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Research on heart failure in Colombia 1980-2015: a systematic review

La investigación en falla cardíaca en Colombia 1980-2015: una revisión sistemática

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| Abstract |

Introduction: Heart failure is one of the most prevalent diseases worldwide. In Colombia, the state of research on the subject is unknown.

Objective: To describe the original publications on heart failure in Colombia.

Materials and methods: Systematic review. Digital search in Embase, PubMed, LILACS and Scielo, using the MeSH terms: "heart failure", "Colombian", "Colombia", "Latin America", "developing countries". Manual search of 58 journals identified in Publindex. Original research that evaluated adult Colombians with heart failure and published between 1980 and 2015 were included.

Results: 2 684 articles were identified, of which 35 met the inclusion criteria. 30 (85.7%) were published since 2009, 30 (85.7%) were conducted in Bogotá and Medellín, 11 (31.4%) had n>200, 19 (54.2%) were descriptive and 5 (14.2%) quasi-experimental. Moreover, 9 (25.7%) described general populations, 9 (25.7%) addressed the issue of self-care, 3 (8.8%) cardiac rehabilitation, 3 (8.8%) perception of the disease and 3 (8.8%) prognostic factors.

Conclusions: The amount of published original research on heart failure is low, and most of them were carried out recently. Descriptive design was the most frequent, while the most frequently addressed topics were self-care and population descriptions.

Keywords: Heart Failure; Research; Colombia; Latin America (MeSH).

| Resumen |

Introducción. La falla cardíaca es una de las enfermedades con mayor prevalencia a nivel mundial. En Colombia no se conoce con certeza el estado de la investigación en torno al tema.

Objetivo. Describir las publicaciones originales en falla cardíaca en Colombia.

Materiales y métodos. Revisión sistemática. Búsqueda electrónica en Embase, PubMed, LILACS Y SciELO, con términos MeSH: "heart failure", "colombian", "Colombia", "Latin America", "developing countries". Búsqueda manual en 58 revistas identificadas en Publindex. Se incluyeron investigaciones originales, publicadas entre 1980 y 2015, que evaluaron población adulta colombiana con falla cardíaca.

Resultados. Se identificaron 2 684 artículos: 35 cumplieron criterios de inclusión; 30 (85.7%) fueron publicados a partir del 2009; 30 (85.7%) se realizaron en Bogotá y Medellín; 11 (31.4%) tuvieron n>200; 19 (54.2%) fueron descriptivos y 5 (14.2%) cuasiexperimentales; 9 (25.7%) describieron poblaciones generales; 9 (25.7%) abordaron el tema del autocuidado, 3 (8.8%), la rehabilitación cardíaca, 3 (8.8%), la percepción de enfermedad y 3 (8.8%), los factores pronósticos.

Conclusión. El número de investigaciones originales publicadas sobre falla cardíaca es escaso; la mayoría se realizó en los últimos años. El diseño descriptivo fue el más común. Los temas abordados con mayor frecuencia fueron el autocuidado y las descripciones poblacionales.

Palabras clave: Insuficiencia cardíaca; Investigación; Colombia; América Latina (DeCS).

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Introduction

Recently, Colombia has presented demographic and epidemiological changes in the population that have determined certain variations in the health profile of its inhabitants. Between 1985 and 2003, a two-fold increase in the number of >60-year-old people and in life expectancy was observed. These changes resulted in a "transitional" epidemiological phase, which led chronic non-communicable diseases to become predominant. For this and other reasons, circulatory system diseases were the leading cause of death by "large groups" in the country between 1997 and 2010, with 28-30% of total deaths. (1) Of these, almost half originated from ischemic heart disease, which is also related to the high prevalence of cardiovascular risk factors such as hypertension, diabetes, smoking, sedentary lifestyle and overweight. (2)

Ischemic heart disease, together with hypertensive heart disease, affects cardiac and vascular function, triggering the condition known as heart failure, a chronic disease that progressively deteriorates the health state of the person. Data obtained in the USA indicated that, between 2011 and 2014, the prevalence of heart failure in people aged ≥20 years was 2.5%, which is equivalent to 6.5 billion people affected. This figure is expected to increase by 46% between 2012 and 2030 (3), a situation that requires the use of a high amount of economic resources for the health system. (4) A study conducted in Colombia estimated that the average monthly cost of outpatient treatment in 2010 was COP 304 318 (about USD 160), while the average cost of hospitalization was COP 6 427 887 (about USD 3 387). (5)

With this in mind, scientific knowledge on heart failure is fundamental to offer a comprehensive clinical approach and to generate innovation processes around the topic. (6) In Colombia, the current status of research and publication about heart failure is unknown, since knowledge may be limited and publications referring to the topics are scarce. (7) Two national consensuses on acute and chronic heart failure have few citations in the bibliographical references of Colombian works. (7,8) As a result, few published studies or publications may not be adequately known due to various circumstances.

For this reason, the objective of this work is to conduct a systematic review of the literature to identify the publications of studies conducted in our country that address the issue of heart failure, expose their methodological characteristics and the most relevant results, and analyze the data provided by the studies.

Materials and methods

A systematic review of the medical literature published in Colombia on heart failure between 1980 and 2015 was carried out. The following search mechanism was used to identify the articles:

Search in domestic scientific journals: A search was made in Colombian health journals acknowledged by the Sistema Nacional de Indexación y Homologación de Revistas Especializadas de CT+I (National Indexing and Homologation System for Journals Specialized in STI) of Colciencias (National Bibliographic Index-Publindex I- 2013 update) that deal with topics related to clinical medicine. (9) The search in this index was filtered using the so-called Great Knowledge Area: Medical and Health Sciences. With this information, a complete list of the journals used to search for the articles was obtained. In addition, the health journals of the universities that had medical faculties in 2014 were searched in their web pages. Journals where publication of original articles of heart failure was considered unlikely were excluded.

Journals were searched individually, in their respective website, identifying the issues published between January 1980 and December 2015. The table of contents of said issues was analyzed, and articles related to heart failure were verified. Inclusion and exclusion criteria were applied to the articles initially identified. In case that the online version of the issues was not found in its entirety, a manual search was carried out in different libraries and national newspaper archives.

Digital search in databases: A digital search was carried out in the Embase, PubMed and Lilacs databases and in the Cochrane Library, using the search structure described in Annex 1.

Manual search of bibliographic references: A manual search was made of the references of all the articles identified in the three previous searches, applying inclusion and exclusion criteria.

Review of CvLac resumes of the main authors: A search of the resumes of the main authors of the identified articles was made on CvLac to verify the existence of additional articles.

Inclusion and exclusion criteria of articles: Original research on patients >18 years of age, diagnosed with acute or chronic heart failure, outpatient or inpatient in Colombia, published in full text, with an observational intervention design or clinical simulation model were included. Case reports, subject reviews, management guidelines and articles published only in summary version were excluded from the analysis.

A data collection tool was designed to carry out the bibliographic documentation, which included the affiliation data of the journal, the type of article described along with the year, issue, number and title of the document. Information on the methodological characteristics of the study, the results and the conclusions of the selected articles was also obtained. The study was approved by the Human Research Ethics Committee of the Hospital of San José of Bogotá and the Fundación Universitaria de Ciencias de la Salud.

Results

Search result

Search in domestic scientific journals: A search of journals was carried out on February 23, 2014 in the National Bibliographic Index-Publindex I-2013 update of the official web page of Colciencias. 73 records were obtained (58 in clinical medicine, 25 in health sciences, 14 in other medical sciences and 3 in basic medicine). Of the total journals identified, 58 were selected to conduct the review. The journal identification process is described in Annex 1. Table 1 shows general information of these journals.

Of 58 journals, 26 were published in full text in an online version. For the remaining 32, it was necessary to complement the search in university and national libraries. It was also necessary to contact editors and administrative staff of some journals to obtain missing issues.

All the issues of 56 journals were reviewed in their entirety. After reviewing all the articles in these issues, 87 studies were found that dealth with heart failure as a central topic, of which 31 met inclusion criteria (Figure 1).

Table 1. Description of selected journals.

Name of the journal	Publishing Institution	First year of publication	City
Acta Médica Colombiana	Asociación Colombiana de Medicina Interna (ACMI)	1977	Bogotá
Actualización en Enfermería	Fundación Santa Fé de Bogotá.	1998	Bogotá
Aquichan	Universidad de la Sabana	2001	Chía
Archivos de Medicina	Universidad de Manizales	2001	Manizales
Área Médica	Universidad de Ciencias Aplicadas y Ambientales (UDCA)	2007	Bogotá
Avances en Enfermería	Universidad Nacional de Colombia	1982	Bogotá
Biomédica	Instituto Nacional de Salud	1981	Bogotá
Biosalud: Revista de Ciencias Básicas	Universidad de Caldas	2002	Manizales
CES Medicina	Universidad CES	1987	Medellín
Ciencia y Cuidado	Universidad Francisco de Paula Santander	2004	Cúcuta
Ciencia y Salud Virtual	Corporación Universitaria Rafael Núñez	2009	Cartagena
Colombia Médica	Universidad del Valle	1970	Cali
Cultura del Cuidado Enfermería	Universidad Libre de Colombia	2004	Pereira
Duazary	Universidad del Magdalena	2004	Santa Marta
Hacia la Promoción de la Salud	Universidad de Caldas	1996	Manizales
Iatreia	Universidad de Antioquia	1988	Medellín
Investigación de Enfermería: Imagen y Desarrollo	Pontificia Universidad Javeriana	1999	Bogotá
Investigación y Educación en Enfermería	Universidad de Antioquia	1983	Medellín
Investigaciones Andina	Fundación Universitaria del Área Andina	2000	Pereira
Investigaciones en Seguridad Social y Salud	Secretaría Distrital de Salud de Bogotá	1999	Bogotá
Manos al Cuidado	Universidad del Tolima	2009	Ibagué
Médicas UIS	Universidad Industrial de Santander	1987	Bucaramanga
Medicina	Academia Nacional de Medicina	1967	Bogotá
Medicina	Corporación Universitaria del Sinú	2002	Montería
Medicina & Laboratorio	Editorial Médica Colombiana S.A.	1989	Medellín
Medicina UPB	Universidad Pontificia Bolivariana (UPB)	1981	Medellín
MedUNAB	Universidad Autónoma de Bucaramanga (UNAB)	1988	Bucaramanga
Perspectiva en Nutrición Humana	Universidad de Antioquia	1999	Medellín
Repertorio de Medicina y Cirugía	Sociedad de Cirugía de Bogotá - Hospital de San José - Fundación Universitaria de Ciencias de la Salud	2000	Bogotá
Revista CES Salud Pública	Universidad CES	2010	Medellín
Revista Ciencias Biomédicas	Universidad de Cartagena	2010	Cartagena
Revista Ciencias de la Salud	Colegio Mayor de Nuestra Señora del Rosario	2003	Bogotá
Revista Clon	Universidad de Pamplona	2002	Pamplona
Revista Colombiana de Cardiología	Sociedad Colombiana de Cardiología y Cirugía Cardiovascular	1989	Bogotá
Revista Colombiana de Enfermería	Universidad del Bosque	2006	Bogotá
Revista Colombiana de Rehabilitación	Escuela Colombiana de Rehabilitación (ECR)	2002	Bogotá
Revista Colombiana de Salud Libre	Universidad Libre de Colombia	2006	Cali
Revista CUIDARTE	Universidad de Santander (UDES)	2010	Bucaramanga
Revista de Gerencia y Políticas de Salud	Pontificia Universidad Javeriana	2001	Bogotá
Revista de la Asociación Colombiana de Gerontología y Geriatría	Asociación Colombiana de Gerontología y Geriatría	1977	Bogotá
Revista de la Facultad de Ciencias de la Salud	Universidad del Cauca	1999	Popayán
Revista de la Facultad de Medicina de la Universidad Nacional de Colombia	Universidad Nacional de Colombia	1932	Bogotá
Revista de Salud Pública	Universidad Nacional de Colombia	1999	Bogotá
Revista ECM Escuela Colombiana de Medicina	Universidad del Bosque	1983	Bogotá
Revista Facultad Nacional de Salud Pública	Universidad de Antioquia	1974	Medellín
Revista Med	Universidad Militar Nueva Granada	1991	Bogotá
Revista Médica de Risaralda	Universidad Tecnológica de Pereira	1995	Pereira
Revista Médica Sanitas	Fundación Universitaria Sanitas	1998	Bogotá
Revista Salud Bosque	Universidad del Bosque	2011	Bogotá
Revista UDCA. Actualidad y Divulgación Científica	Universidad de Ciencias Aplicadas y Ambientales (UDCA)	1998	Bogotá
Revista Vía Salud	Organización para la Excelencia de la Salud	1997	Bogotá
Revista Facultad de Salud-RFS de la Universidad Surcolombiana	Universidad Surcolombiana	2009	Neiva
Salud UIS	Universidad Industrial de Santander	1969	Bucaramanga
Salud Uninorte	Universidad del Norte	1984	Barranquilla
Umbral Científico	Universidad Manuela Beltrán	2002	Bogotá
Universidad y Salud	Universidad de Nariño	2000	Pasto
Universitas Médica	Pontificia Universidad Javeriana	1958	Bogotá
Vitae	Universidad de Antioquia	1991	Medellín

Continues.

Source: Own elaboration based on the data obtained in the study.

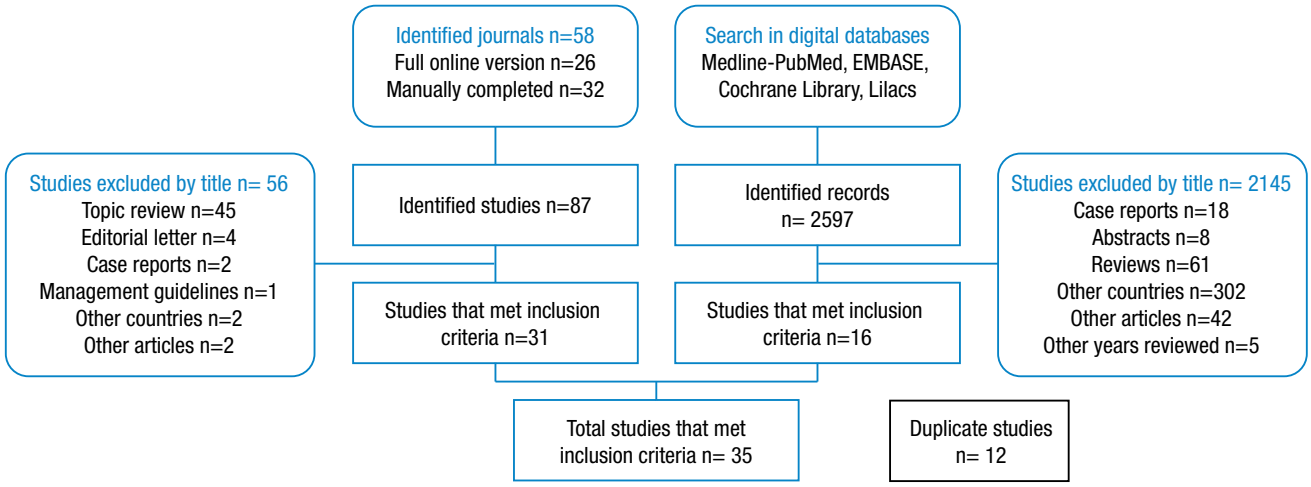

Figure 1. Flowchart of literature search and study selection.
Source: Own elaboration based on the data obtained in the study.

Digital search in databases: This search allowed to identify 2 597 records, of which 16 met the inclusion criteria. Of these, 12 had already been identified in the manual search (Figure 1). Annex 2 describes the digital search strategy. No additional articles were found after searching references and CvLac resumes.

Analysis of identified studies

Of 35 studies published (5,10-43), the largest number (25.7%) was found in the Revista Colombiana de Cardiología with 9, followed by Acta Médica Colombiana with 7 (20%) (Figure 2). The cities with the highest number of publications on heart failure were Bogotá and Medellín, with 15 studies each (42.8%) (Figure 3), and the largest number of publications (85.7%) was observed in 2009 (Figure 4).

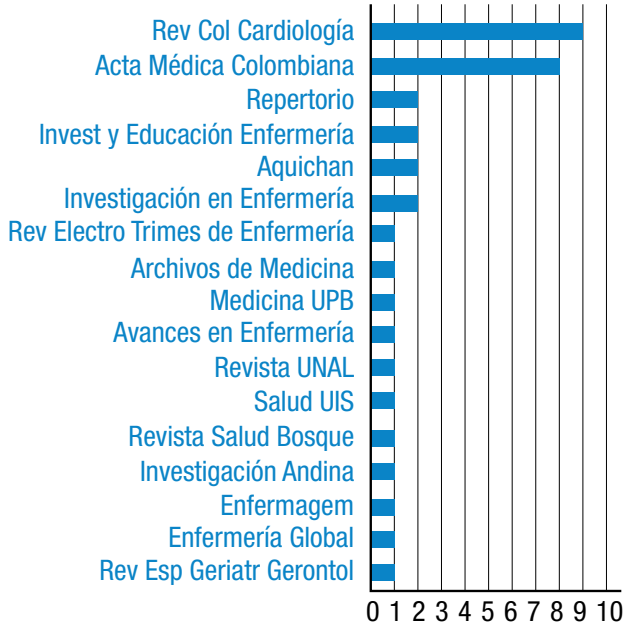

Figure 2. Number of articles per journal.
Source: Own elaboration based on the data obtained in the study.

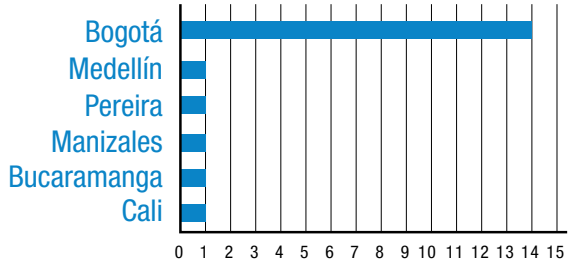

Figure 3. Number of articles per city.
Source: Own elaboration based on the data obtained in the study.

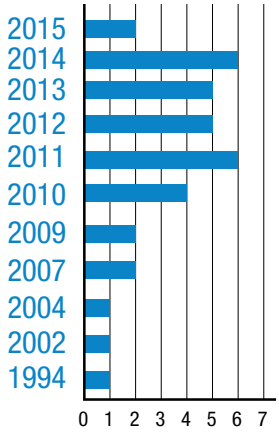

Figure 4. Number of articles per year of publication.
Source: Own elaboration based on the data obtained in the study.

Regarding methodological aspects, 19 (54.2%) studies were descriptive and 5 (14.2%) quasi-experimental. In 13 (37.1%), the sample size was <50, 11 (31.4%) had >200 patients and 9 (25.7%) described general populations (Tables 2-4). On the other hand, 9 studies (25.7%) addressed self-care, 3 (8.8%) evaluated prognostic factors and aspects of cardiac rehabilitation, while 2 evaluated issues related to disease perception, nutritional aspects and therapeutic interventions. No studies related to prevention or treatment for stages I to III, according to the classification of the New York Heart Association (NYHA), were found (Tables 2-4).

Table 2. Observational studies that described populations or established causal relationships with various endpoints in outpatient and inpatient settings.

General characteristics		Main results
Hospital context		
Plata & Angel (10). Prospective cohort n=50.	Patients: hospitalized for HF. Objective: To determine the frequency of malnutrition and to establish its correlation with morbidity and mortality.	Average age: 52.2 years, 56% men. Average weight: 59.3kg ± 13.8. BMI <25: 82%. 10% normal albumin; 52% moderate hypoalbuminemia and 8% severe hypoalbuminemia. Bicipital, triceps, thigh, arm circumference, and Hb fold were greater in survivors than in those who died. In-hospital mortality: 24
Ospina-Serrano & Gamarra-Hernandez (11). Descriptive n=218.	Patients: hospitalized for HF. Objective: To determine clinical and epidemiological characteristics of the patients and their evolution at one year.	Average age: 68 years, 51.6% men. NYHA III: 63%. Average EF: 25%. Comorbidity: AH 73.1%, DM2 21.6%. Causes of hospitalization: lack of adherence to treatment 50%, respiratory infection 15.1%. IH Mortality 16.9%: 31.5%at 3 months, 37.6% at 6 months and 45.2% at 1 year. 40.8% re-admission at 12 months. Factors associated with mortality: age (OR 2.0, 1.27-3.23) and FC (OR 2.6, 1.08-7.08).
Lancheros *et al.* (12). Descriptive, prospective n=129	Patients: decompensated HF. Objective: To describe the population and define factors that may be related to mortality.	Average age: 71.9 years, 56.7% women, AH 80.6%, CAD 19.3%. Previous treatment: 72.1% ACEI/ ARB, 56.5% furosemide, 25.5% BB, 21% spironolactone. Common factors among deceased: age >65 years, creatinine >1.3 mg/dL and HR >90 beats/ min. IH mortality: 4.6%.
Henao *et al.* (13). Prospective n=155	Patient: decompensated HF. Objective: To assess in-hospital death risk using the GWTG-HF scale and the OPTIMIZE HF nomogram	Average age: 72.5 years, 52.2% men. Baseline FC NYHA II 52.9%, EF <40%: 35.3%. Median HS: 8 days, IH mortality: 7.7%. 64.3% were at 1-5% risk according to the GWTG-HF scale and 50.7% according to the OPTIMIZE HF nomogram. No agreement was found between both scales (Lin=0.07).
Senior *et al.* (14). Prospective cohort n=106	Patients: Acute HF admitted to the emergency room. Objective: To describe the epidemiological characteristics of patients.	Average age: 62.4 years, 52.8% men. Hypertensive heart disease 45.2%, idiopathic 31.1%. 11.2% had ACS. Management: digoxin 2.4%, diuretics 73%, ACEI 73.5%, BB 32%, spironolactone 34.9%. FC prior to NYHA II: 26.4%, III: 57.5%. EF ≤40%, 67.2%. Average BNP 2 356pg/mL. Average HS: 11.4 days.
Ramírez *et al.* (15) Retrospective study n=215	Patients: hospitalized with HF. Objective: To determine the incidence of cardiorenal syndrome and to evaluate the clinical characteristics.	Average age: 66.9 years, 63.2% men. Average EF: 23.3%. NYHA III/IV FC: 59.5%. 58.6% had kidney failure and 35.8% had anemia. Prevalence of cardio-renal anemia: 23.3%. Management: diuretics (60.9%), BB (60%) and ACEI (52.6%).
Chaves *et al.* (16) Prospective descriptive n=47	Patients: decompensated chronic HF. Objective: To evaluate compliance with hospital discharge management guidelines.	Average age: 71 years, 55.3% women. NYHA FC II: 59%, III: 19.2%. 80.9% received BB, 76.1% ACEI or ARB and 38% spironolactone. Compliance with the guidelines was adequate in 52.6% for BB, 77.7% for ACEI or ARB and 78.5% for spironolactone. IH mortality: 10.6%
Chaves *et al.* (17) Prospective cohort n=462	Patients: decompensated HF. Objective: To determine the risk factors related to hospital mortality at 30 days.	Average age: 72.4 years, 51.9% women. AH: 80%, COPD: 43%. FC on admission NYHA III: 36.1%, IV: 58.2%. Median HS: 6 days, IH mortality: 8.9%, at 30 days: 13.8%. In the multivariate analysis, BUN >43 mg/dL (OR=3.45, 1.54-7.74) was associated with IH mortality and NT-ProBNP (OR=2.52, 1.25-5.08) and EH >5 days (OR=1.98, 1.04-3.75) at 30 days.
Saldarriaga *et al.* (18) Cross-sectional n=204	Patients: hospitalized with EF <40%. Objective: To evaluate differences in clinical, epidemiological and treatment characteristics according to sex.	36.7% women. Mean age in women (69 vs. 65.4), history of major kidney failure in women (66.7% vs. 51%), 12.7% used ICD. The drugs most used in both sexes were ACEI/ARB, diuretics and BB. In women, BB (54.7% vs. 62%) and ICD (9.3% vs. 14%) were used less frequently.
Ocampo-Chaparro *et al.* (19) Prospective cohort n=106	Patients: aged >75 years and hospitalized. Objective: To describe the clinical characteristics and 30-day survival in a tertiary care university hospital.	Average age: 82 years, FC III and IV: 61.3%. Etiology: AH: 44.3%, ischemic heart disease: 26.4%. Median HS: 10 days. IH mortality: 3.8%. Readmission within the last year: 24.5%. Cause of decompensation: arrhythmia (25%), ischemia and poor adherence (17% each), infection (13%). The use of standardized protocols and aggressive management since admission was related to good clinical outcomes.
Outpatient setting		
Marín *et al.* (20). Descriptive, prospective, n=34	Patients: HF and cardiac resynchronization device. Objective: To determine if BNP is a marker of therapeutic response and prognosis.	Average age: 63.8 years, 56% men. Ischemic heart disease: 50% and idiopathic heart disease: 20%. Management: diuretics (82%), ACEI or ARB (79%), BB (68%), spironolactone (65%). Pre-implant EF: 23.1% and post-implant: 31.9% (p<0.002). Average pre-implant BNP 987.78 pg/mL; at the end: 562.72 pg/mL (p<0.0001).
Castaño-Castrillón *et al.* (21). Cross-sectional n=370	Patients: HF in the first level of care. Objective: To know and analyze the behavior and management in the first level of care	Average age: 69.6 years, 55.4% men. COPD: 31.4%, AH: 21.1%. NYHA FC II: 40%, NYHA III: 27.6%. 27.8% was readmitted at one year, 33.2% had two re-admissions, 15.7% had no re-admissions; 88.7% received ACEI or ARB II, 16.8% BB, 93.2% furosemide and 50.5% spironolactone.
Rodríguez & Gómez (22). Descriptive, retrospective n=557	Patients: HF, with records of weight, age and creatinine. Objective: To estimate the prevalence of kidney failure	Average age: 62 years, 68.2% men. Average creatinine 1.33 mg/dL, creatinine clearance 63.2 mg/min; 82.8% had impaired renal function: creatinine clearance in 37.6% between 60-89 mL/min, in 51.8% between 30-59 mL/min, in 9.1% between 15-29 mL/ min and 1.5% <15 mL/min.
Torres-Navas *et al.* (23). Cross-sectional n=68	Patients: participants in a HF program that attended psychological and social evaluation. Objective: To determine psychosocial characteristics in the first 3 months of admission to the program and its correlation with FC, EF, NT-ProBNP.	Average age: 68.7 years, 60.3% men. Ischemic heart disease: 45.6%. NYHA III-IV FC: 44%. EFLV <40%: 59%. Average NT-ProBNP: 1 665. Patients with higher NYHA FC had a worse quality of life (p<0.001). The emotional state was abnormal in 11.9% and showed direct correlation with NT-ProBNP.
Gómez (24) Cross-sectional n=151	Patients: age >21 years, outpatient, with HF. Objective: To determine the ratio of patients with HF and EF >45% and to compare the clinical characteristics with EF <45%. Analysis for Colombia of the I-PREFER study.	67.5% had EF >45%. Women has a higher incidence (57.8% vs 40.8%, p=0.04) and higher BMI (26.8 kg/m² vs. 24.6 kg/m², p=0.002), HBP (129 mmHg vs. 117 mmHg, p <0.001) and diastolic (76 mmHg vs. 71 mmHg, p=0.014). Data were similar to the global population of I-PREFFER.

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General characteristics		Main results
Outpatient setting		
Arango-Franco *et al.* (25) Cross-sectional n= 70	Patients: Advanced HF with functional electrophysiological device. Objective: To describe patients with advanced HF and the use of electrophysiological devices.	67% men. NYHA FC II: 26%, III: 57.6% IV: 11%. EF >35: 20%, 15-35: 68%. Stage C: 94.2%, QRS width: 75.6%. Resynchronizer: 25.7%, ICD: 41.4%, resynchronizer+ICD: 32.9%. Comorbidities: AH: 91.4%, CAD: 60.9%, DM2: 31%, ventricular arrhythmia: 42.3%.
Triviño *et al.* (26) Cross-sectional n=40	Patients with stage C HF, NYHA FC II and III with EF >45%. Objective: To evaluate the relationship between BMI and cardiorespiratory parameters.	In subjects with BMI ≥25, a negative correlation was observed between the distance reached in the 6-minute walking test (rho=-0.50), the number of steps (rho=-0.45), VO_2max (rho=-0.49) and EF (rho=-0.32).
Senior *et al.* (27) Cross-sectional n=151	Patients: HF who attended a heart failure clinic. Objective: To establish the presence of musculoskeletal pathology in the studied population.	Average age: 68 years, 55.6% men. Etiology: CAD 27.8%, hypertension: 25.8%. NYHA FC I: 26.5%, II: 33.1%, III: 32.5%. Musculoskeletal pathology in 31.8%, the most frequent: osteoarthritis of the hip or knees (6.6%) and rotator cuff tendinitis (4.6%), myofascial and lumbar pain (3.3% each). There was no association between CF and musculoskeletal pathology.

HF: Heart Failure; IH: In-hospital; BMI: Body Mass Index; HBP: High blood preasure; Hb: Hemoglobin; NYHA: New York Heart Association; EF: ejection fraction; EFLV: Ejection fraction of the left ventricle; AH: Arterial Hypertension; DM2: Diabetes *mellitus* tipo 2; FC: Functional Classification; OR: Odds Ratio; CAD: Coronary artery disease; ACEI: Angiotensin converting enzyme inhibitors; ARB: Angiotensin II receptor blockers; BB: Beta blockers; HS: Hospital stay; HR: Heart rate; ACS: Acute coronary syndrome; BNP: Brain natriuretic peptide; BUN: Blood Urea Nitrogen; NT-ProBNP: N-terminal prohormone of brain natriuretic peptide; ICD: Implantable Cardioverter Defibrillator; COPD: Chronic obstructive pulmonary disease; VO_2max: maximum oxygen consumption; GWTH-HF: Get With The Guidelines-Heart Failure
Source: Own elaboration based on the data obtained in the study.

Table 3. Studies related to interventions or costs.

General characteristics		Main results
Núñez *et al.* (28) Prospective cohort n=27	Patients: HF NYHA III or IV. Objective: To determine whether left ventricular reconstruction surgery and annuloplasty or mitral valve replacement technique improve survival and FC at 6 and 12 months.	Average age: 60 years. The Dor technique decreased the ventricular dimensions by 20% and increased EF by 17.3-25%. Mitral preservation techniques did not produce changes in hemodynamic parameters. During follow-up, 92% had FC I, IH mortality was 3.4% and 3.5% at 8 months.
Achury-Saldaña (29). Quasi-experimental study n=50	Patients: Hospitalized for HF Objective: To determine the effect of an educational plan on self-care and adherence.	Average age: 68 years, 54% men, 66% FC II. Training the patient in the treatment, an adequate relationship with the nursing staff and the involvement of the family improved adherence according to the Likert scale from 73 to 89.4 (p=0.0001).
Atehortúa *et al.* (30). Quasi-experimental study n=22	Patients: compensated HF stage C, NYHA II-III, EF <45%. Objective: To evaluate the effect of a cardiac rehabilitation program on functional capacity, NT-proBNP, cardiac function and quality of life.	Average age: 59 years, 77.3% men. Average VO_2max improved from 26.4±6.4 to 34.5±77 mL.kg-1.min-1, (p<0.001). Distance in the 6-minute walk test increased from 438±67.9 meters to 513±83.4 (p<0.001). EF increased from 32.68±8.8% to 38.82±9.16% (p<0.001). Improvement was observed in quality of life in the domain "change in health over time" (p<0.05).
Quiroz *et al.* (31). Cohort study n=224	Patients: HF of ischemic origin. Objective: To establish the impact of cardiac rehabilitation on the modified Borg scale, VO_2, MET and distance in miles.	Average age: 64 years, 81.7% men. Pre-rehabilitation: 63% on Borg scales 1 and 2; post-rehabilitation: 85% on scales 3 and 4 (p<0.001). VO_2 improved from 7.79 to 19.04 (p<0.001), MET from 2.22 to 5.44 (p<0.001) and distance in miles from 1.33h to 2.58 (p<0.001).
Senior *et al.* (32). Case series n=21	Patients: >18 years with severe decompensated chronic HF, Stevenson B or C who received levosimendan. Objective: To evaluate the efficacy and safety of levosimendan in the population.	Average age: 48 years, 81% men. Non-ischemic heart disease: 81.2%. Average EF: 30%. NYHA FC IV: 62.5%, 25% required vasopressors. Levosimendan was well tolerated; no significant side effects were observed. 23.8% required re-admission at 2 months and mortality during this period was 28.6.%.
Arredondo-Holguín *et al.* (33) Quasi-experimental study n=29	Patients: >30 years with HF. Objective: To evaluate the improvement of self-care behaviors after an educational nursing intervention through the Artinian scale.	Average age 65 years, 52.2% women. 82.8% were NYHA FC between II and III. The median scale improved from 40 to 53 (p<0.05). The aspects with the greatest changes were: request for help, adaptation to the disease and adherence to pharmacological treatment. No favorable changes were observed regarding the reduction of salt intake and measurement of the amount of urine eliminated.
Rodríguez-Gázquez *et al.* (34) Diseño: Design: RCT without blinding n=63	Inclusion: >30 years with HF. Objective: To evaluate the effectiveness of an educational nursing program in the improvement of self-care behaviors.	Average age: 67.9 years, 31% men. 80% received family support. EF: intervention group 41.7% and control group 46%. 66% of the intervention group vs. 26.6% of the control group improved by at least 20% in the self-care score (p<0.001). NNT 2.5.
Camargo-Rojas *et al.* (35) Quasi-experimental study n=21	Patients: hospitalized with HF. Objective: To determine if motivational interview is effective to promote self-care in these patients.	Average age: 67 years, 57% men; 52% belonged to low socioeconomic stratum. An overall increase in self-care from medium to high was observed according to the European Heart Failure Self-Care Behaviour Scale in all categories (compliance with the therapeutic scheme, ability to adapt to the disease and seek help in case of exacerbation).
Tamayo *et al.* (5) Cost study n=158	Patients: hospitalized for HF and outpatient. Objective: To carry out an approximation to the determination of direct costs of HF in two hospitals.	Average age: 62 years, 63% men. Average monthly cost of outpatient management COP 304 318; 55.2% spent on medications. The average cost of hospitalization was COP 6 427 887. EH represented the highest proportion of the cost (29.1%).
Romero *et al.* (36) Markov model n=100	Patients: 45 years with HF and AH. Objective: To conduct a cost-effectiveness assessment of metoprolol succinate vs. tartrate vs. carvedilol in patients with HF and AH.	The cost of patients with metoprolol succinate was lower than that for metoprolol tartrate and carvedilol (COP 229 vs. 346 vs. 464 million, respectively). Fewer hospitalizations were observed with metoprolol succinate. Carvedilol had lower mortality.

HF: Heart Failure; NYHA: New York Heart Association; FC: Functional Classification; EF: Ejection fraction; NT-ProBNP: N-terminal prohormone of brain natriuretic peptide; VO_2: Volume of oxygen; MET: Metabolic equivalent of task; COP: Colombian pesos, HS: Hospital stay; RCT: Randomized clinical trial; NNT: Number needed to treat; AH: Arterial hypertension.
Source: Own elaboration based on the data obtained in the study.

Continues.

Table 4. Observational studies that assessed self-care or patient perception.

General characteristics		Main results
Arredondo-Holguín (37). Cross-sectional n=206	Patients: compensated HF NYHA I, II or III. Objective: To describe behaviors and capabilities in self-care agency.	Average age: 60 years, 65.5% male. NYHA FC I: 59.7%, II: 33%. Frequency of self-care: high 14%, average 79% and low 7%. 46.2% had a low self-care frequency in request for help and 43.7% in adaptation to living with the disease.
Uribe *et al.* (38). Case series n=19	Patients: hospitalized for HF. Objective: To perceive the experience lived by patients.	Average age: 67.8 years, 68% women. AH 78.9%, dyslipidemia 52.6%. The patients clearly understood being heart patients and, to a great extent, attributed the onset of the condition to social causes. They recognized healthy lifestyles, but not all of patients implemented them.
Zapata-Gómez (39). Case series n=13	Patients: HF. Objective: To understand how patients perceive, interpret and respond to clinical manifestations.	Death is perceived as a close fact, which is strengthened by the restrictions that the disease imposes on them. This situation leads to important changes in their way of living and relating to people and the environment.
Achury-Saldaña *et al.* (40) Psychometric study. n=192	Patients: HF >18 years. Objective: To determine the reliability and construct validity of the instrument "Evaluation of adherence behaviors to pharmacological and non-pharmacological treatment"	The internal consistency index (Cronbach's alpha) was 0.7213. In the factorial analysis, most of the items coincided with the construct for which it was designed.
Rodríguez & Arredondo (41) Case series n=206	Patients: Compensated HF, NYHA I-III. Objective: To determine the validity and reliability of Nancy Artinian's assessment scale of self-care behaviors.	Average age: 60.6 years, 65.5% men. NYHA FC I: 59.7%. Factorial validation: four domains (request for help, adaptation to living with the disease, adherence to pharmacological treatment and adherence to non-pharmacological treatment) explained 34.2% of the variance of the construct. Final scale reduced to 21 items. Cronbach's apha: 0.75.
Rodríguez-Gázquez *et al.* (42) Cross-sectional n=266	Patients: compensated HF NYHA I, II or III. Objective: To explore the association between self-care agency capacity and factors related to the agency.	Average age: 62.1 years, 62% women. NYHA FC I: 50%, II: 35.3%. Average EF: 31.1%. Self-care capacity was deficient in 47%. Sufficient self-care agency was related to EF, age and married patients.
Arredondo-Holguín *et al.* (43) Descriptive n= 31	Patients: HF. Objective: To describe the difficulties for self-care behaviors related to adherence to non-pharmacological treatment.	Average age: 63 years, 54% women. NYHA FC I: 16.1% II: 38.7% and III: 45.2%. EF <50%: 66.7%. AH (83.9%), CAD (35.5%). All patients had difficulties in self-care related to non-pharmacological treatment. The most frequent: measurement of urine (100%), controlling salt intake (96.7%) and fluid restriction (93.5%).

HF: Heart Failure; NYHA: New York Heart Association; FC: Functional Classification; AH: Arterial Hypertension; EF: Ejection fraction; CAD: Coronary artery disease.
Source: Own elaboration based on the data obtained in the study.

One of the most relevant results was related to in-hospital mortality, with a rate of 3.8-28.6% (10-13,16,17,19,32); one study reported a rate of 13.8% of mortality at one month of and 45.2% at one year. (12) Furthermore, three studies reported data on median hospital stay, which was between 6-10 days (13,17,19); other three studies reported hospital re-admissions rates of 24.5%, 40.8% and 84.3% at one year (13,21,19), and another reported 23.8% re-admission rates at two months. (32) Some studies evaluated specific comorbidities, documenting a high presence of abnormalities in nutritional parameters (10), cardio-renal anemia (15), kidney failure (22), affective disorders (23) and musculoskeletal pathologies. (27)

With reference to interventions, two studies showed the beneficial effects of cardiac rehabilitation plans on patients (30,31), while four others showed an improvement in adherence to management or self-care by patients when performing interventions or educational plans led by nursing. (29,33-35)

An important percentage of works were developed by nursing professionals; 9 (25.7%) corresponded to self-care behavior interventions and adherence to medical treatment for heart failure in quasi-experimental studies in patients.

Discussion

The main motivation to carry out this research was the need to identify domestic studies on heart failure within the framework of the discussions generated based on academic work developed by our institution around this issue. Initial observations of references of domestic guidelines, texts or review articles showed few citations of original studies; therefore, establishing the actual amount of this type of publications and the topics treated was considered important.

The results of this research show that, in fact, there are few studies published based on the observation period, although the number of publications has increased recently. Likewise, almost all designs were observational and only one was a randomized clinical trial. It is important to highlight the lack of the latter design, which offers important results from the point of view of "evidence-based medicine" when evaluating medical interventions.

In Colombia, several investigations have been carried out with the objective of evaluating scientific production in the health area. Jaramillo-Salazar *et al.* (44) evaluated clinical research in the country based on the scientific production recorded in the Thomson-ISI database between 1975 and 2005, while Alvis-Guzmán & De la Hoz (45) analyzed the publications in Medline and LILACS databases in the period between 1993 and 2003. In both studies, there is a significant and progressive increase in the number of publications after the 1990s.

In this study, an increasing number of publications in the last five years was observed. It is important to note that, in the aforementioned research, the number of publications in basic sciences increased more than in clinical areas and, among them, tropical medicine, neurosciences and infectious diseases were the most common. (45) Therefore, the reduced amount of publications on heart failure in the 1990s is related to a lowest amount of publications in the area of clinical medicine in general.

Most of the works were published in Bogotá and Medellín. This is consistent with other reports in health sciences in general, although cities such as Cali provide a significant number of publications in other areas of biomedical research. (45-47)

Among journals evaluated, the Revista Colombiana de Cardiología journal had the highest number of publications, followed by Acta Médica Colombiana, which is an expected result. However, a significant number of articles were found in journals edited by universities. At this point, it is worth noting that, several of these

journals are indexed in Latin American databases such as LILACS or Redalyc, and even some in international databases, but not all of them are, which makes it difficult to access their articles. This was one of the reasons why the digital search did not identify the total number of articles published, leaving manual search as the only option to identify them. This reinforces the importance of quality improvement processes in the journals, highlighted by various editors, to allow them to access international databases and achieve better scientific positioning. (48-51)

Research carried out by nursing professionals deserves special attention, since they contributed a good number of publications focused on self-care and some used qualitative methodology. This allowed obtaining valuable results that must be taken into account when comprehensively approaching the patient. The investigated issues are, in addition to the ones mentioned above, general description studies in inpatient and outpatient populations with heart failure, including studies on prevalence of specific comorbidities such as malnutrition and kidney failure. Although they are few, they offer relevant data on intra-hospital mortality, prevalence of comorbidities and treatment of this disease.

When reviewing Latin American literature, reviews on heart failure that cite studies that address epidemiological, diagnostic and therapeutic aspects were found, especially in Brazil, Chile, Argentina and Mexico. (52-54) Argentina and Chile have national records (55,56) important to evaluate the behavior of the disease in the "real world". (57) Currently, Colombia does not have information on published records of heart failure. With some frequency, the country's institutions have been part of international studies that have evaluated multiple cardiovascular issues (58-62); however, specific data on the Colombian population are not always widely disseminated since there are no specific publications, which would represent a valuable contribution to the knowledge of our patients. The I PREFER record is one of the cases with this kind of publications. (33,63)

It has been established that research should fulfill two important functions. On the one hand, it should make an academic impact, which implies that research should be made public and discussed by the academic community involved and that it should be published in scientific journals, a fundamental part of the process. (64) The objective is to transcend the context of undergraduate and postgraduate programs and conference summaries. In the same way, once published, it should be identified and read by the actors of the community in question. Improving the visibility of published articles and generating an academic discussion around them is a challenge for all people involved in research and teaching processes in health. In this regard, citing more frequently and using domestic investigations as part of discussions of research articles is one of the tasks that should be given more attention. (48)

On the other hand, research should fulfill a social function that occurs when scientific knowledge achieves a benefit for society in general. Therefore, domestic scientific production should be considered when creating social impact policies in a given area. (6,65) In this regard, several studies have been conducted that raise the importance of using the results of research in decision making.

Mosquera *et al.* (66) established that the results of domestic studies did not guide public health decision-making in a departmental health ministry of Colombia and stated that one of the main barriers is the lack of policies and structure for the management of the investigative process. On the other hand, Gómez *et al.* (67) concluded that the potential influence of research on policy decisions depends on multiple factors, some of which may be "governable" by researchers, and stressed the importance of promoting greater contact with decision makers.

The Colombian population has different biological and social realities with respect to cardiovascular risk (68,69), as shown by studies carried out in Latin America; in consequence, it is essential to generate domestic knowledge. While it is true that participation in international research networks is important for strengthening the different scientific groups of the country, strengthening our own work agenda is no less important to enlighten and help provide solutions to our problems. (70,71)

From the academy, validation and local legitimization mechanisms of knowledge application processes that serve to consolidate the scientific tradition of the nation should be sought, without giving so much priority to the "centers of knowledge" that are often seen as models for local scientific activities. (72,73) The idea that "the interpretation of our reality with alien schemes only contributes to making us increasingly unknown, increasingly less free and increasingly lonely" remains valid. (74)

One of the limitations of this review is that it included articles published since 1980, which did not allow identifying articles published prior to this date. However, few Colombian journals began publishing earlier. The review was limited to published studies and did not include results of abstracts or thesis, considered as products of research processes. Abstracts were excluded taking into account that many times they do not provide the data necessary to carry out a complete analysis of the research, while theses were discarded mainly because a systematic way for searching was not identified and, at the moment of carrying out the research, not all universities had a standardized form of thesis file. This undoubtedly generates a potential publication bias, inherent to the research itself. The main strength of this study was that a manual review was carried out which allowed to identify articles that were not found with a digital search.

Conclusion

The amount of original investigations published on heart failure is scarce; most of them were conducted recently, almost all in domestic journals. Descriptive design was the most common form, and the most frequently addressed subjects were self-care and population descriptions.

Conflicts of interests

None stated by the authors.

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Annex 1

Table A1. Journals of the national bibliographic index-IBN Publindex I 2013 update included for review.

	ISSN number	Name of the journal
Area of knowledge: clinical medicine		
1	0121-0793	IATREIA
2	1657-9534	Colombia Médica
3	2145-1362	RFS. Revista Facultad de Salud Universidad Surcolombiana
4	0123-7047	MedUNAB
5	0041-9095	Universitas Médica
6	0121-0807	Revista de la Universidad Industrial de Santander. Salud
7	0121-0319	MÉDICAS UIS
8	0124-308X	Revista de la Facultad Ciencias de la Salud
9	0122-0667	Revista Médica de Risaralda
10	0123-4250	Revista Médica Sanitas
11	0120-5498	Medicina
12	1692-6323	Revista CLON
13	0123-5583	Actualizaciones en Enfermería
14	0120-5633	Revista Colombiana de Cardiología
15	1692-7273	Revista Ciencias de la Salud
16	0121-7372	Repertorio de Medicina y Cirugía
17	0120-5552	Salud Uninorte
18	0121-0076	Revista ECM Escuela Colombiana de Medicina Órgano Oficial de la Facultad de Medicina, Universidad El Bosque
19	0124-1699	Investigaciones en Seguridad Social y Salud
20	0121-5256	Revista MED
21	0120-8705	CES Medicina
22	1657-9550	BIOSALUD: Revista de Ciencias Básicas
23	1692-0880	Medicina
24	0122-6916	Revista de la Asociación Colombiana de Gerontología y Geriatría
25	2215-7840	Revista Ciencias Biomédicas
26	1900-7841	Revista Colombiana Salud Libre
27	2248-5759	Revista Salud Bosque
28	0123-2576	Medicina & Laboratorio
29	1794-9831	Ciencia y Cuidado
30	1794-5240	Médicas UIS
31	0121-4500	Avances en Enfermería
32	1657-5997	Aquichan
33	1794-5232	Cultura del Cuidado Enfermería
34	1794-5992	Duazary
35	121-7577	Hacia la Promoción de la Salud
36	0124-8146	Investigaciones Andina
37	0124-2059	Investigación en Enfermería: Imagen y Desarrollo
38	0120-5307	Investigación y Educación en Enfermería
39	2145-5244	Manos al Cuidado
40	0124-4108	Perspectivas en Nutrición Humana
41	1909-1621	Revista Colombiana de Enfermería
42	1692-1879	Revista Colombiana de Rehabilitación
43	0124-0064	Revista de Salud Pública
44	0120-386X	Revista Facultad Nacional de Salud Pública
45	1657-7027	Revista Gerencia y Políticas de Salud
46	0123-1782	Revista Vía Salud
47	2145-9932	Revista CES Salud Pública
48	2216-0973	Revista Cuidarte
49	2011-7531	Salud Uninorte
50	0124-7107	Universidad y Salud
Area of knowledge: other medical sciences		
51	0120-2448	Acta Médica Colombiana
52	1692-3375	Umbral Científico
53	0120-0011	Revista de la Facultad de Medicina de la Universidad Nacional de Colombia
54	0120-4157	Biomédica
55	0121-2044	Revista de la Asociación Colombiana de Fisioterapia
56	0121-0041	Revista Colombiana de Medicina Física y Rehabilitación
57	0120-4874	Medicina UPB.
Area of knowledge: basic medicine		
58	0121-4004	Vitae

Continues.

Source: Own elaboration based on the data obtained in the study.

Table A2. Journals identified when searching for medical faculties not included in the Publindex list.

	ISSN number	Name of the journal
1	1657-320X	Archivos de Medicina
2	0123-4226	Revista UDCA Actualidad y Divulgación Científica
3	2145-5333	Ciencia y Salud Virtual

Source: Own elaboration based on the data obtained in the study.

Table A3. Excluded journals.

	ISSN number	Name of the journal
1	0121-8123	Revista Colombiana de Reumatología
2	0121-246X	Revista Facultad de Odontología Universidad de Antioquia
3	0120-3347	Revista Colombiana de Anestesiología
4	0124-3691	Revista Gastrohnup
5	0124-1265	Neuropsicología, Neuropsiquiatría y Neurociencias
6	2011-7582	Revista Colombiana de Cirugía
7	0034-7450	Revista Colombiana de Psiquiatría
8	1900-3080	Revista Nacional de Odontología
9	1657-0448	Revista de la Asociación Colombiana de Dermatología y Cirugía Dermatológica
10	0120-9957	Revista Colombiana de Gastroenterología
11	0120-8748	Acta Neurológica Colombiana
12	0123-9015	Revista Colombiana de Cancerología
13	0120-4319	Universitas Odontológica
14	0120-971X	CES Odontología
15	0123-7810	Revista Odontos Odontología Integral
16	0121-5426	Revista Colombiana de Neumología
17	1692-8415	Ciencia & Tecnología para la Salud Visual y Ocular
18	0120-8845	Revista Colombiana de Ortopedia y Traumatología
19	1692-5106	UstaSalud
20	0122-3429	Revista Colombiana de Menopausia
21	0123-4048	Neurociencias en Colombia
22	0120-789X	Revista Urología Colombiana
23	2145-7735	Revista Colombiana de Investigación en Odontología
24	0121-3873	Revista Estomatología y Salud
25	0120-3444	Universitas Odontológica
26	2145-5333	Ciencia y Salud Virtual
27	0121-2095	Revista Colombiana de Radiología
28	0120-0453	Revista Sociedad Colombiana de Oftalmología
29	2216-0280	Investigación y Educación en Enfermería
30	0034-7434	Revista Colombiana de Obstetricia y Ginecología
31	0120-0445	Revista de la Sociedad Colombiana de Psicoanálisis
32	1900-5121	Típica: Boletín Electrónico de Salud Escolar
33	1794-4732	UstaSalud Optometría
34	1692-7427	Revista Actividad Física y Desarrollo Humano
35	0124-5546	Revista Antioqueña de Medicina Deportiva y Ciencias Aplicadas al Deporte y a la Actividad Física
36	0123-9392	Infectio
37	1794-4333	Palestra
38	1657-2513	Revista Areté
39	0120-8411	Acta de Otorrinolaringología & Cirugía de Cabeza y Cuello
40	0120-2729	Revista Colombiana de Cirugía Plástica y Reconstructiva
41	0034-7418	Revista Colombiana de Ciencias Químico Farmacéuticas

Source: Own elaboration based on the data obtained in the study.

Annex 2.

Table A4. Search strategy - heart failure 1980-2015.

Database	Date	Results	Results after excluding duplicates
Medline–Pubmed	19/07/2016	583	406
Embase-Elsevier	19/07/2016	1 069	1 061
Cochrane Library	19/07/2016	492	492
LILACS	19/07/2016	453	452
Total		2 597	2 411

Source: Own elaboration based on the data obtained in the study.

MEDLINE - PUBMED

#24,"Search (((((((((heart failure) OR ""Heart Failure""[Mesh]) OR ""Heart Failure, Diastolic""[Mesh]) OR ""Heart Failure, Systolic""[Mesh]) OR chronic heart failure) OR decompensated heart failure) OR acute heart failure) OR congestive heart failure)) AND (((((((colombia) OR ""Colombia""[Mesh]) OR colombian) OR latin america) OR ""Latin America""[Mesh]) OR developing countries) OR ""Developing Countries""[Mesh]) Filters: Publication date from 1980/01/01 to 2015/12/31",583,05:56:29
#23,"Search (((((((((heart failure) OR ""Heart Failure""[Mesh]) OR ""Heart Failure, Diastolic""[Mesh]) OR ""Heart Failure, Systolic""[Mesh]) OR chronic heart failure) OR decompensated heart failure) OR acute heart failure) OR congestive heart failure)) AND (((((((colombia) OR ""Colombia""[Mesh]) OR colombian) OR latin america) OR ""Latin America""[Mesh]) OR developing countries) OR ""Developing Countries""[Mesh])",625,05:56:05
#22,"Search ((((((colombia) OR ""Colombia""[Mesh]) OR colombian) OR latin america) OR ""Latin America""[Mesh]) OR developing countries) OR ""Developing Countries""[Mesh]",140910,05:55:26
#21,"Search ""Developing Countries""[Mesh]",65910,05:54:48
#19,"Search developing countries",112295,05:54:27
#18,"Search ""Latin America""[Mesh]",9188,05:54:07
#16,"Search latin america",17320,05:53:43
#15,"Search colombian",3352,05:53:24
#14,"Search ""Colombia""[Mesh]",7062,05:53:07
#12,"Search colombia",19143,05:52:41
#11,"Search (((((((heart failure) OR ""Heart Failure""[Mesh]) OR ""Heart Failure, Diastolic""[Mesh]) OR ""Heart Failure,

Systolic””[Mesh]) OR chronic heart failure) OR decompensated heart failure) OR acute heart failure) OR congestive heart failure”,199172,05:52:07
#10,”Search congestive heart failure”,199172,05:51:10
#9,”Search acute heart failure”,32613,05:50:53
#8,”Search decompensated heart failure”,3316,05:50:33
#7,”Search chronic heart failure”,199172,05:50:11
#6,”Search “”Heart Failure, Systolic””[Mesh]”,984,05:49:40
#5,”Search “”Heart Failure, Diastolic””[Mesh]”,605,05:49:09
#4,”Search “”Heart Failure””[Mesh]”,97207,05:48:48
#3,”Search heart failure”,199172,05:48:18

EMBASE-ELSEVIER

#20 #11 AND #18 AND [1980-2015]/py 1,069
#19 #11 AND #18 1,182
#18 #12 OR #13 OR #14 OR #15 OR #16 OR #17 163,154
#17 ‘developing country’ 86,377
#16 ‘developing countries’ 53,990
#15 ‘south and central america’ 14,529
#14 ‘latin america’ 13,750
#13 ‘colombian’ 4,405
#12 ‘colombia’ 36,247
#11 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 299,896
#10 ‘congestive heart failure’ 88,421
#9 ‘acute heart failure syndrome’ 210
#8 ‘acute heart failure’ 15,534
#7 ‘decompensated heart failure’ 4,346
#6 ‘chronic heart failure’ 21,256
#5 ‘systolic heart failure’ 4,610
#4 ‘heart failure systolic’ 119
#3 ‘diastolic heart failure’ 2,680
#2 ‘heart failure diastolic’ 98
#1 ‘heart failure’ 299,896

COCHRANE LIBRARY

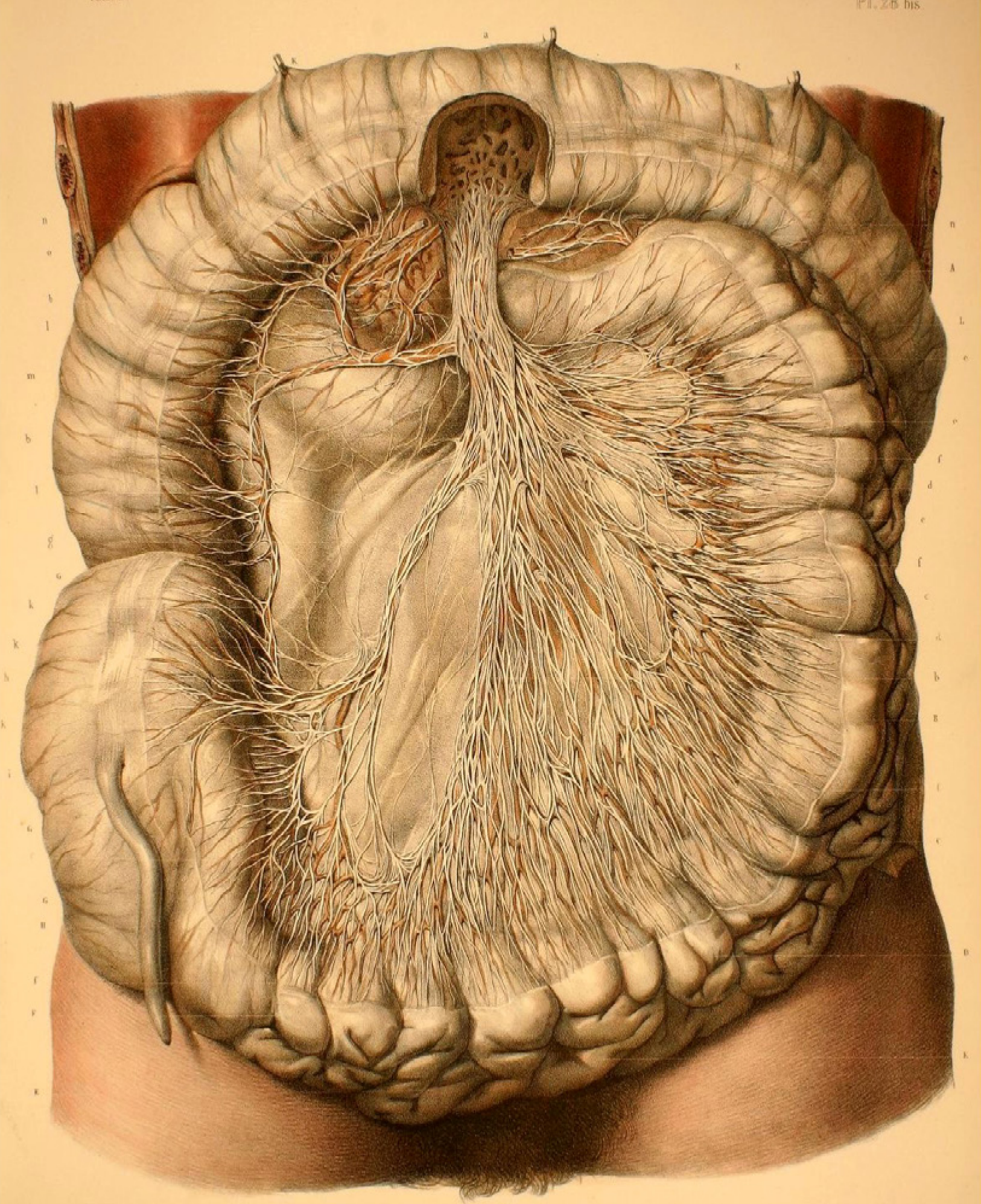
#1 Heart Failure 21018
#2 MeSH descriptor: [Heart Failure] explode all trees 6463
#3 Heart Failure, Diastolic 2424
#4 MeSH descriptor: [Heart Failure, Diastolic] explode all trees 30
#5 Heart Failure, Systolic 3808
#6 MeSH descriptor: [Heart Failure, Systolic] explode all trees 137
#7 Chronic heart failure 6695
#8 Decompensated heart failure 587
#9 Acute heart failure 5734
#10 Congestive heart failure 4897
#11 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 21027
#12 MeSH descriptor: [Colombia] explode all trees 135
#13 Colombia 799
#14 MeSH descriptor: [Latin America] explode all trees 105
#15 Latin america 915
#16 Developing countries 5086
#17 #12 or #13 or #14 or #15 or #16 6305
#18 #11 and #17 751
#19 #18 Online Publication Date from Jan 1980 to Jan 2015 492

LILACS

(tw:(falla cardiaca)) OR (tw:(falla cardiaca aguda)) OR (tw:(falla cardiaca crónica)) OR (tw:(falla cardiaca descompensada)) OR (tw:(falla cardiaca diastólica)) OR (tw:(falla cardiaca sistólica)) OR (tw:(insuficiencia cardiaca)) OR (tw:(insuficiencia cardiaca aguda)) OR (tw:(insuficiencia cardiaca congestiva)) OR (tw:(insuficiencia cardiaca crónica)) OR (tw:(insuficiencia cardiaca diastólica)) OR (tw:(insuficiencia cardiaca sistólica)) AND (tw:(Colombia)) OR (tw:(colombiana)) OR (tw:(colombiano)) OR (tw:(america latina)) OR (tw:(latinoamerica))

Combinado con los siguientes años:

AND year_cluster:(“2012” OR “2011” OR “2010” OR “2013” OR “2008” OR “2009” OR “2014” OR “2015” OR “2007” OR “2006” OR “2004” OR “2005” OR “2002” OR “2003” OR “1985” OR “1984” OR “1986” OR “2001” OR “1997” OR “2000” OR “1990” OR “1999” OR “1989” OR “1982” OR “1980” OR “1995” OR “1992” OR “1981” OR “1998” OR “1991” OR “1983” OR “1996” OR “1987” OR “1993” OR “1994” OR “1988”))



Jean Marc Bourgery
"Traité complet de l'anatomie de l'homme"
Paris 1832-1854