



Original Article

Physician Perspectives on the Diagnosis and Management of Heart Failure With Preserved Ejection Fraction

Milan Gupta, MD,^{a,b} Alan Bell, MD,^c Michelle Padarath, RN,^b Daniel Ngui, MD,^d and Justin Ezekowitz, MD^e

^aMcMaster University, Department of Medicine, Hamilton, Ontario, Canada

^bCanadian Collaborative Research Network, Brampton, Ontario, Canada

^cDepartment of Family and Community Medicine, University of Toronto, Toronto, Ontario, Canada

^dDepartment of Family Medicine, University of British Columbia, Vancouver, British Columbia, Canada

^eCanadian VIGOUR Centre, Department of Medicine, University of Alberta, Edmonton, Alberta, Canada

ABSTRACT

Background: Heart failure (HF) with preserved ejection fraction (HFpEF) carries high morbidity and mortality. Compared with HF with reduced ejection fraction (HFrEF), HFpEF is difficult to diagnose, and lacks evidence-based treatments. In this survey we assessed perceptions of cardiologists, internists, and primary care physicians (PCPs) regarding HFpEF diagnosis and management.

Methods: In total, 159 cardiologists, 89 internists, and 200 PCPs from across Canada completed an online survey, with response rates of 14%–17%.

Results: The perceived prevalence of HFpEF vs HFrEF was similar across physician types (58% HFrEF, 42% HFpEF). Thirty-seven percent

RÉSUMÉ

Introduction : L'insuffisance cardiaque (IC) à fraction d'éjection préservée (ICFEP) entraîne des taux élevés de morbidité et de mortalité. Comparativement à l'IC à fraction d'éjection réduite (ICFER), il est difficile de poser le diagnostic de l'ICFEP et de trouver des traitements fondés sur des données probantes. Dans cette enquête, nous avons évalué la perception des cardiologues, des internistes et des médecins de premier recours (MPR) concernant le diagnostic et la prise en charge de l'ICFEP.

Méthodes : Au total, 159 cardiologues, 89 internistes et 200 MPR du Canada ont rempli l'enquête en ligne. Le taux de réponse a été de 14 % à 17 %.

Approximately 600,000 Canadians live with heart failure (HF), with an additional 50,000 new cases each year.^{1,2} HF accounts for approximately 50,000 hospitalizations per year with a rehospitalization rate of > 20% at 30 days post discharge.³ The average survival for a patient diagnosed in Canada with HF is 5.5 years,⁴ with a 1-year risk of death of 25% after HF diagnosis, and a 30-day death rate of 16% after HF hospitalization.⁵ An aging population, coupled with improved survival in patients with HF, is anticipated to substantially increase the prevalence and societal burden of HF in Canada over the coming decades.⁶

There is considerable heterogeneity in HF care across health regions in Canada,^{7,8} especially for patients recently discharged after a HF hospitalization. Up to 50% of such patients do not see a primary care physician (PCP) within the recommended 30 days after discharge,^{9–11} and there continue to be delays in accessing cardiologists for these patients.¹² Although specialized HF clinics have proliferated in Canada in recent years, only 8.9% of Ontario patients hospitalized for HF are seen in such clinics within 1 year of discharge.¹³ As such, it is estimated that PCPs are responsible for the management of up to half of all HF patients in outpatient settings, yet many PCPs express lack of confidence in managing these patients, many of whom often have complex comorbidities.^{8,11,12,14}

Most of these observations have been in patients with a general diagnosis of HF. HF with reduced ejection fraction (HFrEF) can be readily diagnosed and confirmed with the aid of cardiac imaging for assessment of left ventricular ejection fraction. There are a number of proven and guideline-endorsed therapies to improve survival for patients with this condition, and national treatment guidelines are regularly

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Ethics Statement: This research reported has adhered to relevant ethical guidelines.

Corresponding author: Dr Milan Gupta, Canadian Collaborative Research Network, 3 Conestoga Dr, Suite 300, Brampton, Ontario L6Z 4N5, Canada. Tel.: +1-905-495 4278; fax: +1-905-452-1052.

E-mail: Milangupta1@outlook.com

See page 365 for disclosure information.

of PCPs did not differentiate HF on the basis of ejection fraction. All physician types ranked symptom and mortality reduction as treatment priorities. Ninety-two percent of specialists believed that HFpEF is best managed by PCPs and specialists, whereas one-fifth of PCPs suggested PCP management alone. Compared with specialists, PCPs were more likely to underestimate HFpEF mortality and less aware of sex differences in the prevalence of HFpEF vs HFrEF (all $P < 0.001$). Fewer PCPs use natriuretic peptides for diagnosis ($P < 0.001$). All physician types listed cost and availability as barriers to natriuretic peptide use. Ninety-one percent of PCPs incorrectly identified various therapies as effective for improving HFpEF outcomes. Most of all physicians expressed a strong desire to increase knowledge of diagnostic and treatment algorithms for HFpEF.

Conclusions: There are substantial knowledge gaps in the diagnosis and management of HFpEF, particularly among PCPs. Because of the prevalence of HFpEF in primary care, strategies are required to reduce these gaps.

updated with dissemination programs aimed at PCPs and specialists.¹⁵ However, HF with preserved ejection fraction (HFpEF), which constitutes approximately half of all HF cases, is more challenging to diagnose clinically, carries mortality comparable to that of HFrEF, and lacks evidence-based treatments.^{15,16} Thus, physician perceptions toward the diagnosis and management of HFpEF might affect optimal care, an area that has not previously been studied extensively in Canada.

We therefore sought to better understand the perceptions of PCPs and cardiovascular specialists regarding HFpEF diagnosis and management, via an online survey, developed specifically for this purpose. Our hypothesis from the outset was that important knowledge and practice gaps would be shown, particularly among PCPs compared with specialists. Such gaps, if shown, might then support new initiatives to optimize the care of patients with HFpEF.

Methods

An expert committee developed an online survey to assess physician confidence, practice patterns, and perceptions around the diagnosis and management of HFpEF, and distributed it electronically to physicians across Canada.

Survey development

The Canadian Collaborative Research Network (CCRN) assembled an expert steering committee of representative PCPs and specialists. Members were selected on the basis of expertise in HF and to provide national representation to include regional differences in HF diagnosis and management. In addition to a literature search, the committee reviewed needs assessments in the area of HF, conducted by the CCRN in the previous 2 years among Canadian physicians for the

Résultats : Tous les types de médecins percevaient une prévalence similaire entre l'ICFEP et l'ICFER (58 % ICFER, 42 % ICFEP). Trente-sept pour cent des MPR ne différenciaient pas l'IC en fonction de la fraction d'éjection. Tous les types de médecins donnaient la priorité de traitement à la réduction des symptômes et de la mortalité. Quarante-vingt-douze pour cent des spécialistes croyaient que la prise en charge commune de l'ICFEP par les MPR et les spécialistes était préférable, tandis qu'un cinquième des MPR suggéraient une prise en charge par le MPR seul. Comparativement aux spécialistes, il était plus probable que les MPR sous-estiment la mortalité liée à l'ICFEP et qu'ils soient moins au fait des différences entre les sexes dans la prévalence de l'ICFEP vs l'ICFER (toutes les valeurs $p < 0,001$). Un plus petit nombre de MPR utilisent les peptides natriurétiques pour le diagnostic ($P < 0,001$). Tous les types de médecins ont considéré les coûts et la disponibilité comme des obstacles à l'utilisation des peptides natriurétiques. Quarante-vingt-onze pour cent des MPR ont considéré à tort que les diverses thérapies étaient efficaces pour améliorer les résultats de l'ICFEP. La plupart des médecins ont fait part de leur profond désir de rehausser leurs connaissances sur les algorithmes diagnostiques et thérapeutiques de l'ICFEP.

Conclusions : Il existe des lacunes substantielles dans les connaissances en matière de diagnostic et de prise en charge de l'ICFEP, particulièrement des lacunes dans les connaissances des MPR. En raison de la prévalence de l'ICFEP dans les soins primaires, des stratégies sont nécessaires pour combler ces lacunes.

purposes of continuing professional development (CPD). A live webcast meeting (March 20, 2019) of the committee allowed a discussion of current challenges, new data, guidelines, and potential knowledge/practice gaps to be explored in the survey. The committee then developed the survey, designed to assess key areas of HFpEF knowledge and clinical practice, with reference to the 2017 Canadian Cardiovascular Society HF guidelines.¹⁵ A range of question formats were included in the survey to assess confidence, practice patterns, and perceptions around the diagnosis and management of HFpEF. Questions were also included to assess regional differences in access to certain testing modalities, such as availability of echocardiography and natriuretic peptide (NP) testing. All survey questions had to be approved by all members of the steering committee to be included in the final survey. The final survey was then reviewed and approved by 1 additional expert PCP and 1 expert cardiologist, both of whom were not involved in survey development or dissemination.

The CCRN

The CCRN is a not for profit national physician organization (as recognized and defined by the Royal College of Physicians and Surgeons of Canada), with a formal governance structure. CCRN is accountable to, and serves its physician members, through CPD and research. The CCRN routinely conducts needs assessments and surveys among Canadian physicians on a variety of topics relevant to clinical practice, as part of its CPD activities.^{17,18}

Survey distribution

The CCRN electronically distributed an invitation to complete the online survey to select members from within its

physician database. The CCRN has an extensive database of opt-in physicians across Canada, including PCPs and many different specialties. These physicians have elected to join CCRN's membership to participate in various continuing medical education programs, needs assessments, and clinical research projects. Membership is free of charge and open to all Canadian physicians. For the purposes of this survey, invitations were restricted to PCPs who self-identified their practices as focusing on cardiovascular diseases, to internists with practices devoted at least 70% to cardiology, and to general cardiologists. Cardiologists who self-identified as mostly nonclinical, or as spending most of their clinical time in specialized HF clinics, were excluded. The latter group was specifically excluded to better understand the management of HFpEF by generalists, in primary care and across internal medicine and cardiology. In addition, sponsor representatives assisted by identifying physicians within their territories who were not CCRN members, but matched CCRN's physician characteristics for the survey. These physicians constituted < 15% of the total physician population. Upon verifying that these physicians were appropriate candidates, the CCRN then invited them to complete the survey.

The steering committee aimed from the outset to include responses from 200 PCPs and 250 specialists (cardiologists and internists combined) who routinely manage patients with HF. Sample size calculations were not performed. This sample size was considered by the steering committee to be large enough to: (1) assess regional and demographic differences within the 2 groups of physicians; and (2) assess difference between PCPs and specialists. The final survey consisted of 33 multiple choice and free-text questions with embedded clinical scenarios. A token honorarium was offered for survey completion that was in accordance with ethical regulations.¹⁹ Electronic invitations were distributed between July and November of 2019. E-mail invitations were terminated after 2 nonresponses from any individual physician. The response rates amongst physicians that clicked on the invitation link were PCPs (17.3%), internists (13.8%), and cardiologists (16.7%).

The final surveys can be found in their entirety in the [Supplemental Appendices S1-S3](#).

Funding was provided to the CCRN (M.G.) from Novartis Canada. The CCRN independently developed and distributed the survey, and collated and analyzed the results. The authors, representing the steering committee, developed the report without sponsor involvement. Institutional or central ethics research board approval was not obtained because our study was meant to simply survey physician perceptions and knowledge rather than to collect patient information.

Statistical analysis

Statistical analysis included only completed surveys, and data are presented as aggregate mean percentage responses among respondents of each of 3 physician groups (cardiologists, internists, PCPs). All analyses were conducted using SPSS version 26 (IBM Corp, Armonk, NY). Results are reported in frequencies and percentages. Averages are reported as mean and SD. Differences between groups were determined using the χ^2 test for categorical variables.

Results

Physician characteristics

In total, 448 physicians completed the survey, comprised of 200 PCPs, 159 cardiologists, and 89 internists. The CCRN only received notification of fully completed surveys and therefore, it is unknown how many physicians might have only partly completed the survey. The recruitment goal for PCPs was filled earlier than for specialists. Although the recruitment goal for specialists combined was originally 250, recruitment was cut off at 248 respondents because of slow response time. Demographic and practice details of respondents are noted in [Table 1](#). Although all provinces were represented (not including territories), most respondents were from Ontario, Quebec, Alberta, and British Columbia. Most physicians had been practicing for more than 15 years ($P < 0.001$ for PCPs vs specialists), and specialists more often practiced in metropolitan areas (population > 500,000). Academic affiliation was reported more commonly for cardiologists vs internists or PCPs ($P < 0.001$). HF patients were encountered most frequently by cardiologists, followed by internists, and then PCPs ($P < 0.001$). Most of the cardiologists (84%) treated at least 5 ambulatory HF patients per week vs 64% of internists. Thirty-five percent of PCPs reported treating at least 10 HF patients per month.

HFpEF diagnosis and management

Ninety-two percent of all physician groups stated that PCPs should be comfortable making an initial diagnosis of general HF. However, 50% of PCPs stated that they did not feel comfortable making a diagnosis of either HFpEF or HFrfEF without specialist input. The perceived prevalence in clinical practice of HFpEF vs HFrfEF was similar across all 3 physician types (58% for HFrfEF vs 42%, for HFpEF; $P = 0.86$ across physician groups). Ninety-three percent of specialists believed that uncomplicated HFpEF is best managed with PCPs, whereas 24% of PCPs believed that specialist management for uncomplicated HFpEF was unnecessary ($P < 0.001$ vs specialists).

Ninety-eight percent of specialists differentiate the types of HF according to ejection fraction when determining treatment strategies. However, 37% of PCPs stated that they either made no distinction between HFpEF and HFrfEF, or that they used methods other than ejection fraction to classify HF. Sixty-one percent of cardiologists and 57% of internists believed that mortality rates were similar between HFrfEF and HFpEF, compared with 14% of PCPs ($P < 0.001$ vs specialists), who more often believed that HFrfEF carries a substantially higher mortality than HFpEF. Cardiologists were most aware that HFpEF is more prevalent than HFrfEF in women than men compared with other physician types (cardiologists 85%, internists 60%, and PCPs 31%; P trend < 0.001). All physician types ranked symptom improvement and mortality reduction as their top goals of HF treatment.

NP testing

Approximately half of all specialists routinely order NP level testing when diagnosing HF (55% internists, 50% cardiologists; $P =$ not significant), compared with 33% of PCPs

Table 1. Physician demographic and practice characteristics

	PCPs (n = 200)	Internists (n = 89)	Cardiologists (n = 159)	<i>P</i> , across 3 groups	<i>P</i> , specialists vs PCPs
From ON, BC, AB, or QC	83.5%	93.2%	93.1%	< 0.001	< 0.001
More than 15 years in practice	76.0%	67.4%	54.1%	< 0.001	< 0.001
Metropolitan (> 500,000)	49.5%	53.9%	66.7%	< 0.001	0.016
Academic affiliation	6.5%	25.8%	54.7%	< 0.001	< 0.001
HF patients seen	34.5% (> 10 per month)	29.2% (> 10 per week)	62.2% (> 10 per week)	< 0.001	< 0.001

AB, Alberta; BC, British Columbia; HF, heart failure; ON, Ontario; PCPs, primary care physicians; QC, Quebec.

($P < 0.001$ vs specialists). One-quarter of PCPs indicated unfamiliarity with the interpretation of NP levels compared with < 10% of specialists ($P < 0.001$), and all physician types stated that cost and availability limited their use of NP testing. Twenty-two percent of PCPs were uncertain how to interpret an echo report to determine if a patient might have HFpEF ($P < 0.001$ vs specialists).

Evidence-based therapies for HFpEF

Participants were given a list of therapies (Table 2) including those proven in clinical trials to improve HFrEF outcomes (angiotensin converting enzyme inhibitors, angiotensin receptor blockers, β -blockers, mineralocorticoid receptor antagonists, and neprilysin inhibition). When asked which, if any, of these therapies clearly improved outcomes for patients with HFpEF, 48.4% of cardiologists correctly identified none of the above, vs 41.6% of internists and 9% of PCPs (P trend < 0.001). Specifically for mineralocorticoid receptor antagonists, for which there might be limited evidence for benefit in HFpEF, PCPs were less likely to select this class of agents than specialists ($P < 0.001$).

Between 60% and 75% of all physician types expressed a strong desire to improve their knowledge in various aspects of HFpEF diagnosis and management, with the highest desire noted among PCPs ($P < 0.001$ PCPs vs specialists).

Discussion

Of all cardiovascular diseases, HF is the only condition with incidence and prevalence that are both increasing in the developed world.²⁰ It is only in the past 15 years that HFpEF has been shown to have morbidity and mortality comparable with that of HFrEF, with mortality rates ranging from 20% to 25% at 1 year.¹⁶ With burgeoning rates of HF in Canada, the Public Health Agency of Canada included a Heart Health Strategy and Action Plan in its 2013-2016 Strategic Plan for

chronic disease, with the aim of reducing HF hospitalizations by 25%.^{21,22} Because HFpEF is commonly encountered in ambulatory care,^{8,23,24} it is vital that health care professionals, particularly PCPs, be competent in the diagnosis and management of this complex condition, in consultation with cardiovascular specialists. Proper diagnosis early in the course of the disease might help prevent hospitalizations and further complications. Although specialized HF clinics have been shown to reduce HF hospitalizations and mortality, access to such clinics is limited for most HF patients in Canada.^{25,26}

Previous studies have shown HF management challenges encountered by PCPs and specialists in other countries.^{27,28} We believe this study represents the first survey in Canada of primary care and specialist physicians specifically regarding HFpEF. An earlier survey by Howlett and colleagues surveyed physicians in 6 countries including Canada but did not explore HFpEF vs HFrEF, and also included cardiac nurses.²⁹ Consistent with our results, however, they also reported substantial gaps in diagnosis and management of HF in general, many of which varied between primary care and specialty care. These differences were noted in Canada and in other countries.

Half of PCPs in our survey were uncomfortable making a diagnosis of HFpEF without specialty consultation. Although there is general consensus that a comanagement model is best for patients with HF,¹⁰ because of the limited access to cardiovascular specialists in various parts of Canada, it is critical that PCPs are confident in making an initial HFpEF diagnosis. A similar lack of confidence in making a general HF diagnosis was previously reported among general practitioners in the United Kingdom, where access to cardiologists is also limited as in parts of Canada.¹² Thirty-seven percent of PCPs stated that they did not differentiate types of HF on the basis of ejection fraction. Assessment of ejection fraction is fundamental in differentiating HFpEF from HFrEF, and in determining selection of appropriate therapies. Importantly, PCPs

Table 2. Proportion of physicians who identified treatments considered effective in improving HFpEF outcomes

	PCPs (n = 200)	Internists (n = 89)	Cardiologists (n = 159)	<i>P</i> , across 3 groups	<i>P</i> , specialists vs PCPs
ACE inhibitors	48.0%	24.7%	6.9%	< 0.001	< 0.001
ARB	39.0%	24.7%	17.6%	< 0.001	< 0.001
β -Blockers	42.0%	18.0%	13.2%	< 0.001	< 0.001
Loop diuretics	28.5%	18.0%	15.7%	< 0.001	< 0.001
MRA	31.0%	27.0%	37.7%	< 0.001	< 0.001
All of the above	57.0%	14.6%	11.3%	< 0.001	< 0.001
None of the above	9.0%	41.6%	48.4%	< 0.001	< 0.001

ACE, angiotensin converting enzyme; ARB, angiotensin receptor blocker; HFpEF, heart failure with preserved ejection fraction; MRA, mineralocorticoid receptor antagonists; PCPs, primary care physicians.

were less likely to consider the use of NP testing in the diagnostic workup of HF. Although cost and availability were cited as reasons restricting NP use across all physician types, PCPs expressed less familiarity with the role of NP testing and interpretation of NP levels.

Management of hypertension, associated risk factors, and volume overload are essential in patients with HFpEF. However, to date, there are no evidence-based treatments for HFpEF that clearly improve cardiovascular outcomes, or that are strongly recommended in national guidelines.¹⁵ Mineralocorticoid receptor antagonists are given a “soft” recommendation in several guidelines, but this is on the basis of a subgroup analysis of the Treatment of Preserved Cardiac Function Heart Failure With an Aldosterone Antagonist (TOPCAT) study, the main results of which were neutral.³⁰ More recently, the Prospective Comparison of ARNI [angiotensin receptor–neprilysin inhibitor] with ARB [angiotensin-receptor blockers] Global Outcomes in HF with Preserved Ejection Fraction (PARAGON) study compared sacubitril/valsartan to valsartan alone (rather than true placebo) in patients with HFpEF.³¹ This study failed to show a statistically significant benefit of sacubitril/valsartan on HF outcomes, though the *P* value was marginal at 0.056. To date, sacubitril/valsartan has not been incorporated into HFpEF guidelines.

In our survey, a substantial proportion of specialists (50%–60%) and most of PCPs (93%), incorrectly identified certain drug classes as being effective for event reduction in patients with HFpEF (Table 2). Most of these drug classes have been shown to improve outcomes in patients with HFrEF, but none have been clearly proven to be effective in patients with HFpEF.

Our study has certain limitations, including the fact that we did not validate our survey using a focus group. The methodology used for physician recruitment might have resulted in a selection bias, although measures were taken to minimize this. Interpretation of survey questions was left to the discretion of the responding physicians. Thus, the term, “uncomplicated HF” might have been interpreted differently by PCPs compared with specialists. Finally, our sample sizes for each physician type were relatively small for a large country such as Canada with regional differences in health care delivery, limiting our ability to assess and compare subgroups of physicians.

In summary, our study highlights an important need for enhanced education among all physician types, but particularly among PCPs, regarding the clinical diagnosis, investigation, and management of HFpEF in the outpatient setting. This finding was verified by the participants themselves, with up to three-quarters of physicians expressing a strong desire for improved knowledge on HFpEF. Future efforts should be directed at developing models of shared responsibility for HFpEF management between PCPs and specialists, and at improving transitional care between hospitals and the community. Importantly, targeted HF continuing medical education is required, particularly for PCPs, with a clinical focus on proper clinical diagnosis and the use of ancillary testing for confirmation, along with knowledge translation of practice guidelines. Preceptorships in specialized HF clinics for motivated PCPs (and specialists) might inspire further confidence in HFpEF management in community settings. Continuing

medical education programs will need to be tailored to varying learning needs, including traditional didactic lectures, online offerings, podcasts, case-based tutorials, and more advanced section 3 learning programs that incorporate assessments of performance. Multifaceted educational programs and practice audit programs might be costly, but are clearly necessary, and such education has been shown to improve confidence and clinical performance among health care practitioners.³² Such initiatives would of course have to be tailored separately for the specific learning needs of PCPs vs specialists.

Because of the substantial morbidity and mortality associated with HFpEF, coupled with its rising prevalence in the Canadian population, our findings raise concern regarding physician confidence in managing this condition.

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Supplementary Material

To access the supplementary material accompanying this article, visit *CJC Open* at <https://www.cjcoopen.ca/> and at <https://doi.org/10.1016/j.cjco.2020.11.008>.