Deaths from unintentional injuries in rural areas of the Islamic Republic of Iran

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الوفيات الناجمة عن الإصابات غير المتعمدة في المناطق الريفية بجمهورية إيران الإسلامية

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خلاصة: تم بحث الوفيات الناجمة عن الإصابات العارضة في المناطق الريفية في ثلاث عشرة محافظة بجمهورية إيران الإسلامية في السنتين 1993 و1994. ووجد أن معدل الوفيات الخام كان 4.33 في الألف. وكان عدد الوفيات الناجمة عن الإصابات غير المتعمدة 5213 وفاة (أي 10.7% من إجمالي الوفيات). وكانت الوفيات أكثر وقوعاً بين الذكور عنها بين الإناث (65.7 في المئة ألف في مقابل 26.1 في المئة ألف). وفيما بعد السنة الأولى من العمر، كان أعلى متوسط للوفيات بسبب الإصابات مرتبطاً بمن تزيد أعمارهم عن 65 سنة (111.9 لكل مئة ألف). وتبيَّن أن الأسباب الرئيسية للوفاة كانت حوادث المرور (55.0%) والغرق (10.1%) والسقوط (9.5%) والحروق والسموط (9.5%). ونظراً لأن بالإمكان اتقاء معظم الإصابات، فينبغي اعتبار خفض وقوعها من بين الأولويات.

ABSTRACT Deaths from accidental injury in the rural areas of 13 provinces in the Islamic Republic of Iran from 1993 to 1994 were investigated. The crude mortality rate was 4.33 per 1000 and the number of deaths from unintentional injuries was 5213 (10.7% of all deaths). There were more deaths among males than females (65.7 per 100 000 versus 26.1 per 100 000). After the age of 1 year, over 65-year-olds had the highest average of deaths resulting from injuries (111.9 per 100 000). The leading causes of death were traffic accidents (55.0%), drowning (10.1%), falls (9.5%) and burns and scalding (9.5%). Since most injuries are preventable, their reduction should be considered a priority.

Décès dus à des blessures accidentelles dans les zones rurales de la République islamique d'Iran

RESUME Les décès dus à des blessures accidentelles qui se sont produits de 1993 à 1994 dans les zones rurales de 13 provinces en République islamique d'Iran ont fait l'objet d'une étude. Le taux brut de mortalité était de 4,33 pour 1000 et le nombre de décès dus à des blessures accidentelles s'élevait à 5213 (10,7% de la totalité des décès). Il y avait plus de décès chez les hommes que chez les femmes (65,7 pour 100 000 contre 26,1 pour 100 000). Après l'âge d'un an, c'étaient les personnes âgées de plus de 65 ans qui avaient la moyenne la plus élevée de décès dus à des blessures (111,9 pour 100 000). Les principales causes de décès étaient les accidents de la circulation (55.0%). les noyades (10.1%). les chutes (9.5%) et les brûlures y compris l'ébouillantage (9,5%). La plupart des blessures pouvant être évitées, leur réduction devrait être considérée comme une priorité.

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Introduction

Accidents are the largest single cause of death after the age of 1 year, and are one of the most serious health problems facing the world today. They are the commonest cause of hospital admission and can result in lifelong disability [*1*]. According to a World Health Organization (WHO) estimate, accidents are responsible for three-and-a-half million deaths worldwide, with more than two million occurring in developing countries [*2*]. They are a threat to health in every country and are currently responsible for 7% of world mortality, a figure which is predicted to rise (Declaration of the Third International Conference on Injury Prevention and Control in Melbourne, 1996).

Strategies for injury prevention have been extensively studied in many industrialized nations but not in the developing world. According to a national report on vital statistics in the Islamic Republic of Iran, injuries are the commonest cause of death in different age groups after chronic heart diseases [*3*]. Due to a lack of organization and funding, the data-capture system in the Islamic Republic of Iran is inadequate. For many countries of the world, there are two sources of data on road deaths, the police and the death registration authorities. In rural areas of the Islamic Republic of Iran, data on deaths are mainly collected in "health houses". These are the rural health centres staffed by one or two trained local health workers (community care health workers). Their main function is to offer primary health care services to rural areas of the country. However, their data exclude details about fatal unintentional injuries.

The age and sex distribution of injuries varies by cause and type [*4,5*]. In some countries, studies have been carried out on injuries in rural areas [*4,6,7,8*]. However, no previous study in the Islamic Republic of Iran has attempted a regional analysis of accidental deaths in rural areas. In this study an epidemiological description of deaths from unintentional injuries is presented.

Methods

A cross-sectional study of deaths from accidental injuries was conducted between 21 March 1993 and 20 March 1994. The information was collected from 6267 health houses in 13 provinces in the Islamic Republic of Iran, randomly selected from all 25 provinces of the country. The provinces were Teheran, Mazandaran, Gilan, Kordestan, Kerman, Esfahan, Fars, Kohkiluyeh va Buyer-Ahmadi, Ilam, Hormozgan, Khorasan, Kermanshahan, and Charhar Mahall va Bakhtiari.

For inclusion in the study, the injury had to be unintentional and have led to death. A check-list questionnaire was sent to the health houses; it included information on cause of death, age, sex and place of residence of victims, and also a brief description of the accident. An instructional sheet was attached to the questionnaire which the health workers were asked to read carefully. Each health house serves 1000–1500 inhabitants. Since the health workers are chosen from the main village, they have a close relationship with the village in which the health house is stationed. They record all deaths that occur in their area. Traffic accidents included pedestrian accidents, bicycle accidents and any accidents involving cars. Intentional injuries such as suicides, homicides, and natural disasters were excluded. All analyses were conducted using *Epi-Info* (version 6.0). In statistical analyses, 95% confidence intervals (CI) for the difference between proportions were employed where appropriate.

Table 1 **Total population of the study sample, number of all deaths and number of deaths from unintentional injuries by age group and sex**

Data	Age (years)										Total
	0–1		1–4		5–14		15–64		65+		
	M	F	M	F	M	F	M	F	M	F	
Total	133 937	127 521	618 083	591 257	1 747 383	1 651 440	2 969 082	2 916 700	273 912	233 459	11 262 783
No. of all deaths	3 801	3 489	1 062	956	1 047	668	9 583	6 618	11 752	9 428	48 804
(Death rate/1000)	(28.38)	(27.36)	(1.72)	(1.62)	(0.60)	(0.42)	(3.23)	(2.27)	(42.90)	(40.38)	(4.33)
No. of deaths from unintentional injuries	140	160	413	330	540	249	2270	543	406	162	5213
Proportion of injury deaths to all deaths (%)	3.68	4.59	38.89	34.52	51.58	37.28	23.69	8.20	3.45	1.72	10.68

M = male *F = female*

Results

Table 1 shows the total population study sample, the total number of deaths from all causes and the number of deaths from unintentional injuries by age group and sex. Of a rural population of 11 262 783, the crude mortality rate was 4.33 per 1000 for all age groups. However, over 65-year-olds had the highest mortality rate with 41.6 per 1000. There were 5213 (10.68% of all deaths) unintentional injuries among all age groups. Males aged 5–14 years had the highest proportion of deaths from unintentional injuries, 51.6% (95% CI 48.5–54.6). Males had a higher proportion of accidental deaths compared with females, except for the under 1-year-olds.

Table 2 shows the proportion of deaths from different types of unintentional injuries by sex. For all types of accidental death, 72.3% occurred in males and 27.7% in females ($P < 0.001$). Compared with

Table 2 **Proportion of deaths from different types of unintentional injury by sex (%)**

Type of injury	Males	Females	Total
Traffic accident	60.9	39.5	55.0
Drowning	9.8	11.1	10.1
Fall	8.9	10.9	9.5
Burning and scalding	5.9	10.8	9.5
Poisoning	2.4	5.1	3.2
Electrical accident	2.0	2.0	2.0
Weapon (mines, firearms, etc.)	2.3	0.14	1.7
Animal bite	1.1	3.1	1.7
Falling debris	1.5	2.0	1.7
Inhalation suffocation	1.2	1.2	1.2
Occupational injury	0.6	0.3	0.5
Ingestion suffocation	0.4	0.8	0.5
Others	2.9	5.0	3.5
Total	72.3	27.7	100

Table 3 **Number of deaths from different types of unintentional injury by age group and sex**

Type of injury	Age (years)										Total	
	0–1		1–4		5–14		15–64		65+			
	M	F	M	F	M	F	M	F	M	F	M	F
Traffic accident	19	15	141	90	295	127	1596	269	247	69	2298	570
Drowning	7	16	101	87	85	32	159	25	16	0	368	160
Fall	31	31	35	35	39	16	157	34	74	42	336	158
Burning and scalding	17	19	68	59	29	29	76	135	31	30	221	272
Poisoning	32	35	26	18	5	7	22	13	7	1	92	74
Electrical accidents	0	3	6	7	14	2	54	15	3	2	77	29
Weapon (mines, firearms, etc.)	0	0	3	0	21	2	62	0	0	0	86	2
Animal bite	6	8	9	15	16	13	9	9	1	0	41	45
Falling debris	0	2	6	4	12	9	30	10	9	4	57	29
Inhalation suffocation	6	11	5	1	3	1	28	4	3	0	45	17
Occupational injury	0	0	0	0	1	1	21	3	0	1	22	5
Ingestion suffocation	8	6	7	4	1	0	0	0	0	1	16	11
Others	14	14	6	10	19	10	56	26	15	12	110	72
Total	140	160	413	330	540	249	2270	543	406	162	3769	1444

M = male *F = female*

other causes of accidental death, traffic accidents were the leading cause of accidental death (55.0%) (95% CI 53.7–56.4). This was followed by drowning (10.1%), falls (9.5%) and burns and scalds (9.5%). Males had a significantly higher proportion of accidental deaths from traffic accidents (60.9% versus 39.5%, $P < 0.001$) and weapons (2.3% versus 0.14%, $P < 0.001$) than females. However, females had a higher proportion of accidental deaths from burns and scalds (18.9% versus 5.9%, $P < 0.001$), poisoning (5.1% versus 2.4%, $P < 0.001$), animal bites (3.1% versus 1.1%, $P < 0.001$) and falls (10.9% versus 8.9%, $P < 0.029$).

Table 3 shows the number of deaths from different types of unintentional injury by age group and sex. More deaths resulting from unintentional injuries were from traffic accidents with 2298 for males and 570 for females.

Table 4 shows the mortality rate per 100 000 for unintentional injuries by age

Table 4 **Mortality rate per 100 000 for unintentional injuries by age group and sex**

Age (years)	Mortality rate per 100 000		
	M	F	Total
0–1	104.5	125.5	114.7
1–4	66.8	55.8	61.4
5–14	30.9	15.1	23.2
15–64	76.5	18.6	42.8
65+	148.2	69.4	111.9
Total	65.7	26.1	46.3

M = male *F = female*

group and sex. The mortality rate for unintentional injuries for all age groups was 46.3 deaths per 100 000. After the age of 1 year (114.7 deaths per 100 000), over 65-year-olds had the highest mortality rate for accidental death (111.9 deaths per 100 000). Except for under 1-year-olds, males of all age groups had a higher mortality rate than females. Of all deaths resulting from unintentional injuries, 30% occurred in summer, 26% in spring, 24% in autumn and 20% in winter.

Discussion

This study illustrates that many people in rural areas of the Islamic Republic of Iran die from unintentional injuries. Males compared with females had a higher rate of accidental death, and traffic accidents, drowning, falls, and burns and scalds were the leading causes of death in the different age groups.

This study was the first to be conducted on unintentional deaths in rural areas of the Islamic Republic of Iran for a large population. Because of the cooperation of the caring community health workers, we obtained a 100% response rate. However, there were some limitations to the study. A lack of detailed information made it impossible to obtain complete data about the place and time of accidental deaths or more details about the victims.

Our study showed age and sex differences in accidental deaths as have been shown in other studies [*2, 9, 10*]. There has also been some research on injuries in rural areas. For example, in the United States of America, Grossman et al. compared urban–rural differences in pre-hospital care of major trauma [*11*]. They showed that 58% of the victims were injured in rural areas and the remainder in urban areas. Van and Shackford showed that in victims under 19 years of age, injury mortality in rural areas was higher than in equivalent populations in urban areas [*12*]. Alexander et al., in a study in 1992 on behavioural risk factors for injury among rural adolescents, reported that more than half (53.5%) of the children aged 12–14 years had experienced one or more injuries, with sex and race differences, a high degree of risk taking and low parental supervision among those who had experienced an accidental injury [7]. In Denmark, Jorgensen, in a study on children aged 0–14 years who died from unintentional injuries, showed that the risk of death from accidental injury was 32%–48% greater for boys and 40% higher for girls in rural areas than in Denmark as a whole [*13*]. Crude information on vital statistics in the Islamic Republic of Iran has shown that accidental injuries are the second leading cause of death among different age groups in the country [*3*].

Our results emphasize the importance of unintentional injuries as a major cause of death in rural areas. Berger and Mohan explained that the major types of injury in developing countries are traffic accidents, falls, drowning and poisoning [*14*]. However, the nature and extent of injuries vary according to whether they occur in urban or rural areas. In our study, the leading causes of accidental death were similar to Berger and Mohan's findings. They also showed that in many developing countries injuries are the leading cause of death and morbidity in the middle of the age spectrum, a finding with which our results concurred.

Forjuoh stated that "developing countries are now hanging between the stages of epidemiologic polarization and protracted epidemiologic transition" [*15*]. The Islamic Republic of Iran has been successful in reducing morbidity and mortality from infectious diseases through 15 years of

dedicated effort [16]. However, the importance of unintentional injuries as one of the major causes of death in the country is undeniable, and injury control should be a national priority. There is no injury organization, funding or data-capture system in the Islamic Republic of Iran. Injury-related policies must therefore be considered as a health priority in this country. International support as well as national efforts may enhance the chances of prevention and control of such injuries. One of the important causes of death from unintentional injuries in rural areas of the country could be the lack of good emergency medical care, particularly in villages that are far from the cities. Expanding accident and emergency departments at a reasonable distance from such villages is a strategy worth consideration.

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