

Introduction

In Latin America, the prevalence of HF is 1% and the reported incidence is 1.9 cases per 1,000 people/year.

Both the prevalence and incidence of HF increase with age, according to the Framingham study, in which the incidence doubled for each decade of life, increasing its percentage with age more in women than in men.

In Colombia, cardiovascular diseases represent the first cause of mortality.

In developed countries, the cost of HF treatment is estimated at between 1.5% and 2% of health spending. Within this total expenditure, the percentage of hospitalizations represents the largest proportion, with a range from 74% to 87%. In 2012, it was estimated that HF had a cost of 31,000 million dollars, equivalent to more than 10% of the total health expenditure for cardiovascular diseases in the United States.

According to a cost study conducted in the city of Bogotá, HF outpatient treatment had an average monthly cost of COP 304,318, with medications being the main source of use. of resources (55.2%). On the other hand, hospitalization for HF decompensation had an average cost of COP 6,427,887, of which the hospital stay represented the largest proportion of the cost (29.1%).

Objective

To estimate direct, lost productivity and out of pocket costs attributable to heart failure (HF) and heart failure with reduced ejection fraction and decompensation (HFrEFd) in Colombia.

Methods

- We initially performed an epidemiological estimation of cases and mortality based on local data and published literature.

Table 1. Summary of findings in the literature on the prevalence of heart failure.

| Author, year         | Prevalence                        |
|----------------------|-----------------------------------|
| Rojas et al, 2009    | 15+ years: 1.6% (IC95%: 1.5-1.8%) |
| Gómez et al, 2016    | General population: 2,3%          |
| Ciapponi et al, 2016 | Adults: 1,0% (IC 95% 0,1-2,7%)    |
| García et al, 2020   | Appointments: (2017): 0,36%       |

Table 2. Description of health states associated with HF disability

| Health stage           | Disability weighth     |
|------------------------|------------------------|
| Mild HF (NYHA II)      | 0,041<br>(0,026-0,062) |
| Moderate HF (NYHA III) | 0,072<br>(0,047-0,103) |
| Severe HF(NYHA IV)     | 0,179<br>(0,122-0,251) |

- The disability weights related to HF were obtained from the WHO disease burden methodological guidelines. Due to the similarity of these definitions with those of the HR functional classes, these health states were homologated to classes II to IV of the New York Heart Association (NYHA).

- Costing was performed using local tariff manuals. For productivity loss, we considered local income and employment figures to estimate active population. For productivity lost due to morbidity, we considered time lost due to medical needs considering the quantity of consultation and hospitalizations required. For productivity lost due to premature mortality, we considered life expectancy and income, including a 5% discount rate. For out-of-pocket expense, we considered co-payments and transportation.

Results

- We estimated a total of 490,831 total HF cases, with 27,437 deaths. Of these, 76,247 (16%) cases and 13,308 (49%) deaths were related to worsening HFrEF. We estimated 1.2 billion USD in total costs (46% due to worsening HFrEF).

Outpatient Costs

| Author, year  | Cost (USD\$), 2020 |
|---------------|--------------------|
| Autores, 2020 | 618,21             |

|                    |        |
|--------------------|--------|
| Tamayo et al, 2013 | 988,75 |
|--------------------|--------|

|                    |          |
|--------------------|----------|
| Rincón et al, 2016 | 1.063,41 |
|--------------------|----------|

Bottom-up: Resources + ISS Rate + 30%/Sirmed

2020, 1 USD = \$3,693.36 COP

Inpatient Costs

| Author, year  | Cost (USD\$), 2020 |
|---------------|--------------------|
| Autores, 2020 | 1.189,78           |

|                      |         |
|----------------------|---------|
| McMurray et al, 2018 | 2215,38 |
|----------------------|---------|

|                    |          |
|--------------------|----------|
| Tamayo et al, 2013 | 2.409,45 |
|--------------------|----------|

|                    |          |
|--------------------|----------|
| Rincón et al, 2016 | 2.506,89 |
|--------------------|----------|

Table 6. Total direct and indirect costs estimated

|        | Direct      | Productivity , morbidity | Productivity, mortality | Out of pocket | Total         | PPPY  |
|--------|-------------|--------------------------|-------------------------|---------------|---------------|-------|
| HFpEF  | 164,763,342 | 679,633                  | 103,158,318             | 2,413,027     | 271,014,319   | 1,626 |
| HFmrEF | 74,979,813  | 309,284                  | 47,890,682              | 1,098,110     | 124,277,890   | 1,639 |
| HFrEF  | 537,229,668 | 5,349,960                | 309,722,716             | 3,596,428     | 855,898,772   | 3,446 |
| Total  | 776,972,822 | 6,338,877                | 460,771,716             | 7,107,565     | 1,251,190,981 | 2,549 |

2020, 1 USD = \$3,693.36 COP

The economic impact of HF is calculated as the total national cost during one year. Direct and indirect costs are reported, including costs related to lost productivity and out-of-pocket expenses. All costs were expressed in 2020 monetary values.

Conclusions:

- We estimated significant costs related to HF. Worsening HFrEF was related to just 16% of cases but produced a much more significant fraction of total costs, direct costs, lost productivity costs.
- This is related to the significant morbidity and mortality present in those patients..

References

• Tamayo DC, Rodríguez V, Rojas MX, et al. Costos ambulatorios y hospitalarios de la falla cardiaca en dos hospitales de Bogotá Outpatient and inpatient costs of heart failure in two hospitals in Bogotá. Acta Médica Colomb. 2013;38(4):208-212.

• Lueder TG vo., Agewall S. The burden of heart failure in the general population: A clearer and more concerning picture. J Thorac Dis. 2018;10(Suppl 17):S1934-S1937. doi:10.21037/jtd.2018.04.153

• World Health Organization (WHO). WHO methods and data sources for global burden of disease estimates 2000-2019.

• Ciapponi A, Alcaraz A, Calderón M, et al. Burden of Heart Failure in Latin America: A Systematic Review and Meta-analysis. Rev Española Cardiol. 2016;69(11):1051-1060. doi:10.1016/j.rec.2016.04.054

• García A, Rico J, Ospina D, Fernández D, Muñoz O, Suarez F. Prevalencia de Falla Cardiaca en Colombia según información del Sistema Integral de Información de la Protección Social (SISPRO). In: Congreso Europeo de Cardiología. Comunicación interna.; 2020.

• Ministerio de Salud y Protección Social., Ministerio de Salud y Protección Social. Guía de Práctica Clínica para el diagnóstico y Tratamiento del Trastorno neurocognoscitivo mayor (Demencia) (Adopción). Guía No GPC 2017– 61 [GPC en Internet]. Edición 1. Bogotá D.C.

• Sosa Liprandi M, Racki M, Khoury M, et al. Economic and Financial Crisis in Argentina: A Novel Risk Factor for Cardiovascular Mortality? Rev Argent Cardiol. 2012;80(2):137-144.

• Ministerio de Salud y Protección Social. Bodega de datos Sispro: Registro Individual de Prestación de Servicios en Salud - RIPS, 2015-2019.

• Departamento Administrativo Nacional de Estadísticas (DANE). Bodega de datos Sispro: Estadísticas vitales - EEVV, 2015-2019.

• Saldarriaga C, Gómez J, Echeverría E. Heart failure in Colombia: results form the RECOLFACA registry. In: Heart Failure 2019. ; 2019:P2012. https://esc365.escardio.org/Congress/Heart-Failure-2019-6th-World-Congress-on-Acute-Heart-Failure/Poster-Session-4-Chronic-Heart-Failure-Epidemiology-Prognosis-Outcome/193101-heart-failure-in-colombia-results-form-the-recolfaca-registry.

• Muñoz-Mejía OA, Sierra-Vargas EC, Zapata-Cárdenas A, et al. Sociodemographic and clinical profile of a population with acute heart failure: MED-ICA cohort. Rev Colomb Cardiol. 2018;25(3):200-208. doi:10.1016/j.rccar.2017.12.021

• Serrano AVO, Serrano AVO, Hernandez GG. Características clínicas y epidemiológicas de la insuficiencia cardiaca en el Hospital Universitario Ramón Gonzalez Valencia de Bucaramanga, Colombia. Salud UIS. 2004;36(3).

• Senior JM, Saldarriaga C, Rendón JA. Descripción clínico-epidemiologica de los pacientes con falla cardiaca aguda que consultan al servicio de urgencias. Acta Médica Colomb. 2011;36(3):125-129. doi:10.36104/AMC.2011.1466

• Chaves W, Diaztagle J, Sprokel J, et al. Factores asociados a mortalidad en pacientes con falla cardiaca descompensada. Acta Med Colomb. 2014;39(4):314-320.

• Lam CSP, Gamble GD, Ling LH, et al. Mortality associated with heart failure with preserved vs. reduced ejection fraction in a prospective international multi-ethnic cohort study. Eur Heart J. 2018;39(20):1770-1780. doi:10.1093/EURHEARTJ/EHY005

• Rohatgi A. WebPlotDigitizer: Version 4.5. Pacifica, California, USA.

• Prado-Galbarro FJ, Gamiño-Arroyo AE, Sánchez-Piedra C, et al. Evaluation of the effect of hospitalization on mortality in patients with heart failure followed in primary care. Arch Cardiol México. 2019;89(2):130-137. doi:10.24875/ACM.M19000022

• AH L, JC C, NM S, AM E. Repeat Hospitalizations Predict Mortality in Patients With Heart Failure. Mil Med. 2017;182(9):e1932-e1937. doi:10.7205/MILMED-D-17-00017

• Arcos-Medina LC, Méndez-Toro A, Rojas-Ruiz IT, et al. Caracterización clínico epidemiológica de pacientes hospitalizados con diagnóstico de falla cardiaca descompensada con fracción de eyección reducida. Acta Medica Colomb. 2020;45(1):1-9. doi:10.36104/AMC.2020.1233