



Factors Contributing to Psychiatric Patient Falls

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Abstract

The purpose of this literature review was to identify studies and other literature about patient falls and to investigate the factors contributing to psychiatric inpatient falls. Studies on patient falls among psychiatric patients are scarce compared to research conducted on medical-surgical and community-dwelling patients. Falls related to the intrinsic, and extrinsic factors are identified, and potential interventions are discussed. It is evident from the review that falls incur financial burden and decreases the quality of life for the patient. Fall risk assessment tools have not been very helpful. The most common factors for fall risk are multiple medications, confusion, unsteady gait, and history of falls. Reduction in patient falls can be accomplished using a multifactorial assessment and team intervention.

Keywords: Patient falls; Psychiatric patient falls; Fall risk, Mental health inpatient falls

Introduction

Brown et al. [1] found that studies of the geriatric population in the nursing homes and community dwelling areas are plentiful, but very few have attempted to identify patient falls in psychiatric inpatients. A serious fall risk hazard is evident in the psychiatric inpatient population and is seemingly without a specific solution. Despite 15-minute safety checks by staff in psychiatric inpatient units in the United States, falls have not declined significantly [2-4]. The occurrence of patient falls may contribute to fall-associated injury. Tsai et al. [5] asserted researchers studying fall prevention since the 1980 s aimed the studies at acute medical-surgical units, long-term care units, and nursing homes, and not in psychiatric units. The projections for fall-related expenses in the United States may reach \$43.8 billion yearly by 2020 [6]. Costs associated with patient falls is the driving force for the federal lawmakers to hold hospitals responsible for preventable injuries [7].

Research in the area of patient falls in inpatient psychiatric units is in a state of neglect, thereby endangering the safety of patients [5,8]. The number of patient falls in inpatient psychiatric units is 13-25 per 1,000 patient days, versus 4 for medical-surgical areas per 1,000 patient days, as reported in the National Database of Nursing Quality Indicators (NDNQI) [9]. In the United States, between 670,000 (2%), and 1.3 million (4%), of hospitalized patients in the general hospital fall annually, with 13,000 (2%) to 78,000 (6%) of those falls resulting in injury [10]. Patient falls contribute 30% to 40% of general hospital patient-safety occurrences in the United States [11,12]. Rutledge et al. [13] reported patient falls in hospitals represent only a fraction of actual falls. The financial burden associated with treatment and trauma from falls ranges from \$1,139 up to \$30,931 per fall [14]. Fall prevention is a pressing subject for research because injury from patient falls has become a disease burden [15].

As far back as 1973, extensive research on patient falls addressed the medical-surgical floors, but the falls in psychiatric units received less

attention [8,9,16]. The Joint Commission [17] regulators evaluate hospitals, and the evaluation outcome indicators include a decrease in the occurrence of patient falls and evidence of reduction in fall-associated injuries. Tzeng et al. [18] warned, despite the hospital administrators' efforts to educate and initiate safety improvement projects, patient falls remain the most prominent incident reported to The Joint Commission. Leaders of the organization have the obligation to scan diligently for safety practices [18].

Of all the safety measures, patient falls are among the greatest quality challenges. Patient falls are among the most costly and most sensitive of quality indicators, similar to pressure ulcers. Rutledge et al. [13] affirmed that standard measurements of safety, such as patient fall rates, could aid healthcare leaders in benchmarking the quality of care. Reducing harm from patient falls needs to be a top priority for leadership [19] and healthcare leaders need to establish an environment fostering a culture of safety.

Most patient falls occur during ambulation or on the way to the bathroom [20]. Fall history, multiple medications, staffing ratio variables, and antipsychotic drugs have high correlations to patient falls [9]. Failure by hospital staff to supervise adequately a patient at high fall risk and failure to use suitable measures to keep the patient from harm may be apparent to surveyors and could result in litigation [21]. Fall-related costs to hospitals include ongoing training for staff, one-on-one staffing for high-risk patients, ongoing fall assessments, purchase of fall prevention equipment, litigation expenses, and the cost of surgery and recovery [22].

Intrinsic and Extrinsic Factors

Intrinsic and extrinsic are the two major categories of risk factors contributing to patient falls. Huang et al. [23] used the Delphi technique to create a list of extrinsic and intrinsic factors' contributing to falls. The checklist contained 10 domains: demographics, footwear, nutrition, balance, medication, medical condition or illness, fear of falls, social support, cognitive status, and environment [23]. For the fall prevention program to be effective, the fall risk assessment requires recognizing and adapting for these risk factors.

Definition of intrinsic factors

Intrinsic barriers function within a person [24]. Researchers have identified numerous intrinsic factors associated with patient falls. Intrinsic factors include history of falls, acute or chronic illness, pain, muscle weakness, unsteady gait, heart condition, cognitive status, patient behavior, vision disturbance, incontinence, orthostatic hypotension, advanced age, sleeplessness, and multiple medications [8,9,11,25-33].

Definition of extrinsic factors

Extrinsic barriers function outside of a person [24]. Researchers have identified numerous extrinsic factors as associated with patient falls. Extrinsic factors include the environmental elements, poor lighting, loose cords and tubes, slippery floors, loose floor mats, carpeted floors, design of room and furniture, equipment in walking areas, clutter, lack of walking devices, improper footwear, loose or removed shoes laces, leaving the patient alone, rooms away from nurses' station, decreased visibility of patients from nurses' station, inadequate staffing levels, and lack of implementation of evidence-based policies on falls [11,25,33-37].

Review of the Literature

Research on the inpatient mentally ill population is scarce [8]. The focus of the literature review is on patient falls in psychiatric inpatient units and additional review of research documents from medical-surgical and nonhospital settings applicable to psychiatric inpatients is present for comparison and for gaining general understanding and the extent of the problem. Fall prevention is a challenge in a hospital, especially with psychiatric patients [38].

Title Search, Articles, Research Documents, and Journals

The review of literature includes information on intrinsic and extrinsic factors contributing to patient falls and contains a handy guide to the topics of patient rights, patient safety, patient falls, and mental illness with updates on how the perspectives have changed and what is current in the field. Search strategy included journals, databases, reports, the World Wide Web, the Joanna Briggs Institute, and research documents, with the primary source as the EBSCOhost database of scholarly peer reviewed journals. The library search engines such as correlational dissertations in ProQuest, CINAHL, PsycINFO, and Nursing@Ovid from the specialized resources category facilitated the review of literature. Other sources include psychiatric articles, books, dissertations and theses, journal abstracts, founding theorists, empirical research, peer-reviewed journals, and specialized resources.

The database search included Cochrane library, MEDLINE, ERIC, Ulrich's, PEDro, PubMed, MeSH, and Web of Science. The use of Boolean operators such as "AND," "OR," and "NOT" with key words like accidental falls, hospitalized elderly, fall prevention, fall incidence, fall rates, fall risk factors, and environmental and patient safety narrowed the search.

Cozart et al. [25] conducted a review of articles concerning falls in the research literature on hospitalized patients over a 15-year period. Based on the results, Cozart et al. concluded fall prevention modalities might facilitate achievement of The Joint Commission's patient safety goal in reducing injury from falls. The rationale for the Patient Safety

Goal surfaced because patient falls result in a considerable portion of injuries on hospital inpatient units [17].

Studies addressing falls in hospitals

Falls are a growing concern in general healthcare organizations, as they result in mortality, increased cost, extended length of stay, and considerable morbidity [39]. The magnitude of falls correlates to increased costs, related to an increased length of stay in hospital after falls [40]. The Joint Commission [17] regulators declared harm from patient falls as a patient safety goal in hospitals. The rationale for the National Patient Safety Goal (NPSG.09.02.01) emerged because falls cause a significant portion of injuries in inpatients [17]. However, the existing fall assessment tools have not been helpful to healthcare professionals in eliminating patient falls [41].

The NDNQI fall data for 1,000 patient days are available on the public website [2]. The NDNQI database "has national coverage on patient outcomes and measures the nursing workforce at the patient care unit level" [2]. Despite intervention programs, the fall rate in hospitals has not decreased significantly. With the lack of improvement in patient safety data, perceptions of hospitals by competitors, inspectors, insurance providers, and the public concerning safety and patient falls could be negative in the NDNQI public website. Giordano et al. [42] claimed hospitals with psychiatric inpatient units were at a disadvantage, with the display of falls data on the HCAHPS or the NDNQI [2] website because of the high fall rate in psychiatric units.

Patient adherence: The challenge in psychiatric inpatient units is patient behavior and adherence to staff recommendations [43]. Many patients are admitted against their will and do not want to be in the hospital. Patient fall reduction strategies, such as the patient alerting nursing staff before exiting the bed, mobilizing, or using fall prevention equipment safely, depends on patient adherence [43]. Patient behavior is an important causative factor in inpatient psychiatric unit falls, but intrinsic causes such as lack of ability to follow instructions, cognitive issues, confusion, and impaired judgment also play a major role in patient compliance [26].

The history of a patient falling at home is a clue to place the patient's hospital room mattress on the floor [8]. The risk of falling related to orthostatic hypotension, which is dizziness or blood pooling in the lower extremities, is high if the patient tries to stand up quickly from a sitting or lying position [44]. The patients with altered mental status, confusion, and psychosis may not adhere to patient teaching about standing up slowly from a lying or sitting position. The challenge to keep the patients safe becomes primarily the responsibility of the hospital staff.

Costs associated with patient falls

Because insurance providers will not pay for injuries resulting from hospital-acquired incidents, the costs of addressing preventable occurrences represent a major concern for hospital administrators [45]. Costs arise not only to treat the injury but also to pay for litigation [21]. Fall-related injuries requiring medical attention and hospitalization result in increased costs and probable death within the year [46]. Promoting staff awareness of fall risks and teaching the reasons patients fall are important strategies for reducing falls in psychiatric units.

Stevens et al. estimated the yearly cost for treating patient falls in the United States in 2000 was \$19 billion [47]. Reducing harm from

patient falls minimizes costs to the patient and the insurance providers and prevents long-term changes in function as well as the loss of independence [8]. Patient falls contribute to increases in length of hospital stays and costs of care [22]. "The Department of Human Services through the Department of Medicare and Medicaid Services holds hospitals financially responsible for injury to patients from falls" [22].

Costs associated with patient safety and treating injuries from falls are the driving forces for the federal lawmakers to hold hospitals responsible for preventable injuries. The high cost of treating injuries from falls in the hospital justifies combined efforts to address safety issues related to patient falls [14]. The hospital costs include salaries for sitters for high-risk patients, physical therapy consults, and equipment needs, which may include purchase of walkers, wheelchairs, canes, or specialty beds [48]. When the patient returns home after a hospital-acquired fall, costs involve future medical bills related to the incident as well as making the home wheelchair-accessible, such as building ramps and creating access to the shower.

In a study by Findorff et al. on measurement of the direct healthcare cost of falls injury, "Costs ranged from \$63 to \$85,984, with a mean cost of \$6,606 and a median cost of \$658 per fall-related injurious event" [48]. The quality of life for the fallen patients deteriorated, and half of the people admitted to the hospital for a hip fracture did not return to the original independent living situation [48].

The hospital and the responsible staff members could also face legal liabilities for injuries caused by patient falls [48]. Increases in comorbidities, or the conditions that coexist with the primary condition, add to the risk of falls. In 12 studies investigating the hospital length of stay, the investigators found healthcare costs showed increased measures for individuals with mental health co-morbidity [38].

The approximate cost of treating falls is \$20 billion yearly, and by 2020, the expense is likely to be more than \$43 billion [6]. A severe disability or death related to a patient fall while in a hospital is one of the critical events requiring root cause analysis and reporting to CMS [37]. Literature reviewers identified the cost of patient falls as a drain to the society, with longer hospital stays and a decrease in the quality of life after a fall with serious injury [20,37].

Nursing interventions

Most interventions designed to prevent patient falls have not significantly reduced or prevented injury from falls [4]. Keech asserted nothing could prevent all falls because most prevention strategies reduce fall occurrences only by 30% to 40% [11]. Fall prevention programs consist of risk prediction instruments and the fall intervention strategies [4]. Nurses have the opportunity to engage other staff members in the team to intervene in keeping the patients safe [49]. Nurses are knowledgeable about the interventions within the sphere of nursing practice and the patients' environment in which falls are likely to occur.

Nursing interventions for intrinsic factors include identifying the patient at risk of falling, setting up a voiding schedule, monitoring cognitively impaired individuals regularly, assisting patients to the bathroom, and reviewing medications with the physician [50]. Nursing interventions for extrinsic factors include lowering the bed to the correct height if the patient's feet do not touch the floor when sitting, removing clutter, using adequate lighting, providing safety grab bars, avoiding physical restraints, and placing the sleeping mattress on the floor if the falls from the bed occur more than once [50]. A fall

prevention process includes toileting rounds, walking reports, staff training, patient education, and family education [21].

Multi-disciplinary approach: A team approach to preparing a multi-disciplinary patient care plan and its implementation is paramount because individual responses to fall prevention strategy vary [49]. Healy insisted on involving the multi-disciplinary team in fall prevention intervention because the initiatives are unlikely to succeed with nurses alone [18]. A culture change in how the staff provides care has to take place for improvement, as protecting patients from falling is everyone's responsibility, not just that of the nurses. Using the multi-disciplinary perspectives compartmentalizes issues and eases the process of defining problems and identifying solutions.

Falls, morbidity, and mortality

Falls in hospitals are a significant nursing clinical problem, with legal implications, and regulatory consequences [13]. Trauma, bone fractures and even death can result from falls, leading to psychological trauma, fear of falling and debilitation in activities of daily living [51]. Falls result in injury, pain, distress, loss of independence, and loss of confidence as well as anger toward care providers, including the family [18]. Falls requiring surgery because of sprains, concussions, and fractures occur in up to 10% of falls in hospitals [42]. Falls among older adults lead to negative treatment outcomes, increased mortality, morbidity, emergency department visits, admissions to acute care hospitals, tort litigation, and increased healthcare costs [52]. Among the elderly, professionals use fall occurrences to predict placement of individuals in a skilled nursing home. Fall injuries may result in decline of the patient's physical function and loss of confidence in self-care.

Gaps in research literature

After reviewing the literature, some deficiencies in literature were clear. An important gap in the extant literature regarding patient falls was studies examining individuals in psychiatric inpatient units [53]. Despite rigorous efforts to prevent patient falls in hospitals, gaps continued to exist in the literature, leading to inconsistency in the implementation of programs to control patient falls [54]. A knowledge gap also exists among the physicians in relation to patient falls. Physicians have reported lack of knowledge to assess fall risk or fall prevention.

Variables

In the searched literature, the variables related to patient falls included both intrinsic and extrinsic factors. In a psychiatric patient population study, Knight et al. [8] listed several intrinsic and extrinsic contributing factors for falls. Specific fall-related variables included cognitive status [55], psychotropic medications [29], age [56], staff training [57], staffing levels [36,37], use of restraints [58], scheduled toileting [59], evidence-based fall prevention policy [60], and uncluttered environment [35]. Robey-Williams et al. [53] in a PubMed search, found medications, patient gait, and prior falls as the top three risk factors contributing to patient falls in healthcare areas.

Intrinsic fall risk factors

Patient falls are generally attributable to multiple risk factors. The Nurses Improving Care for Health System Elders (NICHE) guidelines list the following intrinsic factors as contributing to patient falls:

history of falls, age greater than 75, female gender, cognitive impairment, orthostatic hypotension, and gait abnormalities [55]. The parameters of the intrinsic risk factors of patient falls in the literature included age, fall history, arthritis, Parkinson's disease, diabetes, hip fracture, functional disability, depression, dementia, cognitive status, balance, visual problems, incontinence, inappropriate footwear, and medications such as psychotropics and anticoagulants. Among the multiple reasons patient falls occur are balance, decline in vision, lack of strength, and medications causing dizziness [61]. In the psychiatric inpatient unit, multiple medications for numerous patient conditions [62] and cognitive status [55] are the major concerns. Intrinsic fall risk factors have categories of medication use, balance problems, and visual impairment [63].

Intrinsic factors related to patient condition: Investigators studying the hospital length of stay and healthcare costs confirmed increased measures for individuals with co-morbidities or multiple medical problems in addition to mental health issues [64]. Several fallen psychiatric patients experienced the co-morbidity of a heart condition [1,8,18]. Co-morbidities such as diabetes, stroke, Parkinson's, and arthritis are also risk factors for falls [55]. In a study, Brown et al. [1] identified 26 fall predictor variables, of which the three statistically significant were cardiovascular disorder, antipsychotic medications, and psychosis.

The increased risk of falls among individuals with cardiovascular problems is consistent with a study reporting similar findings in the Archives of General Psychiatry [65]. Knight et al. [8] found significantly higher heart rates for patients who fell in a psychiatric unit, but the scope of their study did not establish the causes of increased heart rates. Increased heart rates may be an indicator of fall risk, whether the problem is attributable to the condition of the patient or to medications. Fall prevention strategies such as identifying cardiovascular causes of falls and medication review may help prevent falls [18]. Fall risk assessment tools primarily measure intrinsic factors [53].

Serious intrinsic risk factors requiring immediate attention include medications, confusion, toileting, gait, agitation, orthostatic hypotension, sleeplessness, and acute psychosis. A hospital quality improvement drive to monitor medication treatment for patients with risk of falling resulted in the reduction of fall rate per 1,000 patient days from 6.0 to 0.46 [8]. Although medications have strong links with patient falls, the risks are treatable through adjustments in medications, in consultation with the physicians.

Medications: Complex medication regimens contribute to risk of falls [62] and medications used for treating psychiatric conditions place the patient at risk for falls [9,66,67]. Histamine blockers, benzodiazepines, sleep aids, alpha-blockers, psychotropics, lithium, antidepressants, mood stabilizers, and anticonvulsants are important fall predictors in psychiatric inpatients [27]. Estrin et al. [68] examined fall data in a mental health unit for a five-year period; the results revealed fallers had multiple medications, and the day of fall matched the day of somatic complaint. Fallers in the Estrin et al. [68] study suffered from a medical condition and doctors had prescribed an antihypertensive or clonazepam.

In a Swiss study, the investigators found existence of significant interactions between previous falls and intake of psychotropic medications [29]. A combination of risk factors may cause patient falls in hospitals, including the side effects of medications, acute conditions, and unfamiliarity with the unit environment [11,18]. Antidepressants

contribute to patient falls, and many investigators have found associations between antidepressants and patient falls, causing physical and psychological harm and even death [65].

In a study to investigate the associations between anti-depressant use and patient falls, investigators found wheelchairs fastened with safety belts and bed rails were useful in protecting patients who received fewer anti-depressant medications and insomnia drugs, but the mechanical interventions did not eliminate falls [69]. The use of medications for a psychiatric condition often has association with undesirable side effects in older people [70]. Howland was firm in saying, "Falls are the single most important serious complication associated with all types of prescription and nonprescription drug use in older adults" [70].

Literature review documents included studies showing relationships such as a high correlation of the measurement of the variables of patient falls and medication indicated the presence of an association between the two variables [8,9,18,63,64,66,67]. Other factors such as age [36], cognitive status [56], or noncompliance with treatment may also show associations. Psychotropic medications and co-morbid conditions make fall risk factors a serious safety issue [5,8,27].

Certain medications or combinations of medications contribute to increased fall risk. In the NICHE guidelines, high-risk medications are one of the predictors of falling [56]. High fall risk medications include psychotropics, benzodiazepines, sedatives, antihypertensives, analgesic opioids, anticholinergics, antihistamines, anticonvulsants, antiarrhythmics, and anticoagulants [56,71]. Investigators monitoring scheduled psychotropic medications for a period of 12 months with 28 patients in a dementia unit found significant decrease in patient falls by reducing scheduled psychotropic medications [72].

Nanda et al. [73] determined the chronic use of antipsychotic agents and a diagnosis of depression increased fall risk. In a retrospective study of 135 psychiatric inpatient fallers and 89 non-fallers, increased risk of falls included anticholinergic urinary bladder medications, chronic use of antipsychotic or sedative drugs, unsteady gait, confusion, delusions, dizziness, history of falls, and delirium [73]. Frequent reassessment of fall risk is essential because of changes in patient status.

Nabeshima et al. [74] conducted an analysis of falls of 364 patients in a geriatric hospital in Japan and found 80.9% of the patients who fell had three major contributing factors. Patients with the highest rate of falls included those taking a combination of psychotropic medications, experiencing ambulation problems, and suffering dementia. Researchers identified 14 independent variables, and the one dependent variable was the number of falls [74].

Knight et al. [8] noted, in a study of fall risk in psychiatric inpatients age 21-65, the 14 fallers in the period of three months took medications, which could have increased side effects such as light-headedness, dizziness, and sedation. Piraino [43] warned healthcare providers to be cautious about giving medications able to cause orthostatic hypotension, altered cognitive functioning, or dizziness, which all tend to cause falls. Reviewing medications, replacing drugs requiring multiple doses with a once-daily dose, and adjusting dosages of all medications are tips for avoiding adverse effects [43].

Unsteady gait: Unsteady gait is a common symptom observed in psychiatric patients, mostly in relation to medication use. Reductions in balance and strength contribute to risks associated with falls [30]. Medical personnel encourage psychiatric patients to attend cognitively

enriching group activities. Rutledge et al. [49] found when staff members asked the elderly known to have balance problems to engage in a “cognitive task, they may be more prone to slip or trip and fall because of postural instability.” Moreland et al. [28] affirmed assessment and treatment of lower extremity muscle strength is necessary to keep older adults from fall risk.

Patients with gait problems, frail individuals, those with neurological deficits, and the elderly are vulnerable to falls [8]. In a Swiss study, Muller et al. [29] indicated mobility disorder and altered physical exertion as causative factors in falls. Fall prevention in older individuals needs to include improving patient mobility, preventing inactivity, and addressing depression [75].

Change in mental status or confusion: Changes in mental status contribute to falls [9]. Delirium may have associations with falls in patients on neuroleptic medications. In a study of hospital inpatients, Tzeng [31] found altered mental status as the most prominent issue in patient falls. For the cognitively impaired individuals in a rehabilitation environment, unsteady gait topped the list as the noteworthy risk factor for falls [76]. Poor sense of orientation to surroundings and confusion could lead to an increase in patient falls, especially when the movement is restricted [69].

In another hospital study of fallen patients in acute care units, confusion ranked first, dizziness second, and elimination third as risk factors [77]. For patients experiencing confusion, the hospital environment may seem strange, resulting in anxiety and restlessness. Instilling a trusting relationship and reorienting the patient to surroundings throughout the day are essential [77].

Patients with cognitive problems may have inaccurate perceptions of the environment and personal abilities, leading to engagements and causing falls [8]. Individuals with Alzheimer’s and other dementia have a greater fall risk [27] and individuals with psychosis are almost twice as likely to fall, compared to individuals without psychosis [1]. Haselwanter-Schneider et al. [78] found the use of mobile micro-sensor systems as problematic in a German study investigating the future use of technological systems for fall prevention, such as the use of sensors for the cognitively impaired individuals in the inpatient and outpatient setting. Most cognitively impaired patients lack disease acceptance and are not able to put on sensor-equipped equipment [78].

The most frequently occurring fall risk factors in a psychiatric unit are disorientation, confusion, and clinical diagnosis of depression [5]. The phenomenon of wandering in older patients is a natural process of searching for familiarity and security. Harlein et al. [79] indicated cognitive impairment in older patients places them at high risk for accidental falls in the inpatient setting. The fall rate for patients with cognitive impairment was 12.9%, whereas the risk for patients without cognitive impairment was only 4.2% [79]. Wandering, restlessness, crying, agitation, resisting care, and difficulty falling asleep are some observable symptoms of pain. Toileting cognitively impaired patients prior to administering pain medication is an important intervention to avoid patient falls [12].

Factors contributing to increase in the risk of psychiatric inpatient falls include mental disorders, which reduce patient awareness of environmental hazards, and side effects of medications [80]. In an extended study, Poster et al. [80] found 35% of the fallers required immediate medical intervention and 48% of the falls occurred in patients 60 and older. The greatest risk of falls was for psychotic patients 60 and older [80].

Toileting: In a Michigan hospital study, Tzeng [60] found 45% of patient falls as associated with toileting, and the general theme of the qualitative responses centered on falls on the way to the bathroom. Falls occur when a patient is ambulating [69] Care providers need to modify toileting assistance and individualize the assistance to target the most vulnerable times of day or patient populations. The staff needs to remain in the bathroom within reach of patients with high fall risk.

Falls in inpatient psychiatric units often occurred while ambulating to the bathroom, standing up from a sitting position, or exiting out of bed [5,81]. Patients cannot avoid ambulation in an inpatient psychiatric setting, because the staff prompts most patients to attend groups and activities [82]. Incontinence problems make patients vulnerable to falls when making urgent trips to the bathroom [83]. Even though patient safety is the priority, Healey [18] suggested balancing safety with feelings of privacy, dignity, independence, and rehabilitation as important to the individual. An individual who is not encouraged or permitted to walk will soon be unable to walk [18].

Hydration deficiency: Low hydration can lead to problems, such as decrease in cognition, increased falls, and decreased functional status of patients in a psychiatric unit [84]. An intravenous medication to hydrate the patient is not a common practice in psychiatric units because of the suicide risk caused by intravenous tubes and safety hazards related to equipment. Patient hydration problems can lengthen hospital stay, delay treatments, increase treatment costs, and elevate mortality rates [84].

Of the 202 reviewed records of patients in a geriatric psychiatric unit, the most common diagnosis represented depression with psychosis and dementia [84]. Forsyth et al. [84] found the length of stay in the records averaged 10 days, and heart problem was a common diagnosis. Bedridden patients suffered more dehydration because the immobile condition lowered the ability to eat or drink independently.

Extrinsic fall risk factors

The parameters of extrinsic risk factors of patient falls included wet or uneven floor surfaces, poor lighting, unlocked beds, flimsy furniture, lack of grab bars in bathroom and hallways, adaptive aides not working properly, clothing creating a tripping hazard, and tubing of various kinds used in healthcare. Addressing the extrinsic risk factors includes staff training [85], staffing levels [36,37], use of restraints [58], scheduled toileting [59], evidence-based fall prevention policy [60], and uncluttered environment [35].

The Joint Commission [16] guidelines require healthcare participant members to conduct comprehensive assessments of fall risk factors in hospitals and to take action to promote patient safety. Most fall assessments contain only intrinsic factor measurements [53]. Extrinsic safety risk factors include staffing issues, lack of walking devices, design of room and furniture, poor lighting, improper footwear, and the environment [36]. The unfamiliar physical environment can make the hospital a hazardous and unpredictable place for the older hospitalized patient [17]. An improved facility design with fall hazard prevention in the blueprint could lead to better outcomes for the patient.

The age factor: “One-third of adults 65 and older, living in the community, fall each year. Falls are associated with increased morbidity, mortality, and nursing home placement” [86]. Most patient falls have more than one cause. Rao affirms risk factors for falls include weak muscles, prior falls, multiple medications, arthritis, age older

than 80, depression, impaired balance, poor judgment, and visual problems. Rao [86] suggested use of multi-factorial interventions for older folks, as practiced in some nursing homes, such as exercises for strengthening muscles, balance training, and withdrawing psychiatric drugs.

Some older patients experience sensory deficits and similar shortfalls in all areas of functioning increase during times of acute illness. Sensory deficits, cognitive impairment, medication use, and increasing age all contribute as risk factors for falls [11]. Decline in vision is also a major risk factor for falls [61]. Hignett et al. [63] asserted mainly extrinsic factors caused patient falls among patients 65-74 years, whereas the 80 and above group experienced more falls from intrinsic factors. Adjusting medications and constant supervision of the age 80 and above patient group are important interventions [63].

An et al. [81] and Vaughn et al. [15] confirmed most published articles on patient falls focused on the older population outside the inpatient psychiatric setting. Psychotropic medications may add to falls by causing sedation, visual changes, heart rhythm changes, confusion, blood pressure changes, unsteady gait, and tremors [70]. Addition of psychotropic medications may exacerbate the problem of falls in the elderly [87]. Knight et al. [8] posited younger patients in psychiatric units face fall risks similar to those of older patients because of comorbidity or presence of multiple conditions or disorders in addition to a primary mental health disease, and the use of multiple medications by a patient.

Patients of all ages fall, with older patients experiencing the most serious injuries. Mahoney [42] found more falls occurred in geropsychiatric, or inpatient psychiatric units caring for older adults, than in areas such as obstetrics. In a study by Robey-Williams et al. [53] the age of the individual ranked fourth as a fall risk factor only after medications, history of falls, and gait. Patients in psychiatric units, regardless of age, may experience altered mental status and confusion. Some healthcare organizational researchers leave out younger patients because of increased fall incidence in the older population, but researchers have found patient gait is a better indicator of falls than the age of an individual [53]. Independence and health may decline because of falls in people 65 and older [61].

Fall prevention is a challenge in the hospital, especially with psychiatric patients, because mentally ill individuals often cannot process and understand information, weigh risks and benefits against alternate courses of action, articulate and defend choices, or make informed decisions regarding institutionalization or hospitalization [64]. The mentally ill are a vulnerable patient population [64]. What makes a psychiatric patient vulnerable is the mental disability or the underlying disease.

Preventable extrinsic factors: Hospital staff can prevent some extrinsic factors through efforts in patient education, positive reinforcement, and family support. Patient compliance and acceptance of the disease as a treatable problem are important in the prevention of falls. A holistic approach by the healthcare provider may also be helpful to understand patient needs. Researchers have identified numerous extrinsic factors such as unlocked bed wheels and unstable furniture as associated with patient falls [63].

Improper assessment, poor maintenance of floors and equipment, inadequate communication, lack of training, and inadequate help could be additional reasons for negligence. Extrinsic fall risk factors include footwear, bed alarms, staffing levels, lighting, flooring, and patient assessment [63]. Patients admitted to the psychiatric units have

their shoelaces removed as a suicide precaution measure and patients may walk around in shoes without laces, which could result in a trip and fall. Improper footwear contributes to the risk of falls [88]. In an Australian study, researchers found nonslip mats, sensor alarms on the bed, patient education, and volunteers to help with observation resulted in a reduction from 12.5 to 10.1 falls for 1,000 patient days [89].

Behavioral risk factors reflect the choices made by the patient. Feldman et al. [90] claim, risk-taking behaviors of patients are those increasing the likelihood of adverse physical consequences, such as a fall. Examples of behavioral risk factors include pacing after taking medications, not turning on the lights when using the bathroom at night, being unable to sit still, not using handrails, wearing improper footwear, and using outdated prescription glasses [90]. In a Scandinavian community study, Evron et al. [91] found older people at risk for falls often admitted to having a problem but declined participation in fall assessment programs because of the fear of losing authority and potentially suffering entrapment in the healthcare system. To engage the elderly in fall prevention, Evron et al. [91] recommended refocusing strategies of fall prevention from disease control to promotion of health.

The extrinsic factors can be both human and environmental. In the NICHE guidelines, the following conditions appear as extrinsic factors contributing to falls [55], unsafe floors, poor lighting, use of physical restraints, indwelling catheter tubing, and intravenous tubing. The Joint Commission officials reported physical setting as the cause of patient falls in 44% of cases [63].

The human factor issues cited by The Joint Commission reports were patient assessment, communication, and staff training [64]. Staff education, patient assessment, adequate patient supervision, and appropriate design of the furniture, room, and unit can help prevent human and environmental extrinsic fall risk factors [36]. Understanding the factors contributing to falls can cause them to be less frequent or prevent them, to a certain extent [75].

Environmental factors: Environmental hazards such as the height of the bed and the kind of furniture contribute to fall risk [36] as do loose cords, tubes, design of room, furniture, and clutter. Additional environmental issues such as the types of floors and the lighting add significant risks leading to patient falls [6]. Haines et al. [92] completed a six-month study to assess the use of low beds to avoid falls and reduce harm from falls in hospitals. The researchers discovered no noteworthy variation in the number of falls for 1,000 patient days between patients in regular beds and those in low beds [92].

The purpose of floor mats is to reduce severity in patient falls from the bed or at the bedside; however, some floor mats cause elderly patients with normal and impaired gaits to lose balance while stepping onto the floor. The beveled edge of the mat may shift the patient's center of gravity when trying to exit from the bed. Good lighting in patient rooms and bathrooms, removing furniture between the bed and bathroom, installing handrails in the patient care areas including the bathrooms, and regular maintenance of furniture are essential for fall prevention [35]. Fonad et al. [69] established significant correlation between fall risk and wheelchair use and recommended the use of bed rails and safety belts for patients who use benzodiazepines and sleep medications.

Using bedrails in the hospital setting is a topic of debate in long-term and acute care areas. Bedrails, initially introduced in 1949 to help prevent falls and assist in positioning and transferring patients to and

from the bed, did not serve the intended purpose [93]. Nowicki et al. [93] discovered raised bedrails put patients at greater risk of injury by entrapment within or under the rail and increased the distance the patient might fall if attempting to climb over the bedrail.

Bowers et al. [94] investigated the severity of injuries in falls from the bed to a tiled floor versus onto a floor mat. Bowers et al. [94] found a 25% chance of head trauma occurred when falling from the bed to a tiled floor. Bowers et al. [94] also noted an increase in injury risk of about 40% after a fall from above the side rails to the tiled floor, while the risk of injury decreased to less than 1% with the floor mat present. "Floor mats and height adjustable beds positioned to the lowest height should be used to decrease the risk of injury associated with falling from bed" [94].

Human factors: Falls occurred during shift changes. Spanke et al. [95] recommend walking reports to reduce falls and decrease call light use. In another study, Wayland et al. [21] determined patient fall rates were highest between midnight and 4:00 in the morning. Staffing levels, staff training, organizational culture, and evidence-based policies can make a difference in the delivery of patient care.

Rutledge et al. [50] in a literature search, identified lower staffing ratios as a contributing factor in patient falls. Rutledge et al. [50] recommended heightened precaution whenever staffing was low, and Tzeng et al. [36] associated patient falls with inadequate staffing. Administrators need to make unit-staffing decisions from treatment requirements of the patients rather than the staffing ratios [33].

In a literature search, Rutledge et al. [50] found staff training enhanced staff awareness of fall risk factors. Vere-Jones [37] reported psychiatric staffing levels were unsafe and the demands of administrative tasks and paperwork were heavy, requiring nurses to be away from direct patient care. Staff knowledge about fall risks and interventions were more important in reducing falls than the nurse-to-patient staffing ratio and delays in answering call lights for patients at high risk may result in falls [25].

Tzeng et al. [17] stated a fall reduction program should connect causes to cures and should hold frontline nurses responsible to ensure successful implementation and improved outcomes. Researchers have not explored one-on-one staffing for high fall risk patients enough to determine its effect. A downside of one-on-one staffing is the extra attention for one high-risk patient may mean fewer staff for other individuals [83].

Restraint use

Restraint use to prevent patient falls seemed logical in the past [25]. The strategy, although intended to reduce falls, may instead only increase the risk because of the restlessness, confusion, combativeness, and agitation surrounding confinement [25]. Examples of physical restraints include ankle ties, soft wrist restraints, mittens, belts tied to bed or chair, side rails on beds, geriatric chairs, vest restraints, and leather restraints. Extensive use of Posey vests to prevent falls existed prior to the 1987 Act [59].

Physical restraint, formerly recognized as the primary method of maintaining safety in fall prevention in acute care units of the hospital and the nursing homes, continues to prevail in acute care units [96]. Patients at risk of physical restraints are those interfering with medical devices like ventilators and chest tubes, wanderers, fall-prone individuals, patients resisting care, and individuals who are an imminent danger to themselves or others. Medications given to control

behavior have side effects and may contribute to movement disorder, cognitive dysfunction, and patient falls. Problems associated with restraint use are loss of function, pressure ulcers, delirium, asphyxiation, immobility, severe falls, and agitation [48].

Hartikainen et al. [97] claimed the main groups of psychotropic medications associated with increased fall risk could affect the central nervous system and include antipsychotics, benzodiazepines, and antidepressants. Woolcott et al. [98] asserted adding sedative hypnotics to the list of problem psychotropic medications might cause patient falls. Application of physical restraints is a last resort for behavioral management or medical-surgical needs. Although physical restraint use is a risk factor for falls, medical and nursing professionals rarely use restraints in psychiatric units, and staff members provide one-on-one supervision for patients in restraints [82].

Hughes et al. [99] claimed medical professionals usually administer chemical restraints to agitated psychiatric patients for behavior control rather than initiate physical restraints. A medication is a chemical restraint if the patient receives the agent to sedate, subdue, and control behavior [99]. Constant observation and supervision of cognitively impaired patients are important interventions to assure safety. Hayes [100] recommended an inter-professional, multi-disciplinary team approach, the use of hip protectors, and regular exercise for falls and injury prevention. Reducing or eliminating the use of restraints in managing patient falls upholds ethical principles and the rights of the individuals.

Fall risk assessment

The purpose of risk assessment instruments is to allow healthcare professionals to measure the patients' intrinsic fall risk factors, although the tools may not be useful in assessing the patient's functional status [53]. Nanda et al. [73] claimed fall assessment instruments developed for other population groups could not accurately predict the risk of falls in older psychiatric inpatients. Joanna Briggs Institute researchers found the hospital-based fall risk factor assessment tools ineffective in preventing falls because of lack of accuracy in identifying individuals at fall risk [14]. Laissez-faire type of safety planning may result in failure to accomplish fall reduction goals. Myers [14] listed 32 fall risk factor assessment tools, with most popular domains as mental state, 29; unsteady gait, 27; history of falls, 25; and medication, 22. According to the Joint Commission guidelines, a risk assessment must be specific to the population served [16]. Rutledge et al. [49] reasoned the general failure to decrease fall rates in hospital settings might stem from the failure to consider the environmental context in the assessment, which Unsworth [101] insisted include a patient's vision and sensory deficits.

Preventive care enacted by the United States Congress effective 2011, included provision for educational services as well as programs designed to reduce risk factors and improve physical activity, weight loss, self-management, and fall prevention [102]. Most psychiatric patients have compromised learning ability and cognitive status and could find the recommendations in the Federal Register difficult to follow because of cognition problems [55]. Unsworth [101] insisted, assessments of falls should include a review of intrinsic factors such as past medical history, mobility, medications, vision, footwear, and lower extremity functioning, as well as extrinsic factors such as slipping, tripping, and other environmental hazards in preventing falls.

For vulnerable individuals, safety assessments and functional ability for issues such as prevention of falls need to take place on a regular

schedule [102]. Tsai et al. [5] asserted proper identification and precise assessment of individuals at risk as important components of fall prevention programs. While authorities have established no standardized tool for fall risk [4], assessment tools combining multiple fall risk factors may be better predictors of fall risk [53].

Morse [4] claimed many of the fall prediction instruments in use had not been successful in identifying fall risk accurately. Researchers have not tested many fall detection instruments used in the clinical areas in the right setting. Morse [4] warns improper use of fall scales in the clinical area may exacerbate patient fall risk and injury.

Comprehensive assessments of fall risk need to take place in healthcare organizations, with action taken to promote patient safety. Regulatory and professional agencies require provision of patient safety education for staff to improve health outcomes. The Joint Commission [16] officials evaluate hospital staff education, patient teaching, and the effectiveness of fall reduction activities.

Summary of Review

Multiple intrinsic and extrinsic problems contribute to the safety issues of the elderly related to falls. Healey [18] suggested involving the entire team of pharmacists, doctors, therapists, and the facilities staff in fall prevention intervention was vital, because the initiative was unlikely to succeed with nurses alone. The high cost associated with falls substantiates the need for a team approach to address safety issues related to injuries [38]. The providers need to review all medications to prevent drug-drug interactions, because some medications are more or less risky than others [87]. Nurses can be patient advocates and request safer options to inappropriate drugs. The interdisciplinary team members need to address drug management, strength, balance, and gait for older adults receiving psychotropic drugs.

Systematic review indicates comprehensive assessment and intervention can reduce patient falls up to 30% [103]. The literature has provided information about the lack of safety measures related to patient falls and the neglect of the psychiatric inpatient population in falls investigation [8]. The key direction for the future, based on current literature, is to consider additional research studies on patient safety related to falls in the psychiatric inpatient population. Hospital administrators need to consider also the extrinsic factors in designing new hospitals or planning renovations [17].

Ample information on the variables was available in the review of literature. Patient falls in psychiatric inpatient units are common and represent a significant burden, resulting in higher treatment costs and prolonged hospital stay [36,45]. Multiple factors associated with fall risk are increased age, co-morbidities, impaired functional status, confusion, and frailty [19]. Hospital staff can reduce patient falls, with education and improvements in the environment, but cannot eliminate falls.

Conclusion

Numerous literature documents the burden of patient falls, however, several inconsistencies in the research on psychiatric inpatient falls appeared in the review. The lack of evidence-based fall risk assessment tools that measure both intrinsic and extrinsic factors was of great concern. Factors contributing to patient falls were identified as about 56% intrinsic and 44% extrinsic. The key findings in the literature were multiple causes, such as polypharmacy, the cognitive status including confusion, prior fall, and balance problems. Based on the review, the

priority for fall prevention should include multifactorial patient assessment and intervention, staff training, adequate supervision, and team communication.

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