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FALL RISK ASSESSMENT METHODS AMONG OLDER ADULTS: A LITERATUR REVIEW

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ABSTRACT

The elderly often experience a decline in balance, functional ability, and mobility, increasing their susceptibility to falls and serious injuries. This study aimed to identify commonly used methods for assessing fall risks in the elderly through a literature review. Methods: The review focused on individuals aged >60 years and included studies assessing fall risk factors such as physical weakness and motor reaction time improvement. Cross-sectional studies and full-text journal articles were selected from four databases (ScienceDirect, ProQuest, PubMed, and SAGE Research Methods) covering the period from January 2019 to December 2024. The inclusion criteria involved studies focusing on fall risk factors, while exclusions included COVID-19-related studies, abstracts, reviews, discussion papers, letters to editors, and articles without full texts. Results: A total of 10 journal articles involving 15,274 elderly respondents were reviewed. Demographic data included age, gender, marital status, economic status, environment, weakness, medical history, and fall history. Various assessment methods were identified, with the most frequently used being fall questionnaires (26%), MMSE (17.3%), balance and fall scales (13%), physical activity assessments (8.6%), motor reaction time tests (8.6%), and BMI evaluations (8.6%). The data showed that methods with higher usage percentages are commonly employed to determine fall risks in the elderly. Conclusions: Fall risk assessments utilize diverse methodologies, including physical tests, mental health evaluations, and interviews. Notably, fall risk measurement methods have proven effective in preventing falls in this population.

Keywords: assessment; fall risk; older adult

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INTRODUCTION

The fall of an event, including slipping or tripping, in which the person loses balance and equilibrium Accidentally lands on the ground, floor, or other lower level(Long et al., 2023). Falls are the main reason for fractures, limited activity, and death. Fall-related injuries cause a significant burden on the maintenance of the Health system (Liu et al., 2022). These include decreased quality of life, loss of confidence, functional dependence, fractures and high morbidity rates (Kasović et al., 2020) Aging is a variable dynamic process from one person to another, and is characterized by a decrease in physiological functioning with a decrease in adaptive capacity in situations of functional overload (Tavares et al., 2020) Several studies focusing on the elderly living in urban and rural areas report that the frequency of falls increases with age. The elderly and young seniors (60-69 years) are more likely to experience falls(Zhang et al., 2022). In addition, demographic characteristics, comorbidities, and lifestyle factors have been recognized to have a significant influence on fall risk, requiring a holistic assessment approach (Xu et al., 2022) Demographic data of age, gender, marital status, economic status, environment, weakness, medical history, fall history (Zhang et al., 2022) Reviews of instruments validated to assess gait, balance, and functional mobility show that no single test can predict fall risk with high certainty, although gait speed has shown moderate evidence of its usefulness (Beck Jepsen et al., 2022), Fall risk also considers factors such as fall history, outpatient assistance, and mental status (Gao et al., 2022)(Gao et al., 2022).

The number of aging people (defined as those over the age of 60) is expected to increase by 605 million to 2 billion globally between 2000 and 2050 as a consequence of the latest medical developments in public health that have extended life expectancy (Tavares et al., 2020) In U.S. acute care hospitals, about three to five falls occur per 1,000 patient bed days. In a 2013 study in a Korean public hospital with more than 500 beds, attrition rates were high at 3.87 cases per 1,000 discharged patients per year and 0.55 cases per 1,000 patient days (Zhang et al., 2022) . 2 after a medical error. This condition shows that there were about 34 cases (14%) of falling ill in Indonesia for the period January to September 2012 (Gao et al., 2022). Research in the Indian context has linked physical frailty to a higher prevalence of falls, multiple falls, and fall-related injuries, emphasizing the global relevance of comprehensive fall risk assessments(Thakkar et al., 2022) Studies in treated elderly individuals further emphasized the role of environmental and physiological factors, including polypharmacy, in increasing fall risk, suggesting the need for community intervention strategies(Rocha et al., 2022)

Detection allows patients to receive appropriate care in less time (Hong & Kim, 2021) More than 25 subjective and objective vulnerability evaluation techniques have been developed worldwide to evaluate weaknesses with various conceptual criteria (Meratwal et al., 2023) One strategy that can be used to detect fall risk is with the international physical activity questionnaire (IPAQ) (Beck Jepsen et al., 2022; Gao et al., 2022; Tavares et al., 2020), Mini-Mental State Examination (MMSE) scores (Beck Jepsen et al., 2022; Kasović et al., 2020), gait kinetics (Beck Jepsen et al., 2022), Morse Fall scale and many other types of tests. Systematic review This objective is to identify the methods used in the examination of the risk of falls in the elderly.The occurrence of a fall, including slipping or tripping, involves a loss of balance and equilibrium, causing an individual to accidentally land on the ground, floor, or another lower level (Long et al., 2023). Falls are a major cause of fractures, restricted activity, and even mortality. Fall-related injuries place a significant burden on healthcare systems (Liu et al., 2022), leading to decreased quality of life, loss of confidence, functional dependence, fractures, and high morbidity rates (Kasović et al., 2020).

Aging is a dynamic process that varies among individuals and is marked by a decline in physiological function and adaptive capacity under conditions of functional overload (Tavares et al., 2020). Several studies focusing on elderly populations in urban and rural areas report that the frequency of falls increases with age. Elderly individuals and young seniors (60–69 years) are particularly susceptible to falls (Zhang et al., 2022)(Zhang et al., 2022). Additionally, demographic characteristics, comorbidities, and lifestyle factors significantly influence fall risk, necessitating a holistic assessment approach (Xu et al., 2022). Key demographic factors such as age, gender, marital status, economic status, environment, physical weakness, medical history, and fall history are critical in fall risk evaluation (Zhang et al., 2022).Reviews of validated instruments for assessing gait, balance, and functional mobility suggest that no single test can predict fall risk with high certainty. However, gait speed has shown moderate evidence of its utility (Beck Jepsen et al., 2022)(Beck Jepsen et al., 2022). Fall risk assessments also consider factors such as fall history, outpatient assistance, and mental health status (Gao et al., 2022).

The global population of individuals aged over 60 is expected to increase from 605 million to 2 billion between 2000 and 2050, driven by advancements in medical and public health practices that have extended life expectancy (Tavares et al., 2020). In U.S. acute care hospitals, about three to five falls occur per 1,000 patient bed days. Similarly, a 2013 study in a Korean public hospital with over 500 beds reported an attrition rate of 3.87 falls per 1,000

discharged patients per year and 0.55 cases per 1,000 patient days (Zhang et al., 2022). In Indonesia, there were approximately 34 cases (14%) of fall-related incidents recorded between January and September 2012 (Gao et al., 2022).Research in India highlights a strong association between physical frailty and the prevalence of falls, multiple falls, and fall-related injuries, underscoring the global importance of comprehensive fall risk assessments (Thakkar et al., 2022). Studies on elderly populations receiving treatment emphasize the role of environmental and physiological factors, including polypharmacy, in increasing fall risks, highlighting the need for community-based intervention strategies (Rocha et al., 2022).

Early detection of fall risk allows for timely and appropriate care (Hong & Kim, 2021). Over 25 subjective and objective techniques have been developed globally to evaluate vulnerabilities, each with varying conceptual criteria (Meratwal et al., 2023). Common strategies for assessing fall risk include the International Physical Activity Questionnaire (IPAQ) (Beck Jepsen et al., 2022; Gao et al., 2022; Tavares et al., 2020). Mini-Mental State Examination (MMSE) scores (Beck Jepsen et al., 2022; Kasović et al., 2020), gait kinetics (Beck Jepsen et al., 2022), the Morse Fall Scale, and numerous other tests. The objective of this systematic review is to identify the methods used to assess fall risk in the elderly.

METHOD

Initial scoping literature searches were conducted to identify similar and relevant systematic reviews that had already been published. Articles and journals included in the review were selected based on their appropriateness for systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Selection Criteria

The inclusion criteria for this study were elderly individuals aged >60 years, English-language articles, and studies employing the cross-sectional method, published between January 2019 and December 2024. The study aimed to identify the risk factors for falls and the methods used to assess fall risk in the elderly. The article search strategy was conducted using the PICOS framework, as outlined in Table 1.

Table 1.
PICOS framework

	Inclusion	Exclusion
Population	Elderly individuals aged >60 years	-
Intervention / exposure	Evaluation of factors contributing to fall risk	Studies that do not discuss fall risk factors
Comparison	-	-
Outcome	The studies highlighted the assessment methods most commonly used to score fall risk among older adults.	Studies that do not address fall risk in the elderly
Study design	Cross – sectional study	Studies related to Covid-19, abstract only, reviews, discussion papers, letters to editor
	English-language articles published between January 2019 and December 2024	Unavailable full-text articles

Literature Search and Screening

Following the application of the inclusion and exclusion criteria, the next step was the literature search. The search was conducted in the PubMed, ScienceDirect, ProQuest, and SAGE Research databases, covering publications from January 2019 to December 2024. The search process adhered to the guidelines established by the Preferred Reporting Items for

Systematic Reviews and Meta-Analyses (PRISMA).The identification of relevant articles and journals was performed using specific keywords combined with Boolean operators (AND, OR, NOT, AND NOT), which served to refine or expand the search as needed, thus facilitating the selection of appropriate articles. The search strategy incorporated keywords such as (factor, factors), (influence, influencing), (fall risk, fall), and (elder, elderly). A detailed list of the keywords used in each database is provided in Table 2.

Table 2.
The adjusted search terms as per searched electronic databases

Basis data	Search queries	Result
Pubmed	(((((("factors"[mesh terms] or factor[text word]) or ("factor"[mesh terms] or factor[text word])) or factor[all fields]) and "influence"[mesh terms] or inflluencing[text word]) or ("influencing"[mesh terms] or influence[text word])) or influencing[all fields]) and ("fall"[mesh terms] or falls[text word])) or (("fall risk"[mesh terms] or fall risk[text word]) and ("elders"[mesh terms] or elder[text word])) or ("elderly"[subheading] or "elderly"[mesh terms] or elderly[text word])	18
ScinceDirect	((factor) or factors))) and (influence) or influencing)) and (falls or fall) or fall risk) and (elder or elders) or elderly))	36
Proquest	((factor) or factors))) and (influence) or influencing)) and (falls or fall) or fall risk) and (elder or elders) or elderly))	11
SAGE	((factor) or factors))) and (influence) or influencing)) and (falls or fall) or fall risk) and (elder or elders) or elderly))	31

RESULT

Study Selection

The systematic literature review involved a detailed process of identifying, screening, and selecting studies, as illustrated in Figure 1 below. A total of 96 records were initially identified from four databases: ScinceDirect (36 records), ProQuest (11 records), PubMed (18 records), and SAGE (31 records). After removing 3 duplicate records, 93 unique articles remained. These were screened based on their titles, resulting in the exclusion of 3 articles that were deemed irrelevant, leaving 90 articles for further examination. Next, the abstracts of these 90 articles were reviewed to assess their relevance. At this stage, 71 articles were excluded because they were categorized as literature reviews, discussion sheets, or concept analyses. This left 19 articles for a more detailed evaluation. The full texts of these 19 articles were retrieved and assessed for eligibility based on predefined criteria, which led to the exclusion of 6 articles due to ineligibility. Finally, 10 articles were found to meet all the inclusion criteria and were included in the review. This rigorous screening and selection process ensured the inclusion of high-quality studies relevant to the research objectives.

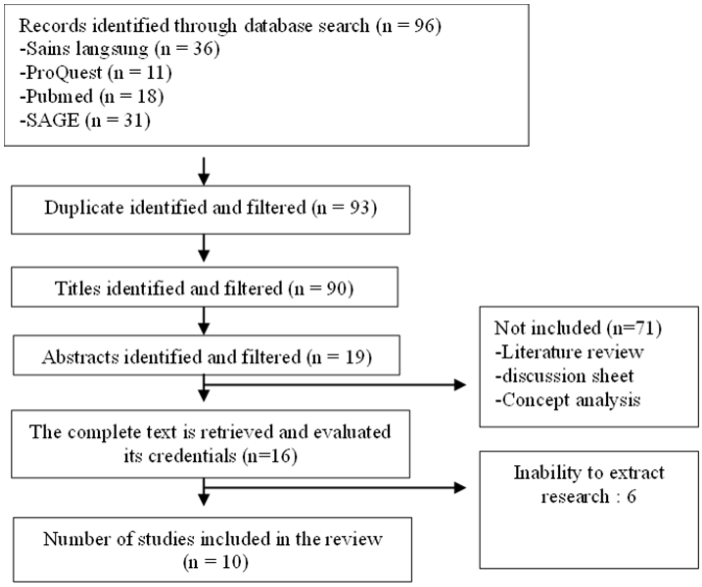

Figure 1. Literature filtering flowchart

Study Characteristics

A total of 10 studies utilizing cross-sectional designs were included, with the majority conducted in Asian countries such as China, Malaysia, India, and Korea. The review also incorporated data from various other countries, including Brazil, the USA, and Australia. The vulnerable age of participants varied, focusing on older adults aged 60 years and above. Participants included all genders, encompassing both males and females.

Table 3.
Summary of included studies

No	Author, year, country of origin	Samples	Intervention	Measurement
1	(Pereira et al. 2023) Brazil	59 elderly women	Inspection mini mental state, questionnaire activity physique international, scale the benefits of waterfalls international, test balance, 30 second sit- stand test, time reaction motor, test walk 10 meters	MMSE questionnaire, IPAQ questionnaire, FES-I-BR scale, balance rating scale, foot strength and endurance rating scale, motor reaction time assessment
2	(Teng et al. 2024) China	401 elderly (male 154, female 247)	Check evaluation self risk fall from the stopping elderly accidents, deaths & injuries (STEADI) toolkit	Stopping elderly accidents, deaths & injuries toolkit questionnaire
3	(Risbridger et al. 2022) Malaysia	1383 elderly (male 593, female 790)	Measurement body mass index, assessment conitive montreal, measurements activity physical, test of strength grip hand	score, score moca, questionnaire activity physical, HGS score
4	(Meratwal et al. 2023) India	288 elderly (male 132, female 156)	assessment, weaknesses and assessments fall	Questionnaire consists of three parts sociodemographic and health-related information, frailty and fall assessment
5	(Go, Lee, and Lee 2021) Korea	3,407 elderly women	HGS assessment uses digital dynamometer (digital grip strength dynamometer)	Questionnaires collecting data on demographic information, medical history, and fall history
6	(Tavares et al.	250 elderly (male 67,	Assessment of mini-mental state examination (MMSE), Berg balance scale	Questionnaire about happen fall

No	Author, year, country of origin	Samples	Intervention	Measurement
	2020) Brazil	female 183)	(BBS), and falls efficacy scale (FES-I).	
7	(Bassett, Siu, and Honaker 2020) USA	30 elderly (male 17, female 13)	Morse fall scale and st assessment. Thomas risk assessment tool in falling elderly inpatients. (STRATIFY)	Questionnaire that evaluates patient falling risk
8	(Lin et al. 2022) China	5,374 elderly (male 2995, female 2379)	Mini-Mental State Examination, chair lift test (CRT), timed up and go test (TUG) and tandem gait test (TGT).	Patient Health Questionnaire version Validated Brazil
9	(Zhang ey al. 2022) China	3.752 elderly (male 1673, female 2079)	Evaluation mental condition of the elderly, ADL (Barthel index (BI)) and IADL scale	Lawton's IADL questionnaire evaluates seven IADL function
10	(kasovic, stefan and zvonar 2020) Australia	210 elderly women	Evaluation with platforms pressure, judgment index mass body (BMI)	Downtown Fall Risk Index questionnaire

Risk of Bias in Study

The quality evaluation of the reviewed studies reveals that five studies (Go et al., 2021; Lin et al., 2022; Meratwal et al., 2023; Pereira et al., 2023; Risbridger et al., 2022) Achieved a perfect score of 100%, indicating high reliability and methodological rigor. These studies met all quality criteria, including clear inclusion criteria, detailed subject descriptions, valid and reliable measurements, and appropriate statistical analyses. In contrast study (Bassett et al., 2020; Tavares et al., 2020; Teng et al., 2024) scored 87.5%, reflecting moderate quality. While these studies demonstrated strong methodologies, they lacked strategies to address confounding factors, which slightly undermines their robustness. (Kasović et al., 2020; Milling et al., 2022) scored 75%, placing them in the moderate category as well. Their shortcomings were primarily related to the absence of confounding factor identification and strategies to address them, which affects the reliability of their findings. Overall, the studies varied in quality, with the majority demonstrating robust designs and a few requiring improvements in handling confounding variables.

Of the 10 studies included, 17,017 participants were a combination of elderly men and elderly women from various countries. The results of the study obtained several methods of assessment and measurement that have been grouped in the form of : fall questionnaire (26%), MMSE measurement (17.3%), balance and fall scale (13%), physical activity (8.6%), motor reaction time (8.6%), BMI assessment (8.6%), balance test (4.3%), 30-second sit-stand test (4.3%), grip strength test (4.3%), safety test (4.3%), strength test (4.3%), bartel index (4.3%), IPAQ measurement (4.3%), death questionnaire (4.3%), BMI score (4.3%), ADL questionnaire (4.3%).

DISCUSSION

Methods of assessing the risk of falls in the elderly can help identify factors that increase the likelihood of falling accidents. This is due to the deterioration of autonomic nervous system control which causes physiological weakness and function to be disrupted (Arantes et al., 2023), there are several assessments that can be done to assess the risk of falls in the elderly

that we have grouped also we present.The results of the review, classify in two category : the first classifying according to the percentage most used, the second by classifying according to category (A. Physical assessment, B mental assessment and C. interview assessment).
For the first group according to the percentage there are at most 3, namely: A. Checklist fall risk self-assessment with a percentage of 26% is used in Korea, China, India, Brazil, the United States, Australia (Bassett et al., 2020; Gao et al., 2022; Go et al., 2021; Kasović et al., 2020; Tavares et al., 2020; Teng et al., 2024). This checklist consists of 12 items that require a "yes" or "no" answer. For the first two items, the "yes" answers each got 2 points, and the "yes" answers to the other ten questions got 1 point each. The score ranges from 0 to 14 points, with higher scores indicating a higher risk of falling. Those who score 4 or more points are considered at risk of falling. This device has been validated in China on community participants (Teng et al., 2024). the high percentage (26%) indicates that this tool is relatively effective in identifying individuals at risk of falling and can be a practical and efficient method for initial fall risk screening.

B. Furthermore, MMSE measurements of about 17.3% (Lin et al., 2022; Pereira et al., 2023; Tavares et al., 2020; Zhang et al., 2022) are used by Brazil and China. MMSE also known as Mini-Mental, used to screen for declines in cognitive function, being one of the most used because it is quick to apply (about 10 minutes) and does not require special ingredients. An MMSE questionnaire is administered to assess cognitive function. The volunteers were asked to answer questions covering orientation, memory, attention and specific skills, such as naming and comprehension, with a maximum total score of 30 points, with scores below 18 points indicating cognitive impairment (Pereira et al., 2023). MMSEs can predict fall risk, as individuals with lower scores may struggle with balance and spatial awareness (Bastos et al., 2023). While MMSE is a valuable tool, it is important to consider its limitations, such as potential biases associated with education and cultural factors, which can affect its accuracy in diverse populations (Melo et al., 2020). Therefore, incorporating MMSE scores into fall risk assessments can help identify individuals who may be at higher risk due to cognitive deficits.

C. The balance and fall percentage scale of 13% (Bassett et al., 2020; Pereira et al., 2023; Tavares et al., 2020) is used by Brazil and the United States. The scale has 14 tasks with scores ranging from 0 to 4 points for each task, and assigns a total score value from 0 to 56 points. Individuals who obtain a score of 56 have a lower risk of falling compared to individuals who obtain a score below 56. A decrease in BBS scores is associated with an increased risk of falling. In the ranges of 56 to 54 and 54 to 46, a one-point change in BBS scores was associated with a 3-4% and 6-8% increased risk of falling (Tavares et al., 2020). There is also an assessment test, namely the Balance test, this stage is carried out to assess the static balance of volunteers, with the following methodology: volunteers are asked to stand in 4 different positions, without support and with their eyes open, and remain in a standing position. Each position for 10 seconds without moving the legs or needing support. This test assesses how many positions are held for 10 seconds(Pereira et al., 2023). the while balance is a critical component, it should be used in conjunction with other assessments to provide a comprehensive evaluation of fall risk.

For the second group according to categories (A. Physical assessment, B. mental assessment and C. interview assessment). A. According to Physical Assessment: a) Physical Activity (walking 15 feet twice at normal speed, and faster readings performed to complete 15 feet speed (stratified by sex and height) Overall physical weakness phenotype score is obtained between 0 and 5. Respondents with a score of 0 were classified as "strong", 1–2 as "pre-

weak", and 3 or higher as "weak" (Meratwal et al., 2023)). b) Balance Berg (BBG) Test (This scale has 14 tasks with scores ranging from 0 to 4 points for each task, and gives a total score value from 0 to 56 points. Individuals who obtain a score of 56 have a lower risk of falling compared to individuals who obtain a score below 56. A decrease in BBS scores is associated with an increased risk of falling. In the ranges from 56 to 54 and 54 to 46, a one-point change in BBS scores was associated with an increased risk of falling by 3-4% and 6-8%, respectively (Tavares et al., 2020). c)30-Second Sit-Stand Test (The 30-Second Sit-to-Stand Test was used to assess leg strength and endurance. The methodology was as follows: the volunteer was asked to perform the task of sitting on a chair and rising to a full standing position and sitting down again, repeating this action for 30 seconds. The number of times she was able to stand and sit was assessed, and the lower the number of repetitions, the greater the risk of falling for that elderly woman (Pereira et al., 2023)). d)Motor Reaction Time (The motor reaction time test was used to measure the simple motor reaction time and fatigue, using the TRT_S2012 Software with the keyboard, considering the space key as the command point. The volunteer had the goal of responding as quickly as possible to the stimuli generated by the software. There was a quick and short stimulus, with which the simple motor reaction time was measured, and a second stimulus held for a certain time at random, measuring the motor reaction time until fatigue (Pereira et al., 2023)). e)BMI Assessment (higher leg rotation on both legs was associated with a higher risk of falling when we adjusted for age, body mass index, leg pain, and fitness index, higher leg rotation on both legs was still associated with a higher risk of falling (Kasović et al., 2020), using body mass index (BMI);

A BMI lower than the WHO recommendation of 18.5k/m2 was given a positive score(Risbridger et al., 2022). f) Grip Strength Test (tested using HGS protocol, HGS is measured three times for each hand by a skilled investigator, using a digital dyna-mometer (digital grip power dyna-mometer, TKK 5401, Takei Scientific Instruments Co., Ltd., Tokyo, Japan). holding the instrument with maximum force for 3 seconds in an upright position, and a break of 60 seconds is allowed after each measurement. based on previously published limit values for HGS asymmetry with a difference of 20% HGS between hands (Go et al., 2021). g) Strength Test (Weakness status is assessed using the Chinese version of the FRAIL scale with a Cronbach coefficient of 0.705 (Khan et al., 2021) The scale includes five self-reported items: fatigue, resistance, ambulation, illness, and weight loss. The "yes" answer to each question is scored 1 point. Participants were awarded 1 point for each disease out of the 11 diseases listed, and 1 point for weight loss of 5% or more in the past 12 months. The total score ranges from 0 to 5. Individuals are classified into three categories based on their score: strong (0 points), pre-weak (12 points), and weak (35 points). In addition, frailty can also be divided into binary category variables (robust or frailty)(Teng et al., 2024)). Balance And Fall Scale (Balance ability is determined by the results of the seat ride test (CRT), timed up and go test (TUG) and tandem gait test (TGT). Poor balance ability is defined as CRT >10s or TUG >12s or TGT (5–9), moderate depression (10–14) and major depression (15–27) (Lin et al., 2022)). From the many types of physical examinations, it can be understood that physical examinations are very important. This examination is a preventive measure that is able to detect and reduce the risk of falls, especially in older individuals or those with certain health conditions.

B. MMSE mental assessment, death questionnaire (This checklist consists of 12 items that require a "yes" or "no" answer. For the first two items, the "yes" answers each scored 2 points, and the "yes" answers to the other ten questions scored 1 point each. The score ranges from 0 to 14 points, with higher scores indicating a higher risk of falling. Those who score 4 or more points are considered at risk of falling (Teng et al., 2024)). Specific cognitive domains, such

as attention and memory, significantly impact mortality outcomes, emphasizing the importance of comprehensive cognitive assessments (Su et al., 2021). Comprehensive cognitive assessments are essential for identifying risks, including falls, thereby improving patient safety and management strategies (Cardoso et al., 2024). Overall, mental health assessment is crucial for identifying factors that contribute to the increased risk of falls and enabling better management to prevent injuries and improve patient safety.

C. Interview assessment a.) Bartel Index (consists of 10 items that include activities such as: Eating, Bathing, Body care, Getting dressed, Urinating, Defecation, Using the toilet, Moving from bed to chair and moving from chair to bed, Ambulation, Going up and down stairs. Each item is assessed based on the patient's level of independence in carrying out the activity. Scores are assigned in a range of 1 to 15 for each item, and the total scores are summed to produce an overall score. Higher scores indicate a higher level of independence, while lower scores indicate lower levels of independence and possible limitations in daily activities. Score 0-20: "Total" dependence, Score 21-60: "severe" dependence, Score 61-90: "Moderate" dependence, Score 91-99: "Little" dependency, Score 100: Independent (Yu et al., 2022)). b) Fall Questionnaire (a) five-item questionnaire that evaluates a patient's fall risk based on five main factors: (a) recent fall history; (b) agitation; (c) frequent urination; and (d/e) combined transfer and mobility assessments. Items are scored as Yes (1 point) or No (0 points) as described by Oliver et al. (1997). (Bassett et al., 2020)). c) ADL Questionnaire (Part of the ADL (Barthel index (BI)) and the IADL scale. Lawton's IADL questionnaire evaluates seven indexes, i.e. collects information on chronic diseases, the condition of elderly individuals, and their health utilization (Yu et al., 2022)). d) IPAQ Measurement (answering questions considering the time spent doing physical activity in a normal or regular week. The categorical score classifies it as: very active; active; irregularly active; or settled. This calculation multiplies the value of the energy expenditure in METs of that activity (running equal to 3.3 METs, moderate 4.0 METs, and strong 8.0 METs) by the frequency in days per week and the time in minutes expressed for each activity (Pereira et al., 2023)). The interview assessment provides a comprehensive overview of the patient's level of independence, fall risk, physical health condition, and physical activity level. Each assessment tool has a different focus but complements each other to help identify factors related to mobility, independence, and the potential for fall-related injuries. The combination of these various assessments helps provide a thorough understanding of the physical health and risks faced by the elderly.

CONCLUSION

Widely used methods for measuring fall risk in the elderly include the Fall Questionnaire, MMSE (Mini-Mental State Examination) measurement, and Fall Balance Scale assessment. Other methods can be categorized into physical, mental, and interview-based assessments. Physical assessment methods include Physical Activity, Berg Balance (BBG) Test, 30-Second Sit-Stand Test, Motor Reaction Time, BMI Assessment, Grip Strength Test, Strength Test, IPAQ (International Physical Activity Questionnaire) Measurement, Balance and Fall Scale, and BMI Score. Mental assessment methods involve the MMSE Measurement and the Death Questionnaire. Assessment through interviews typically includes the Safety Evaluation Test, Barthel Index, Fall Questionnaire, and ADL (Activities of Daily Living) Questionnaire. These fall risk measurement methods have proven effective in preventing falls among the elderly.

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