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The impact of home care on individuals with chronic heart failure: A comprehensive review

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OriginalArticle

Abstract

BACKGROUND: Heart failure is a widespread condition linked to elevated mortality rates, readmission incidents, and healthcare expenditures. Home care has emerged as a promising strategy for managing patients with heart failure. This study seeks to comprehensively review the impact of home care on individuals diagnosed with heart failure.

METHODS: A comprehensive review was conducted by searching for relevant articles in Persian and English using keywords such as 'Nursing,' 'Home care,' 'Home care services,' Health Care Costs,' 'Heart diseases,' and 'Heart failure' across various databases including SID, Magiran, Ovid, Scopus, Web of Science, CINAHL, ProQuest, Embase and Medline. The search was limited to articles published between 2000 and 2023, focusing on those suitable for the study's purpose.

RESULTS: A total of 1,260 articles were initially identified. After eliminating duplicate and irrelevant articles, evaluating the availability of full texts, and applying entry and exit criteria, as well as utilizing the CONSORT, STROBE checklist, and JBI Checklist for qualitative assessment of the studies, a total of 13 English articles were deemed suitable for inclusion in the final review. These studies utilized various study designs to investigate the effects of home care on patients with heart failure.

CONCLUSION: The findings of this study suggest that home care has a positive impact on the quality of life, knowledge, and self-care of patients with heart failure. Additionally, it has been shown to reduce healthcare costs, readmission rates, and mortality. Therefore, it is recommended to prioritize home care for patients with chronic heart failure following discharge.

Keywords: Nursing; Home Care; Heart Failure; Health Care Costs; Heart Diseases

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Introduction

Cardiovascular disease is a prevalent chronic condition that is recognized as the leading cause of mortality worldwide[1-3]. Projections indicate that by 2030, approximately 23.6 million individuals will be affected by cardiovascular diseases[4]. Among the various heart ailments, chronic heart failure stands out as a common affliction[5]. Chronic heart failure is a multifaceted syndrome characterized by functional limitations and symptoms such as fatigue and dyspnea[6]. This disorder significantly impacts the quality of life and places a substantial burden on both the patient's family and society[7]. The prevalence of heart failure has witnessed a surge in recent years, transforming it into a global epidemic affecting approximately 64.3 million individuals globally[8,9]. Furthermore, the annual prevalence rate of this condition is 31.4% in the United States and 17.4% in Europe[10-12]. In 2019, the estimated prevalence of heart failure in Iran ranged from 0.3% to 4.3% of the population[13].

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Concurrently, the healthcare expenditures associated with this disease are substantial, with the United States alone spending over 39 billion dollars annually due to high rates of hospitalization, re-hospitalization, and outpatient visits[14]. Reports indicate that 40% of patients die from the disease within the initial four years of diagnosis[15], resulting in an annual death toll exceeding 287,000 individuals[16], rivaling cancer in terms of mortality rates[14].

Despite advancements in treatment, chronic heart failure remains a significant public health concern, leading to debilitating symptoms and a decline in health-related quality of life[17]. Research has demonstrated that a considerable proportion of patients with heart disease experience uncontrolled symptoms, such as severe pain and dyspnea, towards the end of their lives[18]. Consequently, frequent hospital readmissions have become commonplace, with rates doubling over the past two decades. Studies have reported that 30-50% of hospital readmissions occur within six months following discharge, with the highest incidence observed among individuals aged 65 and above[19-21].

Patients' limited understanding of the disease, its management, and self-care measures contribute to the exacerbation of disease symptoms and subsequent re-hospitalization[22,23]. It is crucial for patients to have a sufficient understanding of the pathology, as well as the signs and symptoms associated with the disease, in order to effectively prevent hospitalization and improve their overall quality of life[24]. Various intervention methods, such as outpatient consultations, home visits, and telephone calls to medical staff, can assist patients. Among these methods, home follow-up after discharge is a strategy that enhances the patient's understanding of their illness and promotes effective management for both the patient and their family. It provides them with assistance in a real-life setting[25].

Home care is widely recognized as an effective strategy for preventing hospital readmissions in patients with heart failure[26,27]. The role of home care nurses in educating patients to manage their condition independently is crucial[23]. A study from the Netherlands highlighted the complexity of managing heart failure[28], emphasizing the need for an optimal approach to home management. Home care nurses play a vital role in imparting knowledge to patients and their families in this regard. However, they face unique challenges in providing comprehensive education on chronic heart failure management, such as limited access to precise patient data, significant geographical distances, and low levels of patient literacy[29]. Despite these challenges, review articles are essential to provide valid evidence on the effectiveness of home care for these patients. For example, in a systematic review, important factors in heart failure management at home included cooperation between primary and hospital care, adjustment of drug dosage, and patient education[14]. Another systematic review analyzed six clinical trial studies to examine the effect of home care on heart failure management[30]. Additionally, a review conducted by Sterling et al. explored the involvement of home care providers in the self-care of patients with chronic heart failure[31].

The quality of studies is steadily improving due to ongoing quality assessment efforts, leading to a reduction in the limitations of these studies[32]. Furthermore, there are continuous advancements in the methods of providing home care[33]. Consequently, there is a pressing need for review studies to effectively summarize and compare these evolving studies, ultimately working towards minimizing the gap in both knowledge and practice within the field. Considering the prevalence of chronic heart failure, its significant impact on patient health and mortality, and the potential of home care to improve patient outcomes and prevent readmission, we have decided to conduct a review study on the effect of home care in patients with heart failure.

Materials and Methods

This study presents a comprehensive review aiming to explore the relationship between home care and heart disease, particularly heart failure. A thorough search was conducted across multiple online databases, including SID, Magiran, Ovid, Scopus, Web of Science, CINAHL, ProQuest, Embase, and Medline, focusing on articles published between 2000 and 2023. This timeframe allows us to observe changes over the past two decades while achieving our research goal. Our search utilized keywords such as "home care," "home care services," "nursing," "heart disease," and "heart failure," following the search strategy "Nursing [Mesh] OR Home Care Services [Mesh] AND Heart Diseases [Mesh] OR

Heart Failure [Mesh] AND Health Care Costs [Mesh]."

The inclusion criteria involved selecting articles in English or Persian relevant to our study objective, meeting the quality standards established by the CONSORT 2010 Statement, STROBE checklist, and JBI Critical Appraisal Checklist for Quasi-Experimental Studies during the qualitative evaluation phase, focusing on the relationship between home care and heart disease, particularly heart failure, with preference given to those presenting interventions or longitudinal perspectives. Articles lacking full-text availability were excluded. Initially, one researcher conducted the search and reviewed articles, which were then approved for inclusion by a second individual.

After applying the search strategy, 1260 article titles were obtained. Due to overlapping databases and indexed articles, 745 duplicates were removed. Subsequently, 515 articles underwent further analysis. During abstract screening, 458 articles were excluded for not meeting inclusion criteria. Among the remaining 57 articles, 21 were excluded due to limited full-text access. The qualitative evaluation, based on the CONSORT 2010 Statement[34], STROBE checklist[35], and JBI Critical Appraisal Checklist for Quasi-Experimental Studies[36], led to the exclusion of an additional 23 articles. This process resulted in 13 articles for the main review, as depicted in Figure 1. These articles were thoroughly analyzed, and relevant information was extracted in alignment with our research objective.

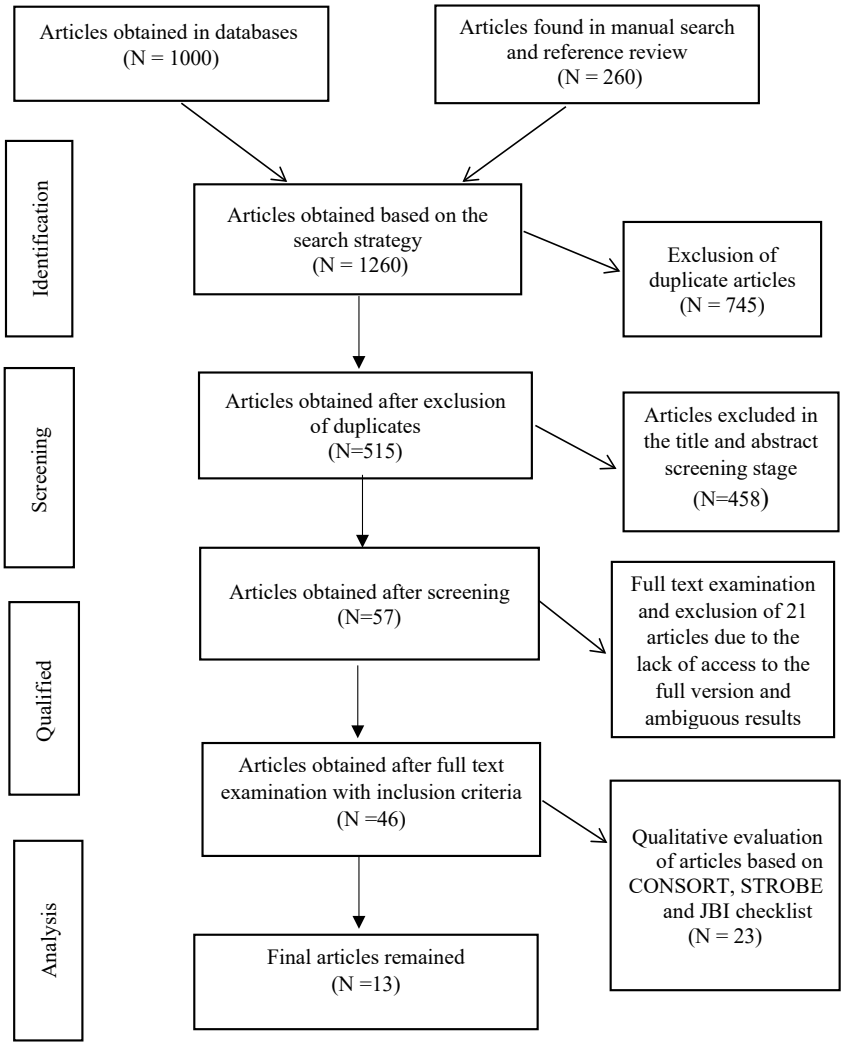

Figure 1. PRISMA diagram of the inclusion and exclusion of the reviewed articles

During the analysis phase, several key steps were undertaken, including data reduction, data display, data comparison, and conclusion verification. To ensure a rigorous and reproducible analysis of the quantitative content, a research technique known for its reliability and objectivity was employed. This method was selected for its systematic and rule-based approach, allowing for a comprehensive description, classification, and quantification of textual content.

Furthermore, the process involved two independent researchers conducting the article search, qualitative assessment, and analysis, validated by a third person. Upon collecting the relevant articles, the researchers independently compared various aspects of the impact of home care. Any discrepancies or differences of opinion between the researchers were thoroughly examined and discussed, leading to the establishment of a consensus on the subject matter.

Results

Characteristics of the studies

A total of 13 studies were included in the final review analysis, all of which were published in English (Table 1). The majority of these studies focused on participants aged 18 years and older. Specifically, two studies examined individuals aged 55 years and above,[37,38] three studies included participants aged 40 years and above,[39-41] and two studies did not impose any age restrictions.[42,43] In terms of methodology, most of the studies in this field were clinical trials, with two of them being semi-experimental.[37,44] Additionally, two studies utilized a retrospective analysis approach.[41,45] It is important to note that all of the studies included in this analysis involved both male and female subjects. Various studies employed different methods for data collection. Some studies used self-made questionnaires,[37-39,42,44] while others relied on standardized questionnaires (Disease Knowledge and Self-care Questionnaire, OASIS-C).[25,40,43,45-47] Furthermore, certain studies were based on North American Nursing Diagnosis Association (NANDA)'s nursing diagnoses[48], while others evaluated the difference in the number of days of hospitalization and hospital visits before and after the intervention[41].

The Impact of Home Care on Patients with Chronic Heart Failure

A study was conducted to examine the effects of home visits on patients with chronic heart failure. The visits occurred on specific days (10, 30, 60, and 120) following discharge from the hospital. The study focused on patients with left ventricular failure, and the results showed that these visits contributed to the improvement of the patients' symptoms. Notably, patients with a higher initial knowledge score experienced a significantly greater improvement in symptoms such as shortness of breath/dyspnea, during activity (walking flat, walking stairs), fatigue, tiredness, decreased appetite/nausea, edema, and chest pain [7,44].

Another study found that patient awareness increased with two follow-up visits conducted after discharge[25]. Additionally, a study evaluated the impact of interventions implemented during home visits using NANDA's nursing diagnoses, showing positive effects on patients[48].

In a study by Stewart et al., home visits made by cardiologist nurses and pharmacists not only increased the survival rate of patients but also significantly reduced health costs. The authors recommended further studies to explore this method[37]. Similarly, a study conducted in South Australia, which involved interdisciplinary collaboration during home visits, resulted in reduced health costs and readmissions[38]. Likewise, in a study where patients were followed up at home for 18 months, health expenses were reduced by one third[47].

In another study by Stewart et al. (2012), two nurses were trained by a specialist physician to provide home care for chronic heart failure patients. The physicians monitored the patients through telephone calls over 18 months, leading to a significant reduction in the number of emergency admissions[46].

Ngatomi et al. employed a novel approach to monitor patients' activity by using specialized tools attached to their feet instead of traditional home visits. This innovative practice, combined with specific training, significantly enhanced the safety of patients' activity[40]. Similarly, in a research study, patients were provided with a self-care program centered around home care nursing, including follow-up sessions at 6 weeks, 3 months, and 6 months. The results indicated improvements in cardiac self-efficacy, health-related quality of life, and a decrease in levels of depression[43].

Table 1. Characteristics of the studies incorporated in the present investigation

	Study design	Author	Title	Sample size	date	Results
1	**RCT**	Nagatomi	Home-based cardiac rehabilitation using information and communication technology for heart failure patients with frailty	30	2022	The Comprehensive Home-Based Cardiac Rehabilitation (HBCR) program employs information and communication technology to improve exercise tolerance, physical debility, and muscular strength in individuals suffering from heart failure. This program serves as evidence that utilizing technology-based interventions is a secure and efficacious strategy.[49]
2	**RCT**	Jiang	The effectiveness of a nurse-led home-based heart failure self-management programme (the HOM-HEMP) for patients with chronic heart failure: A three-arm stratified randomized controlled trial	213	2021	The findings of this study demonstrate that the "Heart Failure Self-Management Program Based on Home Care Nurse Program" (Hom-HEMP) is an effective intervention for individuals diagnosed with heart failure. [50]
3	**Retros pective**	Martin	Retrospective Comparison of Home Telehealth and Nursing Care With or Without Rehabilitation Therapy on Rehospitalization Rates of Individuals With Heart Failure	132	2017	No statistically significant differences were observed in terms of all-cause rehospitalization rates among the three home care groups, which included nurse-provided care, remote telephone contact, and occupational therapy and physiotherapy.[45]
4	**Retros pective**	Punchik	Can home care for homebound patients with chronic heart failure reduce hospitalizations and costs?	196	2017	Research has shown that providing care for adults diagnosed with chronic heart failure in a home-based setting resulted in statistically significant decreases compared to the six months prior to home care. These decreases include hospitalizations (46.3%), the total number of in-hospital days (28.7%), the number of in-hospital days for CHF (66.7%), emergency room visits (47%), and overall costs.[41]
5	**Quasi-experi mental**	Azzolin	Home-based nursing interventions improve knowledge of disease and management in patients with heart failure	17	2015	The findings of this study revealed a significant improvement in Nursing Outcomes Classification (NOC) scores, which assess patients' comprehension of heart failure (HF) disease and its treatment. This improvement was observed after implementing nursing interventions during four home visits. Upon comparing these results with knowledge findings, it became clear that patients with the highest NOC scores also attained the highest average scores on the Knowledge Questionnaire (KQ). Therefore, we conclude that the intervention in the study helped enhance patients' understanding of HF and its management, suggesting potential positive effects on their health.[44]

Continued Table 1

	Study design	Author	Title	Sample size	date	Results
6	**RCT**	Azzolin	Effectiveness of nursing interventions in heart failure patients in home care using NANDA-I, NIC, and NOC	23	2013	Home-based nursing care, guided by appropriate nursing diagnoses, has been demonstrated to effectively enhance patients' understanding of treatment regimens, medications, compliance behavior, symptom control, activity tolerance, and energy conservation, thereby aiding in the management of heart failure patients.[48]
7	**RCT**	Bertuzzi	The knowledge of patients with heart failure in the homecare context: an experimental study	41	2012	Home care services, implemented by specialist nurses, have notably increased disease awareness and promoted beneficial self-care behaviors, such as reducing smoking and alcohol consumption, among individuals with heart failure.[25]
8	**RCT**	Stewart	Impact of Home Versus Clinic-Based Management of Chronic Heart Failure	298	2012	The implementation of home care services has resulted in significant improvements in patient survival rates, a notable decrease in hospitalization rates, and a substantial reduction in healthcare expenditures by approximately 33%. However, Home-Based Intervention (HBI) did not demonstrate superiority over Center-Based Intervention (CBI) in reducing all-cause death or hospitalization. Nevertheless, HBI was associated with significantly lower healthcare costs, primarily due to fewer days of hospitalization.[46]
9	**RCT**	Aguado	Long-term implications of a single home-based educational intervention in patients with heart failure	106	2010	During the 24-month follow-up period, in the context of chronic systolic heart failure patients, a post-discharge home-based educational visit conducted by nursing staff has been found to effectively reduce unplanned emergency visits and readmissions, leading to lower healthcare costs and improved quality of life.[47]
10	**RCT**	Brotons	Randomized Clinical Trial of the Effectiveness of a Home-Based Intervention in Patients With Heart Failure: The IC-DOM Study	283	2009	A meticulously planned and comprehensive intervention fucosed on home care, delivered by skilled nursing specialists, has proven effective in reducing mortality rates and hospital readmissions, enhancing quality of life, and fostering high levels of patient satisfaction among individuals diagnosed with heart failure.[42]

Continued Table 1

	Study design	Author	Title	Sample size	date	Results
11	**RCT**	Wongpiri yayothar	Effects of Home-Based Care Program on Symptom Alleviation and Well-Being Among Persons with Chronic Heart Failure	93	2008	Management skills focused on symptom control have the potential to mitigate the severity of symptoms and enhance the overall well-being of individuals suffering from heart failure. This can be achieved through the practice of self-leadership by both the patient and their family. Therefore, it is recommended that home healthcare nurses adopt and implement this program for the effective care of heart failure patients.[39]
12	**RCT**	Inglis	Extending the Horizon in Chronic Heart Failure: Effects of Multidisciplinary, Home-Based Intervention Relative to Usual Care	297	2006	An interdisciplinary intervention, spearheaded by a nurse, has been found to enhance survival rates and decrease the duration of hospital stays.[38]
13	**Quasi-experimental**	Stewart	Home-Based Intervention in Congestive Heart Failure Long-Term Implications on Readmission and Survival	97	2002	According to the cited source, the implementation of home care services has been associated with a notable extension in the life expectancy of patients, as well as a reduction in the frequency of hospital readmissions.[37]

Discussion

The present review aimed to investigate the effect of home care on heart failure patients. Most studies focused on left ventricular failure and reported positive outcomes, including improvements in disease symptoms, quality of life, reduced re-hospitalization rates, and healthcare cost savings. However, certain studies had limitations, such as small intervention groups and the absence of a control group, which could potentially undermine the findings.

For instance, in the study by Punchik et al. (2017), a retrospective analysis on 196 patients between 2012 and 2015 showed a significant decrease in hospital admission rates after receiving home care. However, this study lacked a control group and may have been influenced by confounding factors.[41] Without a control group, it's challenging to isolate the effect of home care on hospital readmission rates. Other factors, such as changes in medical practice, advancements in treatments, or improvements in patient health behaviors over time, could also contribute to the observed decrease in hospital readmission rates. Therefore, the absence of a control group introduces the possibility of confounding variables affecting the study results.

The study by Azzolin (2013) and colleagues employed interventions that were tailored based on nursing diagnoses. Initially, they formulated eight general nursing diagnoses derived from the common characteristics and symptoms observed in chronic heart failure patients. These standardized nursing diagnoses were then applied uniformly during patient visits, providing the same pre-determined nursing diagnoses to all patientz[48]. However, scholarly research underscores the uniqueness of the nursing process, highlighting its focus on the individual reactions of patients. Consequently, a comprehensive care plan should be developed to address each patient's specific requirements, rather than applying a one-size-fits-all approach based on standardized diagnoses[51,52].

In the study conducted by Jiang et al. (2021), there was a control group alongside two intervention groups. One intervention group received specific interventions, such as teaching patients with chronic heart failure using a symptom box containing visual reminders for fluid intake and alarm reminders for medication adherence. Additionally, daily care

activities were guided by an educational manual developed from the life experiences of patients with chronic heart failure. Visits occurred every 2 weeks for 6 weeks, during which motivational interviewing techniques were employed to enhance participants' engagement in self-care activities. In the second intervention group, patients received additional interventions, including the use of a smart application offering various features such as educational information, personalized reminders for medication and medical appointments, weight and blood pressure monitoring, symptom reporting, and a chat room for communication, with the nurse facilitating secure communication[43]. In this study, it would have been more advantageous to administer the interventions separately in the two intervention groups to conduct a more comprehensive investigation. Additionally, the study did not specify how the relationship between the intervention groups and the control group, as well as the motivational interview, was controlled.

In a separate study, except for the initial session where patients received in-person self-care, activity, and nutrition training, their activity and nutrition were subsequently monitored remotely using a sensor (Fitbit) attached to the patient's foot. Although this method indicated no significant difference in disease complications between the control and intervention groups, it did show that the intervention group exhibited increased physical activity, engaged in safe exercise, and adopted proper nutritional habits[40]. It is noteworthy that this method holds significant potential in terms of its usefulness and effectiveness in optimizing the time management of healthcare professionals.

In one study, specific information regarding the age range of participants was not provided[45]. This absence of age data is noteworthy because previous research has demonstrated that self-care capabilities tend to decline with age across various age groups[53]. Consequently, the age of patients in this study could be considered a confounding variable, as variations in self-care practices may impact the quality of care provided by nurses in a home setting. It would have been beneficial for the study to categorize patients based on their age range to better understand how age may have influenced self-care practices and subsequently affected the quality of care.

In another study, a status survey was conducted at two different time intervals with a two-year gap[37]. This temporal gap between surveys may affect the comparability of the results, as changes in patient conditions or external factors over time could confound the findings.

In a separate study, specialized booklets containing relevant content and leadership techniques were used alongside home visits. This approach involved patients and families identifying concerns and worries, followed by instructors providing education based on these concerns until early warning signs could be recognized. The researcher assigned tasks to participants to monitor and record their symptoms, which were documented daily on an assessment form. The researcher also assisted participants in finding new ways to manage their symptoms and presented a plan to enhance their skills in symptom management. This plan included strategies to improve medication adherence, fluid intake management, and the preparation of low-sodium meals. Participants were instructed to record their fluid intake and output on a designated form, and during subsequent visits, they would receive guidance based on this information[39].

However, one potential issue that may impact the study's results is the improper evaluation of patients' symptoms due to errors in filling out the forms by the patients themselves. Since interventions were based on these forms, errors may reduce the reliability of the results. Therefore, it would have been advantageous for the visiting team in this study to conduct a comprehensive evaluation of the patient in addition to considering the form and then implementing interventions accordingly. This approach would help ensure a more accurate assessment of patients' symptoms and needs, leading to more effective interventions.

In the majority of studies, the primary focus was on diseases classified as class 2, with only a few studies investigating diseases classified as classes 2, 3, and 4[47]. This discrepancy in disease classification across studies may introduce variability in the findings and complicate comparisons.

Additionally, some studies lacked adequate specification of the exact number of home visits, which makes it challenging to compare the results accurately[46]. Variations in the number of visits made by different patients were also reported in certain studies, further complicating the identification and comparison of the effects of home care[44].

For instance, in a specific study involving only

two visits, researchers assessed improvement levels using a standardized questionnaire while controlling for the potential confounding factor of patient knowledge through a separate questionnaire[25]. Patient knowledge can enhance adherence to care measures, but if not properly controlled, it can introduce bias and disrupt the study results[54]. Therefore, the inclusion of the knowledge variable in this study serves to enhance the reliability of the findings and provide a more accurate assessment of the impact of home care interventions.

This review exclusively focused on reports written in Persian and English languages, with full texts readily available through online database search. However, it is important to acknowledge the possibility that there may be studies conducted in other languages or studies whose complete texts were not accessible, thus were not included in this investigation. Furthermore, it is also possible that studies may not be available in electronic format or have been published in databases that were not included in this study. These factors could potentially limit the comprehensiveness of the review and may introduce biases in the findings. Therefore, while the review provides valuable insights based on the available literature, it is essential to recognize its limitations and consider the potential impact of omitted studies on the overall conclusions

Conclusion

The findings of this study unequivocally highlight the positive impact of implementing home care services by nursing professionals on patients with heart failure. Notably, such interventions are shown to significantly enhance patients' quality of life and knowledge, while concurrently driving down healthcare expenses, readmission rates, and mortality rates. In light of these compelling results, we strongly advocate for the widespread adoption of comprehensive home care programs by hospitals for heart failure patients upon their discharge. This proactive intervention not only holds the promise of reducing mortality rates but also alleviating the financial burden imposed by frequent patient readmissions on the healthcare system. By prioritizing home care services, hospitals can effectively enhance patient outcomes, improve resource utilization, and ultimately advance the overall management of heart failure.

Furthermore, future research efforts should focus on exploring the long-term efficacy and sustainability of home care interventions for heart failure patients. It is essential to investigate the durability of the observed improvements in quality of life, knowledge retention, and healthcare cost savings over extended periods.

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Conflict of Interest

The authors declare that they have no competing interests.

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Author's Contributions

FK: Research the article, analyzed the articles, translate the article, ASh: Research the article, analyzed the articles, Writhe the article, MT: Supervision, Revised the article

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