

Original Research

Falls among the elderly in rural areas of the Sharkia Governorate, Egypt

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Abstract

Objective: Falls are one of the greatest public health problems affecting the elderly and can lead to serious consequences. To estimate the prevalence of falls among elderly individuals and to identify the associated risk factors. **Methods:** A cross sectional study was conducted on 408 elderly persons aged 60 years and older in rural areas of the Sharkia governorate, Egypt. All participating persons were subjected to a structured interview questionnaire, Anthropometric measurements and Tinetti scale for balance and gait. **Results:** The prevalence of falls is high among the elderly (62%). Half of the falls occurred indoors, mostly in bathroom (38.2%), on stairs (22.8%) and in the bedroom (21.1%). Traffic falls occurred in (36.2%) of fallers. Slipping and dizziness were the most common causes of falls. The results showed a significant relationship between different types of chronic diseases, as well as medication use, and a high risky tinetti score (OR=12.3) **Conclusion:** Although falls are a frequent problem among elderly, there are preventable risk factors. Community and family physicians have an important role in the prevention and management of falls through the applications of geriatric care programs, identification of risk factors and screening for falls.

Keywords: Elderly, prevalence, falls, risk factors, Tinetti scale.

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Mısır Sharkia Valiliğinin kırsal kesiminde yaşlılar arasında düşmeler

Öz

Amaç: Düşmeler yaşlıları etkileyen en önemli halk sağlığı sorunlarından biridir ve yaşlılarda ciddi sonuçlara yol açabilir. Bu çalışma ile yaşlı bireyler arasında düşme prevalansını ve ilişkili risk faktörlerinin araştırılması amaçlandı. **Yöntem:** Kesitsel tipte planlanan çalışma Mısır'ın Sharki ilinin kırsal bölgesinde 60 yaşında 408 yaşlı üzerinde yapıldı. Çalışmaya katılanlara yapılandırılmış veri formu, antropometrik ölçümler, denge ve yürüyüş için Tinette ölçeği uygulandı. **Bulgular:** Yaşlılar arasında düşme prevalansı yüksektir (%62). Düşmelerin yarısı kapalı alanda oldu, bunların da çoğunluğu banyo (%38.2), merdivenlerde (%22.8) ve bodrumda (%21.1) idi. Düşme ve kayma düşmelerin çoğunun nedeni idi. Bulgular ilaç kullanımının yanısıra farklı kronik hastalıklarla yüksek riskli Tinetti skoru (OR=12.3) arasında önemli bir ilişki olduğunu göstermektedir. **Sonuç:** Düşmeler yaşlılar arasında sık görülen bir problem olmasına karşın, burada önlenebilir risk faktörleri bulunmaktadır. Toplum ve aile hekimleri geriatric bakım programlarını uygulama, risk faktörlerinin tanımlanması ve düşmelerin taranması yoluyla düşmeleri önleme ve yönetmede önemli bir role sahiptir.

Keywords: Yaşlı, prevalans, düşmeler, risk faktörleri, Tinetti ölçeği

Introduction

Fall and fall related injuries are major public health problems that call for global consideration, especially with the rapid increase in the number of elderly individuals.¹ In Egypt, the number of elderly persons reached 5.8 million in 2011 and was estimated at representing 7.3% of the total population. This percentage is expected to increase to 11.6% in 2030.²

Falls have a considerable impact on health and healthcare costs.¹ A fall can lead to hospital admission, disability and functional limitations, which can significantly decrease the quality of life of the elderly.³ In 2010, falls were responsible for approximately 80% of disability stemming from unintentional injuries, excluding traffic accidents, in adults 50 years and over.⁴

Several risk factors for falls in elderly are stated in multiple international studies. These include: advanced age, female gender, unsteady gait and balance, depressive symptoms and impaired cognition. Chronic conditions such as cardiovascular disease, arthritis and diabetes, nutritional deficiency, poor sleep

patterns and visual impairment are also associated with increased danger of falling. Socioeconomic factors including low education, low income and poor housing are also risk factors for falls. Also, environmental conditions, inside or outside the home, can also impact the risk of falls e.g., obstacles on the floor or poor light.⁵

Preventive measures must be taken to reduce the burden of falls on the individual, and society. Some low-cost interventions have been identified for fall prevention, yet implementation is occurring mostly in high-income countries.⁶ Fall prevention is not given a high policy priority in many developing countries. Research is needed to identify preventive strategies that will be effective in different cultural setting.⁷

Gerontological care services have an important role in reducing falls and related injuries through the provision of safety measures and environmental modifications, the elimination of risk factors and the implementation of training programs aimed at improving balance through exercise.^{8,9} Education must be directed towards helping elderly persons to identify potential hazards and changing their health practices and habits

accordingly.¹⁰ Adequate physical, social and psychological rehabilitation of elderly people with a history of falls and injury has been reported to prevent further falls.¹¹

The aim of this study was to estimate the prevalence of falls among elderly individuals and to identify its associated risk factors.

Methods

Study design and setting

A cross sectional study was carried out in the rural areas of Sharkia Governorate, Egypt on elderly people aged 60 years and older. The sample size was calculated by using EPI INFO 6. The total number of elderly in Sharkia governorate was 1,066,931 and the prevalence of falls among the elderly was 32% (Central Agency for Public Mobilization and Statistics of Egypt, 2013), at a confidence interval of 95%, with a study power of 80%. Accordingly, the total calculated sample size was 204, then doubled to 408.

The sampling technique was carried out using a cluster sample, in which the rural areas in Sharkia governorate were divided into 6 sectors. One sector was randomly chosen from them by a simple random technique. A village was selected randomly from the randomly selected sectors. All elderly individuals who were inhabitants of the studied village, and were not bedridden or hospitalized, were studied. A pilot study was carried out on 20 persons and the results were excluded due to modifications done on the questionnaire. The study was conducted during the period from October 2014 to March 2015 on 408 elderly.

Data collection tools

A structured interview questionnaire was developed by the researchers after reviewing scientific literature. It consisted of four parts:

- Part 1 - Socio demographic data (10 questions): age, sex, education, occupation, living conditions (alone,

with family, in geriatric club), special habits, etc.

- Part 2 - Medical history of chronic diseases (6 questions) and history of drug intake (7 questions).
- Part 3 - Fall history (6 questions) (indoors, outdoors, frequency of fall in the last month, how fall happened, types of injuries).
- Part 4 - Measurements: Anthropometric measurements (weight, height, BMI), BP and

The Tinetti gait and balance scale

The Tinetti gait and balance scale is designed to determine an elderly person's risk of falling within the next year. It needs 8-10 minutes to be completed. It consists of 2 sheets: the balance sheet includes 9 questions and its total score is 16 points, the second is the gait sheet, and it includes 6 questions. The highest total score is 28 points, in general, patients who score below 19 are at high risk of falling. Patients in the range of 19-24 have a moderate risk, and patients with a score greater than 24 have a low risk of falling.¹²

Statistical management:

After data collection, data were coded, entered and analyzed using SPSS (Statistical Package for Social Science) version 19. Data were presented as frequencies and percentages. Qualitative variables were compared using chi square test. P value (≤ 0.05) was considered significantly different. Confidence interval (CI) was considered significant when not crossing 1. Subsequently, those variables statistically significant (p value < 0.05) in the univariate analyses were entered into a logistic regression model to evaluate the independent associations between falls and characteristics of the participants.

Ethical aspect and administrative approach:

Before carrying out the study, the necessary official permissions were granted. Letters

addressed from the Faculty of Medicine, explaining the study aim and its procedures, were delivered to official authorities. An informed verbal consent was obtained from participants. Furthermore, participants were given the opportunity to refuse participation and they were notified that they could withdraw at any stage of completing the questionnaire, and were reassured about the confidentiality of any obtained information. There was no conflict of interest and no support has been received for the study. Results of the study and recommendations were disseminated to the MOH directory in Sharkia.

Results

Table 1 describes socio-demographic characteristics and medical history of the studied elderly population. The mean age of the studied group was 70.7 ± 9.28 . Male to female ratio was nearly 1:1. The majority of the participants were retired and widowed. Nearly 40% were illiterate. Most of the group was living with others and had sufficient income. The table also shows that 69.6% of elderly suffered from chronic diseases and 63.7% of them used medication. Also the majority of elderly group use aids as glasses, earpieces and walking sticks, and 34.5% of them used more than one aid.

The prevalence of falls is high among the elderly (62%) Figure 1. More than half of falls occurred indoors, mostly in bathroom (38.2%), on stairs (22.8%) and the bedroom (21.6%). Traffic falls occurred in 36.2% of fallers. Slipping and dizziness were noticed as the most common causes of falls. The most popular injuries following falling were bruises and fractured femurs

and hips; and sustaining more than one injury was more frequent than only a single injury Table 2. In the findings of this study, there was no statistically significant association between body weight and the likelihood of falling among the elderly Table 3.

Also the results showed a significant relationship between the occurrence of a fall and: age, illiteracy, civil status, living alone, having chronic diseases, taking medications (OR=6.25, CI 2.4-16.29), previous falls and the use of aids. A sign association between falling and high risky tinetti score (OR=12.3, CI 2.4-84.3) was also found Table 4. Logistic regression was done to the significant factors affecting occurrence of falls and it was found that having chronic diseases and taking medications were the most important indicators in the occurrence of falls.

Discussion

This study, carried out on 408 elderly persons, revealed a high prevalence of fall history among the elderly (62.0%). This is consistent with the literature as older people have the highest risk of death or serious injury arising from a fall and the risk increases with age.¹³ These findings were similar to those reported in Menoufia¹⁴, which revealed that the prevalence of falls among elderly was 56.4%. Another study in Alexandria reported that the prevalence of falls among elderly was 32%.¹⁵ Lastly another study done on elderly living in Urban Suez estimated the prevalence of falls among elderly to be 60.3%.¹⁶

Table 1. Frequency distribution of socio-demographic characteristics and medical history of the studied elderly population (n = 408)

Socio-demographic characteristics (n=408)		n	%
Age: Mean ± SD (Min-Max)		70.7± 9.28 (60 – 98)	
Gender:			
Male		205	50.2
Female		203	49.8
Education			
Illiterate		162	39.7
Read and write		74	18.1
School education		102	25
Higher		70	17.2
Marital status:			
Married		170	41.6
Widow		218	53.4
Divorced		20	5.0
Living:			
Alone		149	36.5
With others		259	63.5
Current Job status:			
Retired		254	62.3
Working		154	37.7
Income:			
Insufficient		174	42.6
Just sufficient		211	51.8
Sufficient and saving		23	5.6
Diseases:	Yes	284	69.6
Medication use :	Yes	259	63.4
Uses aids			
No		55	13.4
Glasses		73	17.8
Ear piece		92	22.5
Stick		38	9.3
More than one		141	34.5

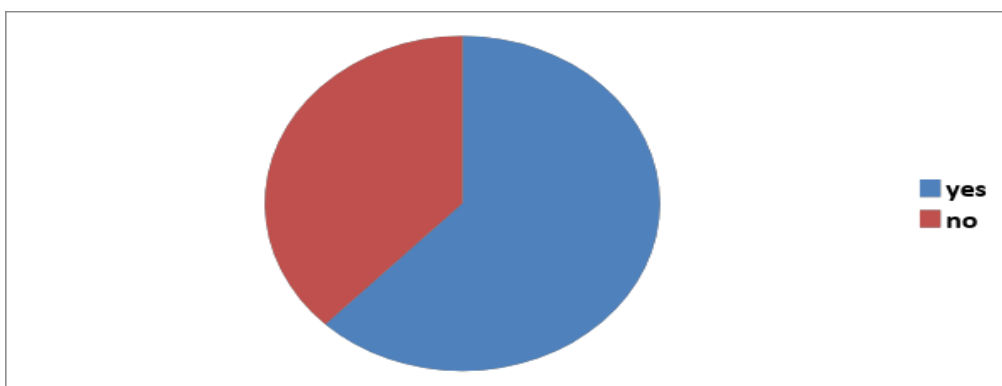


Figure 1. Pie chart showing percentage of fall among the studied elderly population
Turk J Public Health 2018;16(3)

Table 2. Frequency distribution of falls according to their causes, location and types of injuries following falling as reported by participants.

Fall (n=253)	n	%
Place of falls:		
Indoor	136	53.7
- Bedroom	30	22.1
- Kitchen	23	16.9
- Bathroom	52	38.2
-On stairs	31	22.8
Outdoor	91	35.9
- Another home	19	20.9
-At street	23	25.4
- In garden	16	17.6
- Traffic	33	36.1
Both	13	10.7
Causes of falls		
- Slipping	96	37.9
- Dizziness	52	20.5
- Loss of balance	34	13.5
- Stumbling	22	8.6
- No cause	49	19.5
Types of injuries:		
- Bruises	187	73.9
- Cut wound and abrasion	23	9.1
- Back pain	40	15.8
- Broken our limb	32	12.6
- Broken ribs	16	6.3
- Fracture femur an hip	45	17.7
- More than one injury	178	70.3

Table 3. Association between falls and body weight

Fall (n=253)	n	%
Low body weight (BMI<18.5)	61	24.1
Normal (BMI 18.5-25.0)	64	25.3
Overweigh (BMI>25.0-29.9)	62	24.5
Obesity (BMI (≥30)	66	26.1

p>0.05

Table 4. Associations between characteristics of the participants and self-reported falls.

Characteristics	OR	95% CI
Age:		
60-	1	1
70-	3.54	9.5-154.5*
+80	42.5	11.3-135.2*
Gender:		
-Male	1.00	
-Female	1.07	0.56-2.02
Education:		
-Illiterate	17.6	5.2-63.0*
-Read and write	0.62	0.21-1.83
-Sschool education	2.4	0.8-7.57
-Higher	1.00	
Marital status:		
-Married	1.00	
-Widow	9.7	4.5-21.1*
-Divorced	4.08	0.8-22.7
Living:		
-Alone	13.0	4.9-35.29*
-With others	1.00	
Current Job status:		
-Not-working	9.5	4.3-19.2*
-Working	1.00	
Diseases:		
- No	1.00	
-Diabetes	4.5	1.7-12.9*
-Alzheimer	33.7	8.6-232.8*
-ENT	2.84	1.35-6.05*
-Eye diseases	10.3	2.9-44.1*
-Artheritis	70.0	9.9-140.2*
-Hypertension	52.5	11.3-329.8*
-More than one disease	24.0	30.4-51.03*
Medication use: -Yes		
Uses aids	6.25	2.4-16.29*
-No	1.00	
-Glasses	2.63	0.63-11.73
-Ear piece	5.91	1.17-32.3*
-Stick	4.0	8.4-23.09*
More than one	17.1	4.55-70.7*
Tinetti scoru		
-Low	1.00	
-Moderate	4.89	0.81-37.7
-High	12.3	2.4-84.3

*Statistical significance

The reported rate in this study is higher than reported figures in the USA, Canada¹⁷ and Singapore.¹⁸ This difference may be attributed to differences between the rural area of the study and the elderly friendly environments in developed countries, as well as to the high prevalence of morbidity and medications used in the studied group. Generalization of this study results is limited to this studied group in this rural area.

Most of the falls occurred at home, with the bathroom being the most common location. The presence of loose rugs, slippery floors, inadequate lightning and lack of handrails may be contributing factors, these results were in agreement with studies in Egypt¹ and developed countries like USA¹⁹, France²⁰ and Australia.²¹ This can be further explained by the fact that older people in rural communities are confined to homes most of time, while conversely in Japan, most of falls of the elderly were reported outdoors.²²

It was found that falls were more likely to occur to old people who were retired, illiterate, living alone and suffering from chronic diseases. The rate of falls was similar for both males and females. In rural Egypt, daily activities and lifestyles are similar for both old females and males. Regarding relationship between falling and using aids, falls were significantly higher with the users of ear pieces than stick user. High prevalence of illiteracy in this age group is accompanied with the inability to follow different instructions and presence of cognitive disturbance, hearing defects and loss of balance. All this increases the risk of falling. Living alone is associated with deprivation from care, this was in agreement with Badia²³ and Dionyssiotis²⁴. It was noticed that the frequency of falls increased with diseases such as diabetes, Alzheimer, osteoporosis and hypertension. Taking medications, especially anti-hypertensives, hypnotics and antidepressants, is associated with dizziness and drowsiness which may increase the likelihood of experiencing a fall. History of chronic diseases and medications remained a very strong risk factor for all models in Egypt⁵, South East and Asia.¹⁸

Moreover, the results of the Tinetti scale revealed that the majority of the elderly (75%) studied were belonging to the group with a high risk of falling. From the results of this study, falls were frequent among elderly who were illiterate, widowed, living alone, having chronic diseases and taking medications, with history of previous falls and having defect in gait and balance.

Limitations of the study:

Generalization of the study findings are limited to rural areas. Polypharmacy elderly need comprehensive clinical examinations to assess their risk of falling (for example circulatory insufficiency, inner ear disease).

Conclusion and Recommendations

Preventive measures must be taken to reduce the burden of falls on individuals, healthcare systems and society. Fall risk screening assessments and interventions should occur before persons suffer fall related injuries. Fall prevention strategies should be comprehensive and multifaceted. Geriatric care services including promotive, preventive and curative care, with better control of environmental hazards, can reduce this costly and complex health problem facing older persons in Egypt, and the world at large.

Conflict Interest:

No conflict of interest.

Author contribution:

Dr. Amel Elwan Mohammed: Concept, design and collection of data, writing manuscript

Dr. Eman Elshahat Orabi: design, writing revision of manuscript

Dr. Howida Hennerly: Statistical analysis, revision of manuscript

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