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CONTENT AND FACE VALIDITY OF AN INSTRUMENT TO MEASURE THE PRACTICE OF INPATIENT NURSES IN PREVENTING PATIENT FROM FALLING

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ABSTRACT
Fall incidence among healthcare facility patients has recently become a patient safety issue. To date, instruments to measure nurses' performance in preventing patient fall incidence have been lacking. This paper aims to report the first and the second phases of an instrument to measure the implementation of patient fall prevention by nurses working in hospitals' inpatient units or wards. The instrument, Self-Reported Questionnaire: Implementation of Nurses in Inpatient Wards in Preventing Fall among Patients (INI-PFP), was developed using the scale development method. In the first phase, domain and item generation was identified, followed by content validity (panel of 11 experts from universities and hospitals) and readability test/ face validity of 14 inpatient nurses). The study initially generated 46 items from the instrument development process. The initial instrument was sent to 11 experts, assessing the items' relevance, clarity, simplicity, and ambiguity. This stage reduced three items, with the remaining items' S-CVI = 0.99 for the four categories. The 43 items were subsequently provided to 14 inpatient nurses from four hospitals in the readability test and face validity with 98,17% of the items' clear instructions, ranging from 57%-100% of question agreement. From this stage, 13 items were re-written and brought to a second round of face validity involving eight nurses from two hospitals. The end of the face validity test considered the 43-Items INI-PFP were adequate to enter the final phase, including Construct Validity and the Psychometric Evaluation for its final validity and reliability.

Keywords: fall; inpatient; nurse practice; patient safety; prevention

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INTRODUCTION

Fall incidence among healthcare facility patients has recently become a patient safety issue. It represents a significant and escalating global public health challenge, and it is one of the leading causes of mortality and disability worldwide due to unsafe care by health professionals (WHO, 2021). The detrimental harm or injuries can happen due to health professionals' unsafe care, including nurses, which are called patient safety incidents. Patient safety incidents can lead to death and disability, causing suffering for affected patients and

their families (WHO, 2023). The financial and economic costs of such safety lapses are also considerable. These harmful incidents can potentially reduce global economic growth by 0.7% annually. On a global scale, the indirect costs of these events amount to trillions of rupiah each year (Auraaen A et al., 2018).

Injuries resulting from falls are a serious concern within the context of patient safety. This issue is not limited to elderly patients or populations vulnerable to fall risks due to specific factors in healthcare facilities. Patients of any age or physical condition can be at risk of falling due to physiological changes that may arise from underlying medical conditions, medications, surgical procedures, medical interventions, or diagnostic tests, which can lead to weakened bodily functions or balance disturbances (Indonesian Ministry of Health, 2017). Patient falls are among hospitals' most frequent and hazardous adverse events (LeLaurin & Shorr, 2019). Falls with serious injuries consistently rank among the top 10 sentinel events reported to The Joint Commission's database, with 465 cases of falls with injury reported between 2009 and 2015, most of which occurred in hospitals. Approximately 63 percent of these falls resulted in death, while other patients sustained injuries (The Joint Commission., 2023). The incidence rate of falls ranges from 3 to 5 per 1,000 bed days, with more than one-third of these falls resulting in injury (Agency for Healthcare Research and Quality, 2019). These injuries can hinder or delay the clinical recovery of the affected patients. Thereby impeding or delaying clinical recovery, extending hospital stays, and increasing the financial burden on families and the healthcare system as a whole (Dykes et al., 2020).

As the healthcare system's frontline providers, nurses constantly interact with patients. This positions them as key players in the realization of patient safety initiatives. Consequently, nurses are expected to cultivate and implement a culture of patient safety in their daily routines, making patient safety objectives an integral part of their everyday professional practice (Tombong, 2023). Unfortunately, some falls can be attributed to errors or negligence by healthcare professionals, including nurses. Analysis of several cases involving falls with serious injuries (sentinel events) has revealed that the most common contributing factors are inadequate fall risk assessments by nurses, failures in communication between staff or between staf and patients/ families/ caregivers, non-compliance with protocols and professional practices related to patient safety, inadequate staff orientation, qualifications, or supervision, failure to meet multiple standards within the care environment, and a lack of leadership, all of which result in suboptimal implementation of fall prevention measures (WHO, 2023).Given the potential dangers associated with falls, nurses in healthcare facilities should lead efforts to enhance patient safety and prevent fall-related incidents. This entails performing thorough fall risk assessments for all patients, without exception, and implementing fall prevention measures that correspond to the level of risk identified in these assessments. However, to date, there is a lack of literature on the practice of fall prevention among hospital patients, especially in Indonesia. This study aims to develop an instrument to measure the implementation of inpatient nurses in preventing patients from falling in the inpatient units within hospitals in Indonesia.

METHOD

This paper reports a study's first and second phases on instrument development related to fall prevention practice among nurses in Indonesian hospitals. The instrument is called ‘Self-Reported Questionnaire: Implementation of Nurses in Inpatient Wards in Preventing Falls among Patients (INI-PFP)’. Instrument development consists of three phases: Item Development, Item Evaluation, and Scale Validation and Reliability (Boateng et al., 2018). The Item Development phase consists of two steps: 1) domain identification and item

generation and 2) content validity. In the first step, researchers conducted a literature search and literature review to identify current practices in fall prevention among nurses. From this stage, domains of questions/ statements were identified, and items of questions or statements were yielded. After the domain identification and item generation step, we conducted content validity in step 2, involving a panel of experts who were chosen through convenient sampling. The experts were first contacted via telephone, and they were requested to consent once agreeing to participate. The content validation form and a cover letter with instructions were provided. They were given seven days to finish the content validation. Of 15 experts who were requested to conduct the content validity, 11 finished the task (two experts from universities and nine nurses from seven hospitals with a minimum master's degree in nursing qualification). The initial draft of the instrument was sent to the experts, and they were requested to agree on relevance, clarity, simplicity, and ambiguity. Experts were requested to rate the relevance of each domain and item of the instrument on a 4-point Likert scale (1= not relevant; 4=very relevant). The experts were also requested to provide feedback for rewriting the narration of the questionnaire items.

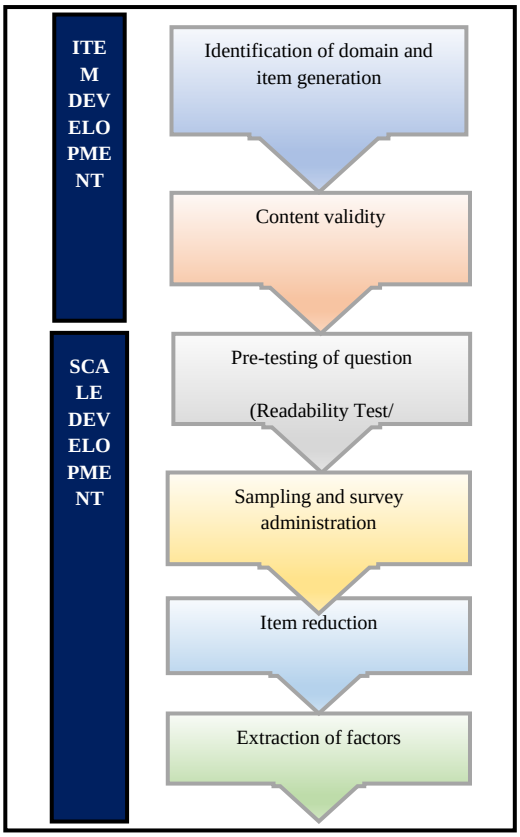

Figure 1. First two phases and stages in an instrument or scale development (Boateng et al., 2018)

After the Item Development, the study continued with the Item Evaluation, especially the first step of the Scale Development phase, which is the readability or face validity tests. This step was conducted in two rounds, of which round 1 involved 14 inpatient nurses from four hospitals, and round 2 involved 11 nurses from three hospitals. The participants were selected through convenient sampling and contacted via telephone. Once the participants had agreed to participate in the study, the author made a time contract to visit the participants to conduct the face-to-face encounter in their hospitals or via Zoom meetings for hospitals outside Makassar City. In the face validity stage, participants were requested to evaluate each part of the instrument with reference to two aspects: 1) the readability of the instrument and its items, whether or not the instrument is clear or difficult to understand, and 2) the narrative sentence, whether or not there is a word or word that need improvement to make it clearer. After Round 1, participants' feedback was reviewed, items were re-written for clarity, and the instrument was brought to Round 2 for obtaining further feedback.

RESULTS

Table 1.
Results of Domain Identification and Item Generation

Domain	Name of Domain	Number of Question
1	Implementing fall hazard signage/ warning system	5
2	Maintaining a safe environment	13
3	Monitoring and providing assistance to patients	17
4	Educating/ involving patients and their families in the fall prevention	11

Source: Primary Data, 2024

The study initially generated 46 items from the instrument development process, which later were categorized into four domains (see Table 1). Domain 1, called 'Implementing fall hazard signage warning system' consisted of five items; Domain 2, called 'Maintaining a safe environment', consisted of 13 items; Domain 3, called 'Monitoring and providing assistance to patients,' consisted of 17 items, and Domain 4, called 'Educating/ involving patients and their families in the fall prevention, consisted 11 items. After receiving judgment from the 11 experts who assessed the items' relevance, clarity, simplicity, and ambiguity, the score given to every question for the four measurements was calculated to yield S-CVI, as seen in Table 2.

Table 2.
Results of Expert Judgment/ Agreement on Items (Quantitative Findings)

No.	Aspect of Items' content evaluated	S-CVI
1	Relevance	0,998389694
2	Clarity	0,997987118
3	Simplicity	0,999194847
4	Ambiguity	0,999194847

Source: Primary Data, 2024

Despite the positive results of the S-CVI values (0.99 for the four categories), this stage reduced three items due to suggestions from the experts (see table 3).

Table 3.
Examples of experts' feedback from different sections of the content validation form (qualitative findings) and decisions made by authors

Section	Experts' Feedback	Authors' Decision	Authors' Considerations/ Motivations	Action taken by authors
Relevance (Domain 1, Item No.5)	"[…]In my opinion, this question is not necessary because it does not comply with accreditation standards […]this item will not not used if already using electronic medical records […] Not all hospitals use stickers. For example, stickers can be attached attached to the patient's bed."	Accepted	This item was originally intended to emphasize the importance of fall risk markers in patients. However, marker use varied greatly between hospitals, so the authors agreed to remove this item	Item deleted
Clarity (Domain 3, Item No.23)	"[…] Can be combined/ unified with question No.17."	Rejected	Question No.17 and No. 23 were different in two aspect: Domain and Setting. No.23 (Domain 3) was about monitoring of the locked wheel in the patient room, while question no.17 (Domain 2) was about preventing patient during mobilization	Item retained but revised to enhance clarity
Ambiguity (Domain 2, Item No.10)	"[…]how many centimeters the dilation is. What about the condition of post-operative patients such as total	Accepted	We agreed with all the experts. '*widen the distance between the legs'* had ambiguity for potential readers (nurses) and the item can lead to confusion of the	Item revised

Section	Experts' Feedback	Authors' Decision	Authors' Considerations/ Motivations	Action taken by authors
	hip replacement with limited joint movement or patients with rheumatoid arthritis who have limited joint movement. […] the words '*widen the distance between the legs'* could perhaps be clarified, what the width should be so that the application is clearer'		nurses.	
Simplicity (Domain 1, Item No. 2)	"[…]What if the narration was like this: I carry out a fall risk assessment using a an instrument based on the patient's age category. "	Accepted	The expert suggestion of word choices was on point and simple compared to the initial draft provided by the authors	Item revised

Source: Primary Data, 2024

After reviewing such feedback from the experts, the authors deleted three items (Item No. 5 from Domain 1, Item No. 18 from Domain 2, and Item No. 44 from Domain 4). The author subsequently rewrote 37 out of the remaining 43 items based on suggestions from the experts. The questionnaire draft was finalized and included in the readability and face validity tests. Quantitatively, the readability and face validity tests resulted in 98,17% of the items having clear instructions, ranging from 57,14%-100% of the question agreement. Feedback from inpatient nurses was reviewed and considered (see Table 4).

Table 4.
Examples of participants' feedback to issue 1 (readability) and issue 2 (narration/ difficulties in understanding words within the items) of the face validation form (qualitative findings) and decisions made by authors

Section	Participants' Feedback	Authors' Decision	Authors' Considerations/ Motivations	Action taken by authors
Narration (Item No.17)	"[…] the narration should be changed into: 'shifts are changed every hour or every time there is a change in the patient's condition ' […] The words 'very hour' should be changed according to indications and (or) hospital regulations […] I recommend to change 'every hour' = for example every shift or according to hospital regulations."	Accepted	Author agreed with the suggestion from the participants. Every hospital has its own procedure regarding monitoring patients for fall prevention. Therefore, the suggestions were accepted.	Item revised
Readability (Item No.9)	"[…]I recommend that patients set their	Accepted	Question No.17 and No. 23 were different in	Item revised

	feet shoulder-width apart when standing or walking, or balance their bodies first before taking a step. […] at least 15 cm should be replaced shoulder width apart […]The word minimum 15 cm should be replaced by shoulder width, because each person's balance is different. "		two aspect: Domain and Setting. No.23 (Domain 3) was about monitoring of the locked wheel in the patient room, while question no.17 (Domain 2) was about preventing patient during mobilization	
Narration (Item No.20)	"[…]Add / change to: I help orient patients who are confused or disoriented. […] delete "if needed'. […] please add the words: I help orient patients who are confused."	Accepted	Majority of participants requested to improve the narration of this item. The author agreed with the suggestion as they made the item clearer	Item revised

Source: Primary Data, 2024

From this stage, 13 items were re-written and brought to a second round of face validity involving eight nurses from two hospitals. From Round 2 of the Face Validity, all items were considered to have clear instructions and qualified for construct validity. All items and their domain are presented in Table 5.

Table 5
The final draft of the Self-Reported Questionnaire after the Face Validity Stage is to be included in the next phase of instrument development (Construct Validity)

Domain	Item	Narration of Item
Domain 1: Implementing a fall hazard signage/ warning system	Q1	I conduct a fall risk assessment when admitting new patients to the ward where I work.
	Q2	I conduct a fall risk assessment using a fall risk assessment instrument based on the patient's age level.
	Q3	I place fall risk markers on patients who have a risk of falling according to the assessment results.
	Q4	I place/install fall risk markers (e.g. fall risk marker cards) on the patient's bed/ on the patient's door/ on the patient's identity bracelet or in a place provided according to hospital regulations.
Domain 2: Maintaining a safe environment	Q5	I tidy up and/or educate the patient's family/companion to continue tidying up any irregular equipment or items around the patient's bed.
	Q6	I ensure there are no liquid or food spills on the floor or ensure the floor around the patient's bed is not slippery.
	Q7	I encourage patients to use non-slip footwear for walking (e.g. when going to the bathroom).
	Q8	I advise the patient to always be accompanied by family/patient companion or by the nurse when walking (e.g. to the bathroom) to avoid falling.
	Q9	I advised the patient to balance the body first when standing or walking and then set the feet shoulder-width apart, so as to be able to rest firmly to maintain balance.
	Q10	I taught the patient's family or caregiver to tidy up and secure irregular cables (e.g. electrical cables, medical equipment cables, electronic device cables) around the patient's bed (if any)
	Q11	I pay attention to environmental factors that increase the risk of falls (e.g. slippery floors, lack of lighting, broken bed guards, etc.) and if there is a problem, immediately report it to the relevant staff to be immediately addressed or repaired
	Q12	If the floor is wet or slippery e.g. due to liquid or food spillage or slippery bathroom floor, I put up warning signs to indicate the danger of wet/slippery floor or direct the

Domain	Item	Narration of Item
		cleaning staff to clean the floor immediately.
	Q13	I installed a bed safety device/handrail to protect movement in patients at risk of falling
	Q14	I ensure that furniture such as oxygen cylinders/other medical equipment or personal equipment of the patient/family/companion around the patient's bed is not easily dropped or scattered.
	Q15	I set the height of the patient's bed at the lowest position lowest position to avoid the possibility of falling on the patient
	Q16	If the patient needs to be mobilized to another unit, I ensure that the wheels of the bed or wheelchair are locked when stopped.
Domain 3: Monitoring and providing assistance to patients	Q17	I monitor the condition of patients at risk of falling regularly, e.g. every shift or according to the regulations in force at the hospital or every time there is a change in the patient's condition
	Q18	I monitor changes in the patient's status or condition that increase the risk of falls (e.g. changes in vital signs, changes in general awareness, changes in balance, etc.).
	Q19	I assisted the patient to sit up or change position as needed, e.g. bathing or assisting with personal hygiene, toileting, or other mobilization needs.
	Q20	I help orient patients who are confused or disoriented (place/time/etc) if needed
	Q21	I ensure that the patient's bed guards on both sides are always locked
	Q22	I teach the patient's family or companion to place objects that are frequently needed by the patient within reach patient
	Q23	I encourage the patient to press the call bell if they need assistance.
	Q24	I respond/respond to patient or family calls immediately.
	Q25	I report the development of the patient's condition that requires further treatment to the Doctor in Charge of Services (DPJP), for example if the patient is agitated, has a decrease in consciousness (delirium), etc.
	Q26	If there is an indication or written in the medical therapy record, I use physical restraint on the patient to prevent falls.
	Q27	I encourage the patient or the patient's family to call the nurse if they need help moving or walking.
	Q28	I place high-risk fall patients close to the nurse station for easy monitoring
	Q29	I taught the patient and family to ensure adequate lighting in the patient's treatment room space, especially when walking or moving.
	Q30	I conduct fall risk assessments on patients at least once every shift or according to institutional policy.
	Q31	I assess and monitor the patient's ability to transfer from bed to wheelchair and vice versa.
	Q32	I use technology (such as movement sensors/I use technology (such as movement sensors/ muscle strength sensors/ vital signs sensors) to monitor patient movement or changes in physical condition.
	Q33	I use monitors at the nurse station that are connected to CCTV/monitoring cameras to monitor patient movement in patient care rooms.
Domain 4 : Educating/ involving patients and their families in the fall prevention	Q34	I oriented the room to the patient and family who were new to the room.
	Q35	I teach patients and families about environmental hazards (e.g. slippery floors, poor lighting, broken bed guards, etc.) that can lead to falls, and if there is a risk or danger, to report it immediately to the relevant staff.
	Q36	I advise the patient/family/patient companion on how to use a walking aid (e.g. walker) if the patient meets the criteria for the use of a walking aid.
	Q37	I advise the patient/family/patient companion to keep away items/equipment that could cause the patient to fall.
	Q38	I explained to the patient/family/patient companion that the use of fall risk markers or other markers to prevent falls in patients is part of patient safety.
	Q39	I teach families to stay involved in patient safety, especially in preventing falls in patients.
	Q40	I taught the patient/family/patient companion how to use the call bell to summon the nurse.
	Q41	I taught the patient/family/patient companion to call for help as needed, e.g. to fix a folded IV tube, sudden deterioration of the patient's condition, etc.)

Domain	Item	Narration of Item
	Q42	I teach the patient's family or companion to ensure the floor is uncluttered and free of obstructions (especially the path between the bed and bathroom)
	Q43	I taught the patient's family to ensure that the patient's bedrail is always in place and to report if the bedrail is stuck or damaged.

Source: Primary Data, 2024

DISCUSSION

In this paper, we reported the first and second phases of instrument validation to measure the practice of inpatient nurses in implementing patient fall prevention strategies within hospitals. The instrument called Self-Reported Questionnaire: Implementation of Nurses in Inpatient Wards in Preventing Fall among Patients (INI-PFP). From the initial 46 items of the instrument, three items were deleted after the content validity stage. The four aspects explored in this stage (relevance, clarity, simplicity, and ambiguity) showed significant S-CVI 0,99 for each section. With this result, this instrument was considered valid for the content validity stage. Content validity is a crucial step in instrument development as the step provides expert judgment in the context researchers focus on (Badenes-Ribera et al., 2020; Boateng et al., 2018). A range of studies (Cocchi et al., 2023; Hariati et al., 2020; McElroy & Esterhuizen, 2017) implemented the content validity with promising results in their specific context.

The next stage of this study was the face validity test. Face validity refers to the extent to which a test appears to measure what it's supposed to measure based on subjective judgment. It's not a formal statistical measure but an assessment based on intuition and end-user opinion. In the face validity test, authors gathered feedback from nurses as potential test-takers to determine if the test items seem relevant and appropriate, consisting of qualitative feedback indicating whether the items seem to represent the construct being measured adequately. also led to remarkable results, 57,14%-100% of the question agreement. After re-writing based on end-user participants (inpatient nurses), all 43 items were considered clear and qualified for construct validity. It has been widely known that the importance of face validity is to assess the extent to which questions reflect the domain of interest and that answers produce valid measurements (Boateng et al., 2018). Several quality studies (Cocchi et al., 2023; Connell et al., 2018; Hariati et al., 2020; McElroy & Esterhuizen, 2017) also highlight the crucial validity from the face validity stage. With such results, the INI-PFP questionnaire was more than enough to enter the construct validity stage with its initial domains and items to be tested for its final validity and reliability.

Domain 1. Implementing a fall hazard signage/ warning system

One of the main steps in preventing falls in hospital patients is implementing a fall hazard marking or warning system, making it easier for medical staff to identify high-risk patients. In a hospital environment, this marking system can take the form of specially colored bracelets, stickers on beds, or the use of detection technology such as sensor monitors (Delahoz & Labrador, 2014; Heng et al., 2020; Tricco et al., 2017). Additionally, nurses or hospital staff should perform a fall risk screening assessment using hospital-provided tools to categorize patients into "high" and "low" risk categories. Based on the results of this assessment, they can implement appropriate preventive interventions, both for high and low risks. To support patients at high risk of falls, several hospitals provide bright items like colorful bracelets, along with cheerful warning signs at their bedside for added safety. They can also be fitted with bed alarms that sound if the patient tries to get up without help (Carter et al., 2020). A study conducted by de Freitas Luzia et al. (2020) shows that the use of marker systems, ranging from bracelets to automatic sensors, significantly contributes to reducing the number of falls in patients.

Domain 2. Maintaining a safe environment

A safe environment is a key factor in preventing hospital falls. Like other adverse incidents, falls result from the dynamic interaction of various factors involving the patient's behavior and condition, the treatment provided, and the characteristics of the environment and system of care, including the practices of health professionals aimed at preventing falls (Fehlberg et al., 2020). Environmental factors such as inadequate treatment room conditions, poor lighting, and slippery floors are often the main triggers for falls (Vu et al., 2020). A study by Lee et al. (2022) also found that slippery floors, the use of unsafe footwear, and unsupportive chairs and toilets significantly increased the risk of falls in patients. This is supported by Takase's (2023) study, which shows that wet floors, lack of handrails, and unstable footwear are the main causes of hospital falls. In addition to environmental factors, the risk of falls is increased in patients who experience hypotension, muscle weakness, or emotional instability. This risk is exacerbated if nurses do not pay adequate attention to at-risk patients when bathing or do not implement preventive measures, such as the use of anti-slip mattresses. These factors are consistently identified as causes of increased risk of falls in hospitals. Therefore, to reduce the potential for falls, nurses must be alert to signs of risk from patients and the environment, have a good understanding of the current situation, and be able to predict and take preventive action to prevent future falls (Takase, 2023).

Domain 3. Monitoring and assisting patients

A variety of fall prevention practices can be implemented in hospitals, such as the use of patient monitoring devices (e.g., caregivers), bed modifications (such as alarms), identification of fall risks (e.g., use of bracelets), implementation of safety measures (such as keeping floors clean) , as well as education for patients and their families. However, in some cases, implementing these practices is still not optimal (LeLaurin & Shorr, 2019). Research states that most fall in inpatients (89%) occur when medical personnel are absent. Patients tend to fall when they are unaccompanied because they are involved in activities that they do not realize are risky or too difficult for them (Stathopoulos et al., 2021). A study by Turner et al. (2022) observed that interventions requiring more time, such as using caregivers, setting a toilet schedule, and regular hourly checks, were less consistently implemented than other prevention practices. This differs from previous findings showing that hourly (70%) and caregiver (68%) checks were the most frequently used fall prevention practices. The main barriers to implementing patient monitoring include increased workload, competing priorities, and lack of staff involvement (Ryan et al., 2019). These barriers slow down the effectiveness of implementing fall prevention strategies in hospitals.

Domain 4. Educating/ involving patients and their families in the fall prevention

Education for patients and families is crucial to preventing hospital falls. Involving patients and families in patient safety endeavors has been strongly recommended internationally (WHO, 2021). In fall prevention, Nurses must actively involve them in every preventive step (Turner et al., 2022). Previous research shows that fall prevention interventions in hospitals prove to be more effective in reducing fall rates when patients and families are routinely involved in planning and implementing prevention strategies (Dykes et al., 2020). These findings are supported by research showing that patient involvement in safety initiatives correlates with improved quality of care, safety, patient experience, and empowerment. Patients who are actively involved in this process are better prepared to carry out specific interventions recommended by health professionals (Duckworth et al., 2019). The main reason for involving patients in fall risk assessment and developing a prevention plan is that it helps patients understand their own risks. When they realize they are at risk of falling, they are more likely to follow the preventive measures outlined. This study also shows that direct

patient involvement in the fall prevention process has a significant impact, especially for younger patients, and reduces fall-related injuries in older patients, the group at the highest risk of injury (Dykes et al., 2020).

CONCLUSION

The Content Validity and Face Validity for developing an instrument titled 'Self-Reported Questionnaire: Implementation of Nurses in Inpatient Wards in Preventing Falls among Patients (INI-PFP)' were conducted with positive results. From the item generation, the instrument initially contained 46 items. Three items were removed following the content validity evaluation. The four aspects assessed during this stage—relevance, clarity, simplicity, and ambiguity—each demonstrated a significant Scale-Content Validity Index (S-CVI) of 0.99, allowing the items to be tested in the Face Validity stage. From the Face Validity stage, 98,17% of the items were considered to have clear instructions, ranging from 57%-100% of the question agreement. After re-writing 13 items and testing in Round 2 of Face Validity, the 43 items of INI-PFP were considered adequate to enter the construct validity test. This study suggests conducting construct validity with optimal standardized testing methodology and sufficient samples in the final phase.

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