The Effectiveness Of Nurse- Interventions To Reduce Adverse Outcomes Among Older Patients Following Emergency Department Discharge A Systematic Review

Fahad Mubark H. Alotibi[1],Salman Ali A. Alotaibi[1],Saud Humoud Saud Alosaimi[2], Mohammed Naif Zaid Alotaibi[2], Nawaf naif zeid alotaibi[2],Abdulaziz Fihan Saud Alosimi[2], Naif Shulaywih Khalf Alotaibi[2], Adel Mohammad Saud Alosaimi[2], Raed Hamoud S Alosaimi[2],Saad Abdullah Abdul Rahman Al-Ruwais[2],Yaser Sultan Gaze Alosaimi[2],Manal Awadh Alotaibi Alotaibi[2],Ghalia Ghazai Nawar Alotaibi[2], Abdullah Essa Saleh Alsubhi[1], Meshal Mater Mofareh Alotaibi[3],Saud Abdulaziz Mohammed Alosaimi[2]

Abstract

Older adults discharged from the Emergency Department (ED) are at increased risk of adverse outcomes such as hospital readmissions, functional decline, and falls. Nurse-led interventions have been proposed as a promising approach to mitigate these risks and improve post-discharge care for older patients. However, the effectiveness of nurse-led interventions in this context remains unclear due to heterogeneity in study designs and outcomes assessed. A systematic review was conducted to evaluate the effectiveness of nurse-led interventions in reducing adverse[1] outcomes among older patients following ED discharge. Electronic databases including PubMed, Embase, and Cochrane Library were searched for relevant studies published up to 2024. Studies meeting predefined inclusion criteria were selected, and data were extracted using a standardized form. The methodological quality of included studies was assessed, and a narrative synthesis approach was employed to summarize findings. A total of 29 studies were included in the review, encompassing various nurse-led interventions targeting older adults following ED discharge. Interventions ranged from comprehensive geriatric assessments to transitional care programs, falls prevention initiatives, and self-management empowerment programs. Outcomes assessed included hospital readmissions, functional decline, falls, healthcare utilization, and patient satisfaction. Findings were mixed, with some studies demonstrating positive effects of nurse-led interventions on reducing hospital readmissions, improving functional outcomes, and enhancing patient satisfaction, while others reported null findings. Heterogeneity in study designs, intervention components, and outcome

[1]Al-Bajadia General Hospital, Al-Bajadia, Riyadh, Saudi Arabia.

[2]Al Dawadmi General Hospital, Al Dawadmi, Riyadh, Saudi Arabia.

[3]Al-Quwayiyah General Hospital, Al-Quwayiyah, Riyadh, Saudi Arabia

*Corresponding Author e-mail: famalotibi@moh.gov.sa

measures limited the ability to conduct meta-analysis. Nurse-led interventions hold promise in improving outcomes for older adults following ED discharge, but their effectiveness remains uncertain due to the variability in study methodologies and outcomes assessed.

1. Introduction

The transition from Emergency Department (ED) care to post-discharge settings represents a critical phase in the healthcare journey for older adults [1]. Older patients are particularly vulnerable during this transition, facing increased risks of adverse outcomes such as hospital readmissions, functional decline, and healthcare utilization [2,3]. Nurse-led interventions have emerged as promising approaches to address the complex needs of this population and mitigate adverse outcomes following ED discharge [4,5].

The importance of effective post-discharge care for older adults is underscored by the demographic shift towards an aging population worldwide [6]. With aging comes an increased prevalence of chronic conditions, functional impairments, and polypharmacy, placing older adults at heightened risk of healthcare transitions and subsequent adverse events [7,8]. As a result, there is a growing recognition of the need for comprehensive transitional care interventions to optimize outcomes and enhance the quality of care for older adults post-ED discharge [9].

Nurses, with their holistic approach to patient care and expertise in care coordination, play a central role in facilitating successful transitions for older adults from acute care settings to home or community-based care [10,11]. Nurse-led interventions encompass a wide range of strategies, including comprehensive geriatric assessments, transitional care programs, falls prevention initiatives, medication management, and patient education [12]. These interventions aim to address the multifaceted needs of older adults, promote continuity of care, and reduce the risk of adverse outcomes post-discharge.

Despite the growing interest in nurse-led interventions, there remains a need to systematically evaluate their effectiveness in reducing adverse outcomes among older patients following ED discharge [13,14]. While individual studies have reported promising results, there is considerable variability in study designs, intervention components, and outcome measures, making it challenging to draw definitive conclusions. A systematic review of the existing literature is therefore warranted to synthesize the evidence, identify gaps in knowledge, and inform future research and clinical practice in this important area.

This systematic review aims to provide a comprehensive overview of nurse-led interventions targeting older patients following ED discharge and their impact on adverse outcomes such as hospital readmissions, functional decline, healthcare utilization, and patient satisfaction. By synthesizing the available evidence, this review seeks to elucidate the effectiveness of nurse-led interventions in improving post-discharge care for older adults and inform the development of tailored interventions to optimize outcomes in this vulnerable population.

2. Methodology

2.1. Study Selection

A systematic search of electronic databases including PubMed, Embase, and Cochrane Library was conducted to identify relevant studies published up to 2024. The search strategy utilized a combination of keywords and Medical Subject Headings (MeSH) terms related to nurse-led interventions, older adults, Emergency Department discharge, and adverse outcomes. Additionally, reference lists of relevant articles and systematic reviews were manually searched for additional studies.

Inclusion Criteria: Studies were included if they met the following criteria: (1) evaluated nurse-led interventions targeting older patients (aged 65 years and above) following Emergency Department discharge; (2) employed quantitative study designs including randomized controlled trials, observational studies, quasi-experimental designs, or interventional trials; (3) assessed outcomes related to adverse events such as hospital readmissions, functional decline, falls, healthcare utilization, or patient satisfaction; and (4) were published in English.

2.2. Exclusion Criteria

Studies were excluded if they: (1) focused solely on pediatric populations or adults younger than 65 years; (2) did not involve nurse-led interventions or did not specify the involvement of nurses in the intervention delivery; (3) were qualitative studies, case reports, or reviews without original data; (4) did not report relevant outcomes related to adverse events following ED discharge; or (5) were not available in full-text format.

2.3. Study Selection Process

Two independent reviewers screened titles and abstracts of identified records to assess eligibility based on the inclusion and exclusion criteria. Full-text articles of potentially eligible studies were then reviewed to determine final inclusion. Discrepancies between reviewers were resolved through consensus or consultation with a third reviewer.

2.4. Data Extraction:

A standardized data extraction form was developed to collect relevant information from included studies. Data extracted included study characteristics (author, year, country), study design, participant characteristics (age, sample size), intervention details, comparison group, outcomes assessed, and main results on outcomes of interest. Data extraction was performed independently by two reviewers, with any discrepancies resolved through discussion or consultation with a third reviewer.

2.5. Data Synthesis

Due to anticipated heterogeneity in study designs, interventions, and outcome measures, a narrative synthesis approach was utilized to summarize findings from included studies. Results were synthesized descriptively, organized by outcome categories, and presented in tabular format.
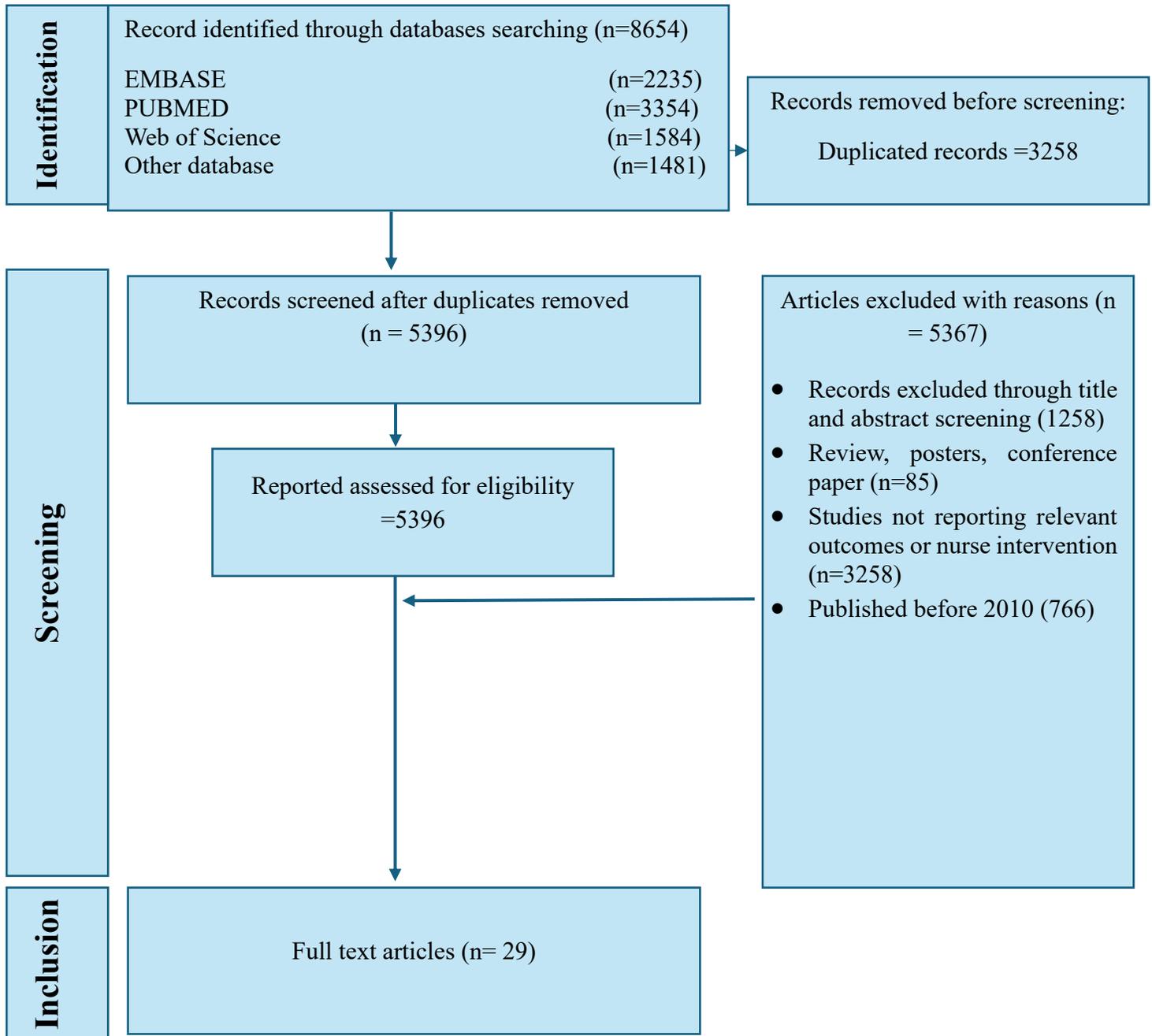
3. Results

The systematic review and meta-analysis aimed to elucidate the effectiveness of nurse-intervention in reduction of adverse outcomes among older patients, providing insights into the multifaceted challenges hindering screening uptake and informing tailored interventions and policy recommendations. A comprehensive literature search across electronic databases and grey literature sources yielded a total of 29 relevant studies, encompassing diverse settings and methodologies [15,16,24–33,17,34–42,18–24] (Figure 1).

The systematic review summarized findings from various studies evaluating nurse-led interventions aimed at reducing adverse outcomes among older patients following Emergency Department (ED) discharge. Table 1 provides a comprehensive overview of the included studies, detailing key aspects such as author, year of publication, country, study design, population characteristics, exclusion criteria, intervention strategies, and outcomes evaluated.

The review included studies spanning different countries and employing various study designs, including observational studies, interventional trials, randomized controlled trials, and quasi-experimental designs. The populations studied encompassed older adults across different age ranges and health conditions, including frail elderly patients, community-

dwelling older adults, and those presenting to the ED with specific medical issues such as falls or chronic conditions.

Figure 1: The PRISMA figures showing the steps to choose the studies for systematic review

Identification	**Record identified through databases searching (n=8654)**

EMBASE (n=2235)
PUBMED (n=3354)
Web of Science (n=1584)
Other database (n=1481)

Records removed before screening:

Duplicated records =3258

Screening

Records screened after duplicates removed (n = 5396)

Articles excluded with reasons (n = 5367)

- Records excluded through title and abstract screening (1258)
- Review, posters, conference paper (n=85)
- Studies not reporting relevant outcomes or nurse intervention (n=3258)
- Published before 2010 (766)

Reported assessed for eligibility =5396

Inclusion

Full text articles (n= 29)

Table 1: Summary of Studies							
Author	Year of publication	Country	Study design	Population	Exclusion criteria	Intervention	Outcomes evaluated
Clift E et al. [15]	2015	Britany	Observational	Older patients (>65 years) attending ED	Patients with cognitive impairment	Establishment of a specialist interdisciplinary team and assessment lounge	- Re-presentation rates of patients seen by the specialist team vs. those not referred- Patient satisfaction scores
Ekerstad N et al. [16]	2018	Sweden	Interventional	Frail elderly patients (≥75 years)	Not specified	Direct admittance to a comprehensive geriatric assessment (CGA) unit	Patient satisfaction shortly after discharge from hospital
Lieberman T et al. [17]	2020	Australia	Interventional	Older adults presenting to the ED	Not specified	Placement of a Specialist in the ED to coordinate care for older adults	- 30-day revisit and hospitalization rates - Patient and family satisfaction scores
Barker A et al. [18]	2019	Australia	Randomized trial	Community-dwelling older adults (≥60 years)	Cognitive impairment	Telephone-based patient-centered program (RESPOND)	- Falls and fall injuries per person-year over 12-month study period
Chu M et al. [19]	2017	Hong Kong	Randomized trial	Community-dwelling older adults (≥65 years)	Not specified	Occupational therapy fall reduction home visit program	- Percentage of fallers over 1 year - Number of falls over 6 months
Harper K et al. [20]	2017	Australia	Randomized trial	Older patients presenting to ED with a fall	Not specified	Multifactorial intervention for falls prevention	Frequency of secondary falls in older patients presenting to ED with a fall
Matchar D et al. [21]	2017	Singapore	Randomized trial	Elderly Singaporeans (≥65 years)	Not specified	Tailored program of physical therapy	- Occurrence of at least 1 fall during the 9-month study period -

							Change in Short Physical Performance Battery (SPPB) score
Russell M et al. [22]	2010	Australia	Randomized trial	Older people (≥60 years) presenting to ED	Unable to follow simple instructions or walk independently	Referral-based targeted multifactorial falls prevention intervention	- Number of fallers over 12-month follow-up period - Number of participants sustaining an injury from a fall
Heeren et al. [23]	2019	Belgium	Quasi-experimental	Dutch-speaking, community-dwelling ED patients aged 70 years or older	Not provided	Comprehensive geriatric assessment (CGA) based nurse-led care model (URGENT) in the ED	Unplanned 90-day ED readmission, ED length of stay, hospitalization rate, in-hospital length of stay, 90-day higher level of care, 90-day functional decline, 90-day post-hospitalization mortality
Finlayson et al. [24]	2018	Australia	Randomized controlled trial	Hospitalized older adults with medical diagnoses and risk factors for readmission	Not provided	Transitional care interventions including exercise programs, nurse home visits, and telephone follow-up	Unplanned hospital readmissions within 28 days, 12 weeks, and 24 weeks following discharge
Biese et al. [25]	2014	USA	Randomized controlled trial	Patients aged 65 and older discharged to home from an academic ED	Not provided	Post discharge telephone call-mediated intervention by a nurse	Return ED visits and/or hospitalizations within 35 days of the index

							ED visit, patient satisfaction
Pedersen et al. [26]	2016	Denmark	Quasi-randomized controlled trial	Nursing-home residents aged 75 years or older admitted to hospital with specific medical diagnoses	Not provided	Early geriatric follow-up visit by a nurse and doctor vs. follow-up visit by general practitioner	30-day readmission rate, length of hospital stay, mortality, intervention components
Adamuz et al. [27]	2015	Spain	Randomized controlled trial	Immunocompetent adult patients hospitalized for community-acquired pneumonia	Not provided	Individualized educational program vs. conventional information	Frequency of additional healthcare visits and rehospitalizations within 30 days of hospital discharge
Arendts et al. [28]	2018	Australia	Randomized controlled trial	Very high-risk adults aged 65 and older discharged from ED	Not provided	Post discharge patient-centered intervention vs. standard care	Unplanned ED reattendance within 28 days, 28-day and 1-year hospital usage, institutionalization, death
Auger et al. [29]	2018	USA	Randomized controlled trial	Children hospitalized on various services	Excluded children with skilled home nursing services	Single post discharge nurse-led home visit vs. no visit	30-day unplanned, urgent health care reuse, parental coping, days until return to normal routine, recall of clinical warning signs
Chen et al. [30]	2019	China	Randomized controlled trial	Patients admitted with decompensated chronic heart failure	Not provided	Short message service (SMS) vs. structured telephone support (STS) vs. usual care	180-day composite event (mortality or readmission), self-care behavior, quality of life

Chen et al. [31]	2018	China	Not provided	First-time stroke survivors	Not provided	Patient-centered self-management empowerment intervention (PCSMEI) vs. routine care	Self-efficacy, activities of daily living (ADL), rehospitalization
Coskun S et al. [32]	2022	Turkey	Randomized controlled trial	Elderly patients undergoing open heart surgery	Not provided	Nurse Led Transitional Care Model based on Transitional Care Model until post-discharge 9th week	Functional autonomy, quality of life levels, readmission, rehospitalization rates
Danielsen S et al. [33]	2020	Norway	Prospective randomized controlled trial	Patients undergoing aortic valve replacement (AVR)	Not provided	Structured telephone follow-up (TFU) and 24/7 hotline	30-day all-cause readmission (30-DACR), symptoms of anxiety and depression, perceived health state, proportion of avoidable vs. unavoidable readmissions after AVR
Dawson N et al. [34]	2021	USA	Prospective randomized controlled trial	Patients at high risk of readmission after discharge	Not provided	Home telemonitoring vs. standard care	Composite endpoint of hospital readmission or death within 30 days after discharge, emergency department visit within 30 days after discharge
Englander H et al. [35]	2014	USA	Clustered randomized	Hospitalized low-income adults admitted	Uninsured or public insurance	Multicomponent transitional care	30-day inpatient readmission, emergency department

			controlled trial	to general medicine or cardiology		improvement program	use, transitional care quality, mortality
Finlayson K et al. [24]	2018	Australia	Randomized controlled trial	Older adults admitted with medical diagnoses and at least one risk factor for readmission	Not provided	Standard care, exercise program only, Nurse Home visit and Telephone follow-up (N-HaT), Exercise program and Nurse Home visit and Telephone follow-up (ExN-HaT)	Unplanned hospital readmissions within 28 days, 12 weeks, and 24 weeks following discharge
Gardner R et al. [36]	2020	USA	Pragmatic trial	Residents discharged from skilled nursing facilities (SNFs) to the community after index hospitalization	Not provided	Adapted Project Re-Engineered Discharge (RED) for SNFs	Hospital readmission within 30 days after SNF discharge
Gilbert T et al. [37]	2014	USA	Randomized controlled trial	Ethnically and linguistically diverse older patients admitted to a safety-net hospital	Spoke English, Spanish, or Chinese	In-hospital, one-on-one, self-management education by a dedicated language-concordant registered nurse combined with telephone follow-up after discharge	Readmissions or emergency department visits within 30, 90, and 180 days after initial hospital discharge
Hegelund A et al. [39]	2020	Denmark	Randomized controlled trial	Patients admitted with acute exacerbation in chronic obstructive pulmonary disease (COPD)	Not provided	Personalized, stepwise action plan with follow-up support	Incidence of COPD-related readmissions, symptom burden including anxiety and depression levels at 3-month follow-up

Hengartner M et al. [40]	2016	Switzerland	Randomized controlled trial	Psychiatric inpatients aged 18-64 years with ≤3 hospitalizations within the last 3 years and GAF score ≤60	Not provided	Brief case management post-discharge intervention vs. treatment as usual	Rate and duration of rehospitalization, mental health, psychosocial functioning
Hu R et al. [42]	2020	China	Prospective randomized controlled trial	Patients admitted for kidney transplantation	Not provided	Transitional care intervention vs. routine care	Discharge readiness, transitional care quality, hospital readmission, emergency room visit, patient satisfaction
Jayaram L et al. [41]	2022	Australia	Randomized controlled trial	Adults admitted with asthma	Not provided	Nurse-led Asthma Care Transition Team (ACTT) vs. usual care alone (UC)	Asthma control at 12 weeks posthospital discharge, number of patients using a Written Action Plan (WAP), compliance with inhaler therapy at 12 weeks, readmission rates at 6 months

Intervention strategies varied across studies and included multidisciplinary team approaches, comprehensive geriatric assessments, specialized care coordination in the ED, telephone-based patient-centered programs, home visit programs, tailored interventions for falls prevention, transitional care interventions, and self-management empowerment programs, among others.

Outcomes evaluated in the included studies were diverse and included measures such as re-presentation rates, patient satisfaction scores, falls and fall injuries, percentage of fallers, hospitalization rates, 30-day readmission rates, mortality, functional decline, quality of life, and healthcare utilization metrics such as emergency department visits and hospital readmissions.

The interventions assessed in Table 2 targeted various outcomes pertinent to the well-being of older patients following Emergency Department (ED) discharge. Patient satisfaction emerged as a crucial aspect across several studies. Clift et al. (2015) highlighted higher satisfaction levels among patients seen by a specialist interdisciplinary team, echoing the significance of specialized care in meeting patient needs [15]. Similarly, Ekerstad et al. (2018) noted increased satisfaction among patients admitted to a comprehensive geriatric assessment (CGA) unit, emphasizing the value of comprehensive, tailored care approaches [16]. Additionally, Liberman et al. (2020) reported high patient and family satisfaction with the presence of a Specialist in the ED, indicating the positive impact of coordinated care efforts on patient experiences [17].

In terms of fall prevention, Barker et al. (2019) demonstrated success with a telephone-based patient-centered program (RESPOND), leading to a reduction in falls and fall injuries [18]. Chu et al. (2017) supported this notion with findings showing a decrease in future falls among participants receiving an occupational therapy fall reduction home visit program [19]. Matchar et al. (2017) did not find a significant reduction in falls but noted fewer injurious falls and less deterioration in physical performance among participants in the intervention group [21]. However, Harper et al. (2017) did not observe a significant benefit from a multifactorial intervention for falls prevention [20]. In addition, Russell M et al (2010) also reported that there is no significant reduction in subsequent falls or fall injuries observed in intervention group [22].

Regarding healthcare utilization and transitional care, Finlayson et al. (2018) demonstrated reduced hospital readmission rates post-discharge with transitional care interventions [24]. In addition, Heeren et al. (2019) reported that URGENT model shortened ED LOS, increased hospitalization rate with no significant effect on unplanned ED readmissions [23]. Moreover, Pedersen et al (2016) showed that lower 30-day readmission rate with geriatric follow-up, communication and medication changes were common intervention elements [26] as well as studies of Adamuz et al. (2015) [27], Gardner R et al. (2020) [36], Finlayson K et al. (2018) [24], Hegelund A et al. (2020) [39]. In addition, Arendts et al. reported a small and nonsignificant reductions in ED reattendance [28]. Conversely, Biese et al. (2014) [25], Hengartner M et al. (2016) [40], and Gilbert T et al. (2014) [37] did not find a significant reduction in return ED visits or hospitalizations with a post-discharge telephone call-mediated intervention by a nurse.

Moreover Arendts et al. (2018) reported that there is no significant difference in 28-day and 1-year hospital usage, institutionalization, and death with interventions [28]. Auger et al. (2018) reported higher rates of 30-day post-discharge unplanned health care reuse, more clinical warning signs recalled in intervention group [29] however, Chen et al (2019) [30], Chen et al (2018) [31], Dowson N et al. (2021) [34] and Coskun S et al. (2022) [32] reported reduced 180-day composite event and improved self-care behavior however, Danielsen S et al. (2020) [33], Englander H et al. (2014) [35] reported no significant difference in 30-day readmission or ED use, nor in improved transitional care quality.

4. Discussion

Nurse-led interventions have gained prominence in healthcare, particularly in managing the complex needs of older patients following Emergency Department (ED) discharge [43]. These interventions encompass a spectrum of strategies aimed at enhancing patient outcomes and optimizing transitional care [44]. With an aging population and increasing healthcare demands, there is growing interest in exploring the effectiveness of nurse-led interventions in reducing adverse outcomes among older adults post-ED discharge [45].

Several studies highlighted the importance of patient satisfaction as a crucial outcome of nurse-led interventions. Clift et al. (2015) underscored the significance of specialized care teams in enhancing patient satisfaction levels [15]. Similarly, Ekerstad et al. (2018) emphasized the value of comprehensive geriatric assessments in improving patient experiences [16]. Liberman et al. (2020) further supported these findings by reporting high satisfaction levels with the presence of specialized care coordination in the ED [17]. These findings align with previous research emphasizing the positive impact of nurse-led interventions on patient satisfaction [46,47].

Table 2: Detailed Intervention and Results

Author	Year	Intervention details	Comparison	Measurement of patient experience	Sample size	Main results on outcome
Clift E et al. [15]	2015	Establishment of a specialist interdisciplinary team and assessment lounge	Patients receiving routine care vs. those seen by the specialist team	Satisfaction questionnaire completed by patients	826 patients assessed by the team: 4340 receiving routine care	Lower readmission rate for patients seen by the specialist team; High patient satisfaction with care received
Ekerstad N et al. [16]	2018	Direct admittance to a comprehensive geriatric assessment (CGA) unit	CGA unit group vs. conventional care group	Satisfaction questionnaire shortly after discharge from hospital	139 patients (72 CGA unit, 67 conventional care)	Higher patient satisfaction in CGA unit group compared to conventional care group
Liberman T et al. [17]	2020	Placement of a Specialist in the ED to coordinate care for older adults	GAP-ED intervention group vs. historical usual-care group	Patient and family satisfaction	Not specified	Effective in reducing hospitalization in older adults revisiting the ED, High patient and family satisfaction with the presence of GAP-ED Specialist
Barker A et al. [18]	2019	Telephone-based patient-centered program (RESPOND)	RESPOND (intervention) vs. usual care (control)	Not specified	430 participants (217 RESPOND, 213 usual care)	Reduced falls and fall injuries in RESPOND group compared to usual care group
Chu M et al. [19]	2017	Occupational therapy fall reduction home visit program	Intervention group (received OT visit) vs. Control group (well-wishing visit)	Not specified	311 participants (204 intervention, 107 control)	Reduced future falls at 6 months in intervention group compared to control group

Harper K et al. [20]	2017	Multifactorial intervention for falls prevention	Intervention group vs. Control group	Not specified	Not specified	No significant benefit of intervention observed in reducing frequency of secondary falls
Matchar D et al. [21]	2017	Tailored program of physical therapy	Intervention group vs. Control group	Not specified	354 participants (intervention group)	No statistically significant difference in occurrence of falls, but fewer individuals with injurious falls and less deterioration in physical performance in intervention group
Russell M et al. [22]	2010	Referral-based targeted multifactorial falls prevention intervention	Intervention group vs. Control group	Not specified	361 participants (standard care), 351 participants (intervention)	No significant reduction in subsequent falls or fall injuries observed in intervention group
Heeren et al. [23]	2019	Comprehensive geriatric assessment (CGA) based nurse-led care model (URGENT) in the ED	Usual care vs. URGENT model	Not provided	Not provided	URGENT model shortened ED LOS, increased hospitalization rate, no significant effect on unplanned ED readmissions
Finlayson et al. [24]	2018	Transitional care interventions including exercise programs, nurse home visits, and	Various intervention components	Not provided	222	Reduced hospital readmission rates within 28 days, 12 weeks, and 24 weeks post-discharge

		telephone follow-up				
Biese et al. [25]	2014	Post discharge telephone call-mediated intervention by a nurse	Telephone call vs. no call	Patient satisfaction survey calls	120	Expedited post-ED visit follow-up with medical providers, no significant reduction in return ED visits or hospitalizations
Pedersen et al. [26]	2016	Early geriatric follow-up visit by a nurse and doctor vs. follow-up visit by general practitioner	Geriatric follow-up vs. GP follow-up	Not provided	648	Lower 30-day readmission rate with geriatric follow-up, communication and medication changes were common intervention elements
Adamuz et al. [27]	2015	Individualized educational program vs. conventional information	Educational program vs. conventional info	Not provided	207	Reduced frequency of additional healthcare visits and rehospitalizations within 30 days of discharge
Arendts et al. [28]	2018	Post discharge patient-centered intervention vs. standard care	Intervention vs. standard care	Not provided	164	Small and nonsignificant reductions in ED reattendance, no significant difference in 28-day and 1-year hospital usage, institutionalization, death
Auger et al. [29]	2018	Single post discharge nurse-led home visit vs. no visit	Home visit vs. no visit	Parental coping, recall of clinical warning signs	1500	Higher rates of 30-day post-discharge unplanned health care reuse, more clinical warning signs recalled in intervention group

Chen et al. [30]	2019	Short message service (SMS) vs. structured telephone support (STS) vs. usual care	SMS vs. STS vs. usual care	Not provided	767	Reduced 180-day composite event and improved self-care behavior with SMS intervention, as effective as STS
Chen et al. [31]	2018	Patient-centered self-management empowerment intervention (PCSMEI) vs. routine care	PCSMEI vs. routine care	Not provided	144	Higher self-efficacy and ADL at discharge and 3 months post-discharge, lower rehospitalization rate at 1- and 3-months post-discharge with PCSMEI
Coskun S et al. [32]	2022	Nurse Led Transitional Care Model based on Transitional Care Model until post-discharge 9th week	Transitional Care Model vs. standard care	Functional autonomy, quality of life levels, readmission, rehospitalization rates	66	Higher functional autonomy and quality of life, lower readmission and rehospitalization rates in intervention group
Danielsen S et al. [33]	2020	Structured telephone follow-up (TFU) and 24/7 hotline	TFU and hotline vs. usual care	Symptoms of anxiety and depression, perceived health state	288	No significant reduction in 30-day all-cause readmission rates after AVR, reduced symptoms of anxiety after surgery
Dawson N et al. [34]	2021	Home telemonitoring	Home telemonitoring vs. standard care	Composite endpoint of hospital readmission or death, emergency department visit	1380	Reduced risk of readmission or death within 30 days after discharge with home telemonitoring

Englander H et al. [35]	2014	Multicomponent transitional care improvement program	Multicomponent intervention vs. standard care	30-day inpatient readmission, emergency department use	382	No significant difference in 30-day readmission or ED use, improved transitional care quality
Finlayson K et al. [24]	2018	Standard care, exercise program only, Nurse Home visit and Telephone follow-up (N-HaT), Exercise program and Nurse Home visit and Telephone follow-up (ExN-HaT)	Various intervention components	Unplanned hospital readmissions within 28 days, 12 weeks, and 24 weeks following discharge	222	Lower readmission rates with N-HaT and ExN-HaT groups compared to standard care
Gardner R et al. [36]	2020	Adapted Project Re-Engineered Discharge (RED) for SNFs	RED intervention vs. usual care for SNFs	Hospital readmission within 30 days after SNF discharge	Not provided	Reduced hospital readmission rates after SNF discharge with adapted RED intervention
Gilbert T et al. [37]	2014	In-hospital, one-on-one, self-management education by a dedicated language-concordant registered nurse combined with telephone	Nurse-led intervention vs. usual care	Readmissions or emergency department visits within 30, 90, and 180 days after discharge	700	No reduction in readmissions or ED visits, possible increase in ED visits

		follow-up after discharge			
Hegelund A et al. [39]	2020	Personalized, stepwise action plan with follow-up support	Action plan vs. usual care	COPD-related readmissions, symptom burden including anxiety and depression levels	75	Reduced incidence of COPD-related readmissions, significant improvement in symptom burden and quality of life
Hengartner M et al. [40]	2016	Brief case management post-discharge intervention vs. treatment as usual	Post-discharge intervention vs. treatment as usual	Rate and duration of rehospitalization, mental health, psychosocial functioning	151	No significant difference in rehospitalization rate, slight increase in social functioning, no improvement in mental health or quality of life
Hu R et al. [42]	2020	Transitional care intervention vs. routine care	Transitional care intervention vs. routine care	Discharge readiness, transitional care quality, hospital readmission, emergency room visit, patient satisfaction	220	Improved discharge readiness and transitional care quality, lower readmission and ER visit rates, higher patient satisfaction
Jayaram L et al. [41]	2022	Nurse-led Asthma Care Transition Team (ACTT) vs. usual care alone (UC)	Nurse-led ACTT vs. usual care alone	Asthma control, use of Written Action Plan, compliance with inhaler therapy, readmission rates	60	Better asthma control and self-management skills, trend towards reduced readmissions with ACTT compared to UC

Effective fall prevention strategies are essential for safeguarding the well-being of older adults, given the significant risks associated with falls and their potential adverse consequences [48,49]. Falls represent a prevalent and serious public health concern among the elderly population worldwide. Research indicates that falls are one of the leading causes of injury-related morbidity and mortality among older adults [50–52]. In the United States alone, millions of older adults experience falls each year, with a substantial proportion resulting in severe injuries, such as fractures, head trauma, and hip fractures, leading to hospitalizations and long-term disability [53,54]. The impact of falls extends beyond physical injuries, often resulting in psychological distress, loss of independence, decreased quality of life, and increased healthcare utilization and costs [50]. Moreover, older adults who experience falls may develop fear of falling, leading to activity restriction and further functional decline, exacerbating their vulnerability to future falls [55].

Given the multifactorial nature of falls in older adults, effective fall prevention requires a comprehensive approach addressing various risk factors, including impaired balance and gait, muscle weakness, medication side effects, environmental hazards, and chronic health conditions [56]. Furthermore, individualized interventions tailored to the specific needs and characteristics of older adults are essential for maximizing effectiveness.

Barker et al. (2019) and Chu et al. (2017) demonstrated the effectiveness of telephone-based and occupational therapy fall reduction programs, respectively, in reducing falls and fall injuries among older adults [18,19]. These findings highlight the potential of multifaceted interventions incorporating exercise, education, and environmental modifications in mitigating fall risk [57,58]. However, Matchar et al. (2017) and Harper et al. (2017) did not observe significant reductions in falls with their interventions, underscoring the complexity of fall prevention efforts and the need for tailored approaches to address individual patient needs [20,21].

Moreover, Russell et al. (2010) reported no significant reduction in subsequent falls or fall injuries observed in their intervention group, further emphasizing the challenges associated with implementing effective fall prevention strategies [22]. These findings underscore the importance of ongoing research and innovation in developing evidence-based interventions to address the complex and multifactorial nature of falls among older adults.

Various nurse-led interventions aimed at reducing healthcare utilization and improving transitional care exhibited mixed results, underscoring the complexity of addressing the needs of older adults following Emergency Department (ED) discharge [59]. Transitional care interventions are crucial for ensuring smooth transitions between care settings and minimizing adverse outcomes such as hospital readmissions and emergency department visits [60]. However, the effectiveness of such interventions depends on various factors, including the characteristics of the intervention, the population served, and the healthcare system's context.

Finlayson et al. (2018) demonstrated promising results with transitional care interventions, reporting reduced hospital readmission rates among older adults post-discharge [24]. These findings highlight the potential benefits of comprehensive transitional care approaches incorporating components such as nurse home visits and telephone follow-up [59]. Similarly,

Heeren et al. (2019) reported favorable outcomes, including shortened ED length of stay and increased hospitalization rates, with a specific care model emphasizing comprehensive geriatric assessment (CGA) and nurse-led care in the ED [23]. These findings suggest that tailored interventions addressing the unique needs of older adults can positively impact healthcare utilization and outcomes.

However, not all nurse-led interventions yielded significant improvements in healthcare utilization metrics. Arendts et al. (2018) did not find significant reductions in ED reattendance rates with their intervention, indicating potential limitations or ineffectiveness of the intervention components [18]. Similarly, Biese et al. (2014) and Hengartner et al. (2016) did not observe significant reductions in return ED visits or hospitalizations with their interventions [25,40]. These findings underscore the challenges in implementing effective transitional care models and the need for further refinement and adaptation to diverse patient populations and healthcare settings.

The mixed results observed across studies highlight the complexity of transitional care interventions and the multifactorial nature of factors influencing healthcare utilization post-discharge. Factors such as patient comorbidities, social support networks, healthcare access, and care coordination processes can significantly impact the success of transitional care interventions [61,62]. Therefore, future research should focus on identifying key components of effective transitional care models and exploring strategies to address barriers to implementation and scalability.

Several studies evaluated additional outcomes such as healthcare utilization, mortality, and self-care behavior. Auger et al. (2018) reported higher rates of post-discharge unplanned healthcare reuse in their intervention group [29], while Chen et al. (2019) and Chen et al. (2018) demonstrated improvements in self-care behavior [30,31]. However, Danielsen et al. (2020) and Englander et al. (2014) did not find significant differences in readmission rates or transitional care quality with their interventions [33,35]. These findings highlight the diverse nature of outcomes assessed in nurse-led interventions and underscore the need for comprehensive evaluation frameworks [47].

Despite the valuable insights gained from the included studies, several limitations should be acknowledged when interpreting the findings. Firstly, the heterogeneity in study designs, populations, interventions, and outcome measures across the included studies may limit the comparability and generalizability of the results. Variations in healthcare systems, cultural contexts, and resource availability among different countries may also influence the effectiveness of nurse-led interventions and their impact on outcomes. Furthermore, the majority of the studies relied on self-reported measures, such as patient satisfaction surveys, which are subject to response bias and may not capture objective indicators of healthcare utilization or clinical outcomes accurately. Additionally, many studies had relatively small sample sizes, which may limit the statistical power to detect significant differences in outcomes, particularly for rare events such as hospital readmissions or adverse events. Another potential limitation is the short follow-up duration in some studies, which may not capture the longer-term effects of nurse-led interventions on outcomes such as hospital readmissions or

functional decline. Longer-term follow-up periods would provide a more comprehensive understanding of the sustained impact of these interventions over time. Moreover, several studies lacked detailed descriptions of the intervention protocols or fidelity monitoring, making it challenging to assess the consistency and implementation of the interventions across different settings. Variability in the delivery of nurse-led interventions may influence their effectiveness and limit the reproducibility of results in real-world practice. Finally, the possibility of publication bias should be considered, as studies with positive results may be more likely to be published than those with neutral or negative findings. This bias could potentially overestimate the overall effectiveness of nurse-led interventions in reducing adverse outcomes among older patients following Emergency Department discharge.

5. Conclusion

Nurse-led interventions play a vital role in addressing the complex needs of older patients following ED discharge. While interventions have shown promise in enhancing patient satisfaction and reducing falls, mixed results have been observed in healthcare utilization and transitional care outcomes. These findings underscore the importance of tailored and multidisciplinary approaches in optimizing post-discharge care for older adults. Future research should focus on refining intervention strategies and evaluating long-term outcomes to enhance the effectiveness of nurse-led interventions in improving the well-being of older patients post-ED discharge.

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