

TRANSITIONAL CARE INTERVENTIONS

Implications of Transitional Care Interventions on Hospital Readmissions in Patients with Destination Therapy Left Ventricular Assist Devices

Jackeline I. Iseler, DNP, RN, ACNS-BC

Michigan State University

Kelly L. Wierenga PhD, RN

Case Western Reserve University

Elizabeth C. Shaid MSN, CRNP and Karen Hirschman PhD, MSW

University of Pennsylvania

Corresponding Author:

Jackeline Iseler, DNP, RN, ACNS-BC

Michigan State University College of Nursing

1355 Bogue Street

East Lansing, Michigan State University

(517) 432-4907 Office

(517) 353-9953 Fax

jackeline.iseler@hc.msu.edu

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Heart failure (HF) affects 26 million patients globally (Ambrosy, Fonarow, Butler, & Chioncel, 2014). Deterioration of the heart ventricles continues to be experienced by patients with advanced heart failure despite guideline-directed medical therapy (Marcuccilli, Casida, Bakas, & Pagani, 2014; Yancy et al., 2013). For patients at high risk for mortality within a year, a left ventricular assist device (LVAD) should be considered (Feldman et al., 2013). An LVAD may be implanted in patients who are eligible for a heart transplant, known as bridge to transplant (BTT) (Gal & Jaarsma, 2012; McMurray et al., 2012; Peura et al., 2012).

Alternatively, some patients receive an LVAD as a long-term solution, or destination therapy (DT), if they are ineligible for transplant (Gal & Jaarsma, 2012; Kirklin, Naftel, Kormos, & Stevenson, 2013; McMurray et al., 2012; Shreenivas, Rame, & Jessup, 2010). Patients with advanced age, high body mass index (BMI), high peripheral vascular resistance, recent malignancy, human immunodeficiency virus, or renal insufficiency are generally ineligible for a heart transplant and prompt consideration for DT LVAD (Miller & Guglin, 2013).

The purposes of BTT and DT LVAD placements are distinct, with BTT allowing patients to wait for a transplant from the limited available organ donors (Pagani et al., 2009). Destination therapy is reserved for patients who do not meet the criteria for transplants and need mechanical circulatory support from an LVAD to improve their quality of life (QOL) and functional capacity (Miller & Guglin, 2013; Slaughter et al., 2009). It is important to consider the needs of an LVAD

patient following implantation as they transition from the inpatient to home environment, particularly for those DT patients expected to care for their LVAD long-term.

Transitions of Care

A transition of care is defined as a transfer of patient care from one type of setting to another while providing time-limited services targeted to prevent poor outcomes (Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011) through coordination and continuity of care (Coleman, Parry, Chalmers, & Min, 2006). Transitional care involves education of the patient and family, and coordination among the healthcare team based on a comprehensive, patient-centered plan of care by trained healthcare practitioners (Coleman et al., 2006). An optimal transition from hospital to home requires a multidisciplinary team approach and includes lifestyle modification by both patient and informal caregivers (Gal & Jaarsma, 2012; Marcuccilli et al., 2014; Mountis & Starling, 2009).

Informal caregivers are individuals with a significant relationship to the patient, such as a relative, partner, or friend, who provide care to the patient (Family Caregiver Alliance, 2017). As part of the home environment, informal caregivers are pivotal to the successful transition for patients with an LVAD. These caregivers are responsible for percutaneous exit-site care, anticoagulation management, monitoring of HF exacerbation symptoms, monitoring for signs of infection, healthy diet adherence, and recognizing signs and symptoms to report to the healthcare team as a requirement for transition from hospital to home (Bellumkonda & Jacoby, 2013; Gal & Jaarsma, 2012; Mountis & Starling, 2009). All of these responsibilities can leave the caregiver feeling overwhelmed (Cicolini, Cerratti, Pelle, & Simonetti, 2016).

LVAD Patient Outcomes

Hospital readmission rates for patients with an LVAD currently range from 26% to 76% (Hasin et al., 2013; Pagani et al., 2009; Iseler, Fox, & Wierenga, 2018; Tsiouris, Paone, Neme, Brewer, & Morgan, 2014; Williams et al., 2012). Leading causes of readmission in patients with an LVAD are bleeding, cardiac-related causes, infection, and thrombosis (Hasin et al., 2013). Recurrent HF accounts for one reason for readmissions (Hasin et al., 2013; Tsiouris et al., 2014). It is critical that patients and informal caregivers adhere to the medication regime, device maintenance, driveline care, and follow-up care with their healthcare team (Gandhi, McCue, & Cole, 2016). Patient and caregiver communication with the healthcare team are pivotal and a thorough understanding of the transitions may be of utmost importance for LVAD patients. Interventions focused on these transitions from hospital to home have shown to decrease readmissions in patients with HF (Feltner et al., 2014; Naylor, Broton, Campbell, Maislin, et al., 2004) and patients with an LVAD may demonstrate similar results.

Globally, over 15,000 people are living with a ventricular assist device (VAD) (Kirklin et al., 2015). Destination therapy LVAD recipients are now considered a new chronic patient population (Gal & Jaarsma, 2012). From 2006 to 2012, there were over 6,600 LVAD implantations in the United States and Canada, and over 40% of these patients classified as DT in 2012 (Kirklin et al., 2013). The increasing number of LVAD implantations, and years of survival, challenge the provision of optimal care to meet implantation goals for patients and families (Gal & Jaarsma, 2012), which include increasing patient survival, functional status, and QOL (Miller et al., 2007; Pagani et al., 2009; Shreenivas et al., 2010; Slaughter et al., 2009).

Aim

Specialized healthcare teams provide long-term care in collaboration with the high-level of care by the patient and their family to support the patients' outcomes (Gal & Jaarsma, 2012).

Evidence to guide healthcare teams in supporting the transitions for these patients and their families are lacking. The aims of this review were to explore components of transitional care interventions in patients with HF, identify components that may improve patient outcomes, and determine potential components appropriate for application in patients with DT LVAD.

Methods

Design

An integrative review was completed, which allowed for the inclusion of a broad range of sources with varied methodologies. The review structure was guided by Whittmore and Knaf'l's (2005) methodology, including the following stages: problem identification, literature search, data evaluation, data analysis, and presentation. Depending on the type of study, the methodological quality was assessed using the Rapid Critical Appraisal Questions for Randomized Controlled Trials method (O'Mathuna, Fineout-Overholt, & Johnson, 2011) or the Overview Questions for Critical Appraisal of Quantitative Studies (O'Mathuna et al., 2011).

Problem Identification

Based on the background literature, it is clear that transitional care interventions may be effective in improving health outcomes for patients with HF (Naylor, Brooten, Campbell, Maislin et al., 2004). Unfortunately, no immediate literature was discovered that identified what makes transitional care interventions more or less effective, or if they were appropriate for use in a highly specific DT LVAD population. As such, variables of interest and a sampling frame were identified to respond to the study aim (Whittmore & Knaf'l, 2005). The variables of interest included transitional care, patients with HF or ventricular assist devices, and readmission to the hospital. The sampling frame included all types of empirical studies such as quantitative, qualitative, and other reviews.

Literature Search

The three electronic databases searched for this review were The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and ProQuest. The following CINAHL headings, medical subject headings, and keywords were used to search for relevant articles: “heart failure,” “heart-assist device,” “ventricular assist device,” “continuity of patient care,” “transitional care,” “patient readmission,” “rehospitaliz*,” “readmit*,” and “readmission”. The search limitations were set to peer reviewed, English language, and age ≥ 18 years. The initial search did not limit the literature to a specific period. Reference lists within identified articles were examined as an additional method of obtaining relevant literature.

Article Selection

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines aided the selection of articles (Liberati et al., 2009). Two reviewers examined articles for inclusion criteria. Included articles contained adult study participants. Additionally, studies needed to include one or more of the following components: home visits, assistance with community resources, coaching, self-management support, transitions coach, case management, an individualized discharge plan implemented by healthcare staff, telephone calls, and/or intense follow-up. Distinct components such as those above were critical to identifying articles with increased effectiveness.

Analysis and Evaluation of the Literature

Extracted information was based on patient diagnosis, intervention type and length, and outcomes. Randomized controlled trials were reviewed for methodological quality using the Rapid Critical Appraisal Questions for Randomized Controlled Trials method (O'Mathuna et al.,

2011). The quality of non-randomized controlled trial articles were reviewed using the Overview Questions for Critical Appraisal of Quantitative Studies (O'Mathuna et al., 2011).

Results

Search Outcomes

The initial CINAHL, PubMed, and ProQuest searches resulted in 93, 171, and 40 articles, respectively ($N = 304$), and were reviewed independently by two reviewers (See Fig. 1). If any disagreement or discrepancies occurred between the reviews, they were resolved through discussion and consensus agreement. A total of 291 articles were removed for not meeting the inclusion criteria. Duplicate articles were identified and removed ($n = 6$). A search of references from each included article identified six additional articles not captured in the CINAHL, PubMed, or ProQuest searches (Lefebvre, Manheimer, & Glanville, 2008). A final sample of 13 articles was included in this literature review. The PRISMA (Liberati et al., 2009) statement was used to outline the search strategy.

Data Evaluation

To evaluate the data, an examination of the methodological quality was conducted. The final sample of articles included eight randomized controlled trials (RCTs) (Coleman, Parry, Chalmers, & Min, 2006; Harrison et al., 2002; Linden & Butterworth, 2014; Naylor, Brooten, Jones, et al., 1994; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin, et al., 2004; Rich et al., 1995; Yu et al., 2015), three quasi-experimental studies (Neff, Madigan, & Narsavage, 2003; Ohuabunwa, Jordan, Shah, Fost, & Flacker, 2013; Williams, Akroyd, & Burke, 2010), one observational study (Russell, Rosati, Sobolewski, Marren, & Rosenfeld, 2011), and one prospective pilot study (Stauffer et al., 2011).

Included Study Results

The interventions in the selected studies were registered nurse (RN) led. All but one study was conducted in the United States, with the other conducted in China. All studies described the interventions used, some also analyzed the cost of the program. The patient outcomes described in the studies were measured as rehospitalization rates, length of stay, outpatient resource utilization, and QOL. All articles reviewed are presented in Table 1.

Study Characteristics and Quality Assessment

For the eight randomized controlled trials, methodological quality was assessed using the Rapid Critical Appraisal Questions for Randomized Controlled Trials method (O'Mathuna et al., 2011). This strategy examines randomization, study results, and clinical relevance. All eight RCT used randomization of subjects in assigning them to the intervention or control groups (Coleman et al., 2006; Harrison et al., 2002; Linden & Butterworth, 2014; Naylor, Brooten, Jones et al., 1994; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin et al., 2004; Rich et al., 1995; Yu et al., 2015). Five of the studies (Harrison et al., 2002; Linden & Butterworth, 2014; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin, et al., 2004; Rich et al., 1995) and revealed the treatment allocation to the research assistants, members of the study team, and the patients after randomization. In the other studies, Coleman et al. (2006) reported that the research assistants were blinded to the participants' allocation statuses, while Naylor, Brooten, Jones et al. (1994) and Yu et al. (2015) did not mention when the treatment allocation was revealed.

For the studies that were not RCTs, methodological quality was reviewed with the Overview Questions for Critical Appraisal of Quantitative Studies. This method examined the purpose of the study, sample size, and validity and reliability of the measurements; analyzed the data; determined unforeseeable events during the study; compared the results to the research; and

determined how the research may affect clinical practice (O'Mathuna et al., 2011). Russell et al. (2011) conducted a retrospective observational study in which they compared patients prior to the implementation of the intervention (in 2009) to the intervention group in the transitional program (in 2010), in order to prevent or reduce contamination bias. In a prospective pilot study conducted by Stauffer et al. (2011), the authors implemented a pilot program and compared participants' data to patients who had opted out of the program, and found no significant differences between the two groups. For two quasi-experimental studies (Oluabunwa et al., 2013; Williams, Akroyd et al., 2010), transitional care groups were compared to historical patient data. In addition to comparing to historical data, Oluabunwa et al. (2013) also conducted a pretest/posttest evaluation in their single intervention group. Finally, Neff, Madigan, and Narsavage (2003) conducted a prospective, nonrandomized trial and assigned the participants according to their county of residence.

Data Analysis

As much of the empirical evidence included in this review does not contain primary data with measurement consistency between articles, analysis of data in this review is limited to ordering and categorizing data. Summarization is based on extracted data compared in the categories of participants and settings, types of interventions, and a variety of patient and cost outcomes.

Types of intervention used in intervention groups. Registered nurses or advanced practice registered nurses (APRNs) led the interventions in all of the included studies. The intensity level of post-discharge contact with patients was determined by type and frequency of post-discharge contact (see Table 2). Improved communication and follow-up were common elements of the discharge components of the interventions. Follow-up appointments, home visits,

and calls were other common discharge components included in study interventions. Nine studies provided phone numbers to patients to enable them to contact staff if they had questions or concerns (Harrison et al., 2002; Linden & Butterworth, 2014; Naylor, Brooten, Campbell, Jacobsen, et al., 1999; Naylor, Brooten, Campbell, Maislin, et al., 2004; Neff, Madigan, & Narsavage, 2003; Oluabunwa et al., 2013; Rich et al., 1995; Russell et al., 2011; Stauffer et al., 2011).

Patient education was also a typical component of the interventions and was implemented using various methods. Eight studies provided disease-specific education (Naylor, Brooten, Jones et al., 1994; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin et al., 2004; Neff et al., 2003; Rich et al., 1995; Stauffer et al., 2011; Williams, Akroyd et al., 2010; Yu et al., 2015), while other studies delivered self-management support through a patient workbook (Harrison et al., 2002), coaching (Russell et al., 2011), reinforcement of teaching (Naylor, Brooten, Campbell, Jacobsen et al., 1999), or information on medication self-management (Coleman et al., 2006).

A commonality of the study interventions was being nursing-led, either by RNs or APRNs, with different intensity levels, determined by the type and frequency of the interventions. The studies also described improved communication between the patient, facilities, or other healthcare providers. In addition to the improved communication methods, discharge elements were described in the studies as follow-up appointments, home visits, and phone calls to the patients. All but two studies included home visits as part of the transitional care interventions (Linden & Butterworth, 2014; Naylor, Brooten, Jones et al., 1994). Additionally, all studies identified patient education execution, in various methods, as an intervention.

Patient outcomes.

Rehospitalizations. All-cause rehospitalization was measured in all 13 included studies. Significant decreases in rehospitalizations were shown in eight studies. These studies implemented an intervention that was at least at a moderate level of intensity (Coleman et al., 2006; Naylor, Brooten, Jones et al., 1994; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin et al., 2004; Neff et al., 2003; Rich et al., 1995; Russell et al., 2011; Stauffer et al., 2011). Yu et al. (2015) reported a significant decrease in rehospitalizations within six weeks. Two studies that implemented a moderate level of intensity intervention did not report significant decreases in rehospitalizations; however, they were able to show a nonsignificant decrease within 30 days (Ohuabunwa et al., 2013; Williams, Akroyd et al., 2010). Only one of the low-intensity level studies had a decrease in rehospitalizations, and it was non-significant (Harrison et al., 2002).

Emergency room visits, acute care use, and primary care services. In addition to rehospitalization, five studies also examined acute care use, such as emergency room visits and primary care services (Harrison et al., 2002; Linden & Butterworth, 2014; Naylor, 1999; Neff et al., 2003; Ohuabunwa et al., 2013). All-cause emergency room visits ranged in occurrence from 24 hours to 90 days after discharge (Harrison et al., 2002; Linden & Butterworth, 2014; Neff et al., 2003) and up to 365 days (Ohuabunwa et al., 2013). Transitional care interventions were associated with an overall decrease in use of emergency department services (Harrison et al., 2002; Neff et al., 2003; Ohuabunwa et al., 2013). Significant reductions in emergency room visits were shown at 30 days (Neff et al., 2003) and after 12 weeks (Harrison et al., 2002).

Quality of life. Patient QOL was shown to have significantly improved in the three studies examining this outcome (Harrison et al., 2002; Naylor, Brooten, Jones et al., 1994; Rich

et al., 1995). Overall QOL improvements were significant in two studies at 12 weeks (Harrison et al., 2002; Rich et al., 1995). Although improvements to components of patient QOL were shown within each of these studies, inconsistency in the measurement and results was apparent.

Cost outcome. Variability existed in the methods used to calculate cost in the studies. Six studies included an analysis of cost and were able to show cost savings with the use of transitional care interventions (Coleman et al., 2006; Naylor, Brooten, Jones et al., 1994; Naylor, Brooten, Campbell, Jacobsen et al., 1999; Naylor, Brooten, Campbell, Maislin et al., 2004, Rich et al., 1995; Stauffer et al., 2011). The calculated cost savings in one study used the annual cost of the care transition intervention and itemized annual costs for the program, and was able to show significant reduction in cost at 90 and 180 days (Coleman et al., 2006). Naylor, Brooten, Jones et al. (1994) were able to show a significant decrease in total charges between two and six weeks after discharge, and similar results at six weeks after discharge. Costs per patient was also found to be significantly less in the intervention group at 24 weeks after discharge (Naylor, Brooten, Campbell, Jacobsen et al., 1999), and the mean at 52 weeks (Naylor, Brooten, Campbell, Maislin et al., 2004). Rich et al. (1995) found the cost of care per patient to be less in the transitional care intervention group, and readmission costs to be less as well ($p = 0.03$). Stauffer et al. (2011) was able to show total direct costs for patients in the transitional care intervention groups; however, from the hospital perspective, the intervention lost revenue in preventing readmissions.

Discussion

The aim of the review was to explore the existing transitions of care interventions for patients and its potential for application in patients with DT LVAD. While it is clear transition care reduces cost and improves outcomes, this review can begin to explain which aspects of

transitional care may be effective in this specific patient population and how the effectiveness of the intervention can be evaluated. This review can also be used as a foundation for the expansion of transitional care interventions in the LVAD patient population to reduce rehospitalization rates. Based on careful examination of the literature, the authors' determined there were no studies investigating transitional care in the LVAD patient population, HF was included in patients' medical diagnoses in 12 of the 13 studies, and chronic obstructive pulmonary disease was the main diagnosis in the remaining study (Neff et al., 2003).

The interventions in the studies applied various methods to improve communication between patients and the facilities or the patient's primary care providers. The type and frequency of post-discharge contact was categorized into levels of intensity and were nursing-led. In addition, the studies identified discharge elements, such as follow-up appointments, home visits, and phone calls to the patients, as improved methods of communication. All studies discussed patient education as an intervention applied through varying approaches. Additionally, all but two studies included home visits as part of the transitional care interventions (Linden & Butterworth, 2014; Naylor, Brooten, Jones, et al., 1994).

Naylor et al. (1994) researchers were able to show a decrease in readmissions of patients in the medical diagnosis-related group (DRG) in comparison to the surgical DRG patients. However, LVAD patients would still be considered HF patients despite having undergone surgery for the LVAD implantation. It is plausible that similar results could be achieved within the LVAD patient population through the implementation of a comprehensive transitional care plan. Because LVAD patients still need to work on HF self-management skills, implementation of transitional care interventions in the LVAD patient population should include newly implanted device patients and rehospitalized LVAD patients.

Conclusion

Transitional care interventions have been studied in HF patients and have shown a decrease in hospital readmissions and hospital costs and an improved QOL when compared to usual care. It is important to note, however, that the intensity of which an intervention is applied is critical in changing these outcomes. The more intensely the intervention is applied, the better the results. Considering the wide range of 30-day rehospitalization rates for patients with an LVAD, hospitals caring for these patients need to assess how their programs can best help lower these rehospitalization rates. While additional research is needed, LVAD hospitals should consider implementing transitional care interventions of at least moderate intensity to reduce their rate of LVAD patient rehospitalization.

Implications for Practice

Nurses are well positioned to provide to and lead several of the transitional care interventions, such as conducting home visits, follow-up phone calls, and individualizing patient education. Nurses should also work with the patient, family, and healthcare team in developing an evidence-based comprehensive and individualized plan of care to improve coordination of care and target the healthcare needs and goals of the patient (Naylor, Feldman et al., 2009). Nurses should lead communication between patients, facilities, and the patient's primary care providers at the time of and after patient's transition. Moreover, the transitional care interventions would need to be at least at a moderate level of intensity to have maximum potential impact on patient outcomes. Research on transitional care interventions in patients with an LVAD may be able to identify which interventions and in what combinations are effective.

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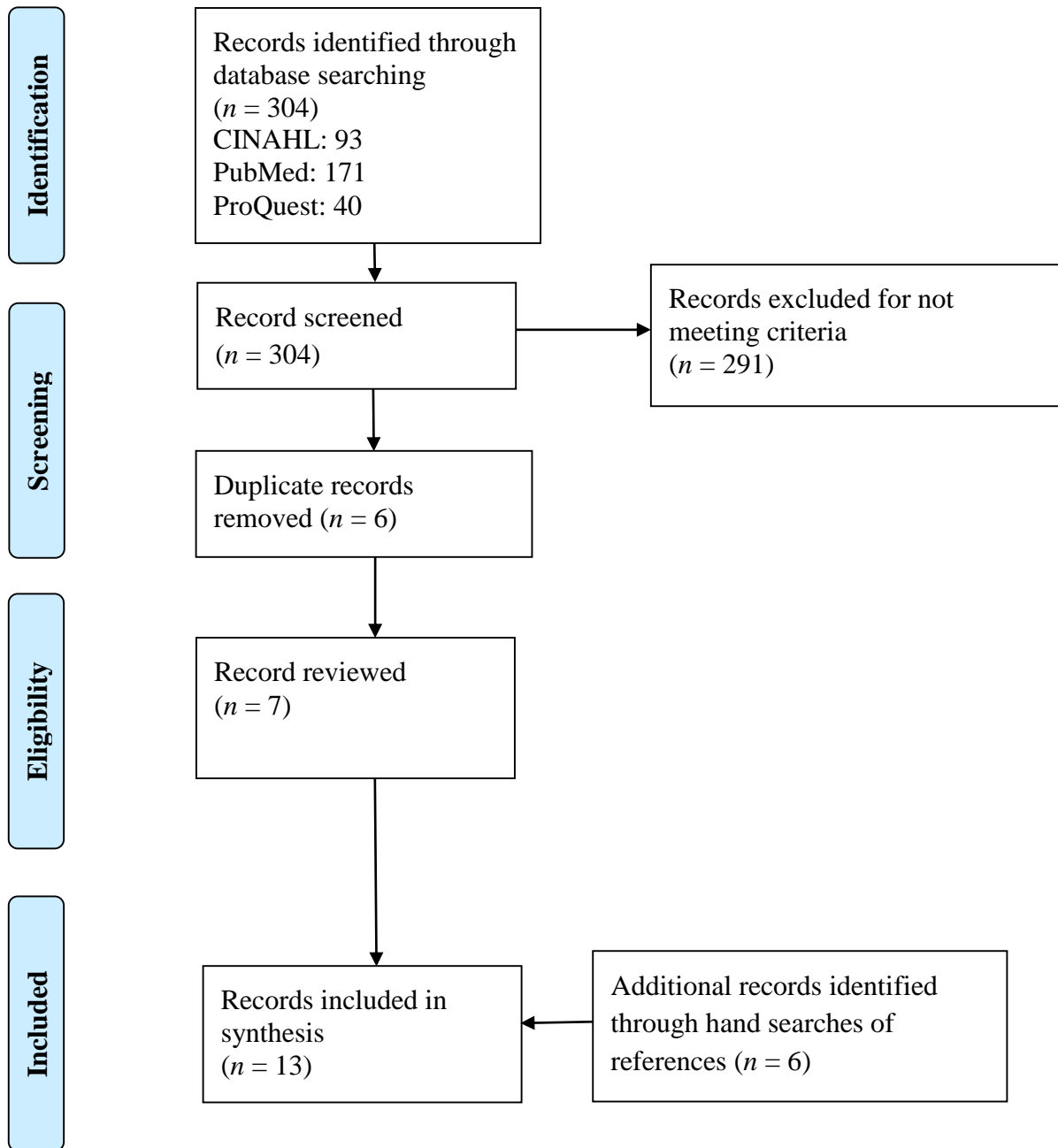


Figure 1: Flow diagram of evidence search and selection process

Table 1 Summary of Articles Included in the Review

Authors	Sample	Study Type	Outcomes	Intervention	Results
Coleman et al., 2006	<i>N</i> = 750	RCT	Rehospitalization rates	28 days APRN Transition coach	Rehospitalization rates at 30 days (<i>p</i> = 0.048) Mean hospital costs at 180 days (<i>p</i> = 0.049).
Harrison et al. 2002	<i>N</i> = 192	Prospective, RCT	Quality of life: Readmission rates ED use	12 weeks RN-led Patient education Minimum of 2 visits	Intervention group: • Better MLHFQ at 12 weeks (<i>p</i> < 0.001). ED first visit (<i>p</i> = 0.03) Hospital readmissions in 12 weeks: Control group 31%, Intervention group 23%
Linden & Butterworth, 2014	<i>N</i> = 512	Parallel-group, stratified, RCT	Readmission rates	90 days RN-led No home visits	No statistical difference between 30-day or 90-day readmission rates.
Naylor et al., 1994	<i>N</i> = 276	RCT	Rehospitalization rate Charges	Two weeks Gerontologic nurse specialist Discharge visit Telephone outreach after discharge	Mean charges: Difference (95% CI) 542 (-5121 to 6205) Rate of first hospitalization: Difference (95% CI) 6 to 12 weeks: -1% (-8% to 12%) Costs of nurse specialist total: 7,374 (108±10)
Naylor et al., 1999	<i>N</i> = 363	RCT	Readmission rates Acute care visits, costs Functional status Depression	Four weeks in length APRN led At least two home visits Weekly APRN initiated telephone contact with patients or caregivers	Readmissions and hospital days (<i>p</i> < 0.001) Acute care visits after discharge (<i>p</i> = 0.77) Acute care visits after discharge costs (<i>p</i> = 0.72) Functional status <i>p</i> = 0.33 Depression <i>p</i> = 20
Naylor et al., 2004	<i>N</i> = 239	RCT	Rehospitalization rate Costs Quality of life	Three months APRN-directed Discharge planning	Rehospitalization or death (<i>p</i> = 0.01) Mean costs (<i>p</i> = 0.002) Overall quality of life (<i>p</i> < 0.05)
Neff et al., 2003	<i>N</i> = 80	Prospective quasi-experimental design	OASIS Data: Health service use	30 days APRN-directed Home visits	Depressive feelings: <i>p</i> < 0.05 Activity of daily living: <i>p</i> < 0.05 Length of stay (<i>p</i> < 0.05) Rehospitalizations <i>M</i> (<i>p</i> < 0.05) Acute care visits (<i>p</i> < 0.05)
Ohuabunwa et al., 2013	<i>N</i> = 104	Quasi-experimental design	Readmission ED visits Primary care services	Four weeks RN-led (coach) Home visits	Readmission rates and ED were not significantly lower Outpatient primary care services: (30 days) <i>p</i> < 0.001
Rich et al., 1995	<i>N</i> = 282	Prospective, RCT	Readmission rate Quality of life Costs	RN-directed 90 days Intensive follow-up.	90-day readmission (<i>p</i> = 0.003) Quality of life (<i>p</i> = 0.0001) Readmission costs (<i>p</i> = 0.003)
Russell et al., 2011	<i>N</i> = 447	Retrospective observational	Rehospitalization rate.	RN-led 60 days	30-day rehospitalization (<i>p</i> < 0.01)
Stauffer et al., 2011	<i>N</i> = 140	Prospective pilot study	Readmission rate Cost	APRN-led Three months Home visits	Readmission rates reduced Costs: not significant
Williams, Akroyd, & Burke, 2010	<i>N</i> = 97	Quasi-experimental design	Readmission rate	APRN-led Follow-up arrangements	30-day readmission rate (<i>p</i> = 0.526) Length of stay (<i>p</i> = 0.05)

Yu et al., 2015	<i>N</i> = 178	RCT	Readmission Length of Stay Self-care Physical well-being	RN-led Nine months Intensive follow-up	Lower six-week readmission rate (<i>p</i> = 0.048) Shorter length of stay (<i>p</i> < 0.001) Improved self-care (<i>p</i> < 0.05) Improved physical well-being at three months (<i>p</i> = 0.05)
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Note: APRN = Advanced Practice Registered Nurse; CI = Confidence Interval; ED = Emergency Department; MLHFQ = Minnesota Living with Heart Failure Questionnaire; RN = Registered Nurse; OASIS = Outcome and Assessment Information Set

Table 2.

Type and Frequency of Post-Discharge Contact with Patients

Article	Length of Intervention	Weekly (High Intensity)	Once or more per month (Moderate Intensity)	Once per month or less (Low Intensity)
Coleman et al. 2006	30 days		Phone calls by APRN	
Harrison et al. 2002	2 weeks			Home visits were conducted by the home care nursing staff
Linden & Butterworth 2014	90 days			No home visits Motivational interviewing-based health coaching and symptom monitoring using interactive voice response.
Naylor et al. 1994	2 weeks		Phone calls by APRN	
Naylor et al. 1999	4 weeks		Home visits by APRN	
Naylor et al. 2004	3 months	Home visits by APRN for 1 month	Home visits by APRN	
Neff et al. 2003	30 days		Home visits by nursing staff	
Ohuabunwa et al. 2013	4 weeks		Phone calls and home visits by the care transitions coach	
Rich et al. 1995	90 days		Phone calls and home visits by members of the study team	
Russell et al. 2011	At least 2 weeks		Phone calls and home visits by members of the study team	
Stauffer et al. 2011	3 months		Home visits by APRN	
Williams et al. 2010	Did not specify		Home visits by nursing staff	
Yu et al. 2015	9 months	Home visits by RN for 2 weeks	Phone calls by RN for 3 months	Phone calls by RN every 2 months for 6 months

Note: APRN = Advanced Practice Registered Nurse; RN = Registered Nurse