

## The prevalence of home injuries among elderly people in Samsun, Turkey, and the influencing factors

Hülya DOĞAN<sup>1</sup>, Sevgi CANBAZ<sup>1</sup>, Berna TANDER<sup>2</sup>, Yıldız PEKŞEN<sup>1</sup>,  
Ferhan CANTÜRK<sup>3</sup>, Nimet ÖZAL ORUÇ<sup>4</sup>

**Aim:** Home injuries are a serious public health problem for the elderly. Our aim was to investigate the prevalence of home injuries among elderly people in Samsun, Turkey, and the influencing factors.

**Materials and methods:** This cross-sectional study was conducted between 1 January and 28 February 2007. A questionnaire, the Home-Screen Scale (HSS), and the Geriatric Depression Scale (GDS) were administered to the elderly subjects.

**Results:** Of all participants, 20.6% had experienced some kind of home injury. Seven participants living alone and 14 living with their families had suffered home injuries, suggesting a statistically significant difference between these 2 groups ( $P < 0.05$ ). Eleven (14.7%) subjects living in secure housing and 10 (37.0%) living in insecure housing had suffered home injuries, the difference again being statistically significant ( $P < 0.05$ ).

**Conclusion:** Home injuries are more common among people living alone and in insecure housing according to the HSS.

**Key words:** Elderly, home injury, falls, home-screen scale, geriatric depression scale

### Samsun'da yaşlılar arasında ev kazaları sıklığı ve etkileyen faktörler

**Amaç:** Ev kazaları yaşlılar için önemli bir halk sağlığı sorunudur. Bu çalışma, Samsun'da yaşayan yaşlılardaki ev kazalarının sıklığını ve bu kazaları etkileyen faktörleri belirlemek amacıyla yapılmıştır.

**Yöntem ve gereç:** Kesitsel tipteki bu çalışma 01 Ocak - 28 Şubat 2007 tarihleri arasında yapılmıştır. Yaşlılara bir soru formu, Ev Güvenliği Kontrol Listesi (EKGL) ve Geriatrik Depresyon Skalası (GDS) uygulanmıştır.

**Bulgular:** Yaşlıların % 20,6'sının herhangi bir tip ev kazasına uğradığı bulunmuştur. Çalışmada, ev kazası geçiren katılımcıların 7'sinin evde tek başına ve 14'ünün ailesi ile birlikte yaşamakta olduğu ve iki grup arasında istatistiksel olarak anlamlı fark olduğu bulunmuştur ( $P < 0,05$ ). Ev kazası geçiren katılımcıların 11 (% 14,7)'inin güvenli evde, 10 (% 37,0)'unun ise güvensiz evde yaşadığı tespit edilmiş olup, bu iki grubun arasında istatistiksel olarak anlamlı fark bulunmuştur ( $P < 0,05$ ).

**Sonuç:** Çalışmada yalnız yaşayan yaşlılarda ve EKGL'de güvenli olmayan evlerde yaşayan yaşlılarda ev kazalarının daha sık görüldüğü bulunmuştur.

**Anahtar sözcükler:** Yaşlı, ev kazası, düşme, ev güvenliği kontrol listesi, geriatrik depresyon skalası

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<sup>1</sup> Department of Public Health, Faculty of Medicine, Ondokuz Mayıs University, Samsun – TURKEY

<sup>2</sup> Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Ondokuz Mayıs University, Samsun - TURKEY

<sup>3</sup> Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Ondokuz Mayıs University, Samsun - TURKEY

<sup>4</sup> Tekkeköy Public Health Center, Samsun - TURKEY

**Correspondence:** Sevgi CANBAZ, Department of Public Health, Faculty of Medicine, Ondokuz Mayıs University, Samsun - TURKEY

E-mail: sevgic@omu.edu.tr

## Introduction

Ageing can be defined as the process of progressive change in individuals' biological, psychological, and social structures. In 1989, the World Health Organization (WHO) defined ageing as a decrease in the ability to adapt to environmental factors and described people over 60 years of age as old (1).

The promotion of healthy living (better diet, more physical activity, and tobacco cessation), improved medical care and preventative measures have significantly contributed to increases in life expectancy across the world over the past century. They have also produced a major shift in the leading causes of death for all age groups, including the elderly, from infectious diseases and acute illnesses to chronic diseases and degenerative illnesses (1,2). In almost every country, the proportion of people aged over 60 years is growing faster compared to other age groups (3). The number of people over 60 across the world is expected to rise to 1.2 billion by 2025, compared with 600 million in 2000 (1). It is estimated that 80% of the 2 billion elderly will be living in the developing world by 2050 (3,4). The number of elderly people is growing in Turkey at the same rate as in other countries. There were approximately 7.0 million (10.0%) old people in Turkey in 2007, and the figure is estimated to reach 12 million by 2050 (5).

These figures emphasize the need for health systems to address the problems of the elderly. Home injuries, an important example of which is falls, are a serious public health problem for the elderly (6). A fall has been defined as "an unintentional event where a person comes to be on the floor without the feet weight-bearing" (7). Around 20 million home and leisure injuries requiring medical attention occur each year in the EU. Some 2 million of these lead to hospital admissions, with around 83,000 resulting in death. More than half of these injuries have been reported as home injuries (6). Domestic studies have reported wide variations in home injury rates, ranging between 23.8% and 65.3% in elderly people in Turkey (8-13).

Falls are the result of a complex interaction between the elderly (intrinsic factors) and the environment (extrinsic factors), and the behavior of elderly people (7). Intrinsic factors are age-related and possible disease-related changes that alter the

individual's ability to negotiate intrinsic environmental factors (12,14,15). Changes in the environment and in behavior when at home are central strategies in the prevention of falls (16). The most important elements in environmental design are adequate and accessible location, physical accessibility, adequate privacy, space, lighting, adequate basic infrastructure such as water supply, sanitation, and waste-management facilities, and suitable environmental quality (6,7,14). The behavior of the older person must also be considered. Older people may engage in particular behavior that increases the risk of a fall (17,18). This behavior may be habitual or inappropriate (18), including rushing to the door or getting up to go to the toilet at night without adequate lighting. Quality of life for elderly people is also affected by falls, an example of which is a subsequent fear of falling. This makes safety in the home a public health issue of national and international importance (7).

Due to the increasing interest in home injuries, various studies and projects concerning housing and health issues have recently been performed. Most of these studies have focused on the elderly and on injuries taking place indoors (19). Indoor studies are particularly required in developing countries such as Turkey, where satisfactory assessment mechanisms for dwellings and adequate statistical data on home injuries are unavailable. The aim of this study was to investigate the prevalence of home injuries among the elderly in Tekkeköy, Samsun, Turkey, and to investigate the relationship between these home injuries and the main factors responsible for them.

## Materials and methods

### Study design and population

This cross-sectional study was conducted in the district of Tekkeköy in Samsun, a province in northern Turkey, between 1 January and 28 February 2007. The elderly population of Tekkeköy stands at 703, according to Provincial Health Directorate data. The study group was randomly selected among elderly people. A sample size of 116 was calculated as necessary for this study ( $P = 0.1$ ,  $d = 0.05$ ,  $t = 1.96$ ). One hundred two (87.9%) members of this target population were involved in the study.

## Questionnaire

A questionnaire, the Home-Screen Scale (HSS), and the Geriatric Depression Scale (GDS) were used to evaluate demographic characteristics, health related questions, housing conditions and depression in elderly people.

The questionnaire, prepared by the authors, included various demographic health related variables such as age, gender, marital status, educational level, social insurance, living status (living alone or with other people), private room status (having a private room or not), chronic illnesses, use of drugs, use of assistive devices, home injuries within the last 12 months, type of home injury, and whether any medical advice was sought. Responses were limited to the previous 12 months to ensure accurate recall. Face-to-face interviews were conducted with the subjects in their homes. Home injury history was confirmed using health records and interviews with relatives.

The HSS, a 14-item scale, was specifically designed by Johnson et al. as a nurse-administered instrument for identifying environmental hazards and unsafe behavior and to alert nurses to the need for specialized environmental assessment and behavior change (20). The items included 7 environmental features: room clutter, good lighting for day and night, floor coverings, shoes worn at home, and toilet and showering facilities. Each item was rated from 1 to 10 at intervals of 1, with a score of 10 representing a home where every room was free of clutter. Home behavior important for safety and easily observed by nurses was also taken into consideration. Seven items were included in the home behavior subscale: use of clean toilet facilities or aids, moving carefully in the house, wearing footwear correctly, taking care when performing actions, night lighting when getting up, climbing to reach high items, and hurrying to answer the telephone or door (reverse scoring applies). A similar scoring system to that was used in the home environment subscale. Total subscale scores ranged from 0 to 140. Cronbach's alpha of this scale was 0.86. A score of 71 (25th percentile) on this scale was identified as a critical point for potential client injury (7). Cronbach's alpha and cut-off point of this scale were 0.84 and 99 points, respectively, in the Turkish version designed by Uysal et al. (21).

The GDS was developed as a basic screening measure for depression in the elderly. While there are many instruments available to measure depression, the GDS, first created by Yesavage et al., has been tested and used extensively with the older population. The GDS Long Form is a brief, 30-item questionnaire in which participants are asked to respond by answering yes or no in reference to how they felt over the previous week. Cronbach's alpha of this scale was 0.92 (22). Cronbach's alpha of the GDS was 0.72 in the Turkish version designed by Sağduyu (23). Scores of 0-11 are considered normal, while 11-14 indicate probable depression and 14 and above indicate a depressed state (22).

## Analysis

Numerical variables such as age and characteristics of items in the HSS were established as normally distributed using the Kolmogorov-Smirnov test. These variables are given as mean  $\pm$  S.D. Other variables are given as median (minimum-maximum) and percentages. Data analysis was performed using Student's t test, Fisher's exact test, and the Mann-Whitney U test. Statistical significance was defined as a probability of less than 0.05.

## Results

The mean age of the participants was  $71.4 \pm 5.4$ . Of these participants, 58 (56.9%) were female and 1 (1.0%) had no social security. Twenty-one (20.6%) of the participants had experienced some kind of home injury within the previous 12 months.

Distribution of some socio-demographic characteristics of the participants according to home injuries is presented in Table 1.

Of the participants, 89 (87.3%) had received medical treatment for chronic diseases before the study. Nineteen (90.5%) who had suffered home injuries had a diagnosed chronic disease, while 2 (9.5%) had no disease ( $P < 0.05$ ). Among those participants suffering home injuries, the median number of chronic diseases was 2 (0.0-4.0) compared with 1 (0.0-4.0) among subjects who had experienced no such injuries, although the difference was not significant ( $P < 0.05$ ).

The participants' most common chronic problems were hypertension (71.9%) and arteriosclerosis

Table 1. Distribution of subjects' socio-demographic characteristics according to home injuries.

	Home injuries				X <sup>2</sup>	P
	Yes (n = 21)		No (n = 81)			
	n	%	n	%		
Age						
<74	15	20.0	60	80.0		>0.05
≥ 75	6	22.2	21	77.8		
Gender					4.03	<0.05
Female	16	27.6	42	72.4		
Male	5	11.4	39	88.6		
Marital status						>0.05
Married	9	14.8	52	85.2		
Widowed	12	29.3	29	70.7		
Educational level						>0.05
Less than high school	20	20.2	79	79.8		
High school and above	1	33.3	2	66.7		
Living status						<0.05*
Alone	7	46.7	8	53.3		
Own room						>0.05
Yes	17	19.8	69	80.2		
No	4	26.7	11	73.3		

\*Fisher's exact test

(28.1%). Distribution of chronic diseases among the participants is presented in Table 2.

Table 2. Distribution of chronic diseases among subjects.

Chronic disease	Number (n = 89)	%
Hypertension	64	71.9
Arteriosclerosis	25	28.1
Diabetes mellitus	23	25.8
Cardiac failure	22	24.7
Musculo-skeletal disease	8	9.0
Cancer	3	3.4

Seventy-seven (75.5%) of the participants reported that they used assistive devices on a continuous basis. Removable dentures were the most frequently used devices (42.2%), followed by eyeglasses (39.2%), walking sticks (21.6%), and hearing aids (1.0%). Fifteen (71.4%) of the subjects who had suffered home

injuries said they used assistive devices, compared with 6 (28.6%) who did not use any, and no significant difference was found between the groups (P > 0.05).

Falling was the most common home injury among subjects who had suffered them (71.4%). The next commonest injuries involved punching-cutting instruments (19.0%) and burns (5.4%). Five (23.8%) of these injuries resulted in fractures. Nine (42.9%) participants with home injuries presented to a health center, 6 (66.7%) received outpatient treatment, 1 (11.1%) was treated in hospital, and 2 (22.2%) received no treatment.

The HSS revealed that 75 (73.5%) of the elderly subjects were living in secure housing and 27 (26.5%) in insecure housing. Eleven (14.7%) of those in secure housing and 10 (37.0%) of those in insecure housing had suffered home injuries, the difference being significant (P < 0.05). Characteristics of items in the HSS are presented in Table 3.

Table 3. Characteristics of items in the Home-Screen Scale.

Item	Home injuries		P	t
	Yes (n = 21)	No (n = 81)		
<b>Home-safe</b>				
Rooms/halls are free of clutter	5.5 ± 1.2	7.7 ± 1.9	<0.001	5.98
Rooms/halls have good daylight	5.8 ± 1.1	7.9 ± 1.7	<0.001	4.34
Rooms/halls have good night lighting	6.3 ± 1.3	7.8 ± 1.9	<0.01	2.89
Floor coverings in home are even, firm, and nonslip	5.6 ± 1.8	8.1 ± 1.7	<0.001	5.21
House slippers/shoes are healthy and fit the feet well	4.9 ± 1.1	7.0 ± 1.5	<0.01	3.21
Can go to the toilet safely at night	6.0 ± 1.1	7.8 ± 2.1	<0.01	3.11
Bathing/showering facilities and items are easy to access and use	6.4 ± 1.5	7.8 ± 1.9	<0.01	2.66
<b>Home-behavior</b>				
Can use the toilet and accompanying equipment	5.6 ± 1.7	7.8 ± 1.9	<0.001	4.33
Person moves carefully through the house	6.0 ± 1.3	7.9 ± 1.7	<0.001	4.30
Person wears footwear correctly	5.9 ± 2.0	8.0 ± 1.7	<0.001	4.11
Person takes care when doing things at home	5.3 ± 1.4	7.8 ± 1.7	<0.001	5.25
Person puts lights on at night if getting up	6.1 ± 1.9	7.6 ± 1.2	<0.05	2.59
Shoes usually worn at home fit well and have good traction on heels and soles	4.8 ± 1.4	5.7 ± 1.8	>0.05	
Hurrying to answer phone or doorbell	3.1 ± 1.3	5.8 ± 1.3	<0.001	4.33

Probable depression was determined in 65 (63.7%) of the elderly subjects and depression in 27 (26.5%). No significant difference was determined between subjects with or without home injuries in terms of depression.

## Discussion

An increase in the elderly population as a proportion of the general population was anticipated in the 9th Turkish Developmental Plan in 2006 (24). The elderly spend most of their time indoors. Indoor environmental risks such as home injuries should be therefore considered a serious public health problem. Accessibility is important for elderly people if they are to live independently in society. Research on housing accessibility as well as valid official statistics on such issues is scarce. However, there is some evidence that most elderly people live in dwellings with environmental barriers, and that the magnitude of accessibility problems increases with age. Indoor environmental risks such as home injuries that the

elderly face should therefore be regarded as a serious public health problem (25).

In our study, 20.6% of the elderly reported home injuries within the previous 12 months, the most common type being falls (71.4%). The home injuries surveillance system in the UK estimated an annual rate of hospital treatment of 20/1000 patients at the age of 65, rising to 90/1000 with advancing age (26). The general household survey determined that 8% of elderly people had reported a home injury to their general practitioner or hospital in the preceding 3 months, equivalent to an annual rate of 320/1000 (27). On the other hand, WHO and other studies have indicated a prevalence of falls ranging between 27.9% and 31.9% (1,25,28,29). In view of the fact that geriatric medicine is still a relatively new discipline in Turkey, addressing the epidemiology of home-based injuries and falls with identification of risk factors is very important. Information about home injuries was obtained from self-reports from elderly people, and the true prevalence of home injuries in the elderly population is unknown. Some national studies have

reported wide variations in home injury rates, ranging between 23.8% and 65.3% in elderly people in Turkey (8-13).

The rate of home injuries rises with age (10,13). However, no correlation was determined in this study between the occurrence of home injuries and age. This may be due to the relatively low number of people over 75, as the average life expectancy in Turkey is 70 (4). Moreover, educational level had no impact on the occurrence of home injuries. This may be due to the similarity of educational levels in the sample population or the inadequacy of education in avoiding home injuries.

We determined a statistically significant difference between female and male participants, similar to that in some other studies (10,12,13). Males and females have different roles in life. This finding may be due to the fact that females are concerned with the care of children and the home, such as the preparation of food and cooking.

Elderly people living alone were more prone to home injuries ( $P < 0.05$ ). This finding was consistent with a study by Evci et al. (10). The higher incidence of home injuries in people living alone may be due to their having to do all the household tasks by themselves.

In this study, 87.3% of elderly people had a chronic disease, and the prevalence of chronic diseases was much greater in people who had suffered home injuries. It was also revealed that 75.5% used assistive devices and that subjects using such devices had more home injuries. The incidence of home injuries increased with the presence of chronic illnesses, musculoskeletal disorders, use of assistive devices, sensorimotor function problems, physical disability of any kind, and depression (10,27-31).

In this study, 23.8% of falls resulted in fractures. Fractures, especially hip fractures, are very significant in terms of resulting in early death, functional dependence, and care costs. Reduction in quality of life and physical activity often leads to social isolation and functional deterioration, with a high risk of resultant dependency, institutionalization, or death. It has been estimated that the cost of falls accounts for 3% of total National Health Service expenditure in the UK (28).

Approximately half of elderly people who suffered falls in this study sought medical advice; 66.7% received outpatient treatment and 11.1% received treatment in hospital while 22.2% received no treatment. Although most people who fall do not seek any medical advice, older people account for 12%-21% of emergency department visits, and those attending the emergency department after a fall are likely to fall again in the following year, with a 30% chance of sustaining a fracture or dislocation (32).

One-fourth of the elderly subjects in this study lived in insecure housing according to the HSS results. Of the participants, 14.7% living in a secure home and 37.0% of those in insecure housing had suffered home injuries, and a statistically significant difference was determined between these groups ( $P < 0.05$ ). The causes of home injuries and falls in elderly people are complex. Most result from an interaction of environmental hazards, physical disability, and carelessness or excessive risk taking. The contribution of environmental factors has recently been emphasized (20). The home environment is of particular concern for the elderly. A detailed report on the location of 242 falls emphasized that most of them occurred in the home (32.2%), while the rest occurred in surrounding transition area (16.1%) or outside (51.2%) (33). Environmental features such as poor lighting, slippery rugs, clutter, and handrails play a part in a third to half of falls of elderly people at home. The behavior of the older person in the environment must also be considered. It has been found that elderly people may engage in particular behaviors that increase the risk of a fall. These may be habitual or inappropriate behaviors, including rushing to get to the door or getting up to go to the toilet at night without adequate lighting. Modifications in the home and changes in behavior when using the home are central strategies to prevent falls. Both strategies aim at making home and home-related behavior safer by minimizing hazards and risk-taking (20). Except for the "Shoes usually worn at home fit well and have good traction on heels and soles" parameter, this study revealed that people who had suffered home injuries had high scores in all subscales, and that their houses were not secure and their behavior exposed them to a greater risk.

Probable depression was determined in 63.7% of the elderly population and depression in 26.5% of them. Depression is one of the most common psychiatric disorders affecting this group and is a major public health problem. It has a high prevalence, is frequently co-morbid with medical illnesses, has negative impacts on quality of life, and increases the number of visits to different medical services. Geriatric depression is more somatic than depression in other age groups (36). Various studies have reported that major depression is widely observed in the elderly. Using GDA, Evans et al. identified symptoms of depression in 30% of male and 40% of female patients admitted to first-step medical services. Furthermore, the rate among hospitalized patients has been reported as 30% (37). On the other hand, the limitations caused by home injuries or the fear of suffering such injuries can also cause social isolation and depression (34,35). In our study, there was no statistically significant difference in terms of depression between subjects with or without a history of home injuries. GDS, based on self reporting and consisting of easily understandable and answerable

questions and ignoring physical symptoms, should be used for the elderly population (22).

Home injuries are preventable. Although prevention strategies have been shown to be effective, the reduction of falls, injuries and associated morbidity is dependent on early identification of people at high risk. Significance of protection against falling was apparent from interventions targeting multiple, identified risk factors in individual patients, and from interventions focusing on behavioral measures aimed at environmental hazards plus other risk factors. Health care purchasers and providers contemplating fall prevention programs should consider housing conditions. It may be difficult to overcome individual factors, but it is still possible to avoid these injuries by improving housing conditions for the elderly. The following 2 lines of action must be ensured: home safety awareness campaigns and action to ensure that potentially dangerous dwelling features are removed or minimized. In order to achieve this goal, more attention should be paid to home safety by implementing home control/assessment checklists.

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