

Fall Prevention Behaviour and Its Predictors Among Older Adults in a Tertiary Centre, Malaysia

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ABSTRACT

INTRODUCTION: Falls are a leading cause of injury and disability among older adults, posing a significant public health challenge. In Malaysia, the prevalence of falls among community-dwelling older adults varies widely. Despite the availability of fall prevention programmes, adoption remains limited. This study aimed to assess fall prevention behaviour and its associated factors among older persons attending Klinik Rawatan Keluarga, Hospital Pakar Universiti Sains Malaysia. **MATERIALS AND METHODS:** A cross-sectional design was employed involving 213 older adults selected via systematic sampling at a primary care clinic in Hospital Pakar Universiti Sains Malaysia. Data on socio-demographics, comorbidities, and fall history were collected. The validated Malay version of the Fall Prevention Knowledge and Behaviour (FPKB) questionnaire was used to evaluate participants' knowledge and behaviour. Logistic regression analysis were performed to investigate the associations between sociodemographic, medical characteristics, fall history, Fall Risk Assessment (FRA), and Fall Prevention Knowledge with Fall Prevention Behaviours. **RESULTS:** Results showed that 43.7% had poor fall prevention knowledge, and 44.1% demonstrated inadequate preventive behaviour. Participants with good knowledge had significantly lower odds of poor behaviour (OR=0.425; 95% CI: 0.244–0.740; $p=0.002$). **CONCLUSION:** These findings underscore the crucial role of health literacy in fostering effective fall prevention practices. Strengthening educational interventions in clinical settings may enhance behavioural outcomes and reduce fall-related risks among older adults.

KEYWORDS: Fall, fall prevention, older adults, knowledge, behaviour

INTRODUCTION

Falls among older adults are not only common but also carry serious consequences, including physical injuries, psychological trauma, and loss of independence.¹ These incidents can significantly impact the quality of life of older persons and place a burden on families and healthcare systems. The prevalence of falls escalates with age, with up to 42% of individuals aged 70 and above experiencing at least one fall annually. These incidents often result in fractures, head injuries, and a decline in functional independence. Despite the availability of fall prevention strategies, many older adults remain unaware of their personal risk, and fall-related injuries continue to rise, particularly in low- and middle-income countries.^{2,3} Understanding the behavioural patterns and associated factors influencing fall prevention is essential for designing effective interventions tailored to older populations.^{3,4}

Multiple factors, including knowledge, attitudes, and practices influence behavioural engagement in fall prevention. Studies from Vietnam and Malaysia reveal that older adults often possess limited knowledge about fall risk factors, particularly those related to environmental hazards and behavioural habits. While attitudes toward the severity and susceptibility of falls are generally moderate to positive, actual preventive practices such as home modifications, the use of assistive devices, and regular exercise are inconsistently adopted. The Health Belief Model (HBM) has been instrumental in explaining these behaviours, highlighting that perceived barriers and lack of cues to action significantly hinder proactive fall prevention.^{3,4}

Socio-demographic and health-related factors play a critical role in shaping fall prevention behaviour. Evidence suggests that gender, education level, living arrangements, and functional mobility are strongly associated with fall awareness and prevention practices. For instance, older males and those living with family tend to exhibit higher fall prevention behaviour scores. Conversely, individuals with higher BMI, multiple comorbidities, and poor mobility are less likely to engage in preventive actions. Additionally, fear of falling, sleep disturbances, and previous fall experiences negatively impact both awareness and quality of life, further complicating behavioural change.^{3,5}

Cultural and environmental contexts also influence fall prevention behaviour, particularly among ethnic minority groups in rural settings. In northern Thailand, older adults from highland communities such as the Hmong exhibit lower fall awareness and quality of life compared to their lowland counterparts. Factors such as limited access to healthcare, traditional beliefs, and challenging living environments contribute to increased fall risk. These findings underscore the need for culturally sensitive, community-based interventions that address both individual and structural factors contributing to fall prevention.⁵

To reduce the burden of falls, public health strategies must prioritise education, empowerment, and accessibility. Interventions should be tailored to address perceived barriers, enhance motivation, and foster supportive environments, particularly for vulnerable groups such as those living alone, with chronic conditions, or in rural ethnic communities. Strengthening fall prevention behaviour is not only vital for reducing injuries but also for improving the overall quality of life among older adults.

Despite the known risks, many older adults have limited awareness and knowledge about fall prevention. Research from Sri Lanka and Vietnam suggests that a substantial proportion of older adults possess only moderate knowledge of fall risk factors and preventive strategies.^{3,6} In Malaysia, a study conducted in Selangor found that fall prevention behaviour was significantly associated with gender, body mass index, living arrangements, and mobility status.⁴ However, a gap remains in understanding fall prevention knowledge and practices among older persons in various settings, particularly in tertiary care centres.

Therefore, this study aims to determine the proportion of inadequate fall prevention behaviour and its associated factors among older persons attending Klinik Rawatan Keluarga, Hospital Pakar Universiti Sains Malaysia (HPUSM). Specifically, it seeks to assess the level of fall prevention knowledge, identify behavioural practices, and explore the sociodemographic and clinical factors that influence fall prevention behaviour. The findings will help inform targeted interventions and contribute to improving the safety and well-being of older adults in Malaysia.

MATERIALS & METHODS

Study design

This was a cross-sectional study conducted at Klinik Rawatan Keluarga (KRK), an outpatient clinic located at the tertiary care centre of Hospital Pakar Universiti Sains Malaysia (HPUSM) in the northeast region of Peninsular Malaysia. The study was carried out between 1st February 2025 and 30th April 2025. The study population consisted of older persons aged 60 years and above attending KRK and HPUSM. The inclusion criteria were individuals aged 60 years or older who were able to understand and respond to the

questionnaire independently. Those with physical (hearing or visual) or mental impairments that affected their ability to participate were excluded. Systematic sampling was employed, with every third eligible patient selected from the daily registration list.

The sample size was calculated using a single-proportion formula based on a previous study that reported a 38.5% prevalence of poor fall prevention knowledge.⁷ With a 95% confidence level and 7% precision, the minimum required sample size was 185. After accounting for a 10% non-response rate, the final sample size was 206.

Study Instruments

Data were collected using a structured questionnaire comprising three sections:

Section 1: Demographic and clinical history

This includes age, gender, ethnicity, education level, marital status, occupation, living arrangement, comorbidities, medication use, and fall history.

Section 2: Validated Malay version of the Fall Risk Questionnaire (FRQ)

This study utilised a translated and validated Malay version of the fall risk assessment scale developed by the U.S. Centres for Disease Control and Prevention. It is a 12-item questionnaire designed to screen older adults who are at risk of falling.⁸ Each item has two answer options: 'yes' or 'no'. A score of 4 or higher indicated a high fall risk assessment by the participants. This questionnaire was validated in the Malay language in another study conducted at HPUSM. The above questionnaires underwent a forward-backward translation into the Malay language involving forward translation, reconciliation, back translation, harmonisation, cognitive debriefing, review of cognitive debriefing results, and finalisation.⁹ Then, a validation study was conducted among 204 older adults in the medical specialist clinic, HPUSM. The analysis demonstrated that the Cronbach's alpha value for this scale was 0.777.

Section 3: The Malay Version of the Fall Prevention Knowledge and Behaviour (FPKB)

Assessment tools such as the Fall Risk Awareness Questionnaire (FRAQ) and the Fall Awareness Behaviour Questionnaire (FaB) have been used internationally to evaluate knowledge and practices related to fall prevention.^{10,11} While these tools have demonstrated acceptable reliability, their cultural adaptation and validation in the Malaysian context are limited. Given the diversity in language, education, and access to healthcare, it is essential to develop and validate culturally appropriate instruments that are easily understood by older Malaysian adults. In this study, a culturally validated tool was used to assess the knowledge and behaviour on fall prevention.

The FPKB questionnaire was developed based on studies in Selangor, Malaysia, and Vietnam.^{3,4} It is a self-administered questionnaire divided into two sections: Knowledge and Behaviour. The Knowledge section had two domains: "Impact of Medications on Fall Risk" (five items) and "Fall Prevention Measures at Home" (six items). Each item has three answer options: 'true', 'false' and 'unsure'. For scoring, each correct answer will be given one score, while incorrect and 'unsure' answers will be given a zero score. The summation of the score will range from 0-11. Higher scores indicate higher knowledge of fall prevention.

Based on the modified Bloom's cutoff score, the level of knowledge was categorised into poor (less than 60%) and good knowledge level (60% and above).¹²

The Fall Prevention Behaviour section has two domains: "Personal Health Management Behaviours" (six items) and "Environmental Safety Practices" (five items). All items utilised a 5-point Likert scale as the scoring system. The Likert scale was based on the following scores: never (1), rarely (2), sometimes (3), often (4) and always (5) for the behaviour scale. The minimum score was 11, and the maximum score was 55. Higher scores indicate better behaviour towards fall prevention. The dependent variable in this study is adequate fall prevention behaviour. It is defined as those who endorsed all items with at least a response rating of 4 (often). Thus, the scores of the 11 items were summed to give an aggregate score of 44. Those who scored 44 or more were categorised as having adequate fall prevention behaviour.¹³

The questionnaire was developed and validated in a previous study at HPUSM. The content and face validity indices (I-CVI and I-FVI) for both knowledge and behaviour sections were high, indicating high relevance and clarity. The Exploratory Factor Analysis revealed both the Knowledge and Behaviour sections had satisfactory internal consistency, with Cronbach's alpha values ranging from 0.774 to 0.823.

Data Collection Procedure

The participants were selected using systematic random sampling, with a ratio of 1:3, based on attendance lists in the clinic, until the calculated sample size was achieved. Eligible participants were approached during clinic visits, briefed on the study, and invited to provide written informed consent. Questionnaires were self-administered or interviewer-assisted when necessary. Completion time was approximately 15–20 minutes.

Statistical Analysis

Data entry and statistical analysis were conducted using IBM SPSS Statistics version 26.0 (SPSS Inc., Chicago, IL, USA, 2019). The dataset was reviewed for any outliers or missing values. Descriptive statistics were applied to summarise the questionnaire responses, and floor and ceiling effects were identified. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to summarise the participants' sociodemographic characteristics, fall-related incidents, and medical profiles. Categorical variables were initially analysed using simple logistic regression. Variables with a p-value less than 0.25 were subsequently entered into a multiple logistic regression model. Both backwards and forward stepwise selection methods were applied to identify significant predictors and explore potential two-way interactions. Associations were reported as odds ratios (OR) with 95% confidence intervals (CI), and statistical significance was set at $p < 0.05$. Model fit was assessed using the Hosmer–Lemeshow test, classification table, and receiver operating characteristic (ROC) curve.

RESULTS

Table 1 demonstrates the sociodemographic characteristics and clinical history of the older adults. Among the 213 participants, 120 (56.3%) were males, and 93 (43.7%) were females. Most of the participants were Malay (91.1%) and married (82.6%). More than half of the participants (51.2%) had multiple comorbidities.

Table I also presents the comparison between those with adequate and inadequate preventive behaviour. A total of 94 participants (44.1%) exhibited inadequate fall-prevention behaviours, whereas 119 participants (55.9%) demonstrated adequate behaviours. The mean ages for the two groups were 68.64 and 68.24, respectively.

Among those who exhibited inadequate behaviour, the majority were male (61.7%), while 36 (38.3%) were female. More than half (55.3%) in this group had poor knowledge of fall prevention.

Table I: Sociodemographic and clinical history of the older adults (n=213)

VARIABLES		FALL PREVENTION BEHAVIOUR	
		Inadequate behaviour	Adequate behaviour
		(n = 94) n (%)	(n = 119) n (%)
SOCIODEMOGRAPHIC			
Age (years)		68.64 (5.58)*	68.24 (5.63)*
Gender	Male	58 (61.7)	62 (52.1)
	Female	36 (38.3)	57 (47.9)
Ethnicity	Malay	87 (92.6)	107 (89.9)
	Non-Malay	7 (7.4)	12 (10.1)
Religion	Muslim	90 (95.7)	110 (92.4)
	Non-Muslim	4 (4.3)	9 (7.6)
Marital status	Married	81 (86.2)	95 (79.8)
	Single/divorced	13 (13.8)	24 (20.2)
Education level	Primary	11 (11.7)	14 (11.8)
	Secondary	54 (57.4)	55 (46.2)
	Tertiary	29 (30.9)	50 (42.0)
Occupation	Unemployed	20 (21.3)	21 (17.6)
	Employed	74 (78.7)	98 (82.4)
Living arrangement	Stay alone	2 (2.1)	8 (6.7)
	Stay with others	92 (97.9)	111 (93.3)
CLINICAL HISTORY			
Comorbidity	<1	7 (7.4)	1 (0.8)
	1-2	40 (42.6)	56 (47.1)
	>2	47 (50.0)	62 (52.1)
Polypharmacy	No	39 (41.5)	52 (43.7)
	Yes	55 (58.5)	67 (56.3)
History of fall in ≤ 1 year	No	60 (63.8)	72 (60.5)
	Yes	34 (36.2)	47 (39.5)
Complications of fall	No	82 (87.2)	95 (79.8)
	Yes	12 (12.8)	24 (20.2)
Fall risk assessment (FRQ)	Low risk	54 (57.4)	61 (51.3)
	High risk	40 (42.6)	58 (48.7)
Knowledge	Poor	52 (55.3)	41 (34.5)
	Good	42 (44.7)	78 (65.5)

* Mean (SD)

Table II showed the participants' knowledge of fall prevention. The results showed that participants had relatively limited knowledge of the effects of various medications on fall risk, with only 28.2%-38.5% providing correct responses. Similarly, only 34.7% of participants correctly recognised that the use of more than four types of medications increases the risk of falls among older adults. In contrast, they demonstrated a good understanding of environmental safety measures at home, as more than 90% correctly identified practices such as using non-slip footwear, maintaining a tidy living space, ensuring adequate lighting, and using handrails.

Table II: Participants' knowledge on fall prevention

NO	ITEM	RESPONSE, n (%)	
		Correct	Incorrect
Domain A: Impact of medications on fall risk			
1.	The following are medications that increase the risk of falling:		
a.	High blood pressure medications	82 (38.5)	131 (61.5)
b.	Diabetes medications	71 (33.3)	142 (66.7)
c.	Antidepressants	63 (29.6)	150 (70.4)
d.	Antihistamine	60 (28.2)	153 (71.8)
2.	The use of more than four types of medications increases the risk of fall among older adults	74 (34.7)	139 (65.3)
Domain B: Fall prevention measures at home			
3.	The following are ways to prevent fall:		
a.	The use of non-slip soles	202 (94.8)	11 (5.2)
b.	A tidy home environment and free of obstacles, especially in walkways	201 (94.4)	12 (5.6)
c.	Adequate lighting inside the home	197 (92.5)	16 (7.5)
d.	Using handrails when going downstairs	199 (93.4)	14 (6.6)
e.	Using non-slip mats in the bathroom	207 (97.2)	6 (2.8)
f.	Using handrails in the toilet	203 (95.3)	10 (4.7)

The participants' behaviour related to fall prevention, encompassing personal health management behaviours and environmental safety practices, is shown in Table III. The results showed that only 22.1% of participants consistently made efforts to improve their knowledge on fall prevention. In contrast, more than half of the participants (62.0-78.4%) reported always practising environmental safety at home.

Table III: Participants' behaviour on fall prevention.

No	ITEM	ANSWER RESPONSE, n (%)				
		Never	Rare	Sometimes	Often	Always
Domain A: Personal Health Management Behaviours						
1.	I seek to improve my knowledge regarding fall prevention (attending talks, surfing the internet).	68 (31.9)	35 (16.4)	52 (24.4)	11 (5.2)	47 (22.1)
2.	I undergo regular health checkups.	9 (4.2)	13 (6.1)	28 (13.1)	51 (23.9)	112 (52.6)
3.	I undergo an eye checkup every year.	48 (22.5)	40 (18.8)	49 (23.0)	21 (9.9)	55 (25.8)
4.	I practice a healthy diet.	4 (1.9)	9 (4.2)	45 (21.1)	53 (24.9)	102 (47.9)
5.	I exercise regularly to strengthen my muscles.	27 (12.7)	51 (23.9)	58 (27.2)	26 (12.2)	51 (23.9)
6.	I discussed my health condition with the doctor.	13 (6.1)	17 (8.0)	44 (20.7)	47 (22.1)	92 (43.2)
Domain B: Environmental Safety Practices						
7.	I ensure that no objects are blocking the walking area.	3 (1.4)	9 (4.2)	17 (8.0)	52 (24.4)	132 (62.0)
8.	I use non-slip floor mats.	17 (8.0)	8 (3.8)	10 (4.7)	34 (16.0)	144 (67.6)
9.	I ensure there is adequate lighting inside the home.	2 (0.9)	3 (1.4)	8 (3.8)	33 (15.5)	167 (78.4)
10.	I wear shoes with non-slip soles.	3 (1.4)	2 (0.9)	10 (4.7)	34 (16.0)	164 (77.0)
11.	I keep frequently used items in a place that is easy to reach.	1 (0.5)	4 (1.9)	8 (3.8)	37 (17.4)	163 (76.5)

Table IV presents the results of simple logistic regression analyses to identify factors associated with inadequate fall-prevention behaviour among older persons. In the simple logistic regression analysis, comorbidities and knowledge level were identified as significant factors. However, in the multiple logistic regression analysis, only the knowledge variable was associated with inadequate fall-prevention behaviour.

Based on simple logistic regression, participants with one to two comorbidities (crude OR=0.10; 95% CI: 0.01-0.60; $p=0.036$) and those with more than two comorbidities (crude OR=0.11; 95% CI: 0.01-0.64; $p=0.041$) were less likely to demonstrate inadequate fall prevention behaviour compared to those without comorbidity. In addition, participants with poor knowledge had 2.36 times higher odds of demonstrating

inadequate behaviour (crude OR=2.36; 95% CI: 1.36-4.13; $p=0.002$) compared to those with good knowledge.

Other variables, including age, gender, marital status, educational level, occupation, polypharmacy, history of falls, complications of falls, and fall risk assessment, were not significantly associated with inadequate fall prevention behaviour.

Table IV: Factors associated with inadequate behaviour among older persons (n=213)

Variables		Simple Logistic Regression		
		b	Crude OR ^a (95% CI)	p-value
Age (years)		0.01	1.01 (0.97, 1.06)	0.601
Gender	Female		1	
	Male	0.39	1.48 (0.86, 2.58)	0.161
Marital status	Married		1	
	Others	0.45	0.64 (0.30, 1.31)	0.228
Education level	Tertiary		1	
	Secondary	0.53	1.69 (0.94, 3.08)	0.081
	Primary	0.30	1.35 (0.54, 3.37)	0.514
Occupation	Employed		1	
	unemployed	0.23	1.26 (0.63, 2.50)	0.505
Comorbidity	<1		1	
	1–2	-2.28	0.10 (0.01, 0.60)	0.036
	> 2	-2.22	0.11 (0.01, 0.64)	0.041
Polypharmacy	No		1	
	Yes	0.09	1.09 (0.63, 1.90)	0.746
History of fall in ≤ 1 year	No		1	
	Yes	-0.14	0.87 (0.49, 1.52)	0.620
Complications of fall	Yes		1	
	No	0.55	1.73 (0.83, 3.77)	0.155
Fall risk assessment	High risk		1	
	Low risk	0.25	1.28 (0.75, 2.22)	0.369
	Good		1	
Knowledge level	Poor	0.86	2.36 (1.36, 4.13)	0.002

^aCrude odds ratio; bAdjusted odds ratio

DISCUSSION

This study explored fall prevention behaviour and its predictors among older adults attending a tertiary care centre in Malaysia. Nearly half of the participants demonstrated inadequate fall prevention behaviour, while a similar proportion exhibited poor knowledge regarding fall prevention. These findings align with earlier studies in Malaysia and Vietnam, which reported suboptimal fall prevention practices among older adults despite moderate awareness of fall risk factors and consequences.^{3,4} The results reinforce that knowledge remains a critical determinant of preventive behaviour, as participants with good knowledge were significantly less likely to engage in inadequate preventive practices. This relationship highlights the importance of enhancing health literacy and providing ongoing education on fall risk reduction strategies in both clinical and community settings.

Consistent with the Health Belief Model, knowledge and perception of susceptibility influence behavioural engagement in fall prevention activities.³ Participants in this study demonstrated better understanding of environmental safety measures, such as adequate lighting and the use of non-slip mats, but lower awareness regarding medication-related fall risks. This pattern mirrors findings from other Asian populations, where older adults often recognise environmental hazards but underestimate the pharmacological contributors to fall risk.^{3,4} This knowledge gap is particularly concerning in populations with high rates of polypharmacy

and comorbidities. Geriatric care providers should therefore integrate medication review and counselling as part of fall risk assessments, empowering older adults to understand and mitigate modifiable risk factors.

The study also revealed that sociodemographic and clinical variables such as gender, marital status, and comorbidities were not significantly associated with fall prevention behaviour after adjustment. Although previous literature reported that living arrangements, functional mobility, and comorbid conditions may influence fall prevention practices,^{4,5} the absence of these associations in this study could be due to the relatively homogenous sample drawn from a hospital-based population with similar access to care. Most participants in this study had regular contact with healthcare services and family support. Nonetheless, the high prevalence of inadequate fall prevention behaviour even among those with multiple comorbidities suggests that routine medical follow-ups alone may not translate into behavioural change. Nevertheless, the persistence of poor fall prevention behaviour even among those receiving ongoing medical care underscores the gap between awareness and action.

Culturally tailored, team-based interventions that actively engage family members and caregivers could improve commitment to fall prevention behaviours, particularly within family-oriented societies like Malaysia.^{5,6} Integrating fall prevention education into every clinical encounter through brief counselling, demonstration, and written materials may help bridge this gap. Furthermore, employing the Health Belief Model as a framework for intervention can enhance older adults' perception of susceptibility and benefits while addressing perceived barriers to behavioural change.³ Family involvement and culturally sensitive messaging should also be emphasised, particularly in collectivist societies like Malaysia, where family plays a central role in caregiving and health decisions.⁶

The proportion of older adults with poor fall prevention knowledge and behaviour in this study is comparable to findings from community-based studies in Malaysia and Vietnam.^{3,4} Similar to those reports, participants were generally more aware of environmental safety measures, such as maintaining adequate lighting and using non-slip mats, than of medication-related fall risks. This discrepancy suggests that while environmental fall hazards are often visible and easily understood, pharmacological risk factors remain under-recognised, despite their clinical significance.^{3,4} Previous studies have shown that polypharmacy and use of psychotropic or antihypertensive medications are major contributors to fall risk among older adults.^{1,5} Therefore, fall prevention education in clinical practice should not only focus on environmental safety but also include medication reviews and counselling, particularly in those with multiple comorbidities or complex treatment regimens.

The use of a validated Malay version of the Fall Prevention Knowledge and Behaviour (FPKB) questionnaire strengthened the internal validity of this study and ensured cultural relevance. The systematic sampling method also enhanced representativeness within the clinical population.

This study has several limitations. Its cross-sectional design limits the ability to infer causality between knowledge and behaviour, and self-reported data may be subject to recall or social desirability bias. The study was conducted in a single tertiary centre, which may not represent community-dwelling older adults or those in rural regions. Additionally, other potential determinants such as physical performance, fear of falling, and environmental assessments were not included. Future research should adopt longitudinal

designs and incorporate objective measures of functional ability and home safety to better understand the dynamic interplay between knowledge, motivation, and behaviour in fall prevention.

CONCLUSION

In conclusion, the study highlights that inadequate fall prevention behaviour remains prevalent among older adults in tertiary care, and poor knowledge is a significant predictor of such behaviour. These findings emphasise the need for structured educational interventions and integration of fall prevention counselling into routine geriatric assessments. By strengthening health literacy, addressing misconceptions about medication use, and promoting active engagement in preventive practices, healthcare providers can play a pivotal role in reducing fall-related morbidity and improving the quality of life of older Malaysians. Broader community-based programmes and interdisciplinary strategies are warranted to sustain behavioural change and support healthy ageing.^{1,6,7}

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CONFLICTS OF INTEREST

All the authors declare they have no competing interests.

INSTITUTIONAL REVIEW BOARD (ETHIC COMMITTEE)

The study was ethically approved by the Research and Ethical Committee, School of Medical Sciences, Universiti Sains Malaysia (USM/JEPeM/24040337). All participants provided informed consent.

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REFERENCES

1. Sahril N, Ahmad M, Razak M, et al. Falls among older adults: findings from screening at the Ministry of Health Malaysia Primary Care Clinics. *Med J Malaysia*. 2015;70:(Suppl 1). Available from: <https://www.e-mjm.org/2015/v70s1/mjm-sept-suppl-2203.html>
2. Gopaul K, Connelly DM. Fall risk beliefs and behaviors following a fall in community-dwelling older adults: a pilot study. *Phys Occup Ther Geriatr*. 2012 Feb 13;30(1):53–72. Available from: <http://www.tandfonline.com/doi/full/10.3109/02703181.2011.649230>
3. Tang HT, Vu HM, Tang HT, et al. Knowledge, attitude and practice on fall risk factors and prevention among rural older community-dwellers in Vietnam. Nakamura K, editor. *PLoS One*. 2023 Nov 30;18(11):e0295119. Available from: <https://dx.plos.org/10.1371/journal.pone.0295119>

4. Goh JW, Singh DKA, Mesbah N, et al. Fall awareness behaviour and its associated factors among community dwelling older adults. *BMC Geriatr*. 2021 Dec 6;21(1):226. Available from: <https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-021-02122-z>
5. Kantow S, Seangpraw K, Ong-Artborirak P, et al. Risk factors associated with fall awareness, falls, and quality of life among ethnic minority older adults in upper northern Thailand. *Clin Interv Aging*. 2021 Oct;Volume 16:1777–88. Available from: <https://www.dovepress.com/risk-factors-associated-with-fall-awareness-falls-and-quality-of-life--peer-reviewed-fulltext-article-CIA>
6. Gamage N, Rathnayake N, Alwis G. Knowledge and perception of falls among community dwelling elderly: a study from Southern Sri Lanka. *Curr Gerontol Geriatr Res*. 2018 May 29;2018:1–8. Available from: <https://www.hindawi.com/journals/cggr/2018/7653469/>
7. Hussein Abdulameer A, Abdulhussein Al-Abedi G. Elderly knowledge of fall prevention at primary health care centers. *Bahrain Medical Bulletin*. 2023;45(4).
8. Rubenstein LZ, Vivrette R, Harker JO, et al. Validating an evidence-based, self-rated fall risk questionnaire (FRQ) for older adults. *J Safety Res*. 2011 Dec;42(6):493–9. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0022437511001289>
9. Wild D, Grove A, Martin M, et al. Principles of good practice for the translation and cultural adaptation process for Patient-Reported Outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. *Value in Health*. 2005 Mar 1;8(2):94–104. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1098301510602525>
10. Wiens CA, Koleba T, Jones CA, et al. The Falls Risk Awareness Questionnaire: development and validation for use with older adults. *J Gerontol Nurs*. 2006 Aug;32(8):43–50. Available from: <https://journals.healio.com/doi/10.3928/00989134-20060801-07>
11. Vivrette RL, Rubenstein LZ, Martin JL, et al. Development of a fall-risk self-assessment for community-dwelling seniors. *J Aging Phys Act*. 2011 Jan;19(1):16–29. Available from: <https://journals.humankinetics.com/view/journals/japa/19/1/article-p16.xml>
12. Mohamud AK, Ali IA, Ali AI, et al. Assessment of healthcare workers' knowledge and attitude on Ebola virus disease in Somalia: a multicenter nationwide survey. *BMC Public Health*. 2023 Aug 28;23(1):1650. Available from: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-16562-2>
13. Lee KW, Yap SF, Ong HT, et al. COVID-19 vaccine booster hesitancy in Malaysia: a web-based cross-sectional study. *Vaccines (Basel)*. 2023 Mar 13;11(3):638. Available from: <https://www.mdpi.com/2076-393X/11/3/638>