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Fall Reduction Among Older Adults in the Emergency Department: An Integrative Review

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NRSG 728D: DNP Scholarly Project 3

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Abstract

Falls remain a leading cause of preventable injuries, hospitalizations, and deaths, particularly among older adults. The overall objective of this integrative review was to identify fall risk screening tools and interventions applicable for the Emergency Department (ED) setting. A comprehensive literature search was conducted using Covidence software in collaboration with a professional librarian to identify the relevant studies. The PRISMA guidelines were used to guide this review. Despite limited research, findings suggest that technologies such as video surveillance along with hourly rounding and tools like the Memorial Emergency Department Fall Risk Assessment Tool (MEDFRAT), KINDER1 and Hendrich Fall-Risk Model are effective in reducing falls. However, more research is needed to enhance fall prevention strategies in the ED.

Keywords: fall risk assessment, falls, emergency department, older adults, prevention, patient safety, best practices

List of Abbreviations

Casa Colina Fall Risk Assessment Scale (CCFRAS)

Center for Disease Control (CDC)

Comprehensive Geriatric Assessment tool (CGA)

Doctor of Nursing Practice (DNP)

Emergency Department (ED)

Institutional Review Board (IRB)

John Hopkins Fall Risk Assessment Tool (JHFRAT)

Memorial Emergency Department Fall-Risk Assessment Tool (MEDFRAT)

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

Program of Research to Integrate the Services for the Maintenance of Autonomy- 7 (PRISMA-7)

Stoke Assessment of Fall Risk (SAFR)

World Health Organization (WHO)

Fall Reduction Among Older Adults in the Emergency Department: An Integrative Review

Introduction

Within the United States, adults 65 and older account for 17% of the population, which continues to rise (Caplan, 2023). Over 20% of older adults present to the Emergency Department (ED), representing 29 million annual visits for various injuries (Ashman, 2020). In particular, 13% to 25% of ED visits by older adults are a result of unintentional falls that occur in either nursing homes or private homes (Ashman, 2020). Injuries related to falls among older adults are increasing and is a significant public health concern (Joseph & Bagavandas, 2019). Falling can be fatal and is the second leading cause of mortality worldwide (World Health Organization, 2023). Moreover, 80% of falls occur in low - and middle-income countries, costing an average of $37.3 million annually (World Health Organization, 2023). To mitigate such a global concern, numerous studies and literature address fall prevention in inpatient, outpatient, and nursing home settings (Boreskie et al., 2022; Shaw et al., 2021). Guthrie and Hochman (2018) mentioned that most of the literature addresses falls in hospitals; hence, it may be challenging to determine the fall rates in the ED. As a result, one can conclude that limited research and screening tools address fall risks and prevention in the ED (Joseph & Bagavandas, 2019). Tools specifically for ED use include the Memorial Emergency Department Fall-Risk Assessment Tool (MEDFRAT) (Flarity et al.,2013), Hendrich II and the use of video surveillance (Guthrie & Hochman, 2018; Flarity et al., 2013).

Background

Falls represent the leading cause of preventable death, hospitalization, and injuries in the ED (Gettel & Goldberg, 2020). According to the Centers for Disease Control (CDC), one in every four older adult falls yearly and sustains minor to severe injuries (Centers for Disease

Control, 2023). One in five older adults that fall results in head injury or broken bones (Guthrie et al., 2018). In 2015, it was estimated that fall-related injuries cost an average of 50 billion dollars, in which Medicare and Medicaid subsidized 75% of the cost (Center for Disease Control, 2023). Sadly, this dollar amount continues to grow due to increased falls among the older adult population. According to the CDC, complications from falls account for over 95 % of hip fractures, 3 million ED visits, including fall-related deaths in the United States –all of which are burdensome to healthcare cost (CDC, 2023). Falls can be motivated by multiple intrinsic and extrinsic factors (Stoeckle et al., 2019). Intrinsic factors include such things as medications, chronic health conditions, mental illness, alcohol use, illicit drug usage, muscle weakness, vision impairment, gait, and balance impairment. Extrinsic factors include Social Determinants of Health (SDOH), such as environmental situations, inadequate access to health and aging services, and lack of fall prevention services (Stoeckle et al., 2019). Despite the high prevalence of falls as a cause of ED visits, screening tools specifically for the ED setting are lacking (Stoeckle et al., 2019). Furthermore, the ED environment is fast-paced, high-acuity, crowded, and unpredictable environment, making fall prevention even more challenging to implement in this setting (Stoeckle et al., 2019). Future research on using fall risk assessment tools prevention strategies for the ED setting is needed.

There remains a lack of fall-risk assessment tools within the ED setting (Strini et al.,2021). According to a systematic review, of the fifteen hospital-targeted assessment tools reviewed, eight were applied to in-home setting, and seven were used in inpatient setting (Strini et al., 2021). Fall risk assessment tools such as KINDER 1, Hendrich II and MEDFRAT identified and assessed patients at risk for falls while in the ED (Strini et al., 2021; Alexander et al., 2013). Multifactorial fall-risk assessment tools such as the MEDFRAT, Hendrich II and

KINDER 1 may be helpful in identifying and preventing falls within the ED. Implementing the MEDFRAT fall-risk assessment tool has decreased fall rates in the ED by 50% (McCarty et al., 2018). The MEDFRAT fall-risk assessment tool was created because a screening tool specifically for the ED was needed (Terrell et al., 2009). MEDFRAT was created from the Conley Fall Risk Screening tool (Conley et al., 1999). The Conley Fall Risk Screening measured the following areas: 1) fall history 2) cognitive impairment, 3) lack of awareness for safety, 4) agitation, 5) gait instability, and 6) dizziness /vertigo. A scoring system of 0-10 was utilized; however, a score of 2 or greater was considered a fall risk (Conley et al., 1999). Later, the Conley Fall Risk Screening tool was modified to screen for intoxication, sedation, and specific vertigo and dizziness (Flarity et al., 2013).

The Hendrich II Fall Risk Assessment Model is an evidence-based fall screening tool that identifies falls within the inpatient setting (Hendrich et al., 2003). It uses a scoring system that suggests if more interventions are required (Hendrich et al., 2003). A score of 0-4 is considered low risk; a score of 5-9 is considered moderate risk and a score greater than 10 is considered high risk. The greater the score, the greater risk of falling (Hendrich et al., 2003). However, Gutherie et al. (2018) mentioned since this instrument evaluates several key risk factors, including cognitive function, mobility, dizziness/vertigo, male gender, medication use, and other physical conditions that may contribute to falls, the Hendrich II screening tool can be used in the ED setting (Gutherie et al., 2018). Based on the components being measures, it identified 37% of falls in the ED (Gutherie et al., 2018; Hendrich et al., 2003).

Significance

Falls and fall-related injuries are emotionally, physically, and financially burdensome to not only patients but family members, which can lead to caregiver role strain and impact on

quality of life (Dykes et al., 2020). In addition, falls amongst older adults in the ED are challenging and create serious complications that can affect or impact the patients' well-being, mobility, independence, finances, and family dynamics (Shankar et al., 2020). Due to the increasing number of falls and high prevalence of frailty amongst the older adult population, aging poses several concerns and a burden to the healthcare system (Centers for Disease Control, 2021; Jarman et al., 2020). The Centers for Medicare and Medicaid Services do not reimburse for traumatic injuries occurring during a hospital admission which includes falls (Fehlberg et al.,2017). With fall risk screening tools and prevention strategies, falls in the ED would decrease.

Project Objective & Clinical Questions

This integrative review aimed to determine the best screening tools to identify and prevent falls among adults 65 and older within the ED. The following questions were addressed: 1) What factors contribute to a patient's fall among older adults? 2) Which fall risk screening tools are feasible for the ED setting? 3) What fall interventions are most effective in identifying and preventing falls among older adults?

Defining Concepts and Variables

According to The World Health Organization, the conceptual definition of a patient fall is loss of control that inadvertently results in a patient's landing on the floor, ground, or lower level (World Health Organization, 2023). The operational definition of a patient fall can result in injury or non-injury despite the circumstance such as in the case where a patient cannot maintain an upright position, resulting in a loss of body control and falling (Agency for Healthcare Research and Quality, 2013). The three classifications of an accidental patient fall include a fall, a fall with injury, or a near miss. A fall is classified as an unintentional patient fall where an injury is not involved, and the patient is assisted to the ground, floor, or lower level (Agency for

Healthcare Research and Quality, 2013; CDC, 2021). Next, a fall with injury is classified as an accidental patient fall that results in an associated patient injury (CDC, 2021). Finally, a near miss is where the patient almost falls but does not fall (Agency for Healthcare Research and Quality, 2013).

Theoretical Framework

This Doctor of Nursing Practice (DNP) project utilizes the Donabedian Model as the conceptual framework. Avedis Donabedian was a physician and health services researcher who developed the Donabedian Model in 1966 (Donabedian, 1966; Donabedian, 2003; Franklin, 2019). This model identifies three dimensions that evaluate and measure quality improvements in healthcare at a fundamental level; in particular, it measures the structure, the process, and the outcomes of methods that can improve patient outcomes (Donabedian, 1966; Berwick & Fox, 2016). Donabedian believed that each dimension is interrelated, which aids in providing systematic quality improvement and enhancing patient safety and care (Donabedian, 1985). Donabedian's framework provides a comprehensive approach to improving healthcare outcomes. (Donabedian, 1985). For this integrative review, the Donabedian framework can be applied in the following manner:

Structure

Structure reflects the attributes of the service, also referred to as input measures. The structure applies to the physical and organizational aspects within the healthcare setting. It looks at the environment, resources, and organizational factors that may contribute to care delivery. For example, in terms of fall prevention, structure involves minimizing hazards within the physical environment. Other examples include proper lighting, clear signage, non-slip floors, socks, bed rails, and obstacle-free pathways (Cary et al., 2018). The structure also involves

adequate staffing (Cary et al., 2018). Adequately skilled and trained professionals such as nurses, physicians, patient care technicians, and physical therapists are experienced in fall prevention techniques, fall risks, and emergency response. (Cary et al.,2018). Equipment such as gait belts, walkers, bed and chair alarms, and monitor technicians ensure that fall prevention tools and gear are easily accessible to at-risk patients within the ED (Cary et al., 2018). Policies are the final structure involvement. Most hospitals have protocols and policies for fall prevention that incorporate safety checks and fall screening tools for a safe environment (Cart et al., 2018).

Process

The process refers to how care is provided including the actions and procedures that involve the healthcare process (Donabedian, 2003). This process encompasses interventions, activities, diagnosis, treatment, patient education/counseling, collaboration, and preventative care (Donabedian, 2003). Regarding fall risk assessments and preventing falls within the ED, the process includes educating patients, nurses, providers and ED staff on implementing interventions, monitoring patients, and collaborating with other specialties (Donabedian,2003). Appeadu and Bordoni (2024) discussed other effective interventions that will aid in reducing falls within the ED. For example, adjusting medications, gait belt use and training could be encouraged, including the implementation of fall screening tools such as MEDFRAT, Hendrich II Fall Risk Model, and video surveillance (Woltsche et al., 2022; Flarity et al., 2013).

Outcome

Outcome is the third component of Donabedian's framework which measures the result of care (Donabedian, 2003). Monitoring falls as an outcome involves tracking incidents, reducing harm, and improving safety. Woltsche et al. (2022) demonstrated a 72% fall reduction rate with the integration of video surveillance and hourly rounding. McCarty et al. (2018)

discussed how utilizing the KINDER 1 fall risk assessment tool reduces falls within the ED among older adults. Harper et al. (2021) stated that hospitalizations decrease with early interventions and recognition of falls.

Methods

Search Organization and Reporting Strategies

With the assistance of an experienced, trained, professional staff librarian, search engines were developed. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline and checklist were used to guide this integrative review. The search strategy for this integrative review was completed using the following databases: Covidence screening and data abstraction assessment tool, the Cochrane Database of Systematic Reviews, Observational Studies, and Randomized Control Trials, PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Google Scholar. The following Boolean search terms were used: "emergency room," "frailty-screening tool," "accidental fall," “screening tool," "assessment tool," "Morse fall scale," "MEDFRAT," "JHFRAT," "Hendrich II Fall Risk," "risk assessment," "kinder1", "prisma7", "older adult" "fall(s), "geriatric," "senior," "aged," "fall-risk," "fall rates," "assistive devices," "frail," "fall injuries," "predicting factors," Predictor and "fall," and "fall-risk screening tool," were combined with terms "reducing falls," "cost," "emergency room," " chronic illness," and "screening tools."

The search strategy used for this integrative literature review utilized full-text peer-reviewed articles published between 2014 and 2024 and 192 relevant articles were identified. Inclusion criteria were articles that included interventions that attempted to reduce patient falls, such as fall prevention strategies and screening tools in the ED and inpatient setting. Articles were excluded if participants were younger than 65 years old or were paralyzed in any form.

Approximately 176 studies were excluded from this review. Publications greater than ten years old were excluded to ensure data remained relevant. Other exclusions were articles that only addressed reducing falls in the outpatient setting, sixteen articles were selected and included for this integrative review (**FIGURE 1**).

Quality Appraisal

Studies were systematically reviewed to evaluate relevance, reliability, and rigor as defined by the quality appraisal process (DistillerSR Inc, 2024; Andrade, 2018). Many integrative reviews utilize a combination of low- and high-quality findings to ensure diversity. Dr. Bernadette Melnyk is a nurse, researcher, and leader in evidence-based practice (EBP). She is renowned for her efforts in promoting EBP in clinical settings. Dr. Bernadette Melnyk developed the Evidence-Based Practice Model, which emphasizes the integration of the best research evidence with clinical expertise and patient preferences when making healthcare decisions (Melnyk & Fineout-Overholt, 2019). The Evidence-Based Practice Model utilizes a seven-rating hierarchy for evaluating the level of evidence (Brunt, 2023). Level one is the highest tier and compromises systematic reviews or clinical practice guidelines of all relevant randomized control trials (RCTs). Level two includes evidence from at least one well-designed RCT. Level three encompasses evidence obtained from a RCT that lacks randomization such as a quasi-experimental design. Level four represents evidence from well-designed case-control and cohort studies. Level five includes evidence from a systematic review of descriptive and qualitative studies. Level six is evidence from a single descriptive or qualitative study, and level seven is evidence from authorities' opinions or expert committee reports (Brunt, 2023 & Melnyk, 2019). In the context of this integrative review, the selected articles were categorized according to the hierarchy of evidence levels. Two articles were classified as level 1 evidence, representing

findings from a systematic review of all RCTs (Strini et al., 2021; Leahy et al.,2021). Four articles were classified as level 2 evidence, corresponding to individual RCTs (McCarty, et al., 2018; Harper et al., 2021; O'Caoimh et al., 2019; Guthrie et al.,2018). Three articles were designated as level 3 evidence, indicating quasi-experimental designs (Woltsche et al., 2022; Fehlberg et al.,2018; Carpenter et al. 2019). Four articles were classified as level 4 evidence, which includes case-control or cohort studies (Barmentloo et al. 2021; Zhang et al., 2022; Boreskie et al., 2022; Scott et al., 2018). Two articles were level 5 evidence encompassing descriptive and qualitative studies (Jarman et al., 2020; Appeadu & Bordoni, 2024). Lastly, one article was categorized as level 6 evidence, representing a single descriptive qualitative study (Thatphet et al., 2022).

Limitations

A literature review may be constrained by the scope defined by a specific research question (Tyndall & Preece, 2020). Common limitations encountered in such reviews include a restricted scope, variations in study quality, challenges in synthesizing diverse findings, time-consuming processes, a lack of standardization, limited capacity for rigorous quantitative analysis, and difficulties in accessing relevant sources (Whittemore & Knafl, 2005). While integrative reviews aim to offer a comprehensive synthesis, they may inadvertently exclude critical articles due to their inclusion criteria or the limited scope of the research. In the present integrative review, several articles were excluded based on the criteria related to the population and setting under investigation. This limitation contributed to a narrower scope, potentially influencing the outcomes and conclusions (Tyndall & Preece, 2020). Additional challenges faced during this review included limitations in resources, time constraints, issues with article timelines, and the availability of data. Future research would benefit from conducting studies

within ED setting, specifically focused on falls and fall risk screening tools, to better address the research questions and interventions related to this area.

Resources

The project resource team included the Emory University faculty lead, Dr. Paula Tucker, and the Emory University Librarian, Sharon Leslie.

Ethical Considerations

This integrative review was submitted to the Emory University IRB board for review, and an exemption was obtained.

Synthesis of Literature

Fall Risk Factors

Falls are multifactorial and are a significant concern, especially among older adults in the ED (Gu et al., 2016). Numerous factors contribute to falls, including frailty, polypharmacy, impaired cognition, chronic medical conditions, intoxication, sedation, environmental factors, and impaired vision (Scott et al., 2018). The effects of falls can be devastating and include physical, emotional, and financial consequences, for which appropriate and effective interventions must be implemented. Injuries sustained from falls could result in increased inpatient hospital days, unscheduled surgeries, and sometimes loss of life (Appeadu & Bordoni, 2024; Scott et al., 2018). Many chronic conditions, such as arthritis, cardiovascular disease, stroke, diabetes, mental illness, malnutrition, depression, and vision and hearing loss, increase the risk of falling. Some fall risk factors, such as chronic pain or exercise intolerance, can result from chronic conditions (Bailey, 2023).

Falls significantly threaten older adults' quality of life, often causing a decline in self-care ability and participation in physical and social activities. Fear of falling, which develops in 20%

to 39% of people who fall, can lead to further limiting activity independent of injury (Boreski et al., 2022). Research has illustrated that primary care providers can reduce frail older adults for injury or harm in the outpatient setting by incorporating strength exercises into their regime and completing a fall-risk level screening tool called STEADI (Stopping Elderly Accidents Death and Injury) (Boreski et al., 2022 & Hamm et al., 2016). With such tools, falls and the risks of falling are reduced; however, close monitoring and yearly screening are critical.

Xu et al. (2022) aimed to clarify fall risk factors and prevent severe consequences in older adults. Xu et al. (2022) identified an increased rate of falls that were prevalent amongst older adults who were malnourished and were on polypharmacy. Namely, weak bones and muscles were key factors resulting in falls amongst this population (Xu et al., 2022). In comparison, the authors further illustrated that fall risks were seen amongst older adults who were less educated, living alone or in rural areas, smoking, and consuming alcohol. Noh et al. (2021) and Xu et al. (2022) mentioned that polypharmacy leads to hallucinations, impaired judgment and vision, dizziness, hypotension, and disorientation, all of which led to falls within the inpatient setting amongst older adults. Xu et al. (2022) and Zhang et al. (2022) agreed that individuals living in rural areas were at an increased risk of falls mainly due to living and working conditions. In addition, such behaviors as alcohol consumption and smoking lead to secondary chronic diseases that put older adults at further risk of falls. Overall, it was concluded that early recognition and further studies are needed to prevent falls among the older adult population (Xu et al., 2022).

Fall Risk Screening Tools

The risk-stratification of older persons visiting the ED is helpful to focus interventions that lower their risk of adverse healthcare outcomes, especially where frailty is found; hence,

identifying an applicable screening tool for older adults is challenging in the ED setting (O'Caoimh et al., 2019). Thatcher et al. (2022) mentioned how the ED has its local environment and culture. Hence, fall screening tools should be aligned with the dynamics and resources of the ED. The Comprehensive Geriatric Assessment tool (CGA) identifies fall risk in frail patients. It is composed of five main domains: spiritual, functional, psychological, physical, and spiritual, which is geared more toward the geriatric population in the inpatient setting (Leahy et al.,2021; O'Caoimh et al., 2019; & Fehlmann et al., 2022). Leahy et al. (2021) further reported that CGA has shown improved outcomes in an inpatient setting, but clear evidence of benefit in the ED setting needs to be established, and further studies are required.

Harper et al. (2021) assessed the effectiveness of fall prevention services in the ED that would support patients after discharge. Harper et al. (2021) identified that incorporating a multifactorial tool such as the Program of Research to Integrate the Services for the Maintenance of Autonomy (PRISMA-7), which is a seven (7) questionnaire that identifies frailty in older adults and interventions such as daily exercise, physical and physiotherapy, home assessments, occupational therapy, and footwear safety, will identify fall risk and minimize falls. Jarman et al. (2020) and O'Caoimh et al. (2019) stated that PRISMA-7 uses a standard of care in a few units, including the ED, where it is found to be reliable and accurate because it assesses the effects of fall risk interventions that were already implemented in the ED. Studies concluded that this screening tool was 84% sensitive and 78% specific, utilized in the ED triage area by trained registered nurses (O'Caoimh et al.,2019). On the other hand, the Clinical Frailty Scale (CFS) is a nine-point scale that qualifies frailty based on function in individual patients. Function ranges from a score of one, being able to perform activities of daily living (fit), to a score of seven, being bedridden (terminally ill). The higher the score, the more frail the individual (Fehlmann et

al., 2022 & Mendiratta et al., 2023). The CFS scale was preferred amongst hospitalized older adults because it predicted or gave an overview of acute illness in admitted patients (Fehlmann et al., 2022). However, if the CFS is used with other screening tools, such as PRISMA-7, it may effectively identify fall-risk patients within the ED.

Scott et al. (2018) evaluated the validity and reliability of implementing the Memorial ED Fall Risk Assessment tool (MEDFRAT) designed for the ED population. The MEDFRAT fall-risk assessment tool has been shown to decrease falls in the ED by 50% with the guidance of implementing the framework of the Iowa Model of Evidence-Based (Guthrie & Hochman, 2018). It assesses cognition, intoxication status, gait stability, use of assistive device, use of sedation, altered elimination, and history of falls at two different times during patient contact.

Woltsche et al. (2022) evaluated the effectiveness of adding Patient Video Monitoring (PVM) to assess for fall risk and fall prediction in the inpatient setting. It was concluded that falls decreased significantly with implementing the PVM in the inpatient setting. Falls decreased by up to 72% in the wards (Woltsche et al., 2022). In addition, a decrease in unwitnessed falls was noted due to the PVM and hourly rounding by trained sitters (Woltsche et al., 2022). This study was geared more toward the inpatient setting and concluded that there are limited screening tools in the ED (Woltsche et al., 2022).

Strini et al. (2021) mentioned a need for more studies on the applicability of fall-risk assessment tools in the ED compared to the inpatient or community living setting. Notably, among the six assessment tools reviewed, only two applied to both inpatient and ED settings. Furthermore, fall assessment tools such as the Casa Colina Fall Risk Assessment Scale (CCFRAS) and Stoke Assessment of Fall Risk (SAFR) only identified fall risk and did not

reduce falls. As a result, a multifactorial fall-risk assessment tool such as MEDFRAT would help identify and reduce falls within the ED (Strini et al., 2021).

Falls are attributed to disequilibrium, medications, frailty, and sensory deficits in the older adult population and can decrease one's quality of life (Carpenter et al., 2019). Even though there is a high prevalence of falls amongst older adults, Carpenter et al. (2019) agree that there is limited research on fall prevention screening tools for patients in the ED. Carpenter et al. (2019) discussed the Fall Clinic Model and The Aachen Fall Prevention Application in addressing falls within the ED. First, the Fall Clinic Model is a protocol utilized in the pre-hospital phase by Emergency Medical Services (EMS) for patients whose personal alarm devices activate and cannot be transferred to the ED. Studies have shown that the Fall Clinic is costly, and it reduced falls; however, no decrease in harm or injury was seen (Carpenter et al., 2019). Next, Carpenter et al. (2019) discussed the future of fall prevention tools within the ED. The Aachen Fall Prevention Application is the future and a cost-effective technology. In addition, the application also gives the patient autonomy to rate, screen, and monitor their fall risk with a smartphone. Preliminary data concluded that there is a positive correlation between early detection of fall risk and a decrease in falls within the ED (Carpenter et al., 2019).

Barmentloo et al. (2021) further illustrated the challenges of implementing fall and frail screening tools in the inpatient setting. Challenges encountered were limited time and staffing constraints, environmental factors, underestimating fall risk patients, and frailty, which are just a few items that impede implementing tools. However, primary care providers and physiotherapists ask questions that address balance or gait issues, chronic illnesses, recent fall history, and medication history. After undergoing a comprehensive analysis, a 5-dimensional EuroQ01 (EQ-5D-5L) tool was created to identify fall risk older adults within the inpatient

setting. The Barmentloo et al. (2021) study concluded that this screening tool will be effective in the inpatient setting; hence, it can be generalized to the ED for further evaluation.

Fall Intervention Strategies

A few multidisciplinary approaches were suggested to help mitigate falls within the hospital and community living among the older adult population (Appeadu & Bordoni, 2024;). According to Appeadu & Bordoni (2024), group and home-based exercise programs and home safety interventions reduce the rate of falls but not the risk of falling. The study focused on single vs multi-factorial fall risk interventions (Appeadu & Bordoni, 2024). Single interventions, such as exercise to strengthen older adults living in the community, were ineffective in preventing falls. Implementing multi-factorial tools such as home safety modification for visually impaired tenants, incorporating Tai Chi into daily activity, administering vitamin D to help with solid bones, wearing anti-grip socks/shoes, and gradually withdrawing individuals from psychotropic medications can all aid in fall risk prevention in inpatient and community settings (Barmentloo et al., 2021; Harper et al., 2021).

Fall Risk Assessment Tools Applicable for ED Settings

There is limited research on fall screening tools applicable to the ED; hence, within such a chaotic environment, falls still occur at high rates (Strini et al., 2021). However, Scott et al. (2018) discussed the benefits of implementing the Memorial ED Fall Risk Assessment Tool (MEDFRAT) and Hendrick II best practice fall screening tools within the ED, which identified and decreased falls by 17% - 29% (Strini et al., 2021). After reviewing various articles, some of the most effective evidence-based fall screening tools that identified high-risk fall patients in the ED were the MEDFRAT and video surveillance with constant patient rounding (Thatphet et al.,2022; Woltsche et al., 2022). Even though video monitoring requires a trained monitor

technician, frequent patient rounding, and assessing fall risks continually, Woltsche et al. (2022) illustrated how video surveillance is headed toward future recommendations because falls decreased on average by 72% within the ED. Even though there was a decrease in fall rates, studies suggest more research is needed to fill gaps in addressing falls within the ED, not just in the inpatient setting. John Hopkins Fall Risk Assessment Tool (JHFRAT) follows a scoring algorithm that implements interventions based on fall-risk severity ranging from low to high risks (John Hopkins, 2023). JHFRAT was initially designed to improve patient safety within the inpatient setting (John Hopkins University, 2015). However, JHFRAT use has expanded and adapted by other areas including the ED in identifying falls early (Baker & Nitz, 2011). This screening tool addresses cognitive dysfunctions, chronic illness, patient care equipment, sedation medication, unsteady gait, and previous history of falls, intoxication, and Altered Mental Status (Baker & Nitz, 2011). The JHFRAT screening tool is quick and easy to administer making it applicable to the ED setting. In addition, when used in conjunction with other screening tools such as the Program of Research to Integrate the Services for the Maintenance of Autonomy-7 (PRISMA-7), it identifies falls early, integrate patient care and improve patient safety outcomes (Baker & Nitz, 2011; Guthrie et al., 2018; Jarman, 2020). Screening tools such as MEDFRAT, Hendrich II and video surveillance address such concerns compared to other inpatient screening tools that do not address the ED's existing environment.

Discussion

Falls and fall-related complications are among the leading causes of death among adults sixty-five and older in the United States and are an ongoing concern (Thatphet et al., 2021; Centers for Disease Control, 2021). Despite implementing fall assessment tools and interventions in hospitals, community centers, and nursing homes, it is still ineffective due to increasing fall

rates among older adults (Scott et al., 2018). The literature review highlighted fragility, chronic illness, sedation, intoxication, mental state, and polypharmacy play a pivotal role in falls among older adults. Signs, non-skid socks, bed/chair alarms, and identifiable armbands are evidence-based interventions in reducing falls. Despite available fall risk screening tools and interventions, fall rates are increasing. Studies have illustrated that video surveillance and hourly rounding feasible for the ED setting (Thatphet, 2018). This integrative review identified video surveillance as superior; however, this could be very costly for the hospital and, eventually, the patient. However, MEDFRAT had a high success rate in preventing falls within the ED and is more cost-effective. KINDER 1 fall- risk assessment tool detect falls early in the ED and has shown decrease fall rates within ED's (McCarty et al., 2018). Hendrich II is another feasible fall risk-screening tool for ED use due to its ability for early fall detection and applicable interventions (Harper et al.,2021; Hendrich et al., 2021).

Implications for Practice/ Future Work

This integrative review highlights critical areas for advancing fall-risk identification and prevention in the Emergency Department (ED). To improve patient safety, it is essential to integrate fall-risk identification and prevention training into the ongoing education of ED staff. This ensures that healthcare providers are equipped with the knowledge and skills to recognize fall risk early and implement timely interventions. Routine training programs can enhance the consistency and effectiveness of fall prevention efforts, ultimately reducing fall-related injuries in the ED setting. Furthermore, the use of standardized fall screening tools should be prioritized to maintain uniformity in assessing and addressing fall risk across various patient populations. Such protocols provide a systematic approach to identifying at-risk patients and ensure appropriate preventive measures are consistently applied.

The implementation of institutional policies that mandate the use of standardized fall screening tools and prevention protocols within the ED is necessary to institutionalize fall-risk management. These policies can ensure that fall-risk assessments are not overlooked in the busy ED environment, where time constraints and high patient turnover often present challenges. Policies should also support multi-disciplinary collaboration, involving nursing staff, physicians, and allied health professionals, to address fall risks in a comprehensive manner. By fostering a team-based approach, these policies can enhance communication and coordination, leading to improved patient outcomes.

Future validation studies should focus on testing the effectiveness of fall screening and prevention protocols within the specific context of ED settings. Research should aim to identify the most effective tools for fall-risk assessment, particularly those that are quick, reliable, and feasible to implement in high-pressure environments. Additionally, exploring the impact of institutional policies on the implementation of fall prevention strategies and their effect on patient safety outcomes will be crucial. Longitudinal studies are needed to assess the long-term benefits of these interventions, including reductions in fall-related injuries, hospitalizations, and associated healthcare costs. By addressing these implications, we can work toward improving patient safety, enhancing clinical outcomes, and informing future policy and practice in the ED setting.

Dissemination

This integrative review is expected to be published for future evidence-based research scholarly projects. The information can be disseminated to various EDs locally to aid in reducing falls and identifying falls early within the department. Later, this integrative review could be utilized in a broader platform, which would aid in reducing falls in the ED, decreasing the cost

and length of hospital stays, and decreasing the emotional burden on families (Dykes, Burns & Adelman, 2020). Additionally, this integrative review could be disseminated throughout the healthcare system via emails, posters, computer-based training, huddles, departmental meetings, nursing council, and mandatory onboarding sessions. Crucial conversations and effective communication must be communicated to ensure that the goal of decreasing and identifying falls among older adults is accomplished. If provided the opportunity and contractual agreement, I am interested in disseminating findings at the facility where I am employed.

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Figure 1. PRISMA Diagram

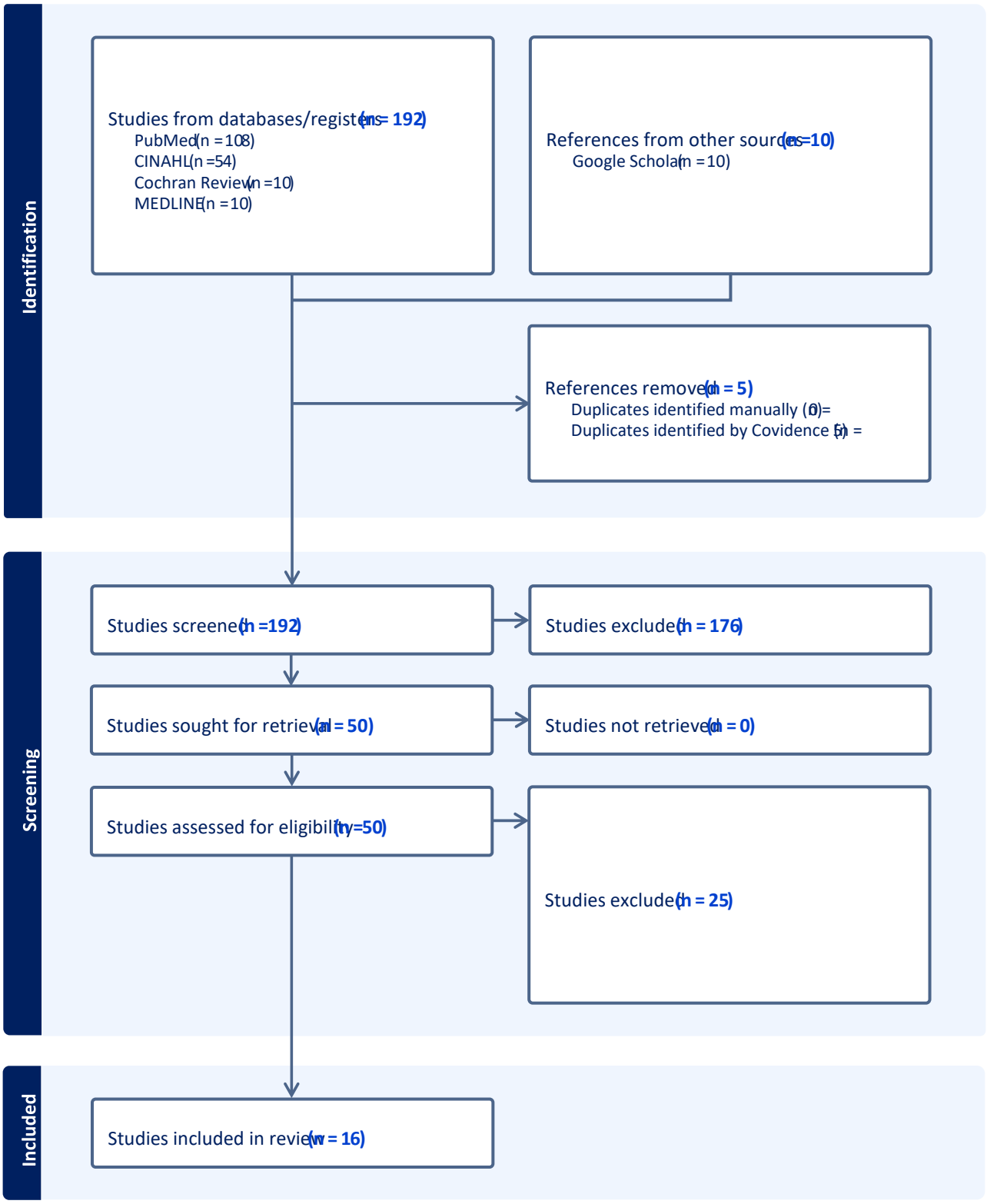

Table 1. Annotated Bibliography

Article Title Author(s)	Study Design/Level of Evidence	Participants	Methods	Exposure/ Intervention/ Measures	Abbreviated Findings/Results
Falls and Fall Prevention in Older Adults **Appeadu & Bordoni (2024)**	Descriptive /Qualitative/V	Older adults		Along with pharmacological evaluation, daily activities such as bathing, toileting, dressing, feeding, grooming, and ambulation evaluated at the bedside. **Multidisciplinary**: Comprehensive Geriatric Assessment (CGA) evaluation of older patients at risk of falling -Berg Balance Scale to evaluate static and dynamic balance - Falls Efficacy Scale to assess the fear of falling -Timed Up and Go Test to assess a patient's mobility. -6 minute Walking Test -10 meters Walking test when indicated.	The Comprehensive Geriatric Assessment (CGA) is a multi-disciplinary tool used to assess older patients who are at risk of falling. Fall risk factors and increase rate of falls are associated No screening tools, including the Tinetti Gait and Balance Assessment Tool, as well as the one-legged and tandem stance assessments, can accurately evaluate fall risks in older adults. Combination of Vitamin D and exercise, medication review encouraged and found to be beneficial Multifactorial treatment should be geared toward falls and fall risk
Can Fall Risk Screening and Fall Prevention Advice in Hospital Settings Motivate Older Adult Patients to Take Action to Reduce Fall Risk? **Barmentloo et al. (2021)**	Observational Cohort Study / IV	ED and Nephrology Outpatient Clinic Patients 70 years and older in a Dutch Hospital n=216	Patients recruited in waiting area (within first 3 months) Hypothesis was rejected due to sample size	Fall Risk Screening to assess older adults for fall risk. Prevention advise given to High Fall risk patient	49 out of 216 patients were high fall risk in ED More falls occurred in ED (42.2%) Mobility/balance (92.7%) Medications (92.5%)

			Data collected by survey		Fall history (85.5%) Over 20 patients received endurance training Larger cohort needed to investigate adherence. ED and Nephrology Outpatient Clinic sample size differ
Frailty-aware care: Giving value to frailty assessment across different healthcare settings. **Boreskie et al. (2022)**	Case Control / Cohort Study /IV	Patients in the ED, Primary Care and ICU setting	Different frailty assessment tools	Discuss and compare barriers, facilitator and application of frailty assessment in primary care, ED and ICU.	Falls, hospitalizations and morbidity are considered predictors of falls. Frailty defined Frailty results in healthcare burden and increase cost.

Older Adult Fall in Emergency Medicine: Update 2019 **Carpenter et al. (2019)**	RCT /III	Older Adults 65 years old and older in Emergency Departments and Assited Living	No randomization. Discussed effects of new intervention	EMS, ED staff and trauma services implemented fall risk precautions. Fall clinic provide information and communicate with EMS on fall risk patients Triage nurse implemented fall risk assessment	Falls are the leading cause of death in developing countries, particularly among adults aged 65 and older. Research on falls in Emergency Departments is limited in both quality and quantity Some healthcare systems are using "Falls Clinic" after ED visit Frailty is a significant predictor of falls. Additional risk factors include loose clothing, muscle wasting, dementia, foot ulcers, visual impairment, intoxication, polypharmacy, and others. Most ED's lack a fall clinic Fall interventions are multifactorial, complicated and time consuming making it difficult to streamline a screening tool for the ED Implementation science is necessary to align screening tools with the pace of the Emergency Department. Most clinicians lack the time to assess fall risks. Passive monitoring systems can be useful in the ED and assisted living

					29,668 fall related deaths in US in 2016 36% - 50% of falls in the ED can lead to death or poor quality of life. ED fall preventions have yet to demonstrate cost effectiveness In ED Get up and Go did not predict falls in the ED. Fall risk stratification score >2 means fall risk Technology such as smart phones has shown to improve detecting falls and improving intervention Aachen Fall Prevention App (AFPA) monitors fall risk, improve quality of care, reduce ED cos

Impact of the CMS No-Pay Policy on Hospital-Acquired Fall Prevention Related Practice Patterns **Fehlberg et al. (2018)**	Observational Study /III Customized RCT Quantitative Review	EMR from 4 hospitals in Southern United States between 2005 - 2010	Matched case control design Blinded data collectors Descriptive data SAS System for windows	Nurses identified and place fall risk bands on patient arms. Nurses applied interventions such as using bed alarms, etc. after Centers for Medicare and Medicaid change policy (not paying/reimbursing for preventable hospital injuries) The use of safety sitters implemented Clinical: physical restraints to prevent falls RN's conducted specific patient education on fall risk.	Interventions led to a minimal, statistically insignificant reduction in hospital falls. The use of sitters are inconclusive and has mixed reviews Increased fall rates and injury were seen with physical restraints. Educating patients on fall risk resulted in a significant decrease in fall rates Few control trials discussed or supported single fall risk intervention Four prevention strategy studies: bed alarm, sitters, physical restraints, and room change Results are from falls on medical surgical unit Patients at risk of falling are often identified with comorbidities like dementia, diabetes, hypertension, congestive heart failure, and stroke Mean age 63 years old This study aimed to change the practice of nursing and fall prevention strategies

Risk Management: Falls in the Emergency Department **Guthrie et al. (2018)**	RCT /II	Emergency Departments			Little research on falls in the ED Risks for falls include: intoxication, gait disturbances and patient with dementia. Falls risk patients identification is challenging. Most fall risk assessment tools developed for inpatient setting Memorial ED fall Risk Assessment Tool (MEDFRAT) and KINDER 1 only risk assessments tools designed for ED Hendrich II Fall Risk identified 37% of fall risk patients in the ED John Hopkins Fall Risk Assessment Tool (JHFRAT) is a tool used in the ED

Providing fall prevention services in the emergency department: Is it effective? **Harper et al. (2021)**	Systematic Review and Meta-Analysis of published quantitative research studies / II	11 studies identified (n= 4018)	PRISMA Guidelines Chi squared and I squared statistic used to quantify heterogeneity Relative Risk Ratio used for patients that fell more than once GRADE summary of evidence		Fall prevention services did not reduce the proportion of adults who experienced falls between the intervention and control groups. However, interventions within the ED did reduce falls and hospital admissions. Fall related injuries and hospital admission were significantly reduced using multifactorial interventions Only twelve studies reviewed involved intervention strategies for patients in the ED. Three of the twelve studies including Prevention of Falls in the Elderly Trial (PROFET), found interventions to be effective in preventing falls

Frailty in major trauma study (FRAIL-T): A study protocol to determine the feasibility of nurse-led frailty assessment in elderly trauma and the impact on outcome in patients with major trauma **Jarman et al. (2020)**	prospective observational study /V	older adults (>65 y/o) in Major Trauma Centers n=370	Baseline data recorded by trained nurses Nurses will rank assessment tools used Data analyzed using statistical software	Nurses assessed patients in the ED for frailty using various screening tools Frailty assessment conducted prior to leaving the ED Patients followed up to six months after discharge Injury severity determined by the Abbreviated Injury Score (AIS) and Injury Severity Score (ISS) upon discharge or death.	Trauma Specific Frailty Index (TSFI) – score >0.27 predictor of poor outcomes Preferred Reporting Items for Systematic Reviews and MetaAnalyses-7: contains 7 questions to analyzed frailty in older adults CFS: assess for frailty using clinical judgment. It uses 9 descriptor to determine severity of frailty.

The impact of frailty Screening of Older adults with multidisciplinary assessment of those At Risk during emergency hospital attendance on the quality, safety and costeffectiveness of care (SOLAR): a randomised controlled trial. **Leahy et al. (2021)**	Parallel Randomized Control Trial /I	ED and University teaching hospital in west Ireland Patients >75 with undifferentiated medical complaints n= 236	Consolidated Standards of Reporting Trials (CONSORT) guidelines used Mann-Whitney test used for skewed data	frailty screening on patients >75 y/o using Identification of Seniors At Risk (ISAR) tool ED and Acute Medical Assessment will undergo the treatment arm using CGA vs standard of care for non-treatment arm Specialist will carry out assessment (i.e. specialist nurses, pharmacist, geriatric doctors, etc.). Triage nurse or dedicated physician informed potential candidates Nurse discussed study with patient and ensured they comprehended Comparison group will obtain same care	Improve outcomes seen in the inpatient setting with the use of Comprehensive Geriatric Assessment (CGA). However, no benefits established with the use in the ED. CGA not beneficial in the ED setting Multi-intervention strategies are more beneficial in the ED when compared to single interventions for falls and fall risks in the ED.

Implementation of the MEDFRAT to Promote Quality Care and Decrease Falls in Community Hospital Emergency Rooms **McCarty, et al. (2018)**	Randomized Control Trial /II	Emergency Department at Essentia Health : rural health care delivery system with 12 EDs	The Iowa Model of Evidence-Based Practice to Promote Quality Care was used to guide the process MEDFRAT programmed into EMR, along with interventions ED nurses had in-service on falls and MEDFRAT	60 nurses received 1 hour education session on falls and MEDFRAT Nurses offered feedback and changes were made prior to implementing MEDFRAT 11 EDs visits over 4 month period Portable bedside alarms ordered for ED Suggestions for preventing falls: Implement different color grip socks, using Velcro signs , and signage	Limited research on falls within the ED During the use of MEDFRAT, it was found that the ED was lacking bedside alarms, among other things MEDFRAT validated in 2 urban ED's in Colorado KINDER1 fall risk assessment tool accurate in identifying fall risk patients within the ED The implementation of the KINDER 1 fall risk assessment tool in Southern New Jersey, using Kotter's model for change, led to a reduction in falls within the ED. Nurses noted that MEDFRAT includes significantly better questions compared to other fall risk screening tools.

Comparison of Frailty Screening Instruments in the Emergency Department **O'Caoimh et al. (2019)**	Well-designed RCT/ II	Hospital University ED in West of Ireland patients >70 years old n= 9407	**Screening tool**s: Clinical Frailty Scale (CFS) vs Identification of Seniors at Risk Tool (ISAR) vs the Programme on Research for Integrating Services for the Maintenance of Autonomy 7 item questionnaire (PRISMA-7)	Manchester triage system used initially in triage Nurses trained on frailty and three screening instruments.	Older adults represents 10-30% in the ED. Frail patients experience longer hospital admissions and have higher conversion rates to the ED. PRISMA-7 identify frailty in community setting, but not validated in ED setting when used as a single component. Comprehensive geriatric assessment (CGA) shown to reduce mortality and hospitalization in older adults.
Above, Beyond, and Over the Side rails: Evaluating the New Memorial Emergency Department Fall–Risk-Assessment Tool **Scott et al. (2018)**	Two-phased prospective descriptive design study/IV	Emergency Department Level II Trauma 600 bed Center n=24,350	50 study patients Statisticians analyzed data 2 independent researchers assessed for fall risk from 4 care teams using convenience sampling n=69 MEDFRAT was in real time The MEDFRAT 14 point scale system measured 6 risk-factor variables to assess fall risk patient's in the ED.	ED staff educated and trained on MEDFRAT RN's with BSN or higher complete MEDFRAT on all patient's 18 years and older Low risk interventions include patient rounding, call light in reach, signs, skid free socks, bed in a low/locked position Moderate/high risk interventions include toilet assist, bed alarms, relocate patient near nursing station	Memorial ED Fall Risk Assessment Tool was validated for ED Falls decreased 48% in the ED when MEDFRAT along with an intervention used Fall-risk assessment tools used in inpatient settings may not effectively identify the risk factors for ED patients. Terrell evaluated the Hendrich II scale in the ED setting and found that the results did not reliably predict those patients who were at a high risk of falling in the ED environment Flarity assessed the Conley Scale in the emergency department and concluded that a fall-risk assessment scoring tool specific to the ED was necessary.

					Common factors contributing to falls in both inpatient and ED settings include cognitive decline, males, gait instability, polypharmacy, age over 65, and toileting. Most inpatient screening tools do not address factors contributing to falls, which includes intoxication, sedation and trauma. Fall reassessment is pivotal to look for changes in scoring. KINDER fall assessment tool designed for ED Data from the quality improvement project showed an overall decrease in falls with the use of the KINDER fall assessment tool in the ED. Further evaluation on fall risk assessment tools needed for the ED patient population
Fall Risk Assessment Scales: A Systematic Literature Review **Strini et al. (2021)**	Literature Review (115 articles)/ I	Patients in hospitals	CINAHL MEDLINE Cochrane Database PRISMA guideline	Applying intervention to assess for fall risk and current practice in ED SOLAR team will assess patients (medication, fall risk, ADL's, cognition, etc)	8 tools designed for at home use 23 targeted for hospitalized patients

Lessons Learned From Emergency Department Fall Assessment and Prevention Programs **Thatphet et al. (2022)**	Qualitative Research using Grounded Theory/ Observational Analysis / VI	5 Hospitals in Canada and the USA (3 Physicians, 2 ED nurses and 1 program coordinator)	ED providers and geriatric providers interviewed with open – ended skype/ telephone interviews by 2 interviewers	Morse Fall Scale and St. Thomas' Risk Assessment Tool compared amongst patient in the inpatient setting	Engage in initiatives to prevent falls in the ED Patient monitoring and hourly rounding was found to identify falls early in the ED and inpatient setting Implementing a fall protocol in ED is complicated. Falls in ED affects quality of life
Preventing Patient Falls Overnight Using Video Monitoring **Woltsche, R., Mullan, L., Wynter, K., & Rasmussen, B. (2022)**	Cohort Study - / III	Night Nurses/ Sitters(n=31); Inpatients from 3 clinical wards(12,323) in tertiary hospitals in Melbourne Australia	Descriptive Statistics used to summarize quantitative data Survey analyzed qualitative open-ended questions.	**<u>Survey Domains</u>** Nurses / sitters evaluated nightly about their experiences with PVM Prevention and fall predication in the inpatient setting evaluated the effectiveness of adding Portable Video Monitoring.	Falls decreased significantly with the implementation of the PVM and hourly rounding - Ward A:72% reduction in falls - Ward B: 50% reduction in falls - Ward C:33% reduction in falls A reduction in unwitnessed falls was noted as well Limited studies on screening tools for the ED
Prevalence and Risk Factors for Fall among Rural Elderly: A County-Based CrossSectional Survey **Zhang et al. (2022)**	Cross sectional Study /IV	Rural Elderly participants >65 years old. Cluster Sample n=3752 from Huangpi county of Wuhan City, Hubei Province, China	Participants completed questionnaires. Medical team completed assessment and examinations Chi Squared and Binary logistic regression data analyzed by ranked test.	Participants from mountains, flatlands and different socioeconomic status. Detailed information of 3752 elderly falls included social and living characteristics, activities of daily living and comorbidities condition	Thirty risk factors were identified, including age, bone density, mental health, gender, education level, marital status, activities of daily living (ADLs), income level, floor tiles, stairs, stair height, use of a cane, sleep, diabetes, hypertension, chronic kidney disease, heart attack, tumors, stroke, cataracts, polypharmacy, arthritis, spinal diseases, meal intake, and living situation. Females fell more than men by at least 2.12 times

					Higher rate of hospitalization among males compared to females Elderly in rural areas fall as a result of suboptimal living and work environment Routine fall assessments addressed several preventable risk factors.