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The knowledge of nurses on self-management principles in heart failure and their role as patients' educators – a narrative review

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Abstract

Introduction and objective: Nurses have primary responsibility for delivering education for patients with heart failure (HF) based on the current knowledge and effective strategies for improving patients' self-management. This narrative review aimed to determine nurses' knowledge of self-management principles in HF, including their role as patients' educators. This narrative review was based on papers indexed in the following databases: PubMed, MEDLINE, CINAHL, Web of Science, and Scopus. The inclusion criteria comprised: full-length articles available in English, recent papers published between 2000 and 2022, studies addressing the topic of assessing nurses' knowledge of self-management in HF, and discussing the nurse's role as a self-management educator in HF.

Description of the state of knowledge: The main role of HF nurse is optimizing the therapeutic process, coordinating patients' care, objective monitoring of signs and symptoms, follow-up observation and check-up visits, and education for self-care and self-management. Therefore, nurses should be adequately trained in the principles of HF self-management and must have access to appropriate information provided to patients. A proper nurses' knowledge

of self-management principles of patients is a crucial component of chronic illnesses such as HF.

Summary: The knowledge level of nursing professionals is far from satisfactory. Therefore, nurses need more in-depth learning and understanding of the subject of HF through educational interventions and postgraduate training courses. In addition, nurses should have specialized knowledge and gain adequate competence to educate HF patients.

Keywords: nurses, knowledge, self-management, heart failure, education, narrative review

Introduction and objectives

The nursing staff, as members of the multidisciplinary team, has a critical role in the management of heart failure (HF). The nurse-led, multidisciplinary treatment of HF is mostly unquestionable and remains to be emphasized [1]. The range of nurses' roles across Europe is varied; however, the recent European Society of Cardiology (ESC) curriculum aimed to provide a framework for HF nurses to use in countries, including cross-cultural factors [2]. The main role of HF nurses is to optimize the therapeutic process, coordinate patients' care, objective monitor signs and symptoms, follow-up observation and check-up visits, but also education for self-care and self-management, including multidisciplinary HF management programs [3]. In addition, the HF nurses have an active role in monitoring physical and mental state, coordinating complex hospital care, planning intervention after hospital discharge, involving the patients and families in self-care interventions, and ensuring effective communication with the therapeutic team [4].

According to the currently implemented comprehensive care program, one of the most essential issues is educating HF patients [5]. The main education issues are as follows: monitoring symptoms, regular administration of medications (adherence, polypharmacy), dietary treatment, managing and recognizing exacerbation, controlling dietary habits and level of physical activity, and follow-up appointments [6]. The knowledge about optimal HF management is crucial for the patient to live longer and better control the symptoms and clinical state. Therefore, education of HF patients should involve (1) basics of HF disease and strategies for its treatment, (2) dietary counseling about sodium, (3) healthy lifestyle changes, (4) efforts to ensure solid medical adherence, (5) strategies to recognize alarming signs and symptoms, and (6) regular monitoring of body mass [7,8].

A definition of self-care proposed by the U.S. Institute of Medicine defines self-care as "the activities that people with one or more chronic diseases must undertake for their health; these tasks include medical management skills, management of roles and emotions resulting from the disease." [9]. A concept analysis of self-care proposed its definition as "the ability to care for oneself through awareness, self-control, and self-reliance in order to achieve, maintain, or promote optimal health and well-being" [10]. The effectiveness of education in preparing patients for self-care depends on the patient's potential and attitude, but also on the nurse's competence and experience in accomplishing these tasks. Therefore, nurses should be adequately trained in the principles of HF self-management and must have access to appropriate and approved information that is provided to HF patients [11].

Based on systematic reviews and meta-analyses, there are also controversial reports that nurse-led education of HF patients about self-care is not associated with improvements in their quality of life or knowledge about the disease. The number of randomized controlled trials (RCTs) on the effectiveness of nurse-led self-care education in HF is still limited, while

recent studies report mostly positive effects on patient health outcomes [12]. The HF educator has been shown to be an important resource for both nurses and patients, but at the same time, their educational activities are time-limited, and there is a need for easily accessible educational resources to optimize educational opportunities for HF patients [13]. Moreover, recent research and review papers report the limited available evidence regarding nurses' knowledge of HF self-management principles [14].

The current state of knowledge clearly indicates the need to conduct research on the discussed issues but also to systematize existing reports on nurses' resources and level of knowledge regarding HF self-management principles in the context of their educational role in comprehensive HF care. This narrative review aimed to determine the knowledge of nurses on self-management principles in HF including their role as patients' educators. The review had the following guiding questions: What is nurses' knowledge on self-management principles in HF, and what is their potential role as patients' educators?

Description of the state of knowledge

This review was prepared in accordance with the SANRA (Scale for the Assessment of Narrative Review Articles) guidelines [15]. Also, the Narrative Review Checklist was followed in terms of proper preparation of both the article's sections and content. Moreover, the PICO strategy used to develop the guiding purpose question and paper search was used: Patient (heart failure), Intervention (self-management, education), Control (not applicable), and Outcomes (knowledge). The descriptors were selected according to the Medical Subject Headings (MeSH) [16] terminology, and the combination of the following keywords was used: nurses, knowledge, self-management, self-care, heart failure, education, and teaching interventions.

The inclusion criteria comprised: (1) studies indexed in PubMed, MEDLINE, CINAHL, Web of Science, and Scopus databases, (2) full-length articles available in English, (3) recent papers published between 2000 and 2022, and (4) addressing the topic on assessing nurses' knowledge of self-management in HF, as well as (5) discussing the nurse's role as a self-management educator in HF. The study protocol was not a critical criterion in the selection of papers. However, editorial letters, commentaries, discussion papers, conference abstracts, reviews, and duplicates were excluded. In addition, the quality of the methodological evidence of the studies and the strength of recommendation using GRADE (Grading of Recommendations, Assessment, Development and Evaluation) [17] were not included due to the narrative character of this review.

Literature search

The main part of this narrative review, based on the literature search, selected 10 studies [18–27] involving a group of 1646 nurses providing care to HF patients. Of all included articles, 6 have been performed in USA, and the remaining 4 papers were from Europe – Poland (n=2), Cyprus (n=1), and Spain (n=1). According to the study design, 5 studies were cross-sectional surveys, 2 studies were exploratory and descriptive, 1 was mixed cross-sectional and descriptive, 1 was descriptive correlational, and 1 was a psychometric study. All studies have been published in the last two decades, from 2002 to 2022. An additional part of this review involved 5 papers [28–32] considering educational interventions for HF nurses to improve their knowledge of self-management skills which involved a total group of 588 nursing professionals.

Main literature review – nurses' knowledge

Albert et al. [18] in their exploratory and descriptive study involved a group of 300 nurses from the USA and evaluated their knowledge of HF self-management information and determined the effect of employment setting on differences in self-care knowledge. Nurses' knowledge of self-care in HF was assessed using a 20-item survey developed by the authors. Attention was paid to the validity and reliability of the tool entitled "Nurses Knowledge of Heart Failure Education Principles" (NKHFEP). This self-administered survey measured 5 HF education topics identified from the literature review: diet (3 questions), fluids or weight (7 questions), signs or symptoms of the deteriorating condition (6 questions), medications (2 questions), and exercise (2 questions). Expert HF nurses and patient education specialists from all participating centers assessed content and face-to-face reliability. The true overall score for the construct of knowledge of HF patient education was expected to be 87.5% or higher. Nurses who regularly care for patients with HF were expected to answer at least 17-18 questions correctly. The mean HF self-care knowledge score was 15.2 ± 2 . Correct responses to individual survey questions ranged from 19% to 98.3%. HF nurses (critical care setting, intensive care unit, or outpatient setting) scored higher on average than intensive care nurses (16.2 ± 1.7 vs. 14.7 ± 2.0). Home care nurses had a higher mean score than hospital nurses (15.9 ± 1.5 vs. 15.1 ± 2.0). This study showed that nurses' level of education on the principles of HF self-management might not be adequate. It was concluded that nurses must receive adequate support in acquiring knowledge to improve the quality and quantity of information given to HF patients before hospital discharge.

Washburn et al. [19] conducted a cross-sectional study on a convenience sample of 51 American nurses ($n=14$ from the intensive care unit and $n=37$ from the general medicine unit). The main objective of the study was to determine nurses' knowledge of HF self-management principles. The same questionnaire as in the above-described study was used, namely a 20-item true (yes) or false (no) NKHFEP survey [18]. This study showed that the mean HF self-care knowledge score was 14.6 ± 2 . There was no statistical difference in mean scores between the intensive care unit (14.7 ± 1.6) and the general medicine unit (14.5 ± 2.1). The percentage of nurses who answered each survey question correctly ranged from 20% to 100%. Two questions were answered correctly by all nurses: about the need for daily weight control when the disease is asymptomatic and about the importance of notifying the physician about the onset or severity of fatigue. The authors summarized that teaching patients about HF and emphasizing the importance of their participation in everyday care and management decisions allow patients to self-manage their disease. This attitude leads to better adherence and practice of more healthy behaviors improving clinical outcomes. It was concluded that nurses working in a small community hospital might not be educated sufficiently in the HF self-management principles.

Willette et al. [20] in their descriptive and correlational study involved a group of 49 American nurses from telemetry and cardiology units who were contracted to provide regular care for HF patients. The same 20-item written true/false NKHFEP survey [18] on HF management principles was used. Additionally, predictor variables including education level, years of experience, work environment, and work status (part-time vs. full-time) were included in this study. The results were as follows: the mean score for all studied nurses was 15.97 ± 1.94 (79.85% correct); the range of correct answers was 12 to 19 of 20 questions (60-95%); the percentage of correct answers to individual questions ranged from 16.3% to 100%; nurses scored >90% in 10 questions (this percentage is higher than in previous studies); individual scores ranged from 60-90% in 5 questions, and individual scores were <60% in 3 questions. It was discussed that the mean score on HF self-management knowledge of nurses was similar to scores found in previous studies by Albert et al. [18] and Washburn et al. [19] (15.97 [80%] vs. 15.2 [76%] vs. 14.6 [73%], respectively). It was explained that the nurses in

the present study performed slightly better because of three potential causes: the study location was a teaching hospital, the nurses were exclusively registered nurses who provided regular care to patients with HF, and the work environment included cardiac units. The researchers concluded that as the prevalence of HF increases, patients need to receive high-quality, accurate information about self-management skills and parameters for self-monitoring, which requires the highest level of knowledge from nurses who are patient educators.

Delaney et al. [21] performed a cross-sectional study on a total sample of 94 home care U.S. nurses. The main purposes were to evaluate home care nurses' knowledge of evidence-based education topics in HF management and determine the differences in nurses' knowledge in terms of education and work experience. The same as above, the 20-item NKHFEP survey [18] was used to assess knowledge in 5 main education subjects. Additionally, a single open-ended question was added to the survey: "What information would be most beneficial to you in managing a patient with HF?" to identify common themes among home care nurses' knowledge needs. In the present study, the following results were obtained: the mean score for HF knowledge was 15.78 ± 1.69 out of a possible 20 points (78.9%); the percentage of correct answers to each question on the survey ranged from 24.5% to 100%; in 10 questions, the percentage of correct answers ranged from 90% to 100%; in 3 questions, the percentage of correct answers ranged from >40% to <75%, and in 3 questions, <40%. A wide variation in depth of knowledge was observed in 4 of the 5 topics. The exercise subscale was the only topic in which all nurses scored >89% correct. Moreover, there were no statistically significant differences in NKHFEP survey scores were related to the education level; however, a statistically insignificant trend with higher NKHFEP survey scores was observed in nurses with longer 11-15 years of practice than those less experienced. It was summarized that home care nurses might not have adequate knowledge of evidence-based education on HF self-management; hence, there is a need to develop a curriculum to educate nurses on HF self-management, which may lead to improved quality of patient education and more effective self-care outcomes.

Hart et al. [22] conducted a two-phase, non-experimental psychometric study on a sample of 122 American nurses (95.1% female, aged 42.23 ± 11.41 years). The primary objective was to compare the psychometric properties of the original dichotomously scored NKHFEP survey [18] with its Likert-scored version. This study revealed the internal consistency reliability was 0.27 for the dichotomously scored NKHFEP version of the questionnaire and 0.70 for the Likert-scored version. The test-retest reliability of the Likert-scored version of the survey was $r=0.66$. Data from the Likert-scored items indicated that nurses had the most knowledge about the need to continue everyday diet even after HF symptoms had normalized (4.43 ± 0.51) and the least knowledge about how to counsel asymptomatic patients to cope with low blood pressure (2.11 ± 0.98). In addition, the Likert-scale version of the NKHFEP survey was found to be psychometrically stronger than the dichotomously scored version. The results of this study were also consistent with previous findings showing that nurses lack sufficient knowledge about serial weight monitoring and using the previous day's weight, ideal body weight, or dry weight in the process, as well as advising the patient to contact the physician for two different symptoms (low blood pressure in the absence of symptoms and transient dizziness in standing position).

Kalogirou et al. [23] in their cross-sectional survey, estimated the level of nurses' knowledge of basic HF self-management principles among 143 Cypriot nurses from five public urban hospitals who provided care for HF patients. The mean duration of the general nursing experience was 12.3 ± 10.54 years, and the cardiology nursing experience was 7.2 ± 7.29 years. The same 20 true-false item NKHFEP survey [18] was used to evaluate the level of HF self-management knowledge. The following results were obtained: mean HF self-care knowledge score was 13.57 ± 2.33 ; equivalent to 67.8%, and the range of individual

scores was 6-19; a percentage of 11.2 (n=16) had a total of correct responses equal to or less than 10 ($\leq 50\%$ correct answers), and a percentage of 38.5 (n=55) responded correctly to 15 statements or more ($\geq 75\%$ correct answers). Gender, hospital, and cardiac clinical experience do not significantly affect NKHFEP survey scoring. A statistically significant difference in the knowledge score was observed among critical care, cardiology, and medical unit nurses. Also, a significant difference was shown in comparing critical care nurses with cardiology unit nurses (14.1 ± 2.3 vs. 13.0 ± 2.1 , respectively). Only a weak negative correlation between correct NKHFEP survey scoring and duration of nursing practice was observed. The authors stated that the low knowledge level of nursing professionals might suggest that they are not able to provide accurate information during education. Therefore, it can be concluded that there is a gap between evidence-based nursing practice and applied nursing practice. There is an urgent need for nurses to update their knowledge and improve their educational skills regarding self-management in HF.

Mahramus et al. [24] performed a prospective, exploratory and descriptive study among 90 registered nurses (aged 42.9 ± 11.7 years) in U.S. who worked directly with HF patients. Most nurses had 10 or more years of experience (67.8%) and worked in the acute-care setting (71%). Nurses completed an online test using the 20-item NKHFEP survey [18]. The study revealed the following results: the main NKHFEP score was $71\pm 10.8\%$ (range: 20-90%); the percentage of correct items on each subscale ranged from $63.9\pm 30.0\%$ for medications to $83.3\pm 25.0\%$ for exercise; only 8.9% of nursing staff achieved a passing score of greater than 85%. Mean NKHFEP scores of registered nurses on the knowledge level were significantly higher than licensed practical nurses. Items with the lowest percentage of correct responses ($<50\%$) were in subscales related to knowledge about medications, management of signs and symptoms, and weight monitoring. The percentage of individual items on the test answered correctly varied widely (13-99%). Three questions regarding knowledge about signs and symptoms of worsening HF and weight monitoring were answered incorrectly by more than 75% of respondents. Also, there were no associations between scoring with any sociodemographic characteristics. In the authors' opinion, improving nurses' knowledge of self-management principles is crucial for the comprehensive education of patients with HF.

Jankowska-Polańska et al. [25] performed the first Polish trial among a large group of 277 nurses (n=48 cardiology intensive care, n=129 non-intensive hospital care, and n=50 family practices care), assessing their knowledge of HF self-care principles as a way to be prepared for educating patients about HF self-care maintenance and management. Also, for the study outcomes, the 20-item NKHFEP survey [18] was used. Translation of the survey into Polish with cross-cultural adaptation was completed using international standards. Also, sociodemographic data were collected on professional experience, place of work, and postgraduate and academic courses. The following results have been presented: mean NKHFEP survey scoring was 12.1 ± 2.7 , which equated to 60.4% (13.4%); the highest scorings were among nurses working in cardiology intensive care (12.39 ± 2.7) and noninvasive care (12.3 ± 2.7) and lowest in family practice care (10.74 ± 2.3). Furthermore, none of the item statements were answered correctly by all nurses; items with the highest overall knowledge scores were reporting new-onset or worsening of fatigue (91.7%) and reporting whether exercise tolerance worsened (89.6%); the incorrect response was highest for notifying a doctor for low, but asymptomatic, blood pressure (16.7%). Also, nurses' knowledge was associated with education level, number of graduate courses, and specialization in cardiac nursing. The alarming conclusions were provided that gaps in Polish nurses' knowledge of self-care principles in HF may lead to problems in providing adequate and qualitative education to patients with HF.

Dalfó-Pibernat et al. [26] prepared their cross-sectional and descriptive study involving a sample of 216 Spanish primary care nurses (aged 44.01 ± 11.2 , 89.4% women).

This study aimed to investigate the knowledge level of the HF self-management principles and to search for associations between sociodemographic, professional, and academic variables. As recommended by the developers of the NKHFEP study [18], a score of ≥ 18 correct responses from a possible 20 was considered an indicator of adequate HF self-management knowledge. The following results were obtained: average NKHFEP scoring was 15.6 ± 2.2 ; high rates of correct answers (percentage scores in high 90%) were obtained for the following themes: dyspnea, fluid intake, medication and lifestyle modification, and leg weakness or low exercise tolerance. An adequate knowledge level was observed in 16.7% ($n=10$) participants; a low level of correct responses, defined as total mean scores below 18-20 points, was observed in the following knowledge themes: cough, nausea/loss of appetite (43.1%), dry weight (22.7%) and non-symptomatic low blood pressure (40.7%). The knowledge level of primary care nurses in the principles of self-care in HF was higher among nurses who had completed the doctorate and in nurses who had received specific training in HF. Therefore, this study presented a high knowledge level among primary care nurses on the HF self-management principles. Also, it was shown that NKHFEP scoring was similar to American nurses [18–20,24], but at the same time, it was slightly higher than in other European countries like Cyprus [23] and Poland [25], where knowledge level on HF self-management principles in hospital setting was 13.57 (67.8%) and 12.1 (60.4%), respectively.

Our study by Krówczyńska and Jankowska-Polańska [27] is the second Polish study and the most recent worldwide trial published in 2022, presenting the most representative group of 304 nurses (90.79% female, aged 42.55 ± 10.03 years, experience 19.41 ± 11.34 years) who caring for HF patients. The standardized 20-item NKHFEP survey [18] to evaluate the level of HF self-management knowledge and an authorized survey to collect information on the nurses' sociodemographic and professional characteristics were used. It was found that the average NKHFEP survey scoring of correct answers was 13.94 ± 2.78 , which means that any nurse gave correct answers to all NKHFEP survey questions, and the obtained result confirms the average skills. Also, 53.55% nurses ($n=98$) demonstrated satisfactory, 33.33% ($n=61$) good, and 12.57% ($n=23$) inadequate level of knowledge (only one nurse obtained a very good result). The nurses presented the best knowledge on questions about physical activity (77.6% correct answers); similar scores were achieved for diet (69.95%), weight and liquids (69.16%), and administration of medications (68.85%). The poorest knowledge was related to HF deterioration symptoms (67.85%). Moreover, the overall knowledge score was the highest among nurses working in provincial specialty hospitals and university hospitals and the lowest in regional hospitals in small towns (14.98 vs. 14.35 vs. 12.83 vs. 11.89, respectively). It was summarized that the knowledge level of cardiac nurses on the principles of self-care in terms of HF patient education is satisfactory but does not address all mandatory issues. In particular, the recognition of disease symptoms, exacerbations, and pharmacological treatment – these domains should be given special attention within educational interventions.

Additional literature review – educational interventions

Fowler [29] conducted a quasi-experimental study among 61 U.S. registered nurses using an educational-communication intervention. The primary purpose of this study was to determine the knowledge of HF education before and after a series of HF education programs and communications. First, a direct half-day program led by a nurse practitioner with HF experience was conducted. Two subsequent face-to-face educational programs on diet and medications were conducted by a dietitian and a clinical nurse specialist. In addition, the agency hosted an HF fair, which focused on a revised HF protocol emphasizing different visit patterns based on HF classification, medications, goal setting, heart and lung sounds, feedback teaching, and patient education. Finally, nurses completed a 20-item questionnaire assessing their HF-related knowledge of diet, fluids, weight changes, signs and symptoms of

worsening condition, medications, and exercise. Correct responses to each survey question ranged from 14% to 100%, with only 2 of the 20 questions answered correctly by all nurses. After the educational program, the level of nurses' knowledge improved on 10 of the 20 survey questions, and it was observed regarding diet (3 questions) and symptoms (7 questions). It was concluded that home care and public health nurses have some knowledge of HF self-management principles, but this may not be sufficient to provide quality care for HF patients. It is important to note that educators can facilitate HF continuing education programs through study modules, webinars, seminars, and articles during contact hours. Continuing education should target gaps in nurses' knowledge and provide new knowledge about treatments and trends in HF.

Mahramus et al. [30] conducted a quasi-experimental study with repeated measures to evaluate an educational intervention on the knowledge of 150 U.S. nurses on the principles of self-care in HF. The studied intervention was a comprehensive educational program based on current literature on principles of self-care in HF. The program included a 3.5-hour lecture with a discussion on principles of self-care in HF including diet, medications, signs, and symptoms of heart failure, fluids or weight, and exercise. A standardized NKHFEP questionnaire was used to measure knowledge about the principles of self-care in HF and was administered before the educational intervention, immediately after, and 3 months later (follow-up). It was shown that the mean NKHFEP score before the test was $65.1 \pm 13.0\%$, and after the test was $80.6 \pm 9.7\%$, which indicates a statistically significant improvement in nurses' knowledge. In addition, a mean NKHFEP survey [18] scoring at each of the three measurement periods improved significantly, including in the follow-up cohort, from a mean of $66.5 \pm 12.9\%$ at pre-test, through $82.1 \pm 9.9\%$ at post-test to $89.5 \pm 7.5\%$ at 3-month follow-up. It was found that prior to participation in the educational intervention, nurses had significant knowledge gaps in HF self-management regarding signs and symptoms of disease exacerbation, fluid and blood pressure assessment, dietary and medication restrictions, home-based symptoms management, and when to contact a physician. It was found that participation in a comprehensive educational program led to an increase in nurses' knowledge of HF self-care principles, and this knowledge was maintained and increased over time.

Ekong et al. [31] performed an educational program among 33 nurses engaged routinely in the care of HF patients. The educational intervention was designed in accordance with updated literature and self-care guidelines for HF patients. A teach-back system was used as an educational instrument to assess HF patients' understanding of the self-care skills they were taught and as a strategy to assess nurses' understanding of HF self-care skills. In addition, each participant received a 20-page color patient education notebook to support nurses in learning and teaching patients. The study was conducted using the standard 20-item NKHFEP survey [18], and data were collected before and after the educational intervention to assess changes in the level of knowledge. It was observed that the mean pre-test NKHFEP survey scoring was 15.15 ± 1.80 , and the post-test was 16.23 ± 1.79 , indicating limited but statistically significant improvement in nurses' knowledge of self-management principles in HF patients. The educational interventions presented in this study were found to be partially effective in introducing and reinforcing HF knowledge in home care nurses. The authors concluded that implementing this evidence-based educational project achieved its goal of increasing knowledge and indicated the need for further education.

Sundel and Ea [32] designed a single-group pre-posttest intervention study involving 40 nurses from a U.S. ambulatory care setting. The primary objective of the study was to determine the effectiveness of an educational intervention on the level of nurses' knowledge of HF self-care principles. After reviewing the results of the pre-test survey, a 20-minute educational intervention was developed based on questions that the surveyed nurses answered incorrectly. The presentation addressed the nurses' understanding of HF issues such as

pathophysiology, risk factors, signs and symptoms, principles of self-care, diagnosis, and medications. A post-test was conducted 30 days after completion of an educational program. Nurses' knowledge of HF self-management principles was assessed using the self-administered 20-item NKHFEP survey [18]. A validated demographic questionnaire on age, education level, and work experience were also used. It was found that nurses who completed the questionnaire prior to the educational intervention answered 10-18 items correctly, yielding a mean NKHFEP questionnaire score of 14.7 ± 1.87 , resulting in a total score of 73.5%. Nursing participants' scores increased significantly on the post-intervention survey, where individual correct responses ranged from 13-20 items, with a mean NKHFEP survey score of 17.4 ± 1.75 , translating to a total score of 86.9%. Overall, the nurses achieved an increase of 18.2%. Importantly, it was observed that the level of education, area of clinical practice and nursing experience influenced nurses' knowledge of HF principles. It was concluded that the presented educational intervention may enhance nurses' knowledge on HF self-management, leading to better patient education and reducing readmissions due to HF.

Our study by Krówczyńska and Jankowska-Polańska [28] performed an interesting cross-sectional analysis on education frequency and nurses' comfort when educating HF patients as the preparation stage for their self-care. The study included 304 nurses (aged 42.55 ± 10.03 years, 90.79% females) working in hospital settings where they were caring for HF patients: conservative cardiology, invasive cardiology, cardiac surgery, and cardiac rehabilitation units. The main results were as follows: the comfort of education was scored on 5.43 ± 1.13 (between "slightly comfortable" and "very comfortable"); the most comfortable topics were "Daily weight monitoring" (5.81 ± 1.25), "Signs/symptoms of worsening condition" (5.77 ± 1.19) and "Fluid restriction" (5.76 ± 1.23); while the least comfortable topics were "Medications" (5.06 ± 1.35) and "Low-sodium diet" (5.31 ± 1.42); education frequency was scored on 5.21 ± 2.51 ; the most frequently education topics were "Daily weight monitoring" (5.82), "Signs/symptoms of worsening condition" (5.9) and "Fluid restriction" (5.92). Moreover, no correlation was found between the nurse's university education with the comfort and frequency of educational delivery. Nurses with postgraduate specialty showed a significantly higher level of comfort and delivered education frequency compared to those without a specialty (5.84 ± 0.78 vs. 5.3 ± 1.2 for comfort and 5.8 ± 2.42 vs. 5.01 ± 2.51 for frequency). To be more precise, nurses with a specialty in cardiac care presented a significantly higher level of comfort and delivered education frequency compared to those with any other specialty (6.29 ± 0.62 vs. 5.36 ± 1.14 for comfort, and 7.08 ± 12.28 vs. 5.06 ± 2.47 for frequency). The most important result was that the overall comfort score indicated that the nurses felt relatively comfortable educating HF patients. The alarming conclusion was presented that Polish nurses are not ready to perform comprehensive HF care duties without proper preparation. It was implicated that HF nurses need to be covered with supporting programs and educational interventions with an appropriate curriculum to improve nurses' knowledge of HF self-care principles.

Future directions

The current state of knowledge clearly indicates the need to conduct well-designed, multidimensional and multicenter studies on the level of nurses' knowledge of HF self-management principles in the context of their educational role in comprehensive HF care [33]. It should be noted that there is a current trend indicating that hospital stays for exacerbations of HF symptoms are becoming shorter and less frequent. Thus, the responsibility for self-care is gradually shifting to patients and their families. Therefore, interventions promoting and supporting self-care after hospital discharge are becoming increasingly important [34]. It is well-known that self-management is associated with significant outcomes in HF patients, including knowledge, attitude, and practice [35].

Future nursing interventions should focus on investigating HF self-regulation practices to understand better the processes used to change patients' health attitudes. This reasoning may be potentially useful in HF with preserved ejection fraction, where no proven pharmacological treatment exists [36]. On the other hand, future directions from a research perspective should involve more studies with fair methodological aspects are needed to provide insights into some of the effective ways to improve the nurses' knowledge about HF self-management and the crucial roles of a nurse in empowering HF patients in this process [37,38]. To sum up, the unique role of HF nurses and their competence to effectively implement self-management for patients based on solid knowledge and current guidelines from cardiological societies.

Review limitations

Potential limitations of this paper include the narrative form of the literature review since more advanced studies involving systematic reviews and meta-analyses are needed. Another limitation may be the restricted number of databases analyzed and the language criterion due to which this review may not have covered all of the relevant published literature. Nevertheless, the above-mentioned criteria are standard in this type of review paper to select the highest quality of records. Furthermore, last but not least, our paper focuses on summarizing the scope of nurses' knowledge of the principles of self-management of HF patients and does not analyze the consequences for HF patients in case of nurses' insufficient knowledge.

Discussion

HF is a severe chronic condition leading to premature death and a serious burden for global health care systems [39]. HF has also been deemed a global pandemic that affects more than 26 million people worldwide and whose prevalence is increasing [40]. The management of HF patients is still challenging and includes complex interventions such as pharmacotherapy, non-pharmacologic treatment and early recognition of decompensation [41].

It should be remembered that one of the discharge criteria for acute decompensated HF is the completion of education by the patient and family, including clear discharge instructions [42]. In addition, the discharge plan for the hospitalized HF patients should meet the following issues: (1) medication reconciliation, (2) written plans for dietary sodium restriction and recommended activity level, (3) follow-up by phone or clinic visit soon after discharge to reassess volume status, (4) medication and dietary adherence, (5) alcohol moderation and cessation of smoking, (6) monitoring of body weight, electrolytes and renal function, and (7) consideration of referral for formal disease management [43,44].

In turn, outpatient management should be focused on: (1) comprehensive education and counseling individualized to the patient's disease and socio-economic and educational level, (2) education/promotion of self-care, including self-adjustment of diuretic therapy in appropriate patients with the help of a family member/caregiver, (3) early attention to signs and symptoms of fluid overload, (4) emphasis on behavioral strategies to increase adherence, (5) optimization of medical therapy, (6) vigilant follow-up after hospital discharge or after periods of instability, (7) increased access to providers or healthcare/social services, and (8) assistance with social and financial concerns [43,44].

Therefore, there is an urgent need to develop support systems for HF nurses that include the following components: (1) curriculum at an appropriate level that would increase nurses' knowledge of self-care in HF, (2) systems to motivate HF nurses' specialization and willingness to continuously improve their professional competence, (3) provision of sufficient staffing and better organization of working hours that would enable more effective education

before hospital discharge, (4) improved documentation of the educational plan with the evaluation of its efficacy and (5) integration of comprehensive patient education into the overall care of HF patients, but most importantly (6) development of unambiguous guidelines for HF nurses regarding patient education [25].

Nurses have a primary responsibility for delivering patient education based on the current knowledge, effective practical strategies, and actual guidelines, which should be a strong foundation for patients' self-management [45]. The self-care process consists of three essential elements of self-care maintenance, self-care monitoring, and self-care management. These elements are interrelated and cannot be considered separate in the patient education process. The essence of preparing a patient with a chronic disease for self-care is to master these three elements in sequence [46].

The present narrative review revealed that nurses might not have adequate knowledge of evidence-based education on HF self-management. The assessment using the NKHFEP demonstrated that the scoring in the Spanish nurses [26] was similar to American nurses [18–20,24], but at the same time, it was slightly higher than other European countries like Cyprus [23] and Poland [25], where knowledge level on HF self-management principles in hospital setting was 13.57 (67.8%) and 12.1 (60.4%), respectively. Undoubtedly, there is a need to develop a curriculum to educate nurses on HF self-management, which may lead to improved quality of patient education and more effective self-care outcomes. There is an urgent need for nurses to update their knowledge and improve their educational skills regarding self-management in HF. The alarming data should be directly announced regarding the level of Polish nurses' knowledge of self-care principles in HF, which may be a direct reason for problems in providing adequate and qualitative education to patients with HF.

Summary

A proper nurses' knowledge of self-management principles of patients is a crucial component of chronic illnesses such as HF. Therefore, self-management has been prioritized as a central pathway for improving most chronic HF care quality and effectiveness. Adherence to self-management is vital to optimize the treatment outcomes in HF patients, but implementing self-management strategies and identifying the difficulties in this process has proved to be a challenge [47].

The adherence to self-care recommendations among HF patients is insufficient, affecting both knowledge about HF and the level of self-management in HF [48]. This may be a direct cause of the inadequate knowledge of HF nurses as patient educators about self-management strategies. Furthermore, despite widespread knowledge that education significantly improves HF outcomes and is crucial from the time of HF diagnosis, educational interventions are not consistently implemented in everyday nursing practice [28,49]. The existing studies clearly indicate that the knowledge level of nursing professionals is far from satisfactory [50]. Nurses need more in-depth learning and understanding of the subject of HF through educational interventions and postgraduate training courses. Nurses should have specialized knowledge and gain adequate competence to educate HF patients. The ability to recognize the signs of clinical deterioration in HF patients, especially during the disease's decompensation phase, becomes the priority.

In the context of nurses' knowledge, it is important to emphasize that self-management is more than just patient education. It helps to illustrate the underlying causal mechanism that constitutes the basis of many modern support programs by leading to changes in patients' ability to self-care and self-efficacy.

References

1. Chan YK, David AM, Mainland C, Chen L, Stewart S. Applying Heart Failure Management to Improve Health Outcomes: But WHICH One? *Card Fail Rev.* 2017;3(2):113-115. doi:10.15420/cfr.2017:11:1
2. Riley JP, Astin F, Crespo-Leiro MG, et al. Heart Failure Association of the European Society of Cardiology heart failure nurse curriculum. *Eur J Heart Fail.* 2016;18(7):736-743. doi:10.1002/ejhf.568
3. Riley J. The Key Roles for the Nurse in Acute Heart Failure Management. *Card Fail Rev.* 2015;1(2):123-127. doi:10.15420/cfr.2015.1.2.123
4. Uchmanowicz I, Lisiak M, Lelonek M, et al. A curriculum for heart failure nurses: an expert opinion of the Section of Nursing and Medical Technicians and the Heart Failure Working Group of the Polish Cardiac Society. *Kardiol Pol.* 2020;78(6):647-652. doi:10.33963/KP.15405
5. Strömberg A. Educating nurses and patients to manage heart failure. *Eur J Cardiovasc Nurs J Work Group Cardiovasc Nurs Eur Soc Cardiol.* 2002;1(1):33-40. doi:10.1016/S1474-5151(01)00011-1
6. Riegel B, Westland H, Iovino P, et al. Characteristics of self-care interventions for patients with a chronic condition: A scoping review. *Int J Nurs Stud.* 2021;116:103713. doi:10.1016/j.ijnurstu.2020.103713
7. Heart Failure Society of America, Lindenfeld J, Albert NM, et al. HFSA 2010 Comprehensive Heart Failure Practice Guideline. *J Card Fail.* 2010;16(6):e1-194. doi:10.1016/j.cardfail.2010.04.004
8. McDonagh TA, Metra M, Adamo M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J.* 2021;42(36):3599-3726. doi:10.1093/eurheartj/ehab368
9. Institute of Medicine (US) Committee on the Crossing the Quality Chasm: Next Steps Toward a New Health Care System. *The 1st Annual Crossing the Quality Chasm Summit: A Focus on Communities.* (Adams K, Greiner AC, Corrigan JM, eds.). National Academies Press (US); 2004. Accessed April 2, 2022. <http://www.ncbi.nlm.nih.gov/books/NBK215518/>
10. Martínez N, Connelly CD, Pérez A, Calero P. Self-care: A concept analysis. *Int J Nurs Sci.* 2021;8(4):418-425. doi:10.1016/j.ijnss.2021.08.007
11. Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benrimoj SI. Helping patients help themselves: A systematic review of self-management support strategies in primary health care practice. *PLoS ONE.* 2019;14(8):e0220116. doi:10.1371/journal.pone.0220116
12. Son YJ, Choi J, Lee HJ. Effectiveness of Nurse-Led Heart Failure Self-Care Education on Health Outcomes of Heart Failure Patients: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health.* 2020;17(18):E6559. doi:10.3390/ijerph17186559
13. Gilmour J, Strong A, Hawkins M, Broadbent R, Huntington A. Nurses and heart failure education in medical wards. *Nurs Prax N Z Inc.* 2013;29(3):5-17.
14. Washburn SC, Hornberger CA. Nurse educator guidelines for the management of heart failure. *J Contin Educ Nurs.* 2008;39(6):263-267. doi:10.3928/00220124-20080601-10
15. Baethge C, Goldbeck-Wood S, Mertens S. SANRA—a scale for the quality assessment of narrative review articles. *Res Integr Peer Rev.* 2019;4(1):5. doi:10.1186/s41073-019-0064-8
16. National Library of Medicine. *Medical Subject Headings* 2022. <https://meshb.nlm.nih.gov>
17. Kavanagh BP. The GRADE System for Rating Clinical Guidelines. *PLoS Med.* 2009;6(9):e1000094. doi:10.1371/journal.pmed.1000094

18. Albert NM, Collier S, Sumodi V, et al. Nurses's knowledge of heart failure education principles. *Heart Lung J Crit Care*. 2002;31(2):102-112. doi:10.1067/mhl.2002.122837
19. Washburn SC, Hornberger CA, Klutman A, Skinner L. Nurses' knowledge of heart failure education topics as reported in a small midwestern community hospital. *J Cardiovasc Nurs*. 2005;20(3):215-220. doi:10.1097/00005082-200505000-00014
20. Willette EW, Surrells D, Davis LL, Bush CT. Nurses' knowledge of heart failure self-management. *Prog Cardiovasc Nurs*. 2007;22(4):190-195. doi:10.1111/j.0889-7204.2007.06403.x
21. Delaney C, Apostolidis B, Lachapelle L, Fortinsky R. Home care nurses' knowledge of evidence-based education topics for management of heart failure. *Heart Lung J Crit Care*. 2011;40(4):285-292. doi:10.1016/j.hrtlng.2010.12.005
22. Hart PL, Spiva L, Kimble LP. Nurses' knowledge of heart failure education principles survey: a psychometric study. *J Clin Nurs*. 2011;20(21-22):3020-3028. doi:10.1111/j.1365-2702.2011.03717.x
23. Kalogirou F, Lambrinou E, Middleton N, Sourtzi P. Cypriot nurses' knowledge of heart failure self-management principles. *Eur J Cardiovasc Nurs J Work Group Cardiovasc Nurs Eur Soc Cardiol*. 2013;12(2):159-166. doi:10.1177/1474515112440367
24. Mahramus TL, Penoyer DA, Sole ML, Wilson D, Chamberlain L, Warrington W. Clinical nurse specialist assessment of nurses' knowledge of heart failure. *Clin Nurse Spec CNS*. 2013;27(4):198-204. doi:10.1097/NUR.0b013e3182955735
25. Jankowska-Polańska B, Brzykowska M, Uchmanowicz I, Lisiak M, Rosinczuk J. Polish Nurses' Knowledge of Heart Failure Self-Care Education Principles. *Clin Nurse Spec CNS*. 2017;31(3):E7-E13. doi:10.1097/NUR.0000000000000295
26. Dalfó-Pibernat A, Duran X, Garin O, et al. Nursing knowledge of the principles of self-care of heart failure in primary care: a multicentre study. *Scand J Caring Sci*. 2020;34(3):710-718. doi:10.1111/scs.12775
27. Krówczyńska D, Jankowska-Polańska B. Polish Nurses' Knowledge of Heart Failure Self-Management Principles. *Int J Environ Res Public Health*. 2022;19(3):1327. doi:10.3390/ijerph19031327
28. Krówczyńska D, Jankowska-Polańska B. Nurses as educators in the comprehensive heart failure care programme—Are we ready for it? *Nurs Open*. 2020;7(5):1354-1366. doi:10.1002/nop2.507
29. Fowler S. Improving community health nurses' knowledge of heart failure education principles: a descriptive study. *Home Healthc Nurse*. 2012;30(2):91-99; quiz 100-101. doi:10.1097/NHH.0b013e318242c5c7
30. Mahramus T, Penoyer DA, Frewin S, Chamberlain L, Wilson D, Sole ML. Assessment of an educational intervention on nurses' knowledge and retention of heart failure self-care principles and the Teach Back method. *Heart Lung J Crit Care*. 2014;43(3):204-212. doi:10.1016/j.hrtlng.2013.11.012
31. Ekong J, Radovich P, Brown G. Educating Home Healthcare Nurses About Heart Failure Self-Care. *Home Healthc Now*. 2016;34(9):500-506. doi:10.1097/NHH.0000000000000453
32. Sundel S, Ea EE. An Educational Intervention to Evaluate Nurses' Knowledge of Heart Failure. *J Contin Educ Nurs*. 2018;49(7):315-321. doi:10.3928/00220124-20180613-07
33. Jaarsma T, Hill L, Bayes-Genis A, et al. Self-care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail*. 2021;23(1):157-174. doi:10.1002/ejhf.2008
34. Jiang Y, Wang W. Improve self-care in heart failure. *Int J Nurs Sci*. 2021;8(2):243-244. doi:10.1016/j.ijnss.2021.01.001

35. Meng X, Wang Y, Tang X, Gu J, Fu Y. Self-management on heart failure: A meta-analysis. *Diabetes Metab Syndr*. 2021;15(4):102176. doi:10.1016/j.dsx.2021.06.013
36. Zaharova S, Litwack K, Gopalakrishnan S, Ellis J, Saltzberg MT. Self-management in Heart Failure: The Importance of Self-regulation but not Complexity of Condition. *West J Nurs Res*. 2022;44(4):375-382. doi:10.1177/0193945921997428
37. Świątoniowska-Lonc N, Polański J, Pilarczyk-Wróblewska I, Jankowska-Polańska B. The Revised Self-Care of Heart Failure Index - a new tool for assessing the self-care of Polish patients with heart failure. *Kardiol Pol*. 2021;79(7-8):841-847. doi:10.33963/KP.a2021.0009
38. Pobrotyn P, Mazur G, Kałużna-Oleksy M, Uchmanowicz B, Lomper K. The Level of Self-Care among Patients with Chronic Heart Failure. *Healthc Basel Switz*. 2021;9(9):1179. doi:10.3390/healthcare9091179
39. Ponikowski P, Anker SD, AlHabib KF, et al. Heart failure: preventing disease and death worldwide. *ESC Heart Fail*. 2014;1(1):4-25. doi:10.1002/ehf2.12005
40. Savarese G, Lund LH. Global Public Health Burden of Heart Failure. *Card Fail Rev*. 2017;3(1):7-11. doi:10.15420/cfr.2016:25:2
41. Shah P, Pellicori P, Cuthbert J, Clark AL. Pharmacological and Non-pharmacological Treatment for Decompensated Heart Failure: What Is New? *Curr Heart Fail Rep*. 2017;14(3):147-157. doi:10.1007/s11897-017-0328-x
42. Inamdar AA, Inamdar AC. Heart Failure: Diagnosis, Management and Utilization. *J Clin Med*. 2016;5(7):62. doi:10.3390/jcm5070062
43. Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA Guideline for the Management of Heart Failure. *Circulation*. Published online January 1, 2013:CIR.0b013e31829e8776. doi:10.1161/CIR.0b013e31829e8776
44. Watson RD, Gibbs CR, Lip GY. ABC of heart failure. Clinical features and complications. *BMJ*. 2000;320(7229):236-239. doi:10.1136/bmj.320.7229.236
45. Fereidouni Z, Sabet Sarvestani R, Hariri G, Kuhpaye SA, Amirkhani M, Kalyani MN. Moving Into Action: The Master Key to Patient Education. *J Nurs Res JNR*. 2019;27(1):1-8. doi:10.1097/jnr.0000000000000280
46. Riegel B, Jaarsma T, Lee CS, Strömberg A. Integrating Symptoms Into the Middle-Range Theory of Self-Care of Chronic Illness. *Adv Nurs Sci*. 2019;42(3):206-215. doi:10.1097/ANS.0000000000000237
47. Gardetto NJ. Self-management in heart failure: where have we been and where should we go? *J Multidiscip Healthc*. 2011;4:39-51. doi:10.2147/JMDH.S8174
48. Kolasa J, Lisiak M, Grabowski M, et al. Factors Associated with Heart Failure Knowledge and Adherence to Self-Care Behaviors in Hospitalized Patients with Acute Decompensated Heart Failure Based on Data from “the Weak Heart” Educational Program. *Patient Prefer Adherence*. 2021;15:1289-1300. doi:10.2147/PPA.S297665
49. Sala RL, Dicembrino RB, Dall’Argine S, et al. Nurse training in self-management of patients with cardiovascular diseases: a multicentre observational study. *Acta Bio Medica Atenei Parm*. 2017;88(Suppl 5):22-30. doi:10.23750/abm.v88i5-S.6882
50. Chi SY, Soh KL, Raman RA, Ong SL, Soh KG. Nurses’ knowledge of heart failure self-care education: A systematic review. *Nurs Crit Care*. Published online February 2, 2022. doi:10.1111/nicc.12758