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The Relationship Between Individual Perception of Perceived Susceptibility of Fall Risk and Fall Risk Level among Elderly Adult Patients Admitted in Acute Care Setting in a Saudi Arabian Hospital (KSFAH)

Zuhur Altaymani, PhD, RN, MSN, BSN. Primary researcher

Nursing Education Manager at KSFAH (king salman forces armed hospital)

zuhuraltaymani@gmail.com

Dana M. Hansen Ph.D., APRN, ACHPN, FPCN

Associate Professor

dhansen1@kent.edu

Amy Petrinec, PhD, RN

Associate Professor

apetrine@kent.edu

Jo A. Dowell, PhD, APRN-CNP, PNP, FNP-BC, CFNE

Associate Professor, Co-Director of PhD Program

Email: jdowell1@kent.edu

Donna J. Bernert, PhD, LSHE

Associate Professor, Health Education & Promotion

Email: dbernert@kent.edu

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Abstract

Falls are a significant public health concern for the elderly population. This study investigates the relationship between individual perception of perceived susceptibility to fall risk and fall risk level among elderly adult patients admitted to an acute care setting in a Saudi Arabian hospital. A convenience sample of 150 patients aged 60 to 89 years was enrolled in the study. The perceived susceptibility to fall risk was measured using a scale with high internal consistency (Cronbach's alpha = 0.87). Fall risk was assessed as a dichotomous variable (No Fall Risk or High Fall Risk). The results revealed a significant association between individual perception and fall risk level, with higher perceived susceptibility scores in patients classified as No Fall Risk compared to those in the High Fall Risk group ($p < 0.001$). The study also explored the impact of demographic variables, frailty, and high-risk medications on fall risk. Binary logistic regression analysis indicated that age and frailty were positively associated with an increased fall risk, while the use of certain high-risk medications was associated with a decreased risk. These findings contribute to the understanding of how individual perceptions and frailty influence fall risk and can inform the development of targeted fall prevention interventions for elderly patients in acute care settings. This research adds to the limited existing literature on perception and fall risk, particularly in the context of the Saudi population, and provides valuable insights for healthcare practitioners seeking to enhance fall prevention programs and patient outcomes.

Keywords: *Individual Perception; Perceived Susceptibility; Fall Risk; Elderly Adult; Frailty; Saudi Arabia*

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1. Introduction

Fall-related injuries are a major public health concern among the elderly. Each year, one in every three persons aged 60 and older falls (Chopik et al., 2018). Individual perceptions of falls among older persons, or the "elderly," differ between cultures and generations, hence no precise description exists. Other variables that contribute to the concept of 'elderly' include social, economic, and temporal aspects, such as frailty, which is found in 80% and 85% of elderly men and women, respectively (Chopik et al., 2018). Globally, anyone above the age of 60 is considered elderly, and there were around 810 million elderly people in 2012, with two-thirds of them living in developing nations. This figure is expected to rise to two billion by 2050. In 2012, there were 1.4 million Saudis over the age of 60 in Saudi Arabia alone. By 2050, the figure is predicted to rise to 10 million.

Falls are the primary cause of injury-related deaths and the most common cause of nonfatal injuries and trauma hospital admissions (Sihag et al., 2021). Any unintentional descent to the floor, with or without injury to the patient, is considered a patient fall. These are the most frequently reported adverse hospital events and the second most prevalent cause of patient injury (Huynh et al., 2020).

The individual's perception of fall risk is a crucial determinant in falls among the elderly. Individual views of vulnerability, severity, obstacles, and advantages are examined using the Health Belief Model (HBM).

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Individual fall perceptions in the elderly are studied infrequently, and especially less so in the Saudi population.

Many of the variables that increase the likelihood of falls in any context are directly related to risk factors present at the time of the fall and may be intrinsic or extrinsic (Sihag et al., 2021). Age, past falls, co-morbidities, walking style, visual, auditory, or cognitive impairment, and musculoskeletal difficulties are some of the fundamental variables.

Environmental circumstances, mobility challenges, the environment, assistance equipment in toilets, lighting, footwear, and medications such as opioids, benzodiazepines, and some antidepressants are examples of extrinsic factors (Graham, 2012; Huynh et al., 2020; Sihag et al., 2021). Heart drugs, such as anti-hypertensives, analgesics, and diuretics, as well as the overall number of medications taken by a patient, are also strongly connected with falls (Fonad, 2022). Cardiac medicines and analgesics have been identified as one of the major risk factors in adult falls, particularly in patients over the age of 65 due to concomitant co-morbidities (Hohtari-Kivimäki et al., 2021; Fonad, 2022; Jindal et al., 2019).

Falls in the community appear to be a possibility at times. Hospitals must create a safe atmosphere while still providing high-quality patient care. Despite the availability of fall prevention methods, up to 12% of patients in the United States (700,000 to 1,000,000) fall at least once during their hospitalization (Graham, 2012; Kalisch et al., 2012; WHO, 2015). Falls

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with injury, on average, lengthen hospital stays by 6.3 days and add roughly $13,000 to total hospital expenses (WHO, 2015). The predicted cost for hospitals to treat these injuries by 2021 is $54.9 billion (WHO, 2015). Examining linkages between intrinsic and extrinsic factors guided the science around fall perceptions of elderly Saudi Arabia hospitalized patients, given the enormous impact on patients and health systems.

1.1 Problem Statement

With an aging population, there are considerable direct and indirect implications on healthcare systems from the accompanying increase in falls. We still don't know what variables lead older persons to put themselves at risk of falling, despite tools and other measurements to assess fall risk and countless methods to help prevent falls.

The perception of an individual is complicated and multi-dimensional. It serves as the foundation for a person's decision-making process (Glanz et al., 2002; Salovey & Steward, 2004), and its distinguishing characteristics include awareness and comprehension. The current literature has examined patient perception in relation to topics such as patient engagement and self-efficacy, but fall risk has received less attention (Garcia et al., 2012).

1.2 Research Objective

The aim of this study was to examine the relationship among individual perceptions related to risk for falling by examining their perceived

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susceptibility frailty, and fall risk level (no risk, high risk) among older adult patients admitted in an acute care setting in a Saudi Arabian Hospital (KSFAH).

1.3 Research Question

There is a relationship between individual perception of perceived susceptibility to fall risk and fall risk level among elderly adult patients admitted an acute care setting in a Saudi Arabian hospital (KSFAH)?

2. Literature Review

2.1 Fall Risk Factors

The risk of falling increases with the number of risk factors present, and the prevalence of numerous risk factors increases with age, according to Sharif et al. (2018). Falls are caused by a variety of factors, which can be classified into four categories (one intrinsic and three extrinsic): biological factors such as age, gender, chronic illness, physical and cognitive decline; socioeconomic factors such as low income, a lack of community resources, limited access to health and social services, and inadequate housing; environmental factors such as poor building design, poor lighting, slippery floors and stairs, and cracked or uneven sidewalks; and behavioral factors like multiple medication use, lack of exercise, inappropriate shoes (Huynh et al., 2020; Sharif et al., 2018).

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Despite normal nursing education about fall prevention, patients have views about their own risk of falling that influence intrinsic and extrinsic risk variables as well as adherence to fall-prevention measures (Ahn & Oh, 2018). Strategies to minimize falls have limited behavioral change effectiveness, particularly when patients do not perceive they are at danger (Cameron et al., 2018; Huang et al., 2015).

Patients' individual perceptions of fall risk are influenced by variables such as a lack of awareness and understanding about their disease, a lack of social support, and a lack of self-control or motivation to engage in health promotion behaviors (Ahn & Oh, 2018). The impact of these elements varies from community to community. Despite a growing body of research indicating characteristics that raise awareness of perceived fall risk in older patients, few studies have looked into those aspects in the Saudi population.

2.2 Patient Falls in Saudi Arabia

There is one known Saudi Arabian study that identifies risk factors associated with falls injuries among patients at the King Abdul-Aziz University Hospital (Bergen et al., 2016). The data from 108 participants (58 who had fallen, 50 who acted as a control group) revealed that 98% had fall-related hospitalizations, 85% of which were complicated by fractures, and 12% by cerebral bleeding. Patients over the age of 60 were more likely to fall and have a fall history (p 0.001), self-identified as nonsmokers (p 0.001), and had a fall-related hospitalization (p 0.001).

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Those having a history of anemia were less likely to fall [28 (48%) (p 0.001)] than those who were not anemic. Individuals are at a high risk of experiencing multiple falls, with the possibility of consequences such as fractures. More research is required to help improve patient outcomes while lowering treatment costs and the need for long-term care.

To educate patients about falls, KSAFH employs verbal education in addition to posters and handouts. All falls must be recorded to the Occurrence-Variance-Accident (OVA) system at the hospital. Even when a registered nurse delivered fall prevention education, the hospital's Quality Improvement and Patient Safety Department reported an increase in adult patient falls in the acute care setting in 2020. Few studies have shed light on the elements that influence, predict, or shape a patient's perception of fall risk. Evidence of the role of the patient's feeling of safety and fall prevention practices is particularly lacking.

2.3 Age

Age is one of the strongest determinants of fall risk, with the elderly being the most vulnerable. The term 'elderly' is difficult to define because it differs among countries, cultures, and generations. From a social, economic, or chronological aspect, a person can be called elderly. The United Nations (UN) uses 60 years of age as the general reference point to designate someone as elderly. Age, history of falls, gait impairment, dizziness, hypotension, and visual impairment were found to be the most frequently reported factors in falls by Tasi et al. (2020). More than 30%

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of adults over the age of 65 and 50% of people over the age of 80 are predicted to have had at least one fall every year (Tsai et al., 2020). The risk of falling increases with age in those 85 and older due to deterioration of overall health status; among those with outstanding overall health status, there was no greater risk of falling in individuals 85 and older compared to those 65-84 years of age.

2.4 Gender

The evidence is unclear on gender as a risk factor for falls. Some research, like the CDC's 2020 statistics, show that women are at a higher risk of falling, whilst other studies show that men are at a higher risk of falling. Several researchers discovered distinct correlations between gender and other risk factors that may help in assessing fall risk. Stroke, dietary risk, post-secondary school degree, eye condition, widowed/separated/divorced marital status, and arthritis were revealed to be independently related to considerably higher risks of falls in men (Tasi et al., 2020).

2.5 Women

Stroke, age 85 years or older, nutritional risk, mobility, vision impairment, consumption of at least 1 alcoholic drink per week, use of 5 or more medications, and diseases such as arthritis, diabetes, Parkinson, and osteoporosis were all significant independent predictors of falls in women (Ambrose et al., 2013; Sasidharan et al., 2020; Tsai et al., 2018;

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Vicky & Minh, 2015). Khongboon and Kespichayawatt (2021) revealed substantial risk variables in addition to these correlates. These included residing in a rural area, working in the previous seven days, a lack of/excessive exercise, and smoking. Eleven Asian studies indicated a 15-20% fall rate among the elderly, with females having a higher fall incidence (Ngamsangiam & Suttanon, 2020). Dependence on fundamental daily living activities, cognitive deterioration, and a history of falling was also found to correspond with being female (Ambrose et al., 2013; Sasidharan et al 2020).

2.6 Education Level

The amount of education represents an understanding of fall risk and socioeconomic status. Education levels are typically associated with fall-related health beliefs and risk-reducing practices. There is a decrease in fall risk when there is a higher awareness of "perceived severity," "perceived susceptibility," and "perceived barriers." It may also explain persons with a low education level's lack of confidence in undertaking fall prevention measures, as they may have a low sense of fall risk (Lamis et al., 2012). Elderly individuals who did not complete high school had 95% more falls than those who completed their diploma and bachelor's degree (Sulaiman, 2018; Lamis et al., 2012).

A fall occurs when an individual falls inadvertently to the floor or to a lower level than their beginning position (Ngamsangiam & Suttanon, 2020). For patients who are hospitalized, falling is regarded as one of the

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most serious adverse occurrences that must be avoided by the institution (Abreu et al., 2012). According to studies, falls occur at a rate ranging from 1.1% to 22% among diverse patient categories (Vieira et al., 2018). Falls are closely related to patient safety and may lengthen the hospital stay while also interfering with the patient's recovery (Tucker, 2012). Numerous factors can impact falls, and the implications for patients can include injuries, longer hospital stays, and increased costs of care (Tucker, 2012). Pasa (2017) investigated the risk of falling in hospitalized adults in a cohort research design involving 831 patients at a university hospital. The Morse Fall Scale (MFS) was used to assess fall risk, with patients with a high risk (45 points) believed to be more vulnerable to falls. The average MFS score was 39.4 (19.4) points, with a 4.6% increase from the first to the final evaluation. These two scores had a high positive connection ($r = 0.810$; $p = 0.000$). The study concluded that patients with higher risk scores upon arrival had a higher risk score at the end of their stay.

Researchers have explored the association between falls and specific kinds of medication such as antidepressants, anticonvulsants, analgesics, psychotropics, sedatives, anxiolytics, diuretics, and antihypertensives (Lamis et al., 2012). It has been discovered that if a patient is using three or more of these medications, they are at a higher risk of falling, with each new medication in those categories increasing the chance of falling by 6% to 10% (Lamis et al., 2012; Murphy et al., 2014; Titler et al., 2011). Certain medication side effects (e.g., tranquilizers,

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anticonvulsants, and hypertensive medications) are associated with increased fall risk (Viera et al., 2013), and Tasi et al. (2020) discovered similar precipitating factors, the most important being cardiac medications, antidepressant medications, and insulin or non-insulin diabetes medications). Srivastava and Muhammad (2022) discovered dizziness from drug side effects as a key risk factor in individuals who had a stroke, syncope, or accident.

2.7 Frailty

McMillan (2012), Vellas (2012), and their colleagues produced seminal research on frailty, which is a major health risk in the elderly. Frailty is described as a diminished resistance to stressors caused by a decline in physiological capacity, which has been linked to bad health outcomes such as death, hospital admissions, and falls (Thakkar & Srivastava, 2022). The Tilburg Frailty Indicator (TFI) is commonly used to assess frailty and divides it into three categories: physical, psychological, and social variables (Chong et al., 2018). Frailty has a detrimental influence on people's daily activities and quality of life, as well as a number of unfavorable health consequences, such as an increase in emergency visits, falls, and hospitalization (Chong et al., 2018). Falls have been identified as the leading cause of accidental death and injury in older individuals (Thakkar & Srivastava, 2022). Many research have studied the association between frailty and fall risk because both are critical health concerns associated with bad health outcomes (Bandeen et al., 2015;

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Delgado et al., 2015; Hubbard et al., 2017; Joosten et al., 2014; Tom et al., 2013; Tsai et al., 2018).

The studies' findings were diverse. Some studies found frailty to be a predictor of falls (Bandeen et al., 2015; Delgado et al., 2015; Hubbard et al., 2017), whereas others found no difference (Samper et al., 2011; Tom et al., 2013). The studies used diverse measurements to assess frailty, making it impossible to compare results. A lack of agreement on frailty metrics may make evaluating frailty difficult for clinical professionals. In three investigations (Bandeen et al., 2015; Delgado et al., 2015; Hubbard et al., 2017), frailty was found to be strongly linked with future falls. Frailty was also found to be a strong predictor of future falls in hospitalized patients, and identifying frailty may lead to a reduction in fall risks (Thakkar & Srivastava, 2022).

3. Methodology

In this study, a descriptive correlational, cross-sectional research design was utilized to allow the researcher to gather data on the study's variables at one point in time and evaluate the correlations between the variables (Aggarwal & Ranganathan, 2019). Correlational research is one type of non-experimental design that is used to "look for and describe relationships that may exist among naturally occurring phenomena, without attempting to alter these phenomena" (Tavakol & Pinner, 2019 p.135). No conditions were modified or adjusted in this study. A

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descriptive correlational, cross-sectional, non-experimental design seemed adequate.

A convenience, a nonprobability sample of all adult patients admitted to the King Salman Armed Forces Hospital (KSAFH) in an acute care unit and meeting the inclusion/exclusion criteria was used to enroll the study's 150 participants.

3.1 Reliability

Table (1) Reliability

Dimensions	Item #	Items	Cronbach
Perceived susceptibility (belief about the chances of experiencing a risk or getting a condition or disease)	5	The elderly people are prone to fall	0.87
	6	Insecurities in the home and community can easily lead to falls, such as slippery floors, aisle debris, etc.	
	7	Some bad habits can cause falls, including unsuitable dressing and shoes, not using handrails, etc.	
	8	Unhealthy mental states can cause falls, such as depression	
	9	Many chronic disease and organ hypofunction can cause falls	

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In the analysis for internal consistency in the reliability study of the scale, the study found Cronbach's alpha reliability coefficients for perceived susceptibility (a=0.87).

4. Results and Discussion

4.1 Demographic Characteristics

Table (2) Sample Characteristics

Demographic Variables		Frequency	Percentage
Gender	Male	65	43.3
	Female	85	56.7
Age	60-69	77	51.3
	70-79	66	44.0
	80-89	7	4.7
Marital Status	Married	141	94.0
	Divorced	9	6.0
Education	High School	78	52.0
	Diploma degree	49	32.7
	Bachelor's degree	22	14.7
	Master's degree	1	0.7
Length of Hospitalization	Less than 1 week	88	58.7
	1 week	40	53.3
	More than 1 week	22	46.7
High Risk Medications			
Cerebral Neurovascular agents	Yes	25	16.7
	No	125	83.3
Diuretics	Yes	80	53.3
	No	70	46.7
Analgesic	Yes	121	80.7
	No	29	19.3
Antihypertensive	Yes	105	70.0
	No	45	30.0
Anticoagulant agents	Yes	56	37.3
	No	94	62.7

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Antidepressants	Yes	14	9.3
	No	136	90.7

Because no missing data were detected during data screening, all 150 patients were included in the study's overall sample. The individuals' ages ranged from 60 to 89 years. The subjects were mostly male (n = 65, 43.3%) and married (n = 141, 94%). The participants held various educational degrees, with 52% holding a high school diploma and 32.7% holding a diploma degree. 14.7% earned a bachelor's degree, and 0.7% earned a master's degree. The hospital length of stay for the majority of individuals (58.7%) was less than one week, compared to 26.7% admitted for one week and 14.7% admitted for more than a week. Participants were on a variety of high-risk drugs, including 16.7% on cerebral neurovascular agents, 53.3% on diuretics, 80.7% on analgesics, 70.0% on antihypertensive agents, 37.7% on anticoagulant agents, and 90.7% on antidepressants.

4.2 Study Variables

Table () Independent Variable

	Participant Range			
	N	Minimum	Maximum	Mean $\pm$ SD
Frailty Indicator	150	1.00	13.00	6.2 $\pm$ 3.70
Susceptibility	150	5.00	25.00	11 $\pm$ 8.8

The independent variable for this study was the perceived susceptibility.

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Table () Dependent Variable

Morse Fall Scale	Number	Percentage
No Risk	43	29
High Risk	107	71
Total	150	100

The dependent variable for this study was a fall risk, which was measured as a dichotomous variable of No Fall Risk or High Fall Risk.

Table () Normality Test

Test of Normality		
	Shapiro-Wilk	
Variables	Statistic	***p* - value**
Susceptibility	0.62	**0.001**

The Shapiro-Wilk test results indicate the individual perceptions of the susceptibility were not normally distributed, so a nonparametric test was utilized.

Table () Comparison of scores of the perceived susceptibility among fall of risk levels

	No Risk			**High Risk**			**U test Statistics (Z)**	***p*-value**
	N	Median	Mean Rank	N	Median	Mean Rank		
Susceptibility	43	25.0	126.8	107	5.0	54.9	-9.82	**0.001**

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As the data for the individual perception did not meet the assumption of normal distribution, a Mann-Whitney U test was used to compare means among fall risk levels and individual perceptions of the perceived susceptibility. The mean scores for the perception of “No Fall Risk” with participants are significantly higher than “High Fall Risk” in perceived susceptibility ($p < 0.001$).

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Table () Comparison between Demographic Variables and Individual Perceptions

Demographic Variables		HBM INDIVIDUAL PERCEPTIONS											
		Sensitivity			Susceptibility			Benefits			Barriers		
		Mean Rank	U test & H test †	*p*	Mean Rank	U test & H test †	*p*	Mean Rank	U test & H test †	*p*	Mean Rank	U test & H test †	*p*
Gender	Male	78.45	2570.5	0.43	76.85	2675.0	0.72	74.43	2693.0	0.76	76.18	2718.0	0.85
	Female	73.24			74.47			76.32			74.98		
Marital Status	Married	75.07	574.0	0.60	75.55	627.5	0.95	74.84	542.0	0.40	75.06	572.0	0.59
	Divorced	82.22			74.72			85.78			82.44		
Age	60-69	86.7	12.6	0.00	89.48	19.2	0.00	87.34	16.0	0.00	89.61	20.0	0.00
	70-79	63.9			61.58			64.02			60.45		
	80-89	61.64			53			53.57			62.14		
Education	High school	67.46	8.7	0.03	66.99	10.0	0.02	65.56	16.3	0.00	67.37	9.7	0.02
	Diploma	82.01			81.61			80.9			80.93		
	Bachelor	91.11			93.77			100.1			93.86		
	Master	40			37.5			46			40		
Hospitalization Duration	> week	76.32	9.9	0.01	75.18	12.5	0.00	75.3	8.0	0.02	76.9	5.7	0.06
	1 week	86.06			89.4			85.88			82.26		
	< week	53.02			51.52			57.45			57.61		
Cerebral Neurovascular agents	Yes	55.84	1071.0	0.01	63.76	1269.0	0.11	62.4	1235.0	0.06	68.36	1384.0	0.33
	No	79.43			77.85			78.12			76.93		
Diuretics	Yes	64.48	1918.5	0.00	62.68	1774.5	0.00	64.58	1926.0	0.00	66.59	2087.0	0.00
	No	88.09			90.15			87.99			85.69		

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Analgesic	Yes No	77.11 68.79	1560.0	0.31	76.72 70.41	1607.0	0.45	77.28 68.07	1539.0	0.24	76.67 70.6	1612.5	0.46
Anti-hypertensive	Yes No	70.68 86.76	1856.0	0.02	68.86 90.99	1665.5	0.00	70.84 86.38	1873.0	0.02	69.05 90.54	1685.5	0.00
Anticoagulant agents	Yes No	65.04 81.73	2046.5	0.01	66.7 80.74	2139.0	0.04	66.27 81	2115.0	0.02	65.97 81.18	2098.5	0.02
Anti-depressants	Yes No	57.46 77.36	699.5	0.08	59.86 77.11	733.0	0.13	63.36 76.75	782.0	0.21	61.89 76.9	761.5	0.18

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For gender and marital status, the Mann Whitney U test was employed to explore the connections between individual perceptions and demographic characteristics. For variables with more than two categories, such as age, education, and hospitalization length, the Kruskal-Wallis H test was utilized. There were statistically significant mean differences across age groups and all individual perceptual characteristics. Individual perception scores were found to be lower in the elderly. Individual perceptions of sensitivity, susceptibility, and advantages (but not barriers) fluctuate in their relative scores throughout hospitalization categories in the variable of hospitalization duration. Except for analgesics and antidepressant drugs, non-users of risk medications had considerably higher individual perception scores. The previous table contains detailed results of the Mann Whitney U test (for gender and marital status) and the Kruskal-Wallis H test (for age, education, and hospitalization).

Table () Comparison of Fall of Risk level among High Risk Medications

High Risk Medication	Morse Fall Scale (MFS) Risk Level				Chi-Square	*p*-value
	No Risk		High Risk			
	N	%	N	%		
Less than 3 medications	36	70.6	15	29.4	66.41	0.001
3 or more medications	7	7.1	92	92.9		
Total	43	28.1	107	71.3		

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There is a link between four high-risk medications: cerebral neurovascular agents, diuretics, antihypertensive medicines, and anticoagulant drugs. Participants taking these high-risk drugs had a significantly increased chance of falling (p0.05). In terms of participants taking several medications, the risk of falling was found to be considerably higher for those taking three or more prescriptions. The results of the Chi-Square test are shown in the preceding table.

Table () Comparison of Demographic Variables and Frailty

Demographic		**Frailty**		
Variables		Mean Rank	U test & H test Statistics†	***P***
Gender	Male Female	71.59 78.49	2508.5	**0.332**
Marital Status	Married Divorced	76.51 59.61	491.5	**0.255**
Age	60-69 70-79 80-89	60.45 88.8 115.64	21.654	**0.001**
Education	High School Diploma Bachelor's Master's	84.78 70.21 53.36 97.5	10.379	**0.016**
Hospitalization Duration	Less than 1 week 1 week More than 1 week	77.75 63.66 88.02	5.095	**0.078**
Cerebral Neurovascular agents	Yes No	113.02 68	624.5	**0.001**
Diuretics	Yes No	87.26 62.06	1859	**0.001**

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Analgesic	Yes	74.02	1575.5	**0.391**
	No	81.67		
Antihypertensive	Yes	75.39	2350.5	**0.961**
	No	75.77		
Anticoagulant agents	Yes	78.46	2466.5	**0.518**
	No	73.74		
Antidepressants	Yes	95.46	672.5	**0.069**
	No	73.44		

† **U statistic for gender, marital status, risk medication, & H statistics for age, education, and hospitalization.**

Mann Whitney U test for gender and marital status was used to discover differences between demographic characteristics and frailty. For variables with more than two categories, such as age, education, and hospitalization length, the Kruskal-Wallis H test was utilized. Frailty levels were found to be statistically greater in people aged 70 to 79. Individual views and frailty scores were also reported to be considerably diverse across educational categories. In terms of risk drugs, patients who used Cerebral Neurovascular and Diuretic medications had considerably greater frailty scores than those who did not.

Table () Comparison between scores of Tilburg Frailty Indicator (TFI) and Fall Risk level

Risk Level	N	Mean	Median	Mean Rank	Sum of Ranks	Mann-Whitney U	*Z*	*p*-value
No Risk	43	3.0	3.0	36.43	1566.50	620.500	-7.02	0.001
High Risk	107	7.5	7.0	91.20	9758.50			

A non-parametric Mann Whitney U test was utilized to identify any link between TFI scores and Fall Risk (No and High Risk), and mean rank

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scores of the High-Risk categories were considerably higher than the No Risk Category (p =.001).

3.4 Prediction of Fall Risk with Respect to Demographic Variables, Individual Perception Scale, and Frailty Scale

We used a binary logistic regression analysis to predict fall risk, with fall risk level as a binary dependent variable and demographic characteristics and frailty scores as independent (predictor) variables.

Table () Binary Logistic Regression Model for Fall Risk

Variables in Equation						
	B	S. E.	Wald	df	Sig.	Exp(B)
Age	1.061	.504	4.437	1	.035	2.888
Education	.140	.189	.546	1	.460	.870
Hospitalization duration	.119	.570	.044	1	.835	.888
Cerebral Neurovascular agent	20.540	5686.312	.000	1	.997	.000
Diuretics	3.644	.983	13.748	1	.000	.026
Antihypertensive	4.484	1.161	14.907	1	.000	.011
Anticoagulant agents	3.490	.940	13.790	1	.000	.030
Frailty	.980	.274	12.771	1	.000	2.664

Gender, marital status, antidepressant, and analgesics are insignificant in Block 0 (Beginning Block), so we eliminated them from the model and moved on to age, education, hospitalization duration, cerebral nervous agent medication, diuretics, antihypertensive, anticoagulant agent, and frailty scale. A statistically significant model exists, with chi-square =

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69.9, p = 0.00. The model explained 53.4% of the variance in fall risk (Nagelkerke R2) and properly identified 82.7% of the cases.

Gender, marital status, antidepressant, and analgesics are insignificant in Block 0 (Beginning Block), so we eliminated them from the model and moved on to age, education, hospitalization duration, cerebral nervous agent medication, diuretics, antihypertensive, anticoagulant agent, and frailty scale. A statistically significant model exists, with chi-square = 69.9, p = 0.00. The model explained 53.4% of the variance in fall risk (Nagelkerke R2) and properly identified 82.7% of the cases. Age, CNS medicine, diuretics, antihypertensive, anticoagulant agents, and frailty are all related with an increased risk of falling. When all other independent variables were held constant, a one-unit increase in age resulted in a 2.8-fold increase in fall risk. Similarly, when all other independent variables were held constant, a one-unit increase in frailty scores resulted in a 2.7-fold increase in fall risk. In terms of risk medication use, diuretic, antihypertensive, and anticoagulant medicines were associated with a decrease in risk. This means that when the use of these medications increases, so will the danger.

Table () Binary Logistic Regression Model for Fall Risk

	Dependent Variable	**Independent Variable**	**B**	**Wald**	**Exp (B)**	**Chi-Square**	***p*-value**	**Nagel-kerke R^2**	**Predicted % (corrected)**
Model 2	Fall Risk	Susceptibility	-0.43	34.96	0.65	158.0	0.00	0.93	**98.70**

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A stepwise strategy was used to build a binary logistic regression model for fall risk. First, we included all variables in the whole model, including demographic and frailty information. They were removed from the model due to significant collinearity. At that point, each individual perception was entered into the model as an independent variable on its own. Because of the high correlation between the variables, there was a significant model. We solely used binary regression to compare all individual perceptions. In all cases, there was a significant model with a negative association to fall risk.

5. Discussion and Conclusion

There was a considerable disparity between the mean of different age groups and individual views in the context of age. Individual perception scores in older age groups were shown to be lower. This means that the older individuals in this study had a lower assessment of fall risk and were more likely to fall. Frailty was statistically higher in older age groups. This corresponds to earlier research. Age is one of the main determinants of fall risk, with the elderly experiencing the bulk of falls (Sasidharan, 2020). This is a worry for the elderly in Saudi Arabia because the majority of older patients have low educational levels, necessitating the adoption of various approaches to raise awareness of fall prevention initiatives.

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In terms of gender, the majority of participants (n = 85) identified as female (n = 65), and there were no significant variations in fall risk based on gender, individual perceptions, or frailty in this study (p = 0.817). So far, the literature has been silent on the effect of gender on fall risk. Several research (Ambrose et al., 2013; Sasidharan et al., 2020; Sulaiman et al., 2018; Tsai et al., 2020; Vicky & Minh, 2015) indicated that women are more likely to fall than men. According to the study, this is due to the weak character of elderly women, who are more prone to live alone. Other studies show that males are more likely to fall (Tsai et al., 2020;), and this link was more significantly connected with co-morbidities such as stroke in these investigations.

Because of Saudi Arabian culture, it is not surprising that there is no association for the participants in this study. The elderly do not live alone, which is generally linked to the fact that the majority of the population remains married (divorce rates are extremely low). If the elderly were divorced or widowed, they would live with other members of their family. In this culture, risk based on gender or marital status is unusual.

Individual perceptions (p = 0.001) and frailty scores (p = 0.016) were substantially linked with educational levels (p = 0.001). In other research, education levels were found to have a positive correlation with fall-related individual perceptions (Sulaiman, 2018), indicating that a higher education level results in a greater awareness of "perceived severity," "perceived susceptibility," "perceived benefits," and "perceived barriers,"

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resulting in lower fall risk. Lower education levels may explain the lack of confidence in applying fall prevention methods in this study (Lamis et al., 2012). Elderly individuals who did not complete high school had 95% more falls than those who completed their diploma and bachelor's degree (Sulaiman, 2018; Lamis et al., 2012). This is an important conclusion of the study, and as previously stated, it highlights the necessity to build tailored fall prevention programs that are accessible for the needs of the Saudi population, because a patient's level of education likely influences their ability to adapt the information.

Medication side effects have a significant impact on fall risk. Antidepressants, anticonvulsants, analgesics, psychotropics, sedatives, anxiolytics, diuretics, and antihypertensives are among the drugs that have been linked to an increased risk of falling. In terms of high-risk pharmaceutical use, 81% of individuals used analgesics (opioid and non-opioid analgesics), 70% used antihypertensives, and 53% used diuretics. At the individual level, there was a significant (p0.05) connection between four high-risk drugs, namely cerebral neurovascular agents, diuretics, antihypertensive, and anticoagulant agents, and fall risk.

Whereas more than 80% of the participants in this study took the high-risk medicine classed as analgesic, 33% of those participants (n = 121) were taking fewer than three medications per day, whereas just 19 participants who reported taking analgesics were taking more than three prescriptions per day. Twenty-nine participants were using analgesics

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such acetaminophen or ibuprofen, which have fewer negative effects on falls than opioids. Despite the large number of those taking analgesics, the actuality of the drugs used and the combination of medications had no effect on fall risk.

Participants taking numerous prescriptions, defined as taking three or more high-risk medications, experienced a much larger drop in risk. This is consistent with past research studies that revealed taking three or more high-risk prescriptions increases the risk of falling by 6% to 10% for each additional medication in those categories (Lamis et al., 2012; Titler et al., 2011).

Individual perceptions of vulnerability were strongly connected with hospital duration of stay. Falls occur at a rate of 1.1% - 22% among various categories of patients, according to prior research studies (Vieira et al., 2013), and are directly related to patient safety. When there is a fall in the hospital, the length of the hospital stay may lengthen, especially if there is an injury, because it interferes with the patient's recovery (Tucker, 2012). Pasa (2017) evaluated fall risk in hospitalized adults and found that there are incidents in the hospital setting, concluding that patients with higher risk ratings upon arrival also had higher scores at the conclusion of their stay. Participants in this dissertation study who were hospitalized for a longer period of time may have considered the need for more individual perspectives of their health and safety. This may be a

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valuable subpopulation to target with fall prevention education since their perceptions of fall risk may be influenced directly.

Frailty and fall risk have a strong connection (p =.001). Other studies have demonstrated frailty to be a serious health risk in the elderly. Falls have been identified as the leading cause of accidental death and injury among the fragile elderly (Siviero et al., 2022). Many studies have investigated the relationship between frailty and fall risk because both are important health issues associated with negative health outcomes (Bandeen et al., 2015; Delgado et al., 2015; Hubbard et al., 2017; Joosten et al., 2014; Samper et al., 2011; Tom et al., 2013; Tsai et al., 2020). The studies' findings were contentious. Some studies found frailty to be a predictor of falls (Bandeen et al., 2015; Delgado et al., 2015; Hubbard et al., 2017), while others found no difference (Lin et al., 2018; Samper et al., 2011; Tom et al., 2013; Tsai et al., 2018). Frailty and high fall risk have a substantial link among the senior Saudi population, indicating the need to include a frailty scale in any fall risk prevention program or screening tool. The following section discusses frailty as a predictor of fall risk in this study.

Gender, marital status, education, and hospital stay length were all insignificant indicators of fall risk. High fall risk is connected with age and weakness. When all other independent variables were held constant, a one-unit increase in age resulted in a 2.8-fold increase in fall risk. This

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means that aging is a significant role in the risk of falls in patients, and every unit increase in age raises the risk of falling by about 3%.

Frailty component scores, which were generated by examining physical functionality and mental health, balance, and level of dependence, were also found to have a greater impact on fall risk. A rise in the frailty score owing to poor physical or mental health will double (2 times) the odds of falling into danger. These findings are similar to those of Siviero et al., (2022), who discovered that greater age and frailty were substantially related to future falls among P 0.000. When combined with an intervention program to address individual perspectives, identifying frailty in the community or hospital environment may lead to a reduction in fall occurrence (Siviero et al., 2022).

All binary regression models of individual perception (susceptibility, severity, benefits, and barriers) with fall risk as a dependent variable were statistically significant, indicating a negative relationship with fall risk. It projected that strengthening individual perceptions would result in a significant reduction in fall risk. Individual perception, along with other associated characteristics such as age, education, medication intake, and frailty, is an important component of identifying fall risk. An increase in patient awareness about the perception of falls in these situations may have a major impact on fall reduction (Sharif et al., 2018). It may be concluded that changing characteristics such as age, gender, frailty level, hospital length of stay, and high-risk medicine have a substantial

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influence on individual perceptions, which may lead to the prediction of patient fall risk.

5.2 Importance to Advancement of Knowledge and Research

The current study described the relationships between individual perceptions of severity, susceptibility, benefits and obstacles, frailty, modifying variables, and fall risk. Because there have been few studies on perception and fall risk conducted worldwide, and none in the Saudi context, this study adds to the existing body of scientific knowledge about how perception may be related to fall risks and influence future behavior change interventions. These findings could help healthcare practitioners understand the impact of perceptions and frailty on fall prevention, improve fall risk programs, and inform future fall risk interventions.

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ISSN: 2616-9185

References

Abreu, C., Mendes, A., Monteiro, J., & Santos, F. R. (2012). Falls in hospital settings: A longitudinal study. *Revista Latino-Americana de Enfermagem*, *20*(3), 597-603. https://doi.org/10.1590/s0104-11692012000300023

Ahn, S., & Oh, J. (2018). Relationships among knowledge, self-efficacy, and health behavior of Osteoporosis and fall prevention in old aged women. *Korean Journal of Women Health Nursing*, *24*(2), 209–218. https://doi.org/10.4069/kjwhn.2018.24.2.209

Ambrose, A. F., Paul, G., & Hausdorff, J. M. (2013). Risk factors for falls among older adults: A review of the literature. *Maturitas*, *75*(1), 51–61. https://doi.org/10.1016/j.maturitas.2013.02.009

Ambrose, A. F., Paul, G., & Hausdorff, J. M. (2013). Risk factors for falls among older adults: A review of the literature. *Maturitas*, *75*(1), 51–61. https://doi.org/10.1016/j.maturitas.2013.02.009

Bandeen-Roche, K., Seplaki, C. L., Huang, J., Buta, B., Kalyani, R. R., Varadhan, R., Xue, Q.- L., Walston, J. D., & Kasper, J. D. (2015). Frailty in older adults: A nationally representative profile in the United States. *Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *70*(11), 1427-1434. https://doi.org/10.1093/gerona/glv133

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
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Bandeen-Roche, K., Seplaki, C. L., Huang, J., Buta, B., Kalyani, R. R., Varadhan, R., Xue, Q.- L., Walston, J. D., & Kasper, J. D. (2015). Frailty in older adults: A nationally representative profile in the United States. *Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *70*(11), 1427-1434. https://doi.org/10.1093/gerona/glv133

Bergen, G., & Stevens, M.R. (2016, September 23). Falls and fall injuries among adults aged [greater than or equal to] 65 years-United States, 2014. *Morbidity and Mortality Weekly Report*, *65*(37), 993-998. https://www.cdc.gov/mmwr/volumes/65/wr/mm6537a2.htm

Cameron, I. D., Dyer, S. M., Panagoda, C. E., Murray, G. R., Hill, K. D., Cumming, R. G., & Kerse, N. (2018). Interventions for preventing falls in older people in care facilities and hospitals. *The Cochrane Database of Systematic Reviews.* https://doi.org/10.1002/14651858.CD005465.pub4

Chong, E., Ho, E., Baldevarona-Llego, J., Chan, M., Wu, L., Tay, L., Ding, Y. Y., & Lim, W. S. (2018). Frailty in hospitalized older adults: Comparing different frailty measures in predicting short- and long-term patient outcomes. *Journal of the American Medical Directors Association*, *19*(5), 450–457. https://doi.org/10.1016/j.jamda.2017.10.006

Chopik, W. J., Bremner, R. H., Johnson, D. J. & Giasson, H. L. (2018). Age differences in age perceptions and developmental transitions.

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

Frontiers in Psychology, *9*. https://doi.org/10.3389/fpsyg.2018.00067

Delgado, C., Shieh, S., Grimes, B., Chertow, G. M., Dalrymple, L. S., Kaysen, G. A., Kornak, J., & Johansen, K. L. (2015). Association of self-reported frailty with falls and fractures among patients new to dialysis. *American Journal of Nephrology*, *42*(2), 134–140. https://doi.org/ 10.1159/000439000

Fonad, E. (2022). Older people's safety and security in community care for the elderly: Focusing on fall risk and fall. *The Sciences and Engineering 83*, Issue 2–B.

Garcia, A., Marciniak, D., McCune, L., Smith, E., & Ramsey, R. (2012). Promoting fall self- efficacy and fall risk awareness in older adults. *Physical & Occupational Therapy in Geriatrics*, *30*(2), 165–175. https://doi.org/10.3109/02703181.2012.681431

Glanz, K., Rimer, B. K., & Lewis, F. M. (2002). *Health behavior and health education: Theory, research, and practice* (3rd ed.). Jossey-Bass

Graham, B. C. (2012). Examining evidence-based interventions to prevent inpatient falls. *Medsurg Nursing*, *21*(5), 267–270.

Hohtari-Kivimäki, U., Salminen, M., Vahlberg, T., & Kivelä, S. L. (2021). Orthostatic Hypotension is a risk factor for falls among older adults: 3-year follow-up. *Journal of the American Medical Directors*

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

Association, *22*(11), 2325–2330. https://doi.org/10.1016/j.jamda.2021.07.010

Huang, L. C., Ma, W. F., Li, T. C., Liang, Y. W., Tsai, L. Y., & Chang, F. U. (2015). The effectiveness of a participatory program on fall prevention in oncology patients. *Health Education Research*, *30*(2), 298–308. doi: 10.1093/her/cyu072

Hubbard, R. E., Peel, N. M., Samanta, M., Gray, L. C., Mitnitski, A., & Rockwood, K. (2017). Frailty status at admission to hospital predicts multiple adverse outcomes. *Age & Ageing*, *46*(5), 801–806. https://doi.org/10.1093/ageing/afx081

Huynh, A., Woodward, M., Zeimer, H., Zisis, G., Martins, R. N., Rainey, S. S. R., Brown, B. M., Fernando, W., Gardener, S. L., Rowe, C. C., Masters, C. L., & Yates, P. A. (2020). Risk factors for falls in preclinical and prodromal Alzheimer's disease and dementia due to Alzheimer's disease: Findings from the Australian imaging, biomarker and lifestyle study of ageing (AIBL). *Alzheimer's & Dementia: The Journal of the Alzheimer's Association,* *16*(S10), e044954. https://doi.org//10.1002/alz.044954

Huynh, A., Woodward, M., Zeimer, H., Zisis, G., Martins, R. N., Rainey, S. S. R., Brown, B. M., Fernando, W., Gardener, S. L., Rowe, C. C., Masters, C. L., & Yates, P. A. (2020). Risk factors for falls in preclinical and prodromal Alzheimer's disease and dementia due to

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

Alzheimer's disease: Findings from the Australian imaging, biomarker and lifestyle study of ageing (AIBL). *Alzheimer's & Dementia: The Journal of the Alzheimer's Association, 16*(S10), e044954. https://doi.org//10.1002/alz.044954

Huynh, A., Woodward, M., Zeimer, H., Zisis, G., Martins, R. N., Rainey, S. S. R., Brown, B. M., Fernando, W., Gardener, S. L., Rowe, C. C., Masters, C. L., & Yates, P. A. (2020). Risk factors for falls in preclinical and prodromal Alzheimer's disease and dementia due to Alzheimer's disease: Findings from the Australian imaging, biomarker and lifestyle study of ageing (AIBL). *Alzheimer's & Dementia: The Journal of the Alzheimer's Association, 16*(S10), e044954. https://doi.org//10.1002/alz.044954

Jindal, H. A., Duggal, M., Jamir, L., Sharma, D., Kankaria, A., Rohilla, L., Avasthi, A., Nehra, R., & Grover, S. (2019). Mental health and environmental factors associated with falls in the elderly in North India: A naturalistic community study. A*sian Journal of Psychiatry, 39*, 17–21. https://doi.org/10.1016/j.ajp.2018.11.013

Joosten, E., Demuynck, M., Detroyer, E., & Milisen, K. (2014). Prevalence of frailty and its ability to predict in hospital delirium, falls, and 6-month mortality in hospitalized older patients. *Boston Medical Center Geriatrics, 14*(1). https://doi.org/10.1186/1471-2318-14-1

Kalisch, B. J., Tschannen, D., & Lee, K. H. (2012). Missed nursing care,

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

staffing, and patient falls. *Journal of Nursing Care Quality*, *27*(1), 6-12. https://doi.org/10.1097/NCQ.0b013e318225aa23

Khongboon, P., & Kespichayawatt, J. (2021). Accidental falls and associated factors among the elderly in Thailand: A national cross-sectional study in 2007, 2011, 2014 and 2017. *Journal of Health Research*, *36*(4), 767–780. https://doi.org/10.1108/JHR-07-2020-0308

Lamis, R. L., Kramer, J. S., Hale, L. S., Zackula, R. E., & Berg, G. M. (2012). Fall risk associated with inpatient medications. *American Journal of Health-System Pharmacy*, *69*(21), 1888–1894. https://doi.org/10.2146/ajhp110723

Lamis, R. L., Kramer, J. S., Hale, L. S., Zackula, R. E., & Berg, G. M. (2012). Fall risk associated with inpatient medications. *American Journal of Health-System Pharmacy*, *69*(21), 1888–1894. https://doi.org/10.2146/ajhp110723

McMillan G. J. & Hubbard R. E. (2012). Frailty in older inpatients: What physicians need to know. *QJM - Monthly Journal of the Association of Physicians*, *105*(11):1059-1065. https://doi.org/10.1093/qjmed/hcs125

Murphy, M.P., Carmine, H., & Kolakowsky-Hayner, S. (2014). Modifiable and nonmodifiable risk factors for falls after traumatic brain injury: An exploratory investigation with implications for medication

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

use. *Rehabilitation Nursing, 39*(3), 113-122–122. https://doi.org/10.1002/rnj.89

Ngamsangiam, P., & Suttanon, P. (2020). Risk factors for falls among community-dwelling elderly people in Asia: A systematic review. *Science & Technology Asia, 25*(3), 105-126. retrieved from https://ph02.tci-thaijo.org/index.php/SciTechAsia/article/view/219557

Ngamsangiam, P., & Suttanon, P. (2020). Risk factors for falls among community-dwelling elderly people in Asia: A systematic review. *Science & Technology Asia, 25*(3), 105-126. retrieved from https://ph02.tci-thaijo.org/index.php/SciTechAsia/article/view/219557

Pasa, T. S., Magnago, T. S. B. D. S., Urbanetto, J. D. S., Baratto, M. A. M., Morais, B. X., & Carollo, J. B. (2017). Risk assessment and incidence of falls in adult hospitalized patients. *Revista Latino-Americana de Enfermagem, 25*. e2862. https://doi.org/10.1590/1518-8345.1551.2862

Salovey, P. & Steward, W. (2004). *Methodological challenges and scientific rewards for social psychologists conducting health behavior research*. Sage Publications.

Sasidharan, D. K., Vijayakumar, P., Raj, M., Soman, S., Antony, L., Sudhakar, A. & Kabali, C. (2020). Incidence and risk factors for falls among community-dwelling elderly subjects on a 1-year follow-up: A

prospective cohort study from Ernakulam, Kerala, India. *British Medical Journal Open*, 10e033691. https://doi.org/10.1136/bmjopen-2019-033691

Sasidharan, D. K., Vijayakumar, P., Raj, M., Soman, S., Antony, L., Sudhakar, A. & Kabali, C. (2020). Incidence and risk factors for falls among community-dwelling elderly subjects on a 1-year follow-up: A prospective cohort study from Ernakulam, Kerala, India. *British Medical Journal Open*, 10e033691. https://doi.org/10.1136/bmjopen-2019-033691

Sasidharan, D. K., Vijayakumar, P., Raj, M., Soman, S., Antony, L., Sudhakar, A. & Kabali, C. (2020). Incidence and risk factors for falls among community-dwelling elderly subjects on a 1-year follow-up: A prospective cohort study from Ernakulam, Kerala, India. *British Medical Journal Open*, 10e033691. https://doi.org/10.1136/bmjopen-2019-033691

Sasidharan, D. K., Vijayakumar, P., Raj, M., Soman, S., Antony, L., Sudhakar, A. & Kabali, C. (2020). Incidence and risk factors for falls among community-dwelling elderly subjects on a 1-year follow-up: A prospective cohort study from Ernakulam, Kerala, India. *British Medical Journal Open*, 10e033691. https://doi.org/10.1136/bmjopen-2019-033691

Sharif, S. I., Al-Harbi, A. B., Al-Shihabi, A. M., Al-Daour, D. S., &

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

Sharif, R. S. (2018). Falls in the elderly: Assessment of prevalence and risk factors. *Pharmacy Practice, 16*(3), 1–6. https://doiorg.lopes.idm.oclc.org/10.18549/PharmPract.2018.03.1206

Sihag, G., Delcroix, V., Grislin-Le Strugeon, E., Siebert, X., Piechowiak, S., Gaxatte, C., & Puisieux, F. (2021). Evaluation of risk factors for fall in elderly using Bayesian networks: A case study. *Computer Methods and Programs in Biomedicine Update, 1*, Article 100035. https://doi.org/10.1016/j.cmpbup.2021.100035

Sihag, G., Delcroix, V., Grislin-Le Strugeon, E., Siebert, X., Piechowiak, S., Gaxatte, C., & Puisieux, F. (2021). Evaluation of risk factors for fall in elderly using Bayesian networks: A case study. *Computer Methods and Programs in Biomedicine Update, 1*, Article 100035. https://doi.org/10.1016/j.cmpbup.2021.100035

Srivastava, S., & Muhammad, T. (2022). Prevalence and risk factors of fall-related injury among older adults in India: evidence from a cross-sectional observational study. *Boston Medical Center Public Health, 22*(1), 550. https://doi.org/10.1186/s12889-022-12975-7

Tavakol, M., & Pinner, G. (2019). Using the Many-Facet Rasch Model to analyze and evaluate the quality of objective structured clinical examination: A non-experimental cross- sectional design. *British Medical Journal Open, 9*(9), Article e029208. https://doi.org/10.1136/bmjopen-20190029208

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 66 (2023)
ISSN: 2616-9185

Thakkar, S. T. M. & Srivastava, S. (2022). Cross-sectional associations of physical frailty with fall, multiple falls and fall-injury among older Indian adults: Findings from LASI, 2018. PLoS ONE, 17(8), 1–16. https://doi.org/10.1371/ journal.pone.0272669

Titler, M. G., Shever, L. L., Kanak, M. F., Picone, D. M. & Qin, R. (2011). Factors associated with falls during hospitalization in an older adult population. *Research and Theory for Nursing Practice, 25*(2), 127-148. https://doi.org./10.1891/1541-6577.25.2.127

Tom, S. E., Adachi, J. D., Anderson, F. A., Boonen, S., Chapurlat, R. D., Compston, J. E., Cooper, C., Gehlbach, S. H., Greenspan, S. L., Hooven, F. H., Nieves, J. W., Pfeilschifter, J., Roux, C., Silverman, S., Wyman, A., & LaCroix, A. Z. (2013). Frailty and fracture, disability, and falls: a multiple country study from the global longitudinal study of osteoporosis in women. Journal of the American Geriatrics Society, 61(3), 327–334. doi: 10.1111/jgs.12146

Tom, S. E., Adachi, J. D., Anderson, F. A., Boonen, S., Chapurlat, R. D., Compston, J. E., ooper, C., Gehlbach, S. H., Greenspan, S. L., Hooven, F. H., Nieves, J. W., Pfeilschifter, J., Roux, C., Silverman, S., Wyman, A., & LaCroix, A. Z. (2013). Frailty and fracture, disability, and falls: a multiple country study from the global longitudinal study of osteoporosis in women. Journal of the American Geriatrics Society, 61(3), 327–334. doi: 10.1111/jgs.12146

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Tsai, M. T., Lee, S. M., Chen, H. K. & Wu, B. J. (2018). Association between frailty and its individual components with the risk of falls in patients with schizophrenia spectrum disorders. *Schizophrenia Research, 197*. 138–143. https://doi.org/10.1016/j.schres.2018.01.023

Tsai, M. T., Lee, S. M., Chen, H. K. & Wu, B. J. (2018). Association between frailty and its individual components with the risk of falls in patients with schizophrenia spectrum disorders. *Schizophrenia Research, 197*. 138–143. https://doi.org/10.1016/j.schres.2018.01.023

Tucker, S. J., Bieber, P. L., Attlesey-Pries, J. M., Olson, M. E., & Dierkhising, R. A. (2012). Outcomes and challenges in implementing hourly rounds to reduce falls in orthopedic units. *Worldviews on Evidence-Based Nursing*, *9*(1), 18-29–29. https://doi.org./10.1111/j.1741-6787.2011.00227.x

Vieira, E. R., Berean, C., Paches, D., Caveny, P., Yuen, D., Ballash, L., & Freund-Heritage, R. (2013). Reducing falls among geriatric rehabilitation patients: A controlled clinical trial. *Clinical Rehabilitation, 27*(4), 325–335. doi: 10.1177/0269215512456308

Vieira, L. S. Gomes, A. P., Bierhals, I. O., Farías-Antúnez, S., Ribeiro, C. G., Miranda, V. I. A., Lutz, B. H., Barbosa-Silva, T. G., Lima, N. P., Bertoldi, A. D., & Tomasi, E. (2018). Falls among older adults in the south of Brazil: Prevalence and determinants. *Revista de Saude Publica, 52*(22), Epub. doi: 10.11606/s1518-8787.2018052000103