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ORIGINAL ARTICLE

Delay in cardiology consultation after primary care physician referrals in heart failure: Clinical implications

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Abstract

Aims To investigate the association between the elapsed time to cardiology care following a primary care physician (PCP) referral and 1 year outcomes among patients with heart failure (HF).

Methods Data from electronic medical records at our institution encompassing all PCP referrals to cardiology consultation from 2010 to 2021 (N = 68 518) were analysed. Of these, 6379 patients had a prior diagnosis of HF. Using a Cox regression model for hospitalization and mortality outcomes, the association between delay time in cardiology care post-PCP referral and 1 year outcomes was examined, adjusting for age, gender and comorbidities.

Results A significant increase in 1 year mortality rates with delayed cardiology care was observed for each day: all-cause (0.25%), cardiovascular (CV) (0.13%) and HF (0.11%). In multivariate analysis, continuous delay to consultation was independently associated with higher risk of all-cause [hazard ratio (HR): 1.02; 95% confidence interval (CI) (1.01–1.02); $P < 0.01$], CV [1.01 (1.00–1.02); $P < 0.01$] and HF mortality (HR: 1.01; 95% CI 1.00–1.03; $P < 0.01$). Patients attended in the 25th quartile of time delay (<2 days) had significantly lower mortality and HF readmission rates [1.21 (1.10–1.33); $P < 0.01$] as compared with patients in the 75th quartile (>14 days).

Conclusions Delay in cardiology assistance following a PCP referral among patients previously diagnosed with HF was associated with increased in all-cause, CV, and HF mortality at 1 year.

Keywords ambulatory healthcare; gender differences; heart failure; primary care referral

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Introduction

Managing heart failure (HF) represents a significant challenge due to the high incidence of worsening HF episodes requiring intensified ambulatory treatment, emergency department visits and hospitalizations, ultimately leading to disease progression, deterioration in functional capacity and death.[1] Early clinical identification of these decompensations is crucial to prevent further advancement of HF. Typically, such cases are initially evaluated by primary care physicians (PCPs), who often refer patients to specialist care, such as cardiologists or internal medicine specialists. However, there remains a specific gap in understanding the impact of delayed cardiology consultation post-PCP referral on 1 year outcomes, particularly regarding gender differences.

Delay in seeking care among patients experiencing worsening HF symptoms has been significantly associated with an increased risk of rehospitalization and mortality following discharge.[2] Accordingly, the current European Society of Cardiology HF Clinical Guidelines recommend an early follow-up visit within 1–2 weeks after discharge to evaluate signs of congestion, assess drug tolerance and start and/or titrate

evidence-based therapy.[3] Hospitals and healthcare providers have implemented early outpatient follow-up strategies (typically within 7–14 days of HF discharge) to mitigate readmissions, resulting in lower 30 day readmission rates.[4] Edmonston et al. demonstrated an association between specialist and PCP visits in the immediate post-discharge period and improved 90 day readmission and mortality rates in certain high-risk groups of HF patients.[5] A healthcare system oriented towards facilitating early management of worsening episodes, including prompt specialist care following a PCP referral, is imperative to prevent more advanced clinical deterioration and improve clinical outcomes.[6] However, the relationship between delay in specialist care (cardiologist) following a PCP referral in HF patients and subsequent cardiac events (specifically rehospitalization or death) remains unknown. Implementation of electronic consultation system in our institution has proven safe and effective, leading to reduced waiting times due to a significant reduction in the need for urgent care, hospital admissions and mortality among a high-risk patient cohort.

Addressing the healthcare needs of women with suspected or confirmed cardiovascular disease is a global health challenge. Despite a continuous decrease in age-adjusted mortality rates for these conditions over recent decades, the decline has been less pronounced in women compared with men.[7] Ongoing debates persist regarding potential inequities in access to care, diagnosis, and disease management, contributing to gender disparities in outcomes among female patients with suspected or confirmed cardiovascular conditions.[8] Previous studies have shed light on the influence of gender on the management and outcomes of HF, reinforcing the need to analyse gender differences in the context of delayed cardiology consultation. For example, a recent review by Lala et al. revealed significant disparities between men and women in the prevalence, traditional and gender-specific risk factors, pathophysiology and response to pharmacological treatment and device-based therapies in HF.[9] These disparities in care provision could potentially impact the long-term clinical outcomes of female HF patients. Therefore, considering gender differences is paramount when evaluating the impact of delayed cardiology consultation on HF patients.

Using data from the centralized electronic medical record of a healthcare area (IANUS), we investigated the association between the elapsed time to response to cardiology e-consultation and 1 year outcomes in patients with an established HF diagnosis. Additionally, our secondary objective involved analysing the influence of gender on these outcomes.

Methods

Patients with a prior diagnosis of HF referred from PCPs to the Cardiology Department between 2010 and 2021 were analysed. Meticulously selected demographic and clinical variables were assessed, along with relevant outcomes during the first-year post-cardiology consultation.

The investigation conforms with the principles outlined in the Declaration of Helsinki. The study was approved by the local ethics committee on 23 March 2022, under reference number 2021/496. Methods of extraction and global results have been previously reported.[10]

Patients

We analysed patients with a previous diagnosis of HF referred to the cardiology department (CD) from PCPs between the years 2010 and 2021 in our healthcare area, which covers 446 603 individuals. During this period, we received 68 518 electronic referrals from PCPs. Out of these referrals, 6379 patients had a prior diagnosis of HF, and these were the patients we included in our analysis for the study's objectives with no other exclusion criteria applied to the patient selection process.

Variables

In our study, we meticulously selected variables to encompass crucial aspects of patient demographics, clinical characteristics and healthcare utilization relevant to our research objectives. Variables such as age, gender and comorbidities were chosen due to their well-established associations with HF outcomes. Additionally, we included variables such as referral date, date of cardiology consultation, delay between referral and CD consultation (calculated as the days between the date of referral and the date of cardiology answer in the electronic consultation), prior hospital admissions, emergency department visits and the number of follow-up consultations during the first year following CD consultation because of their significance in investigating the relationship between delayed cardiology consultation and 1 year outcomes.

Outcomes assessed during the first-year post-cardiology consultation were predefined based on clinical relevance. These outcomes were selected to capture important aspects of HF progression, including hospital readmissions, mortality rates [all-cause, cardiovascular (CV) and HF-related] and other relevant clinical events.[10,11] As we used national health statistics system to obtain the cause of mortality, 6% of the mortality was unknown.

Statistics

Quantitative variables with a normal distribution are presented as mean (standard deviation), while those without are presented as median [inter-quartile range (IQR)]. In this

study, ANOVA and the non-parametrical Kruskal–Wallis test were employed to compare means or medians across multiple groups, respectively, for continuous variables such as wait times or clinical outcomes. Specifically, these statistical methods were applied when analysing the differences in wait times and clinical outcomes among patients referred for cardiology consultation. Bivariable analyses between genders included the χ^2 test and Student's *t*-test, after confirming the normal distribution assumption for the latter, to study the association between qualitative and quantitative variables, respectively.

For the analysis of time-to-event data, Cox regression models were employed after confirming the proportional hazards assumption via the Schoenfeld residual test. Time to cause-specific mortality was censored at the time of death if the patient died of another cause. These models were utilized to investigate the association between the elapsed time to response to cardiology e-consultation and 1 year outcomes in patients with an established HF diagnosis. In terms of model evaluation, Harrell's *C*-statistic was calculated to assess the discriminative ability of the Cox regression models in predicting outcomes such as rehospitalization or death. Calibration of the models was evaluated using the Gronnesby and Borgan test to ensure that the predicted probabilities aligned well with the observed outcomes. The time elapsed to CD consultation was expanded using fractional polynomials prior to entry into regression models to avoid assuming linearity of effect. A power of 1.5 was selected as it had highest the area under the curve and lowest Bayesian information criterion for all outcomes. To further assess the effect of time delay, we assessed the difference between 25th (<2 days) and 75th (>14 days) quartiles of time delay.

By employing these statistical methods and evaluation techniques, we aimed to conduct a robust analysis of the data, providing reliable insights into the association between delayed cardiology consultation and 1 year outcomes in patients with HF.

We conducted all statistical analyses using IBM SPSS Statistics version 28 (IBM Corp., Armonk, NY, USA) and STATA version 14.3 (StataCorp, College Station, TX, USA).

Results

Baseline clinical characteristics

A total of 6379 referrals from 2010 to 2021 were included, with 3123 women (48.9%). Women were older than men ($P < 0.001$). *Table* 1 presents the baseline epidemiological characteristics and comorbidities for both genders.

Compared with men, women exhibited a higher prevalence of hypertension ($P < 0.001$) and lower prevalence of diabetes ($P < 0.001$), ischaemic heart disease ($P < 0.001$), peripheral arterial disease ($P < 0.001$) and cancer ($P < 0.001$). Men had a higher history of previous HF hospitalizations ($P < 0.001$) while the previous admissions due to ischaemic heart disease were similar in both genders ($P = 0.120$).

The median elapse time to assistance in CD was 5 (IQR 2–11) days, with 53.4% of patients receiving assistance within <7 days, and no difference was observed between genders

Table 1 Baseline epidemiological characteristics, comorbidities and healthcare data in both genders.

	Total (n = 6379)	Men (n = 3256)	Women (n = 3123)	P
Age (mean [*SD*])	77.6 [9.8]	76.0 [10.2]	79.3 [9.1]	<0.001
Comorbidities				
Hypertension (%)	75.9%	73.9%	78.0%	<0.001
Diabetes mellitus (%)	33.4%	36.0%	30.7%	<0.001
IHD (%)	19.5%	23.9%	14.9%	<0.001
Atrial fibrillation (%)	46.3%	45.8%	46.8%	0.399
Cerebrovascular disease (%)	6.9%	7.1%	6.6%	0.491
Peripheral arterial disease (%)	8.1%	10.1%	6.0%	<0.001
Cancer (%)	12.4%	15.7%	9.0%	<0.001
Previous admissions by IHD				
Admissions <1 year (%)	12.4%	13.5%	10.5%	0.120
Previous admissions by HF				
No admissions (%)	52.4%	49.5%	55.4%	<0.001
Previous admissions (%)	47.7%	50.4%	44.6%	
Admissions <1 year (%)	17.7%	18.2%	17.0%	<0.001
Admissions >1 year (%)	30.0%	32.2%	27.6%	
Delay time to cardiology consultation (median [inter-quartile range])	5 [2–14]	5 [2–13]	5 [2–15]	0.09
≤7 days (%)	53.4%	54.4%	52.4%	<0.001
≥8 days (%)	46.6%	45.6%	47.6%	
Cardiology consultation at 1 year (mean [*SD*])	2.13 [3.59]	2.49 [3.99]	1.75 [3.07]	<0.001
Emergency department visits at 1 year (%)	70.7%	70.8%	70.7%	0.892

Abbreviations: IHD, ischaemic heart disease; HF, heart failure; *SD*, standard deviation.

Table 2 Hospital admissions and mortality in both genders.

	Total (n = 6379)	Men (n = 3256)	Women (n = 3123)	P
Any-cause admissions (%)	38.0%	41.3%	34.6%	<0.001
Any-cause admissions rate (mean [*SD*])	0.64 [1.08]	0.74 [1.20]	0.54 [0.94]	<0.001
CV admissions (%)	20.2%	23.0%	17.2%	<0.001
CV admissions rate (mean [*SD*])	0.26 [0.61]	0.31 [0.65]	0.22 [0.55]	<0.001
HF admissions (%)	7.8%	9.3%	6.3%	<0.001
HF admissions rate (mean [*SD*])	0.10 [0.39]	0.11 [0.42]	0.08 [0.36]	<0.001
Admissions causes				
HF (%)	26.8%	26.9%	26.7%	<0.001
Respiratory infection (%)	14.0%	14.8%	12.8%	
IHD (%)	4.4%	5.7%	2.5%	
Cancer (%)	4.1%	4.6%	3.4%	
Valvular disease (%)	3.6%	3.2%	4.0%	
Chronic kidney disease (%)	2.8%	3.0%	2.4%	
Atrial fibrillation (%)	2.0%	1.8%	2.3%	
Embolic ictus (%)	0.6%	0.5%	0.8%	
Haemorrhagic ictus (%)	0.5%	0.5%	0.5%	
Ischaemic ictus (%)	0.2%	0.1%	0.3%	
Any-cause deaths (%)	11.1%	12.4%	9.7%	0.001
CV deaths (%)	4.9%	5.0%	4.7%	0.581
HF deaths (%)	3.1%	3.3%	3.0%	0.574
Death causes				
HF (%)	25.1%	26.0%	24.1%	<0.001
Cancer (%)	10.1%	12.4%	7.5%	
Respiratory infection (%)	8.7%	8.9%	8.3%	
IHD (%)	8.1%	9.8%	6.0%	
Valvular disease (%)	3.3%	2.7%	3.9%	
Atrial fibrillation (%)	2.5%	2.0%	3.2%	
Ischaemic ictus (%)	2.3%	2.0%	2.6%	
Sepsis (%)	2.0%	1.8%	2.3%	
Peripheral arterial disease (%)	1.9%	1.7%	2.2%	
Chronic kidney disease (%)	1.6%	1.8%	1.3%	

Note: Admissions and deaths were estimated at 1 year after cardiology consultation.
Abbreviations: CV, cardiovascular; HF, heart failure; IHD, ischaemic heart disease.

(P = 0.09). Men had a higher number of cardiology follow-up consultations ($P < 0.001$), but there were no differences in emergency department visits (P = 0.892) (*Table* 1).

Mortality after cardiology consultation

One-year follow-ups were available for all patients. The all-cause mortality rate was 11.1%, CV mortality was 4.9%, and HF mortality was 3.1%. All-cause mortality was lower in women [9.7% vs. 12.4%; hazard ratio (HR) 0.70; 95% confidence interval (CI) 0.64–0.76; $P < 0.001$]; however, no differences were observed in CV mortality (4.7% vs. 5.0%; P = 0.58) or HF mortality (3.0% vs. 3.3%; P = 0.57) (*Table* 2).

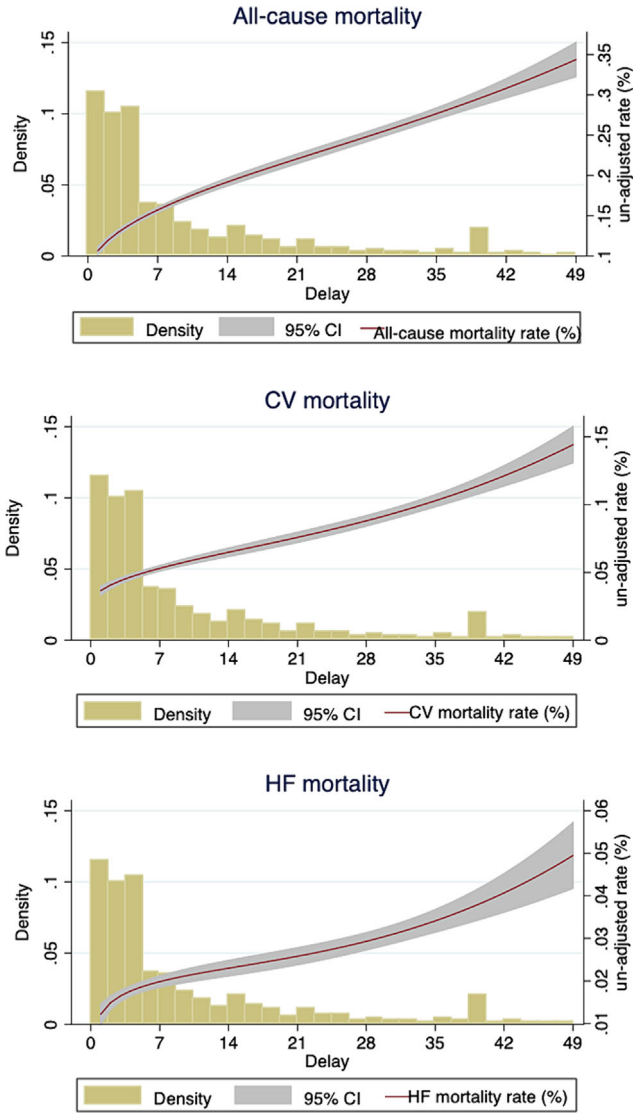
The all-cause mortality rate increased by 0.25%, CV mortality by 0.13% and HF mortality by 0.11% with the delay in time from PCP referral to cardiology care (*Figure* 1). When considering delay to consultation as a continuous variable, multivariate analysis adjusted for age, gender, diabetes mellitus, hypertension, atrial fibrillation, peripheral arterial disease and stroke revealed that elapsed time to consultation was independently associated with a higher risk of all-cause mortality (HR: 1.02; 95% CI 1.01–1.02; $P < 0.01$), cardiovascular mortality (HR: 1.01; 95% CI 1.00–1.02; $P < 0.01$) and HF mortality (HR: 1.01; 95% CI 1.00–1.03; P = 0.03) (*Table* 3 and *Figure* 2). The multivariate analyses showed that patients in the 75th quartile of time delay had significantly higher risk of mortality (HR: 1.31; 95% CI 1.18–1.44; $P < 0.01$).

Figure 3 displays the results of subgroup analysis between elapsed time to cardiology consultation and 1 year all-cause mortality without significant interaction among subgroups.

Hospitalizations after cardiology consultation

Table 2 shows the incidence of 1 year hospital admissions and mortality after cardiology consultation. The rate of hospital admissions for any cause was lower for women ($P < 0.001$), with HF-related admissions being the most frequent cause in both genders. Patients with a time delay in the lowest quartile (<2 days) had a significantly lower mortality and HF readmission rates (HR: 1.21; 95% CI 1.10–1.33; $P < 0.01$) than patients in the highest quartile (>14 days); as presented in *Figure* S1, CV readmissions were slightly higher in patients in the lowest quartile than those in the highest quartile (HR 1.00; 95% CI 0.98–1.01; P = 0.53).

Figure 1 Un-adjusted mortality rate associated with delay time to assistance in the cardiology department after primary care physician referral. The figure depicts[1] all-cause mortality,[2] cardiovascular mortality and[3] heart failure mortality rates with the density of patients for each day of delay. CI, confidence interval; CV, cardiovascular; HF, heart failure.



Multivariate analyses demonstrated an increase in all-cause hospitalizations with elapsed time to cardiology consultation in the overall population and both genders (*Table* 3).

Discussion

We investigated the association between delays in cardiology care following a PCP referral and 1 year outcomes in 6379 patients with established HF diagnosis while also considering the influence of gender. Our findings revealed a direct relationship between delayed cardiologist visits and subsequent 1 year mortality (all-cause, CV and HF related) in patients with HF referred for cardiology consultation by PCPs. In multivariate analysis, the elapsed time for cardiology care was associated with an increase in all-cause, CV and HF-related mortality at 1 year. While hospitalization outcomes showed a similar trend, statistical significance was only reached in all-cause hospitalization. Despite some differences in clinical profiles between women and men, the associations between delays in cardiology care after PCP referral and 1 year outcomes remain consistent across both genders.

To our knowledge, this is the first study to investigate how the timing after a PCP referral relates to outcomes over 1 year, while also considering gender differences, in a large cohort of HF patients. Our findings highlight the critical importance of promptly seeing a cardiologist after being referred by a PCP for patients with HF. The connections we observed between delayed cardiologist visits and increased 1 year mortality underscore the importance of prompt specialist intervention in managing HF patients. Reducing delays in cardiology care has the potential to significantly improve patient outcomes by minimizing the risk of mortality, particularly from cardiovascular causes and HF-related complications. Moreover, timely access to specialist care may reduce the need for emergency department visits and hospitalizations, thus optimizing healthcare resource utilization and potentially alleviating the burden on healthcare systems. Furthermore, by ensuring timely evaluation and management of HF patients, including initiation or optimization of evidence-based therapies, reducing delays in cardiology care can enhance the overall quality of HF management. This proactive approach aligns with current guideline recommendations for early clinical assessment (1–2 weeks) in HF patients after hospital discharge and extends these recommendations to PCP referrals for cardiology care among ambulatory HF patients. Implementing integrated care pathways for HF patients, which include quality indicators to assess care and outcomes, may also be beneficial. These pathways could involve recommendations for seamless transitions between healthcare providers, promoting continuity and cohesion in patient management. Additionally, our findings suggest that women with HF may benefit more from prompt cardiology care after a PCP referral.

Retrospective studies show that models of multidisciplinary transitional care with early clinical assessment post-hospital discharge in HF patients are associated with lower 30 day readmission rates,[11,12] although prospective randomized trials have not yet been conducted.[13]

Incorporating certain specialists (cardiologists, nephrologists, pulmonologists and endocrinologists) and PCPs into post-discharge follow-up plans may improve 90 day HF readmission and mortality in high-risk patients.[5]

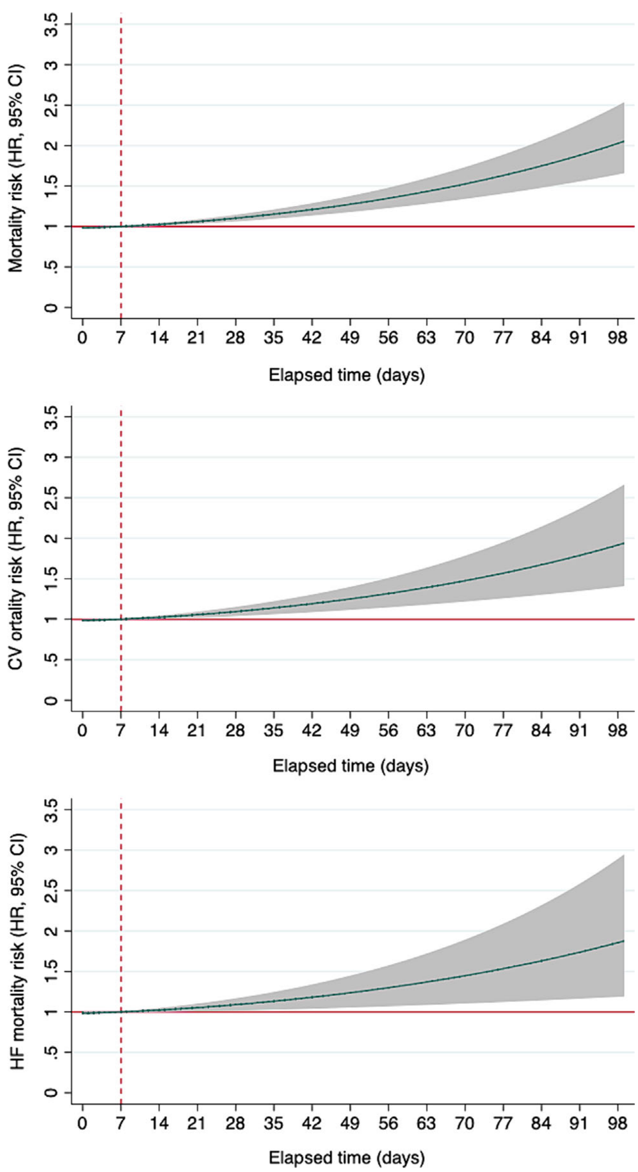
Lin et al. studied 153 patients hospitalized for HF and found that care-seeking delays in patients with worsening

Table 3 Multivariate analysis of factors linked to hospital admissions and death at 1 year after consultation.

	HF hospitalization HR (95% CI)	CV hospitalization HR (95% CI)	All-cause hospitalization HR (95% CI)	HF mortality HR (95% CI)	CV mortality HR (95% CI)	All-cause mortality HR (95% CI)
Age (each year)	***1.012 (1.002–1.022)***	1.004 (0.998–1.011)	***1.008 (1.003–1.014)***	***1.094 (1.071–1.117)***	***1.083 (1.066–1.101)***	***1.077 (1.066–1.089)***
Male gender	***1.532 (1.261–1.862)***	***1.347 (1.181–1.536)***	***1.267 (1.138–1.411)***	1.29 (0.96–1.734)	1.242 (0.976–1.579)	***1.538 (1.298–1.823)***
Comorbidities						
Arterial hypertension	1.245 (0.986–1.571)	1.124 (0.964–1.309)	1.075 (0.949–1.217)	1.227 (0.882–1.706)	***1.329 (1.019–1.736)***	***1.427 (1.185–1.718)***
Diabetes mellitus	***1.351 (1.113–1.641)***	1.132 (0.989–1.296)	***1.206 (1.078–1.348)***	1.017 (0.741–1.396)	1.038 (0.802–1.344)	1.064 (0.888–1.277)
Ischaemic heart disease	1.163 (0.929–1.457)	***1.41 (1.208–1.645)***	***1.169 (1.024–1.334)***	1.058 (0.725–1.543)	1.061 (0.79–1.426)	1.046 (0.849–1.287)
Atrial fibrillation	***1.246 (1.034–1.502)***	***1.142 (1.005–1.296)***	1.034 (0.931–1.148)	1.106 (0.827–1.479)	***1.316 (1.036–1.669)***	***1.269 (1.075–1.499)***
Cerebrovascular disease	0.819 (0.557–1.203)	1.107 (0.868–1.411)	1.219 (0.995–1.493)	0.731 (0.390–1.369)	1.215 (0.796–1.855)	1.019 (0.740–1.403)
Peripheral arterial disease	1.012 (0.732–1.401)	***1.287 (1.037–1.597)***	1.147 (0.949–1.386)	1.198 (0.728–1.973)	***1.574 (1.082–2.289)***	***1.471 (1.117–1.937)***
Cancer	***1.475 (1.069–2.033)***	1.200 (0.982–1.468)	***1.173 (1.003–1.373)***	***2.070 (1.139–3.759)***	***2.618 (1.538–4.464)***	1.199 (0.917–1.567)
Previous hospitalizations by HF						
No hospitalizations	1	1	1	1	1	1
Hospitalization <1 year	***3.659 (2.888–4.635)***	***2.892 (2.438–3.431)***	***2.421 (2.103–2.787)***	***5.944 (3.924–9.004)***	***5.106 (3.787–6.883)***	***4.352 (3.561–5.319)***
Hospitalization >1 year	***2.329 (1.852–2.928)***	***3.407 (2.94–3.949)***	***2.171 (1.926–2.446)***	***4.771 (3.217–7.075)***	***2.541 (1.879–3.437)***	***1.672 (1.366–2.045)***
Delay time (days)	1.000 (0.997–1.002)	1.000 (0.997–1.002)	***1.003 (1.001–1.004)***	***1.005 (1.000–1.010)***	***1.003 (1.000–1.006)***	***1.006 (1.003–1.009)***

Note: HR was obtained to analyse the impact of delay time per day raised to a power of 1.5. *Italic and bold letters* refer to statistically significant values.
Abbreviations: 95% CI, 95% confidence interval; CV, cardiovascular; HF, heart failure; HR, hazard ratio.

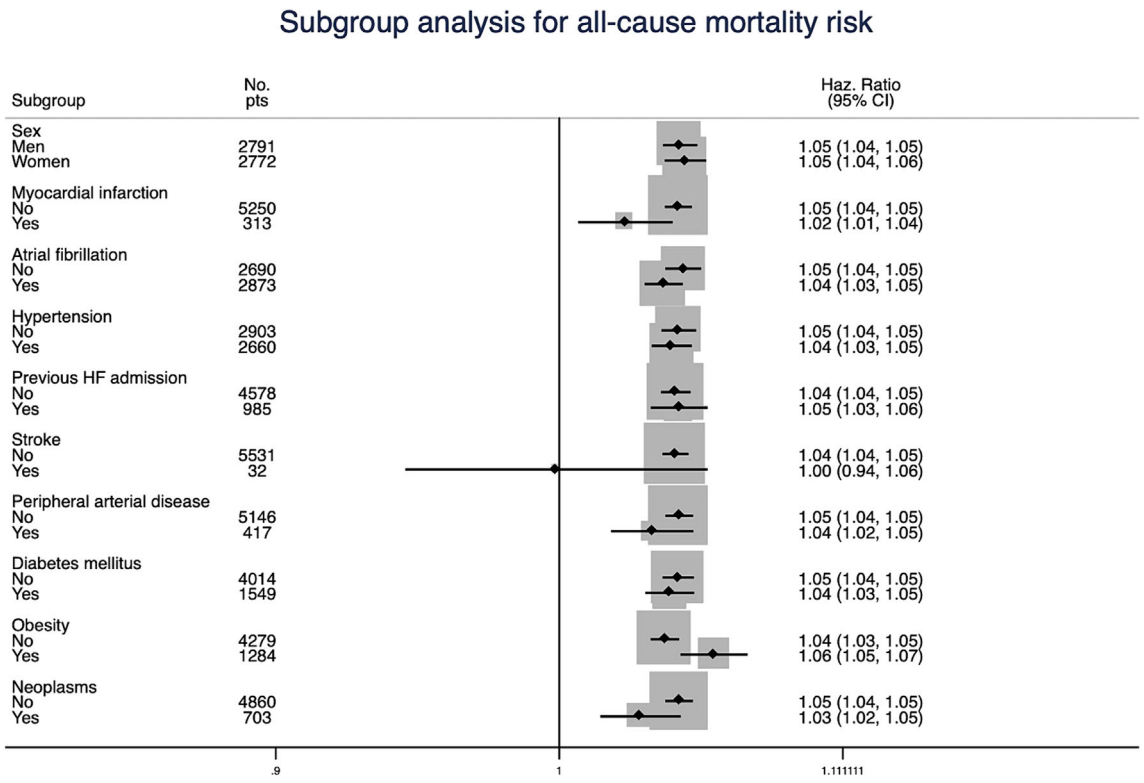
Figure 2 Risk of mortality associated with delay time to cardiology assistance after primary care referral. The risk is assessed for three categories of mortality causes[1]: all-cause,[2] cardiovascular and[3] heart failure. CI, confidence interval; CV, cardiovascular; HF, heart failure; HR, hazard ratio.



HF symptoms were significantly associated with increased risk of rehospitalization and mortality. They concluded that intervention strategies addressing functional status. Psychological state, cognitive and behavioural factors need to be considered to reduce delay and improve outcomes.[14]

Based on the STRONG-HF clinical trial results,[15,16] the recent update of ESC HF Guidelines recommends an intensive strategy and rapid up-titration of evidence-based HF treatment before discharge and during frequent and careful follow-up visits in the first 6 weeks following a HF hospitalization to reduce the risk of HF rehospitalization and death.[3]

Figure 3 Influence of delay time on all-cause mortality in each subgroup analyses group. CI, confidence interval.



Compared with usual care, participants in the intensive care group underwent up-titration of therapies to recommended dosing within 2 weeks of discharge and were followed over 2 months with at least four outpatient visits for close assessment. At 90 days, a significantly higher proportion of patients in the high-intensity group had been up-titrated to recommended doses, resulting in a significant reduction in HF hospitalizations or all-cause death.[17] This study provides randomized evidence supporting the need for an approach to initiate and optimize HF therapy rapidly with close follow-up, which is superior to usual practice where there may be a lag in, or absence of drug optimization and patients are not monitored as closely.

A recent publication evaluated the long-term effect of a transitional care model following hospitalization for HF. In the Patient-Centered Care Transitions in Heart Failure (PACT-HF) randomized controlled trial, 2494 patients (50.4% female) were randomized to close intervention versus usual care. The clinical event rate remained high during the 3 year follow-up, and the treatment effect on the primary composite outcome of all-cause death, hospital readmission or emergency visits was neutral at 3 years. Moreover, it did not improve the individual component outcomes, likely due to similar uptake of guideline-directed medical therapy in both groups.[18] These results align with recent trials such as Care OptimizatioN through PatieNt and hospital Engagement Clinical Trial for HF (CONNECT-HF) and the Get With The Guidelines HF (GWTG-HF) trials, both of which showed no benefit with transitional care quality improvement interventions. There were no differences in evidence-based medications between the groups.[19,20] The worse prognosis and optimized medical therapy may contribute to explaining the differences observed compared with the results seen in the group of patients randomized to active intervention in the STRONG-HF trial.

Despite the limitations in the design, our study describes for the first time a significative association between the delay in cardiology care after PCP referral and 1 year outcomes in ambulatory patients with HF, which underscores the urgency of addressing this issue in clinical practice. To enhance patient outcomes, several strategies and interventions could be implemented.[10] First, healthcare systems could establish streamlined referral processes and improve communication channels between PCPs and cardiologists. This could involve implementing electronic consultation systems or standardized referral pathways to expedite specialist evaluations for HF patients. Additionally, promoting interdisciplinary collaboration and care coordination between primary care and cardiology teams may facilitate timely access to specialized care. Second, interventions aimed at optimizing outpatient follow-up protocols for HF patients could be implemented. This may include scheduling early post-discharge follow-up

appointments with cardiologists or HF specialists, as recommended by current guidelines. Furthermore, leveraging telemedicine and remote monitoring technologies could enhance access to specialist care and enable proactive management of HF patients in community settings. Moreover, healthcare policy initiatives focusing on improving healthcare infrastructure and resource allocation may be necessary to support timely access to cardiology care. This could involve investing in additional cardiology clinics, expanding telemedicine services and enhancing training programmes for primary care providers in HF management. While implementing these interventions may pose logistical challenges, their feasibility and practicality could be enhanced through collaborative efforts between healthcare stakeholders, including policymakers, healthcare administrators, clinicians and patients. By prioritizing strategies to address delays in cardiology care, healthcare systems can improve patient outcomes, optimize resource utilization and ultimately enhance the quality of HF management in clinical practice.

An improved interdisciplinary and cooperative care model in women's health has recently been suggested as an attractive approach to address cardiovascular health inequalities between women and men linked to modifiable risk factors and social and healthcare systems determinants of health.[21–23] Women with cardiovascular pathologies, including HF, continue to experience higher patient and system delays and receive less aggressive invasive treatment and pharmacotherapies compared with men.[24,25]

However, we recognize some limitations in our study. We conducted our analysis without regard to the phenotypical classification of HF based on left ventricular ejection fraction, and we were unaware of the pharmacological treatment that the patients were receiving.

Additionally, our data are retrospective, and while we are aware of all deaths that occurred during the follow-up period, in a few cases, it was not possible to ascertain the exact cause of death, potentially influencing some of our findings. Furthermore, the diagnosis of HF in patients who had never been hospitalized was based on codified information in the electronic health record, which we could not clinically corroborate. Moreover, we lacked data on any visits that some patients may have made to private healthcare providers, which could also impact our results. Nevertheless, we believe these limitations are insufficient to dismiss our experience with a large cohort of ambulatory patients with an established HF diagnosis referred by PCPs for cardiology consultation. These characteristics make our data clinically relevant and valuable for healthcare management purposes. We even conducted a satisfaction survey among clinicians and patients, the results of which indicate that a healthcare model that includes telemedicine is well accepted.[10] To address these limitations and further strengthen the findings, future research could focus on prospective studies to validate the observed associations. Additionally, exploring additional factors contributing to delays in cardiology care, such as patient-specific barriers or healthcare system factors, could provide a more comprehensive understanding of the issue. Furthermore, investigating the impact of interventions aimed at reducing delays in cardiology care on patient outcomes and healthcare resource utilization would be valuable for informing clinical practice and healthcare policy.

In conclusion, our study provides evidence for the first time on the associations between elapsed time to cardiology care after PCP referral and outcomes in patients with HF. Our study contributes significantly to our understanding of the repercussions of delayed cardiology care on HF outcomes. By highlighting the consistent associations between delayed care and adverse outcomes across genders, we emphasize the critical need for targeted interventions to address this issue. Our findings underscore the urgency of extending guideline-recommended care delays beyond post-hospital discharge to PCP referrals for cardiology consultation, thereby enhancing the evaluation of HF management programmes.

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Conflict of interest

The authors declare no conflicts of interest in relation to this article.

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Data availability statement

The data underlying this article are available in RUNA (https://runa.sergas.gal/) and can be accessed online (https://runa.sergas.gal/10.1002/ehf2.15101).

Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Figure S1. Mortality, cardiovascular (CV) readmission and heart failure (HF) readmission in patients attended in the 25th vs. 75th quartile of time delay to cardiology department consultation.

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