

# Frailty as a risk factor for hospitalization and mortality in older adults admitted to a chronic heart failure hospital program before and during the COVID-19 pandemic

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## ABSTRACT

**Objective** To determine whether frailty is a risk factor for hospitalization and mortality in older adults enrolled in the "Chronic Heart Failure Program" at a hospital in Lima, Peru, between 2018–2021.

**Methods** This was an ambispective cohort study. A total of 85 older adults participating in the Chronic Heart Failure Program at Guillermo Almenara National Hospital were included. Each had an initial frailty assessment, forming two cohorts: frail and non-frail older adults. Medical records were reviewed, and patients were followed for one year to track events of interest (hospitalization and mortality). Overall survival and risk factors for hospitalization and death were determined.

**Results** During follow-up, 15.3% of the older adults died, and frailty was identified in 58.8% of the patients. Overall survival using the Kaplan-Meier method was 96.5% at 3 months after entering the Chronic Heart Failure Program; 92.9% at 6 months; and 85.9% at one year. Multivariate analysis using Poisson regression found that frailty was not a risk factor for hospitalization (aRR = 0.92; 95% CI: 0.42–2.03). Survival analysis using the Cox proportional hazards model showed that frailty was also not a risk factor for mortality after one year of follow-up (aHR = 1.32; 95% CI: 0.27–6.53).

**Conclusions** Our research does not confirm frailty as a risk factor for hospitalization or mortality in older adults enrolled in the "Chronic Heart Failure Program" after one year of follow-up.

Heart failure (HF) is a common clinical syndrome that represents the final stage of various heart diseases and is a significant public health issue. In 2021, a total of 56.5 million people were affected by HF worldwide.<sup>[1]</sup> Although the prognosis of HF has slightly improved, mortality and hospitalization rates remain high. Many cases progress to advanced HF, for which treatment options are limited.<sup>[2]</sup> Moreover, patients with HF often face high out-of-pocket expenses, primarily due to prescribed medications.<sup>[3]</sup>

Patients with HF are at increased risk of frailty, which

is itself an additional risk factor for morbidity and mortality, as well as cognitive and functional decline.<sup>[4]</sup> Frailty is a condition in which the body is more vulnerable to adverse outcomes under stress. It is reversible and highly prevalent among older adults with HF (up to 79%). It is increasingly recognized as a modifier of traditional treatment strategies. Frail patients often experience a lower quality of life, higher mortality risks, longer hospital stays, multiple relapses, impaired functional status, and greater institutionalization.<sup>[5,6]</sup>

In the United States, there are 5.7 million cases of

HF, with projections indicating an increase to 8 million by 2030 — representing a 46% rise in prevalence.<sup>[7]</sup> In Latin America, although few studies have assessed HF prevalence, estimates suggest it affects around 1% of the population.<sup>[7]</sup> The only population-based study on incidence was conducted in Brazil, reporting rates similar to those in the U.S. — 310 HF cases per 100,000 inhabitants per year. Incidence was higher in older adults, with an average age of 60. As in other studies, hospital admissions due to cardiac issues were significant, and although mortality showed a decreasing trend, it remained high.<sup>[8]</sup>

In Peru, the only reference available is from 2012, which reported that 16% of hospitalized patients in the Cardiology Department at the Edgardo Rebagliati Martins National Hospital had HF.<sup>[9]</sup> Despite the impact of this study on patients' quality of life, no other clinical-epidemiological research reports have been found in other Peruvian hospitals to date.

There are inconsistencies in the literature regarding the association between frailty in older adults with HF and adverse outcomes such as increased mortality and hospitalization. A study using secondary sources suggested that frailty may amplify the risk of adverse outcomes in HF patients, including hospitalizations and death.<sup>[10]</sup> Additionally, frailty in patients undergoing coronary artery or valvular procedures was predictive of postoperative mortality, complications, and greater healthcare use.<sup>[11]</sup> Conversely, a retrospective cohort study in adult and older Brazilian patients undergoing cardiovascular surgery found that frailty was not a predictor of postoperative morbidity or mortality.<sup>[12]</sup> These discrepancies may stem from differences in follow-up duration, the instruments used to assess frailty, and geographic context and the different instruments used to measure frailty, in addition to the absence of a globally accepted definition, which makes it difficult to compare the interpretation of data from different studies.<sup>[13]</sup>

Because HF patients are often frail, their care should not be limited to the cardiovascular domain. A multidisciplinary approach is necessary for early detection of other health problems to improve morbidity and mortality outcomes. Thus, implementing cost-effective secondary prevention strategies, including frailty assessments, is essential for early intervention and improving outcomes in older adults with chronic HF.<sup>[6,10]</sup>

The Guillermo Almenara Irigoyen National Hospital (HNGAI) is a national reference hospital within Peru's

Social Security system (EsSalud) and was classified as a level III-E facility — the highest level granted by the Ministry of Health — in April 2015.<sup>[14]</sup> In 1992, the National Heart Institute (INCOR) was established at HNGAI as a referral center for the diagnosis and surgical treatment of complex cardiovascular diseases. It became an independent institution in 2010 under the name Carlos Alberto Peschiera Carrillo Cardiovascular Disease Institute. Despite this, HNGAI has maintained its reputation for excellence in cardiovascular care.<sup>[15]</sup> A previous study by our research team found that more than half of the older adults in HNGAI's Chronic Heart Failure Program were frail, highlighting the need to determine whether frailty affects patient prognosis.<sup>[16]</sup> The objective of this study was to determine whether frailty is a risk factor for hospitalization and mortality in older adults enrolled in the Chronic Heart Failure Program at HNGAI.

## METHODS

### Study Design and Population

An ambispective cohort study<sup>[17]</sup> was conducted between June 2018 and December 2021. The study population consisted of patients over 60 years of age, of both sexes, enrolled in the Chronic Heart Failure Program at Guillermo Almenara National Hospital (HNGAI) and receiving outpatient care. In cases where patients were unable to answer for themselves, a family member or caregiver responded on their behalf.

Exclusion criteria included patients with decompensated heart failure who did not undergo frailty assessment during the recruitment period, those who were hospitalized or referred to other hospitals, and patients with incomplete medical records.

### Variables

The dependent variable was prognostic outcome (hospitalization and mortality), and the independent variable was frailty. Hospitalization was defined as any hospital stay longer than 24 h, as documented in the medical record and the ESSI system. Frailty was assessed using the Edmonton Frail Scale, which has been validated and proven reliable in its Spanish version.<sup>[18]</sup> For analysis purposes, patients scoring  $\geq 7$  on the Edmonton Frail Scale were classified as frail older adults.



## Study Procedures

Patients received multidisciplinary follow-up through the Chronic Heart Failure Program at HNGAI, including consultations in Cardiology, Physical Medicine and Rehabilitation, Nursing, Nutrition, and Psychology. Follow-up was conducted at three time points: 3 months, 6 months, and 12 months. Patient records from the Chronic Heart Failure Program and electronic medical records in the ESSI system were reviewed. When necessary, researchers contacted patients or their relatives by phone – up to 4 calls over the course of one week – until follow-up for all patients was completed.

Recruitment continued until the calculated sample size was met with participants who met the inclusion criteria. Each patient was followed for one year for the outcomes of interest (survival and mortality) until January 2021. Mortality from any cause during the follow-up period was recorded, and hospitalization was defined as an HF-related hospital stay lasting longer than 24 hours, as documented in the patient's medical record and the ESSI system.

This study is a sub-analysis of the research project titled: "Prognostic Implication of Frailty and Functional Dependence in Patients of the Chronic Heart Failure Program at the Guillermo Almenara National Hospital – EsSalud 2018–2021".

## Statistical Analysis

Statistical analysis was performed using IBM SPSS version 27. Univariate analysis included frequencies, percentages, and measures of central tendency and dispersion. Overall, 1-year survival was estimated using the Kaplan-Meier method.

Bivariate analysis was conducted using the log-rank test (Mantel-Cox), crude relative risk (cRR), and the crude hazard ratio (cHR). Multivariate analysis was conducted using a Poisson regression with a robust estimator to estimate the relative risk adjusted for confounding variables (aRR) and using a Cox proportional hazards model to control for confounding variables, yielding adjusted hazard ratios (aHR) and confidence intervals. All calculations were performed with a 95% confidence level.

## Ethical Considerations

The research project was submitted to the Institutional Ethics Committee of HNGAI and was exempted from

review, as the data were collected from secondary sources in a manner that prevented subject identification. Therefore, informed consent was not required.

The researchers signed a confidentiality agreement as part of the process, committing to adhere to the Declaration of Helsinki and the research guidelines of Peru's Social Security system (EsSalud), ensuring responsible and ethical treatment of data and the individuals involved in the study at all times.

## RESULTS

From an initial population of 153 older adults enrolled in the Chronic Heart Failure Program at HNGAI, 40 patients were excluded due to age not matching the study criteria. Of the remaining 113 patients, 5 presented clinical decompensation, 3 were referred to other hospitals, 15 had incomplete medical records, and 5 had incomplete scales or missing files, and were therefore excluded. A total of 85 patients were eligible and included in the final analysis.

### General Characteristics

The majority were male (71.8%), with a mean age of  $72.9 \pm 7.5$  years (median: 71 years). The most represented age group was 60–69 years (41.2%), and most patients were overweight (47.1%). The predominant etiology of heart failure was ischemic (61.2%), and the majority had reduced ejection fraction (EF) (68.2%). Additionally, most patients had 2–3 comorbidities (57.7%). Patient characteristics are summarized in Table 1.

During the 12-month follow-up period, 30.6% of patients required hospitalization. The overall survival of older adults, estimated using the Kaplan-Meier method, was 96.5% at 3 months, 92.9% at 6 months, and 85.9% at 12 months. The mean survival time was  $11.3 \pm 0.2$  months. The Kaplan-Meier survival curve is shown in Figure 1.

### Prognostic Impact of Frailty

Frailty was common among participants, observed in 58.8% of cases. The 12-month survival for frail older adults was 84.0%, compared to 85.7% for non-frail participants. The log-rank test (Mantel-Cox) found no statistically significant difference between the survival curves of frail and non-frail older adults ( $P = 0.835$ ). The Kaplan-Meier survival curves by frailty status are shown in Figure 2.



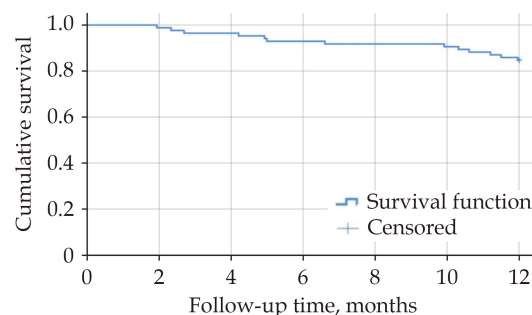
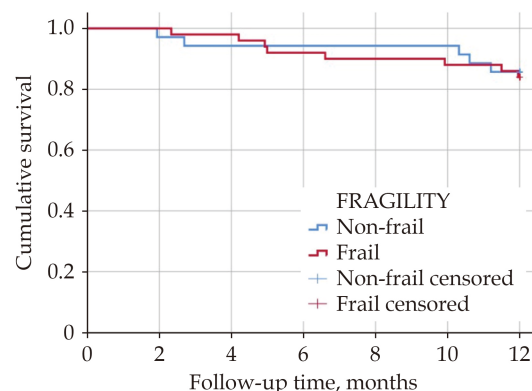
**Table 1** Sociodemographic and clinical characteristics of older adults enrolled in the chronic heart failure program.

| Characteristic          | Frequency | %    |
|-------------------------|-----------|------|
| Sex                     |           |      |
| Female                  | 24        | 28.2 |
| Male                    | 61        | 71.8 |
| Age group, yrs          |           |      |
| 60–69                   | 35        | 41.2 |
| 70–79                   | 31        | 36.5 |
| 80+                     | 19        | 22.4 |
| Nutritional status      |           |      |
| Underweight             | 1         | 1.2  |
| Normal weight           | 34        | 40.0 |
| Overweight              | 40        | 47.1 |
| Obesity                 | 10        | 11.8 |
| Heart failure etiology  |           |      |
| Non-ischemic            | 33        | 38.8 |
| Ischemic                | 52        | 61.2 |
| EF classification       |           |      |
| Reduced                 | 58        | 68.2 |
| Mid-range               | 10        | 11.8 |
| Preserved               | 17        | 20.0 |
| Comorbidities           |           |      |
| 1 comorbidity           | 7         | 8.2  |
| 2–3 comorbidities       | 49        | 57.7 |
| 4 or more comorbidities | 29        | 34.1 |

A multivariate Poisson regression analysis (Table 2) found that frailty was not a risk factor for hospitalization (aRR = 0.92; 95% CI: 0.42–2.03). Similarly, a Cox proportional hazards model (Table 3) showed no association between frailty and mortality risk (aHR = 1.32; 95% CI: 0.27–6.53). However, hospitalization during follow-up was the only variable significantly associated with increased risk of death (aHR = 3.95; 95% CI: 1.21–15.79).

## DISCUSSION

In the present study, frailty was not identified as a risk factor for hospitalization or mortality among older adults during a 12-month follow-up. It was observed that overall survival in the cohort of frail older adults was similar to that of the non-frail cohort (84.0% vs. 85.7%). It should be noted that in the Chronic Heart Failure Program of HNGAL, the Edmonton Scale is used because it offers a broad and multidimensional perspective on frailty, considering a score of 7 or more as frailty. Although this criterion has not been validated in the Peruvian population,

**Figure 1** Kaplan-Meier global survival curve of older adults enrolled in the chronic heart failure program.**Figure 2** Kaplan-Meier survival curves for frail and non-frail older adults.

it is widely used in Latin America. However, there are some studies conducted in Europe, such as that of Tajik *et al.*,<sup>[19]</sup> which, in order to increase the statistical power of the analysis while maintaining a relatively small sample size, consider the pre-frail state (5–6 points). This could lead to an overestimation of the prevalence of frail patients and further limit the possibility of comparing results across different studies.<sup>[20]</sup>

This study found no direct relationship between frailty and hospitalization, nor between frailty and mortality. However, it is important to note that the absence of statistical significance does not imply the absence of an effect, especially when considering that various international studies report that frailty is particularly relevant in HF, as there is a complex overlap between the two conditions. Both are strongly associated with age, functional dependency, worse clinical outcomes, and a high burden of hospitalization. As people age, they accumulate other comorbid conditions, each of which may contribute to the development of frailty. The lack of physiological resilience and homeostatic reserve makes them more susceptible to greater functional decline during acute illness and lowers the likelihood of returning to



**Table 2** Multivariate analysis of frailty as a risk factor for hospitalization in older adults enrolled in the chronic heart failure program (adjusted for confounders).

| Variables                    | cRR  | 95% CI    | P-value | aRR  | 95% CI    | P-value |
|------------------------------|------|-----------|---------|------|-----------|---------|
| Frailty                      |      |           |         |      |           |         |
| Yes                          | 0.70 |           |         | 0.92 |           |         |
| No (Ref)                     | 1    | 0.37–1.32 | 0.272   | 1    | 0.42–2.03 | 0.833   |
| Sex                          |      |           |         |      |           |         |
| Male                         | 1.65 |           |         | 1.57 |           |         |
| Female (Ref)                 | 1    | 0.70–3.88 | 0.249   | 1    | 0.68–3.63 | 0.293   |
| Age group                    |      |           |         |      |           |         |
| 80+                          | 0.49 |           |         | 0.51 |           |         |
| 70–79                        | 0.53 | 0.19–1.27 | 0.143   | 0.51 | 0.18–1.39 | 0.189   |
| 60–69 (Ref)                  | 1    | 0.25–1.12 | 0.097   | 1    | 0.23–1.12 | 0.094   |
| Nutritional status           |      |           |         |      |           |         |
| Obesity                      | 1.40 |           |         | 1.15 |           |         |
| Overweight                   | 1.05 | 0.56–3.52 | 0.475   | 1.02 | 0.42–3.18 | 0.782   |
| Normal and underweight (Ref) | 1    | 0.52–2.13 | 0.892   | 1    | 0.42–2.47 | 0.968   |
| Comorbidities                |      |           |         |      |           |         |
| ≥ 4                          | 1.17 |           |         | 0.93 |           |         |
| < 4 (Ref)                    | 1    | 0.58–2.35 | 0.669   | 1    | 0.40–2.17 | 0.860   |
| Etiology HF                  |      |           |         |      |           |         |
| Ischemic                     | 1.20 |           |         | 1.19 |           |         |
| No ischemic (Ref)            | 1    | 0.61–2.37 | 0.601   | 1    | 0.62–2.30 | 0.598   |
| EF Classification            |      |           |         |      |           |         |
| Reduced                      | 0.83 |           |         | 1.00 |           |         |
| Mid                          | 0.85 | 0.39–1.77 | 0.631   | 1.06 | 0.44–2.24 | 0.995   |
| Normal (Ref)                 | 1    | 0.27–2.67 | 0.781   | 1    | 0.30–3.75 | 0.929   |
| COVID-19 pandemic            |      |           |         |      |           |         |
| Pandemic                     | 1.32 |           |         | 1.28 |           |         |
| Pre pandemic (Ref)           | 1    | 0.67–2.62 | 0.423   | 1    | 0.64–2.57 | 0.492   |

aRR: adjusted relative risk; cRR: crude relative risk; CI: confidence interval; HF: heart failure; EF: ejection fraction

their baseline functional state.<sup>[6,21,22]</sup>

In respect to mortality, the results of this study differ from most secondary pre-COVID-19 pandemic studies. For example, a meta-analysis by Uchmanowicz, *et al.*, which included studies published up to May 31, 2019 – mostly in Europe and the U.S. – evaluated all-cause mortality (29 studies with 18,757 patients, 45.1% of whom were frail), they found that frailty in chronic HF was associated with an average 48% increase in the risk of all-cause mortality. Furthermore, the association between frailty and mortality was consistent across clinical settings and regardless of whether frailty was measured using the Fried phenotype or other tools.<sup>[23]</sup> Similarly, Yang *et al.* demonstrated the negative and significant impact of frailty in chronic HF, with an approximately 1.5 times higher risk of mortality, commonly related to older age.<sup>[24]</sup>

Similarly, regarding hospitalization related to heart failure, the finding of this study differs from evidence provided by secondary studies conducted before the COVID-19 pandemic. For example, the study by Uchmanowicz *et al.*, who analyzed data from 13,525 pa-

tients – 52.5% of whom were frail – reported that frailty was associated with a 40% increase in the risk of hospitalization,<sup>[23]</sup> while another study conducted by Yang *et al.* reported that the presence of frailty was significantly associated with a 56% higher risk of hospitalization (adjusted HR = 1.56; 95% CI: 1.36–1.78;  $P < 0.001$ ).<sup>[24]</sup>

It was observed that the COVID-19 pandemic occurred during the follow-up period of this cohort. Given that the studied population was at very high risk of severe complications and mortality from COVID-19, the pandemic may have influenced the results. In the early years (prior to the COVID-19 pandemic), four frail older adults died, and no non-frail patients. In the following months, during the pandemic, three non-frail patients died (two of them with confirmed COVID-19), along with three frail patients.

Regarding clinical characteristics, this study did not account for the etiology of heart failure in the prognosis, differing from studies such as that of Holmes *et al.*, who suggested that patients with heart failure due to aortic valvular disease have a higher prevalence of frailty and worse prognosis depending on the type of heart fai-

**Table 3** Multivariate Cox regression model for frailty and mortality risk in older adults enrolled in the chronic heart failure program (adjusted for confounders).

| Variables                    | cHR  | 95% CI     | P-value | aHR   | 95% CI     | P-value |
|------------------------------|------|------------|---------|-------|------------|---------|
| Frailty                      |      |            |         |       |            |         |
| Yes                          | 1.13 | 1.37–1.44  | 0.835   | 1.32  | 0.27–6.53  | 0.733   |
| No (Ref)                     | 1    |            |         | 1     |            |         |
| Sex                          |      |            |         |       |            |         |
| Male                         | 2.19 | 0.49–9.88  | 0.308   | 1.85  | 0.33–10.39 | 0.488   |
| Female (Ref)                 | 1    |            |         | 1     |            |         |
| Age group                    |      |            |         |       |            |         |
| 80+                          | 1.87 | 0.378–9.27 | 0.443   | 3.28  | 0.36–29.89 | 0.291   |
| 70–79                        | 2.85 | 0.74–11.01 | 0.129   | 5.46  | 1.02–29.25 | 0.047   |
| 60–69 (Ref)                  | 1    |            |         | 1     |            |         |
| Nutritional status           |      |            |         |       |            |         |
| Obesity                      | 1.63 | 0.42–6.29  | 0.481   | 5.20  | 0.94–28.84 | 0.059   |
| Overweight                   | 0.35 | 0.09–1.37  | 0.132   | 0.33  | 0.07–1.59  | 0.167   |
| Normal and underweight (Ref) | 1    |            |         | 1     |            |         |
| Comorbidities                |      |            |         |       |            |         |
| ≥ 4                          | 0.45 | 0.04–4.96  | 0.514   | 0.31  | 0.05–1.84  | 0.199   |
| <4 (Ref)                     | 1    |            |         | 1     |            |         |
| Etiology HF                  |      |            |         |       |            |         |
| Ischemic                     | 0.74 | 0.25–2.20  | 0.585   | 0.851 | 0.220–3.29 | 0.816   |
| No ischemic (Ref)            | 1    |            |         | 1     |            |         |
| EF Classification            |      |            |         |       |            |         |
| Reduced                      | 1.50 | 0.33–6.86  | 0.599   | 1.61  | 0.29–8.33  | 0.582   |
| Mid                          | 0.82 | 0.07–9.02  | 0.870   | 0.93  | 0.06–13.81 | 0.957   |
| Normal (Ref)                 | 1    |            |         | 1     |            |         |
| Hospitalization              |      |            |         |       |            |         |
| Sí                           | 2.65 | 0.89–7.88  | 0.081   | 4.38  | 1.21–15.79 | 0.024   |
| No (Ref)                     | 1    |            |         | 1     |            |         |
| COVID-19 pandemic            |      |            |         |       |            |         |
| Pandemic                     | 1.84 | 0.62–5.49  | 0.270   | 3.88  | 0.62–15.87 | 0.058   |
| Pre pandemic                 | 1    |            |         | 1     |            |         |

cHR: crude hazard ratio; CI: confidence interval; aRR: adjusted relative risk; HF: heart failure; EF: ejection fraction.

lure.<sup>[25]</sup> Warraich, *et al.*<sup>[26]</sup> also reported that patients with HFpEF, the most common type of heart failure in older adults, show a higher prevalence of frailty (60% to 90%), which is associated with poorer prognosis and lower quality of life after hospitalization compared to patients with HFrEF. Evidence suggests that frailty is common in people with atrial fibrillation (AF) because some characteristics of frailty predispose individuals to AF, such as advanced age, low physical activity, slowness, weakness, and exhaustion, which characterize the frailty phenotype and are risk factors for the development of cardiovascular diseases, including AF which is a significant contributor to adverse events, higher hospitalization rates, and mortality in patients with chronic HF.<sup>[27]</sup>

Another possible factor influencing the results of this study is the small sample size, which may have limited the statistical power to detect significant differences. This limitation is similar to the study by Joseph *et al.*,<sup>[28]</sup> which evaluated 75 patients and found no association between frailty and mortality.

The length of follow-up is another variable to consider. According to Cacciatore *et al.*, frailty is an important long-term predictor of mortality, as evidenced by their 12-year follow-up study.<sup>[29]</sup> The present study was designed with a one-year follow-up, based on literature that reported significant associations between frailty, mortality, and hospitalizations. Additionally, the relatively younger age of the participants in this study (median age: 71 years) may have contributed to the findings. In contrast, other international studies, such as that of Jiménez-Méndez in Spain, included 499 patients diagnosed with chronic heart failure with a mean age of 81.4 years.<sup>[30]</sup> Similarly, Afilalo, *et al.*<sup>[31]</sup> conducted a prospective, multicenter cohort study with 1,200 cardiac patients (mean age: 82 years) undergoing surgical or transcatheter aortic valve replacement. In their study, frailty measured by the Essential Frailty Toolset (EFT) was the strongest predictor of death and worsening disability after one year.

Currently, there are several scales to assess the risk of mortality and hospitalizations in older adults with heart



failure, and the choice of which to use depends on the context. For example, Hayiroğlu *et al.*, in an observational study with 189 geriatric patients with heart failure with reduced ejection fraction and an implantable cardioverter-defibrillator (ICD), found that the MADIT II scale had greater prognostic value compared to the FADES, PACE, and SHOCKED scores.<sup>[32]</sup>

Among the limitations of the present study is that, although the researchers initially assessed patients using frailty scales, there was no direct evaluation at the time of outcome measurement (mortality and hospitalization). Instead, data were obtained through medical record review, heart failure registry, and telephone calls when necessary. This approach limited the ability to determine causes of death, especially in cases of out-of-hospital mortality. Additionally, the sample size was small and limited to a single hospital, which limits the ability to detect moderate associations, despite the patient enrollment period spanning 20 months, which may have affected the confidence intervals of the estimates, which could suggest some degree of imprecision. In addition, the results could be influenced by a type II error, meaning that no significant association was found even though one actually exists.

On the other hand, the 12-month follow-up period may be insufficient to observe the impact of frailty on hospitalization or mortality. A longer follow-up period could provide better evidence of the relationship between frailty and mortality, as well as between frailty and hospitalizations, since frailty is not a static phenomenon. Monitoring frailty over time is a better approach to identify older adults at higher risk of death than relying on a cross-sectional measure.<sup>[33]</sup> Although the study population consisted of patients attending a chronic heart failure unit and was not selectively chosen, it does not necessarily represent the broader population with heart failure, as evidenced, for example, by the low representation of women.

Future studies should consider a larger sample size and include data from multiple hospital institutions to confirm or reject these findings. A longer follow-up period might provide stronger evidence on the relationship between frailty and mortality, as well as frailty and hospitalizations. Moreover, the COVID-19 pandemic could have acted as a confounding factor in deaths with undefined causes. Nevertheless, the findings are consistent with large clinical trials that report high prevalence of frailty in heart failure.

## CONCLUSION

Our study did not confirm fragility as a risk factor for hospitalization or mortality in older adults enrolled in the Chronic Heart Failure Program at HNGAI after one year of follow-up.

It is necessary to implement heart failure programs in hospitals to provide high-quality, specialized care that enables a comprehensive and multidisciplinary evaluation of patients. It is also important to assess frailty in older adults with chronic heart failure in a sustainable manner over time, in order to detect frailty early and implement strategies to improve their quality of life. This should be done using standardized geriatric assessment tools for frailty detection, such as the Edmonton Frail Scale, which is a brief, valid, and reliable multidimensional tool that can be administered by healthcare personnel without specialized training in geriatrics.

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