

Do general practitioners follow treatment recommendations from guidelines in their decisions on heart failure management? A cross-sectional study

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ABSTRACT

Objective: To investigate whether general practitioners (GPs) follow treatment recommendations from clinical practice guidelines in their decisions on the management of heart failure patients, and assess whether doctors' characteristics are related to their decisions.

Design: Cross-sectional vignette study.

Setting: Continuing Medical Education meeting.

Participants: 451 Dutch GPs.

Main outcome measures: Answers to four multiple-choice treatment decisions in clinical vignettes of a patient with heart failure and a reduced ejection fraction. With univariable and multivariable regression analyses, respondent characteristics were related to optimal treatment decisions.

Results: Of the 451 GPs, none took four optimal decisions: 7% considered stopping statin treatment, 36% initiated β -blocker treatment at a low-dose and 4% doubled the β -blocker in the up-titration phase. Finally, for our vignette patient now also suffering from chronic obstructive pulmonary disease, 45% of the GPs continued β -blocker therapy even when they considered prescribing a long-acting β 2-agonist. While the relation between respondent characteristics and each decision was very different, none was independently associated with all four decisions. Giving priority to evidence-based medicine was independently related to stopping statin treatment and doubling the β -blocker in the up-titration phase.

Conclusions: GPs seem not to follow treatment recommendations from clinical practice guidelines in their decisions on the management of heart failure patients. The recommendations from guidelines may appear counterintuitive when statin treatment needs to be stopped when a patient feels comfortable, or when a β -blocker should be up-titrated in patients who experience more symptoms. Giving priority to evidence-based medicine is possibly positively related to difficult treatment decisions.

ARTICLE SUMMARY

Strengths and limitations of this study

► In total 451 general practitioners (GPs) participated in our clinical vignette study. Unfortunately, the statistical power of our analyses on the relation of doctor characteristics as determinants of their management decisions was strongly reduced by the very few GPs that followed recommendations from CPGs.

INTRODUCTION

Robust evidence is available about optimal management of patients with heart failure and a reduced ejection fraction (HF-REF).¹ This evidence is included in clinical practice guidelines (CPGs), that aimed to serve as up-to-date evidence summaries, to provide recommendations on medical decisions, to prevent unwarranted interdoctor variation and to promote best practice. However, counterintuitive recommendations, that is, those in conflict with prior knowledge or common clinical practice, or those which are unclear or ambiguous seem most sensitive to poor agreement, acceptance and adherence.

On the basis of evaluation and reviews of patient records and insurance claims previous studies showed that adherence to guidelines on heart failure (HF) differs largely between physicians.^{2–5} A systematic review reported that adherence to CPGs was increased among female practitioners, those of younger age, with a belief in evidence-based medicine (EBM), and with feedback by peers.⁶ Although, research has failed to show a consistent relationship between doctor characteristics and quality of care,^{3 7 8} the female sex was reported to be related to better physician's performance,⁸ and being part of a

group practice was reported to improve optimal drug prescription in patients with cardiovascular disease.^{3 7}

For any patient with cardiovascular disease, treatment with statins is generally considered useful. A fairly recent insight is that statins have only a neutral effect in patients with HF-REF.^{9 10} Although recent guidelines on HF incorporate this evidence, they fail to provide a clear recommendation on stopping statins. While they mention the 'unproven benefit' of statins, they, on the one hand, advocate not to initiate statins, but on the other hand advise neither to stop statins in patients with HF-REF, nor to consider potential interactions with polypharmacy.¹ Moreover, the willingness of a physician to stop this drug when a patient does not experience any adverse effects will probably be low. Therefore, a recommendation to stop statins in patients with HF-REF may appear counterintuitive.

While β -blockers were considered contraindicated some decades ago, they are now viewed as mandatory in HF-REF. The large body of evidence on the effectiveness of β -blockers in HF-REF has been incorporated in HF guidelines since 2001. Nevertheless up-titration of β -blockers has not been adopted, in particular by general practitioners (GPs).^{2 3} Moreover, qualitative studies showed that GPs tend to refrain from initiation and up-titration of β -blockers because of fear of adverse effects and interactions with comorbid conditions.^{11 12}

During β -blockers up-titration an initial reduction in exercise tolerance can be expected, and this certainly may have had an impact on the slow adoption of β -blocker treatment by physicians.¹³ Therefore, the currently available guidelines may appear counterintuitive when they recommend up-titration of β -blockers irrespective of both symptom severity and patient's water or salt retention.²⁻⁵

A recent shift in management is that cardioselective β -blockers are no longer considered contraindicated in chronic obstructive pulmonary disease (COPD)^{14 15} as they were a decade ago. Since 2008, HF guidelines recommend not to withhold cardioselective β -blockers when indicated¹⁶ and guidelines on COPD have followed this recommendation since 2011.¹⁷ Still, both guidelines do not provide clear recommendations on combining β -blockers with β_2 -agonists in patients with HF and concomitant COPD.

Clinical vignette surveys showed to be especially effective and efficient for the evaluation of interdoctor variation in treatment decisions.^{18 19} We therefore used a clinical vignette mimicking four common treatment decisions for an imaginary patient with HF-REF.

We thereby concentrated on CPG recommendations on the management of patients with HF regarding prescribing statins and β -blockers which for different reasons can be considered as counterintuitive, that is, in conflict with common practice or prior knowledge, or can be considered as unclear. We also assessed whether GP characteristics were related to optimal treatment decisions.

METHODS

Setting and participants

We collected data during a 2-day CME meeting for GPs in December 2010 in which a wide range of clinical topics were addressed, attracting GPs nationwide (Boerhaave meeting, Leiden, the Netherlands). The verbal introduction to the survey informed the GPs that our survey was about their management of HF; that a vignette with limited response options was used to collect the data using an electronic voting system; that the data they provided would be treated anonymously during collection, analyses and reporting. They had about 10 min to decide on their participation. We used an electronic voting system that prevented respondents from going back and forth between questions, and allowed a maximum of 60 s to respond. Participating GPs were instructed to make decisions that reflect their actual practice. To prevent carry-over effects, that is, making interdependent inappropriate decisions, the best treatment decision was provided after each question but before the next information block and question. Data were collected anonymously.

Vignettes

We presented four information blocks on consecutive encounters with an imaginary patient with HF-REF (see online supplementary text box). Each information block included details on signs, symptoms, additional investigations and diagnosis to arrive at the treatment decision in accordance with the CPG recommendations. At the end of each information-block we asked a multiple-choice question with four or five decision options for the treatment decision. Thereafter we asked them to indicate their level of confidence on the chosen treatment decision. The Dutch College of General Practitioners informs all GPs about their new and updated CPGs. CPGs are made available in print and through free online access at the website of the College.

In accordance with the evidence-based CPG treatment recommendations the decision for the first patient encounter was to stop statins,^{9 10} irrespective of the fact that the patient did not experience any adverse effects. For the second patient encounter, this was to add a low-dose β -blocker to ACE inhibitors and diuretics in a clinically stable patient.^{16 20} At the third encounter, doubling the β -blocker dosage was in accordance with the evidence-based CPG treatment recommendations, and not contraindicated because of the relapse in exercise tolerance.^{16 20} At the fourth encounter for a patient with HF-REF and COPD, not withholding a cardioselective β -blocker irrespective of prescribing a long-acting inhalation β_2 -agonist was the decision in accordance with the evidence-based CPG treatment recommendations.^{15 16 20}

Characteristics of the respondent

On the basis of a review of the literature we considered age, sex, years in practice, practice size, current professional tasks and responsibilities, experience with doing

research, decision-making style, first acquaintance with EBM, priority given to EBM, sources consulted for keeping up-to-date with evidence and perceived EBM performance of themselves and colleagues, as relevant putative determinants for quality of patient care and adherence to evidence-based CPGs.^{3 6–8 21} We asked information from participating GPs about this, together with their confidence and preferred information sources for arriving at each treatment decision.

Vignette pretesting

Sixty-eight GPs participated in pretest sessions in which they judged that the questions and the imaginary patient scenario were sufficiently genuine and representative of the actual clinical practice. We also ensured that the wording was unambiguous. In addition, they did not encounter hidden prompts towards socially desirable answers nor cues to the evidence-based CPG treatment recommendations. Based on the pretest sessions we finalised the vignette.

Data analyses

The respondent characteristics on priority given to EBM, own EBM performance, colleagues' EBM performance and confidence on each treatment decision—all with a 9-point response scale—were dichotomised: 1–6 for low/poor and moderate/modest, and 7–9 for high/excellent. The scores for decision-making style—with a 9-point response scale—were dichotomised: 1–6 intuitive or mixed intuitive and rational, and 7–9 rational.

We summed the four treatment decision confidence scores and dichotomised them in low-to-moderate (1–24), and high (25–36) overall confidence. We dichotomised the treatment decisions into those in accordance with CPG treatment recommendations or those that are not. Before applying multivariate analysis, we assumed missing decisions to reflect 'wrong' decisions, and used unconditional median imputation for missing respondent characteristics. With multivariate logistic regression analyses we explored which GP characteristics were related to each of the decisions in accordance with CPG treatment recommendations. We included GP characteristics which had a univariate relationship with at least one treatment decision in accordance with CPG treatment recommendations (p value ≤ 0.20). For the final multivariate model per treatment decision, we retained respondent characteristics with a p value ≤ 0.10 . We used SPSS, V.20.0 for Windows (SPSS Inc, Chicago, Illinois, USA) for all data analyses.

RESULTS

We obtained data from 451 respondents, that is, 72% of the 623 GPs who signed the attendance list of the CME meeting. There were 10% missing data for decision points 1 and 4, 2% missing data for decision point 2, 5% for decision point 3. Seven respondent characteristics had fewer than 4% missings, and five characteristics had

4% or more missings, with a maximum of 10% for gender.

The respondents resembled the Dutch GP population; most were men, about half were older than 50 years of age, and women were over-represented in the younger age categories. Most respondents had been in practice for more than 10 years, practiced alone or with one other GP, did not train GP registrars, and had no research experience (table 1). Respondents preferred reading journals (30%), following CME (28%), and consulting Dutch GP guidelines (27%) for keeping

Table 1 Baseline characteristics of the 451 responding GPs

Doctor characteristics	N (%)
Sex*	
Male	266 (62)
Female	162 (38)
Age (years)†	
21–50	189 (47)
51+	217 (53)
Years in practice*	
0–20	218 (50)
21+	219 (50)
Practice size*	
Solo practice	104 (24)
Duo or group practice	334 (76)
Current job*	
GP only	306 (72)
GP plus other‡	120 (28)
Research experience*	
No	341 (78)
Yes	99 (22)
First acquaintance with EBM*	
Medical school or residency	234 (53)
After GP certification, while doing research	208 (47)
Priority given to EBM in own daily practice*	
Low or moderate	239 (55)
High	193 (45)
Own EBM performance*	
Poor or moderate	253 (58)
Excellent	186 (42)
EBM performance of GP colleagues*	
Poor or moderate	272 (62)
Excellent	164 (48)
Decision-making style*	
Strong intuition or mixed	305 (70)
Strong ratio	128 (30)
Preferred source§ for keeping up-to-date with evidence*	
Oral reference	139 (32)
Written reference	302 (68)

Missing data.

* $<5\%$.

†Between 5% and 10%.

‡Other, that is, registrar supervision, research, education, management.

§Oral reference, that is, colleagues, specialists, pharmaceutical reps or CME. Written reference, that is, internet, guidelines, handbooks or journals.

CPG, clinical practice guideline; EBM, evidence-based medicine; GP, general practitioner.

up-to-date with evidence. About 40% of respondents gave EBM high priority, and rated their own EBM performance as excellent (table 1).

Treatment decisions

The number of optimal treatment decisions was low for all four decisions (table 2). While 195 GPs (43%) had high confidence about their first decision, 32 (7%) respondents considered stopping statin treatment. For the second decision, 171 GPs (38%) were highly confident, while 163 GPs (36%) decided to initiate a β -blocker at an appropriate low dose. While 124 GPs (27%) were highly confident in their third decision, 17 (4%) decided to increase β -blocker dose to target for maximum tolerated dose irrespective of the fact that the patient had a relapse in exercise tolerance. For the fourth decision, 79 GPs (18%) were highly confident with their decision, while 202 (45%) decided to continue β -blockers even when a long-acting inhalation β_2 -agonist was considered necessary for the patient with HF-REF and COPD. Another 32% of GPs decided that β -blockers could not be combined with β_2 -agonists and therefore continued β -blockers with an inhalation anticholinergic.

None of the participants responded optimally to all four decision points, 9 (2%) GPs decided favourably for three decision points, 86 (19%) twice and 215 (48%) once. Finally, 141 GPs (31%) never decided optimally.

Impact of respondent characteristics on treatment decisions

The distribution of appropriate treatment decisions for GP characteristics is shown in table 3. Univariate analysis (data not shown) revealed that *age*, *sex* (male), *number of years in practice* (more than 20 years), *research experience* (none), *first acquaintance with EBM* (after medical school or residency), *EBM performance of GP colleagues* (low or moderate), *giving priority to EBM* (high) and *overall confidence across four treatment decisions* (high) were all related to both the decision to stop statin treatment and the decision to double β -blocker dosage.

Table 4 shows the results of the multivariate analysis for GP characteristics with a univariate relationship with at least one decision in accordance with CPG treatment

recommendations. These multivariate analyses showed that *age* was independently associated with three decisions; *number of years in practice*, *first acquaintance with EBM*, *priority given to EBM* and *EBM performance of GP colleagues* were each associated with two decisions. Only high *priority given to EBM* show a significant independent association with two decisions in a consistent direction: stopping statin treatment and doubling β -blocker dosage. The other doctor characteristics assessed during multivariate analysis were related to one treatment decision (table 4). None of the doctor characteristics was related to doctor compliance with CPG recommendations on all four treatment decisions, neither during univariate nor multivariate analysis.

DISCUSSION

Most treatment decisions by GPs on prescribing statins and β -blockers in a clinical vignette patient with HF-REF were not in accordance with recommendations from available CPGs. While in particular, adherence to recommendations which may appear counterintuitive, that is, conflicting with common practice or prior knowledge, will be low, weak recommendations seem most sensitive to poor agreement, acceptance and adherence. Moreover, unclear or ambiguous recommendations clearly will give rise to non-adherence.

None of the relevant doctor characteristics was related to doctor compliance with CPG recommendations on all four treatment decisions. But encouragingly, giving high priority to EBM in clinical practice was associated with the decision to stop statins as long as the patient does not mention any adverse effect, and with the decision to up-titrate β -blockers while the patient experienced a commonly associated and therefore predictable relapse in exercise tolerance.

Some aspects of our findings deserve further consideration. First, our study setting (Boerhaave) may have been somewhat artificial and this may have contributed to the low number of GPs taking decisions in accordance with the CPG recommendations. Still, our approach to data collection, notably clinical vignette surveys with self-reported responses, has been shown to be effective and efficient in evaluating variation in

Table 2 Number (%) of respondents with CPG-based treatment decisions

	Decision 1 Stop statin	Decision 2 Start low dose β -blocker	Decision 3 Double dose of β -blocker	Decision 4 Continue β -blocker in COPD
CPB-based decision	32 (7)	163 (36)	17 (4)	202 (45)
Confidence per treatment decision†				
High	195 (43)	171 (38)	124 (27)	79 (18)
Moderate or low	256 (57)	280 (62)	327 (73)	372 (82)
Mean (sd)	6 (2)	6 (2)	5 (2)	4 (2)

*The percentages are calculated based on a total number of 451 respondents.

†Confidence per treatment decision: the nine-point ordinal scale ranging from 1 (lowest possible confidence in appropriateness of decision) to 9 (highest possible confidence in appropriateness of decision) was dichotomised to high (7–9), moderate or low (1–6).

COPD, chronic obstructive pulmonary disease; CPG, clinical practice guideline; EBM, evidence-based medicine.

Table 3 Proportion of respondents with CPG-based treatment decisions per doctor characteristic

Doctor characteristic	Status	N	Decision 1	Decision 2	Decision 3	Decision 4
			Stop statin Per cent	Start low dose β-blocker Per cent	Double dose of β-blocker Per cent	Continue β-blocker in COPD Per cent
Sex	Male	266	9	42	5	43
	Female	162	5	29	2	47
Age (years)	21–50	189	4	37	5	47
	51+70	217	11	36	3	44
Years in practice	0–20	218	5	37	2	43
	21+	219	9	36	5	44
Practice size	Solo practice	104	20	98	11	118
	Duo or group practice	334	2	17	2	21
Current job	GP	306	8	49	5	56
	GP plus	120	4	8	0	13
Research experience	No	341	8	39	4	45
	Yes	99	5	27	2	44
First acquaintance to EBM	Med school/ residency	234	12	65	6	79
	During research	208	1	4	0	3
Priority given to EBM	Low or moderate	239	5	38	3	47
	High	193	9	36	6	44
Own EBM performance	Poor or moderate	253	8	37	3	43
	Excellent	186	6	35	4	44
EBM performance of GP colleagues	Poor or moderate	272	8	40	5	44
	Excellent	164	5	30	2	45
Decision-making style	Intuitive or mixed	305	8	36	3	43
	Rational	128	5	38	5	48
Confidence per treatment decision	Low or moderate	274	7	30	4	60
	High	114	11	71	5	30
Preferred source for keeping up-to-date	Oral reference†	139	10	34	3	44
	Written reference†	302	6	37	4	43

†Oral reference, that is, colleagues, specialists, pharmaceutical reports or CME. Written reference, that is, internet, guidelines, handbooks or journals.

COPD, chronic obstructive pulmonary disease; CPG, clinical practice guideline; EBM, evidence-based medicine; GP, general practitioner.

treatment decisions.^{18 19} Moreover, our use of multiple-choice response options, rather than an open-ended format, may have resulted in either or both an underestimation of actual practice variation¹⁹ and overestimation of doctor performance.²²

Second, numerous participating GPs may have been reluctant to stop statins when a patient feels comfortable with them (decision 1), while many were hesitant to initiate β-blocker treatment (decision 2) or to up-titrate β-blocker to the recommended dose, even if the complaints of patients turn out to show no contraindication for this (decision 3). Furthermore, many turned out to be rather cautious to combine β-blockers with a long-acting inhalation β₂-agonist in the management of patients with HF-REF and COPD (decision 4).

Third, our vignettes concern CPG recommendations for the management of patients with HF-REF which, to

some extent and for different reasons, may appear counterintuitive or can be considered ambiguous or unclear. Therefore, one might question whether and when it is appropriate for a GP to follow CPG recommendations in the management of patients with HF-REF. While the Dutch and ESC guidelines clearly recommend not to initiate statins for patients with HF-REF, they do not advise to stop.^{1 16 20} We think, however, that continuing a drug that is not shown to be beneficial is a waste of money. Particularly in patients with HF-REF where polypharmacy is often seen, careful medication management is justified in order to prevent harm or interactions.

The evidence on the effectiveness of β-blockers for HF-REF has been available for more than a decade,^{23–29} and their careful up-titration is advocated in the available CPGs on HF.^{16 20} Still, previous qualitative studies

Table 4 Independent associations (multivariate OR and their 95% CI) between doctor characteristics (n=451 GPs) and CPG-based treatment decisions

	Decision 1 Stop statin	Decision 2 Start β -blocker at low dose	Decision 3 Double dose of β -blocker	Decision 4 Continue β -blocker in COPD
Sex				
Male		–		
Female		0.58 (0.37; 0.92)		
Age (year)				
21–50	–		–	–
51+	2.13 (0.90; 5.01)		0.18 (0.04; 0.72)	0.60 (0.37; 0.98)
Years in practice				
0–20			–	
21+			6.15 (1.49; 25.3)	
First acquaintance with EBM				
Medical school/residency		–		–
Afterwards or during research		0.67 (0.43; 1.04)		1.64 (1.01; 2.66)
Priority given to EBM				
Low or moderate	–		–	
High	1.70 (0.77; 3.74)		2.88 (0.94; 8.90)	
EBM performance of GP colleagues				
Poor or moderate		–	–	
Excellent		0.57 (0.37; 0.88)	0.36 (0.10; 1.31)	
Confidence in treatment decision				
Low or moderate		–		
High		2.27 (1.49; 3.46)		
Overall confidence across four treatment decisions				
Low or moderate				–
High				0.91 (0.60; 1.36)
Preferred source for keeping up-to-date				
Oral reference*	–			
Written reference*	2.41 (1.10; 5.31)			

*Overall confidence across treatment decisions: sum of confidence scores of all four treatment decisions. In 14% of the participants there was one or more of the four confidence scores missing.

COPD, chronic obstructive pulmonary disease; CPG, clinical practice guideline; EBM, evidence-based medicine; GP, general practitioner.

have shown that GPs were unfamiliar with their beneficial effects and poorly adhered to the latest guidelines with respect to β -blockers.^{11 12} While β -blocker intolerance in HF-REF is very low,^{5 11 12} GPs are hesitant to prescribe β -blockers because of individual prior negative experiences and their concerns about harmful effects.¹¹ While CPGs discuss continuation of β -blockers, preferably cardioselective ones in patients with HF-REF and COPD, they provide no clear recommendation about combining β -blockers with β_2 -agonists.^{16 20} Combining β -blockers and β_2 -agonists may seem counterintuitive, but adverse effects are very rare.^{14 15} Certainly, GPs may have been confused by contradictory recommendations from current (ie, up to 2011) guidelines in cardiology advocating not to refrain from β -blockers in patients with COPD, and guidelines in pulmonology discussing β -blockers as (relatively) contraindicated in patients with COPD. It should be noted that after data for this study had been collected, the pulmonology guidelines that had been issued in 2011 recommend β -blockers in patients with HF as well as COPD.¹⁷ Still, in CPGs conclusions on the evidence and the recommendations

based thereupon should be stated more transparently, and should be separated more explicitly.

Finally, although our findings on the poor adherence to CPG recommendations may have important implications for patient care, they may have been subject to chance. Moreover, despite our large sample size, the low number of decisions in accordance with CPG recommendations decreased statistical power to identify characteristics related to adherence to CPG recommendation. Still, the associations between doctor characteristics and adherence to CPG recommendations that have been reported to date were weak and lacked consistency across studies.^{3 7 8}

While the CPG recommendations for the management of patients with HF-REF are unclear or ambiguous, or may appear counterintuitive, we conclude that GPs appear not to follow evidence-based CPG recommendations in their decisions on prescribing statins and β -blockers for patients with HF-REF. None of the relevant respondent characteristics were consistently associated with decisions in accordance with CPG recommendations. Encouragingly, giving high priority to

EBM in clinical practice was related to adherence to the guidelines for more decisions.

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