

Home Accidents in the Elderly in Turkey

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EVÇİ, E.D., ERGİN, F. and BEŞER, E. *Home Accidents in the Elderly in Turkey.* Tohoku J. Exp. Med., 2006, **209** (4), 291-301 — Houses may accommodate environmental barriers that pose a risk for older people. This study aimed to identify the main characteristics of the dwellings of the elderly, and to assess the impact of those on home accidents. In that cross-sectional study, 3,277 people over 60 years of age living in Aydın province of Turkey were evaluated in December 2004, using a questionnaire and a home safety check list. The results indicated that 38.6% of the elderly have had any type of home accident within the last 12 months, and the most common type of accident was falls (31.9% of all accidents). Possible causes of accidents were analyzed and the houses were graded based on two different types of safety point scales (SP): SP1 for “house characteristics” and SP2 for “personal opinions.” According to SP1, 22.7% of the houses were defined as in poor condition while this percentage was 20.1% according to SP2. Poor housing conditions, being female, living alone, having a chronic illness, physical and hearing disability, wearing eyeglasses, inactivity, use of assistive devices and more than four drugs were found to be associated with having a home accident. The environmental hazards and factors contributing to accidents or injuries were well-known. However, the information about home accidents in the elderly and the impact of dwelling characteristics was limited. This study was considered to be helpful to provide a new perspective on this subject. More studies are needed using the home safety check lists to collect additional quantitative data. ——— elderly; house characteristics; safety point; home accidents

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Aging is an inevitable period and is also known to be the most sensitive era of life. World Health Organization (WHO) defines ageing “the decrease in the ability of being in consistency with environmental factors” and accepts people over 60 years of age as old. The number of people over 60 in the world is estimated to rise to 1.2 billion by 2025, compared with the 600 million in 2000 (Stein and Moritz 1999; Erkal 2005). In Turkey, there are approximately 3.5 million old people and it has been estimated that this number

will reach 12 million by 2050 (Bilir 2004).

These figures emphasize the need for health systems to address the problems of older people. One outstanding problem for the elderly is home accidents. Studies indicate that around 20 million home and leisure injuries occur each year in the European Union (EU) requiring medical attention. Dwellings may constitute major risks for the injury of older people as well as causing social isolation (Güner and Güler 2002).

Factors relevant to home accidents are shown

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as dwelling design and maintenance in addition to human characteristics and behavior (Bonnefoy et al. 2004, Nishiwaki et al. 2005). The most important elements in dwelling design are adequate and accessible location, physical accessibility, adequate privacy, space, security, lighting, heating and ventilation, adequate basic infrastructure such as water supply, sanitation and waste-management facilities; and suitable environmental quality (Bonnefoy et al. 2004; The WHO approach to housing and health 2004).

Because of an increasing interest in health consequences of housing conditions and the environmental health concept, various studies and projects on housing and health issues were carried out recently. Most of these studies were focused on children and also on accidents or injuries that have taken place outdoors. However, there is no commonly agreed definition of "healthy housing," and there are still major knowledge gaps on how housing conditions may affect health and which improvement strategies will lead to best results (Current Knowledge 2004).

For this purpose, indoor studies are required especially in developing countries like Turkey, where satisfactory assessment mechanisms for dwellings or adequate statistical data on home accidents are not present.

The aim of this study was to determine the main characteristics and safety points of houses that affect daily lives of older people and to assess the relation between them and home accidents.

MATERIALS AND METHODS

Study population

This study was conducted in the city center of Aydin, a province in western Turkey. The population of Aydin was reported as 217,558 according to the data of Provincial Health Directorate, of which 21,103 people were estimated to be above 60 years old. Target group was selected as 3,277 elderly people above 60, living within the municipality of Aydin. 98.6% ($n = 3,231$) of this target population were accessed during the study.

Study design

The cross-sectional study was carried out in December 2004. The study group was determined by

cluster and random sampling methods. Health station subunits of health centers, each served nearly 2,500 individuals and staffed by a midwife, were accepted as clusters. One rural and one urban health station were selected from each of the ten health centers within the municipality of Aydin by random sampling method. Therefore the study was conducted in the catchment areas of a total of 20 health stations. The approval for the study with target group was obtained from Provincial Health Directorate and also ethics committee of Medical School, Adnan Menderes University.

Questionnaire and check list

A questionnaire and a home safety check list were developed to evaluate housing conditions of old people. Turkey Population and Health Survey, WHO Healthy Cities Indicators, studies of British Geriatric Society, administration instruments of WHO Large Analysis and Review of European Housing and Health Status (LARES) Project and Home Safety Questionnaire of American Geriatrics Society were used as references to prepare these tools (Evci et al. 2001; Bonnefoy et al. 2002; American Geriatrics Society 2004; British Geriatrics Society 2004; Turkey Demographic Health Survey 2004). Face-to-face interviews were conducted with the study participants who gave their consent. The questionnaires were implemented by trained students from Aydin College of Health. A separate check list was used for each house visited.

The participants were asked demographic and health related questions like general health condition, use of assistive devices, sleeping habits, presence of acute and chronic illnesses. General housing conditions, number of rooms, ground coatings, staircases, kitchen, bathroom and lavatory of the houses were evaluated as well.

Evaluation criteria for house characteristics

The dwellings of old people were evaluated from two different aspects. The first stage included the consideration of the interviewer and the second stage was reflecting the opinions of the participant.

Seven characteristics of houses (ventilation system, grabbing bar, ground coating, indoor steps or staircases, handrails, damaged staircase, height differences in staircases) that might have importance in considering safety issues were evaluated and safety points 1 (SP1) obtained from these criteria were recorded as "Present:1, Absent:2, Not observed:0" (Table 1). Houses that had five and below points were considered to be in good, 6 points was

considered to be in medium, seven and above points were considered to be in poor safety level. The opinion of older people about “difficulties and barriers in the house and support or help facilities” were evaluated with safety points 2 (SP2) between 0 and 3 (Table 2). Houses that had 11 and below points were considered to be in good, between 12-18 points were considered to be in medium and 19 and above points were considered to be in poor safety level.

Analyses

SPSS 11.5 software was used for data analysis. The descriptive data was given as mean \pm S.D. and percentiles. Chi-square test was conducted for the statistical analyses. The level for statistical significance was accepted as

$p < 0.05$. In order to determine risk levels for home accidents, Crude Odds Ratio (COR) and 95% confidence intervals were presented as well.

RESULTS

Among 3,211 participants who have answered the age and gender questions, mean age of the participants was 68.8 ± 6.3 (60-96) and 46.7% were male. Among 3,206 participants who have answered the education question, 27.3% were illiterate, 49.9% was literate or primary school graduate, and others have had higher levels of education. Moreover, 40.3% of the 3,209 participants who have mentioned the living condition

TABLE 1. Selected characteristics of the participants, Aydin, December 2004.

Characteristics of participants	<i>n</i>	%
Marital status (<i>n</i> = 3,209)		
Married and living with spouse	1,915	59.7
Other*	1,294	40.3
Social security (<i>n</i> = 3,203)		
Present	2,894	90.3
Absent	300	9.4
Unknown	9	0.3
Employment (<i>n</i> = 3,207)		
Employed**	1,878	58.6
Retired	1,329	41.4
Physical disability of any kind (<i>n</i> = 3,206)		
Present	287	9.0
Absent	2,919	91.0
Use of assistive devices (<i>n</i> = 3,207)		
Present	407	12.7
Absent	2,800	87.3
Eye glasses (<i>n</i> = 3,203)		
Present	1,805	56.4
Absent	1,398	43.6
Exercising (<i>n</i> = 3,168)		
Present	1,041	32.9
Absent	2,127	67.1
Hearing problem (<i>n</i> = 3,206)		
Present	2,467	77.0
Absent	675	21.0
With device	64	2.0

* Married, but not living with spouse or widows, singles and divorced people.

were living alone. Mean duration of sleep was 6.9 ± 1.7 hrs and 60.9% of 3,157 participants who have answered this question reported that they fell asleep within ≤ 30 min after going to bed. During the last 12 months, 71.8% of 2,991 participants who have answered the relevant question have received health services for chronic diseases.

Most common chronic problems of these participants were hypertension (28.4%) and diabetes (19.4%). Additional characteristics of the participants have been presented in Table 1.

A total of 2,345 houses were assessed in the context of the study. Mean age of the houses was 28.7 ± 14.1 years and 90.3% of the participants

TABLE 2. Distribution of safety points according to the characteristics of the houses of participants, Aydin, December 2004.

Characteristics of the houses	Safety points	<i>n</i>	%
Ventilation system in the kitchen (<i>n</i> = 2,323)			
Present	1	2,147	92.4
Absent	2	130	5.6
Not observed	0	46	2.0
Ventilation system in the bathroom (<i>n</i> = 2,325)			
Present	1	2,067	88.9
Absent	2	232	10.0
Not observed	0	26	1.1
Grabbing bar in the bathroom (<i>n</i> = 2,325)			
Present	1	274	11.8
Absent	2	2,051	88.2
Ventilation system in the lavatory (<i>n</i> = 2,141)			
Present	1	1,886	88.1
Absent	2	234	10.9
Not observed	0	21	1.0
Grabbing bar in the lavatory (<i>n</i> = 2,229)			
Present	1	158	7.1
Absent	2	2,071	92.9
Indoor steps or staircase (<i>n</i> = 2,306)			
Present	2	113	4.9
Absent	1	2,193	95.1
Handrails (<i>n</i> = 113)			
Present	1	55	48.7
Absent	2	58	51.3
Damaged staircase (<i>n</i> = 112)			
Present	2	11	9.8
Absent	1	101	90.2
Height differences in staircase (<i>n</i> = 112)			
Present	2	31	27.7
Absent	1	81	72.3
Damaged ground coating (<i>n</i> = 2,325)			
Present	2	330	14.2
Absent	1	1,995	85.8

TABLE 3. Distribution of safety points according to personal opinions of participants, Aydin, December 2004.

Personal opinions	Safety points	<i>n</i>	%
Facing with a barrier when moving from room to room (<i>n</i> = 3,199)			
Never	0	1,310	41.3
Rarely	1	1,559	48.7
Once a week	2	261	8.2
More than once a week	3	59	1.8
Presence of resistant materials they can grab to steady themselves if they feel unsteady when moving from room to room (<i>n</i> = 3,201)			
Everywhere	0	391	12.2
Most places	1	708	22.1
Sometimes	2	1,651	51.6
Few things to steady them	3	451	14.1
Good lighting (<i>n</i> = 3,202)			
Always	0	2,546	79.5
Almost always	1	499	15.6
Sometimes	2	139	4.3
Often dark	3	18	0.6
Difficulty getting on and off the lavatory (<i>n</i> = 3,201)			
Never	0	1,630	50.9
Rarely	1	950	29.7
Sometimes	2	524	16.4
Often	3	97	3.0
Difficulty getting in and out of the bath or shower (<i>n</i> = 3,200)			
Never	0	1,617	50.5
Rarely	1	971	30.3
Sometimes	2	504	15.8
Often	3	108	3.4
Difficulty with steps or staircases (<i>n</i> = 3,109)			
Never	0	1,467	47.2
Rarely	1	976	31.4
Sometimes	2	516	16.6
Often	3	150	4.8
Stand on toes to get things out of reach in the kitchen or closets (<i>n</i> = 3,199)			
Never	0	970	30.3
Rarely	1	1,067	33.4
Sometimes	2	786	24.6
Often	3	376	11.7
Easily getting help for standing up in cases of injury or falls (<i>n</i> = 3,203)			
Always	0	841	26.3
Usually	1	1,290	40.3
Sometimes	2	706	22.0
No-usually alone	3	366	11.4

were living in houses that were older than 10 years. 60.8% of the houses were made up of reinforced concrete and 21.8% was made up of brick. 57.6% of the houses were in the first, 21.7% was in the second and 20.7% was in higher floors. Mean number of rooms in the dwellings was 3.57 ± 1.00 and mean number of rooms per person was 2.03 ± 0.98 . There were doorsteps in 79.7% of the houses; 43.9% of them was in the entry, 22.3% was between rooms and 21.7% was present in more than one place. Ground coatings were as follows; concrete (24.4%), wooden (20.5%), carpet (14%), tiles (11.2%) and parquet (8.9%).

Characteristics of the houses in terms of safety points were shown in Tables 2 and 3 in detail.

It was found that 38.6% of the study participants have had any type of home accident within last 12 months ($n = 1,234$). The most common type of accidents was reported as falls (31.9%), cuts (26.7%) and hits (19.9%). The types and causes of accidents together with the injured body part were presented in Table 4.

Distribution of accidents within the last year according to safety points and some characteristics of participants were presented in Table 5. It was found that the incidence of home accidents

TABLE 4. Distribution of types of accidents, their causes and injured body parts of bodies in participants, Aydin, December 2004.

Type and cause of the Accident	<i>n</i>	%	Injured body part	<i>n</i>	%
Falls (<i>n</i> = 376)					
Construction materials	180	47.9	Leg	140	36.0
Furniture/coatings	122	32.4	Arms	67	17.2
Cleaning materials	15	4.0	Head	58	14.9
Cuts (<i>n</i> = 311)					
Knife	201	64.6	Skin	129	39.9
Other kitchen materials	81	26.0	Arms	91	28.2
Construction materials	8	2.6	Leg	14	4.3
Hits (<i>n</i> = 232)					
Construction materials	112	48.3	Leg	88	36.4
Furniture/coatings	84	36.2	Arms	61	25.2
Kitchen materials	23	9.9	Head	35	14.5
Electricity accidents (<i>n</i> = 39)					
Electrical devices	30	76.9	Whole body	14	41.2
Kitchen devices	3	7.7	Arms	6	17.6
Heating/cooling devices	3	7.7	Skin	6	17.6
Burns (<i>n</i> = 182)					
Gases/flammable materials	75	41.2	Skin	83	45.1
Heating/cooling tools	56	30.1	Arms	45	24.5
Kitchen materials	22	12.1	Leg	28	15.2
Poisoning/chemical (<i>n</i> = 13)					
Nutrients	8	61.5	Whole body	7	50.0
Cleaning materials	4	30.8	Nose-throat	4	28.6
Flammable gases	1	7.7	Arms	1	7.1
Poisoning/gas (<i>n</i> = 5)					
Heating/cooling tools	3	60.0	Whole body	3	75.0
Gases/flammable materials	2	40.0	Arms	1	25.0

TABLE 5. Distribution of accidents within the last 12 months according to safety points and selected characteristics of the participants, Aydin, December 2004.

	Accident		COR (%95 CI)****
	Yes (n [%])	No (n [%])	
Safety point 1			
Poor	343 (46.9)	388 (53.1)	1.56 (1.32-1.85)
Good*	890 (36.1)	1,575 (63.9)	
Safety point 2			
Poor	330 (52.6)	297 (47.4)	2.12 (1.78-2.54)
Good*	849 (34.3)	1,623 (65.7)	
Floor			
$\leq 2^*$	937 (36.2)	1,653 (63.8)	1.69 (1.41-2.02)
> 2	296 (48.9)	309 (51.1)	
Rooms			
< 4	664 (48.2)	713 (51.8)	2.05 (1.77-2.37)
$\geq 4^*$	569 (31.3)	1,250 (68.7)	
Gender			
Female	700 (41.1)	1,002 (58.9)	1.26 (1.09-1.45)
Male*	534 (35.7)	961 (64.3)	
Age			
≥ 75	227 (40.8)	330 (59.2)	1.12 (0.93-1.35)
60-74**	1,006 (38.1)	1,634 (61.9)	
Education			
Less than high school	1,129 (38.9)	1,774 (61.1)	1.13 (0.88-1.46)
High school and Above**	105 (36.0)	187 (64.0)	
Marital status			
Other***	536 (41.6)	752 (58.4)	1.24 (1.07-1.43)
Married and living with spouse*	698 (36.6)	1,211 (63.4)	
Exercising			
No	866 (40.8)	1,255 (59.2)	1.31 (1.12-1.53)
Yes*	359 (34.5)	681 (65.5)	
Continuous medications			
More than four	78 (56.9)	59 (43.1)	2.36 (1.67-3.33)
≤ 4 or absent*	1,031 (35.9)	1,838 (64.1)	
Eye glasses			
Present	753 (41.8)	1,047 (58.2)	1.37 (1.19-1.59)
Absent*	480 (34.4)	915 (65.6)	
Use of assistive devices			
Present	197 (48.8)	207 (51.2)	1.61 (1.31-1.99)
Absent*	1,037 (37.1)	1,757 (62.9)	
Hearing problem			
Present	320 (43.4)	417 (56.6)	1.30 (1.10-1.53)
Absent*	914 (37.2)	1,546 (62.8)	
Physical disability of any kind			
Present	163 (57.0)	123 (43.0)	2.27 (1.78-2.91)
Absent*	1,071 (36.8)	1,840 (63.2)	
Chronic illnesses			
Present	942 (44.0)	1,199 (56.0)	2.99 (2.48-3.61)
Absent*	175 (20.8)	666 (79.2)	

*Reference groups, $p < 0.01$. ** Reference groups, $p > 0.05$. *** Married, but not living with spouse or widows, singles and divorced people. ****COR, crude odds ratio; CI, confidence interval.

was 2.99 times higher in people who had any chronic illness; 2.36 times higher in people who were using more than four medications continuously and 2.27 times higher in people who had any physical disability ($p < 0.01$). Also, the incidence of home accidents was found related with presence of chronic illnesses, use of eyeglasses, use of assistive devices, hearing problems, any physical disability and use of more than four medications. Occurrence of home accidents was not related with age or educational level ($p > 0.05$). The incidence of home accidents was 1.69 times higher in elderly who lived on the third floor or higher and 2.05 times higher in houses that had less than four rooms. Mean safety point of houses according to SP1 was 6.36 ± 1.63 (0-12), while it was 15.21 ± 3.76 (8-28) according to SP2. According to the results of SP, 22.7% of houses in SP1 and 20.1% of houses in SP2 were classified as being in poor condition. There was a statistically significant relation between safety points and occurrence of accidents within the last 12 months ($p < 0.01$). Incidence of home accidents was 1.56 times and 2.12 times higher in houses at poor safety level for house characteristics and personal opinions, respectively.

DISCUSSION

It has been anticipated in the Turkish 8th Developmental Plan in 2001 that the proportion of older people in general population would increase by 2-3 times within the subsequent 30 years (8th Five Years Development Plan 2001). Elderly people spend approximately 2/3 of their lives in their homes and in close neighborhood (Toprak et al. 2002). Thus indoor environmental risks that elderly face should be considered as an important issue.

The conclusions of International Ageing Assembly (2002) focused on the removal of barriers in houses of elderly and indoor safety issues (Koçoğlu and Bilir 2002). Home accidents are easily preventable. Eliminating most of the risk factors is possible by periodical administration of control and audit lists (Güner and Güler 2002). Although the checklist used in this study was consistent with audit list proposed by Güner and

Güler (2002), it needed to be modified towards the needs of health sector.

It is obvious that handrails, steps or doorsteps with anti-slip materials are necessary for indoor safety (Coşkun et al. 2004). In the current study, safety levels were poor in approximately one fifth of the houses. There were indoor steps or staircases in 4.9% and doorsteps in 79.7% of houses. However, none of the steps were coated with anti-slip material. Handrails were not present in 51.3% of the houses. In Forli sample, 38.9% of the dwellings had steps or stairs inside, 14.6% of which had no handrails and 3.8% of which had damaged or loose steps (Bonney et al. 2002).

Wash basin in the lavatory, which is a must for hand hygiene, were present in 73.7% of lavatories. Ventilation system and accessible (preferably indoor), safe and clean water supply were the other requirements for living areas (Bonney et al. 2002). In the current study, ventilation systems and water supply were present in most of the houses. This was due to the fact that the study was conducted in a developed part of the country.

Terzioğlu and colleagues (2004) determined illumination and heating problems as preceding risk factors for indoor living. In Aydın study, 0.6% of elderly reported that their houses were generally dark. Heating conditions were not evaluated in this study.

Studies that aim to determine the causes of home accidents in elderly are crucial for taking safety measures (Erkal 2005). In Aydın, 38.6% of the participants have experienced home accidents. The WHO study about dwelling health revealed the incidence for home accidents as 26.8% (Bonney et al. 2002). Other studies from Turkey reported incidences ranging between 27.7% and 65.3% (Tezcan et al. 2001; Keskinöglü et al. 2004; Topaç et al. 2004; Erkal 2005).

Females were reported to have home accidents more frequent than males (Keskinöglü et al. 2004; Topaç et al. 2004; Erkal 2005). Similarly, it was found that the incidence of home accidents was 1.26 times higher in females in Aydın study. As clarified by Keskinöglü (2004), Topaç (2004) and Erkal (2005), males and females have differ-

ent roles in life. Females are concerned with the care of children and their houses and with the preparation and cooking of food. This finding might be due to the fact that females spend more time and have more responsibility at home.

The proportion of home accidents increases with age (Topaç et al. 2004; Erkal 2005). However, no relation was found between the occurrence of home accidents and age in this study. This might be due to the relatively low number of people over 75, as the mean life expectancy is 70 years in Turkey (Bilir 2004). Moreover, it was found that educational level had no impact on the occurrence of home accidents. This finding might be due to the similarity of educational levels of the sample population or inadequacy of education in avoiding home accidents.

It was found that elderly people living alone were more prone to accidents than others living with their spouses (41.6% vs 36.6%). This finding was consistent with the study of Topaç et al. (2004) and Erkal (2005). The higher incidence of home accidents in people living alone might be due to the necessity to do all the household tasks by oneself.

There might be potential threats to individual safety in every dwelling (Masud and Morris 2001; Housing Topics accessed in 2004). Poor housing conditions might result in a wide range of health conditions, like respiratory infections, asthma and injuries (Masud and Morris 2001; Krieger and Higgins 2002). In Aydin study, the incidence of home accidents was found as 1.56-2.12 times higher in houses that were evaluated to be in poor safety level. Common threats to home safety were various barriers, absence of grabbing bars, use of tiles in bathrooms and presence of doorsteps. As elderly spent most of their time in their houses, indoor safety conditions constituted an important factor in the occurrence of home accidents. Moreover, ability losses due to increased age might lead to a tendency towards accidents as well. The incidence of home accidents increased with the presence of chronic illnesses, use of eyeglasses, use of assistive devices, hearing problems, any physical disability and use of more than four medications. The study of Topaç and

colleagues revealed similar findings (Topaç et al. 2004). It has been reported that the use of multiple medications and their side effects might affect the balance of elderly and lead to falls, and current health problems might facilitate accidents (Masud and Higgins 2001; Bonnefoy et al. 2004; Karaduman et al. 2004; Topaç et al. 2004).

Moreover, it was shown that the incidence of home accidents was 1.31 times higher in elderly who did not exercise regularly. There was not any study which evaluated the relation between exercising and occurrence of home accidents, but it was suggested that effective exercising would help to maintain mobility and muscle strength and consequently would reduce individual risks (Topaç et al. 2004; Karaduman et al. 2004).

The most common type of home accidents was reported as falls (31.9%). WHO (27.9%) and other studies also pointed out the same incident (Bonnefoy et al. 2002; Coşkun et al. 2004; Keskinoglu et al. 2004; Erkal 2005). It was mentioned in Berlin report of WHO that the main house related predictor for falls was the stairs in the dwelling (Housing and health 2005). But, in Aydin study most of the falls were due to construction materials, furniture and coatings. As most of the dwellings in Aydin were localized on single floors, indoor staircases did not have any role in falls. On the other hand, poor socioeconomic development, ineffective audit of indoor safety, lack of experience in home design specifically for individuals at risk and use of inconvenient construction materials might facilitate the occurrence of home accidents.

Home accidents are preventable. Main predictors for all kind of home accidents are associated with not only individual characteristics but also housing conditions. It may be difficult to overcome individual factors, but it is possible to avoid these accidents by improving the housing conditions for elderly. In order to achieve this goal, more attention should be given to home safety by implementing home control/assessment check-lists. This study was considered to be helpful to provide data on this subject. The study tools and grading scales were developed according to the references and adjusted according to the

needs of the health sector by the investigators. Simple variables and questions were chosen to construct a tool that could be easily implemented by non-professional staff.

Limitations

In Turkey, there is no standard checklist to evaluate indoor safety issues. Designing homes specifically for older people is not a routine practice. The checklists and grading studies were, therefore, developed by the investigators using published reports as a guide. Simple characteristics and questions that were easily completed by non-professional staff were chosen because of insufficient funding.

A national database on home accidents is not present in Turkey. Information about home accidents was obtained from self-reports of older people and it was not possible to cross-check findings of Aydın study with national records. WHO records do not include findings from Turkey. Thus, the present Aydın study could be compared with results of the studies mentioned in the references.

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References

- American Geriatrics Society, Home Safety Questionnaire (2004) http://www.americangeriatrics.org/education/ppep_index.shtml, accessed on November 11, 2004.
- Bilir, N. (2004) Aging and Public Health. In: *Facts on Elderly*, Hacettepe University, Research Center of Geriatric Sciences, Ankara, pp. 11-28. (in Turkish)
- Bonnefoy, X.R., Braubach, M., Moissonnier, B., Monolbaev, K. & Röbbel, N. (2002) Housing and Health in Europe: Preliminary Results of a Pan-European Study. *Am. J. Public Health*, **93**, 1559-1563.
- Bonnefoy, X.R., Annesi-Maesano, I., Aznar, L.M., Braubach, M., Croxford, B., Davidson, M., Ezratty, V., Fredouille, J., Gonzalez-Gross, M., Van Kamp, I., Maschke, C., Mesbah, M., Moissonnier, B., Monolbaev, K., Moore, R., Nicol, S., Niemann, H., Nygren, C., Ormandy, D., Röbbel, N. & Rudnai, P. (2004) Review of evidence on housing and health. *Background document, EUR/04/5046267/BD/1*, WHO/EURO.
- British Geriatrics Society, Publications and reports (2004) www.bgs.org.uk, accessed on November 11, 2004.
- Coşkun, A., Çobanoğlu, Z. & Evci, D. (2004) *Housing Health*, edited by Güler, Ç. & Çoksun, A. Publications of Public Health Association, Trust of Health and Social Assistance. Technical Report, 11. (in Turkish)
- Current Knowledge, Housing And Health. World Health Organization (2004) Denmark. WHO Regional Office For Europe. http://www.who.dk/Housing/Activities/20041013_1, accessed on November 11, 2004.
- 8th Five Years Development Plan, 2001-2005 (2001) *Publications of State Planning Institution*, 31, 43. (in Turkish)
- Erkal, S. (2005) Analysis of home accidents and their causes in 65 and above years old people living in Ovacık, Kırıkkale. *Turkish Journal of Geriatrics*, **8**, 17-21. (in Turkish)
- Evci, E.D., Aydınmakina, K.D. & Vaizoğlu, S. (Transl.) (2001) *WHO Healthy Cities Project, Indicators Questionnaire*, R.T. Ministry of Health, Ankara. (in Turkish)
- Güner, P. & Güler, Ç. (2002) Home Safety and Check List. *Turkish Journal of Geriatrics*, **5**, 150-154. (in Turkish)
- Housing and Health (2005) Third Technical consultation on the analysis of evidence, Report of a WHO expert meeting, Berlin. www.euro.who.int/HousingActivities/20050302_1, accessed on December 22, 2005.
- Housing Topics (2004) World Health Organization, Denmark. WHO Regional Office For Europe. http://www.who.dk/Housing/activities/20040204_4, accessed on November 11, 2004.
- Karaduman, A., Yiğiter, K., Aras, Ö. & Yakut, Y. (2004) Physical Independency and Life Quality, In: *Facts on Elderly*, Hacettepe University, Research Center of Geriatric Sciences, Ankara, pp. 79-97. (in Turkish)
- Keskinoğlu, P., Giray, H., Piçakçiefte, M., Bilgiç, N. & Uçku, R. (2004) Home Accidents in Elderly Living in Region of İnönü Health Center, *Turkish Journal of Geriatrics*, **7**, 89-94. (in Turkish)
- Koçoğlu, G.O. & Bilir, N. (Transl.) (2002) *International Action Plan on Aging*, Hacettepe University, Research Center of Geriatric Sciences. (in Turkish)
- Krieger, J. & Higgins, D.L. (2002) Housing and health: time again for public health action, *Am. J. Public Health*, **92**, 758-768.
- Masud, T. & Morris, R.O. (2001) Epidemiology of Falls, *Age and Aging*, **30-S4**, 3-7.
- Nishiwaki, T., Nakamura, K., Ueno, K., Fujino, K. & Yamamoto, M. (2005) Health characteristics of elderly japanese requiring care at home. *Tohoku J. Exp. Med.*, **205**, 231-239.
- Stein, C. & Moritz, I. (1999) A life course perspective of maintaining independence in older age. *WHO/HSC/AHE/99.2*, World Health Organization, Geneva.
- Terzioğlu, G., Güven, S., Hazer, O., Öztıp, H. & ener, A. (2004) Social and Economical Life in Old Age, In: *Facts on Elderly*, Hacettepe University, Research Center of Geriatric Sciences, Ankara, pp. 115-131. (in Turkish)
- Tezcan, S., Aslan, D., Yardım, N., Demiröz, A.S., Coşkun, E., Cengiz, G., Bayram, G., Bozkurt, M., Çelik, M. & Çelebi M. (2001) Prevalence of Accidents and Determination of Relations between Accidents and Some Factors in Central

- Health Center, No 1, Altındağ, Ankara. *Ege Medical Journal*, **40**, 165-175. (in Turkish)
- The WHO approach to housing and health. World Health Organization (2004) Denmark. WHO Regional Office For Europe. http://www.who.dk/Housing/Activities/20041012_1, accessed on November 11, 2004.
- Topaç, Ş., Ateşkan, Ü., Ceylan, S. & Biçer, T. (2004) Analysis of Various Characteristics of Home Accidents in Elderly under Routine Monitoring in Hospital for Medical Education, Gülhane Military Medical Academy. www.gata.edu.tr/samyobolumler/samyoAABT/kongreler/3paramedik/yaşlı%20ev%20kaza.doc, accessed on November 11, 2004. (in Turkish)
- Toprak, İ., Soydal, T., Bal, E., İnan, F., Aksakal, N., Altunyollar, H., Babalıolu, N., Coşkun, Ö., Çakır, B., Demirören, M., Doğan, S., Evcı, D., Kurtuluş, A., Şafak, N. & Yüksel B. (2002) *Elderly Health*, General Directorate of Primary Health Care, R.T. Ministry of Health, pp. 30-33.
- Turkey Demographic and Health Survey (TDHS) 2003 Household Questionnaire (2004) In: *TDHS 2003*, Appendix E, Hacettepe University Institute of Population Studies, Ministry of General Health Directorate of Mother and Child Health and Family Planning, State Planning Organization and European Union, Ankara, pp. 141-155.
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