

ORIGINAL ARTICLE

Factors Associated With Falls among the Elderly Attending a Government Clinic in Kuala Lumpur

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ABSTRACT

Introduction: Falls among the elderly can be associated with serious complications such as fractures, injuries and death. This study aims to ascertain the factors associated with falls among the elderly patients attending a government clinic located in Kuala Lumpur. **Method:** This was a cross-sectional study using a convenience sampling method. Data collection in 2017 from 322 elderly who attended the above clinic. A modified assisted self-administered questionnaire was used that contained the socio-demographic data, falls profile as well as extrinsic and intrinsic factors associated with falls. Analysis was done with SPSS v20.0. **Results:** 120 (37.27%) elderly reported falls in the past one year. The majority who had falls were females (n=76, 41.8%) and between the age of 80-89 years old (n=29, 44.6%). Malay ethnicity group, reported more falls compared to other ethnicities (n=93,44.5%). Significant associations were found between age, ethnicity and history of falls with falling (p<0.001). Intrinsic factors such as gait or imbalance problem, vision problem, using visual aids, having medical co-morbidities such as stroke, diabetes, Parkinson's Disease and osteoporosis, and being on antidiabetic drugs were also associated with increased risk of falling as well as extrinsic factors such as uneven floor, change in furniture position, poor lighting, lack of handrails, staircase, absence of railing at stairs and using walking aids (p<0.05). **Conclusion:** Factors found to be associated with falls should be the primary intervention targets to help those who are at a heightened risk for falling such as visual problem and uneven floor, in order to reduce the negative impacts of falls.

Keywords: Falls; Elderly; Factors; Extrinsic; Intrinsic

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INTRODUCTION

Recently, the number of elderly among the world population is increasing. In Malaysia, the population above the age of 60 years old comprised 6% of the total population (31,833,964) and it was expected to increase up to 15% by 2035 (1). This situation is definitely worrying since the elderly aged 60 years and above are at high risk at getting falls. According to a research conducted in the USA by Stevens et al., one in three people aged 65 years and above fall each year (2). Fall is defined as an event which will result in a person accidentally tripping on the ground or other lower levels (3). It also considered as a fall when even only a part of the body or only the buttocks or knees have contact to ground. Approximately 28-35% of elderly over the age of 65 falls in a year and the prevalence of falls are seen to

range between 32-42% for those over 70 years old and it has been proven that the number of falls among elderly has been increasing as the age of a nation increases (4). Falls have become grave issues among all age groups and they are worse among the geriatric age group because they can cause many severe complications such as fractures, injuries, fear of falling, hospitalization and even deaths (5,6). Fractures of hip, spine, pelvic and hand are the common fractures that are reported among the elderly that had a fall (5,6). Furthermore, more serious injuries such as head and brain parenchymal injuries also can be a result of having a fall. Elderly with these injuries tend to have a prolonged hospitalization and are prone to develop other complications such as pneumonia, deep vein thrombosis and even pulmonary embolism which can even lead to death. Worldwide, it is estimated that fall results in 424 000 deaths every year, which ranks it as the as one of the leading cause of unintentional death and injury (3). Elderly patients that experienced fractures of the spine or lower limbs as a direct result of the falls will often require other people to assist in performing their daily activities. Indirectly,

this can lead to poor self-esteem and social withdrawal arising from a sense of hopelessness.

The prevalence of fall is different among countries in the world. Dhargave & Sendhilkumar mentioned that in India, the falls prevalence was estimated to range between 14% to 53% (7). Another study conducted in the South-East Asia Region found that in Japan, 20% of elderly fall each year (8). Studies done in Malaysia have consistently revealed a high prevalence of falls in Malaysia among the elderly (5). In Malaysia, there was a high prevalence of fall in 2008 (47%) as reported in a local study (9). This study conducted among the elderly patients at a primary care clinic attached to a teaching hospital. While a study done in 2015 by Norhafizah et al. reported that falls prevalence as 19.1% (10). Even though, these studies showed the prevalence of fall is decreasing by time, this may be due to the different population studied rather than a reduction in the numbers of falls per se, thus, it is important to conduct this study so that people stay alerted with the factors that cause fall among the elderly and remain aware that falls is still a major cause of deaths and significant quality of life impairment among the elderly patients as well as the need for proactive interventions to prevent falls at the first place (11).

MATERIALS AND METHODS

A cross-sectional study was conducted at the General Physician Clinic in Hospital Kuala Lumpur, Kuala Lumpur, Malaysia from April till May 2017. The Kuala Lumpur Hospital (HKL) is the pioneer government tertiary referral center and has 54 different departments and units.

For this study, the sample population were those aged 60 years old and above who were attending the General Physician Clinic in Hospital Kuala Lumpur during the period of data collection.

Sample size

A sample size was calculated using a formula from Lameshow, Klar, Lwanga & Hosmer (1990) (12). With the estimated population of 4000 older people attending the clinic in one month, and considering the prevalence of falls at 28.9% (7), a total sample of 322 is required to provide 95% confidence interval and degree of accuracy at 0.05 considering 10% attrition rate. The sampling frame was elderly who attended the General Physician Clinic, HKL.

The sampling method that used for this research project is a convenience sampling method. As General Physician Clinic in HKL is scheduled on Monday until Friday at 7.30am until 5.00pm, a researcher approached the elderly aged 60 and above as respondents. The researcher then distributed the questionnaire to the respondents if they meet the inclusion and exclusion criteria.

Inclusion and exclusion criteria

The inclusion criteria for this study are:

1. Elderly aged ≥ 60 years who were attending the General Physician Clinic
2. Able to understand Malay or English language

The exclusion criteria for this study are:

1. Elderly aged ≥ 60 years who are not Malaysia citizen (foreigners)

Conceptual definitions

- a. Intrinsic factors of fall can be defined as those ingrained in the subject that may have impaired function of the his or her own bodily systems, which may cause difficulty in maintaining balance when necessary (13). These include gait or imbalance problem, hearing problem, vision problem, medical problems, use of medications and fear of falling. Extrinsic factors of fall meanwhile are those environmentally-related such as uneven or slippery walking surface, high or narrow steps, poor lighting and loose carpets, and as well as the use of assistive devices (13).
- b. Fear of Falling (FOF) is meanwhile defined as an excessive concern about the possibility of having an unpreventable fall and it can experienced by previous fallers or non-fallers (14).

Study instrument

A set of bilingual questionnaire in Malay and English language was used for this study. The questionnaire has been adopted and modified from the previous study done in India by Dhargave & Sendhilkumar (7). The questionnaires then were subjected to a pilot study and pre-test for 10% of sample sizes at the General Physician Clinic HKL to ascertain its validity and reliability. This questionnaire was face and content validated. In this research, internal consistency was used to assess the reliability of the instrument. Internal consistency was performed using Cronbach's α test. Cronbach's α above 0.70 considered as sufficient evidence for supporting the internal consistency of the instrument. The Cronbach's α score for this questionnaire was 0.705 and therefore the instrument was deemed to be reliable.

The questionnaire consists of four parts. In part A, the questions is about socio-demographic features (gender, age, ethnicity, marital status and living status). Part B consisted of five questions and respondents were asked about the history of their fall and related falls profile questions such as frequency, timing of falls as well as falling indoors or outdoors and sustaining any complications secondary to fall. Part C and Part D consisted of questions that related to intrinsic factors and extrinsic factors of falls, respectively.

Data collection

This questionnaire was self-administered by the participants with some assistance provided by the researchers for those with difficulty in completing the

questionnaire (eg. those with arthritis, visual problem, etc.) and collected back on the spot once done. There was no verification of answers provided by the respondents with actual medical records or home visits as we believe the questionnaire has a good internal consistency and a prior pilot project was done to verify its accuracy. The data on falls was collected on the record of falls in the past 12 months.

Upon completion the questionnaires were collected and placed in an envelope to maintain its confidentiality. All the data was kept by the researcher in a confidential file well secured. The data will be kept for 7 year from the completion date of the study (i.e. till June 2024). Softcopy was kept in researcher's personal laptop while the hardcopy was kept in a box and sealed.

Data analysis

Data collected were analyzed using Statistical Package for Social Science (SPSS) version 20.0. Descriptive analysis was used to analyze frequency, percentage, mean and standard deviation for socio-demographic, falls profile, intrinsic factors and extrinsic factors of falls. Chi square test was used to analyze the association between the socio-demographic factor and falls, the association between falls with history and profile of falls, intrinsic factors of falls and extrinsic factors of falls. Level of significance was set at $p < 0.05$. Ethical clearance to carry out this study was obtained from Jawatankuasa Etika Untuk Penyelidikan Manusia (JKEUPM), Universiti Putra Malaysia and Medical Research Ethics Committee (MREC), Ministry of Health. Permission also was obtained from Clinical Research Centre (CRC) of Hospital Kuala Lumpur, Director of the Hospital Kuala Lumpur and Head of General Medicine Department of Hospital Kuala Lumpur. JKEUPM approval code was UPM/TNCPI/RMC/1.4.18.2(JKEUPM) and MREC ethics approval code was 16-2584-33092 (IIR).

RESULTS

Response rate

322 older persons were approached as asked if they like to participate in the study. All of the older persons agreed to participate and this yielded to 100% response rate. All questionnaires were answered completely and returned.

Socio-demographic characteristics of respondents

The socio-demographic characteristic of the study sample is illustrated in Table I. There was a total of 322 respondents of which 182 (56.5%) were female. The minimum age of the respondents was 60 years old and maximum age was 89 years old with an associated mean age of 70.1 ± 8.1 years. In this study, the majority of the respondents were age group of 60-69 years old ($n=161$, 50%) followed by age 70-79 years old ($n=96$, 29.8%) and 80-89 years old ($n=65$, 20.2%), female ($n=182$, 56.5%), Malays ($n=209$, 64.9%), married ($n=298$,

92.5%) and not living alone ($n=301$, 93.5%).

Socio-demographic characteristics of fallers

Table II shows that respondents that had fallen in past

Table 1. Socio-demographic characteristics of respondents

Variables	Respondents, n= 322 (%)
Age (Mean = 70.1; SD = 8.1)	
60-69 years old	161 (50)
70-79 years old	96 (29.8)
80-89 years old	65 (20.2)
Gender	
Female	182 (56.5)
Male	140 (43.5)
Ethnicity	
Malay	209 (64.9)
Chinese	49 (15.2)
Indian	50 (15.5)
Others	14 (4.4)
Married status	
Married	298 (92.6)
Single	11 (3.4)
Divorce	13 (4)
Living alone	
No	301 (93.5)
Yes	21 (6.5)

one year were 120 (37.3%) while respondents that not had fall were 202 (62.7%). In this study, the majority of respondents that had fallen in the past one year was from age group of 80-89 years old ($n=29$, 44.6%) followed by age 60- 69 years old ($n=60$, 37.3%) and 70-79 years old ($n=31$, 32.3%). Falls occurred more in female ($n=76$, 41.8%) compared to male ($n=44$, 31.4%). This study also found that the Malay had more falls ($n=93$, 44.5%) compared than other ethnic groups. Divorcees $n= 9$, 69.2%) were found to have the highest percentage of falls followed by singles ($n=4$, 36.4%) and married ($n=107$, 35.9%). As for the living status, elderly who are not living alone was found to have a higher percentage of falls ($n=113$, 37.5%) compared to elderly that lived alone ($n=7$, 33.3%).

Association between socio-demographic factors and falls

Table III shows the association between the socio-demographic factors and falls among the elderly. In this study, age and ethnicity were both found to have

Table II: Socio-demographic characteristics of respondents with falls and without falls

Variables	Non fallers, n= 202 (%)	Fallers, n= 120 (%)
Age (Mean = 70.10; SD = 8.06)		
60-69 years old	101 (62.7)	60 (37.3)
70-79 years old	65 (67.7)	31 (32.3)
80-89 years old	36 (55.4)	29 (44.6)
Gender		
Female	106 (58.2)	76 (41.8)
Male	96 (68.6)	44 (31.4)
Ethnicity		
Malay	116 (55.5)	93 (44.5)
Chinese	32 (65.3)	17 (34.7)
Indian	43 (86)	7 (14)
Others	11 (78.6)	3 (21.4)
Married status		
Married	191 (64.1)	107 (35.9)
Single	7 (63.6)	4 (36.4)
Divorce	4 (30.8)	9 (69.2)
Living alone		
No	188 (62.5)	113 (37.5)
Yes	14 (66.7)	7 (33.3)

Table III: Association between socio-demographic factors and falls

Variable	Respon- dents, n	Non fall- ers (%)	Fallers (%)	χ^2	p
Age (Mean = 70.10; SD = 8.06)				73.88	<0.001*
60-69 years old	161	101 (62.7)	60 (37.3)		
70-79 years old	96	65 (67.7)	31 (32.3)		
80-89 years old	65	36 (55.4)	29 (44.6)		
Gender				3.612	0.057
Female	182	106 (58.2)	76 (41.8)	17.893	<0.001*
Male	140	96 (68.6)	44 (31.4)		
Ethnicity				5.921	0.057
Malay	209	116 (55.5)	93 (44.5)		
Chinese	49	32 (65.3)	17 (34.7)		
Indian	50	43 (86)	7 (14)		
Others	14	11 (78.6)	3 (21.4)		
Marital status				0.149	0.7
Married	298	191 (64.1)	107 (35.9)		
Single	11	7 (63.6)	4 (36.4)		
Divorce	13	4 (30.8)	9 (69.2)		
Living alone					
No	301	188 (62.5)	113 (37.5)		
Yes	21	14 (66.7)	7 (33.3)		

*Significant at p<0.05

a significant association with having falls (p<0.001). In other hand, the other variables like gender, marital status and living alone did not have significant association with the fall.

Association between history and profile of falls and falls

Table IV shows the association of falls profile among fallers. In this study, all the variables for falls profile were found to also have a significant association with having falls (p<0.001) including frequency of fall, time of fall, place of fall and complication of falls.

Table VI: Association of falls profile among fallers (n=120)

Variables	Fallers	p
Frequency of fall		<0.001*
1 time	29 (24.2)	
2 times and more	91 (75.8)	
Time of fall		<0.001*
Morning	49 (40.9)	
Afternoon	33 (27.5)	
Evening	22 (18.3)	
Night	16 (13.3)	
Place of fall		<0.001*
Inside home	67 (55.8)	
Outside home	53 (44.2)	
Complication of falls		<0.001*
Fracture	21 (17.5)	
Admission to hospital	5 (4.2)	
Wound needed stitches	1 (0.8)	
Bruises, sprain, cut, abrasion	75 (62.5)	
Others	18 (15)	

*Significant at p<0.05

Association between intrinsic factors and falls

Table V shows the association between the intrinsic factors and falls among the elderly. In this study, the intrinsic factors that were found to be significantly associated with fall are having gait problem, having vision problem, use of visual aids, presence of co-morbidities (including Diabetes Mellitus, stroke, Parkinson’s disease, and osteoporosis) and the use of anti-diabetic medication (p< 0.05).

Association between extrinsic factors and falls

Table VI shows the association between the extrinsic

Table V: Association between intrinsic factors and falls

Variables		Non-fall- ers (%)	Fallers (%)	χ	p
Gait or imbalance problem	No	130 (72.6)	49 (27.4)	16.873	<0.001*
	Yes	72 (50.3)	71 (9.7)		
Hearing problems	No	137 (64.6)	75 (35.4)	0.948	0.330
	Yes	65 (59.1)	45 (40.9)		
Poor vision problems	No	106 (69.3)	47 (30.7)	5.347	0.021*
	Yes	96 (56.8)	73 (43.2)		
Long sightedness	No	120 (67.4)	58 (32.8)	3.733	0.053
	Yes	82 (56.9)	62 (43.1)		
Short sightedness	No	135 (65.9)	70 (44.1)	2.350	0.125
	Yes	67 (57.3)	50 (42.7)		
Using visual aids	No	103 (69.1)	46 (30.9)	4.851	0.028*
	Yes	99 (57.2)	74 (42.8)		
Dizziness	No	158 (65.3)	84 (34.7)	2.723	0.099
	Yes	44 (55)	36 (45)		
Medical problems	No	111 (70.7)	46 (29.3)	8.32	0.004*
	Yes	91 (55.2)	74 (44.8)		
Hypertension	No	76 (63.3)	44 (36.7)	0.029	0.864
	Yes	126 (62.4)	76 (37.6)		
Stroke	No	188 (65.5)	99 (34.5)	8.68	0.003*
	Yes	14 (40)	21 (60)		
Parkinson’s disease	No	201 (63.4)	116 (36.6)	3.967	0.046*
	Yes	1 (20)	4 (80)		
Osteoporosis	No	189 (66.1)	97 (33.9)	12.287	<0.001*
	Yes	13 (36.1)	23 (63.9)		
Cataract	No	161 (61)	103 (39)	1.916	0.166
	Yes	41 (70.7)	17 (29.3)		
Dementia	No	195 (62.9)	115 (37.1)	0.103	0.748
	Yes	7 (58.3)	5 (41.7)		
Other disease	No	117 (61.3)	74 (38.7)	0.438	0.508
	Yes	85 (64.9)	46 (35.1)		
Use medications	No	108 (70.1)	46 (29.9)	6.908	0.009*
	Yes	94 (56)	74 (44)		
Anti-hypertensive drug	No	80 (64)	45 (36)	0.14	0.708
	Yes	122 (61.9)	75 (38.1)		
Sedative/hypnotic drug	No	198 (63.5)	114 (36.5)	2.281	0.131
	Yes	4 (40)	6 (60)		
Psychotropic drug	No	192 (62.1)	117 (37.9)	1.167	0.280
	Yes	10 (76.9)	3 (23.1)		
Feeling of “fear of falling”	No	121 (65.8)	63 (34.2)	1.684	0.194
	Yes	81 (58.7)	57 (41.3)		
Feeling of “fear of falling” disturb activities daily living	No	152 (65.2)	81 (34.8)	2.259	0.133
	Yes	50 (56.2)	39 (43.8)		

*Significant at p<0.05

factors and falls among the elderly. In this study, it was found that extrinsic factors such as uneven floor, change in furniture position, poor lighting, lack of handrail, staircase, no railing along staircase and use walking aids had significant association with falls (p< 0.05). However, falls due to slippery floor had no significant association with falls.

Table VI: Association between extrinsic factors and falls

Variables		Non fallers (%)	Fallers (%)	χ	p
Slippery floor	No	47 (54.7)	39 (45.3)	3.278	0.07
	Yes	155 (65.7)	81 (34.3)		
Uneven floor	No	87 (56.5)	67 (43.5)	4.915	0.027*
	Yes	115 (68.5)	53 (31.5)		
Changes of furniture's position	No	148 (56.7)	113 (43.3)	21.413	<0.001*
	Yes	54 (88.5)	7 (11.5)		
Poor lighting	No	117 (56.3)	91 (43.7)	10.562	0.001*
	Yes	85 (74.6)	29 (25.4)		
Lack of handrails	No	70 (53.4)	61 (46.6)	8.166	0.004*
	Yes	132 (69.1)	59 (30.9)		
Staircase	No	83 (56.8)	63 (43.2)	3.955	0.047*
	Yes	119 (67.6)	57 (32.4)		
No railing along the staircase	No	71 (50.7)	69 (49.3)	15.304	<0.001*
	Yes	131 (72)	51 (28)		
Use of walking aid	No	155 (67.4)	75 (32.6)	7.472	0.006*
	Yes	47 (51.1)	45 (48.9)		

*Significant p<0.05

DISCUSSION

In this study, the prevalence of falls among the elderly population was 37.3% which is somewhat between the prevalence of falls reported earlier in Malaysia (i.e. 19% and 47% respectively) (6,9,10). This indicates that the prevalence of fall is still worryingly high, and contribute to significant proportion of morbidity and mortality in the elderly, this is due to the population investigated where people attending clinic is people with health issues. Therefore, the risk is higher in this population compared to the healthy community-dwelling older people. Moreover, the use of non-probability sampling method and high number of female respondents may contribute to this matter. This concurs with the finding of the prevalence of falls of 47% among elderly patient frequenting a primary care clinic (9).

This study found that there was association between falls with age and ethnicity. Particularly, respondents aged 80-89 years old (44.62%) had higher incidence of fall than other age groups. This shows that as the age increased, the risk of fall also increased. This finding is similar to the findings based on a study conducted in North Region of Brazil by Siqueira et al. that mentioned the prevalence of falls among 60-69 years old was 15.3%, while in those in the 70-79 years age group was 18% and this confirmed that as the age increases, the prevalence of fall also increase (15). The systematic review and meta-analysis by Deandrea et al showed that for every 5-year increase in age, the odds of the risk of falls increases by 12% for both all fallers and recurrent fallers (95% CI = 1.07–1.17 and 1.07–1.18, respectively) with all studies showing rising age as a risk factor for falls (16). As the age increases, body tends to become weaker and this can increase the possibility of fall among the older people.

The percentage of fall among the ethnic groups were highest in Malays (44.5%), followed by Chinese (34.69%), other ethnic groups (21.43%) and Indian (14%). This finding is totally contrast with the previous study done in Malaysia by Sazlina et al. that reported Indian had the highest fall (54.3%) followed by Malays (48.8%) and Chinese (40.3%) (7). The finding by Sazlina et al is echoed by a recent study in Malaysia which stated that Indians (23.8%) had the highest percentage of fallers followed by Chinese (19.4%) and Malays (16.2%) among the elderly population (17). Such a large difference might be explained by possibility that this study had a different composition in term of ethnic group with a higher majority of Malay ethnicity that had attended to the clinic in this study. Our study finding also differs similarly with the findings by the study by Singh DKA et al which stated that Indian ethnicity had the highest prevalence of fall at 27.6% (18).

There was no significant between falls with gender, marital status and living alone status. For living alone status especially, it was found that the study done by Qader et al. had the same result with this study (19). In their study, they reported that there was not significant association between living alone with sustaining falls. Another study also supported this finding, as Juliana, Lucy, Ot6vio & Marcelo stated that there was no significant association between falls and living with partner (20).

The study also showed that there was an association between the history of fall with falls (p<0.001). Dhargave & Sendhilkumar also mentioned in their study that there was a strong association of having falls with a positive history of falling (7).

In this study, it was found that there was an association between balance problems, vision problem, use of visual aids, medical problems like Diabetes Mellitus, stroke, Parkinson's Disease and osteoporosis and use of the anti-diabetic drug with falls. This is similar to the study by Singh et al which stated that the presence of medical illness such as arthritis and diabetes predisposes to fall possibly due to arthritis and diabetes (18).

Poor vision was found to be strongly associated with fall and this result is similar to study done by Patil, Suryanarayana, Dinesh, Shivraj & Murthy and Suraj & Awasthi that mentioned visual impairment was strongly associated with falls (21,22). This could be explained by the fact that poorer vision may cause problem in estimating depth perception, and therefore may lead to falls.

In relation to having medical problems, we found that patients with Diabetes Mellitus had a significant association to having falls (p= 0.004). Masud & Morris also had similar result as our study that found

an association between having Diabetes Mellitus and fall mainly due to the inherent risk of hypoglycaemia and autonomic neuropathy (23). Yet, this result was in contrast to the study by Rodrigues, Fraga & Barros that mentioned diabetes and hypertension were not associated with the having falls (24). Notwithstanding, this study also found that stroke, Parkinson's disease and osteoporosis had associations with having falls ($p= 0.003, 0.046$ and <0.001), respectively. This result is similar to a study by Kalula, Ferreira, Swingler & Badri that revealed Parkinson's disease and stroke were associated with having falls (25). This is consistent with the fact that the ageing process can affect muscle strength, balance and also gait in the elderly. Chang and Do in their study also agreed that the having stroke had a strong association with falls (26). This is mainly caused by neuropathy and balance problem in stroke patients. Not only that, Rodrigues, Fraga & Barros agreed that there was an association between osteoporosis and having falls as osteoporosis also tend to happen in the frail and elderly patients (24).

For patients on medications, only the use of anti-diabetic drug was found to be associated with fall ($p= 0.009$). The findings were similar to the study done by Yu et al. that reported there was significant association between using anti-diabetic drug and having falls ($p= 0.004$) (27). Use of anti-diabetic drug such as insulin used has been demonstrated to increase the high risk of fall due to the side effects of hypoglycemia (28,29). However, this study found there was no statistically significant association between other types of medications such as anti-hypertensive drug ($p= 0.708$), sedative/hypnotic drug ($p= 0.131$) and psychotropic drug ($p= 0.28$) with sustaining falls. This is similar to a study done by Patil, Suryanarayana, Dinesh, Shivraj & Murthy that reported there was no significant association between the use of sedative/hypnotic drug and anti-hypertensive drug with having falls ($p= 0.47, 0.27$) respectively (21). This comes as a surprise as these medications are the commoner causes of dizziness and postural hypotension which may lead to falls. Possibly, patients in this study living in an urban demography, are more educated on proper timing of intake of these medications, thereby reducing risk of falling. However, a study by Tsai et al. stated that there was a significant association between use of anti-hypertensive with having falls (30).

In this study, it was found that there was an association between having falls and most of the extrinsic factors of falls like uneven floor, changes in furniture position, poor lighting, lack of handrails, staircases and no railing at staircases. This is in congruent with study by Rodrigues, Fraga & Barros that mentioned that the common environmental factors that caused falls at the house were changed the position of furniture, lack of proper lighting, use of staircase, presence of wet floor and rugs (24). From the result of the study, we can see that most respondents reported that falls happening due

to the slippery floor (73.3%), uneven floor (52.2%), lack of handrails (59.3%), at the staircase (54.7%) and presence of no railing along the staircase (56.5%). Yu et al., meanwhile in their study conveyed that inadequate lighting for stairway had a significant relationship with falls ($p= 0.03$) (22). Another study by Romli et al identified hazards as to be no grab rail, no non-slip mat, distant toilet, floors that were slippery, no bedside light access and inappropriate footwear akin to our study (31). The study by Sazlina et al also showed that most falls occurred in bathroom and stairs due to slipping and tripping (9).

With regard to the use of walking aids, it was found that there was an association with falls and this is in congruent to a study done by Dhargave & Sendhilkumar (5). Rodrigues, Fraga & Barros also reported that there was a significant association between using a cane/walker and having falls (19). This could result from the fact that users of such assistive devices have inherent poor balance and lower limb muscle weakness which may have led to falls.

CONCLUSION

In conclusion, falls in the elderly are a common occurrence. Falls is arguably the most common geriatric giant threatening the quality of life of the elderly population. The percentage of falls among the elderly were quite high as more than 30% had fallen in past one year. The majority of falls in the elderly occur due to the intrinsic factor such as poor vision, possessing medical problems such as Diabetes Mellitus, stroke, Parkinson's disease, osteoporosis and using anti-diabetic drug. Furthermore, falls among the elderly also occur due to extrinsic factors such as uneven floor, changes in furniture position, poor lighting, lack of handrails, use of staircase, no railing at staircase and use of walking aids. Most of these factors leading to falls in this study are preventable. Therefore, intervention protocols and prevention methods need to be established to help those at high risk for falls and ultimately reduce the negative consequences caused by falls in the elderly. Caregivers, along with patients, should receive more detailed health education related to fall prevention especially of the predisposing risk factors. Besides, in order to improve the overall health quality of the elderly population, it is important to carry out more randomised studies related to interventions to prevent falls among the elderly.

There are many strengths associated with this study. This include the identification of many intrinsic and extrinsic factors associated with having fall. This may help in fall prevention programs. Findings of this study also reiterated the importance of continuing fall prevention programs to prevent devastating complications including fractures and death.

There were a few limitations identified in this study. The

findings from this study possibly can't be generalized to all elderly in Malaysia as this study was only carried out at an urban clinic at a general hospital. The use of bilingual questionnaire (Malay and English language) only could have excluded the elderly who are unable to understand either languages from participating in this study. Another limitation of this study was this study was conducted using the convenience sampling methods and not random sampling study.

Based on this study findings, we suggest some recommendations. Firstly, it is important that elderly who are at a higher risk of falling get adequate supervision when they are performing activities of daily living. Relatives who are living with the elderly diagnosed with medical conditions must be equipped with information regarding the factors associated with having falls and how falls can be prevented.

Secondly, efforts should be made to ensure that the house environment of the elderly should be safe, thereby elderly friendly. Since uneven floor, poor lightings, lack of hand-railings and use of staircase are associated with falls, it is necessary to make certain renovations to the elderly's house so as to reduce the risk of fall. Installing more light points at places such as the toilet, stairs and bedroom can help to reduce fall among the elderly due to better vision. Hand-railings placed at certain parts of the house, particularly areas which are slippery will enable the elderly to walk with support in a safe manner.

Thirdly, health care providers play a crucial role in educating the community regarding the factors which are associated with having falls and how to prevent falls from happening. Existing programmes regarding prevention of falls among the elderly should be continuously updated and disseminated nationwide so as to benefit all.

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