

Home accidents in rural and urban areas of Shiraz, 2000–02

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الحوادث المنزلية في المناطق الريفية والحضرية من Shiraz، 2000 – 2002

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الخلاصة: تم في إطار هذه الدراسة جمع بيانات عن الحوادث المنزلية على مدى ثلاث سنوات (2000 – 2002) من البيوتات الصحية والمراكز الصحية والمستشفيات المشاركة في برنامج للوقاية من الحوادث المنزلية في مدينة Shiraz الإيرانية. وقد سُجِّلت 15 402 حادثة، بلغ معدل الوفيات فيها 1.3%. وكانت الحوادث أكثر شيوعاً بين النساء (52.1%) للرجال، مقابل 47.9% للرجال، كما كانت أكثر شيوعاً في المناطق الحضرية (66.3%) بالمقارنة مع المناطق الريفية (33.7%). وكان المسببان الرئيسيان للحوادث هما الحروق (66.5%) ثم الإصابات الناجمة عن الأدوات الحادة (11.3%). وتركزت الحوادث بشكل أكبر بين الأطفال الذين هم دون الخامسة، ثم الأطفال في الفئة العمرية 5 – 9 سنوات، ثم الفئة العمرية 15 – 19 سنة.

ABSTRACT Data on home accidents for a 3-year period (2000–2002) were collected from health houses, health centres and hospitals involved in a home accident prevention programme in Shiraz, Islamic Republic of Iran. A total of 15 402 accidents were registered, with a mortality rate of 1.3%. Accidents were more common in women than in men (52.1% versus 47.9%) and urban than rural areas (66.3% versus 33.7%). Burns (66.5%), followed by injuries due to sharp objects (11.3%) were the most common causes. Accidents were more prevalent in children aged under 5 years, followed by 5–9 and 15–19 years of age.

Les accidents domestiques en milieu rural et urbain à Chiraz, 2000-2002

RÉSUMÉ Des données concernant les accidents domestiques sur une période de 3 ans (2000-2002) ont été recueillies dans des maisons de santé, des centres de santé et des hôpitaux participant à un programme de prévention des accidents domestiques à Chiraz (République islamique d'Iran). Au total, 15 402 accidents ont été enregistrés, le taux de mortalité s'élevant à 1,3 %. Les accidents étaient plus courants chez les femmes que chez les hommes (52,1 % contre 47,9 %) et en milieu urbain qu'en milieu rural (66,3 % contre 33,7 %). Les brûlures (66,5 %), suivies par les lésions dues à des objets piquants et tranchants (11,3 %), constituaient les causes les plus courantes. Les accidents étaient plus fréquents chez les enfants âgés de moins de 5 ans, suivis par les 5-9 ans et les 15-19 ans.

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Introduction

Along with cardiovascular diseases and cancers, accidents currently form the 3 leading causes of morbidity and mortality in developed and developing countries [1]. In a World Health Organization (WHO) report, the number of deaths caused by accidents was estimated to be 3.5 million annually [1,2]. This figure corresponds to an average of 10 000 deaths per day [3]. Intentional and unintentional accidents are the cause of 15% of years of life lost globally (13% in the Eastern Mediterranean Region) which is greater than any other cause of death [4,5].

Each year, tens of thousands of accidents occur worldwide. Accidents can take place in a wide variety of environments and there is a possibility of accidents in every sphere of human life: at home, while travelling, at play and at work. However, the home is the most likely location [6]. Home accidents are a major cause of death and injury. They produce major costs in terms of loss of life, pain and suffering as well as lost production and wages for the employed injured.

Despite a marked lack of reliable data for proper epidemiological information about domestic accidents and fatalities on a worldwide basis, it has been reported that in the United Kingdom (UK) more than 1 million people are affected by home accidents annually. About 47% of those affected by such injuries are men and 53% are women. Furthermore, the active population (aged 15–64 years) accounts for 45%, children (aged 0–14 years) for 43% and older people (aged 65 years and over) for 12% of all home accidents [7].

Housing hazards in the United States of America (USA) also contribute to considerable morbidity and mortality among millions of children [8]. For instance, a 1995 study has shown that the predominant location of injury for USA children is the

home, accounting for an average of 4.01 million emergency department visits each year for children aged under 20 years [9]. Similarly, recent studies in Israel [10,11] have indicated that home accidents account for 52% of all accident-related injuries among hospitalized individuals aged under 15 years. Additionally, 34% of all unintentional hospitalized trauma cases are due to home injuries and average hospital stay is 6.2 days per patient. A study in Ireland at 16 emergency centres has also found that the most prevalent accidents are home accidents (41%). Moreover, 39% of home accidents involve children aged 0–15 years, while 19% involve children under 5 years. This study also revealed that, being struck by an object was the main cause (for almost 50%) of home accidents [12].

Although socioeconomic as well as regional and cultural differences do not allow studies from different countries to be compared directly, there is evidence that accidents are also a major health problem in the Islamic Republic of Iran, an important cause of morbidity, temporary or permanent disability and death, and a major contribution to potential years of life lost, the social and economic costs of which are often underestimated. For example, accidents are reported to be the second leading cause of deaths, responsible for 13.5% of total deaths in the country [13]. A study in Fars province showed that 32.6% of the total registered accidents occurred at home, while motor vehicle accidents accounted for 31.6% [5]. This study also found that 25.8% of the accidents resulted in some degree of disability. Additionally, the total cost of accidents was estimated to be 100 billion rials (equivalent to US\$ 12 500 000) and the average lost working days of the injured people was 45.5 days.

The majority of home accidents can be prevented. In recent years, legislative meas-

ures and the development of new multi-factorial injury prevention interventions, as well as modernization of homes and improved facilities for cooking, heating, lighting and laundering, have been shown to reduce injuries and their fatalities in the home in developed countries [2,14]. However, information about the pattern of accidents is needed to plan and implement programmes of accident prevention. To the best of the authors' knowledge, no systematic study has been carried out in Shiraz to assess the extent, frequency, causes and major outcome(s) of domestic accidents in rural and urban areas of this city. Additionally, no comparative study has been undertaken to evaluate the longitudinal trend of these accidents over a period of time, and finally, the morbidity and mortality rates of these accidents are unknown. The current study was undertaken to address these issues in order to identify and prioritize areas for prevention.

Methods

This investigation is a descriptive study on home accidents in rural and urban areas of Shiraz, Islamic Republic of Iran, over a 3-year period.

In 1999, an accident prevention programme, the Home Accident Prevention Plan, was introduced to the health care system of Shiraz city. The project involved visiting families on a regular basis, giving them training on accident-related topics and inspecting homes using a safety checklist.

From 2000 to 2002, data were collected about all types of home accidents that had taken place in any urban or rural areas of Shiraz city. The reporting method was a carefully completed standard questionnaire on domestic accidents, administered and collected on a monthly basis from all health houses, rural and urban health centres and

hospital emergency departments involved in the project. One of the authors with his profession team were legally responsible as part of their occupational commitment to personally attend each centre and randomly check the accuracy of the data.

Questionnaires collected monthly were coded and their information transferred to a computer. A national classification system, developed and implemented by joint cooperation of WHO and the Iranian Ministry of Health and Medical Education, was adopted to classify the domestic accidents. The data were then transferred to computer for further analysis, conducted by the *Epi-Info* package. The data were checked and verified to avoid any double entries (e.g. if an injured person had attended more than one health centre or emergency department for the same accident). Sex, age, seasonal distribution and outcome of injuries were considered in the data analysis.

Statistical tests were conducted using *GraphPad InStat*, version 204a. The data were analysed using the chi-squared test with a probability of $P < 0.05$, with Yates correction where applicable.

Results

The total number of reported home accidents over the 3-year period was 15 402 and an average increase was seen of 24.4% per year (4027, 5141 and 6234 for the years 2000, 2001 and 2002 respectively). About 47.9% of those affected by such injuries were men (7374 cases) and 52.1% were women (8028 cases). The number of home accidents in the urban and the rural areas were found to be 10 208 (66.3%) and 5194 (33.7%) respectively.

Table 1 shows the frequency of home accidents in different years in both sexes. The homogeneity test showed significant differences between the sexes ($P < 0.0001$).

Table 1 Distribution of home accidents during the study period by sex

Sex	2000		2001		2002		Total	
	No.	%	No.	%	No.	%	No.	%
Male	1712	42.5	2408	47.0	3254	52.0	7374	47.9
Female	2315	57.5	2733	53.0	2980	48.0	8028	52.1
Total	4027	100.0	5141	100.0	6234	100.0	15402	100.0

$$\chi^2 = 95.28, df = 2, P < 0.0001.$$

The overall accident rate for women showed a decreasing trend over time that was statistically significant ($P < 0.0001$), whereas for men it increased.

The frequencies of various types of injuries in different years are presented in Table 2. As shown, burns (66.5%) followed by sharp object injuries (11.3%) were the most common types of injuries. The distribution of accidents in different years was significantly different ($P < 0.0001$).

Table 3 depicts the outcome of home accidents in different years during the study period. As shown, 80.5% of accident cases made a full recovery, 18.2% of injuries required a long period of treatment (up to 6 weeks after the accident), 1.3% of accidents

resulted in death and 0.05% were associated with prolonged or permanent disability.

Table 4 illustrates the age and sex distribution of home accidents. The highest number of accidents occurred among children aged under 5 years (25.3%), followed by 5–9 years and 15–19 years age groups. Although 47.9% and 52.1% of home accidents occurred in men and women respectively, the incidence rate was not constant for different age groups of both sexes. For children under 15 years, boys had more accidents than girls (24.7% versus 19.1%), whereas for the older ages, women increasingly had more accidents than men (54%, 41% and 38% of reported accidents were in men < 20, 20–39 and 40–60 years respec-

Table 2 Frequency of different types of accidents during the study period

Type of accident	2000		2001		2002		Total	
	No.	%	No.	%	No.	%	No.	%
Burns	3146	78.1	3460	67.3	3643	58.4	10249	66.5
Injury by sharp objects	438	10.9	557	10.8	750	12.0	1745	11.3
Falls on the level	208	5.2	264	5.2	396	6.4	868	5.6
Poisoning	104	2.6	155	3.0	464	7.4	723	4.7
Falls from height or elevation	102	2.5	87	1.7	161	2.6	350	2.3
Entry of foreign body	5	0.1	46	0.9	6	0.1	57	0.4
Others	24	0.6	572	11.1	814	13.1	1410	9.2
Total	4027	100.0	5141	100.0	6234	100.0	15402	100.0

$$\chi^2 = 843.40, df = 12, P < 0.0001.$$

Table 3 Outcome of home accidents over the study period

Outcome of accident	2000		2001		2002		Total	
	No.	%	No.	%	No.	%	No.	%
Full recovery	3443	85.5	4375	85.1	4588	73.6	12406	80.5
Long period of treatment	562	13.9	611	11.9	1622	26.0	2795	18.2
Prolonged/permanent disability	3	0.1	1	0.02	1	0.01	5	0.05
Death	19	0.5	154	3.0	23	0.4	196	1.3
Total	4027	100.0	5141	100.0	6234	100.0	15402	100.0

$\chi^2 = 609.01$, $df = 6$, $P < 0.0001$.

tively compared with 46%, 59% and 62% respectively for women).

Table 5 exhibits the sex distribution of various types of injuries caused by home accidents in rural and urban areas, aggregated over the 3 years. Overall, burns were mainly caused by hot liquids (51.0%) and occurred more in women than men (57.3%

versus 42.7%). Sharp object injuries were also more common in women than men (54.2% versus 45.8%). Poisoning (57.4% versus 42.6%) and falls from a height (67.1% versus 32.9%) were more common among men than women.

Seasonal distribution of home accidents, aggregated over the 3 years, revealed that

Table 4 Age and sex distribution of home accidents

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
0-4	2052	27.8	1833	22.8	3885	25.3
5-9	991	13.4	627	7.8	1618	10.4
10-14	764	10.4	477	5.9	1241	8.0
15-19	689	9.3	855	10.7	1544	10.1
20-24	581	7.9	783	9.8	1364	8.8
25-29	454	6.1	571	7.1	1025	6.6
30-34	362	4.9	511	6.4	873	5.7
35-39	241	3.3	546	6.8	787	5.1
40-44	264	3.6	365	4.5	629	4.0
45-49	192	2.6	378	4.7	570	3.7
50-54	161	2.2	272	3.4	433	2.8
55-59	90	1.2	144	1.8	234	1.5
60-64	123	1.7	160	2.0	283	2.1
65-69	102	1.4	99	1.2	201	1.3
70+	308	4.2	407	5.1	715	4.6
Total	7374	100.0	8028	100.0	15402	100.0

$\chi^2 = 474.86$, $df = 14$, $P < 0.0001$.

Table 5 Sex distribution of various types of accidents in urban and rural areas

Type of accident	Male		Female		Total		P-value
	No.	%	No.	%	No.	%	
Burn							
Urban	3435	42.5	4647	57.5	8082	100.0	$\chi^2 = 0.96; P = 0.33$
Rural	947	43.7	1220	56.3	2167	100.0	
Total	4382	42.7	5867	57.3	10249	100.0	
Injury by sharp objects							
Urban	142	54.6	118	45.4	260	100.0	$\chi^2 = 9.18; P = 0.002$
Rural	657	44.3	828	55.7	1485	100.0	
Total	799	45.8	946	54.2	1745	100.0	
Falls on the level							
Urban	152	40.8	221	59.2	373	100.0	$\chi^2 = 27.60; P < 0.0001$
Rural	292	59.0	203	41.0	495	100.0	
Total	444	51.2	424	48.8	868	100.0	
Poisoning							
Urban	403	57.3	300	42.7	703	100.0	$\chi^2 = 0.00008; P = 1.00$
Rural	12	60.0	8	40.0	20	100.0	
Total	415	57.4	308	42.6	723	100.0	
Falls from height							
Urban	126	60.3	83	39.7	209	100.0	$\chi^2 = 10.30; P = 0.001$
Rural	109	77.3	32	22.7	141	100.0	
Total	235	67.1	115	32.9	350	100.0	
Entry of foreign body							
Urban	15	71.4	6	28.6	21	100.0	$\chi^2 = 2.88; P = 0.09$
Rural	16	44.4	20	55.6	36	100.0	
Total	31	54.4	26	45.6	57	100.0	
Others^a							
Urban	347	62.0	213	38.0	560	100.0	$\chi^2 = 94.79; P < 0.0001$
Rural	721	84.8	129	15.2	850	100.0	
Total	1068	75.7	342	24.3	1410	100.0	
Total							
Urban	4620	45.3	5588	54.7	10208	100.0	$\chi^2 = 82.85; P < 0.0001$
Rural	2754	53.0	2440	47.0	5194	100.0	
Total	7374	47.9	8028	52.1	15402	100.0	

^aDrowning, trauma, electric shock, stings and bites.

a higher proportion of poisonings (34.0%) occurred during summer (Table 6). In contrast, the frequency of burns was higher in winter (33.2%). Furthermore, significant differences were found in the seasonal distribution of burns, sharp object injuries and falls on the level among both sexes.

Discussion

The results of this study showed an average increase in the occurrence of home accidents of 24.4% each year. This apparent increase could be explained, at least in part, by a more accurate reporting system,

Table 6 Seasonal distribution of different types of accidents by sex

Type of accident	Spring		Summer		Autumn		Winter		Total		P-value
	No.	%	No.	%	No.	%	No.	%	No.	%	
Burns											
Male	1012	23.1	1108	25.3	1029	23.5	1233	28.1	4382	100.0	$\chi^2 = 114.4;$ P < 0.0001
Female	1171	19.9	1119	19.1	1413	24.1	2164	36.9	5867	100.0	
Total	2183	21.3	2227	21.7	2442	23.8	3397	33.2	10249	100.0	
Injury by sharp objects											
Male	231	28.9	212	26.5	195	24.4	161	20.2	799	100.0	$\chi^2 = 8.01;$ P = 0.046
Female	234	24.8	231	24.4	248	26.2	233	24.6	946	100.0	
Total	465	26.6	443	25.4	443	25.4	394	22.6	1745	100.0	
Falls on the level											
Male	114	25.7	119	26.8	104	23.4	107	24.1	444	100.0	$\chi^2 = 7.88;$ P = 0.049
Female	126	29.7	87	20.5	87	20.5	124	29.3	424	100.0	
Total	240	27.7	206	23.7	191	22.0	231	26.6	868	100.0	
Poisoning											
Male	54	13.0	149	35.9	127	30.6	85	20.5	415	100.0	$\chi^2 = 6.93;$ P = 0.07
Female	32	10.4	97	31.5	91	29.5	88	28.6	308	100.0	
Total	86	12.0	246	34.0	218	30.0	173	24.0	723	100.0	
Falls from height											
Male	114	48.5	55	23.4	34	14.5	32	13.6	235	100.0	$\chi^2 = 5.00;$ P = 0.17
Female	46	40.0	24	20.9	20	17.4	25	21.7	115	100.0	
Total	160	45.7	79	22.6	54	15.4	57	16.3	350	100.0	
Entry of foreign body											
Male	1	3.2	28	90.3	0	0.0	2	6.5	31	100.0	$\chi^2 = 1.26;$ P = 0.53
Female	0	0.0	23	88.5	0	0.0	3	11.5	26	100.0	
Total	1	1.7	51	89.5	0	0.0	5	8.8	57	100.0	
Others^a											
Male	361	33.8	319	29.9	214	20.0	174	16.3	1068	100.0	$\chi^2 = 46.65;$ P < 0.0001
Female	83	24.3	78	22.8	69	20.2	112	32.7	342	100.0	
Total	444	31.5	397	28.2	283	20.0	286	20.3	1410	100.0	
Total											
Male	1887	25.6	1990	27.0	1703	23.1	1794	24.3	7374	100.0	$\chi^2 = 228.0;$ P < 0.0001
Female	1692	21.1	1659	20.7	1928	24.0	2749	34.2	8028	100.0	
Total	3579	23.2	3649	23.7	3631	23.6	4543	29.5	15402	100.0	

^aDrowning, trauma, electric shock, stings and bites.

as well as a population growth of about 6% during the study period. Furthermore, this study revealed that home injuries were more common in women than in men. This could be attributed to women spending longer periods of time at home and their greater

responsibilities in daily home activities. Similar findings have been reported from a study in the UK in which about 47% of those affected by home accidents were men and 53% were women [7]. However, a study on all types of accidents (domestic

and non-domestic) in the Islamic Republic of Iran have shown that men were more affected (70%) than women (30%) [5].

During the study period, the accident rate for women showed a decreasing trend over time. This statistically significant decrease could be related to an improved awareness as a result of effective training and information propagation programmes. In fact, women were the main target group for the local health intervention programme (the Home Accident Prevention Plan). This might explain why men, in the absence of such training programmes, experienced an overall higher incidence rate of accidents.

More than 25% of accidents occurred among children aged 4 years and under. In other studies, on average, more than 50% of home accidents have been reported to occur among children aged under 5 years [1,15]. Children aged 5–10 and 15–19 years formed the second and the third most vulnerable age groups respectively. Institution of educational programmes for school-age children to emphasize the importance of domestic injuries and their control measures would be of considerable benefit for reducing home accidents among these age groups.

Our data also show that for children under 15 years, boys had more accidents than girls. These results, which accord with the findings of similar studies in the UK, Israel, USA and Canada, may be attributed to more vigorous physical activity, adventurousness and carelessness of boys at home as compared with girls of the same age group [9,11,16–18]. Among the older age groups, however, women had more accidents than men. This observation is consistent with the finding of studies in which the share of females among those injured at home has been reported to increase with age [11], and could be related to most men being absent from home during the day time at work and

most women spending long hours working in the home.

Burns, with a frequency of 66.5%, were the most prevalent domestic accident. This finding is consistent with the results of a 5-year (1996–2000) follow-up study in Turkey where home accidents were reported to be responsible for 63% of burns [19]. The high rate of burns reported among women is consistent with the results of studies undertaken in Kuwait [20] and Pakistan [21]. This seems to be associated with women's exposure to hot liquids, hot dishes and ovens in the kitchen. The high incidence rate of burns in women, particularly in winter is probably due to the use of unsafe heaters or unsafe use of heaters, and suggests that better training is needed on the safety aspects of the kitchen environment, heaters and ovens. Unlike in developing countries, statistics on domestic accidents in developed countries show that the leading causes of home injuries (50% to 79% of injuries) are falls and being struck by an object [9,11,12]. Injuries from sharp objects, burns and poisonings are among the less important causes. These differences are likely to be the result of standardization of diverse aspects of lifestyle and increased awareness of people in developed countries. Following burns, injuries resulting from sharp objects were the most frequent causes of domestic accidents in our study (11.3%). These injuries were more common in rural areas in general, and among women (54.2%) in particular. This also indicates that more effective training is needed for women about safe use of sharp tools (i.e. knife, scissors, etc.), particularly in rural areas where sharp object injuries were more common.

Falls from a height were more common in men than in women. This may be explained by the nature of men's activities at home that increase the risk of such injuries (i.e. working on the roof, climbing ladders

for home repairs, installing lamps, repairing the building, etc.).

About 57% of poisonings and 76% of other accidents (i.e. drowning, trauma, electric shock and insect stings) occurred in men. This, in turn, may represent men's greater exposure to high-risk activities as compared with women. Conducting off-the-job educational programmes on home safety for men and providing informative posters and booklets on this issue would be a low-cost but effective intervention for reducing the incidence of domestic accidents.

A mortality rate of 1.3% for home accidents is very high and unacceptable, particularly compared with its corresponding value in developed countries. The statistics on home accidents in Netherlands [2] indicate that for every 1 person killed in home accidents, 23 are hospitalized and 917 receive outpatient medical services for trivial injuries. These figures correspond to a mortality rate of about 0.1%. Given the above, one would expect 15 deaths in our study, whereas the actual number of deaths was 196 (13-fold higher than that expected in a developed country). This unusually high mortality rate may be explained by the fact that many people in developing countries lack sufficient knowledge or skills to enable them to deal properly with injuries. Additionally, delayed arrival of injured people to hospital emergency departments, particularly in rural areas, and possibly

inadequate and inefficient medical services at these centres may play a role.

The prevention of domestic accidents is a difficult task, as it often requires intervention with people at home. In Canada, there are 2 strategies for prevention: parental (e.g. increased supervision, parent modification of their own behaviour to decrease injury risk for their child) and environmental (e.g. hazard removal, safety devices to prevent children's access). These, singly or in combination, serve a protective function that significantly reduces children's risk of in-home injuries [22]. The role of safety education needs clarification and promotion. Strategies for eliminating home accidents should concentrate on ensuring safe domestic environments with proper training for the family members. Prevention should be applied at community level and at the family level. It includes health and safety measures, ergonomic approaches in housing, furniture, dishes, tools, machines, installations and appliances as well as safety education.

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