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**Systematic Review**

# Patient- and family-centred care transition interventions for adults: a systematic review and meta-analysis of RCTs

**Julie Chartrand[1,*], Beverley Shea[2,3,4], Brian Hutton[2,3], Orvie Dingwall[5,6], Anupriya Kakkar[6], Marième Chartrand[7], Ariane Poulin[1], Chantal Backman[1,3,8]**

[1]School of Nursing, University of Ottawa, 200 Lees Avenue, Ottawa, Ontario K1N 6N5, Canada
[2]School of Epidemiology and Public Health, University of Ottawa, 600 Peter Moran Crescent, Ottawa, Ontario K1G 5Z3, Canada
[3]Clinical Epidemiology Program, Ottawa Hospital Research Institute, 501 Smyth Road, Ottawa, Ontario K1H 8L6, Canada
[4]Bruyère Research Institute, Bruyère Continuing Care, 85 Primerose Avenue, Ottawa, Ontario K1R 6M1, Canada
[5]Neil John Maclean Health Sciences Library, University of Manitoba, 727 McDermot Avenue, Winnipeg, Manitoba R3E 3P5, Canada
[6]School of Psychology, University of Ottawa, 136 Jean-Jacques Lussier Private, Ottawa, Ontario K1N 6N5, Canada
[7]Collège La Cité, 801 Aviation Parkway, Ottawa, Ontario K1K 4R3, Canada
[8]Care of the Elderly, Bruyère Continuing Care, 43 Bruyère Street, Ottawa, Ontario K1N 5C8, Canada

[*]Corresponding author. School of Nursing, University of Ottawa, 200 Lees Avenue, Room 418E, Ottawa, Ontario K1H 8M5, Ontario K1N 6N5, Canada.
E-mail: julie.chartrand@uottawa.ca
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## Abstract

Although patient centredness is part of providing high-quality health care, little is known about the effectiveness of care transition interventions that involve patients and their families on readmissions to the hospital or emergency visits post-discharge. This systematic review (SR) aimed to examine the evidence on patient- and family-centred (PFC) care transition interventions and evaluate their effectiveness on adults' hospital readmissions and emergency department (ED) visits after discharge. Searches of Medline, CINAHL, and Embase databases were conducted from the earliest available online year of indexing up to and including 14 March 2021. The studies included: (i) were about care transitions (hospital to home) of ≥18-year-old patients; (ii) had components of patient-centred care and care transition frameworks; (iii) reported on one or more outcomes were among hospital readmissions and ED visits after discharge; and (iv) were cluster-, pilot- or randomized-controlled trials published in English or French. Study selection, data extraction, and risk of bias assessment were completed by two independent reviewers. A narrative synthesis was performed, and pooled odd ratios, standardized mean differences, and mean differences were calculated using a random-effects meta-analysis. Of the 10,021 citations screened, 50 trials were included in the SR and 44 were included in the meta-analyses. Care transition intervention types included health assessment, symptom and disease management, medication reconciliation, discharge planning, risk management, complication detection, and emotional support. Results showed that PFC care transition interventions significantly reduced the risk of hospital readmission rates compared to usual care [incident rate ratio (IRR), 0.86; 95% confidence interval (CI), 0.75–0.98; $I^2 = 73\%$] regardless of time elapsed since discharge. However, these same interventions had minimal impact on the risk of ED visit rates compared to usual care group regardless of time passed after discharge (IRR, 1.00; 95% CI, 0.85–1.18; $I^2 = 29\%$). PFC care transition interventions containing a greater number of patient-centred care (IRR, 0.73; 95% CI, 0.57–0.94; $I^2 = 59\%$) and care transition components (IRR, 0.76; 95% CI, 0.64–0.91; $I^2 = 4\%$) significantly decreased the risk of patients being readmitted. However, these interventions did not significantly increase the risk of patients visiting the ED after discharge (IRR, 1.54; CI 95%, 0.91–2.61). Future interventions should focus on patients' and families' values, beliefs, needs, preferences, race, age, gender, and social determinants of health to improve the quality of adults' care transitions.

**Keywords:** patient readmission; transitional care; family; emergency service; caregivers; systematic review

## Introduction

Adults' transitions between health care settings are frequent, complex, fragmented, and risky [1–3]. In the first days and weeks following hospital discharge, many experience medication-related problems, hospital readmissions, emergency department (ED) visits, or even death [4–7]. According to studies conducted among surgical and medical patients in Europe, Asia, and North America, 9.8–50% of readmissions within 30 days [8, 9], 17.8% of readmissions within 90 days [10], and 30.7% of readmissions within 1 year, are preventable [5]. Suboptimal care transitions represent a significant cause of preventable readmissions [11]. As these contribute to increasing the health care expenditures, the quality-of-care transitions and their impact on health care outcomes and cost remain a growing concern.

Indicators for quality health care, namely effectiveness, efficiency, safety and risk, timeliness, equity, and patient-centred care (PCC), are endorsed by many countries [12–14] to guide the provision and evaluation of optimal care transitions. PCC encompasses holistic, collaborative, and responsive care [15].

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According to the World Health Organization (WHO) [16], quality health services should translate into the provision of care that meets individual preferences, needs, and values. Since both patients and families are important allies for quality and safety in healthcare, a patient- and family-centred approach to care that 'is grounded in mutually beneficial partnerships among healthcare providers, patients, and families, and its goal is to 'promote the health and well-being of individuals and families' is warranted during care transitions [17]. Furthermore, Burke *et al.* [18] have proposed 10 domains for (ideal) care transitions, for example monitoring and managing symptoms after discharge; patient education; outpatient follow-up; and communication of accurate, timely, clear, organized information.

Several reviews have examined care transitions from hospital to home [19–25]. However, to our knowledge, only one has included interventions specifically involving patients' families [21]. This review described family-centred transition processes, from US EDs to home, found in randomized controlled trials (RCT), cohort studies, case–control studies, and among paediatric and adult populations. It reported intervention effectiveness for outcomes such as patient health, knowledge, health care utilization, and cost. However, it lacked a comprehensive searching approach, a quality appraisal of included studies, or a meta-analysis of the literature [26].

This systematic review (SR) examined evidence on the effectiveness of either patient- or family-centred care (PFC) transition interventions or PFC transition interventions compared to usual care in decreasing adult hospital readmissions and ED visits after discharge (hospital to home).

## Methods

### Research design and methodology

This SR and meta-analysis were reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [27] and were conducted based on methods recommended by Cochrane's Handbook for Systematic Reviews of Interventions [28]. A SR protocol was developed and registered in PROSPERO (CRD42017067990), and then published [29].

### Protocol amendments

Due to a large amount of data gathered, herein we report on a SR, and meta-analysis conducted to answer the following broad question: 'Are PFC care transition interventions offered to adults during their transition from the hospital to home effective in decreasing unplanned hospital readmissions and ED visits?'. A separate manuscript focuses on the effectiveness of these interventions on diverse patient-oriented outcomes [30].

### Eligibility criteria

#### Population/participants

This SR considered studies on hospital to home care transitions of patients ≥18 years of age. Studies conducted among adults discharged to acute care settings or specialty nursing facilities, and those examining transitions from the ED to home were excluded. Studies related to paediatrics, obstetrics, gynaecology, psychiatric, and mental health services were also excluded.

#### Interventions and comparators

Studies assessing the effectiveness of PFC care transition interventions provided during or after a hospitalization were included. Specifically, interventions with at least one element from each of the components (holistic, collaborative, and responsive care) of the PCC framework [15] were included. Those focusing on either the patient or their family/caregiver or on both the patient and the family were included. Examples of interventions included discharge planning, needs assessment, medication reconciliation, telephone follow-up, home visits, and patient/caregiver education. The comparators of interest included usual care, simplified intervention, or no other intervention.

#### Outcome measures

Study outcomes covered unplanned hospital readmissions and ED visits at 1, 3, 6 months, and ≥1 year post-discharge.

#### Types of studies

Only cluster-, pilot-, or RCTs published in English or French were included. Non-randomized experimental and qualitative studies were excluded.

### Search strategy

Eligible references were identified from a systematic search conducted in Medline, CINAHL, and Embase. The search strategy was developed by an experienced health sciences librarian (O.D.). The search terms focused on continuity of patient care, care transition, and patient-centred care. An initial search was created and ran in 2016, with a recent search strategy updated up to and including 14 March 2021. The Medline search strategy is described in Supplementary Data File 1. References were compiled, and duplicates were removed, using EndNote X9 [31]. The final set of citations was exported into the Covidence SR software for screening, full-text review, risk of bias assessment, and data extraction [32].

### Study selection

Two reviewers (M.C., A.P.) screened 15 titles and abstracts together, then independently screened the remaining references according to eligibility criteria. Unclear references were included for full-text screening. Two reviewers (M.C., A.P.) screened 15 full-text references together, then independently reviewed the remaining references for inclusion in the review. During this process, a third reviewer (J.C.) arbitrated conflicts. The study selection process was summarized using the PRISMA flow diagram [27].

### Data extraction

Two reviewers (M.C., A.P.) independently extracted and organized data using a previously piloted spreadsheet. The following were extracted: first author's last name, year of publication, full reference, country, study aim, patient eligibility criteria, groups sample size, total sample size, format of the intervention, PCC elements [i.e. (i) comprehensively assess patients' condition including physical, emotional, social, and

spiritual domains of health, (ii) assess patient's understanding of presenting the problem, (iii) assess patient's health values and goals, (iv) identify patient's concerns and/or needs, (v) monitor or reassess patient's needs, (vi) provide interventions/services to patient that address all domains of health including physical comfort and emotional support, (vii) provide information regarding health promotion, illness prevention, or lifestyle change to patient, (viii) provide information on disease and self-management to patient, (ix) support patient decision making—share information in a complete and unbiased way regarding condition, prognosis, treatment, (x) explore and respect patient's beliefs about the problem and specific health concerns, (xi) promote discussion with patient to find a common understanding of what the problem is, (xii) explain to patient the treatment options and self-management strategies available to manage the problem, (xiii) provide complete, accurate and unbiased information about the nature of each option, and associated risks, benefits, potential outcomes, and uncertainty, (xiv) answer questions patient may have about his/her care, (xv) assess patient's preferences for treatment or self-management, (xvi) provide the chosen treatment option or self-management strategy, (xvii) provide instructions to patient on how to apply treatment option or self-management strategy in daily life, (xviii) provide support, as needed, to patient for the application of treatment option or self-management strategy in daily life, (xix) explore with the patient who he/she wants to be involved in his/her care, (xx) incorporate the patient and family in patient care, (xxi) respond to patient's needs, beliefs, values, and preferences, (xxii) modify the type, mode of delivery or dose of treatment or self-management strategy to be consistent with patient's needs and preferences, (xxiii) identify changes in patient's condition or feeling and act upon them, (xxiv) take time to answer patient questions, (xxv) make sure patient has what he/she needs with regards to his/her health care, (xxvi) make sure patient has what he/she needs with regards to community resources, and (xxvii) comfort the patient when needed], ITC domains [i.e. (a) outpatient follow-up, (b) monitoring and managing symptoms after discharge, (c) coordinating care among team members, (d) enlisting help of social and community supports, (e) educating patients to promote self-management, (f) medication safety, (g) availability, timeliness, clarity, and organization of information, (h) complete communication of information, and (i) discharge planning], provider(s) involved, description of control intervention, length of follow-up period, results of post-discharge unplanned hospital readmissions and results of post-discharge unplanned ED visits. Data were extracted from the studies or provided by authors on request.

### Risk of bias assessment

The Cochrane Risk of Bias Tool [29] integrated within the Covidence SR software [32] was used. Two reviewers (M.C., A.K.) independently evaluated each included study by assessing the domains of sequence generation, allocation concealment, blinding of outcome assessment, missing outcome data, selective outcome reporting, and other sources of bias. Domains were evaluated as 'low', 'unclear', or 'high'. A third reviewer (J.C.) was available to provide arbitration during reviewer disagreements.

### Data analysis

The Cochrane Review Manager 5.4 (RevMan) was used to conduct the meta-analysis [33]. The appropriateness of conducting such a meta-analysis was evaluated by first assessing the clinical and methodologic homogeneity of all studies and identifying outlying studies. Due to variability in the reporting format for continuous outcomes, random effects inverse variance models were used to estimate standardized mean differences (SMD) comparing the PFC and usual care groups for post-discharge hospital readmissions and ED visits [29]. Similar models were used to estimate the pooled odds of post-discharge unplanned hospital readmissions and ED visits among PFC care transition interventions compared with usual care. Summary estimates were reported along with 95% confidence intervals (CI). Statistical heterogeneity was evaluated in consideration of both the Cochrane Q test and the $I^2$ measure [34]. In addition to analysing outcomes separately according to their original reporting formats (e.g. number of patients per group with the event, mean number of events per patient), we also converted related outcome measures to a common format to allow for incidence rate ratio (IRR) analyses. Numbers of events were taken as raw data or approximated in cases where the mean number of events per patient was reported. Total person-time per group was estimated using each study's maximum follow-up time and the number of patients in the study groups.

Subgroup analyses were conducted according to follow-up duration, PCC elements (i.e. low = 0–3 elements, moderate = 10–17 elements, and high = 18–25 elements), and ITC domains (low = 1–3 domains, moderate =4–6 domains, and high = 7–9 domains) targeted in the transition interventions.

Findings of trials with insufficient data were excluded from the meta-analysis and were aggregated based on the similarity of interventions and presented in a narrative synthesis.

## Results

### Extent of evidence identified

Following the removal of duplicates, the search yielded a total of 10 021 unique citations for review. Following title and abstract screening, 674 citations were retained for full-text screening. Fifty references were included in this SR; see Supplementary Data File 2 for the study selection process. Supplementary Data File 3 lists the citations excluded during full-text screening ($n = 624$), grouped by reason for exclusion.

### Study characteristics

Characteristics of the 50 included RCTs ($n = 13\,985$ participants) are shown in Table 1. These studies were published in English between 1993 and 2021 in peer-reviewed journals and mostly conducted ($n = 23$) in the USA [35–57]. Sample sizes ranged from 26 to 1390 participants. The trials included adults who had at least one active chronic condition or who were admitted to a general medicine, general surgery, geriatric, neurosurgery, orthopaedic, or urology unit.

### Study interventions

While 50 studies were included in this SR, three trials included two PFC care transition interventions [38, 58, 59], for a total of 53 unique interventions. Table 2 provides an overview of the characteristics of the included interventions.

**Table 1.** Characteristics of studies.

| Citations' first author, year of publication | Country | Sample size | Diagnosis/Specialty | Outcomes | Data source | Included in meta-analysis |
|---|---|---|---|---|---|---|
| Aboumatar, 2019 | United Stated of America (USA) | 240 | COPD | Hospital Readmissions and ED visits | Medical record review | Y |
| Al-Hashar, 2018 | Oman | 622 | Admitted to medical wards | Hospital Readmissions and ED visits | Patients' self-report | Y |
| Altfeld, 2012 | USA | 720 | Admitted for an inpatient hospitalization | Hospital Readmissions | Medicare & Medicaid claims<br>Patients' self-report | Y |
| Andersen, 2000 | Denmark | 155 | Acute stroke | Hospital Readmissions | Data from the Danish Central Person Register, the City of Copenhagen Health Administration, and the Copenhagen Hospital Corporation<br>Further details on readmission were obtained from discharge records | Y |
| Balaban, 2015 | USA | 1510 | CHF or COPD | Hospital Readmissions and ED visits | Medical record review | N |
| Bostrom, 1996 | USA | 1413 | Patients from general surgery, neuro-surgery, orthopaedic, general medicine, and urology units | Hospital Readmissions | Medical record review | Y |
| Boter, 2004 | Netherlands | 486 | First admission for a stroke (TIA or ischaemic stroke, primary intracere-bral haemorrhage, or subarachnoid haemorrhage) | Hospital Readmissions | Not mentioned | Y |
| Bronstein, 2015 | USA | 89 | Patients admitted to unmentioned inpatient units | Hospital Readmissions | Medical record review | Y |
| Burns, 2014 | USA | 423 | CHF, COPD or pneumonia | Hospital Readmissions and ED visits | Medical record review | Y |
| Coleman, 2006 | USA | 750 | At least one of 11 diagnoses, including stroke, CHF, CAD, cardiac arrhythmias, COPD, DM, spinal stenosis, hip fracture, PVD, DVT, and PE | Hospital Readmissions | Medical record review | N |
| Collinsworth, 2018 | USA | 308 | COPD | Hospital Readmissions and ED visits | Medical record review | Y |
| Courtney, 2009 | Australia | 122 | Medical diagnosis | Hospital Readmissions | Medical record review | N |
| Cui, 2019 | Australia | 96 | CHF, with left ventricular ejection fraction of $\leq$45% | Hospital Readmissions | Medical record review and Patients' self-report | Y |
| Davis, 2012 | USA | 125 | CHF | Hospital Readmissions | Medical record review | Y |
| Fors, 2018 | Sweden | 243 | COPD or CHF | Hospital Readmissions | Not mentioned | Y |
| Hanssen, 2009 | Norway | 288 | AMI | Hospital Readmissions | Medical record review | Y |
| Harrison, 2002 | Canada | 192 | CHF | Hospital Readmissions and ED visits | Medical Outcome Study Short Form (SF-36) | Y |
| Henschen, 2022 | USA | 151 | Not mentioned | Hospital Readmissions and ED visits | Medical record review | Y |
| Hu, 2020 | China | 220 | Recipient of a primary allograft kidney transplantation | Hospital Readmissions and ED visits | Not mentioned | Y |
| Huang, 2005 | Taiwan | 126 | Hip fractures due to falling | Hospital Readmissions | Medical record review | Y |

(continued)

**Table 1.** (Continued)

| Citations' first author, year of publication | Country | Sample size | Diagnosis/Specialty | Outcomes | Data source | Included in meta-analysis |
|---|---|---|---|---|---|---|
| Kangovi, 2014 | USA | 446 | General medicine service | Hospital Readmissions | Patients' self-report | Y |
| Kazemi Majd, 2021 | Iran | 120 | CHF | Hospital Readmissions | Medical record review and Patients' self-report | Y |
| Lainscak, 2013 | Slovenia | 253 | Acute exacerbation of COPD with reduced pulmonary function | Hospital Readmissions | Medical record review and Patients' self-report | Y |
| Laramee, 2003 | USA | 234 | CHF, moderate-to-severe left ventricular dysfunction or pulmonary congestion | Hospital Readmissions | Medical record review | Y |
| Lembeck, 2019 | Denmark | 537 | Any diagnosis from the Medical, Geriatric, Emergency, Surgical or Orthopaedic departments | Hospital Readmissions | Data from the Ministry of Health | Y |
| Li, 2021 | USA | 407 | Not mentioned | Hospital Readmissions | Family care givers' (FCG) self-report | Y |
| Liang, 2021 | Taiwan | 200 | Not mentioned | Hospital Readmissions and ED visits | Medical record review | Y |
| Lindhardt, 2019 | Denmark | 330 | Not mentioned | Hospital Readmissions | Medical record review | Y |
| Lisby, 2019 | Denmark | 200 | Medical conditions (non-surgical) | Hospital Readmissions and ED visits | Medical record review | Y |
| Lopez Cabezas, 2006 | Spain | 134 | CHF | Hospital Readmissions | Not mentioned | Y |
| Magny-Normilus, 2021 | USA | 180 | Type 2 DM on medicine or cardiology units | Hospital Readmissions and ED visits | Medical record review and Patients' self-report | N |
| Naunton, 2003 | Australia | 121 | Medical units, with at least two chronic medical conditions (including at least one of CHF, ischaemic heart disease, COPD or DM) | Hospital Readmissions | Medical record review | Y |
| Naylor, 1994 | USA | 401 | Selected medical (CHF and angina/AMI) and surgical (CABG and cardiac valve replacement) diagnostic-related groups (DRG) | Hospital Readmissions | Not mentioned | Y |
| Naylor, 1999 | USA | 363 | Multiple, active, chronic health problems or history of depression | Hospital Readmissions and ED visits | Not mentioned | Y |
| Naylor, 2004 | USA | 239 | CHF | Hospital Readmissions and ED visits | Patients' medical records and bills | Y |
| Nguyen, 2018 | Vietnam | 166 | Either unstable angina or AMI | Hospital Readmissions | Patients' self-report | Y |
| Nucifora, 2006 | Italy | 200 | CHF | Hospital Readmissions | Medical record review | Y |
| Oliveira-Filho, 2014 | Brazil | 61 | CVD | Hospital Readmissions | Patients' self-report | Y |

(continued)

**Table 1.** (Continued)

| Citations' first author, year of publication | Country | Sample size | Diagnosis/Specialty | Outcomes | Data source | Included in meta-analysis |
|---|---|---|---|---|---|---|
| Ong, 2016 | USA | 1437 | CHF | Hospital Readmissions | Hospitalization data, combined with California's inpatient discharge data for hospitalizations at non study sites obtained from the California Department of Public Health Office of Statewide Health Planning and Development. | Y |
| Pearson, 2006 | Australia | 528 | Medical or surgical unit | Hospital Readmissions | Medical record review | Y |
| Piette, Striplin, Aikens, 2016 | USA | 284 | CHF, stroke, CAD, arrhythmia, COPD, PVD, DVT, PE, pneumonia, type 2 DM, UTI, gastroenteritis, or asthma | Hospital Readmissions | Medical record review | N |
| Piette, Striplin, Fisher, 2020 | USA | 283 | CHF, stroke, CAD, COPD, PVD, pneumonia, type 2 DM, UTI, gastroenteritis, or asthma | Hospital Readmissions | Patients' medical and billing records | N |
| Sales, 2013 | USA | 137 | CHF | Hospital Readmissions | Medical record review | Y |
| Schneider, 1993 | USA | 54 | CHF | Hospital Readmissions | Medical record review | Y |
| Schnipper, 2021 | USA | 1679 | Admitted to medical and surgical services | Hospital Readmissions | Medical record review and patients' self- report | Y |
| Shahrokhi, 2018 | Iran | 72 | Glasgow Coma Scale (GCS) score of 11–15 on discharge, hospitalized for the first time after trauma, without known UTI or respiratory infection, Grade 3 and 4 pressure ulcers, DM, and patients without thoracostomy and percutaneous endoscopic gastrostomy | Hospital Readmissions | Not mentioned | Y |
| Tu, 2020 | China | 270 | Uncontrolled hypertension at admission; and diagnosis of type 2 DM | Hospital Readmissions and ED visits | Hospital health records, community health centre records (IG) or outpatient specialist clinics (CG) | Y |
| Van Spall, 2019 | Canada | 2494 | CHF | Hospital Readmissions and ED visits | Not mentioned | Y |
| Wu, 2019 | China | 150 | AMI | Hospital Readmissions | Patients' self-report | Y |
| Zhao, 2009 | China | 220 | Angina or AMI | Hospital Readmissions | Patients' self-report | Y |

COPD, chronic obstructive pulmonary disease ; CHF, congestive heart failure; TIA, Trans-ischaemic attack; CAD, coronary artery disease; DM, diabetes mellitus; PVD, peripheral vascular disease; DVT, deep vein thrombosis; PE, pulmonary embolism; AMI, acute myocardial infarction; CABG, coronary artery bypass graft; UTI, urinary tract infection; CVD, cardio vascular disease.

**Table 2.** Characteristics of the interventions.

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aboumatar, 2019 | Three-month program to help patients and their family caregivers with long-term self-management of COPD | To evaluate whether a hospital-initiated program that combined transition and long-term self-management support for patients hospitalized due to COPD and their family caregivers can improve outcomes. | Standardized tools | The program was delivered during a series of sessions held at the hospital and after discharge via home visit or telephone | Patient | Engaging the family/caregivers in the disease management<br>Assessing the family/caregivers' needs at discharge<br>Co-developing care transition intervention with caregivers | Hospital and home visits and phone calls | Hospital and home | Duration of 3 months | Yes | No |
| Al-Hashar, 2018 | Medication reconciliation intervention | To investigate the impact of a medication reconciliation and counselling intervention on admission and on discharge on the rate of preventable ADEs and healthcare use at 30 days following hospital discharge | Written information, Institute for Safe Medication Practices, Medication list | Medication reconciliation with patient via interview<br>Patients were informed that they would receive a phone call 1 month post discharge to discuss their experience with their medications. | Patient | Targeting education on medications | Interview<br>Written information<br>Phone call | Hospital and home | During hospitalization and up to 1 month after discharge | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Altfeld, 2013 | Enhanced Discharge Planning Program | Identify needs encountered by older adult patients after hospital discharge<br>Assess the impact of a telephone transitional care intervention on stress, health care utilization, readmissions, and mortality | Individualized plan, written information | The intervention group participants received the telephone-based Enhanced Discharge Planning<br>Program intervention that included biopsychosocial assessment and an individualized plan following program protocols to address identified transitional care needs | Patient | Assessing their needs related to stress management (their own and the patient's)<br>Providing emotional support to caregiver | 1) Verbal information<br>2) Phone call<br>3) Home visit, if necessary | Hospital and home | At discharge and 30 days post-discharge | Yes | No |
| Andersen, 2000 | INT1-HVP (physician intervention) and INT2-PI (physiotherapist intervention) | To evaluate follow-up interventions after completed inpatient rehabilitation that focused on social and psychological adjustment, in preventing readmission, reduce the mortality rate and postpone institutionalization. | Written instructions | INT1-HVP<br>The physician intervention consisted of three 1-hour home visits (at 2, 6, and 12 weeks after discharge). These visits focused on early detection and treatment of complications, maintenance of functional capacity, and psychological and social adjustment to a new life with stroke-related disability.<br>INT2-PI<br>Patients in this group received instruction and reeducation by the hospital physiotherapist during a 6 week period immediately after discharge. The visits took place in the patient's home; frequency was determined by the physiotherapist and was adjusted to the patient's needs. | Patient, families, caregivers | Engaging the family/caregivers in the disease management and rehabilitation care<br>Engaging the family/caregivers in the discharge process<br>Targeting education on the disease | INT1-HVP: Home visits, Phone calls (if needed)<br>INT2-PI: Home visits | Home | INT1-HVP<br>2, 6, 12 weeks<br>INT2-PI<br>6 weeks | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Balaban, 2015 | The Patient Navigator Intervention | Determine if an intervention by patient navigators (PNs), hospital-based Community Health Workers, reduces readmissions among high risk, low socioeconomic status patients | Verbal information | PNs provided coaching and assistance in navigating the transition from hospital to home through hospital visits and weekly telephone outreach, supporting patients for 30 days post-discharge with discharge preparation, medication management, scheduling of follow-up appointments, communication with primary care, and symptom management | Patient | Connecting with family/caregivers during follow-ups<br>Assessing the family/caregivers' needs at discharge | Verbal information<br>Hospital (inpatient) visit<br>Phone calls | Hospital and home | 30 days post-discharge | Yes | No |
| Bostrom, 1996 | The Telephone Nursing Care Link Project | To compare Nurse-initiated call (NIC) and patient-initiated call (PIC) systems with patients who had no follow-up call and analyse their effectiveness | NIC: Verbal information<br>PIC: Written information (brochure) | One group of patients was called by nurses 2–3 days after discharge; another group received a brochure describing a nurse-run telephone service they could call. These nurses asked each patient if they had any questions about their post-discharge care and if they experienced any difficulties in their transition to home. Questions were answered by the nurse either at that time or in a follow-up call after consultation with another health care provider. | Patient | Not mentioned | NIC: Phone call<br>PIC: Written information & Phone call if needed | Home | NIC: 2–3 days post-discharge<br>PIC: As needed (up to 3 months after discharge) | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Boter, 2004 | Outreach care | To assess the effectiveness of an outreach care program on dissatisfaction with care and quality of life. | Standardized checklist on risk factors for stroke, consequences of stroke, and unmet needs for stroke services<br>Caregiver's checklist<br>Brochure | The outreach care consisted of three telephone calls and one home visit within 5 months after discharge by 1 of 13 stroke nurses. Nurses supported patients and carers according to their individual needs (eg, by giving information or reassurance) or, when the presented problem required additional care or exceeded the nurses' expertise, advised patients or carers to contact the general practitioner. | Patients and caregivers | Assessing the family/caregivers' needs at discharge<br>Supporting and advising them on how to solve the problems themselves or cope with them | Brochure, phone call or home visit | Hospital and home | Three nurse-initiated telephone contacts (1–4; 4–8; and 18–24 weeks after discharge) and a visit to the patients in their homes (10–14 weeks after discharge) | Yes | No |
| Bronstein, 2015 | Social worker-led care coordination intervention | To assess the efficacy of social work-led care coordination for stroke patients post-hospitalization and post-rehabilitation & within-30-day readmission rates. | 1) Verbal information through phone call and home visit<br>2) Verbal information through phone call<br>3) Verbal or written information through educational monthly meetings held at the hospital. | The intervention assisted primarily low-income patients in addressing barriers to their remaining at home, including financial constraints, lack of knowledge about the role of their PCP, accessing and taking prescribed medications, and accessing necessary transportation for both medical follow-up care and quality-of-life activities. The interns conducted an individualized needs assessment, identifying medication concerns, transportation issues, home care needs, home safety concerns, and behavioural barriers to follow-up care and activities post-discharge via phone call and home visits. | Patient | Not mentioned | 1) Verbal information through phone call and home visit<br>2) Verbal information through phone call<br>3) Verbal or written information through educational monthly meetings held at the hospital. | Hospital and home visits | Home follow-up phone call within 3–5 days post-discharge. After that, a home visit was scheduled and paid between days 7 and 14. A final phone call was made at approximately day 21 post-discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Burns, 2014 | Inpatient introductory visit and weekly post-discharge telephonic support for 4 weeks to assist patient in coordinating medical visits, obtaining, and using medications, and in self-management | To evaluate the feasibility of a community health workers (CHW) intervention to reduce inpatient readmissions within 30 days of discharge for medical patients at high risk of readmission. | Verbal information, telephone interpreter | CHW participation in the hospital discharge process; semi-structured CHW outreach calls to patients on at least a weekly basis to elicit patient concerns; and liaison calls, as needed, to primary care nurses to assist in scheduling or to respond to patient concerns. A telephone script for the outreach calls prompted the CHW to address topics such as reminders and transportation assistance for upcoming appointments, barriers to obtaining medications, concerns that might require nurse intervention and poor understanding of self-management instructions. | Patients and caregivers | Supporting the family during care transition | 1) Verbal information giving (hospital visit) before discharge in the hospital<br>2) Verbal information<br>3) Phone calls on at least a weekly basis | Hospital and home | 30 days after discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Coleman, 2006 | Care Transitions Intervention | To test whether this same intervention, designed to encourage older patients and their caregivers to assert a more active role in their care transitions, can reduce rates of rehospitalization. | Verbal and written information<br>Inpatient, phone, and home visits | Hospital visit: Discuss importance of knowing medication and having a system in place to ensure adherence to regimen<br>Explain the patient hospital record (PHR)<br>Recommend primary care provider follow-up visit<br>Discuss symptoms and drug reactions<br>Home visit: Reconcile pre-hospitalization and post-hospitalization medication lists<br>Identify and correct discrepancies<br>Review and update the PHR<br>Review discharge summary<br>Encourage patient to update and share PHR with primary care provider or specialist at follow-up visits<br>Emphasize importance of follow-up visit and need to provide primary care provider with recent hospitalization information<br>Practice and role-play questions for primary care provider<br>Assess condition<br>Discuss symptoms and adverse effects of medications<br>Follow-up telephone calls<br>Answer remaining medication questions<br>Remind patient to share PHR with primary care provider or specialist<br>Discuss outcome of visit with primary care provider or specialist<br>Provide advocacy in getting appointment, if necessary<br>Reinforce when primary care provider should be telephoned | Patients and caregivers | Encouraging family/caregivers to participate in updating the patient's health condition<br>Ensuring their presence<br>Teaching self-care to family/caregivers<br>Connecting with them during follow-ups | Verbal and written information<br>Inpatient, phone, and home visits | Hospital and home | The transition coach first met with the patient in the hospital before discharge to establish initial rapport, to introduce the personal health record, and to arrange a home visit, ideally within 48–72 h after hospital discharge. Following the home visit, the transition coach maintained continuity with the patient and caregiver by telephoning three times during a 28-day post-hospitalization discharge period. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Collinsworth, 2018 | COPD Chronic Care (CCC) education program | To assess the feasibility of a registered respiratory therapist (RRT)-led CCC program and determine the impact of the CCC program on patient outcomes, including hospital readmissions and patient activation. | Verbal and written information | The COPD education and self-management planning took place in the hospital and lasted 15–30 min. These strategies included further discussions of COPD symptoms, medication management, appropriate diet and nutrition, stress and coping, and smoking cessation activities. The RRT would then help the participants to create a COPD self-management plan. These patients also received follow-up phone calls. | Patients | Not mentioned | Inpatient meetings and phone calls | Hospital and home | 15–30 min session prior to discharge, and follow-up phone calls lasting 5–10 min from the RRT at 3–7 days and 1-, 2-, and 6-months post-hospital discharge | Yes | No |
| Courtney, 2009 | Older Hospitalised Patients' Discharge Planning and In-home Follow-up Protocol | Evaluate the effect of an exercise-based model of hospital and in-home follow-up care for older people at risk of hospital readmission on emergency health service utilization and quality of life | Individualized exercise program, pedometer, resistance bands | (a) Exercise intervention<br>An individually designed exercise program prescribed by the physiotherapist included four components: muscle stretching, balance training, walking for endurance, and muscle strengthening using resistance exercises.<br>(b) Nursing intervention<br>The nurse visited daily during participants' hospital stays to address concerns, facilitate the exercise program, and oversee discharge planning.<br>(c) Intervention after discharge<br>Within 48 h of discharge, the nurse undertook a home visit to assess availability of support, address transitional concerns, provide advice, and support, and ensure that the exercise program could be safely undertaken at home. Extra home visits were provided if required. Weekly follow-up telephone calls were provided for 4 weeks, followed by monthly follow-up for a further 5 months. The nurse was also available for contact between 9 a.m.. and 5 p.m.. weekdays. | Patients and caregivers | Not mentioned | Hospital visit<br>Home visits<br>Phone calls | Hospital and home | The protocol commenced within 72 h of admission and continued throughout hospitalization, after transfer to home, and in home for 6 months. | Yes | No |

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**Table 2.** (Continued)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Cui, 2019 | Structured educational intervention | To determine the effect of a structured nurse-led education program on patient self-management, symptom control, and hospital readmission | Verbal information, tutorials, printed materials, and pictures. Printed charts were provided free of charge to record all measures during the study. Detailed exercise plans were developed. | Nursing staff provided a 1-h education session to each of the participants, after their heart failure symptoms were stabilized at the hospital. A second education session of 1 hour was provided before discharge to address any concerns or questions from the participants in relation to the self-care management measures, with families encouraged to attend to discuss patient support requirements. Community supports were contacted, and exercise plans were developed for each participant. A follow-up was completed every 4 weeks post-discharge. | Patients and families | Assessing the family/caregivers' needs in terms of support (psychological and financial) at discharge<br>Engaging the family/caregivers in the disease management<br>Assessing the family/caregivers' needs at discharge | Inpatient visits<br>Lectures<br>Written<br>Phone calls | Hospital and home | One-hour education session inpatient and 1-h education session prior to discharge<br>Follow-up was completed every 4 weeks up to 12 months post-discharge. | Yes | No |
| Davis, 2012 | Cognitive training intervention | To evaluate the effectiveness of a tailored educational intervention designed specifically for patients with mild cognitive impairment on heart failure knowledge, self-care behaviour, and 30-day readmission rates. | Spiral workbook developed for the intervention that contained pictograms and provided areas to create a person self-care schedule, medication schedule, track future appointments, and document symptoms<br>Audio tape from session | The study intervention was based on principles of cognitive training. The intervention focused on environmental manipulations and training compensatory strategies for working with impairments in memory and executive functioning, and on improving self-confidence related to the patients' ability to manage their health. Environmental manipulations include altering the demands on the patient by simplifying tasks and providing external cues or prompts to initiate action. | Patients | Not mentioned | Written information, teaching sessions (one on one), Audiotape of teaching session<br>Follow-up phone call at 24–72 h post-discharge<br>Self-care material given | Hospital and home | Inpatient and 1 phone call 24–72 h post-discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fors, 2018 | Person-centred telephone support intervention | To evaluate the effects of a person-centred telephone support in patients with CHF and/or COPD. | Health plan | The RNs listened to the patients' narratives and asked questions to identify and deepen their understanding of the patients' capabilities, resources and potential for self-care. The RNs made efforts to identify patients' wishes, potentials and discussed problem areas such as dilemmas on how to take prescribed medicines and sleeping problems. The patient and the RNs together formulated attainable goals during the 6-month-long study period. After the calls, a summary of the conversation as well as goals agreed upon were documented in a health plan which was sent by mail to the patients | Patients | Not mentioned | Phone call | Home | First telephone call 1–4 weeks after discharge. And subsequent ones up to 6 months after discharge. | Yes | No |
| Hanssen, 2009 | Telephone follow-up intervention | Assess to what extend the telephone follow-up intervention (TFI) has a long-term effect on health-related quality of life (HRQOL), up to 18 months after discharge. And to assess the long-term effects on the secondary endpoints, smoking and exercise habits, return to work and rehospitalization due to chest pain | Verbal information | The patient follow-up included primarily responses to individual needs and support of patients' own coping efforts with respect to lifestyle changes and risk factor reduction. | Patients | Not mentioned | Phone call | Home | Weekly nurse-initiated telephone calls were arranged for the first 4 weeks; subsequently calls were arranged 6, 8, 12 and 24 weeks after discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Harrison, 2002 | Transitional Care Intervention | To evaluate whether the use of usual providers, and a reorganization of discharge planning and transition care with improved intersector linkages between nurses, could improve quality of life and health services utilization for individuals admitted to hospital with heart failure. | Education booklet and map | Evidence-based education program (PCCHF) initiated<br>Nursing transfer letter received by Home RN<br>Phone Outreach within 24 h of discharge<br>Phone advice from hospital nurse<br>Education booklet used at home<br>Education map<br>Community RN consult with hospital RN | Patients and families | Connecting with them after discharge<br>Providing written teaching documentation | Written information<br>Phone call | Hospital and home | Phone call within 24 h post-discharge | Yes | No |
| Henschen, 2021 | The Complex High Admission Management Program | To assess the CHAMP program's effect on hospital readmissions. | Individualized care plans, verbal information | Comprehensive care planning and inpatient, outpatient, and community visits to address both medical and social needs. | Patients | Not mentioned | Inpatient, outpatient and home visits<br>Phone calls | Hospital and home | Care planning while inpatient<br>Post-discharge follow-up (2 clinics help per week + community support)—up to 180 days after discharge | Yes | No |
| Hu, 2020 | Transitional care intervention | To develop and test an innovative kidney transplant recipients (KTRs) transitional care program covering interventions at admission, during the hospital stay, predischarge, and postdischarge and utilizing WeChat and teach-back strategies to promote the safe transition for KTRs under the current health care context. | WeChat, Health self-management handbook for kidney transplant recipients, drug safety instruction sheet | Risk assessment for early readmission, health education from admission to pre-discharge, individualized discharge planning, and a telephone follow-up once per week for one month and WeChat follow-up post-discharge | Patients and caregivers | Encouraging the family/caregivers to support the patient | Written<br>Lectures<br>Phone calls<br>Online support | Hospital and home | Risk assessment for early readmission, health education from admission to pre-discharge, individualized discharge planning, and a telephone follow-up once per week for one month and WeChat follow-up post-discharge (within 30 days after discharge) | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Huang, 2005 | Discharge planning intervention | Examine the effectiveness of a discharge plan in hospitalized elderly patients with hip fracture due to falling. | Verbal information<br>Brochures<br>Hard copy summaries detailing the plans, goal progression and ongoing concerns | The nurse collaborated with the patients, family caregivers and health care team members to design an individualized discharge plan based on the patient's information. The intervention group received two brochures prepared by the researcher. The nurse provided direct care, education, and confirmation of learning regarding both medication and environmental safety, as well as the proper employment of assistance devices | Patients, families, and caregivers | Connecting with them during follow-ups<br>Engaging the family/caregivers in the disease management<br>Assessing the family/caregivers' needs at discharge and after discharge | Hospital and home visits<br>Phone call | Hospital and home | The initial nurse visit took place within 48 h of hospital admission and the nurse visited patients at least every 48 h during hospitalization. Three–seven days after patient discharge, the nurse made one home visit and was available for patient by telephone 7 days/week (8 a.m.–8 p.m.); once a week the nurse-initiated telephone contacts with patients or caregivers. Up to 3 months after discharge. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Kangovi, 2014 | CHWs worked with patients to create individualized action plans for achieving patients' stated goals for recovery. | To determine whether a tailored CHW intervention would improve post-hospital outcomes among low socioeconomic status patients. | Individualized action plan, verbal information | During and after hospitalization, CHWs provided tailored support based on patients' goals using telephone calls, text messages, and visits. | Patient | Not mentioned | Semi-structured interview<br>Inpatient visit<br>Telephone calls, text messages, and home visits | Hospital and home | The CHWs provided support tailored to patient goals for a minimum of 2 weeks | Yes | No |
| Kazemi Majd, 2021 | Information Prescription (IP) | To assess the effect of a patient centred and physician prescribed evidence-based information prescription (IP) intervention on reducing the hospital readmission and death among the HF patients. | Written information (information prescription simplified by clinical librarian)<br>Verbal description (verbal description of the importance of IPs in understanding the physician's diagnosis, treatment, and recommendations) | This process was done in three phases as follows: (i) prescribing information by MD/information prescription direction, (ii) dispensing IP by clinical Librarian, and (iii) approval by MD and delivering it to patient | Patient | Not mentioned | Written<br>In person while inpatient | Hospital | Duration of the discharge planning meeting upon discharge | Yes | No |

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**Table 2.** (Continued)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Lainscak, 2013 | Discharge coordinator intervention | To test whether coordination of discharge from hospital and postdischarge care reduces hospitalizations in patients with chronic obstructive pulmonary disease (COPD). | Verbal information | The discharge coordinator assessed patient situation and homecare needs to identify any problems and specific needs to adjust the in-hospital intervention according to prespecified objectives. After discharge, patients were contacted by phone 48 h after discharge to check the process of adjustment to the home environment and to inquire about any additional needs to be met until the home visit. Final patient assessment was performed during a home visit 7–10 days after discharge when prescheduled intervention was completed | Patients, families, and caregivers | Engaging the family/caregivers in the disease management<br>Providing education on the disease, the treatments and the interprofessional team<br>Assessing the family/caregivers' needs at discharge<br>Actively involving caregivers in the discharge planning | Inpatient visit, phone call, home visit | Hospital and home | Assessment needs while inpatient, 48 h post-discharge phone call and final patient assessment home visit 7–10 days after discharge | Yes | No |
| Laramee, 2003 | The intervention consisted of four major components: early discharge planning, patient and family CHF education, 12 weeks of telephone follow-up, and promotion of optimal CHF medications. | To test the effect of hospital-based nurse CHF ) case management (CM) on the 90-day readmission rate in a more heterogeneous setting. | The patient received educational materials, including a 15-page CHF booklet called Heartworks developed by personnel in the institution, weight logs, self-care activities summary sheets, computerized medication lists, and a guide for measuring sodium intake. Home scales and pillboxes were made available as needed. | Four major components were: [1] early discharge planning and coordination of care [2] individualized and comprehensive patient and family education [3] 12 weeks of enhanced telephone follow-up and surveillance, and [4] promotion of optimal CHF medications and medication doses (ACEIs or ARBs and BBs) based on consensus guidelines | Patients, families, and caregivers | Connecting with them during follow-ups<br>Providing education to family/caregivers | Inpatients visits<br>Written information, educational material, Verbal information<br>Phone calls<br>Inpatient monitoring of medication and doses | Hospital and home | Patient and/or family members received telephone calls at 1–3 days after discharge and at weeks 1, 2, 3, 4, 6, 8, 10, and 12 | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lembeck, 2019 | Single follow-up home visit | To complement the evidence concerning the effect of discharge planning by focusing on a single follow-up home visit administered to frail elderly patients living in a rural area of Denmark. | Verbal information | For intervention patients study and department nurses reviewed discharge planning the day before discharge.<br>On the day of discharge, study nurses accompanied the patient to their home, where they met with the municipal nurse. Together with the patient they reviewed cognitive skills, medicine, nutrition, mobility, functional status, and future appointments in the health care sector and intervened if appropriate | Patients | Targeting risk factors at the patient's home<br>Giving informed consent if necessary. | Inpatient discharge planning meeting<br>Home visits | Hospital and home | One home visit day one post-discharge | Yes | No |
| Li, 2012 | Intervention to empower and Intervention to educate and inform | To test the efficacy of an intervention program—Creating Avenues for Relative Empowerment (CARE)—designed to increase family member participation in the hospital care of elderly relatives to prepare them for their anticipated post-hospital caregiver roles. For improving outcomes of hospitalized older adults and their family caregivers (FCGs) | Audio-taped and written materials containing information given during hospital stay and before discharge | Intervention to empower family caregivers to choose care activities they wish to perform in association with identified potential problems<br>Intervention provides FCGs with two 10 min tapes and written handouts describing common complications of and older patient responses to hospitalization | Patients and caregivers | Participating in the patient's care while in hospital<br>Preparing the family/caregivers for the patient's discharge<br>Assessing the family/caregivers' needs at discharge<br>Filling out questionnaires about empowerment as a caregiver | Inpatient visit, Audio-taped and written materials | Hospital | Within 1–2 days after hospital admission, CARE Program FCGs were assisted to develop a plan (a Mutual Agreement) for their relatives' hospital care, based on their abilities and preferences. Session II, initiated 1–3 days before discharge, consisted of audio-taped and written materials | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Liang, 2021 | The patients in the intervention group participated in an integrated tele-homecare program. | To evaluate the effectiveness of an integrated nurse-led tele-homecare program for patients with multiple chronic illnesses and a high risk for readmission. | Wireless transmission devices, including a one-touch smartphone, blood pressure (BP) monitor, medication dispenser, and a necklace emergency call button. Participants with diabetes were also given a glucometer to measure their blood sugar | The intervention group program offered continuous telemonitoring through wireless transmission devices and home visits. To ensure integrated program compliance and to meet patients' medical needs, tele-homecare nurses also conducted home visits (content of care included assessment, patients' education, nutrition and medication consultation, and medication reminders) on the discharge day (T0), 3 months after discharge (T3), and 6 months after discharge (T6). | Patients and families | Engaging the family/caregivers in the disease management<br>Providing caregivers with education regarding patient care, mental support, and pain management | Continuous telemonitoring<br>Home visits | Home | Tele-homecare nurses conducted home visits on the discharge day (T0), 3 months after discharge (T3), and 6 months after discharge (T6). | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lindhardt, 2019 | Group A ($n = 117$): patients were informed of health problems and self-care interventions<br>Group B ($n = 116$): a motivational conversation targeting activities of daily living with a home care nurse and a home visit. | To test and compare the effect of [1] a systematic discharge assessment with targeted advice and [2] a motivational interview followed by a home visit. | Intervention A: written information<br>Intervention B: verbal information | Intervention A: This group received a brief information-based intervention comprising a report with the assessment results from the baseline measurements and oral, written, and web-based information about self-management targeted at the relevant problem areas. The municipality preventive consultant phoned the patients at home and provided information about relevant municipality activities they could join. No home care or other services were offered.<br>Intervention B: Patients in this group took part in a motivational interview with an experienced municipality nurse, skilled in this technique. The nurse made a home visit a week after discharge to follow-up on possible problems and sent a brief narrative report to the general practitioner and the municipality preventive consultant. The municipality preventive consultant phoned the patient at home and provided the same information as in intervention A. | Patients | Not mentioned | Intervention A: written, hospital, phone call<br>Intervention B: hospital, home visit, phone call | Intervention A: hospital and home<br>Intervention B: hospital and home | Intervention B: home visit 1 week post-discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lisby, 2019 | The intervention consisted of [1] an assessment of the patient's overall situation, [2] an assessment of their comprehension of discharge recommendations, [3] a simple discharge letter targeting the individual patient's health literacy and [4] a follow-up telephone call 2 days post-discharge. | To investigate the clinical impact (e.g. readmissions, utilization of healthcare, patients' experience of the discharge and their health-related quality of life) of a comprehensive nurse-led discharge intervention on non-surgical patients in acute medical units. | Discharge letter | The intervention consisted of four elements: [1] an assessment of the participant's overall situation and initiation of relevant actions (Pit stop 1),<br>[2] a dialogue with the patient focusing on the discharge recommendations provided by the physician (Pit stop 2),<br>[3] a discharge letter targeting the patient's health literacy and<br>[4] a follow-up telephone call 2 days post-discharge | Patients | Not mentioned | Meeting in hospital<br>Follow-up phone call | Hospital and home | Assessment when inpatient and phone call 2 days post-discharge | Yes | No |
| Lopez Cabezas, 2006 | The patients assigned to the intervention group received information about the disease, drug therapy, diet education, and active telephone follow-up | To assess the efficacy of a multifactorial educational intervention carried out by a pharmacist in patients with heart failure (HF). | Written and verbal information | 1. Information: the day of hospital discharge, a personal interview was performed, aimed at the patient and his caregiver, particularly dealing with the following:<br>-Information on the disease<br>- Diet education<br>- Information on drug therapy<br>2. Telephone strengthening:<br>- Contact telephone<br>- Monthly during the first 6 months of follow-up, and subsequently, every 2 months, a telephone call was made to the home of the patient, as a strengthen to the intervention and to solve any doubts or problems that could have arisen | Patients and caregivers | Providing education to the patients and their caregivers. | Phone call and in person interview | Hospital and home | Visits were completed at 2, 6, and 12 months. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Magny-Normilus, 2021 | Intensive transitional care intervention | To design, implement, and evaluate a multipronged transitional care intervention among hospitalized patients with diabetes. | Written information | 1. Inpatient protocol for adjusting the discharge diabetes regimen<br>2. Nurse practitioner 'discharge advocate' (DA) to schedule follow-up appointments, prepare an after-hospital care plan, and educate patients/caregivers regarding the primary diagnosis, self-care plan after discharge, upcoming tests and appointments, danger signs to watch for, and who to contact.<br>3. Inpatient pharmacist counselling<br>4. Visiting nurse intervention<br>5. Phone call by the DA to patient within 48 h of discharge<br>6. Follow-up in a post-discharge clinic with the DA and pharmacist (who was also a certified diabetes educator) within 3 days of discharge<br>7. Telemonitoring of point-of-care glucose levels to the patient's PCP or endocrinologist as appropriate<br>8. Follow-up with PCP or endocrinologist within 1 week of discharge. | Patients and caregivers | Assessing the family/caregivers' needs at discharge<br>Engaging the family/caregivers in the disease management | Written, in person visits, and via phone call | Hospital and home | Inpatient protocol<br>Inpatient pharmacist counselling<br>Phone call by the DA to patient within 48 h of discharge<br>Follow-up in a post-discharge clinic with the DA and pharmacist (who was also a certified diabetes educator) within 3 days of discharge<br>Follow-up with PCP or endocrinologist within 1 week of discharge. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Naunton & Peterson, 2003 | Home Visit Protocol | To evaluate pharmacist-conducted follow-up at home of high-risk elderly patients discharged from hospital. | written and verbal information | Patients were visited at home by a pharmacist 5 days after discharge. The pharmacist educated patients on their medications, encouraged compliance, assessed for drug-related problems, intervened when appropriate and communicated all relevant findings to community health professionals. | Patients and caregivers | Assessing the family/caregivers' needs at discharge<br>Engaging the family/caregivers in the disease management<br>Assuring family/caregiver would provide increased support to patient<br>Connecting with them during follow-ups | written, in person visits | Home | Pharmacist home visit 5 days post-discharge | Yes | No |
| Naylor, 1994 | Patients and caregivers in the intervention group received the hospital's routine plan and a comprehensive, individualized discharge planning protocol developed specifically for elderly patients and implemented by gerontologic clinical nurse specialists | To determine the effects of a comprehensive discharge planning protocol, designed specifically for the elderly and implemented by nurse specialists, on patient and caregiver outcomes and cost of care. | Written discharge plan, verbal information | 1. In hospital visit at admission and discharge<br>2. Visit at admission<br>3. Visit every 48 h to implement the plan through patient and caregiver education.<br>4. Summaries of the discharge plan distributed to health care team members and caregiver.<br>5. Visit every 48 h and before discharge to evaluate the discharge plan. Nurse specialist available 7 days a week for questions from patients or caregivers for up to 2 weeks after discharge.<br>6. Telephone calls | Patients, families, and caregivers | Providing education to the patients and their caregivers.<br>Assessing the family/caregivers' needs at discharge<br>Validating the education provided<br>Connecting with them after discharge<br>Being available to family/caregivers after discharge for questions or concerns | In person visits, phone call | Hospital and home | In hospital visit at admission and discharge.<br>Visit every 48 h to implement the plan and calls up to 2 weeks after discharge. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Naylor,1999 | A 3-month APN-directed discharge planning and home follow-up protocol | To examine the effectiveness of an APN-centred comprehensive discharge planning and home follow-up protocol for elders hospitalized with one of several common medical and surgical reasons for admission. | Verbal information | The intervention included all the following components: [1] a standardized orientation and training [2] use of care management strategies foundational to the Quality Cost Model of APN Transitional Care [3] APN implementation of an evidence-based protocol, guided by national heart failure guidelines and designed specifically for this patient group and their caregivers | Patients and caregivers | Engaging the family/caregivers at discharge Connecting with them during follow-ups Assessing the family/caregivers' needs at discharge Ensuring their presence during follow-up visits Engaging the family/caregivers in the disease management Answering their questions | In person visits, and phone call | Hospital and home | Started with an initial APN visit within 24 h of index hospital admission, APN visits at least daily during the index hospitalization, at least eight APN home visits (one within 24 hours of discharge), weekly visits during the first month, bimonthly visits during the second and third months, additional APN visits based on patients' needs, and APN telephone availability 7 days per week (8 a.m. to 8 p.m., weekdays; 8 a.m. to noon, weekends). | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Naylor, 2004 | Intervention group patients received a comprehensive discharge planning and home follow-up protocol designed specifically for elders at risk for poor outcomes after discharge and implemented by advanced practice nurses | To examine the sustained effect of a 3-month comprehensive transitional care (discharge planning and home follow-up) intervention directed by APNs for elders hospitalized with heart failure on time to first readmission or death, total rehospitalizations, readmissions due to heart failure and comorbid conditions, quality of life, functional status, patient satisfaction, and medical costs. | Verbal information, standardized comprehensive discharge planning and home follow-up protocol | Intervention group patients and their caregivers, if available, received a standardized comprehensive discharge planning and home follow-up protocol designed specifically for elders at high risk for poor post-discharge outcomes. The protocol guided patient assessment and management and specified a minimum set of APN visits. | Patients, families, and caregivers | Assessing the family/caregivers' needs at discharge<br>Engaging the family/caregivers in the disease management | In person visits, written information, audiotapes of patient teaching sessions | Hospital and home | Initial APN visit within 48 h of hospital admission; APN visits at least every 48 h during the index hospitalization; at least 2 home APN visits (1 within 48 h after discharge, a second 7–10 days after discharge); additional APN visits based on patients' needs with no limit on number; APN telephone availability 7 days per week (8 a.m. to 10 p.m. on weekdays and 8 a.m. to noon on weekends); and at least weekly APN-initiated telephone contact with patients or caregivers up to 3 months after hospital discharge. | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nguyen, 2018 | Intervention patients received educational and behavioural interventions by a pharmacist | To assess whether a pharmacist-led intervention enhances medication adherence in patients with acute coronary syndrome (ACS) and reduces mortality and hospital readmission. | Verbal information | The multifaceted intervention comprised two counsellingsessions. At the first counselling, a pharmacist performed a 30- min in-person counselling within 1 week before discharge including: [1] assessment and giving advice on basic knowledge of ACS: definition, risk factors, possible cardiac events, and prevention; [2] assessment of past experiences of using medications, encouragement and tailored advice; [3] providing medication aids including pill organizer and drug information leaflet; [4] teaching back and correcting misunderstanding. At the second counselling, the pharmacist performed a 30 min telephone counselling within 2 weeks after discharge including: [1] assessment of general and medication-related issues patients concerning; [2] encouragement and tailored advice; [3] teaching back and correcting misunderstanding | Patients | Not mentioned | In person and via phone call | Hospital and home | First counselling by pharmacist within 1 week before discharge including and second counselling within 2 weeks after discharge | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nucifora, 2006 | Nurse-led education programme, facilitated telephone communication and follow-up visits with an internist at 15 days, 1 and 6 months | Evaluated the effects of a heart failure (HF) management programme, which included patient education and regular outpatient contact with the HF team, on re-hospitalisation and death, optimising the few resources already available at the hospital | Verbal information, teaching booklet | The study intervention consisted of pre-discharge intensive education about HF. Three to five days after discharge the study nurse telephoned the patient to assess potential problems, to promote self-management skills and to reinforce education. Patients were encouraged to telephone the study nurse any time they experience worsening symptoms or had questions about their disease or treatment, from 8.00 to 9.00 a.m., Monday to Friday. Outpatient visits by internal medicine doctors were planned at 15 days, 1 and 6 months after discharge. During these visits doctors evaluated test results, performed a physical examination, and assessed patient's clinical progress since discharge and patient's adherence to prescribed therapeutic regimen. | Patients | Not mentioned | Verbal and written information, in person inpatient, outpatient visits, phone call | Hospital and home | Pre-discharge intensive education about HF. Three to five days after discharge the study nurse telephoned the patient to assess potential problems. Outpatient visits by internal medicine doctors were planned at 15 days, 1 and 6 months after discharge. | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Oliveira-Filho, 2014 | This protocol consisted of two distinct parts: patient-centred verbal instructions and written material about prescribed medications. | To assess the impact of a low-cost intervention designed to improve medication adherence and clinical outcomes in post-discharge patients with cardiovascular disease (CVD). | Written and verbal information | Enhanced medication review provided by pharmacists to patients in the intervention group on the day of discharge consisted of nine steps with mean total duration of 32 min:<br>1. Doctor confirms the patient's hospital discharge and sends the outpatient prescription for analysis by the pharmacist.<br>2. Pharmacist transcribes data from medical records and prescription to a form specifically designed for this study.<br>3. Pharmacist reviews the following data for each drug: indication, dosage and schedule, treatment duration, method of use, adverse reactions, main drug–drug, and drug–food interactions. Current drug–drug interactions or other drug-related problems are communicated to the prescriber before discharge. The communicated problems did lead to an adaptation/correction of the prescription.<br>4. Pharmacist reviews the following data for each patient: diagnosis, age, sex, and drugs used before hospitalization.<br>5. After reviewing patient data, the pharmacist highlights critical points to the success of treatment after hospital discharge.<br>6. Main advice and schedules are written on a drug treatment card adapted as a refrigerator magnet. | Patients and families | Ensuring their presence | In person, written information | Hospital | The enhanced medication review was provided by pharmacists to patients in the intervention group on the day of discharge | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 7. Subjects considered critical to successful treatment and schedules are discussed with the patient. In this step, the health-disease process is also discussed, as well as measures to be taken in case of a forgotten dose.<br>8. Instructions about drug treatment are checked with the patient.<br>9. Drug card and phone number are given to the patient for contact. | | | | | | | |
| Ong, 2016 | The intervention combined health coaching telephone calls and telemonitoring. | To evaluate the effectiveness of a care transition intervention using remote patient monitoring in reducing 180-day all-cause readmissions among a broad population of older adults hospitalized with heart failure (HF). | Electronic equipment that collected daily information about blood pressure, heart rate, symptoms, and weight, education booklet | Pre-discharge HF education, regularly scheduled telephone coaching, and home telemonitoring of weight, blood pressure, heart rate, and symptoms | Patients | Not mentioned | In person, electronic monitoring, phone call | Hospital and home | The nurse first contacted each enrolled patient 2 or 3 days after discharge from the hospital to reinforce the pre-discharge health coaching topics. Subsequent telephone nurse coaching then occurred on a weekly basis during the first month after discharge. After the first month, nurse coaching telephone calls were made monthly until the end of the 6-month study period | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pearson, 2006 | Multidisciplinary home-based intervention | To compare all-cause mortality and recurrent hospitalization during median follow-up of 7.5 years in a heterogeneous cohort of patients with chronic illness initially exposed to a multidisciplinary, homebased intervention (HBI) (n = 260) or to usual postdischarge care (n = 268) | Verbal information<br>Written information (Reminder cards)<br>Medication compliance devices | All HBI patients received counselling before discharge by the study nurse and/or hospital pharmacist in relation to their prescribed medications. High-risk patients received the following additional interventions: A home visit at 1 week by the study nurse and pharmacist to: [1] assess the patient's physical, clinical and psychosocial status; [2] optimize home-medication management; [3] increase patient and/or caregiver vigilance for clinical deterioration; and [4] improve liaison with community-based services thereafter. Patients with more complex problems were referred to a community pharmacist. The patients' primary care physician received a comprehensive report with recommendations for remedial action and long-term follow-up. | Patients and caregivers | Engaging the family/caregivers in the disease management | Inpatient and home in person visits | Hospital and home | Counselling before discharge, and a home visit 1 week after discharge. | Yes | No |
| Piette, Striplin, Aikens, 2020 | CarePartner Program Intervention | To evaluate a mobile health intervention designed to improve post-hospitalization support for older adults with common chronic conditions. | IVR (Interactive voice response) Phone Calls<br>Care Partners (CPs) Communication<br>Clinical Alerts | Intervention patients received automated assessment and behaviour change calls. CarePartners received automated, structured feedback following each assessment. Clinicians received alerts about serious problems identified during patient calls | Patients and caregivers | Ensuring patient and caregiver to communicate after discharge<br>Providing education on the role and expectations of a caregiver | Follow up automated calls (IVR) | Home | During the initial 2 weeks post-discharge, patients received up to 3 attempts to complete a daily assessment call. Call frequency was then reduced to 3 times weekly for the second 2 weeks, and then once weekly for the final 9 weeks. | No | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Piette, Striplin, Fisher, 2020 | Care Partner Program Intervention | Our primary hypothesis was that the Care Partner intervention would improve 30-day readmission rates and the combined outcome of readmission/emergency department use | IVR (Interactive voice response)<br>Phone Calls<br>Care Partners (CPs) Communication<br>Clinical Alerts | Intervention patients received weekly automated assessment and behaviour change calls. CPs received structured email feedback. Outpatient clinicians received fax alerts about serious problems. | Patients and caregivers | Providing transition education<br>Providing access to family/caregiver to receive information about the patient<br>Providing education on the role and expectations of a caregiver<br>Ensuring patient and caregiver to communicate after discharge | Automated IVR calls | Home | During the initial 2 weeks after discharge, patients received daily IVR calls, with up to three attempts per day. After the initial 2 weeks, patients received IVR calls three times per week for 2 weeks, and then weekly for 9 weeks. | No | No |
| Sales, 2013 | Instructions from the volunteer staff including education before discharge from the hospital, a unique single-page discharge sheet, and post-discharge follow-up phone calls. | To evaluate the effectiveness of using trained volunteer staff in reducing 30-day readmissions of CHF patients | Written and verbal information, 1-page discharge sheet with the patient's medication names, dosage, and frequency at which the medication should be taken were written in large letters and simple language | The interventional arm (arm A) received dietary and pharmacologic education by a trained volunteer, a follow-up telephone calls within 48 h, and a month of weekly calls | Patients and caregivers | Engaging the family/caregivers in the disease management | Written information, in person, phone calls | Hospital and home | Dietary and pharmacologic education prior to discharge, a follow-up telephone calls within 48 h, and of weekly calls up to 1 month after discharge | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Schneider, 1993 | Medication discharge planning program | To examine the effects of a medication discharge planning program on readmissions within 31 days. | Written and verbal information, information cards | Medication discharge planning to provide instruction on the requisites necessary for medication self-care. | Patients | Educating the family/caregivers at discharge regarding medications | Written and verbal information | Hospital | Medication education session prior to discharge | Yes | No |
| Schnipper, 2021 | Multifaceted Intervention to Achieve Ideal Hospital Discharge | To develop, implement, and refine a multifaceted care transitions intervention and evaluate its effects on postdischarge adverse events. | Written and verbal information | Multicomponent intervention in the 30 days following hospitalization, including inpatient pharmacist-led medication reconciliation, coordination of care between an inpatient 'discharge advocate' and a primary care 'responsible outpatient clinician,' postdischarge phone calls, and postdischarge primary care visit. | Patients and caregivers | Engaging the family/caregivers in the disease management<br>Assessing the family/caregivers' needs at discharge | Hospital and home in person visits, and phone call | Hospital and home | Inpatient pharmacist–led medication reconciliation and patient counselling, postdischarge phone call, post-discharge follow-up up to 30 days following hospitalization | Yes | No |
| Shahrokhi, 2018 | Telenursing intervention | To assess the effect of telenursing on care provided by the caregivers of patients with head trauma. | Written and verbal information, educational booklets | Phone calls were made by a telenurse. The patients' caregivers were trained in one face to-face session, lasting for 1 h, on how to take care of patients at home and were provided with educational booklets 2 days before discharge for both groups. Then, the patients of the intervention group were followed up every week for 12 weeks through phone calls by the telenurse, who recorded the patient status checklists. | Patients and caregivers | Engaging the family/caregivers in the disease management<br>Giving them the opportunity to connect with them after discharge | Written information provided in hospital<br>Phone calls | Hospital and home | One face to-face session 2 days before discharge for both groups. Then, the patients of the intervention group were followed up every week for 12 weeks through phone calls. | Yes | No |

(continued)

**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tu, 2020 | A transitional care intervention for hypertension control for older people with diabetes | To evaluate the effect of a nurse-coordinated hospital-initiated transitional care programme on hypertension control for older people with diabetes in China | Verbal information | Participants in the intervention group received a 6-month hospital to home transitional care programme coordinated by discharge nurses and community nurses. The programme comprised self-management education, lifestyle changes, individualized medication treatment, structured telephone support, and primary care visits | Patients | Not mentioned | In person hospital discharge visit<br>Follow up phone calls | Hospital and home | Provide older people with self-management support through goal setting, action planning, health education, and problem-solving in hospital discharge and during the follow-up period (6 months) in community health centres | Yes | No |
| Van Spall, 2019 | Patient-Centred Transitional Care Services | To test the effectiveness of the Patient-Centred Care Transitions in HF transitional care model in patients hospitalized for HF. | Verbal information | Nurse-led self-care education, a structured hospital discharge summary, a family physician follow-up appointment less than 1 week after discharge, and, for high-risk patients, structured nurse home visits and heart function clinic care. | Patients and caregivers | Engaging the family/caregivers in the disease management | In person hospital visit<br>Home visits<br>Phone calls | Hospital and home | Nurse-led self-care education, structured hospital discharge summary, family physician follow-up appointment less than 1 week after discharge. The nurse-led visits included weekly, structured, face-to-face and telephone assessments lasting 4–6 weeks | Yes | No |

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**Table 2.** (Continued)

| Citations' first author, year of publication | Name, title, or short sentence describing the intervention | Aim/goal/ purpose of intervention | Materials (physical or informational) | Procedures (activities) | Target | Involvement of patients/families | Mode of delivery | Setting (where/ locations) | Timing and doses (when and how many times) | Tailoring/ personalized/ individualized | Modification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wu, 2019 | The health management intervention program | To assess the effects of transitional health management on adherence and prognosis in elderly patients with acute myocardial infarction undergoing percutaneous coronary intervention (PCI). | Handbook of Transitional Health Management after PC, verbal information | The 'Handbook of Transitional Health Management' was distributed to patients and their families in the intervention group on the first postoperative day after PCI and explained one by one, repeatedly emphasizing the precautions during the transition period. After discharge, two follow-up methods were adopted: telephone and home visit | Patients and caregivers | Engaging the family/caregivers in the disease management<br>Targeting post-op interventions | Written information<br>In person hospital discharge session<br>Follow-up phone calls | Hospital and home | The handbook was given postoperative day 1. The telephone was used to follow up once a day after discharge. If no new problems occurred for 3 days, phone calls were changed to 2 times a week for 1 month. Then, follow-up was carried out once a month up to 12 weeks. | Yes | No |
| Zhao, 2009 | Transitional care programme | To test the effects of a post-discharge transitional care programme among patients with coronary heart disease. | Hospital visit<br>Home visit<br>Phone call | The study group received the post-discharge transitional care programme, which consisted of pre-discharge assessment, structured home visits and telephone follow-ups within 4 weeks after discharge | Patients | Not mentioned | In person pre-discharge in hospital visit<br>Home visits<br>Follow-up phone calls | Hospital and home | Nurse in hospital assessed the participant. Nurse in community continued to follow up with the participant in the community for 4 weeks. Nurse-C provided one home visit on the second day and another in the third week and made two telephone calls in the second and fourth weeks after the patient was discharged from the hospital. | Yes | No |

Types of PFC care transition interventions varied according to the interventions' target audience, involvement of patients and families, duration, implementation setting, mode of delivery, implementer and components of PCC and ITC.

Reported interventions were patient-centred [35–39, 42–45, 52, 56, 59–69]. Only one study reported actively involving patients' and caregivers in the co-development of their PFC care transition intervention [35].

Interventions varied in length ranging from 1 day to 12 months, with the majority lasting up to 3 or 6 months [35, 38, 42, 44, 46, 52–54, 58, 61, 62, 67, 68, 70–74]. Most interventions were hospital- and home-based [35–37, 39–46, 48–52, 55, 57, 59, 64–82]. Some were offered in the hospital setting only [47, 56, 63, 83] and others in the home setting only [38, 53, 54, 58, 61, 62, 80].

The mode mostly used to deliver the PFC care transition interventions include hospital visits, follow-up home visits, follow-up phone calls during which either or both verbal (i.e. education sessions) and written information (i.e. brochure and booklet) was provided to patients and families. The types of care transition interventions included health assessment, symptom and disease management, medication reconciliation, discharge planning, risk management, complication detection, and emotional support. Only a few PFC interventions included the use of technology, such as audiotapes [43, 47, 51], interactive voice responses [53, 54], online support [74], text messages [45], and telemonitoring with smartphones [52, 79]. Nurses (i.e. registered nurses, advance practice nurses, and nurse practitioners), on their own or with other healthcare providers, were more often responsible for implementing the PFC care transition interventions.

The PFC care transition interventions varied in the number of included PCC elements, ranging from 3 to 14 of the possible 27 PCC elements [15] (Supplementary Data File 4). The study which included the most PCC elements ($n = 14$) in their PFC intervention was Naylor [51]. The most recurrent PCC component in the PFC care transition interventions was collaborative care, whereas the most recurrent PCC element was the provision of information on disease and self-management to patient and family. The interventions also varied regarding their comprehensiveness of the transition in care, according to nine of Burke and colleagues' [18] domains of an ITC, as the advance care planning domain was excluded (Supplementary Data File 5). The ITC component that was included most often in the PFC care transition interventions was patient education and promotion of self-management. Laramee *et al.* [46] was the only study that included all nine ITC components.

## Outcome measures

Trials measured hospital readmissions and ED visits using a combination of administrative data as well as patients' and their family members' reports. Most trials ($n = 34$) reported solely on unplanned hospital readmissions and 16 reported on unplanned hospital readmissions and ED visits (Table 1).

## Findings from risk of bias appraisal

The Supplementary Data File 6 and Supplementary Data File 7 summarize the findings of our appraisal of the studies' risk of bias.

## Findings, missing data

Trials recorded outcomes on hospital readmissions or ED visits after discharge. However, 11 trials provided insufficient data. Some authors [35, 48, 64, 77] responded to inquiries for missing details (hazard ratios and 95% CIs, standard deviations for adjusted outcomes or separate data for readmissions and ED visits) and to clarify the frequency of readmissions post-discharge. Trials were excluded from the meta-analyses when authors [37, 41, 53, 54, 71, 76] were unable to provide means, standard deviations, or hazard ratios.

## Findings, hospital readmissions

Hospital readmission data were reported in various formats in 44 trials ($n = 17\,350$ participants) (Table 1). Only statistically significant results are reported below. Findings from all meta-analyses are provided in Supplementary Data File 8.

### Number of patients readmitted one or more times

A meta-analysis of 10 trials (38, 39, 45, 52, 55–57, 65, 77, 82) involving 8076 participants was conducted. Analysis based on the measurement one month after discharge showed that PFC care transition interventions had minimal impact on the risk of patients being readmitted at least once compared to the usual care group (OR = 0.93; 95% CI, 0.74–1.18; $I^2 = 46\%$; Supplementary Data File 8). A meta-analysis was conducted of four trials [62, 81, 83, 84] among 1011 participants assessing the number of patients readmitted at least once 1–8 years after discharge. The PFC care transition interventions significantly reduced the risk of patients being readmitted at least once compared to the usual care group (OR = 0.63; 95% CI, 0.44–0.91; $I^2 = 32\%$).

### Number of incidents of hospital readmissions

When combining study data across reporting formats from 24 trials [35, 36, 38, 43–46, 49–51, 59–64, 67, 72, 75, 78, 84], results from the meta-analysis showed that PFC care transition interventions significantly reduced the incidence of hospital readmission rates compared to the usual care group (IRR= 0.86; 95% CI, 0.75–0.98; $I^2 = 73\%$) (Supplementary Data File 8).

## Findings, ED visits after discharge

ED visits were reported in various formats in 16 trials ($n = 7734$ participants) [35, 37, 40, 42, 44, 48–51, 60, 65, 68, 71, 76, 77, 79, 82]. Only statistically significant results are reported here. Findings from all meta-analyses are provided in Supplementary Data File 9.

### Number of patients who visited the ED after discharge one or more times

A meta-analysis of three trials [42, 68, 79] involving 778 participants was conducted. Analysis based on measurement 6 months after discharge showed that PFC care transition interventions significantly reduced the risk of patients visiting the ED compared to the usual care group (OR = 0.56; 95% CI, 0.34–0.95; $I^2 = 51\%$, Supplementary Data File 9).

### Number of incidents of ED visits

When combining all formats for five trials [35, 44, 46, 60, 82], results showed that PFC care transition interventions had minimal impact on the incidence of ED visits compared to the

usual care group (IRR = 1.0; 95% CI, 0.85–1.18; $I^2$= 29%; Supplementary Data File 9).

### Findings, subgroups

The PFC care transition interventions which had a moderate PCC score (10–17 elements) significantly decreased the risk of patients being hospitalized compared to the usual care group (IRR= 0.73; 95% CI, 0.57–0.94; $I^2$= 59%; Supplementary Data File 9), but had a minimal effect on their risk of visiting the ED after discharge (IRR= 1.54, 95% CI 0.91–2.61; Supplementary Data File 8). Those which scored high (7–9) on ITC domains, significantly decreased the risk of patients being hospitalized compared to the usual care group (IRR = 0.76; 95% CI, 0.64–0.91; $I^2$= 4%; Supplementary Data File 8), but significantly increased their risk of visiting the ED after being discharged compared to the usual care group (IRR = 1.54; 95% CI, 0.91–2.61; Supplementary Data File 9).

## Discussion

### Statement of principal findings

PFC care transition interventions appear to significantly decrease the risk of unplanned hospital readmissions rates compared to usual care. However, these interventions seem to have minimal impact on the risk of ED visits rates compared to the usual care group, regardless of time after discharge. PFC care transition interventions with a greater number of PCC elements seem to significantly decrease the risk of hospitalization yet have a minimal impact on the risk of patients visiting the ED any time after being discharged. The PFC care transition interventions targeting a greater number of ITC domains appear to significantly decrease the risk of hospitalization; however, increase the risk of patients visiting the ED. Therefore, our findings show that it is not any particular component of the PFC interventions, but rather the PCC and ITC framework as a whole that appears to be most effective in decreasing hospital readmissions.

### Strengths and limitations

This SR and meta-analysis adhered to the PRISMA guidelines [27], and the recommendations of the Cochrane's Handbook for Systematic Reviews Interventions [29]. However, the database search was conducted ∼2.5 years prior to the manuscript submission for publication. Although a research librarian developed the search strategy, some relevant studies may not have been identified during the search process and may have been missed. Our SR found significant heterogeneity among trials in terms of the wide range of samples, interventions, usual care, and reported outcomes. Thus, we included a narrative synthesis of the outcomes to avoid biased reporting.

### Interpretation within the context of the wider literature

Previous reviews have reported on care transition interventions and their effectiveness regarding patient outcomes as well as health care utilization and costs. However, they targeted surgical [22], medical [25], frail older [23], cardiac [24], and paediatric patients [21] or did not focus on PFC interventions [19, 20, 22–24]. This is, to our knowledge, the first SR and meta-analysis that assessed the effectiveness of care transition interventions involving patients and caregivers in terms of adults' hospital readmissions and ED visits after discharge. Findings suggest that these interventions reduce adults' risk of hospital readmission and ED visits. This contradicts Desai *et al.*'s [21] findings that patient- and family-tailored discharge education showed mixed results regarding 30-day hospital readmissions and ED visits. This divergence may be attributed to Desai *et al.*'s [21] focus on ED, lack of a framework to determine family-centredness of transition processes, and inclusion of studies conducted solely in the USA.

### Implications for policy, practice, and research

The involvement of patients and families in care transition interventions may contribute to decreasing hospital readmissions and ED visits after discharge, which may lead to reducing hospitals' operational costs. Like the WHO [85], we recommend the development and execution of national quality policies to design, implement, and evaluate care transition interventions engaging, and empowering patients and families. PFC care transition interventions are variable and cannot be standardized [86]. Such interventions need to be coherent with patients' and families' values, beliefs, needs, preferences, race, age, gender, and social determinants of health. Dismantling and feasibility studies are required to gain knowledge about causality between PFC intervention exposure and outcomes, as well as PFC intervention components and outcomes, and uptake of the PFC care transition interventions [87]. Moreover, process evaluations, instead of outcomes, may capture the fidelity of the PFC care transition interventions and may provide insight into which PCC component or ITC domain, in isolation or in combination, is most effective in decreasing health care utilization [25]. Finally, this review found that PFC care transition interventions including a greater number of ITC domains significantly increased ED visits after discharge regardless of time elapsed. This is consistent with Branowicki *et al.*'s [88] conclusions. Therefore, the use of all components of the PCC and ITC framework [15, 18] presented in this paper are key to inform future policies, practice, and research. Effective discharge planning and post-discharge follow-up allow patients to detect worrisome signs and symptoms and get medical treatments and advice, which may mean returning to the ED after discharge. Even if ED visits result in hospital readmissions, these may not adequately capture deficits in the quality of care delivered during the ED visit [89]. Therefore, like Udod *et al.* [90], we recommend evaluating the outcomes of care transition interventions according to Donabedian's framework [91] by measuring patient knowledge and behaviour, patient satisfaction, and health-related quality of life [92].

### Conclusions

Various interventions involving patients and families have been developed and evaluated regarding health care utilization of adults from hospital to home. This review highlights the effectiveness of such interventions in decreasing hospital readmissions compared to usual care. The current evidence supports recommending care transition interventions that include patients who are being discharged from hospital and their families in the development and evaluation of such interventions. Further research could evaluate these in terms

of patients' and families' knowledge, and behaviour, patient satisfaction, and health-related quality of life.

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## Author contribution

Julie Chartrand and Chantal Backman designed the project and performed data acquisition. Orvie Dingwall designed and conducted the literature searches. Julie Chartrand, Brian Hutton, and Beverley Shea conducted the data analyses. Julie Chartrand, Mariève Chartrand, Ariane Poulin, and Anupriya Kakkar performed data interpretation. Julie Chartrand was the major contributor in writing the manuscript. All authors critically reviewed and edited the final manuscript.

## Supplementary data

Supplementary data is available at *IJQHC* online.

## Conflict of interests

Brian Hutton has previously received honoraria from Eversana Inc for the provision of methodologic advice related to SRs and meta-analysis. All other authors have no conflict of interest to declare.

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## Data Availability Statement

Since this is a Systematic Review, the article along with supplementary data files accessible online include all data generated during this study.

## Ethics and other permissions

Not required.

## References

1. Markiewicz O, Lavelle M, Lorencatto F *et al.* Threats to safe transitions from hospital to home: a consensus study in North West London primary care. *Br J Gen Pract* 2020;**70**:e9–19. https://doi.org/10.3399/bjgp19X707105
2. Backman C, Stacey D, Crick M *et al.* Use of participatory visual narrative methods to explore older adults' experiences of managing multiple chronic conditions during care transitions. *BMC Health Serv Res* 2018;**18**:1–0. https://doi.org/10.1186/s12913-018-3292-6
3. Werner NE, Tong M, Borkenhagen A *et al.* Performance-shaping factors affecting older adults' hospital-to-home transition success: a systems approach. *Gerontologist* 2019;**59**:303–14. https://doi.org/10.1093/geront/gnx199
4. Adhiyaman V, Chattopadhyay I. Unexpected deaths following discharge of medical patients from hospital. *Clin Med* 2019;**19**:531. https://doi.org/10.7861/clinmed.2019-0306
5. Chiou L-J, Lang H-C Potentially preventable hospital readmissions after patients' first stroke in Taiwan. *Sci Rep* 2022;**12**:3743. https://doi.org/10.1038/s41598-022-07791-3
6. El Morabet N, Uitvlugt EB, van den Bemt BJF *et al.* Prevalence and preventability of drug-related hospital readmissions: a systematic review. *J Am Geriatr Soc* 2018;**66**:602–8. https://doi.org/10.1111/jgs.15244
7. Salgado R, Moita B, Lopes S Frequency and patient attributes associated with emergency department visits after discharge: retrospective cohort study. *PLoS One* 2022;**17**:1–11. https://doi.org/10.1371/journal.pone.0275215
8. Samuel SV, Viggeswarpu S, Wilson BP *et al.* Readmission rates and predictors of avoidable readmissions in older adults in a tertiary care centre. *J Family Med Prim Care* 2022;**11**:5246–53.
9. Knighton A, Martin G, Sounderajah V *et al.* Avoidable 30-day readmissions in patients undergoing vascular surgery. *BJS Open* 2019;**3**:759–66. https://doi.org/10.1002/bjs5.50191
10. Brown CS, Montgomery JR, Neiman PU *et al.* Assessment of potentially preventable hospital readmissions after major surgery and association with public vs private health insurance and comorbidities. *JAMA Netw Open* 2021;**4**:1–13. https://doi.org/10.1001/jamanetworkopen.2021.5503
11. Braet A, Weltens C, Bruyneel L *et al.* The quality of transitions from hospital to home: A hospital-based cohort study of patient groups with high and low readmission rates. *Int J Care Coord* 2016;**19**:29–41. https://doi.org/10.1177/2053434516656149
12. Agency for Healthcare Research and Quality. *Six Domains of Healthcare Quality*. Rockville, MD, 2022. https://www.ahrq.gov/talkingquality/measures/six-domains.html ( 2022 December, date last accessed).
13. Australian Commission on Quality and Safety in Healthcare. *National Safety and Quality Primary and Community Healthcare Standards*. 2021. https://www.safetyandquality.gov.au/publications-and-resources/resource-library/national-safety-and-quality-primary-and-community-healthcare-standards (30 May 2023, date last accessed).
14. Health Quality Ontario. *Quality matters: Realizing excellent care for all*. 2017. https://www.hqontario.ca/Portals/0/documents/health-quality/realizing-excellent-care-for-all-1704-en.pdf (30 May 2023, date last accessed).
15. Sidani S, Collins L, Harbman P *et al.* Development of a measure to assess healthcare providers' implementation of patient-centered care. *Worldviews Evid Based Nurs* 2014;**11**:248–57. https://doi.org/10.1111/wvn.12047
16. World Health Organization. *Quality of Care: Overview*. Geneva: World Health Organization, 2023. https://www.who.int/health-topics/quality-of-care#tab=tab_3 (30 May 2023, date last accessed).
17. Institute for Patient- and Family-Centered Care. *Patient- and Family-Centered Care*. n.d. https://www.ipfcc.org/about/pfcc.html (27 September 2023, date last accessed).
18. Burke RE, Kripalani S, Vasilevskis EE *et al.* Moving beyond readmission penalties: Creating an ideal process to improve transitional care. *J Hosp Med* 2013;**8**:102–9. https://doi.org/10.1002/jhm.1990
19. Allen J, Hutchinson AM, Brown R *et al.* Quality care outcomes following transitional care interventions for older people from hospital to home: a systematic review. *BMC Health Serv Res* 2014;**14**:1–18. https://doi.org/10.1186/1472-6963-14-346
20. Coffey A, Mulcahy H, Savage E *et al.* Transitional care interventions: relevance for nursing in the community. *Public Health Nursing* 2017;**34**:454–60. https://doi.org/10.1111/phn.12324

21. Desai AD, Popalisky J, Simon TD *et al.* The effectiveness of family-centered transition processes from hospital settings to home: a review of the literature. *Hosp Pediatr* 2015;**5**:219–31. https://doi.org/10.1542/hpeds.2014-0097
22. Hladkowicz E, Dumitrascu F, Auais M *et al.* Evaluations of post-operative transitions in care for older adults: a scoping review. *BMC Geriatrics* 2022;**22**. https://doi.org/10.1186/s12877-022-02989-6
23. Lee JY, Yang YS, Cho E. Transitional care from hospital to home for frail older adults: a systematic review and meta-analysis. *Geriatric Nurs* 2022;**43**:64–76. https://doi.org/10.1016/j.gerinurse.2021.11.003
24. Mai Ba H, Son YJ, Lee K *et al.* Transitional care interventions for patients with heart failure: an integrative review. *Int J Environ Res Public Health* 2020;**17**:1–18. https://doi.org/10.3390/ijerph17082925
25. Rasmussen LF, Grode LB, Lange J *et al.* Impact of transitional care interventions on hospital readmissions in older medical patients: a systematic review. *BMJ Open* 2021;**11**:1–13. https://doi.org/10.1136/bmjopen-2020-040057
26. Sutton A, Clowes M, Preston L *et al.* Meeting the review family: exploring review types and associated information retrieval requirements. *Health Info Libr J* 2019;**36**:202–22. https://doi.org/10.1111/hir.12276
27. Page MJ, McKenzie JE, Bossuyt PM *et al.* The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Syst Rev* 2021;**10**:1–11. https://doi.org/10.1186/s13643-021-01626-4
28. Higgins JPT, Thomas J, Chandler J *et al.* (eds.) *Cochrane Handbook for Systematic Reviews of Interventions*, 2nd Edition. Chichester, UK: John Wiley & Sons, 2019.
29. Backman C, Chartrand J, Dingwall O *et al.* Effectiveness of person- and family-centered care transition interventions: a systematic review protocol. *Syst Rev* 2017;**6**. https://doi.org/10.1186/s13643-017-0554-z
30. Backman C, Chartrand J, Crick M *et al.* Effectiveness of person- and family-centred care transition interventions on patient- oriented outcomes: a systematic review. *Nurs Open* 2021;**8**:721–54. https://doi.org/10.1002/nop2.677
31. The EndNote Team Clarivate. EndNote, Version EndNote X9 [Computer program]. Version X9.2. 2013 Philadelphia, PA.
32. Covidence. *A Cochrane technology program*. https://www.covidence.org/ (13 November 2022, date last accessed).
33. Review Manager (RevMan) [Computer program]. The Cochrane Collaboration. Version 5.4. 2020.
34. Deeks JJ, Higgins JPT, Altman DG, Higgins JPT *et al.* (eds.). Chapter 10: Analysing data and undertaking meta-analyses. In: Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (eds), *Cochrane Handbook for Systematic Reviews of Interventions*. Cochrane: Cochrane Collaboration, 2022.
35. Aboumatar H, Naqibuddin M, Chung S *et al.* Effect of a hospital-initiated program combining transitional care and long-term self-management support on outcomes of patients hospitalized with chronic obstructive pulmonary disease: a randomized clinical trial. *JAMA* 2019;**322**:1371–80. https://doi.org/10.1001/jama.2019.11982
36. Altfeld SJ, Shier GE, Rooney M *et al.* Effects of an enhanced discharge planning intervention for hospitalized older adults: a randomized trial. *Gerontologist* 2012;**53**:430–40. https://doi.org/10.1093/geront/gns109
37. Balaban RB, Galbraith AA, Burns ME *et al.* A patient navigator intervention to reduce hospital readmissions among high-risk safety-net patients: a randomized controlled trial. *J Gen Intern Med* 2015;**30**:907–15. https://doi.org/10.1007/s11606-015-3185-x
38. Bostrom J, Caldwell J, Mcguire K *et al.* Telephone follow-up after discharge from the hospital: does it make a difference? *Appl Nurs Res* 1996;**9**:47–52. https://doi.org/10.1016/s0897-1897(96)80402-2
39. Bronstein LR, Gould P, Berkowitz SA *et al.* Impact of a social work care coordination intervention on hospital readmission: a randomized controlled trial. *Social Work* 2015;**60**:248–55. https://doi.org/10.1093/sw/swv016
40. Burns ME, Galbraith AA, Ross-Degnan D *et al.* Feasibility and evaluation of a pilot community health worker intervention to reduce hospital readmissions. *Int J Qual Healthcare* 2014;**26**:358–65. https://doi.org/10.1093/intqhc/mzu046
41. Coleman EA, Parry C, Chalmers S *et al.* The care transitions intervention. AMA Arch. *Intern Med* 2006;**166**:1822–28. https://doi.org/10.1001/archinte.166.17.1822
42. Collinsworth AW, Brown RM, James CS *et al.* International journal of COPD dovepress the impact of patient education and shared decision making on hospital readmissions for COPD. *Int J Chron Obstruct Pulmon Dis* 2018;**13**:13–1325. https://doi.org/10.2147/COPD.S154414
43. Davis KK, Mintzer M, Dennison Himmelfarb CR *et al.* Targeted intervention improves knowledge but not self-care or readmissions in heart failure patients with mild cognitive impairment. *Eur J Heart Fail* 2012;**14**:1041–9. https://doi.org/10.1093/eurjhf/hfs096
44. Henschen BL, Theodorou ME, Chapman M *et al.* An intensive intervention to reduce readmissions for frequently hospitalized patients: the CHAMP randomized controlled trial. *J Gen Intern Med* 2022;**37**:1877–84. https://doi.org/10.1007/s11606-021-07048-1
45. Kangovi S, Mitra N, Grande D *et al.* Patient-centred community health worker intervention to improve posthospital outcomes a randomized clinical trial. *JAMA Intern Med* 2014;**174**:535–43. https://doi.org/10.1001/jamainternmed.2013.14327
46. Laramee AS, Levinsky SK, Sargent J *et al.* Case management in a heterogeneous congestive heart failure population a randomized controlled trial. *Arch Intern Med* 2003;**163**:809–17. https://doi.org/10.1001/archinte.163.7.809
47. Li H, Powers BA, Melnyk BM *et al.* Randomized controlled trial of CARE: An intervention to improve outcomes of hospitalized elders and family caregivers. *Res Nurs Health* 2012;**35**:533–49. https://doi.org/10.1002/nur.21491
48. Magny-Normilus C, Nolido NV, Borges JC *et al.* Effects of an intensive discharge intervention on medication adherence, glycemic control, and readmission rates in patients with type 2 diabetes. *J Patient Saf* 2021;**17**:73–80. https://doi.org/10.1097/PTS.0000000000000601
49. Naylor M. Comprehensive discharge planning for the hospitalized elderly. *Ann Intern Med* 1994;**120**:999–1006. https://doi.org/10.7326/0003-4819-120-12-199406150-00005
50. Naylor MD, Brooten D, Campbell R *et al.* Comprehensive discharge planning and home follow-up of hospitalized elders a randomized clinical trial. *JAMA* 1999;**281**:613–20. https://doi.org/10.1001/jama.281.7.613
51. Naylor MD, Brooten DA, Campbell RL *et al.* Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. *J Am Geriatr Soc* 2004;**52**:675–84. https://doi.org/10.1111/j.1532-5415.2004.52202.x
52. Ong MK, Romano PS, Edgington S *et al.* Effectiveness of remote patient monitoring after discharge of hospitalized patients with heart failure the better effectiveness after transition-heart failure (BEAT-HF) randomized clinical trial. *JAMA Intern Med* 2016;**176**:310–8. https://doi.org/10.1001/jamainternmed.2015.7712
53. Piette JD, Striplin D, Aikens JE *et al.* Impacts of post-hospitalization accessible health technology and caregiver support on 90-day acute care use and self-care assistance: a randomized clinical trial. *Am J Med Qual* 2020;**36**:145–155. https://doi.org/10.1177/1062860620943673
54. Piette JD, Striplin D, Fisher L *et al.* Effects of accessible health technology and caregiver support posthospitalization on 30-day readmission risk: a randomized trial. *Jt Comm J Qual Patient Saf* 2020;**46**:109–17. https://doi.org/10.1016/j.jcjq.2019.10.009

55. Sales VL, Ashraf MS, Lella LK *et al.* Utilization of trained volunteers decreases 30-day readmissions for heart failure. *J Card Fail* 2013;**19**:842–50. https://doi.org/10.1016/j.cardfail.2013.10.008
56. Schneider JK, Hornberger S, Booker J *et al.* A medication discharge planning program: measuring the effect on readmissions. *Clin Nurs Res* 1993;**2**:41–53. https://doi.org/10.1177/105477389300200105
57. Schnipper JL, Samal L, Nolido N *et al.* The effects of a multifaceted intervention to improve care transitions within an accountable care organization: results of a stepped-wedge cluster-randomized trial. *J Hosp Med* 2021;**16**:15–22. https://doi.org/10.12788/jhm.3513
58. Andersen HE, Schultz-Larsen K, Kreiner S *et al.* Can readmission after stroke be prevented? *Stroke* 2000;**31**:1038–45. https://doi.org/10.1161/01.str.31.5.1038
59. Lindhardt T, Loevgreen SM, Bang B *et al.* A targeted assessment and intervention at the time of discharge reduced the risk of readmissions for short-term hospitalized older patients: a randomized controlled study. *Clin Rehabil* 2019;**33**:1431–44. https://doi.org/10.1177/0269215519845032
60. Al-Hashar A, Al-Zakwani I, Eriksson T *et al.* Impact of medication reconciliation and review and counselling, on adverse drug events and healthcare resource use. *Int J Clin Pharm* 2018;**40**:1154–64. https://doi.org/10.1007/s11096-018-0650-8
61. Fors A, Blanck E, Ali L *et al.* Effects of a person-centred telephone-support in patients with chronic obstructive pulmonary disease and/or chronic heart failure – a randomized controlled trial. *PLoS One* 2018;**13**:1–12. https://doi.org/10.1371/journal.pone.0203031
62. Hanssen TA, Nordrehaug JE, Eide GE *et al.* Does a telephone follow-up intervention for patients discharged with acute myocardial infarction have long-term effects on health-related quality of life? A randomised controlled trial. *J Clin Nurs* 2009;**18**:1334–45. https://doi.org/10.1111/j.1365-2702.2008.02654.x
63. Kazemi Majd F, Gavgani VZ, Golmohammadi A *et al.* Effect of physician prescribed information on hospital readmission and death after discharge among patients with health failure: a randomized controlled trial. *Health Informatics J* 2021;**27**:1–17. https://doi.org/10.1177/1460458221996409
64. Lembeck MA, Thygesen LC, Sørensen BD *et al.* Effect of single follow-up home visit on readmission in a group of frail elderly patients – a Danish randomized clinical trial. *BMC Health Serv Res* 2019;**19**:1–0. https://doi.org/10.1186/s12913-019-4528-9
65. Lisby M, Klingenberg M, Ahrensberg JM. Clinical impact of a comprehensive nurse-led discharge intervention on patients being discharged home from an acute medical unit: Randomised controlled trial. *Int J Nurs Stud* 2019;**100**:1–10. https://doi.org/10.1016/j.ijnurstu.2019.103411
66. Nguyen T, Nguyen TH, Nguyen PT *et al.* Pharmacist-led intervention to enhance medication adherence in patients with acute coronary syndrome in Vietnam: a randomized controlled trial. *Front Pharmacol* 2018;**9**:1–9. https://doi.org/10.3389/fphar.2018.00656
67. Nucifora G, Albanese MC, De Biaggio P *et al.* Lack of improvement of clinical outcomes by a low-cost, hospital-based heart failure management programme. *J Cardiovasc Med* 2006;**7**:614–22. https://doi.org/10.2459/01.JCM.0000237910.34000.58
68. Tu Q, Xiao LD, Ullah S *et al.* A transitional care intervention for hypertension control for older people with diabetes: a cluster randomized controlled trial. *J Adv Nurs* 2020;**76**:2696–708. https://doi.org/10.1111/jan.14466
69. Zhao Y, Kam F, Wong Y. Effects of a postdischarge transitional care programme for patients with coronary heart disease in China: a randomised controlled trial. *J Clin Nurs* 2009;**18**:2444–55. https://doi.org/10.1111/j.1365-2702.2009.02835.x
70. Boter H. Multicenter randomized controlled trial of an outreach nursing support program for recently discharged stroke patients. *Stroke* 2004;**35**:2867–72. https://doi.org/10.1161/01.STR.0000147717.57531.e5
71. Courtney M, Edwards H, Chang A *et al.* Fewer emergency readmissions and better quality of life for older adults at risk of hospital readmission: a randomized controlled trial to determine the effectiveness of a 24-week exercise and telephone follow-up program. *J Am Geriatr Soc* 2009;**57**:395–402. https://doi.org/10.1111/j.1532-5415.2009.02138.x
72. Huang TT, Assistant Professor R, Liang MSN SH, Instructor R, Huang Chang Gung TT. Care of older people: a randomized clinical trial of the effectiveness of a discharge planning intervention in hospitalized elders with hip fracture due to falling. *J Clin Nurs* 2005;**14**:1193–201. https://doi.org/10.1111/j.1365-2702.2005.01260.x
73. Shahrokhi A, Azimian J, Amouzegar A *et al.* Effect of telenursing on outcomes of provided care by caregivers of patients with head trauma after discharge. *J Trauma Nurs* 2018;**25**:21–5. https://doi.org/10.1097/JTN.0000000000000338
74. Wu Q, Zhang D, Zhao Q *et al.* Effects of transitional health management on adherence and prognosis in elderly patients with acute myocardial infarction in percutaneous coronary intervention: a cluster randomized controlled trial. *PLoS One* 2019;**14**:1–15. https://doi.org/10.1371/journal.pone.0217535
75. Cui X, Zhou X, Ma LL *et al.* A nurse-led structured education program improves self-management skills and reduces hospital readmissions in patients with chronic heart failure: a randomized and controlled trial in China. *Rural Remote Health* 2019;**19**:1–8. https://doi.org/10.22605/RRH5270
76. Harrison MB, Browne GB, Roberts J *et al.* Hospital-to-home transition. *Med Care* 2002;**40**:271–82. https://doi.org/10.1097/00005650-200204000-00003
77. Hu R, Gu B, Tan Q. The effects of a transitional care program on discharge readiness, transitional care quality, health services utilization and satisfaction among Chinese kidney transplant recipients: a randomized controlled trial. *Int J Nurs Stud* 2020;**110**:1–10. https://doi.org/10.1016/j.ijnurstu.2020.103700
78. Lainscak M, Kadivec Phd S, Kosnik M *et al.* Original study discharge coordinator intervention prevents hospitalizations in patients with COPD: a randomized controlled trial. 2013. *J Am Med Dir Assoc* 2013;**14**:450.e1–6. https://doi.org/10.1016/j.jamda.2013.03.003
79. Liang YH, Hann Lin L, Yu Chang C *et al.* Effectiveness of a nurse-led tele-homecare program for patients with multiple chronic illnesses and a high risk for readmission: a randomized controlled trial. *J Nurs Sch* 2021;**53**:161–70. https://doi.org/10.1111/jnu.12622
80. Naunton M, Peterson GM. Evaluation of home-based follow-up of high-risk elderly patients discharged from hospital. *J Pharm Pract Res* 2003;**33**:176–82. https://doi.org/10.1002/jppr2003333176
81. Pearson S, Inglis SC, McLennan SN *et al.* Prolonged effects of a home-based intervention in patients with chronic illness. *Arch Intern Med* 2006;**166**:645–50. https://doi.org/10.1001/archinte.166.6.645
82. Van Spall HG, Fu Lee S, Xie F *et al.* Effect of patient-centered transitional care services on clinical outcomes in patients hospitalized for heart failure the PACT-HF randomized clinical trial supplemental content CME quiz at jamanetwork.com/learning and CME questions page 802. *JAMA* 2019;**321**:753–61. https://doi.org/10.1001/jama.2019.0710
83. Oliveira-Filho AD, Morisky DE, Costa FA *et al.* Improving post-discharge medication adherence in patients with CVD: a pilot randomized trial. *Arq Bras Cardiol* 2014;**103**:502–12. https://doi.org/10.5935/abc.20140151
84. Lopez-Cabezas C, Falces C, Arnau A. *Randomized clinical trial of a postdischarge pharmaceutical care program vs regular follow-up in patients with heart failure Farm Hosp.* 2006;**30**:328–42. https://doi.org/10.1016/s1130-6343(06)74004-1

85. World Health Organization, Organisation for Economic Co-operation and Development, The World Bank Delivering quality health services: a global imperative for universal health coverage. https://iris.who.int/bitstream/handle/10665/272465/9789241513906-eng.pdf?sequence=1. 2018 (30 May 2023, date last accessed).
86. Jones B, James P, Vijayasiri G *et al.* Patient perspectives on care transitions from hospital to home. *JAMA Netw Open* 2022;**5**:1–13. https://doi.org/10.1001/jamanetworkopen.2022.10774
87. Markle-Reid M, Valaitis R, Bartholomew A *et al.* An integrated hospital-to-home transitional care intervention for older adults with stroke and multimorbidity: a feasibility study. *J Comorb* 2020;**10**:1–21. https://doi.org/10.1177/2235042X19900451
88. Branowicki PM, Vessey JA, Graham DA *et al.* Meta-analysis of clinical trials that evaluate the effectiveness of hospital-initiated postdischarge interventions on hospital readmission. *J Healthc Qual* 2017;**39**:354–66. https://doi.org/10.1097/JHQ.0000000000000057
89. Sabbatini AK, Kocher KE, Basu A *et al.* In-hospital outcomes and costs among patients hospitalized during a return visit to the emergency department. *JAMA* 2016;**315**:663–71. https://doi.org/10.1001/jama.2016.0649
90. Udod S, Lobchuk M, Avery L *et al.* Using the Donabedian framework to examine transitional care for cardiac patients and family caregivers. *Leadersh Health Serv* 2022;**35**:285–305. https://doi.org/10.1108/LHS-10-2021-0084
91. Donabedian A. Evaluating the quality of medical care. *Milbank Q* 1966;**44**:166–206. https://doi.org/10.2307/3348969
92. Donabedian A. Quality of care: problems of measurement. II: some issues in evaluating the quality of nursing care. *Am J Public Health* 1969;**59**:1833–6. https://doi.org/10.2105/ajph.59.10.1833

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