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ORIGINAL SCIENTIFIC PAPER

The in- and out-of-hospital management of HF patients: results from a nationwide Belgian survey

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ABSTRACT

Background: We conducted a nationwide survey to describe the in-and out-of-hospital flow (diagnosis, treatment and follow-up) of patients with heart failure with reduced ejection fraction (HFrEF).

Method: A survey was developed with five dedicated HF cardiologists. The data are all self-reported by cardiologists.

Results: The response rate was 84%. Presence of a dedicated HF cardiologist or HF nurse was indicated by 49% and 46% of the hospitals respectively. Devices ($p < .05$), angiotensin receptor neprilysin inhibitors, and rehabilitation are considered more standard of care therapy by dedicated compared to non-dedicated HF cardiologists. Most cardiologists indicated that target dosages of HF drugs can be reached in 25–75% of patients. Achieving >75% of the target dose seems easier for angiotensin converting enzyme inhibitor/angiotensin receptor blockers (ACEI/ARB) (22%) and mineralocorticoid receptor antagonists (25%), compared to β-blockers (10%) and angiotensin receptor neprilysin inhibitors (7%). 62%, 49% and 4% of the cardiologists indicated to use subtypes of angiotensin converting enzyme inhibitors, angiotensin receptor blockers and β-blockers respectively not validated in the HF population. In the acute setting, dedicated HF cardiologists (23%) are less influenced by blood parameters for decongestion compared to non-dedicated HF cardiologists (39%). They tend to change patients more to guideline-recommended drugs (60% vs 47%). Six minutes walk test and ergospirometry are significantly more used by dedicated compared to non-dedicated HF cardiologists for HF drug change (17% and 29% vs 2% and 4%).

Conclusion: This survey showed that a minority of hospitals have HF care. Those that do, report a higher implementation of guideline-recommended diagnosis, treatment and follow-up of HF patients. Competent authorities could use this survey as a tool to improve HF care.

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HFrEF; survey; multidisciplinary (treatment); HF nurse

Introduction

Heart Failure (HF) is a widespread disease, affecting around 26 million people worldwide [1]. The prevalence increases with age, from 2–3% in the adult population, to over 10% in people older than 70 years of age, and will further increase over the next decade [2,3]. Despite improvements in treatment over the last decades, the outcome remains poor. Recent European data demonstrated 1 year all-cause mortality or HF hospitalisation rates of 36% and 18% in hospitalised and ambulatory HF patients, respectively [4]. As a result of the high level of medical interventions, HF comes with a high cost, being responsible for 1–2% of total healthcare costs in Western industrialised countries [5].

Diagnosis, treatment, and follow-up, including monitoring and support, as well as a smooth transition between the different stages of the disease are crucial to guarantee optimal HF care [1]. To support clinicians in this, the European Society of Cardiology (ESC) guidelines for the diagnosis and treatment of HF have been developed, based on evidence-based data [6]. Good adherence to pharmacological treatment guidelines, with prescription of ≥50% of the recommended dosages, is associated with improved short-and long-

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term outcomes in HF with reduced ejection fraction (HFrEF) [7–9]. Nevertheless, several surveys have proven underuse and underdosing of guideline-recommended drugs [9–13]. Over time, the use of guideline-recommended drugs has improved, as the prescription percentage has increased from 60% to >70% for renin angiotensin aldosterone system inibitors (RAASI), from 30% to >60% for β-blockers (BB) and from 20% up to >30% for mineralocorticoid receptor antagonists (MRA) [10,13]. Nevertheless, despite increased use of guideline-recommended drugs, the percentage of patients that reaches target dose has not improved over time [10,13]. Guideline adherence is determined by both patient and physician factors. Patient factors include age, frailty, co-morbidities, contra-indications for medications and adverse events [8,14]. Physician factors such as clinical inertia and variation in communication between intra-and extra mural HF care, affect suboptimal medication dosing, whereas HF drug treatment is also influenced by high drug costs and limited access to healthcare facilities [8]. Multidisciplinary approaches are key to address these shortcomings and include HF management programmes, focussing on guidelines implementation by dedicated HF cardiologists, presence of dedicated HF nurses and transmural care both in and out the hospital [15]. An European Society of Cardiology position statement paper from 2011 suggested that 25% of the cardiology staff in a tertiary/university centre and one per three cardiologists in a secondary centre, should be dedicated to HF [15]. Moreover, presence of a HF nurse might be associated with reduced hospital readmissions for HF [16–18]. Additionally, general practitioners (GP) are also key in HF care, as they are often the first point of contact for patients, both in the diagnostic process, as well as in recognising worsening of HF [15,19].

Although the importance of all these care-related elements are well described, HF care is often fractionated and influenced by regional or even hospital-based differences [15]. We conducted a national survey to describe the in-patient and out-patient flow of HF patients in terms of diagnosis, treatment, short- and long-term follow-up, especially focussing on multidisciplinary approaches and the role of specialised HF care.

Methods

Survey

A questionnaire was developed with a steering committee of five dedicated HF cardiologists, working in different types of Belgian hospitals, i.e. clinics with structured HF care, academic centres and general hospitals. Cardiology services in all Belgian hospitals were asked to fill in the questionnaire. Data on the number of beds and the presence of a cardiac rehabilitation centre were consulted in the official reports published by the Belgian Federal public service of health, food chain safety and environment [20]. Based on the number of beds, hospitals were classified as large (>600 beds), medium (400–600 beds) or small (<400 beds). In case of affiliated centres, the questionnaire was conducted in the main hospital.

The survey was conducted either by face to face conversations or by using an electronic version sent by e-mail. Only hospitals with a cardiology department were taken into account. In each hospital, (one of) the cardiologist(s) with a primary responsibility for HF was interviewed. Thirty-seven questions related to the management of HFrEF patients were asked and can be consulted in the supplementary material. A dedicated HF cardiologist was defined as a cardiologist, who has a self-defined primary interest in HF. There is no official accreditation nor educational track for dedicated HF cardiologists in Belgium. A non-dedicated HF cardiologist was defined as a general cardiologist without a self-defined primary interest in HF. HF nurse was defined as a nurse with responsibilities in HF care, with a HF-specific training and under the supervision of a HF cardiologist. In Belgium, no official HF-nurse certification is available. The project was conducted according to the general data protection regulation (GDPR).

Data collection

The results are all self-reported data by cardiologists. The information was recorded on paper surveys, or electronic. The hospitals were informed that the data would not be saved longer than necessary in the context of the project, and that names and institutes would not be mentioned, according to GDPR.

Statistics

Continuous variables are expressed as mean ± standard deviation, whereas categorical data are expressed as numbers and percentages. Continuous variables were compared with the Student's t test and categorical data with the use of the Fisher's exact test. Correlations were assessed using Spearman correlation coefficient. Statistical significance was always set at a 2-tailed probability level of <0.05. All statistical

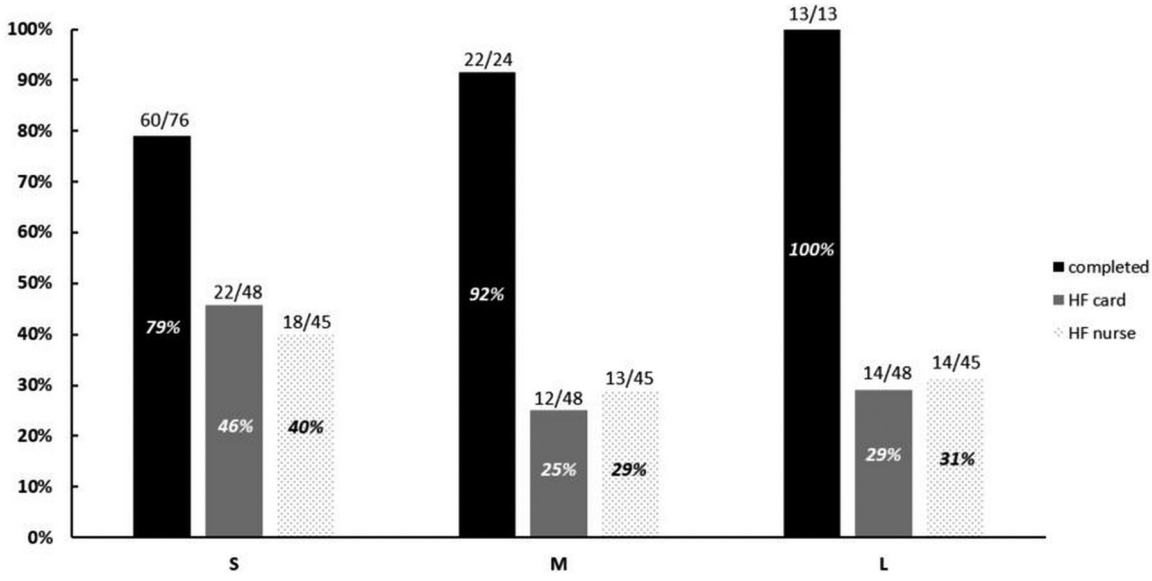

Figure 1. Overview of the response rate per size of the hospital. Based on the numbers of beds, hospitals were defined as small (S) (<400 beds), medium (M) (400–600 beds) or large (L) (> 600 beds).

analyses were performed using GraphPad Prism 8 (La Jolla, California, USA).

Results

Belgium has 11 376 070 inhabitants, reported on 1 January 2018 in official governmental documents [21]. There are 175 hospitals in Belgium [22], but only 115 with a cardiology department were taken into account, those having a mean of 376 ± 276 beds and 10 ± 9 cardiologists per hospital. The response rate for completing the questionnaire was 84% (97/115). Of the respondents, 62% (60/97) were small, 23% (22/97) medium and 15% (15/97) large hospitals. Presence of a dedicated HF cardiologist was indicated by 49% (48/97) of the hospitals. A mean full time equivalent (FTE) of 1.5 ± 1.2 was calculated based on the answers of 71% (34/48) of the hospitals with a dedicated HF cardiologist. A HF nurse was present in 46% (45/97) of the hospitals, with a mean full time equivalent of 0.8 ± 0.6, calculated based on the answers of 84% (38/45) of the centres with a HF nurse. Most of them (89%) are employed in hospitals with a dedicated HF cardiologist. There is a positive and significant ($p < .001$) correlation between the presence of a HF nurse and the size of the hospital ($r = 0.41$), and the presence of a HF cardiologist ($r = 0.48$). The response rate and deployment of dedicated HF cardiologists and HF nurses per size of hospital is shown in Figure 1.

HF diagnosis and NT-proBNP

Almost all cardiologists indicated echocardiography (99%), history taking (98%) and physical examination (96%) as routine diagnostic tests, followed by electrocardiography (82%), extended lab testing with (N-terminal pro) brain natriuretic peptide (NT-pro)BNP evaluation (71%) and RX thorax (36%). Coronary angiogram (95%) and cardiac MRI (81%) were indicated as the most important extended tests to evaluate the aetiology of HF. Congestion is most commonly evaluated by physical examination (96%) and echocardiography (94%), whereas 59% of cardiologists use (NT-pro)BNP as a congestion marker. NT-proBNP is the biomarker of choice, but most cardiologists indicated the use in <20% of their patients, and when used, it is mainly in the emergency setting (Figure 2(A,B)). No significant differences between dedicated and non-dedicated HF cardiologists were observed for answers regarding diagnosis, except for the use of endomyocardial biopsies (EMB) collection to define the aetiology of HFrEF (29% in dedicated HF cardiologists vs. 14% in non-dedicated HF cardiologists [$p < .05$]). Dedicated HF cardiologists from larger hospitals indicated to use endomyocardial biopsies more (71%) compared to dedicated HF cardiologists from medium (36%) and small centres (14%).

HF treatment

HF drug treatment in the hospital setting

Symptoms (78%) and stabilised echo parameters (69%) are determining if a patient is decongested for most

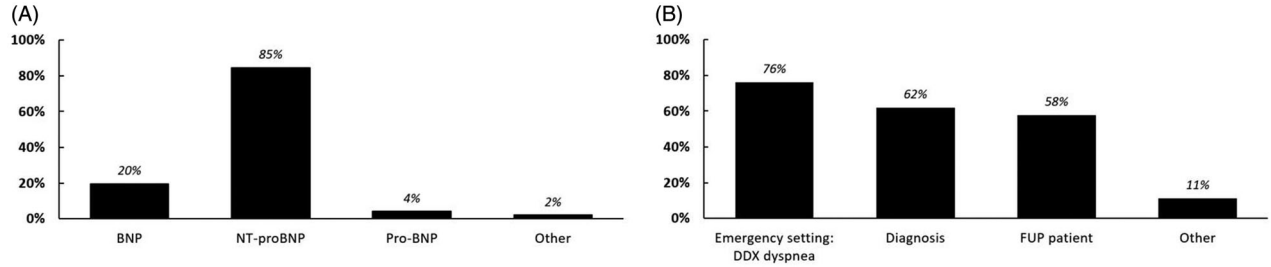

Figure 2. (A) Percentage of cardiologists indicating use of brain natriuretic peptide (BNP) or N-terminal proBNP (NT-proBNP). (B) Percentage of cardiologists indicating the use of (NT-pro)BNP in diagnosis and follow-up.

cardiologists. This resonates in the use of physical examination (86%) and echocardiography (74%) as the main drivers to lower the dose of diuretics. Stabilised blood parameters are less influencing dedicated HF cardiologists (23%) compared to the non-dedicated HF cardiologists (39%) to decide decongestion. The determining factors to change medication and titration of medication in the acute HF setting are shown in Figure 3. Symptom worsening, clinical signs and deteriorating echo parameters mainly determine drug modification (Figure 3(A)). Dedicated compared to non-dedicated HF cardiologists tend to change HF patients more to guideline-recommended drugs (60% vs 47%). Six minute walk test (6MWT) and exercise capacity, evaluated by ergospirometry, are significantly more used by dedicated HF cardiologist compared to non-dedicated HF cardiologists for HF drug change (17% and 29% vs 2% and 4%). About 50% of the cardiologists indicated that up-titration of angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB), β-blocker, mineralocorticoid receptor antagonist is undertaken in >20% of their patients before hospital discharge. In contrast, up-titration of angiotensin receptor neprilysin inhibitor (ARNI) is performed to a lesser extent (Figure 3(B)). However, no significant differences were reported in up-titration practices between dedicated and non-dedicated HF cardiologists.

General HFrEF treatment

An overview of the answers on elements of HFrEF standard of care (SOC) is illustrated in Table 1. Angiotensin converting enzyme inhibitor/angiotensin receptor blocker, β-blockers and mineralocorticoid receptor antagonist are considered standard of care for HFrEF treatment by all cardiologists. Angiotensin receptor neprilysin inhibitor, devices and rehabilitation seem to be considered more standard of care therapy by dedicated HF cardiologists compared to non-dedicated HF cardiologists, but only for devices the difference was significant ($p < .05$). Angiotensin converting enzyme inhibitor/angiotensin receptor blocker are up-titrated first, followed by β-blockers and angiotensin receptor neprilysin inhibitor . However, reaching target dose is perceived difficult for all four drug classes i.e. angiotensin converting enzyme inhibitor/angiotensin receptor blocker angiotensin converting enzyme inhibitor/angiotensin receptor blocker, β-blocker, mineralocorticoid receptor antagonist and angiotensin receptor neprilysin inhibitor. This is reflected in Figure 4(A). Most cardiologists indicated that target doses can be reached in 25–75% of their patients, but achieving the target dose in >75% of HFrEF patients seems to be somewhat easier for angiotensin converting enzyme inhibitor/angiotensin receptor blocker and mineralocorticoid receptor antagonist, compared to β-blocker and angiotensin receptor neprilysin inhibitor. The most reported causes for not reaching target dose are hypotension for angiotensin converting enzyme inhibitor/angiotensin receptor blocker, β-blocker and angiotensin receptor neprilysin inhibitor; worsening renal function for angiotensin converting enzyme inhibitor/angiotensin receptor blocker, mineralocorticoid receptor antagonist and angiotensin receptor neprilysin inhibitor; brady-tachycardia for β-blocker and hyperkalemia for mineralocorticoid receptor antagonist. No marked differences between dedicated and non-dedicated HF cardiologists could be observed (Figure 4(B)). Perindopril, candesartan, bisoprolol and spironolactone are the preferred angiotensin converting enzyme inhibitor, angiotensin receptor blocker, β-blocker and mineralocorticoid receptor antagonist respectively. However, with the class angiotensin converting enzyme inhibitor/angiotensin receptor blocker, olmesartan is the preferred agent for non-dedicated HF cardiologists, whereas lisinopril and enalapril ($p < .05$) are more favoured by dedicated HF cardiologists (Figure 4(C)). Interestingly, 62%, 49% and 4% of the cardiologists indicated to use non-evidence based angiotensin converting enzyme inhibitor, angiotensin receptor blocker and β-blocker respectively for the treatment of HFrEF [6]. Of the dedicated

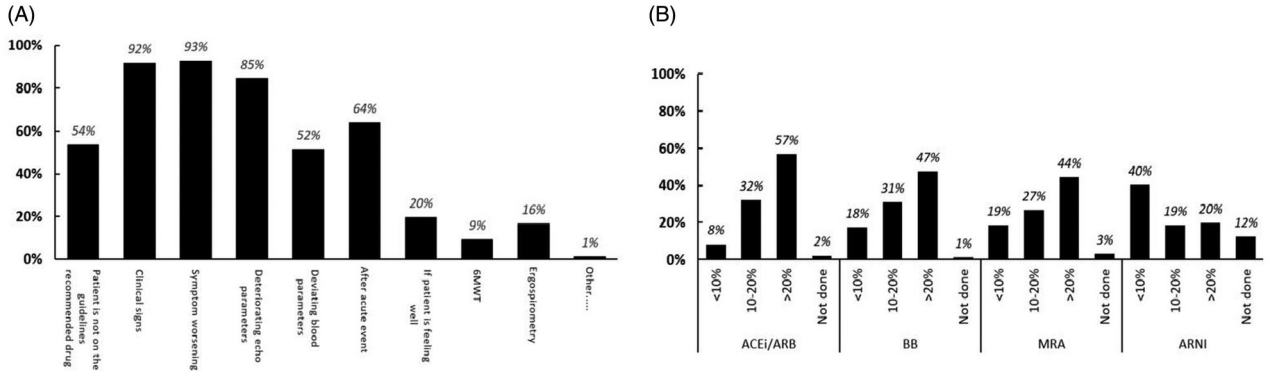

Figure 3. HF drug treatment in the hospital setting. (A) Percentage of cardiologists indicating which parameters determine change of HF medication (B) Percentage of cardiologists indicating in what percentage of HF patients medication at discharge has been up-titrated. 6MWT, six minute walk test; ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; MRA, mineralocorticoid receptor antagonist; ARNI, angiotensin receptor neprilysin inhibitor.

Table 1. HFrEF standard of care treatment.

	All ($n = 97$)	HF cardiologist ($n = 48$)	Non-HF cardiologist ($n = 49$)	p Value
What do you consider as SOC therapy for HFrEF?				
ACEI/ARB	97 (100%)	48 (100%)	49 (100%)	.99
β-blocker	97 (100%)	48 (100%)	49 (100%)	.99
MRA	95 (98%)	48 (100%)	47 (96%)	.24
ARNI	76 (78%)	41 (85%)	35 (71%)	.089
Ivabradine	62 (64%)	30 (63%)	32 (65%)	.99
SGLT2-i	21 (22%)	14 (29%)	7 (14%)	.14
Diuretics	74 (76%)	36 (75%)	38 (78%)	.99
Device	54 (56%)	32 (67%)	22 (45%)	**.025**
Rehabilitation	58 (60%)	33 (69%)	25 (51%)	.064
Which class do you uptitrate first?				
ACEI/ARB	89 (92%)	43 (90%)	46 (94%)	.71
β-blocker	39 (40%)	17 (35%)	22 (45%)	.54
MRA	8 (8%)	3 (6%)	5 (10%)	.49
ARNI	21 (22%)	11 (23%)	10 (20%)	.99
Ivabradine	2 (2%)	0 (0%)	2 (4%)	.24
SGLT2-i	0 (0%)	0 (0%)	0 (0%)	.99

HF: heart failure; SOC: standard of care; ACEI: angiotensin-converting enzyme inhibitor; ARB: angiotensin receptor blocker; MRA: mineralocorticoid receptor antagonist; ARNI: angiotensin receptor neprilysin inhibitor; SGLT2-i: sodium-glucose cotransporter 2 inhibitor.
Significant p-value ($p < .05$) is indicated in bold.

HF-cardiologists, 52%, 43% and 8% indicated to use non-evidence based angiotensin converting enzyme inhibitor, angiotensin receptor blocker and β-blocker respectively for the treatment of HFrEF.

A detailed overview of the answers on HF rehabilitation, quality of life evaluation and ergospirometry is illustrated in Table 2. Cardiac rehabilitation after decompensation and ergospirometry are significantly more performed in hospitals with a cardiac rehabilitation centre as compared to hospitals without a rehabilitation centre. The most commonly used method to evaluate quality of life (QoL) is history taking. Questionnaires, 6 min walk tests, and ergospirometry, are more preferred by dedicated HF cardiologists, the latter two being significantly more used as compared to non-dedicated HF cardiologists ($p < .05$). Ergospirometry to evaluate exercise capacity is never used by 31% of the non-dedicated HF cardiologists compared to only 6% of the dedicated HF cardiologists ($p < .05$). Almost 80% of the dedicated HF cardiologists indicated to always prescribe cardiac rehabilitation after decompensation, two times more as non-dedicated HF cardiologists ($p < .05$).

Multidisciplinary approach

Patients reach the cardiologist by general practitioners referral, direct appointment, or emergency after acute event, with no marked differences, as these three paths were indicated by 78%, 72% and 71% of the cardiologists respectively. The cardiologists' perception of the role of the general practitioner, geriatrician and nephrologists in HF management is illustrated in Table 3. General practitioners are considered more important in the follow-up of HF patients, to monitor blood parameters and recognise worsening HF. Nephrologists are mostly consulted for treatment advice and for managing dialysis, and geriatricians for managing comorbidities and polypharmacy. Treatment advice by nephrologists and geriatricians was indicated by 75% and 50% of the dedicated HF cardiologists, compared to 61% and 29% of the non-dedicated HF cardiologists. In contrast, managing polypharmacy by geriatricians is perceived more importantly by non-dedicated HF cardiologists (80%) compared to the dedicated HF cardiologists (63%). However, none of the differences were significant.

The HF nurse

A ranking of the tasks of a HF nurse, taking only the hospitals with a HF nurse employed into consideration, is illustrated in Table 4. Informing the patients at discharge and education during follow-up are

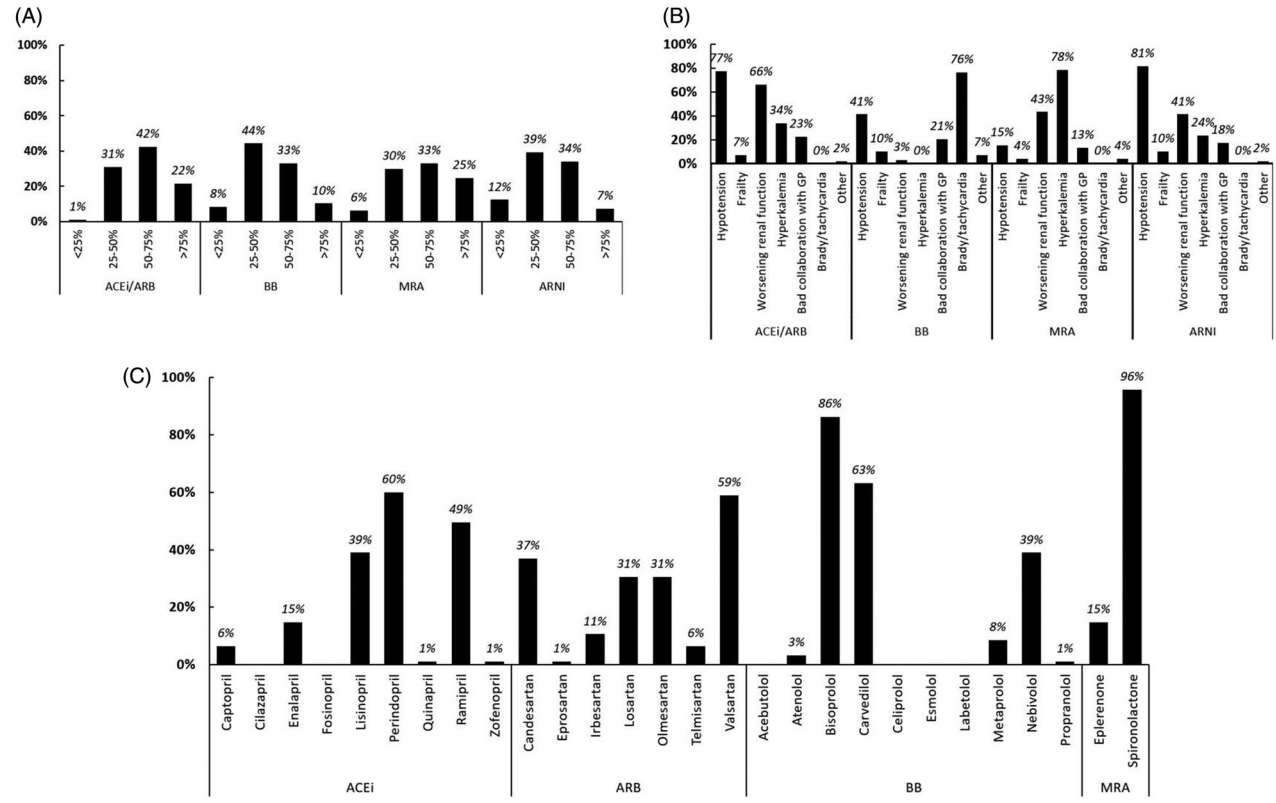

Figure 4. Overview of the answers regarding drug treatment of HFrEF. (A) Percentage of cardiologists indicating how many HFrEF patients reach target dose of ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, β-blocker; MRA, mineralocorticoid receptor antagonist and ARNI, angiotensin receptor neprilysin inhibitor (B) Percentage of cardiologists indicating the causes of not reaching target dose for angiotensin converting enzyme inhibitor/angiotensin receptor blocker (ACEI/ARB), β-blockers (BB), mineralocorticoid receptor antagonist (MRA) and angiotensin receptor neprilysin inhibitor (ARNI). (C) Percentage of cardiologists indicating their drugs of choice.

Table 2. Evaluation of quality of life, rehabilitation and use of ergospirometry in HFrEF patients.

	All ($n = 97$)	HF cardiologist ($n = 48$)	Non-HF cardiologist ($n = 49$)	Centre with cardiac rehabilitation ($n = 50$)	Centre with no cardiac rehabilitation ($n = 47$)
Evaluation of QOL?					
Anamnesis	88 (91%)	41 (85%)	47 (96%)	43 (86%)	45 (96%)
Questionnaire	31 (32%)	19 (40%)	12 (24%)	17 (34%)	14 (30%)
6MWT	24 (25%)	18 (38%)*	6 (12%)	15 (30%)	9 (19%)
Ergospirometry	43 (44%)	29 (60%)*	14 (29%)	28 (56%)*	15 (32%)
HF rehabilitation after decompensation?					
Always	54 (56%)	36 (75%)*	18 (37%)	35 (70%)*	19 (40%)
Never	6 (6%)	2 (4%)	4 (8%)	2 (4%)	4 (9%)
Only when additional pathologies are present	16 (16%)	6 (13%)	10 (20%)	5 (10%)	11 (23%)
How often is ergospirometry performed in HFrEF patients?					
Never	18 (19%)	3 (6%)	15 (31%)*	2 (4%)	16 (34%)*
Once a year	33 (34%)	23 (48%)*	10 (20%)	20 (40%)	13 (28%)
Twice a year	16 (16%)	10 (21%)	13 (27%)	12 (24%)	4 (9%)

HFrEF: heart failure with reduced ejection fraction; HF: heart failure; QoL: quality of life; 6MWT: 6-minute walk test.
* indicates significant differences ($p < 0.05$).

considered the most important tasks of an HF nurse. If a dedicated HF cardiologists is present, a diary, booklet with information and emergency number are significantly more given compared to centres without a dedicated HF cardiologist. A medication scheme (85%) is given by the majority of cardiologists. 66% of the cardiologists responded that the patients should be seen by their general practitioner within one week after discharge, whereas only 8% sees the patients themselves within one week after discharge. 45% of the cardiologists responded to see the patients within two weeks, 12% within three weeks, 33% within four

Table 3. Role general practitioner (GP), geriatrician and nephrologist in HF treatment responded by all cardiologists ($n = 97$).

		Role			
Role GP		geriatrician		Role nephrologist	
HF screening	68 (70%)	Treatment	29 (30%)	Treatment	29 (30%)
Uptitration medication	56 (58%)	Referral to cardiologist	57 (59%)	Referral to cardiologist	48 (49%)
Blood analysis follow-up	84 (87%)	Treatment advise	38 (39%)	Treatment advise	66 (68%)
Recognising worsening HF	87 (90%)	Managing comorbidities	76 (78%)	Dialysis	64 (66%)
Managing comorbidities	66 (68%)	Managing polypharmacy	69 (71%)	No role	3 (3%)
		Palliative care	42 (43%)		
		No role	8 (8%)		

* Indicates significant difference ($p < 0.05$) between dedicated and non-dedicated HF cardiologists.

Table 4. Ranking of tasks of an HF nurse ($n = 45$) mean ± SD FTE of 0.8 ± 0.6.

Rank (Geomean)	Task HF nurse
1.76	Patient information at discharge
1.77	Patient education during follow-up
2.62	First point of contact for the patients
2.73	Patient follow-up when hospitalised (also other departments)
3.65	Telephone contact within 2 weeks
3.69	Anamnesis during consultation
4.64	Remind cardiologist for uptitration
4.87	Device optimisation
4.96	First point of contact general practitioner

HF: heart failure.

weeks and 5% later than four weeks. 22% of the cardiologists indicated that the first follow-up visit is based on the patient frailty. No differences between dedicated and non-dedicated HF cardiologists could be observed.

Discussion

This manuscript offers as a first insight into the flow and care of HF patients in Belgium, with a special focus on the real world relevance of dedicated multidisciplinary HF care. The main finding of this survey is that dedicated HF care is only present in a slight minority of hospitals. Nevertheless, the presence of dedicated HF care in this survey is associated with a higher probability of implementing guideline recommendations regarding diagnosis, medical and non-medical treatment and follow-up of HF patients.

To the best of our knowledge, this is the largest prospective survey assessing the HF landscape in Belgium specifically. A particular strength of the survey is the high response rate covering 84% of all Belgian clinics with a cardiology department. This response rate is also fairly distributed across the hospital size and geographic location. Despite the well-described importance of dedicated HF care, only a minority of hospitals indicated to have a dedicated HF cardiologist and/or a HF nurse [15–17]. This can partially be explained by the fact that no specific HF curriculum for HF cardiologists or nurses exists in Belgium. Additionally, no specific reimbursement nor remuneration exists to support the work of a qualified HF nurse, in contrast to the diabetes or oncology nurse whose work is duly appreciated. Although all cardiologists used the same diagnostic strategies (which carry a class I to IIa recommendation in guidelines) to diagnose HF, a difference was seen with the use of (endomyocardial biopsy) with dedicated HF cardiologist being more likely to use endomyocardial biopsies. In part, this difference could be attributed to the fact that the infrastructural possibilities are more substantial in the bigger HF centres. It is important to emphasise towards non-dedicated HF cardiologists that guidelines outlining the use of endomyocardial biopsies in certain clinical scenarios in HF exist and should be implemented accordingly [23]. Following such strategies can offer important diagnostic information without exposing patients to unacceptable risks, the latter often being overestimated [24].

Although all surveyed cardiologists apply the diagnostic process in HF rather similarly, more pervasive differences were found between dedicated HF cardiologists and non-dedicated HF cardiologists in the treatment of HF. In the setting of acute HF for instance, dedicated HF cardiologists worried less about blood parameters during decongestive therapy. This is in line with the emerging data that effective decongestion is determining clinical outcome to a larger degree than for instance changes in creatinine (worsening renal function), and the latter should be accepted temporarily rather than hamper effective decongestion [25,26]. Concomitantly, data suggest that a substantial number of patients is dismissed early, i.e. before the

therapeutic goal of full decongestion is reached [27]. Additionally, dedicated HF cardiologists were more likely to change to or initiate guideline-recommended drugs during the acute HF setting. Nevertheless, both dedicated HF cardiologists and non-dedicated HF cardiologists indicated that symptom worsening, persistent signs of acute HF and deteriorating echocardiography parameters were the main drivers behind therapy changes in acute HF. This points out that, in general, our Belgian HF care is still reactive to the circumstance of worsening of HF and is less focussed on attaining, for instance, complete decongestion at discharge and optimised guideline-directed medical therapies as a primary objective. Both randomised controlled trial data and real world data indicate that only 10–28% of patients attain complete decongestion at hospital discharge [27,28]. Indeed, practice guidelines for the treatment of congestion in acute HF recommend the primary attainment of complete decongestion, instead of a reactive approach aimed at mitigating worsening of HF as observed in our questionnaire [29]. Resolution of dyspnoea is often insufficient as a therapy goal in acute HF as it is associated with residual congestion at discharge and poor outcome [30]. Furthermore, especially in heart failure with preserved ejection fraction (HFpEF) patients, dyspnoea is not always reliable as a symptom for disease severity. Still, this was regarded to as an important therapy changer by all cardiologists (dedicated and non-dedicated) in our questionnaire. Although our questionnaire was not specifically designed to tackle such issues, it remains clear that in the perception and practice of cardiologists overall, HF therapy is too much focussing on symptom relief, this at the cost of not up-titrating life-saving evidence-based HF therapies.

In the general treatment of HFrEF patients, both dedicated HF cardiologists and non-dedicated HF cardiologists regarded angiotensin converting enzyme inhibitor/angiotensin receptor blocker, β-blocker and mineralocorticoid receptor antagonist as standard of care. Nevertheless, dedicated HF cardiologists were more likely to choose an evidence based agent within the class of angiotensin converting enzyme inhibitor/angiotensin receptor blocker (lisinopril and enalapril) than non-dedicated HF cardiologists (olmesartan) [6]. It is important to emphasise that within class, not all agents are equally effective in the HF patient, and a careful choice of a specific drug is not to be considered a detail [6]. Additionally, dedicated HF cardiologists regarded other class I life-saving therapies more often as standard of care, such as rehabilitation, angiotensin receptor neprilysin inhibitor and devices (for the latter the difference being statistically different in our survey) [6]. Additionally, dedicated HF cardiologists were more likely to up-titrate β-blocker and mineralocorticoid receptor antagonist early on Furthermore, dedicated HF cardiologists were more likely to objectify functional limitation using questionnaires, 6 min walk test and ergo-spirometry. This is important, as recognising subtle functional limitations by objective measures might better identify the ostensibly stable patient, emphasising that the term ‘stable’ should be used with caution in HF. Indeed, it is becoming increasingly recognised that even patients with mild functional limitations, are at high risk of adverse outcome [31–35]. Adequate implementation of guideline- directed medical therapy, especially focussing on up-titrating towards the guideline-recommended dosages, is paramount in these patients and might necessitate more objective strategies to clearly comprehend the degree of functional limitation. Finally, in line with the class IA recommendation of the European Society of Cardiology HF guidelines [6], most cardiologists regarded multidisciplinary follow-up of HF patients essential. While such strategies reduce HF hospitalisation and mortality, it remains striking that only 46% of clinics actually had a dedicated HF nurse to offer this multidisciplinary disease modifying approach [36–39].

Limitations

Although unique in its setting, our study is subject to several limitations. First, this was a survey, and the answers in this survey reflect impressions of physicians in the field and are not necessarily the result of objectified registration. Typical subtypes of self-reporting bias, e.g. social desirability bias, cannot be excluded. Additionally, it is not possible in this survey to exclude over- or underreporting of adherence to guidelines. In general, data point out that cardiologists overestimate their adherence to the guidelines. Nevertheless, data on impressions of physicians generally offer valuable and unique insights into perceptions and misperceptions regarding HF care. Secondly, there is no official title of dedicated HF cardiologist recognised by the Belgian government, so the classification of dedicated HF cardiologist versus the non-dedicated HF cardiologist is based on self-perception. Therefore, this self-perception is of added value as it resulted in a ‘spontaneous’ classification of groups of cardiologists demonstrating distinct behaviours in clinical practice that corroborated the classification. Therefore, it is

reasonable to assume that a self-reported HF cardiologist is indeed displaying a clear interest in the disease and related therapies, guidelines and literature.

Conclusion

From our survey covering the whole area of Belgium, it appears that there is room for improvement of our HF care at three cornerstones: (1) the use and especially the up-titration of guideline-recommended HF drugs and more advanced therapies, (2) the paramount focus on full decongestion and therefore the quantification of subtle signs of congestion, (3) the multidisciplinary approach of the HF patient under guidance of the HF nurse. Despite the drawbacks of self-reporting, this survey could therefore represent a framework to improve HF care in cooperation with the competent authorities.

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