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Knowledge of Falls Risk Factors in Older Adults among Physiotherapy Students in Malaysia

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Authors' Contribution

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by all the authors. Conceptualization of the study was done by Maria Justine. The first draft of the manuscript was written by Sarah Zulaikha and all authors assisted in the data analysis and commented on previous and final versions of the manuscript. All authors read and approved the final manuscript.

Knowledge of falls risk factors in older adults among physiotherapy students in Malaysia

Abstract

Introduction: Knowledge of the risk factors for falls is necessary for the prevention of falls in older adults. This study aimed to identify the levels of knowledge of the risk factors of falls among physiotherapy students in Malaysia. **Methods***:* A total of 239 physiotherapy students from seven institutions completed a two-section questionnaire about their sociodemographic information and knowledge regarding risk factors for falls (balance/gait disorders, muscle weakness, environmental hazards, postural hypotension, sensory/perceptive deceptive, multiple medications, impaired cognitive and foot/footwear problems) that were answered on a Likert scale ranging from "Not very important (1)" to "Very important (5)". **Results:** Analysis indicated that only two factors scored means of >4, namely balance/gait disorders and muscle weakness, with 82.8% and 65.7% responded "very important", respectively. The factors with the lowest means were postural hypotension (3.41±1.40) and multiple medications (2.97±1.21), in which the majority of the participants responded as "somewhat unimportant" or "moderately important. Students studying full-time and those with no working experience were significantly better than part-time students and those with working experience, respectively, in the level of knowledge of risk factors of falls (Both $p<0.05$). **Conclusion:** This study suggests that physiotherapy students in Malaysia may have insufficient knowledge about the risk factors of falls as all factors should be deemed very important. The higher education providers should design a comprehensive curriculum considering all factors, especially postural hypotension and multiple medications.

Keywords: Falls, Malaysia, Physiotherapy, Prevention strategies.

Introduction

A fall, which is an occurrence resulting in a person coming to rest unintentionally on the floor is the most frequent accident for people aged above 65 years [1-3]. Falls have a significant consequences to older adults that include morbidity, immobility, hospitalisation and even mortality [4]. The World Health Organization reported that about 28%–35% of the older adults experience falls every year, and the number of accidents rapidly increases with age such that 32%–42% of older adults above 70 years of age have had fall episodes [5]. Accordingly, it was reported that about 3.0 million older adults were treated for fall injuries, and 68% of people who fell had injuries that account for the decline of their physical performance [6,7]. In Malaysia, a recent review found about 45% of the older adults aged 60 years and above have received treatments due to injury from falls [8].

Given the high fall incidence in Malaysia, developing awareness regarding risk factors for falls and establishing prevention guidelines that can be utilised among the Malaysian society is crucial, especially for those involved in caring for older adults with chronic conditions and physical limitations. Singapore, being the nearest country to Malaysia, has developed fall prevention guidelines emphasising the importance of assessing fall risks and thus focusing on prevention intervention such as exercise training, walking aids, home modifications, proper footwear, modification of medication, and prescription of Vitamin D [9]. Guidelines on fall prevention strategies as structured by the Government of South Australia for hospital settings highlight the use of beds with adjustable heights, overhead grab handle and bed rails, belts for

preventing falls and ensuring that personal items are within reach for older patients [10,11]. These guidelines were found to target the common risk factors as reported in various studies [1,7,12-16].

A relationship may exist between knowledge and awareness regarding the risk factors for falls and fall incidents. A previous study conducted in Nigeria revealed a significant correlation between the level of knowledge and awareness, in which greater knowledge indicates greater awareness of fall risks and fall prevention strategies [17]. Other studies have found that providing proper education for healthcare practitioners on the conceptualisation of fall prevention programs increases the knowledge, awareness and even confidence to undertake fall prevention strategies [18-21]. On the other hand, low understanding of fall risk and minimal awareness of healthcare-provided fall prevention strategies are hurdles to fall prevention, especially when these strategies fail to tackle some of the major risk factors of falling [22]. This result may be because these individuals lack a sense of urgency and fail to understand the hazards due to fall incidence.

Educating future healthcare providers, especially those involved in the rehabilitation of older adults, is of the utmost importance to prepare them to face the ageing of the population. Previous studies have been conducted among licensed physiotherapists, care staff and even the older adults themselves with their self-perceived knowledge [17,22,23-25]. Research that emphasises knowledge of risk factors for falls among physiotherapy students is lacking. This circumstance further advocates the importance of conducting this study to understand better the level of future physiotherapists' knowledge of risk factors for falls and how they can improve the fall prevention guidelines. Thus, this study aimed to identify the levels of knowledge of the risk factors among physiotherapy students in Malaysia.

Methods

Study design and participants

This cross-sectional study was conducted from July to September 2020. A total of 600 physiotherapy students from public and private institutions that offered Bachelor in Physiotherapy (Hons) program were invited. According to a calculation, a total of 239 participants were sufficient using the Krejcie and Morgan's sample size determination table. from a known population of 600 enrolled in the public and private institutions that offered a degree program in physiotherapy. The participants were contacted through WhatsApp, Instagram, Facebook and emails to inform them of the details of the study with the Google Form link attached and asked for their consent to participate.

The inclusion criteria consisted of individuals who are: 1) currently studying as a physiotherapy student and 2) able to understand and read the English language. The exclusion criteria consisted of 1) students from other courses and 2) diploma students. Consent from the participants was obtained after they affirmed the end-user agreement policy presented on the first page of the Google Form by ticking the 'Yes' box before proceeding to the main questions on the next page. Ticking the 'No' box led the participants to the end of the Google Form page. A total of 239 participants responded to the questionnaire distributed for approximately three months. This study was granted ethics approval by the UiTM Research Ethics Committee with the approval number REC/07/2020 (MR/151) on 20 July 2020.

Instruments

The questionnaire used for the data collection consisted of two sections. Section A contained sociodemographic data. Section B of the questionnaire, adopted (with permission) [17], contained questions regarding risk factors for falls on a Likert scale ranging from *Not very important (1)* to *Very important (5)*.

Sociodemographic data

The first part of the questionnaire focused on sociodemographic data, which was essential in obtaining the respondents' background. The section included 11 items regarding the participants' gender (male/female), age (22 and below, >22 years), ethnicity (Malay and Bumiputera/non-Bumiputera), occupation (working/student), study institution (public/private), working experience (none/1 year and above), ageing course completion (yes/no), field experience with older adults (yes/no), employment in services to older adults (yes/no) and frequency of experience in having personal contact with both family or non-family older adults (no/frequent/occasional).

Knowledge of fall risk factors

Knowledge can be perceived as a range of understanding a particular topic acquired from learning, association and experience. For the section on knowledge, eight items, which consisted of questions regarding risk factors for falls were tested using a 5-point Likert scale. The components of the risk factors were physical and cognitive problems, which consisted of balance/gait disorders, muscle weakness, sensory/perceptive deficits, impaired cognitive and foot/footwear problems, and others that involved environmental hazards, postural hypotension and multiple medications. In assigning the level of importance of the risk factors, a 5-point Likert scale presenting 8 items

listing the risk factors for falls was measured similarly as 1, 2, 3, 4 and 5 from left to right with a total of 40 points. The measured knowledge responses were represented as *not very important, somewhat unimportant, moderately important, somewhat important* and *very important*. For this study, the scores were recorded as *not very important and somewhat unimportant* as 1 (low level of knowledge), *moderately important* as 2 (moderate level of knowledge), and *somewhat important and very important* as 3 (high level of knowledge). A higher score showed higher knowledge of the risk factors for falls. A total score below 16 indicated a low knowledge level, 17–24 indicated moderate knowledge level, and 25–40 suggested a high knowledge level. The Cronbach's alpha for the questions regarding knowledge was 0.74, thereby indicating fair internal consistency with the Intraclass Correlation Coefficient of 0.74.

Data Analysis

All data from this study were analysed by using the SPSS Version 25, Statistical Package for social sciences. Participants who submitted questionnaires with missing data were excluded from the study. Descriptive analysis was performed for sociodemographic data, knowledge levels regarding fall risk factors and the awareness level regarding fall prevention strategies. The characteristics of the participants in terms of frequency, mean, standard deviations and percentages are presented in Table 1. The comparisons between knowledge of risk factors for falls were measured by using an independent t-test and the ANOVA test.

Results

A total of 239 physiotherapy students from public and private universities in Malaysia participated in this study. Table 1 presents all the characteristics of the participants. Table 2 describes the responses regarding the knowledge level about the risk factors for falls. Factors deemed by the participants as very important include balance/gait disorders (82.8%), muscle weakness (65.7%), environmental factors (50.2%), sensory/perceptual deficits (56.1%), impaired cognitive (55.2%) and footwear problems (48.5%). Approximately 42.3% and 51.0% of participants deemed postural hypotension and multiple medications, respectively, as somewhat unimportant risk factors for falls.

INSERT TABLE 1 HERE

INSERT TABLE 2 HERE

Table 3 displays the comparisons of the level of knowledge on risk factors for falls according to different participants' characteristics. Full-time students have significantly higher knowledge ($p = 0.010$) than part-time counterparts. Additionally, participants who had no working experience have been shown to have significantly higher knowledge ($p = 0.009$). No significant differences occurred between gender, age, ethnicity, study institution, ageing course completion, field placement experience in service to the older adults, and personal contacts with an older non-family member(s) and with an older family member(s) (all $p > 0.05$).

INSERT TABLE 3 HERE

Discussion

This study aimed to determine the levels of knowledge of the risk factors for falls among physiotherapy students in Malaysia. Knowledge levels regarding the risk factors for falls were low for most participants, the worst being the knowledge about postural hypotension and multiple medications as risk factors for falls among the older adults. All factors were deemed important risk factors related to the incidence of falls [7,12,14,16,26].

The participants scored the highest mean for knowledge in acknowledging balance/gait disorders and muscle weakness as risk factors for falls in this study. Not just physiotherapy students; in fact, most people are aware that physical deterioration comes with age, impair balance and muscle strength. A previous study reported that muscle strength was significantly lower among older adults who experienced fall, affecting their balance and gait [27].

Aside from the physical declines mentioned before, many participants had insufficient knowledge of sensory/perceptive deficits and cognitive impairment as risk factors for falls. Visual impairments can lead to falls due to poor perception of surroundings [28], while cognitive impairment may cause a decline in processing function, leading to impaired balance and fall [29].

The participants also had insufficient knowledge about environmental hazards and footwear problems being a risk factor for falls. Falls can occur in an environment with poor lighting and slippery surfaces, especially without proper footwear. A previous study in Thailand reported that home/environmental hazards and improper footwear were associated with a high risk of falls [30].

The results with regards to a very low knowledge about postural hypotension and multiple medications could be because they have received neither ageing nor pharmacology courses to understand the hazard behind experiencing postural hypotension and the side effects from polypharmacy especially for the older adults. Another research reported that the incidence of experiencing a fall among the older adults associated with postural hypotension was significantly high [31]. On the other hand, the incidence of falls caused by multiple medications was mostly associated with anti-depressants for which the older adults will experience side effects such as sedation, dizziness, and postural hypotension [32]. The odds ratio of falls that lead to hospital admissions increased for every additional drug taken (OR 1.47, 95% CI 1.32–1.64 for > 15 drugs in contrast to 0–3 drugs) [33].

Despite not showing any significant difference, the current study indicated that female physiotherapy students had a higher knowledge of risk factors for falls than their male counterparts. A possible explanation for this result is that, on average, female students had a higher likelihood of excelling better than male students on reading and verbal assessments [34]. It is also noted that the majority of the physiotherapy students in Malaysia from public and private institutions were females.

Age differences seem to be not a significant factor in determining knowledge in fall prevention consistent with a previous study [17]. However, older participants might

have more experience with older adults and were more mature in handling and preventing issues among older adults. Among the other factors that provide knowledge, the experience that comes with co-existing with older adults who experienced falls with ageing may influence the ability of people to adopt fall prevention strategies [25]. However, merely coexisting with the older adults will provide insufficient information from scientific knowledge regarding the risk factors for falls [25].

Studies that have compared the knowledge of the risk factors for falls and awareness of fall prevention strategies between full-time and part-time students is lacking. For this current work, full-time students showed a higher knowledge compared to part-time counterparts. Full-time students may be assumed to be able to focus more in classes compared to part-time peers who must cram a six-hour worth of lessons at one go. A study in Australia reported that undergraduate students from health professional courses in 43 different universities were taught fall prevention as a core unit that is delivered in two or three hours in both practical sessions or tutorials [35].

Moreover, no significant differences were found between public and private institutions. Even so, public institutions in Malaysia receive more exposure to corporate social responsibility and programs for older adults. For example, a program called the Service Learning Malaysia (also known as SULAM) [36] with older adults is annually conducted by public institutions to provide a learning experience that implements both theory and practical knowledge towards solving a community issue. Both public and private institutions taught similar subjects and contents, and they corresponded to the universities in Australia and New Zealand, where curriculum guidelines regarding fall incidences are implemented [35].

The current findings also reported that physiotherapy students with no working experience had a higher knowledge of the risk factors for falls. A study in India reported that working nurses had low knowledge levels despite receiving fall prevention education [37]. Moreover, health workers reported low knowledge levels regarding fall incidences [37]. The speculation could be made that full-time students had more time to equip themselves with knowledge than part-time counterparts who had other commitments in life.

No significant differences occurred between knowledge in terms of ageing course completion, field placement in service with older adults, employment in service to the older adults and personal contact with older non-family member(s) and family member(s). A previous study suggested that licensed care staff had limited knowledge of the risk factors for falls and low awareness that the older adults they cared for were at risk of falling [24]. However, another research confirmed that the rate of falls declined in eight rehabilitation units in general hospitals located in Australia after implementing a fall education program [20]. This outcome confirmed the need for an evidence-based training program to implement effective fall prevention strategies among healthcare providers. Having knowledge learned theoretically without practical training might explain why some healthcare workers lack knowledge and awareness even after completion of an ageing course. Despite not having significant differences, participants who had frequent personal contact with an older family member(s) had higher knowledge of risk factors for falls. Spending more time with a blood-related, older family members might instil the need for preventing fall incidences, hence driving them to find out what could cause falls. This result is compatible with those of a previous study which indicated that blood-related caregivers were able to identify measures and precautions to prevent fall incidences [25].

The outcomes of this study could be a keystone in providing better physiotherapy updates in future that may assist many healthcare practitioners in producing better courses of action to overcome fall incidences among older adults while considering knowledge and awareness levels. These outcomes could also be impactful in adding more syllabus contents that focus on the risk factors for falls and prevention strategies in older adults in physiotherapy courses.

Limitations

A few limitations were noted in this current study. Firstly, a sampling bias may occur whereby the physiotherapy students who were not interested in the topic of the older adults and falls refused to participate in this work. Secondly, providing close-ended questions prevented the likelihood of obtaining detailed data regarding the participants' knowledge and awareness [17]. Thirdly, this research did not focus on the academic year level of the participants. This feature may impact the study results whereby those who were in a higher year level may be more exposed to clinical training with the older adults and equipped with knowledge from their respective gerontology classes compared to their juniors.

Conclusions

Physiotherapy students in Malaysia generally showed low knowledge of the risk factors for falls among older adults. The results of this study could potentially become a guide in producing and implementing educational programs focusing on fall prevention strategies for older adults that can be offered to physiotherapy students by higher education providers.

CONFLICT OF INTEREST

The authors have no conflict of interest to report.

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Table 1 Characteristics of participants (N=239)

Characteristics	Frequency (%)	Mean ± SD (Range)
Gender		
Male	36 (15.1)	
Female	203 (84.9)	
Age (years)		
22 and below	143 (59.8)	22.33±1.968
> 22	96 (40.2)	(19-32)
Ethnicity		
Malay & bumiputera	192 (80.3)	
Non-bumiputera	47 (19.7)	
Occupation		
Working	19 (7.9)	
Student	220 (92.1)	
Study institution		
Public	181 (75.7)	
Private	58 (24.3)	
Working experience		
None	209 (87.4)	
1 year and above	30 (12.6)	
Ageing course completion		
Yes	112 (46.9)	
No	127 (53.1)	

Field placement experience in service with older adults	42 (17.6)
Yes	197 (82.4)
No	
Personal contact with older non-family member(s)	169 (70.7)
No	29 (12.1)
Frequent (once a week or more)	41 (17.2)
Occasional (about few times a week)	
Personal contact with older family member(s)	82 (34.3)
No	81 (33.9)
Frequent (once a week or more)	76 (31.8)
Occasional (about few times a week)	

Table 2 Responses on level of knowledge towards risk factor of falls among participants

Items	Not very important Frequency (%)	Somewhat unimportant Frequency (%)	Moderately important Frequency (%)	Somewhat important Frequency (%)	Very important Frequency (%)	M ± SD
1. Balance/ gait disorders	1 (0.4)	32 (13.4)	8 (3.3)	0	198 (82.8)	4.51 ± 1.08
2. Muscle weakness	0	65 (27.2)	17 (7.1)	0	157 (65.7)	4.04 ± 1.35
3.Environme-ntal hazards	0	89 (37.2)	30 (12.6)	0	120 (50.2)	3.63 ± 1.41
4. Postural hypotension	0	101 (42.3)	39 (16.3)	0	99 (41.4)	3.41 ± 1.40
5.Sensory/ perceptive deficits	0	82 (34.3)	23 (9.6)	0	134 (56.1)	3.78 ± 1.41
6. Multiple medications	0	122 (51.0)	60 (25.1)	0	57 (23.8)	2.97 ± 1.21
7. Impaired cognitive	0	82 (34.3)	25 (10.5)	0	132 (55.2)	3.76 ± 1.41
8. Foot/ Footwear problems	0	89 (37.2)	34 (14.2)	0	116 (48.5)	3.60 ± 1.40

Table 3 Comparisons of knowledge of fall risk factors among participants with different sociodemographic factors

Characteristics	Knowledge	
	M ± SD	*p*-value
Gender		
Male	28.28 ± 6.18	0.148[a]
Female	29.95 ± 6.40	
Age (years)		
22 and below	29.35 ± 5.92	0.303[a]
Above 22	30.22 ± 7.01	
Ethnicity		
Bumiputera	29.78 ± 6.34	0.706[a]
Non-bumiputera	29.38 ± 6.63	
Status of students		
Part-time students	26.11 ± 7.01	**0.010[a]**
Full-time students	30.01 ± 6.257	
Study institution		
Public	30.06 ± 6.10	0.127[a]
Private	26.87 ± 7.15	
Working experience		
None	30.11 ± 5.98	**0.009[a]**
1 year and above	26.87 ± 8.27	
Aging course completion		
Yes	29.80 ± 6.91	0.812[a]
No	29.61 ± 5.10	
Field placement experience in service with older adults	30.24 ± 6.09	0.548[a]
Yes	29.58 ± 6.45	

No		
Personal contact with older non family member(s)		
No	29.66 ± 6.36	0.844[b]
Frequent (once a week or more	30.31 ± 7.41	
Occasional (about few times a week	29.44 ± 5.80	
Personal contact with older family member(s)		
No	29.71 ± 4.64	0.323[b]
Frequent (once a week or more	28.95 ± 5.21	
Occasional (about few times a week	30.49 ± 3.80	

[a]*Independent t-test &* [b]*ANOVA *Statistically significant, p< 0.05.*