

Relationship between Disease Knowledge and Self-care Adherence among Heart Failure Patients: A scoping Review

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Abstract: Heart failure is a leading cause of hospitalization in developed and developing healthcare systems as well as the subsequent increasing healthcare cost. Risk factors as age and lifestyle choices such as physical inactivity, smoking, and unhealthy diets cause heart failure further. Self-care and knowledge of HF are important at reducing the overall impact of the disease for populations at risk.

Aim: The study sought to analyze existing literature to determine the relationship between disease knowledge and self-care adherence among adult heart failure patients.

Methods: A scoping review approach was adopted to answer research on the relationship between the patient's knowledge about the disease and their self-care adherence. Literature was searched through Saudi Digital Library (SDL) in ProQuest, CINAHL, MEDLINE, and PubMed. A predetermined eligibility criteria was used to select 28 journal articles.

Results: Studies found knowledge came from the guidelines and cardiac educational programs delivered by healthcare professionals such as nurses. The self-care adherence varied with patients' level of knowledge, ages, income, and educational status. Self-care practices include medication protocols, dietary changes, daily weighing, blood pressure monitoring, and physical activities.

Conclusion: Patient's knowledge of heart failure was the antecedent for their self-care adherence. Future studies should attempt to understand the knowledge and self-care adherence among Saudi patients.

Keywords: Awareness, Compliance, Education, Heart Failure, Knowledge, Self-care adherence.

1. INTRODUCTION

The World Heart Federation (WHF) (2020) estimates that 1 in 5 people face the lifetime risk of developing heart failure (HF). HF is one of the leading causes of hospitalization in developed and developing economies as well as the subsequent increasing healthcare costs. The disease contributes to 17-45% deaths among patients admitted within one year. The lifetime increases with age and lifestyle choices such as physical inactivity, smoking, and unhealthy diets. Moreover, the World Health Organization (WHO) (2019) views HF as one of the cardiovascular diseases (CVDs) that lead to 17.9million deaths every year. The patients report increased blood pressure and glucose besides the overweight as well as obesity issues that increase lipids in the body. The HF morbidities and deaths vary in developed and developing economies due to access to non-communicable disease medicines, basic health technologies, and quality of treatment for patients below and over 70years.

The risk of HF in the Middle East and Saudi Arabia varies with the statistics presented by different scholars across the globe. According to AbuRuz et al. (2015), the quality of life of different Saudi patients is low, which then drives the risk of HF. The clinical syndrome affects patients' social and psychological wellbeing due to its chronic as well as progressive nature. Another study by Aljefree and Ahmed (2015) established different risk factors from adult informants in the Gulf region. The systematic review established increased physical inactivity, smoking, overweight, and obesity across female as well as male participants. There was apparent low education on reducing HF among other CVDs in the Gulf region. Therefore, HF is a rampant problem in Saudi Arabia besides the Middle East region as it contributes to the morbidities as well as mortalities recorded by the WHO in the developing economies worldwide.

AIM OF THE REVIEW

The study seeks to analyze existing literature to determine the relationship between disease knowledge and self-care adherence among adult heart failure patients.

RESEARCH QUESTION

The research question of this review was defined using the PICOT (Population-Intervention-Comparison-Outcome-Time) framework. The question is:

Among patients with heart failure, what is the relationship between the patient's knowledge about the disease and their self-care adherence?

2. METHODOLOGY

The methodology of this scoping review relied on the Arksey and O'Malley (2005) framework. First, the PICOT question was identified to guide this search process in the electronic databases. Then, a search was performed between November 2020 and January 2021 to identify relevant studies. Recent studies were then selected according to the inclusion and exclusion criteria, and the review matrix was used for charting and sorting the data (Appendix 1). Lastly, themes were developed for collating, summarizing, and reporting the results. This method allowed the inclusion for analysis of primary studies with various methodological strategies and research designs. This review critically evaluated the evidence found and the characterization of the knowledge state of the subject of interest.

2.1. SEARCH STRATEGY

The search was conducted in four different electronic databases of medical and nursing topics, accessed through the Saudi Digital Library: ProQuest, CINAHL, MEDLINE, and PubMed. Google Scholar was also searched. The process included the application of search limits to generate relevant studies in line with the PICOT research question. The search was limited to include publication years from 2015 to 2021 to retrieve the most current journal articles.

2.2. SEARCH TERMS

The literature search was conducted based on relevant key search terms generated from the research question, broken down based on the PICOT framework. The terms were "heart failure," "patients' knowledge," "patient's awareness," "self-care," "adherence," and "compliance." The Boolean operators "AND" and "OR" were applied to combine the various search terms to retrieve journal articles that focused on the details of the research question.

The combinations of key terms by Boolean operators were "heart failure AND patient's knowledge," "heart failure AND patient's awareness," "heart failure AND patient compliance OR adherence," and "heart failure AND self-care OR self-care management."

2.3. INCLUSION CRITERIA

The relevant studies were selected through a focused and comprehensive search process using the inclusion criteria.

Inclusion Criteria

- Journal articles that addressed the research question adequately.
- Scholarly studies published between 2015 and 2021 (up to 6 years old).

- Peer-reviewed and scholarly articles.
- Journal articles published in English.
- Full-text journal articles.

2.4. STUDY SELECTION PROCESS

A total of 328 studies were initially retrieved from the four electronic databases: 108 from ProQuest, 90 from CINAHL, 60 from MEDLINE, and 70 from PubMed. Each database produced different records due to the varied search processes and protocols required for a focused literature search. Additionally, eight articles were found through the Google Scholar search.

The study selection process applied different parameters to produce the most appropriate studies. The 336 records were checked for duplication, and 107 duplicates were removed. The remaining 229 were screened further for relevance, which led to the exclusion of 121 articles. The reviewers then assessed the remaining 108 articles for eligibility, leading to the exclusion of 80. Only 28 articles met the inclusion and exclusion criteria. These 28 journal articles were synthesized in the scoping review. Figure 2.1 presents the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) 2009 Flow Diagram that summarizes the study selection process.

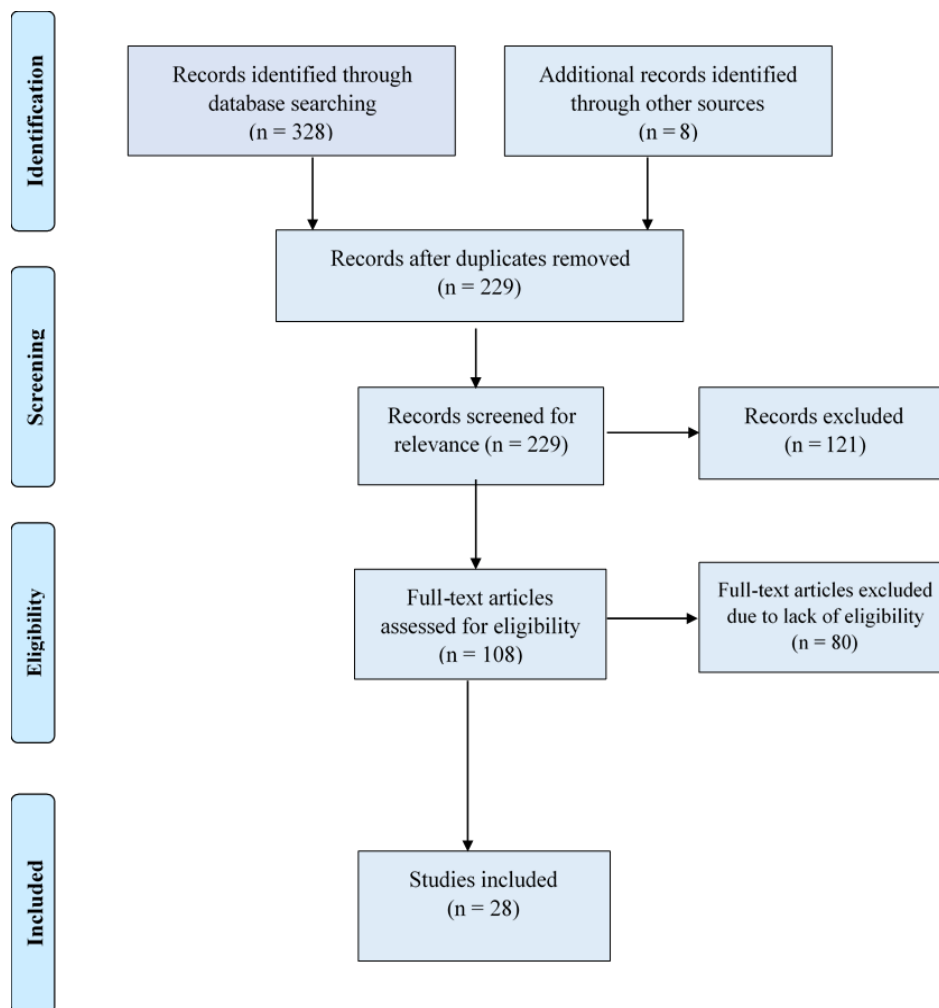


Figure 2.1: PRISMA 2009 Flow Diagram.

Note: PRISMA 2009 Flow Diagram. Figure 2: PRISMA 2009 Flow Diagram. Available at: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097. www.prisma-statement.org

3. FINDINGS /RESULTS

The 28 journal articles that met the eligibility criteria were analyzed, organized, and sorted into different themes, guided by the information findings in the data extraction table (Appendix 1). The features of the studies gathered in the data extraction table include the reference, country, study design, sampling, and aim. The table further specifies the study tools used, main outcomes, and findings for each study selected for the synthesis of evidence.

Different themes emerged from the 28 journal articles selected for the review synthesis. The themes were based on the findings extracted from each study. The three key themes were the level of knowledge among HF patients, the level of self-care adherence in HF patients, and the relationship between disease knowledge and self-care adherence among HF patients. These themes guided the narrative synthesis of the findings.

Theme 1: Level of Knowledge Among HF Patients

Nine studies were found in the literature examining HF patients' knowledge about the disease, which may affect their adherence to elements of management such as symptom recognition and management, fluid restriction, weight monitoring, sodium restriction, and physical activity. The level of knowledge of HF among patients varied. A descriptive study of 187 HF patients was performed by Zeng et al. (2017) to measure HF patients' knowledge of the disease and self-care management and examine the factors that affected their knowledge level, using a questionnaire adapted from the DHFKS. The study results showed that the patients' general knowledge of HF (the function of the heart and the meaning of HF and its main causes) had the highest score, and their knowledge of HF symptoms and their recognition scored the lowest. The study concluded that the lack of specific knowledge was primarily related to treatment regimens and HF symptoms and their recognition. The patients' knowledge was largely related to their level of education and whether they had received HF education. The authors also noted that for the education of HF patients to be effective, the program had to be fitted to the needs of different audiences and individuals.

Likewise, the cross-sectional study of (Nomali et al., 2019) was performed in Iran to examine 190 patients' knowledge about HF, using a questionnaire adapted from the DHFKS. The study found that patients with HF had a decreased knowledge level regarding management, signs, and symptoms, which must be improved by an appropriate intervention, especially knowledge of symptom recognition.

The knowledge of HF and implementation of self-care practices increased with the age of the patients. Patients should undergo sufficient education to shape their self-care management strategies towards HF. A single-center observational study by Selan et al. (2016) aimed to investigate the prevalence of self-awareness of HF among ninety 80-year-old patients and the association with age-related factors related to HF. The study found that the prevalence of HF self-awareness among the elderly was insufficient, and external factors may influence this self-awareness. One of these factors is likely how the patient is informed of the HF diagnosis by healthcare professionals. It recommended the input of healthcare professionals to foster self-awareness of symptom control, blood pressure monitoring, and daily weighing among the self-care strategies by patients with HF.

Bidwell et al. (2018) relied on a secondary analysis of a cross-sectional study of shared knowledge on HF among 114 partners of patients to identify shared HF knowledge configurations in patient-caregiver dyads. The study showed that the average level of HF knowledge in these dyads was 70.1%, with patients typically reporting higher scores than their caregivers, and that their high level of shared knowledge led to self-care adherence behaviors as individual patients gained support and autonomy. The dyads with a higher level of HF knowledge were more likely to adhere to self-care behaviors.

Improving overall patient education generates knowledge about medication, diet, and symptom control. A longitudinal study conducted by Huesken et al. (2021) aimed to evaluate the short-term and long-term impacts on patients' self-care behavior and disease knowledge of structured education provided by a qualified HF nurse. The study included 150 patients who completed a questionnaire, the EHFScB-9, and six questions on their knowledge of the disease before and after an education intervention, as well as at a 6-month follow-up. The results showed that the overall EHFScB-9 score improved, and the disease knowledge score improved with respect to adherence to medication protocol and daily weighing habits compared to before the intervention. The most significant improvement after education was noted in response to weight gain, daily weight control, and knowledge of the cause of HF in patients. The study concluded that a positive correlation existed between the structured education provided by nurses and the patients' disease knowledge, as

well as a positive relationship between structured education and self-care adherence behavior in patients, and a positive relationship between structured education and daily weight control and knowledge of the cause of patients' HF.

In alignment with that study, a systematic review by Daley et al. (2019) aimed to characterize the nature of patients' knowledge of HF in the sense of living with the disease. It focused on the knowledge among HF patients without linking it to an education program or self-management strategies. This study used 73 articles; the outcome of the review showed the importance of explicit, implicit, dynamic, and personal knowledge types in enhancing decision-making around HF symptoms or complications. Raines and Dickey (2019) agreed with Daley et al. (2019) on the importance of providing multidimensional knowledge. The researchers adopted a descriptive cross-sectional approach, which relied on questionnaires for data collection to examine the learning needs of hospitalized patients with chronic HF. They found that 42 hospitalized adult patients with HF expressed knowledge gaps in self-care, maintenance, confidence, and overall HF management. Overall, patients faced difficulties in applying their knowledge of HF to promote self-care behaviors through maintenance, management, and confidence.

The knowledge level among patients with HF might vary with the education strategies adopted by individuals. Peyman et al. (2020) studied the impacts on HF patients' self-care behaviors of education guided by self-efficacy approaches through a semi-experimental study conducted on 80 HF patients. The execution of an education intervention enhanced health-promoting knowledge as well as self-care approaches by patients in the experimental group compared to the control group. Comparatively, a prospective cohort study by Róin et al. (2019) was performed to examine HF knowledge and self-care among 47 patients in the Faroe Islands. The study found that incorporating outpatient education programs increased improvement among 15% of men and 85% of women. The study recommended the use of a multidisciplinary outpatient program to expand HF-related knowledge.

Knowledge of HF depends on the different circumstances facing patients with HF. Tawalbeh et al. (2017) carried out a cross-sectional descriptive study on 226 Jordanian patients with HF. They found that the low knowledge level affected by their culture, social issues, and healthcare contexts determined their condition, and the outcomes of the education process depended on their age, income, duration of HF, employment status, and presence of potential caregivers. The study emphasized the importance of knowledge to enhance self-care. The same authors in 2018 conducted a quasi-experimental study on 127 patients to investigate the impact of a cardiac education program on knowledge and self-care behaviors. The result showed changes in knowledge level and subsequent self-care in the experimental group compared to the control group, who showed constant effort to manage HF due to low familiarity with the symptoms or relevant medication.

These studies highlighted that the patients' ability to recognize and interpret HF symptoms was limited. A prospective study was conducted by Płotka et al. (2017) in Poland using a survey of 201 patients to investigate the relationships between patients' perception of symptoms of chronic HF and their compliance with non-drug recommendations. The study revealed that HF patients must be educated about the disease and the importance of changing their lifestyle.

Theme 2: Level of Self-Care Adherence in HF Patients

The level of self-care adherence varied among adult HF patients. A cross-sectional study was conducted among 310 adult HF patients by Seid et al. (2019) to assess their adherence to self-care recommendations and the associated factors. The findings showed that only 22.3% reported good adherence to their self-care recommendations. The study found that the adherence of HF patients to self-care recommendations was poor and selective, and men adhered to the medication, diet, and symptom control recommendations more than did women. It suggested strategic planning to improve HF patients' knowledge of the signs, symptoms, and methods of managing HF to improve patient adherence.

Stut et al. (2015) conducted a multicenter observational study of 123 HF patients to assess their self-care adherence approaches. The study found increased adherence to blood pressure monitoring, symptom reporting, and daily weighing during the period of observation. The findings showed that the average adherence was $90\% \pm 16\%$ to measuring weight, $89\% \pm 17\%$ to measuring blood pressure, and $66\% \pm 32\%$ to symptom reporting. However, the adherence to the guidelines depended on the information disseminated through telehealth, e-coaching, and patient programs. Likewise, Lee et al. (2015) investigated the relationship between adherence to regular symptom monitoring and adequate self-care management in a sample of 311 HF patients enrolled from HF clinics of six large community hospitals and academic medical centers in Kentucky, Georgia, and Indiana in the United States. The researchers adopted a cross-sectional

observational approach, which relied on the Self-Care of Heart Failure Index questionnaire for data collection. The study showed that satisfactory self-care management was positively associated with regular monitoring of symptoms, enabling the performance of self-care behaviors and contributing to decreased hospitalization times for chronic HF patients.

A cross-sectional study conducted by Tegegn et al. (2021) aimed to assess the adherence to self-care practices and the associated factors among 396 outpatient adult HF patients. The study results revealed that the HF patients had very poor self-care adherence, and a statistically significant relationship existed between comorbidity, depression, level of knowledge, and self-care adherence. The study concluded that comorbidity, inadequate knowledge, and depression were predictors of self-care practice.

A descriptive correlational study conducted by Sen et al. (2020) aimed to examine the treatment compliance among 112 patients with HF and identify factors related to treatment compliance. The study results showed that 54.5% of the patients were highly committed to medication and routine checkups, and they had a low commitment to performing exercise, fluid restriction, and daily weighing. Factors including their gender, education level, number of hospitalizations during the past year, comorbidities, HF knowledge, and cognitive function were significantly associated with treatment compliance. The study concluded that patients should enhance their knowledge of HF to improve treatment compliance.

Different factors determine the self-care adherence among patients with HF. A cross-sectional study carried out by Chuang et al. (2019) relied on a path model to assess the elements that influenced health maintenance and patients' wellbeing in HF. The study included a sample of 141 patients whose data were analyzed. It found that e-health literacy had significant and direct effects on self-care management and HF knowledge, and depressive symptoms negatively affected the maintenance of self-care. The study also found that confidence in self-care reduced the adverse effects of depressive symptoms on self-care. This study highlighted the importance of interventions aimed at increasing patients' confidence in self-care to maximize self-care among HF patients. However, Giezeman et al. (2017) found that the hospital readmissions and outcomes of patients with HF depended on their adherence to the crucial guidelines within the primary care units. The researchers used a descriptive cross-sectional approach to describe the adherence to international guidelines for chronic HF management concerning diagnostics, pharmacological treatment, and self-care behavior in primary healthcare. The findings of this study revealed the adoption of the ESC guidelines enhanced self-care behaviors among 155 participants from three Swedish centers.

A secondary analysis conducted by Lee et al. (2017) aimed to explore the variables related to self-care in 580 HF patients living in rural areas. The results found that self-care adherence among patients in rural areas was dependent on annual income, confidence, perceived control, and overall depression symptoms. Consequently, the self-care behaviors manifested in different ways, as also shown in another study by Ling et al. (2020). This was a cross-sectional descriptive correlational study, which aimed to investigate diet adherence, medication adherence, and self-care behavior among chronic HF patients in a multi-ethnic society and identify the significant factors associated with their diet and medication adherence. It reported that 107 patients had positive attitudes towards diet adherence, poor self-care behavior, and good medication adherence.

According to Massouh et al. (2020), rurality did not influence the self-care adherence to management and control of HF as much as did self-care confidence. In addition, self-care confidence should influence the maintenance and management of HF patients. The descriptive correlational study aimed to examine whether confidence explained the associations of social support and HF knowledge with self-care. The study population consisted of all HF patients in a medical center in Lebanon; the sample comprised 100 patients. The study found that self-care confidence mediated the association between social support and self-care maintenance, with a statistically significant relationship between these in HF patients. Supporting self-care confidence may be a major goal of interventions to improve disease management and behaviors in patients with HF.

Similarly, a cross-sectional study by Zou et al. (2017) aimed to explore the factors associated with self-care behaviors and examine the mediating role of self-care. The sample included 321 HF patients. The study found a significant relationship between functional ability, knowledge, and self-care management, and health literacy and social support were related directly to self-care maintenance. Furthermore, the relationship between knowledge, health literacy, social support, and self-care behaviors was mediated by self-care confidence. The results also found that chronic HF patients had poor self-care behaviors

Theme 3: The Relationship Between Disease Knowledge and Self-Care Adherence in HF Patients

According to the WHF (2020), self-care and knowledge of HF are important in reducing the overall impact of the disease for populations at risk. Several studies discussed the relationship between disease knowledge and self-care. A cross-sectional study conducted by Sewagegn et al. (2015) aimed to assess the knowledge and adherence to self-care behaviors among 328 adult HF patients. The results showed that adherence to individual self-care behaviors ranged from 9.7% to 99.7% with statistically significant differences in self-care commitment according to the variables of age and HF knowledge. The study also found that HF patients had a low commitment to self-care, and the majority of patients had a severe lack of knowledge about HF and self-care behaviors.

Knowledge promotes self-care adherence by increasing understanding of the signs and symptoms of HF. Lee et al. (2018) conducted a secondary analysis of baseline cross-sectional data in a multi-site randomized study to link self-care to the in-depth understanding of HF and its signs and symptoms. The sample included 571 HF patients. The analysis found that 22.1%, 40.1%, and 37.8% had poor, moderate, and complete familiarity with the disease, respectively. Moreover, patients with complete or moderate understanding were more likely to have better adherence to self-care activities. According to the findings of this study, patient education should include topics that promote a comprehensive understanding of HF and its symptoms and the importance of self-care behaviors. However, Ling et al. (2020) found that self-care behaviors cannot change without adequate education and rehabilitation programs for patients with chronic HF. Appropriate education from health professionals such as cardiologists and nurses charged with the bedside care of HF patients influences their adherence to diet and medication.

Health literacy may influence the knowledge and self-care behaviors of patients with HF. A cross-sectional observational study conducted by Matsuoka et al. (2016) aimed to explore the relationship between comprehensive health literacy, including functional (the ability to read and write), communicative (the ability to access information), and critical health literacy (the ability to evaluate information critically), and self-care behavior in HF patients. The study population consisted of all HF patients in Japan; the sample included 249 patients. The result showed that a negative relationship between low health literacy and HF knowledge, a negative relationship between low health literacy and self-care behaviors, and a statistically significant relationship between critical health literacy and self-care behaviors in HF patients. The study concluded that self-care behavior was independently determined by critical health literacy in patients with HF.

According to (Tawalbeh et al., 2017), patients should undergo sufficient education to shape their self-care management strategies towards HF. Moreover, a structured education program generates the knowledge to influence self-care adherence among patients with HF. Cui et al. (2019) observed in a randomized controlled trial the role of nurse-led education programs in promoting adherence to medication, social support, and dietary changes. The study of 96 patients with congestive HF investigated the effect of an education program delivered by nurses related to patient self-management. Medication adherence, dietary adjustments, social support, and symptom monitoring were evaluated 12 months after the education program intervention. The study found that the intervention improved self-management skills for chronic HF. This program enabled the 96 patients to consider a healthy diet, social support, medication adherence, and symptom monitoring, as well as reducing the overall admission rate from 27.1% to 10.4%. Moreover, the source of knowledge was considered an important determinant of the self-management skills implemented by HF patients in China. Healthcare professionals such as nurses play a critical role in offering cardiac-related education to increase the foundational knowledge of HF and various self-care practices among patients.

Scholars have conceptualized cardiac education as the antecedent for the knowledge and self-care behaviors of HF patients. This was evident in a semi-experimental study by Peyman et al. (2020), which aimed to explore the influences on self-care behaviors of education based on self-efficacy strategies for 80 HF patients. The experimental group confirmed the importance of adopting education protocols on usual care for HF to build good experiences for the patients with varied signs and symptoms of HF. The study concluded that implementing education interventions for self-efficacy to produce foundational knowledge could have important positive effects on self-care adherence. Patient experiences determine their self-efficacy and ultimate adoption of self-care management practices for HF.

Róin et al. (2019) agreed with Peyman et al. (2020) on providing the ideal education framework to improve knowledge of self-care approaches. However, patient education should be multidisciplinary to align with the varied signs, symptoms, and other risk factors among patients with HF. The prospective cohort study of Róin et al. (2019) recognized that offering

multidisciplinary outpatient information would have enhanced the baseline data on self-care practices to alter the HF-related outcomes. Their findings matched the outcomes of the quasi-experimental study conducted by Tawalbeh (2018), which aimed to examine the effect of a cardiac education program on knowledge and self-care behaviors among 127 HF patients. The study determined the posttest prevalence of HF knowledge and self-care attitudes after participants underwent cardiac education programs. The findings confirmed the effectiveness of these programs in providing the required knowledge to enhance self-care adherence among HF patients. Therefore, patients' familiarity with symptom control, daily weighing, dietary changes, and physical activity depends on the information provided by the healthcare professionals in different clinical settings.

Similarly, a quasi-experimental study conducted by Liou et al. (2015) aimed to investigate the effects of self-care programs on patients with HF. The study sample included 131 patients, divided into 75 patients in the control group and 56 patients in the experimental group. The results showed significant differences in the posttest scores for HF knowledge, with significantly higher scores in the experimental group compared to the control group. A positive statistically significant relationship existed between self-care programs, self-care maintenance, and self-care confidence. The study concluded that self-care programs led by HF patients can enhance meeting their education goals and improve their ability to perform self-care effectively. However, scholars differ on the way information influences knowledge and self-care adherence in HF patients.

4. CONCLUSION

This scoping review involved a comprehensive search for literature in four databases. The search of PubMed, CINAHL, ProQuest, and MEDLINE retrieved 328 journal articles, in addition to eight articles from Google Scholar. Only 28 journal articles met the eligibility criteria. The articles informed the review synthesis of different findings to understand the link between knowledge and self-care adherence among patients with HF.

The comparative analysis of the studies found different levels of knowledge about HF among patients with the disease. Their knowledge came from the guidelines and cardiac education programs delivered by healthcare professionals such as nurses. Self-care adherence varied with the level of knowledge received by patients of different ages, incomes, and education levels. The duration of HF further influenced the foundational knowledge and subsequent adherence to the medication protocols, dietary changes, daily weighing, blood pressure monitoring, and physical activity.

Therefore, the scoping review established that patients' knowledge about the disease was the antecedent for their self-care adherence. However, their level of knowledge depended on the administration of cardiac education programs. The studies focused on the Western context of HF, which limits the generalizability of the findings to patients in Saudi Arabia. The gaps from the current studies justify further research to understand the knowledge and self-care adherence among Saudi patients.

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APPENDIX 1

DATA EXTRACTION TABLE/ REVIEW MATRIX

Study reference (Author/s, year of publication)	Country Of study	Study design	Total sample & Types of participants	Aim	Tool	Main Findings
Bidwell et.al. (2018)	USA	Secondary analysis of cross-sectional data	114 HF patients and their caregivers	To: 1) identify configurations of shared HF knowledge in Patient-caregiver dyads. 2) characterize dyads within each configuration by comparing sociodemographic factors, HF characteristics, and psychosocial factors; and 3) quantify the relationship between configurations and patient self-care adherence to managing dietary sodium and HF medications.	Atlanta Heart Failure Knowledge Test. Patient dietary Sodium intake was measured by 3-day food record and 24 hr urine sodium. Medication adherence was measured by Medication Events Monitoring System caps. Patient HF-related quality of life was measured By the Minnesota Heart Failure Questionnaire, caregiver health-related quality of life was measured by the Short Form-12 Physical Component Summary. Patient and caregiver depression were measured with the Beck Depression Inventory-II. Self-care was measured by the Family Care Climate Questionnaire	Knowledge together and knowledge gap dyads were identified. The findings found knowledge from caregivers as the influence on the self-care adherence behaviors. Self-care behaviors comprised medication and dietary changes.

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Chuang et al. (2019)	Netherlands	Cross-sectional study using path model	141 Hf Patients aged 65.5years	To examine how depressive symptoms, social support, health literacy, and HF knowledge directly and indirectly affect self-care maintenance and management and to identify the mediating role of self-care confidence in self-care maintenance and management.	Multidimensional Scale of Perceived Social Support, Health Literacy Scale, DHFKS, and Self-Care of Heart Failure Index (SCHFI).	The self-confidence directly influenced the self-care maintenance and the different management towards response to depressive symptoms, HF knowledge, and social support. All the participant registered increased confidence that reduced depressive symptoms of HF.
Cui et. al (2019)	China	RCT	96 patients with CHF in intervention and control groups.	To evaluate the impact of a nurse-led education program on patient self-management and hospital readmissions in rural Chinese patients with CHF.	Self-management ability was assessed by a Chinese Version	Education in the medication adherence, dietary changes, social support, and symptom control led to self-management and clinical outcomes in intervention rather than control group
Daley et al. (2019)	-	Systematic review	73Journal articles retrieved from MEDLINE, CINAHL, PSYCINFO and PSYCARTICLES	To characterize the nature of patients' knowledge of HF, in the context of living with the disease.		Narrative synthesis determined different levels and types of patients' knowledge on HF. The knowledge was explicit, implicit, dynamic, and personal. The patients' level of knowledge influenced their context of living and clinical outcomes from the disease
Giezeman et al. (2017)	Sweden	Cross-sectional descriptive study	155 Patients aged at least 79-89 years.	To describe adherence to international guidelines for chronic heart failure (CHF) management concerning diagnostics, pharmacological treatment and self-care behaviour in primary health care.	EHFScBS-9	Patients adhered to different guidelines by the European Society of Cardiology. The patients improved their daily weighing and consulting behaviors besides taking proper medications such as diuretics
(Huesken et al., 2021)	Germany	longitudinal study	150 HFpatients	To assess the short- and long-term effects of structured education provided by a qualified nurse for heart failure on patients' self-care behaviors and disease knowledge	EHFScB-9 and six questions on patient's knowledge of the disease	The results found that after the educational session, the overall score for EHFScB-9 improved, and disease knowledge score improved with respect to adherence to medication protocol and daily weight habits prior to instructions. The greatest improvement was noted after education on response to weight gain, daily weight control and knowledge of the cause of heart failure in patients. At a 6-month follow-up, there was no indication of the effect of insufficient teaching.
Lee et al., 2015)	Kentucky, Georgia, and Indiana	cross-sectional, observational study.	311 HF patients from HF clinics from six large community hospitals and academic medical centres in Kentucky, Georgia, and Indiana.	To examine the relationship of adherence to regular symptom monitoring with adequate self-care management in HF patients	Self-Care of Heart Failure Index (SCHFI).	The finding suggests that regular symptom monitoring facilitates performance of adequate self-care management, which may contribute to a decrease in preventable hospitalizations in HF.
Lee et al. (2017)	USA	Secondary analysis	580 HF patients living in the rural USA	To explore the variables related to self-care in HF patients living in rural areas	Self-care measured by EHFScB-9.	The secondary analysis found depressive symptoms, lower perceived control, symptom status, and improve overall self-care among the rural residents with chronic HF. The self-care framework comprises the decisions on psychosocial status, health literacy, and symptom statuses of the 580 patients

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Lee et al. (2018)	USA	Secondary analysis using baseline cross-sectional data	571 HF Patients	To determine whether incomplete understanding of heart failure and its signs and symptoms is associated with self-care in heart failure patients who were recently discharged from the hospital due to heart failure exacerbation.	EHFScB-9 and questionnaire to assess knowledge of heart failure and its signs and symptoms.	Poor, moderate, and incomplete knowledge at 22.1%, 40.1%, and 37.8% Complete understanding of HF signs and symptoms enhanced self-care adherence to the self-care activities despite the lack of educational intervention
Ling et al. (2019)	Singapore	Cross-sectional descriptive correlational study	107 Patients with chronic HF	To investigate diet adherence, medication adherence and self-care behaviour among patients with chronic heart failure (CHF) in a multi-ethnic society and identify the significant factors associated with their diet and medication adherence.	Dietary Sodium Restriction Questionnaire, the Medication Adherence Rating Scale 5items and the EHFSBS12.	All the respondent showed positive attitudes towards the recommended diets and medication, which underlined their self-care behaviors Low income, ethnicity, diabetic complications, and ineffective education influence low adherence to self-care by the patients.
(Liou et al., 2015)	Taiwan	A quasi-experimental study	131 HF patients	To investigate the effects of self-care programs on patients.	knowledge of the CHF questionnaire and SCHFL.	The results of the self-care evaluation revealed significant differences between the two groups. The NYHA functional group in the experimental group showed a significant improvement after hospital discharge compared to the control group.
Massouh et al. (2020)	Lebanon	Cross-sectional correlational study	100 HF patients	To examine whether confidence explained the associations of social support and HF-knowledge with self-care.	Arabic version of SCHFL, ENRICHD Social Support Inventory and DHFK.	Patients with HF reported high self-care confidence that led to social support as well as self-care maintenance. The confidence enhanced the disease management and self-care behaviors in patients with chronic HF.
(Matsuoka et al., 2016)	Japan	Cross-sectional study	249 HF patients	To identify the relationship between functional, communicative, critical HL and self-care behaviors in HF patients	Heart Failure-Specific Health Literacy Scale EHFSCBS, Japanese heart failure knowledge scale	Patients with low HL had less knowledge and behaviors regarding self-care than those with high HL. Critical HL was an independent determinant of self-care behaviors. Critical HL was independently linked to self-care behaviors in patients with HF.
Nomali et al. (2019)	Iran	Cross sectional study	190 HF patients	To determine knowledge regarding HF among Iranian patients with HF	DHFkS.	Patients with HF had low levels of total, general, HF treatment, and symptoms/symptom recognition knowledge. Thus, there is an essential need to be improved by an appropriate intervention, especially on knowledge of symptoms /symptom recognition.
Peyman et al. (2020)	Iran	Semi-experimental study	80 Patients in test and control groups	To investigate the effects of education based on self-efficacy strategies on self-care behaviors in heart failure patients.	Sullivan self-efficacy questionnaire for heart failure patients and EHFSCBS	Educational interventions enhanced self-efficacy and self-care from 23.5% to 42.64% Self-care behaviors improved overtime after the 3-months interventions.
Plotka et al. (2017)	Poland	prospective, single-center survey-based registry	201 HF patients	To gain a deeper insight into patients' perception of chronic heart failure (CHF) symptoms by analysing their compliance with non-pharmacological recommendations.	Survey was designed to include information about the patients' sex, age, education, length of the illness and 12 questions about their perception of the disease	The younger the patients, the more often they thought that CHF is curable. The patients presenting with severe CHF tended to think that CHF is incurable significantly more often than those with mild CHF. Patients need to be better educated about the nature of CHF and the importance of lifestyle changes

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Raines and Dickey (2019)	USA	Descriptive cross-sectional design	42 hospitalized patients with chronic HF	To examine the learning needs of hospitalized patients with CHF by identifying their current CHF self-care behaviors and knowledge levels in addition to identifying relationships between patient learning needs and select clinical variables (sociodemographic and health history data)	SCHFI and the Japanese Heart Failure Knowledge Scale.	Learning deficits were evident as maintenance, management, and confidence were noted at 38.6%, 41.6%, and 17%, respectively The knowledge deficits explained the readmissions for patients with chronic HF.
Róin et al. (2019)	Faroe Islands	Prospective cohort study	47 Patients with chronic HF	To investigate if self-care and heart failure knowledge persists at 9 month follow up among patients with heart failure after an outpatient programme	EHFSCBS and DHFKS.	Outpatient programme delivered the knowledge needed to influence self-care adherence to the medication, weighing, blood pressure monitoring, and dietary control
Seid et al. (2019)	Ethiopia	cross-sectional study	310 HF patients	To assess heart failure patients' adherence to self-care recommendations and its associated factors	"Revised Heart Failure Compliance Scale" The Japanese heart failure knowledge scale.	Only 22.3% were aware of HF and adopted self-care recommendations Male participants committed to self-care more than female respondents did Gender influenced the level of knowledge and subsequent self-care
Selan et al. (2016)	Sweden	Single centre observational study	90 Patients 80-year-olds	To determine the prevalence of self-awareness of HF in participants, ≥ 80 years of age, and to investigate the association between this self-awareness and age-related and HF-related factors.	The Montgomery and Asberg Depression Rating Scale (MADRS)	The 80-year-old participants had different level of participation and self-awareness levels HF diagnosis was evident in 26% of the respondents
(Sen et al., 2020)	Vietnam	descriptive correlational study	112 HF Patients	To examine compliance with treatment among patients with heart failure, and to identify factors related to treatment compliance	Revised Heart Failure Compliance Scale Mini mental state examination (MMSE) Japanese Heart Failure Knowledge Scale (JHFKS)	The results showed that 54.5% of the participants complied with the treatment. The study concluded that patients should enhance knowledge of heart failure in order to improve treatment compliance
(Sewagegn et al., 2015)	Ethiopia	Cross-sectional study	328 HF patients	To examine adherence to self-care behaviors and knowledge among adult patients with heart failure on active follow-up	structured questionnaires	The study found that general adherence to self-care behaviors for heart failure is low and selective. The majority of patients had a severe lack of knowledge about heart failure and self-care behaviors. Age, comorbidity, NYHA category, and degree of knowledge of heart failure were independent predictors of impairment at all.
Stut et al. (2015)	UK, Spain Germany	Multi-center observational study	123 Patients with a mean age of 66.5years under a third-generation telehealth system	To evaluate a novel online education and coaching program to promote self-care among patients with heart failure.	EHFSCBS.	At least 101 respondents registered high scores in self-reported self-care behaviors Patient adherence varied with the information received through the telehealth system The self-care behaviors included daily weighing, blood pressure, symptom control, and monitoring
Tawalbeh et al. (2017)	Jordan	Cross-sectional descriptive correlational design	226 HF Patients	To describe the associations between knowledge, sociodemographics, and self-care behaviors	DHFS and SCHFI.	The cross-sectional data showed low knowledge, varied income, educational levels, short disease duration, living with HF, old age, and unemployment as the contributors to low self-care behaviors. Low confidence in Jordan patients affected their knowledge of the disease

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Tawalbeh (2018)	Jordan	Quasi experimental pre-test/ post-test design	127 HF patients	To examine the effect of a cardiac educational program on knowledge and self-care behaviors among patients with heart failure.	DHFS and SCHFI.	Knowledge from cardiac educational programs increased the self-care attitudes of the intervention group as opposed to control group after 3-month application
(Tegegn et al., 2021)	Ethiopia	Cross-sectional study	396 HF patients	To assess adherence to self-care practices and associated factors among adult outpatient heart failure patients	“Revised Heart Failure Compliance Scale” Japanese heart failure knowledge scale.	The study found comorbidity, insufficient knowledge, and depression were predictors of self-care practice. As a result, nursing intervention programs related to knowledge about heart failure are recommended to enhance self-care practices. Self-care strategies should target patients with depression and comorbidities.
Zeng et al. (2017)	Singapore	quantitative study, descriptive	187 HF patients	To measure HF patients’ knowledge on the disease and self-care management, and to explore factors influencing their knowledge level	Questionnaire adapted from DHFKS.	Patients’ knowledge is considered a significant predictor and it had significantly relationship with self-care adherence among patients with heart failure
(Zou et al., 2017)	China	Cross-sectional study.	321 HF patients	To explore the factors associated with self-care behaviors and to examine the mediating role of trust in self-care.	SCHFI, Duke Activity Status Index, HF Knowledge Test, Health Literacy Scale, and Multidimensional Scale of Perceived Social Support	The modified model showed a good fit. Functional ability and knowledge were also directly related to self-care management, and health literacy and social support were directly related to self-care maintenance. The results also found that patients with chronic heart failure had poor self-care behaviors.