

## ORIGINAL ARTICLE

# Content validation of the nursing outcome Knowledge Heart Failure Management: Brazilian nurses' opinions

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## Abstract

**Purpose:** To estimate the content validity of the outcome *Knowledge: Heart Failure Management* (1835) of the Nursing Outcomes Classification (NOC).

**Methods:** A methodological study conducted in Brazil with nurses with expertise in cardiovascular nursing and nursing process. The nurse experts evaluated the relevance of the indicators for the nursing outcome on a 5-point Likert scale. A total of 55 indicators were analyzed, including 50 NOC indicators, four indicators located from a scoping review, and one suggested by an expert during the content validation process. The relevance ratio supported the categorization of indicators as critical, supplemental, or unnecessary. Relevance ratios of critical and supplemental indicators were summed and divided by the total number of the indicators to calculate the outcome content validity (OCV) score of the nursing outcome.

**Findings:** Fifteen nurse experts, mostly females ( $n = 13$ ) with a mean age of  $36.0 \pm 6.3$  years,  $13.9 \pm 6.5$  years of professional experience, and extensive use of the nursing process in their clinical practice ( $n = 10$ ), teaching ( $n = 13$ ), and research ( $n = 11$ ), participated in this study. Regarding the content validation, 43 (78.2%) out of 55 indicators were categorized as critical (relevance ratio .80–.98), 11 (20%) as supplemental (relevance ratio .67–.79), and one indicator (1.8%) was categorized as unnecessary (relevance ratio .48). The OCV score of the nursing outcome was .87.

**Conclusion:** The study provided evidence of content validity of 49 indicators of the NOC outcome, *Knowledge: Heart Failure Management*, and five new indicators identified through the validation process based on nurse experts' opinions.

**Implications for the nursing practice:** These findings provide evidence-based indicators for the measurement of heart failure patients' knowledge about disease management. As a result, nurses can test the effectiveness of nursing interventions based on valid outcome indicators.

## KEYWORDS

Classification, heart failure, knowledge, standardized nursing terminology, validation study

## 1 | INTRODUCTION

Heart failure (HF) is a complex syndrome characterized by chronic signs and symptoms such as dyspnea, orthopnea, lower limb edema,

elevated jugular venous pressure, and pulmonary congestion (Benjamin et al., 2018). HF is associated with multiple hospital readmissions, increased morbidity, and premature mortality (Inamdar

& Inamdar, 2016). Over 6 million Americans aged 20 years or older were affected by this syndrome between 2013 and 2016 (Virani et al., 2020). The prevalence of HF is expected to increase 46% from 2012 to 2030, thereby elevating the HF incidence from 2.42 to 2.97% (Virani et al., 2020). Although the majority of studies with patients diagnosed with HF are conducted in the United States, social inequalities can impact HF outcomes in middle-income countries. HF incidence in Brazil is around 240,000 new cases every year (Gioli-Pereira et al., 2019).

Recent studies suggest the positive impact of HF management programs on patients' quality of life, decreasing HF-related hospitalizations and health care costs (Carneiro et al., 2016; Souza et al., 2017; Van Spall et al., 2017). One of the strategies used by HF management programs is nurse-led HF inpatient education, with positive outcomes especially on patients' knowledge (Toback & Clark, 2017). Lacking knowledge has been identified as a major factor in the delay to search for specialized help because patients with HF do not know how to recognize signs and symptoms associated with HF (Farmer et al., 2016). Moreover, patients with insufficient knowledge do not know which strategies should be adopted to improve their health status (Sousa & Santos, 2019). Increased knowledge has been shown to impact positively on self-care maintenance and management behaviors (Awoke et al., 2019). The success of HF management programs is related to lifestyle modifications based on knowledge of the disease such as smoking and alcohol cessation, adequate diet, and exercise training (Toback & Clark, 2017).

There are a variety of instruments to assess patients' knowledge about HF including the *HF Knowledge and Self-Care Questionnaire* (Artinian et al., 2002), the *Atlanta Heart Failure Knowledge Test* (Reilly et al., 2009), the *Dutch Heart Failure Knowledge Scale* (van der Wal et al., 2005), the *Japanese Heart Failure Knowledge Scale* (Kato et al., 2013), and the nursing outcome *Knowledge: Heart Failure Management*, of the Nursing Outcomes Classification (NOC) (Moorhead et al., 2018). Particularly, the NOC outcome, *Knowledge: Heart Failure Management*, is defined as the degree to which the understanding about HF, treatment, and the potentially preventable exacerbations and complications of HF is conveyed (Moorhead et al., 2018). The fourth edition of NOC (2008) introduced this NOC outcome which contains 50 indicators to evaluate patients' knowledge for management of HF using a 5-point Likert scale ranging from 1 = no knowledge to 5 = extensive knowledge (Moorhead et al., 2018).

Compared to other measurement tools, the NOC outcome, *Knowledge: Heart Failure Management*, provides a more comprehensive tool for measuring patients' knowledge about HF management, which includes knowledge of the disease, treatment, and the potentially preventable exacerbations and complications of HF. Having reliable and valid instruments to measure the effectiveness of health education on patients' knowledge about HF is critical for researchers and clinicians delivering care for patients with HF. Nonetheless, the validation of the NOC outcome, *Knowledge: Heart Failure Management* has not been performed, in a Brazilian population.

## 2 | BACKGROUND

Multidisciplinary treatment of patients with HF, including continuous patient engagement in HF management, is imperative, given the symptoms burden, impaired quality of life, and morbidities associated with HF (Sedlar et al., 2017). To achieve effective HF management, patients must acquire knowledge about the condition, treatment, and recognize and interpret signs and symptoms (Jacobson et al., 2018). Thereby, standardized nursing outcome terminologies are valuable instruments for the measurement of the necessary information for patients to understand the condition, the preventable symptoms, and modify behaviors (Moorhead et al., 2018). Validation studies are needed to support the use of nursing outcome terminologies in clinical practice and promote an accurate evaluation of the effectiveness of nursing interventions for patients with HF.

In the last decade, studies estimating the content validity of NOC outcomes related to the management of chronic diseases have been published. Pancorbo-Hidalgo and Bellido-Vallejo (2019) conducted a study to estimate the psychometric properties of the outcome, *Knowledge: Pain Management*, in patients with chronic pain in primary care centers and hospitals in Spain. Twenty-one pain experts, 19 nurses and two physiotherapists, assessed the relevance of 30 indicators using a 4-point Likert scale (Pancorbo-Hidalgo & Bellido-Vallejo, 2019). The content validity of the overall outcome was .92, and only one indicator (3.4%) did not reach the preset values with a content validity index of .76 (Pancorbo-Hidalgo & Bellido-Vallejo, 2019).

Oh and Moorhead (2019) validated two nursing outcomes focused on knowledge and self-management for people with diabetes. Seven nurse experts on NOC and nine individuals with expertise on diabetes self-management evaluated the degree of importance of indicators for measuring the respective outcomes (Oh & Moorhead, 2019). For the outcome *Self-Management: Diabetes*, 38 of 44 indicators (86.3%) were considered critical, with an overall outcome ratio of .88. The outcome, *Knowledge: Diabetes Management*, reached an overall ratio of .92, and 35 of 36 indicators (97.2%) were identified as critical (Oh & Moorhead, 2019). Recently, Oh and Moorhead (2020) also validated knowledge and self-management NOC outcomes centered on hypertension and lipid disorder. One hundred and ten indicators from four NOC outcomes were evaluated by 30 nurse experts; 85% were categorized as critical and 15% as supplemental to their respective outcomes (Oh & Moorhead, 2020). However, no validation studies focusing on patients' knowledge of HF management have been identified. Besides, the NOC outcome, *Knowledge: Heart Failure Management*, was last revised in 2013. Considering the availability of a translated version of the NOC outcome, *Knowledge: Heart Failure Management*, in Brazilian Portuguese, the purpose of this study was to estimate the content validity of this outcome based on Brazilian nurse experts' opinions.

## 3 | METHODS

A methodological study developed in four phases: (1) Literature search to support current and possible new outcome indicators;

(2) Development and validation of conceptual and operational definitions for the outcome indicators; (3) Preliminary analysis of possible new indicators; (4) Content validation of the nursing outcome based on nurse experts' opinion.

### 3.1 | Phase (1) Literature search to support current and possible new outcome indicators

Four researchers conducted a scoping review following the Joanna Briggs Institute guidelines (Peters et al., 2015) aiming to identify measurable characteristics or attributes of a patients' understanding conveyed about HF, treatment, and the prevention of disease progression and complications, that is, the definition of nursing outcome, *Knowledge: Heart Failure Management*. The following research question guided the review: "What are the attributes of the nursing outcome *Knowledge: Heart Failure Management*?" The scoping review offered empirical support for the current NOC indicators, the proposed new indicators, and provided content for the development of conceptual and operational definitions for the outcome indicators.

The literature search was performed using 11 databases, including gray literature, from which 8,072 studies were retrieved. After exclusion of duplicates and those studies which did not meet the research question, 143 full articles were retained, out of which 74 were included in the study. One hundred and thirty-three attributes were found and matched to at least one indicator of *Knowledge: Heart Failure Management*. However, 16 attributes did not have any correspondence with the NOC indicators. The attributes with no correspondence were grouped into eight categories by content similarity, and labels were assigned for each group, totaling eight new possible indicators.

### 3.2 | Phase (2) Development and validation of conceptual and operational definitions for the outcome indicators

Establishing definitions for the outcome indicators allow nurses to implement the NOC classification in clinical practice and evaluate the effectiveness of nursing interventions to improve patients' health status (Hoskins, 1989, pp. 126–131). In this phase, 11 studies identified in the scoping review provided content for the development of 15 definitions for the outcome indicators. For the 43 remaining indicators, textbooks, guidelines from specialty societies, and articles related to HF knowledge provided content for the development of definitions.

The conceptual and operational definitions were validated by seven nurses of the research group *Nursing Diagnoses, Interventions and Outcomes* of the School of Nursing, University of Sao Paulo, Brazil. The nurses were considered eligible experts because they scored at least five points in an expert classification system (Guimarães et al., 2016). The experts evaluated the simplicity and clarity (Pasquali, 2010) of the conceptual definitions. The nurses also evaluated the simplicity, clarity, behavior, precision, and amplitude (Pasquali, 2010) of the operational definitions.

Simplicity is defined as the expression of a unique idea; a definition is considered clear when it is intelligible to all individuals regardless of the level of education. The "behavior" criterion is met when the definition does not express an abstraction or construct, but a behavior. A definition is precise when it makes it possible to distinguish one indicator from another. Finally, the amplitude criterion is met when it discriminates patients at different levels of magnitude of the indicator (Pasquali, 2010). The experts analyzed each criterion using a 3-point Likert scale, in which (-1) = disagree; (0) = neither agree nor disagree; (+1) = agree. For the interpretation of the results, a minimum agreement index of 80% was considered satisfactory (Pasquali, 2010).

Nine meetings with seven experts were conducted from February to April 2018. Regarding the conceptual definitions, 24 indicators were adjusted to express more clearly their theoretical meaning. The experts also suggested adjustments regarding the number of examples provided in all operational definitions, by adding the expression "or other" at the end of the definitions. The experts' suggestions improved the definitions, and all indicators achieved the predetermined agreement value (.80).

### 3.3 | Phase (3) Preliminary analysis of possible new indicators

The scoping review identified eight possible new indicators: *Usual course of disease*, *Concept of disease*, *Actions to promote dignified death*, *Strategies to manage blood pressure*, *Recommended appointments with healthcare professionals*, *Correct name of prescribed medication*, *Correct use of prescribed medication*, and *Causes of readmission*. To confirm whether the possible new indicators expressed new measurable characteristics of the nursing outcome, each one was analyzed by the review panel concerning the simplicity, clarity, precision, and consistency with the conceptual definition. Assisting the judgment of experts, the criteria were structured as dichotomous questions. The possible new indicators were considered new if a consensus was reached for each criterion. As a result, four of the new indicators were eliminated, and the following four indicators were retained: *Usual course of disease*, *Correct name of prescribed medication*, *Correct use of prescribed medication*, and *Actions to promote a dignified death*.

### 3.4 | Phase (4) Content validation of the nursing outcome based on nurse experts' opinion

There is no known consensus in the literature about the sample size needed to conduct content validation studies, and nurse researchers have been adopting different sample sizes for content validity studies (Emidio et al., 2020; Santos et al., 2016). For the present study, a literature search on the Virtual Health Library (VHL) in February 2018, using the following strategy: "validation studies" AND "nursing process" determined the sample size. The researchers reported sample sizes varying from six to 30 experts. Based on the literature, a nonprobabilistic convenience sample composed of 15 nurse experts is acceptable.

Nurse experts were located through active searching in the Directory of Research Groups of the National Council for Scientific and Technological Development (CNPq) in Brazil and snowball sampling techniques (Polit & Beck, 2011). The expert classification system used in phase 2 also guided the selection and inclusion of the nurse experts for the content validation (Guimarães et al., 2016). The criteria for the classification of experts were minimum clinical experience of four years in cardiology or cardiovascular nursing, minimum teaching experience of one year in cardiology or cardiovascular nursing and nursing classifications, Ph.D. and/or master's degree and/or nursing residency in cardiology or cardiovascular nursing, and participation in a research group in cardiology or cardiovascular nursing for at least two years.

### 3.5 | Data collection

Data collection from nurse experts was carried out from May to July 2018 using a structured survey. After signing the informed consent, the nurse experts received the survey by e-mail with a two-week return deadline. A new electronic contact was made extending the return deadline. Experts who did not return the completed survey at the end of four weeks were excluded from the study. The data from the returned surveys were extracted into a Microsoft Excel® spreadsheet and were anonymized using an alphanumeric code associated with the nurse expert. Considering the length of the survey, the nurse experts would be contacted again in case of missing responses.

Demographic, academic, and professional data were used to characterize the nurse experts who evaluated the relevance of each indicator to measure patients' HF knowledge. Relevance was defined as the degree to which each indicator is consistent with the outcome (Pasquali, 2010). Considering the conceptual definition for each indicator, the nurse experts assessed the relevance of each indicator using a 5-point Likert scale, in which 1 = not relevant; 2 = less relevant; 3 = moderately relevant; 4 = very relevant; and 5 = extremely relevant. Also, nurse experts were able to make comments and suggestions for each indicator as part of the survey.

One expert suggested a new indicator, *Strategies to manage thirst*, including conceptual and operational definitions. The researchers accepted the suggestion and the indicator was reviewed by the same review panel who participated in phase 3. According to the panel, this indicator met the criteria to be added as a new indicator. Thus, 55 indicators were analyzed by the nurse experts: 50 from the NOC outcome, four identified in the scoping review, and one suggested during the content validation process.

### 3.6 | Data analysis

The software R version 3.5.3 was used to analyze the data. Descriptive statistics—absolute (n) and relative (%) frequencies, means, and standard deviations—were used to summarize the demographics, profes-

sional experience, and self-reported experience in the use of nursing process, standardized nursing languages, and NOC.

The relevance weighted score was calculated by assigning weights to the scores provided by the nurse experts using a 5-point Likert scale: 1 = .00; 2 = .25; 3 = .50; 4 = .75; 5 = 1.00. Relevance weighted scores for each indicator were summed and divided by the number of responses to calculate the relevance ratio (Scherb et al., 1998). Then, the indicators were categorized as critical (relevance ratio  $\geq .80$ ), supplemental ( $.80 < \text{relevance ratio} \leq .60$ ), or unnecessary (relevance ratio  $< .60$ ) (Scherb et al., 1998). To validate the outcome, relevance ratios of critical and supplemental indicators were summed and divided by the total number of the indicators to calculate the outcome content validity (OCV) score of the nursing outcome (Head et al., 2004; Head et al., 2003; Oh & Moorhead, 2019, 2020).

### 3.7 | Ethical considerations

The study obtained approval by the Ethics Committee of the institution under number 2.620.411. All nurse experts were informed about the purpose of the study and their anonymity and confidentiality were assured.

## 4 | FINDINGS

Thirty-seven potential nurse experts were located, although 12 (32.4%) did not respond to the invitation, and three (8.1%) declined. Seven (31.8%) of the 22 remaining experts did not return the surveys by the four-week deadline. Therefore, 15 nurse experts participated in this study, mostly females ( $n = 13$ , 86.6%), with a mean age of  $36.0 \pm 6.3$  years. The nurse experts' demographic, academic, and professional characteristics are presented in Table 1.

The majority of nurse experts self-reported extensive use of nursing process in their clinical practice ( $n = 10$ , 66.7%), teaching ( $n = 13$ , 86.6%), and research ( $n = 11$ , 73.3%). Regarding the use of standardized nursing languages, experts also reported comprehensive use in clinical practice ( $n = 11$ , 73.2%), teaching ( $n = 10$ , 66.7%), and research ( $n = 9$ , 60.0%). However, only two nurse experts (13.4%) reported a wide use of NOC in clinical practice, eight (33.3%) nurses had experience in research, and five (53.3%) in teaching. The relevance ratios of the indicators for the outcome, *Knowledge: Heart Failure Management* are shown in Table 2.

Forty-three indicators (78.2%) were categorized as critical (relevance ratio .80–.98), 11 indicators (20%) were categorized as supplemental (relevance ratio .67–.79), and only the indicator, *Signs and symptoms of depression*, was classified as unnecessary (relevance ratio .48) to evaluate the knowledge of HF management. The OCV score of the nursing outcome was .87. Of the total of 55 indicators, five (1%) were considered less specific to, at least, another indicator of *Knowledge: Heart Failure Management*, as shown in Table 3. Therefore, 54 indicators were considered validated by this research.

**TABLE 1** Nurse Experts' Demographic, Academic, and Professional Characteristics

| Variable   | Mean (SD)  |
|--|------------|
| Age  | 36 (6.3)   |
| Time of professional experience  | 13.9 (6.5) |
| Time of clinical experience in nursing in cardiology   | 7.2 (6.8)  |
| Time of experience teaching in cardiac nursing and nursing process                                     | 9.7 (4.4)  |
|  | n (%)      |
| Female gender  | 13 (86.6)  |
| PhD degree in Nursing  | 8 (53.3)   |
| Post-doctoral degree   | 4 (26.7)   |
| Master's degree  | 3 (20)     |
| Experience in teaching   | 15 (100)   |
| Experience in research   | 10 (66.6)  |
| Experience in clinical practice  | 4 (26.6)   |
| Participation in research group about nursing process or standardized language, for at least two years | 14 (93.3)  |
| Participation in research group about cardiac nursing, for at least two years                          | 6 (40)     |

## 5 | DISCUSSION

Insufficient knowledge of HF symptom management leads to clinical instability and consequently increases hospital readmissions (Albert et al., 2017). Measuring patients' knowledge may improve the management of HF symptom burden and reduce hospital admissions, as well as the costs of treatment. In this scenario, the nursing outcome, *Knowledge: Heart Failure Management*, may guide nurses and researchers on what aspects of HF management are important to be evaluated.

In our study, we validated 54 indicators focused on patients' knowledge of HF as critical or supplemental. The indicators include knowledge about the disease itself (n = 8, 14.5%), disease treatment (n = 37; 67.3%), and strategies to prevent disease progression and complications (n = 10; 18.2%). Knowledge about the disease can be conceptualized as the understanding of the normal function of the heart and changes due to HF, causes of HF, signs and symptoms, and prognosis of the disease. Recent publications have measured HF knowledge through a variety of different questionnaires. In 2011, a cross-adaptation and content validation of a HF knowledge and self-care questionnaire were conducted with 153 patients in a Brazilian hospital (Rabelo et al., 2011). The items of the questionnaire included topics such as signs and symptoms of HF and the definition of the disease (Rabelo et al., 2011). In 2015, two different studies applied the *Dutch Heart Failure Knowledge Scale*, a 15-item questionnaire to measure the knowledge of HF definition, etiology, recognition of symptoms, and other items (Davis et al., 2015; Hagglund et al., 2015). These HF knowledge questionnaires share similarities with the outcome, *Knowledge: Heart Failure Management*, which measures knowledge

**TABLE 2** Relevance of Indicators for the Nursing Outcome Knowledge: Heart Failure Management

| Code   | Indicator  | Relevance <sup>a</sup> (ratio, SD) |
|--------|--|------------------------------------|
| 183502 | Signs and symptoms of early disease                        | C (.98, .06)                       |
| 183505 | Signs and symptoms of progressive heart failure            | C (.98, .06)                       |
| 183537 | When to obtain assistance from a health professional       | C (.96, .08)                       |
| 183503 | Benefits of disease management                             | C (.95, .10)                       |
| 183525 | Strategies to manage weight                                | C (.95, .10)                       |
| 183526 | Strategies to increase diet compliance                     | C (.95, .10)                       |
| 183531 | Self-monitoring techniques                                 | C (.95, .10)                       |
| 183532 | Effects on lifestyle                                       | C (.95, .10)                       |
| 183540 | Strategies to manage the dyspnea                           | C (.95, .14)                       |
| 183542 | Strategies to manage edema                                 | C (.95, .14)                       |
| 183553 | Importance of tobacco abstinence                           | C (.95, .10)                       |
| 183555 | Importance of alcohol restrictions                         | C (.95, .10)                       |
| *      | Correct use of prescribed medication                       | C (.95, .10)                       |
| 183501 | Causes and contributing factors                            | C (.93, .11)                       |
| 183511 | Signs and symptoms of overexertion                         | C (.93, .11)                       |
| 183516 | Treatments to improve cardiac performance                  | C (.93, .14)                       |
| 183519 | Strategies to balance activity and rest                    | C (.93, .11)                       |
| 183527 | Medication therapeutic effects                             | C (.93, .11)                       |
| 183541 | Strategies to manage tachycardia                           | C (.93, .14)                       |
| 183548 | Recommended physical activity                              | C (.93, .11)                       |
| 183552 | Recommended fluid intake                                   | C (.93, .11)                       |
| 183554 | Strategies for smoking cessation                           | C (.93, .11)                       |
| 183515 | Strategies to control anxiety                              | C (.91, .18)                       |
| 183524 | Factors contributing to weight changes                     | C (.91, .15)                       |
| 183528 | Medication side effect                                     | C (.91, .12)                       |
| 183538 | Signs and symptoms of complications                        | C (.91, .20)                       |
| 183551 | Prescribed diet  | C (.91, .12)                       |
| 183529 | Medication adverse effects                                 | C (.90, .15)                       |
| 183535 | Adaptations for sexual performance                         | C (.90, .15)                       |
| *      | Strategies to manage thirst                                | C (.89, .12)                       |
| 183549 | Strategies to prevent overexertion                         | C (.88, .18)                       |
| 183512 | Relationship of physical and emotional stress to condition | C (.86, .15)                       |
| 183513 | Psychosocial effects of heart failure                      | C (.86, .15)                       |
| 183517 | Strategies to promote peripheral circulation               | C (.86, .15)                       |
| 183534 | Effects on sexuality                                       | C (.86, .15)                       |
| 183546 | Benefits of adequate rest                                  | C (.86, .18)                       |
| 183533 | Adaptations for role performance                           | C (.83, .18)                       |
| 183550 | Recommended immunizations                                  | C (.83, .22)                       |

(Continues)

**TABLE 2** (Continued)

| Code   | Indicator   | Relevance <sup>a</sup><br>(ratio, SD) |
|--------|---|---------------------------------------|
| 183559 | Adaptations for travel                              | C (.83, .18)                          |
| *      | Correct name of prescribed medication               | C (.83, .22)                          |
| 183547 | Benefits of regular exercise                        | C (.81, .27)                          |
| 183539 | Barriers to self-care                               | C (.80, .31)                          |
| 183557 | Correct use of oxygen                               | C (.80, .27)                          |
| 183504 | Basic actions of the heart                          | S (.78, .26)                          |
| 183536 | Available support groups                            | S (.78, .20)                          |
| 183545 | Health behaviors to promote physiological stability | S (.76, .33)                          |
| 183507 | Signs and symptoms of anemia                        | S (.71, .32)                          |
| 183521 | Strategies to increase resistance to infection      | S (.71, .31)                          |
| 183544 | Counseling available for depression                 | S (.71, .22)                          |
| 183558 | Risk associated with travel                         | S (.71, .31)                          |
| *      | Usual course of disease                             | S (.70, .35)                          |
| 183530 | Role of diagnostic tests for disease management     | S (.65, .20)                          |
| 183556 | How to use a pulse oximetry                         | S (.65, .29)                          |
| *      | Actions to promote dignified death                  | S (.61, .43)                          |
| 183543 | Signs and symptoms of depression                    | U (.48, .33)                          |

\*New indicators identified in the content validation study.

<sup>a</sup>C = Critical, S = Supplemental, U = Unnecessary.

about the disease through indicators such as *Basic actions of heart*, *Causes and contributing factors*, and *Signs and symptoms of early disease*.

Knowledge about disease treatment can be defined as the understanding of pharmacological and nonpharmacological strategies to decrease the progression of the disease and symptom burden. This is a characteristic of HF knowledge approached by the majority of studies. A systematic review published in 2016 described the psychometric properties of 12 HF knowledge questionnaires and summarized the main characteristics of knowledge (Vieira et al., 2016). The key attributes of knowledge identified in the review were “physical activity/exercises” and “monitoring of heart rate” (Vieira et al., 2016). These are similar to the outcome indicators *Signs and symptoms of overexertion*, *Strategies to prevent overexertion*, *Strategies to balance activity and rest*, *Benefits of adequate rest*, *Benefits of regular exercise*, *Recommended physical activity*, and *Strategies to manage tachycardia*. In 2017, a group of Jordanian researchers described the associations between knowledge, sociodemographic characteristics, and self-care behaviors in 236 patients with HF applying the Arabic version of the *Dutch Heart Failure Knowledge Scale* (Tawalbeh et al., 2017). The Arabic version of the HF scale also evaluates the knowledge about medications, fluid intake, diet, and nutrition, which are similar concepts measured by the outcome indicators *Prescribed diet*, *Recommended fluid intake*, *Medication therapeutic effects*, and *Medication side effects*.

**TABLE 3** Overlapped Indicators of the Nursing Outcome Knowledge: Heart Failure Management

| Indicators less specific                                      | Indicators more specific                                 |
|---|--|
| Factors contributing to weight (183524)                       | Signs and symptoms of progressive heart failure (183505) |
|   | Signs and symptoms of complications (183538)             |
| Treatments to improve cardiac performance (183516)            | Recommended physical activity (183548)                   |
|   | Prescribed diet (183551)                                 |
|   | Recommended fluid intake (183552)                        |
|   | Medication therapeutic effects (183527)                  |
|   | Medication side effects (183528)                         |
|   | Medication adverse effects (183529)                      |
| How to use pulse oximetry (183556)                            | Self-monitoring techniques (183531)                      |
| Healthy behaviors to promote physiological stability (183545) | Prescribed diet (183551)                                 |
|   | Recommended fluid intake (183552)                        |
|   | Self-monitoring techniques (183531)                      |
|   | Recommended physical activity (183548)                   |
| Strategies to prevent overexertion (183549)                   | Strategies to balance activity and rest (183519)         |

Finally, knowledge about the strategies to prevent disease progression and complications can be defined as the understanding of what can be done to stop or slow the advancement of HF and related problems. Several outcome indicators, such as *When to obtain assistance from a health professional*, *Importance of alcohol restrictions*, and *Importance of tobacco abstinence*, can measure this category of knowledge. The concepts identified in these indicators are also recognized in other studies. Rosen et al. (2016) aimed to assess changes in the self-care knowledge of patients with HF who were monitored by video chat. One of the items measured was the patients’ knowledge of when to seek medical assistance (Rosen et al., 2016). Other researchers conducted a randomized clinical trial with 80 patients to test the effectiveness of a health education pamphlet and telephone follow-up on the patients’ medication adherence, health-related quality of life, and psychological status (Yu et al., 2015). The concepts “importance of controlling alcohol consumption” and “avoiding or stopping smoking” were similar to those measured by the NOC outcome indicators related to the prevention of HF progression and complications.

In the content validity of the nursing outcome, only the indicator *Signs and symptoms of depression* was considered unnecessary by nurse experts. Nevertheless, this finding requires careful attention due to recent associations between mortality and rehospitalization in patients with *depression* (Farré et al., 2017). A cohort study conducted with 425 patients with HF, either hospitalized or during outpatient follow-up, identified 42.1% of patients presented a mild depression score (Farré et al., 2017). Mortality and rehospitalization rates in

patients with depression were 2.02 ( $p = .02$ ) and 1.42 times ( $p < .01$ ) higher when compared to those without depression in research conducted by Jani and colleagues (2016). Further exploration of the importance of depression on the outcomes of this population is needed.

## 5.1 | Limitations

Regarding the external validity of the findings, the convenience and nonrandomized sampling might be a limitation of this study. Finally, the content of the nursing outcome, *Knowledge: Heart Failure Management*, was validated by nurses with expertise in cardiovascular nursing and the nursing process. It is recognized that the inclusion of certified HF nurses would be beneficial to the study. However, Brazil lacks a Board of Nursing Specialties such as an Association of HF nurses. Further studies evaluating the patients' perspective about the relevance of the outcome indicators, and their usefulness in a clinical setting will contribute to obtain more accurate measures of HF knowledge or the implications for management.

## 6 | CONCLUSIONS

The study provided evidence of content validity of 49 indicators of the Brazilian version of the nursing outcome, *Knowledge: Heart Failure Management*, currently included in NOC, and five new indicators identified throughout the validation process based on nurse experts' opinion. Relevance ratios of 54 outcome indicators met the criteria for categorization as critical or supplemental indicators. Only the indicator, *Signs and symptoms of depression*, was considered unnecessary to measure the nursing outcome. Further studies with nurse experts from other countries should be conducted to confirm whether the indicator is, in fact, irrelevant to assess the knowledge of HF management.

Evidence of overlapped indicators was also identified based on nurse experts' judgments, although they were considered critical or supplemental to measure the HF knowledge in the management of disease. The findings support the need to conduct studies evaluating the accuracy of nursing outcome indicators to guide nurses' decisions into the selection of indicators that are sensitive to nursing interventions.

### IMPLICATIONS FOR THE NURSING PRACTICE

These findings provide evidence-based indicators for the measurement of patients' knowledge about HF management. As a result, nurses can test the effectiveness of nursing interventions based on valid indicators for the outcome *Knowledge: Heart Failure Management*.

### CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

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Dr. Natany da Costa Ferreira: Design and planning of the research project; obtaining, data analysis and interpretation; writing and critical review of article. Dr. Camila Takao Lopes: Critical review of article. Dr. Sue Moorhead: Critical review of article. Dr. Rita de Cassia Gengo e Silva Butcher: Design and planning of the research project; data analysis and interpretation; and critical review of article.

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