties of these FD, 39% were pediatricians, 24% were general practitioners, 9% had an educational background in Family Medicine, 7.5% were surgeons and 20.5% were from other specialties. Table 1 lists the characteristics of the doctors expressed as averages (SD).

A random sample of one hundred CC from Niterói also received the questionnaire, which was completed by 62 of them. The annual report of the Cardiology Society of the State of Rio de Janeiro was used to obtain the addresses, telephone numbers and names.

The questionnaires and instructions were delivered to the doctors. This material contained an explanation about the study, identification of the questionnaire (EURO-HF), a confidentiality guarantee in regards to the content of the responses and a request for the questionnaires to be completed based on personal knowledge without consulting any supplementary material. When completed, the questionnaires were returned to the study administrative commission for comparison of the responses from the FD and CC.

Percentage comparisons were conducted using the chi-square or Fisher exact probability test. Comparisons of the averages between the two groups were conducted using the Wilcoxon test.

The criterium adopted to determine significance was 5%. The statistical analysis was processed using the statistical software SAS® System.

Results

The study included 116 doctors: 54 FD and 62 CC. In response to the question regarding the three signs and symptoms most suggestive of HF, both the FD and CC reported dyspnea, edema in the lower limbs and fatigue as the most common. Only fatigue was reported more frequently by the CC ($p < 0.001$) (Table 2).

The percentages of HF diagnosis based on either symptoms alone or a combination of symptoms and signs were similar for both FD and CC. A higher percentage of CC conduct complementary tests before making the HF diagnosis and more FD consult specialists before making the HF diagnosis ($p < 0.001$) (Table 3).

The most common HF classification model used by the FD was mild/moderate/severe, whereas the most common model used by the CC was the NYHA classification (I/II/III/IV). Only 1.8% of the FD and 17.7% of the CC ($p < 0.001$) opted for A/B/C/D (the currently accepted HF classification model) (Table 4).

The FD and CC have ready access to electrocardiograms (ECG), chest telerradiographies (chest x-rays) and echocardiograms (ECHO); however the CC have better access to myocardial scintigraphies ($p < 0.001$), cineangiocoronariographies ($p < 0.001$) and respiratory function tests (RFT) ($p = 0.007$) (Table 5).

In response to the question regarding the tests requested by the doctors to determine the HF diagnosis,

Table 1 – Characteristics of the Family Doctors and Cardiologists

	Family Doctor	Cardiologist	p VALUE
Women (%)	68.5%	48.4%	p = 0.02
Average age (years)	37 years (± 3.6)	37.8 years (± 8.5)	NS
Years after graduation	13.2 years (± 13)	13 years (± 8.4)	NS

Table 2 – Most Influential HF Signs and Symptoms

	Family Doctor	Cardiologist	p VALUE
Dyspnea	96.3%	100%	NS
Edema	74%	58%	NS
Fatigue	22.2%	67.7%	p < 0.001

Table 3 – HF Diagnostic Basis

	Family Doctor	Cardiologist	p VALUE
Symptoms	21.5%	24.8%	NS
Signs and symptoms	53.5%	46%	NS
Complementary tests	17.8%	26%	p < 0.001
Specialist	7.2%	3.2%	p < 0.001

it was confirmed that the most common tests used by the CC are the echocardiogram ($p < 0.001$) and myocardial scintigraphy ($p < 0.001$) (Table 6).

Only 37% of the FD differentiated HF with preserved systolic function in clinical practice in comparison to 85.5% of the CC ($p < 0.001$).

Next, aspects related to HF treatment were analyzed. The doctors were asked what percentage of their patients were using loop diuretics, thiazide diuretics, digoxin, beta-blockers, angiotensin-converting enzyme inhibitors (ACEI) and spironolactone. The results are shown in Table 7 and are expressed as averages (SD).

Table 8 contains the maximum daily dosages of the medications used for HF treatment. It was confirmed that the CC use higher dosages of furosemide (loop diuretics) ($p < 0.001$) and captopril (ACEI) ($p < 0.001$) than the FD and that the FD use higher dosages of digitalis ($p = 0.03$) and spironolactone ($p < 0.001$) than the CC. The beta-blocker dosages could not be compared, since the FD used propranolol and the CC used carvedilol.

More CC ($p < 0.001$) considered that beta-blockers reduced symptoms in HF patients, whereas some of the FD and CC considered that loop diuretics, thiazide diuretics, digitalis, ACE inhibitors and spironolactone improved the symptoms of these patients, however with no statistical difference (Table 9).

A greater percentage of CC considered that beta-blockers, ACE inhibitors and spironolactone reduced HF patient mortality, whereas a greater percentage of FD considered that the thiazide diuretics reduced the mortality of these patients (Table 10).

Discussion

This study supplies national data regarding HF treatment methods used by FD and CC, which have been studied extensively throughout the world. It is known that the majority of HF patients are treated by general practitioners; however, the adhesion to HF diagnostic and management guidelines by the Brazilian professionals is unknown. Many of the practices identified in the present study are also found in international studies.

The signs and symptoms related by the Brazilian family

Table 4 – HF Classification

	Family Doctor	Cardiologist	p VALUE
Mild/moderate/severe	53.8%	9.6%	$p < 0.001$
I/II/III/IV	40.8%	72.7%	$p < 0.001$
A/B/C/D	1.8%	17.7%	$p < 0.001$
Other	3.6%	0%	NS

Table 5 – Complementary Tests Available to the Doctors

	Family Doctor	Cardiologist	p VALUE
ECG	94.4%	90.3%	NS
Chest x-ray	100%	100%	NS
ECHO	88.8%	91.9%	NS
Scintigraphy	9.2%	41.9%	$p < 0.001$
Cineangiocoronariographies	7.4%	56.4%	$p < 0.001$
RFT	9.2%	29%	$p = 0.007$

Table 6 – Most Common Complementary Tests for HF Diagnosis

	Family Doctor	Cardiologist	p VALUE
ECG	99.9%	100%	NS
Chest x-ray	100%	100%	NS
ECHO	68.5%	95.1%	$p < 0.001$
Scintigraphy.	1.8%	16.1%	$p = 0.008$
Cineangiocoronariographies	0%	6.4%	NS
RFT	1.8%	1.6	NS

Table 7 – Percentage of Patients using Medications

	Family Doctor	Cardiologist	p VALUE
Hydrochlorothiazide	40.8 % (29.5)	34.5 %(25.3)	NS
Furosemide	58.9 % (34.6)	66.8 % (23.9)	NS
Digitalis	52.6 % (35.4)	54.9 % (26.6)	NS
Beta-blockers	26.9 % (19.7)	61.2 % (24.9)	$p < 0.01$
ACE inhibitors	78.5 % (22.7)	94 % (12)	$p < 0.01$
Spironolactone	18.9 % (23)	62 % (31.1)	$p < 0.01$

Table 8 – Maximum Daily Dosage of HF Medications

	Family Doctor	Cardiologist	p VALUE
Hydrochlorothiazide	31.2 mg (12)	31.6 mg (19.1)	NS
Furosemide	45.9 mg (16.3)	67.4 mg (36.6)	p < 0.001
Digitalis	0.26 mg (0.26)	0.23 mg (0.04)	p = 0.03
Propranolol/Carvedilol	103.7 mg (51.8)	23.8 mg (11.2)	----------
Captopril	84.7 mg (47.9)	125.8 mg (37)	p < 0.001
Spironolactone	75 mg (42)	32.2 mg (15.9)	p < 0.001

Table 9 – Medications that Promote HF Symptom Improvement According to the CC and FD

	Family Doctor	Cardiologist	p VALUE
Hydrochlorothiazide	66.6%	82.2%	NS
Furosemide	92.6%	96.8%	NS
Digitalis	85.2%	93.5%	NS
Beta-blockers	40.7%	64.5%	p < 0.001
ACE inhibitors	57.4%	72.5%	NS
Spironolactone	44.4%	54.8%	NS

Table 10 – Medications that Promote Reduced HF Mortality According to the CC and FD

	Family Doctor	Cardiologist	p VALUE
Hydrochlorothiazide	66.6%	82.2%	p = 0.03
Furosemide	92.6%	96.8%	NS
Digitalis	85.2%	93.5%	p = 0.006
Beta-blockers	40.7%	64.5%	p < 0.001
ACE inhibitors	57.4%	72.5%	p < 0.001
Spironolactone	44.4%	54.8%	p < 0.001

doctors and cardiologists (dyspnea, edema and fatigue) are also the most common signs and symptoms found by these professionals in Norway[20]. Among the general practitioners of the EURO-HF study[24], the most common signs and symptoms were edema in the lower limbs (75%), dyspnea (58%), rales (28%) and fatigue (20%).

Roughly 75% of the FD and 71% of the CC make the HF diagnosis based on either symptoms or a combination of signs and symptoms. Sixty-six percent of the general practitioners evaluated by the EURO-HF study[24] also base their diagnoses on these factors; however, the specificity of a HF diagnosis based on signs and symptoms alone is poor[25]. Although most FD and CC use this diagnostic method, more CC confirm the HF diagnosis only after complementary cardiac image tests (ECHO and myocardial scintigraphy) ($p < 0.001$), in accordance with the HF diagnostic and management guidelines. Natriuretic peptides are still not available to the private or public clinical practices in Niterói.

The majority of the CC use the patient's functional class (NYHA) to identify HF, whereas the majority of the FD use mild/moderate/severe. A/B/C/D was reported by only 1.8% of the general practitioners and 17.7% of the cardiologists ($p < 0.001$) as a classification system used by them on a daily basis.

Most of the professionals, regardless of specialty, reported that ECHO, ECG and chest x-rays are readily available to them for complementary tests, however it was confirmed that the ECHO is used more often by the cardiologists ($p < 0.001$), as well as the myocardial scintigraphy ($p=0.008$). Only 22% of the EURO-HF general practitioners have access to ECHO tests, a much lower percentage than the Brazilian FD (88.8%). Even though the Brazilian FD use echocardiographs less than the CC, our FD use this method more often than the European general practitioners (68.5% vs. 38%). Compared to the cardiologists, American[26] and Norwegian[20] general practitioners also underutilize the echocardiograph for the diagnosis of HF.

Our data show a higher usage rate of ACE inhibitors, beta-blockers and spironolactone by the CC ($p < 0.001$ for these pharmaceuticals). In relation to beta-blockers and ACE inhibitors, the usage rates by the FD could be higher, since they are the initial medications to be prescribed after the diagnosis of HF and have an important impact on the morbidity and mortality of these patients. This lower usage rate of medications that reduce HF morbidity and mortality by general practitioners was also described by Edep et al[26], Houghton et al[27], and Rutten et al[20,28]. It should be emphasized that in Niterói, Brazil, the patients attended by the FD are poor and the beta-blocker available in the public pharmacies is propranolol, which has a low tolerance level particularly for patients with serious HF. The EURO-HF[24] study reveals that the European general practitioners use these medications even less: 6.2% of the patients use beta-blockers and 55.4% use ACE inhibitors. In comparison to the FD, the CC use more appropriate dosages of ACE inhibitors (125.8

mg vs. 84.7 mg – $p < 0.001$), spironolactone (32.2 mg vs. 75 mg – $p < 0.001$), digitalis (0.23 mg vs. 0.26 mg – $p = 0.03$) and furosemide (67.4 mg vs. 45.9 mg – $p < 0.001$). The impact of low dosages of ACE inhibitors[16] and inappropriate dosages of spironolactone[17] on patient morbidity and mortality is well known.

More CC believe that beta-blockers improve HF patient symptoms and reduce mortality. No statistical difference was found for the use of ACE inhibitors and spironolactone between FD and CC in regard to improved symptoms; however, more CC reported that they reduce mortality.

Many CC and FD still consider that diuretics and digitalis also reduce HF patient mortality and there is a higher number of CC that believe digitalis reduces mortality in comparison to FD. These data reinforce the need to improve the disclosure of HF information.

International studies report a worse prognosis[23] for HF patients under the care of a general practitioner, as well as longer hospital stays[22]; a higher rate of repeat hospital admissions[19]; and higher costs[26]. Our findings can partially explain the possible causes for these data.

With base on our findings, a training and continual education program can be established in order to improve the quality of care given by these professionals. Specialization courses in family medicine could lead to an improvement in the performance of these professionals and continual training could promote the disclosure of information which would benefit the patients. Awareness of the Brazilian reality enables the development of local and regional strategies to meet our educational demands.

Potencial Conflict of Interest

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

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