

Domestic injuries and suicide among women of reproductive age in Iran

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Background: The aim of this study was to map out some epidemiological aspects of intentional and unintentional injuries among Iranian women of reproductive age using a national registry.

Methods: Injury data were taken from a national-based injury surveillance system over the period 2000–2002. The study population comprised 31.5% of the population of Iran.

Results: Of all the 307,064 domestic injuries reported during the years 2000–2002, about 152,600 cases (49.7%) involved women. About half of these women (76,474) were in the reproductive age group. The majority (42.7%) of injuries among women of reproductive age were burn wounds followed by lacerations in 32.6%. Eighty-five percent of suicide cases were poisonings, followed by 11% for suicides by burning. However, 45.2% of burn suicides were fatal, compared with a 0.89% fatality rate for poisonings. Of all female suicide victims, 1029 died, 174 victims became disabled, while the remainder improved or were undergoing therapy when reported.

Conclusion: Injuries, especially burns, are a major public health problem for women of reproductive age.

Keywords: injuries, women's health, accidents, burns, falls, poisonings, home safety, domestic injuries, epidemiology

Introduction

The traditional view of injuries as “accidents” or random events, has resulted in historical neglect of this important area of public health.¹ Injury epidemiology can be defined as “the study of the distribution and determinants of injuries and safety-related states/events in specified populations, and the application of this study to prevent injuries and promote safety”.² Reports of injuries, if based on large-scale studies or widespread registries, are appropriate for focusing on specific populations prone to particular diseases and injuries.

The home, which is considered by many people to be a safe haven for living, may not prove to be so, according to statistics for domestic injuries worldwide. Children and women can be at higher risk of injuries in the home due to greater exposure to home hazards. Much research has been done on these injuries, especially during recent decades.^{3,4} However, most of the available knowledge is based on hospital data, and research data showing details of domestic injuries among women of reproductive age, especially from low-income and middle-income countries, are limited. The aim of this study was to map out some epidemiological aspects of intentional and unintentional injuries among Iranian women of reproductive age using a national registry.

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Materials and methods

Injury data were taken from a national-based injury surveillance system for the period 2000–2002. The system included registration forms for home-related injuries treated in health or emergency centers. In addition, a hierarchical reporting system was designed to gather data from all over the country. The surveillance system used in this study was based on the work of 31 Iranian universities in medical sciences and health services that are responsible for both medical education and delivering health services. All catchment areas were encompassed, but some universities initiated their program with just a portion of their population.

The study population comprised 31.5% of the population of Iran. The register was initially constructed in order to map the epidemiology of home-related injuries sustained in the country. In Iran, the population in rural areas, but not that in all urban areas, is well defined, which means that the incidence rate in this study is valid mostly for the former segment of the population and small cities.

The variables for injury recording included a minimum data set which was tested in a pilot program.⁵ During the implementation phase of the register, a computerized questionnaire was also designed and sent to all health administration centers in the country. A countrywide training program consisting of annual workshops at national, provincial, and district levels had been carried out for all staff who were working in the field.

Seven variables were selected for determination of injury patterns, ie, the specific location of occurrence of injury in the home environment ($n = 10$), injury mechanism ($n = 16$), type of injury ($n = 16$), part of body injured ($n = 16$), age and gender of the victim, and outcome ($n = 4$). A standardized registration form was used for data collection. Data were collected at hospital outpatient emergency departments, health care centers in rural and urban areas, and most peripheral health services in rural areas, known as “health houses”. Data entered into a standard questionnaire was created in the Epi6 program, which was available to all health administration centers in the country. All centers were sending a disc to Iran’s Center for Disease Control (CDC) in Tehran annually, and these were merged to form the national dataset. Quality control measures included checking for repeatability of cases, same-month revision of all completed forms, double data entry, missing data, and underreporting. This procedure was supposed to control 20% of all data registered in the first year and 10% in the following years. Supervisors of the program at the provincial and national levels monitored and controlled the data according to the

plan. Monitoring excluded checking the completed forms and data entered in the computer system.

For this research, the national dataset was restricted to female injury victims for overall analysis and limited to those 15–49 years of age, generally known as “women of reproductive age”. Data were analyzed using the Stata 11 statistical software package. Both descriptive and analytical methods were used. Frequency and relative frequency tables were produced. Age-adjusted incidence rates and mortality rates were plotted. The denominator for the five-year intervals of age needed to calculate incidence rates was estimated using averages of two national population censuses conducted in 1996 and 2006. The Chi-square test was used to assess predictors of mortality, followed by bivariate estimation of odds ratios along with their 95% confidence intervals. Finally, a logistic regression multivariate analysis was done while adhering to the standards of model development, as well as an assessment of model fitness and appropriateness. The analyses were done in accordance with the ethical codes of the Ministry of Health and Medical Education in Iran.

Results

Of the 307,064 home injuries reported during the years 2000–2002, about 152,600 cases (49.7%) involved women. About half of these women (76,474) belonged to the reproductive age group studied in this research. A histogram of the age distribution is given in Figure 1, and age-adjusted incidence rates are shown in Figure 2. The mean age of the women in the reproductive age group was 28 ± 9.5 years, with a median age of 26 years.

Overall, 56% of domestic injuries in the women of reproductive age occurred in the living room or a bedroom, 28.4% in the kitchen, 10.3% in the yard or garden, and the remainder occurred in other parts of the house, including the bathroom,

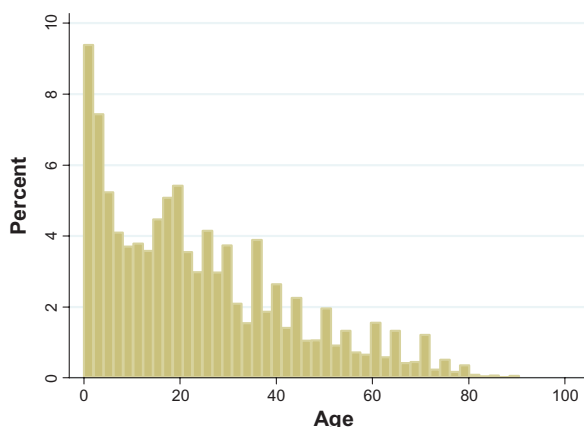


Figure 1 Histogram of age for Iranian women victims of injury.

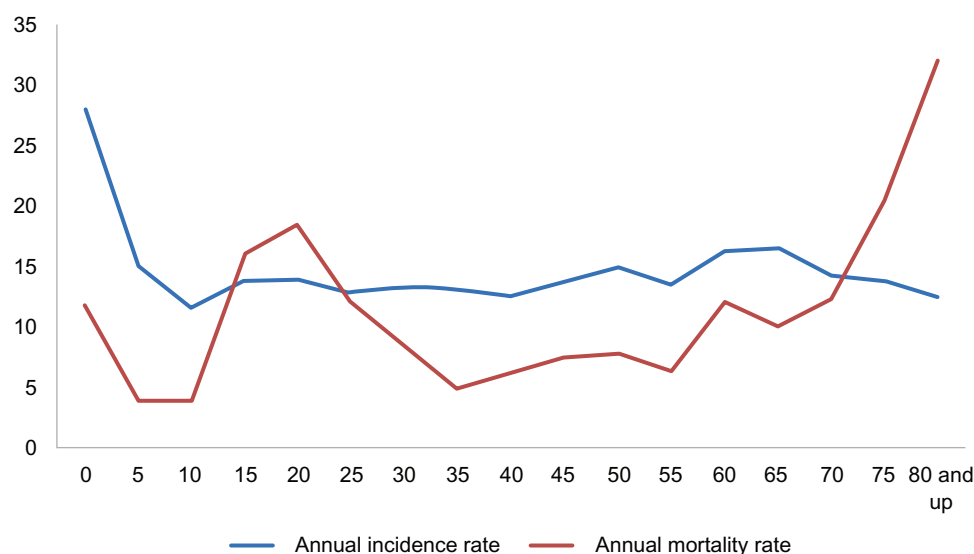


Figure 2 Age-adjusted incidence and mortality rates for Iranian female injury victims.

Notes: y axis, age-adjusted rates as per 1000 for incidence and per 100,000 for mortality; x axis, age groups of five-year intervals except for older than 80 years.

stable, stairs, or stockroom, or on the roof. Hands and fingers were injured in 37,934 cases (49.6%), the lower limbs in 16,534 cases (21.6%), with multiple trauma in 2104 cases (2.8%), and involvement of other organs in the remaining cases. With regard to the mechanism of injury, 37.7% of all women and 32.3% of women in the reproductive age group were injured by hot liquids. The rest of the mechanisms of injury along with age group comparisons are shown in Table 1.

The majority (42.7%) of injuries among women of reproductive age were burn wounds followed by lacerations

(32.6%, Table 2). Age-adjusted incidence rates for female burn injury victims versus other types of injuries are compared in Figure 3 for the various age groups.

Eighty-five percent of suicides were the result of poisonings, followed by 11% due to burns. However, 45.2% of suicides by burning were fatal compared with a fatality rate of only 0.89% for poisoning. This means a 50 times higher risk of fatality for self-inflicted burns compared with poisoning.

For all the injuries, 42.5%, 27.2%, and 30.3% were reported by primary health centers, secondary health centers,

Table 1 Distribution of injury mechanisms among the women injury victims in Iran compared for the three age groups

Injury mechanism	<15 years	Reproductive age	>49 years	Total	P value
Attack and sting	691	745	271	1707	<0.001
Collision with sharp objects	8931	22,520	4,437	35,888	<0.001
Collision with substance	3181	3821	1,212	8214	<0.001
Contact with hot objects	3934	4033	1,233	9200	<0.001
Exposure to fire	1782	3206	781	5769	<0.001
Hot liquids	26,328	24,699	6501	57,528	<0.001
Falls	4388	3927	1936	10,251	<0.001
Overthrown (fall at the same level)	4408	4316	2190	10,914	<0.001
Foreign body	493	661	115	1269	<0.01
Chemical materials	218	546	60	824	<0.001
Violence	130	539	73	742	<0.001
Others	376	638	147	1161	<0.01
Suicide	142	2,906	106	3154	<0.001
Overcome by smoke	94	365	58	517	<0.001
Using drugs or poison	1424	3283	147	4854	<0.001
Falling debris	115	151	65	331	<0.001
Drowning	38	6	3	47	<0.001
Electric shock	91	112	27	230	<0.001
Total	56,764	76,474	19,362	152,600	<0.001

Table 2 Types of injuries among women trauma victims in Iran

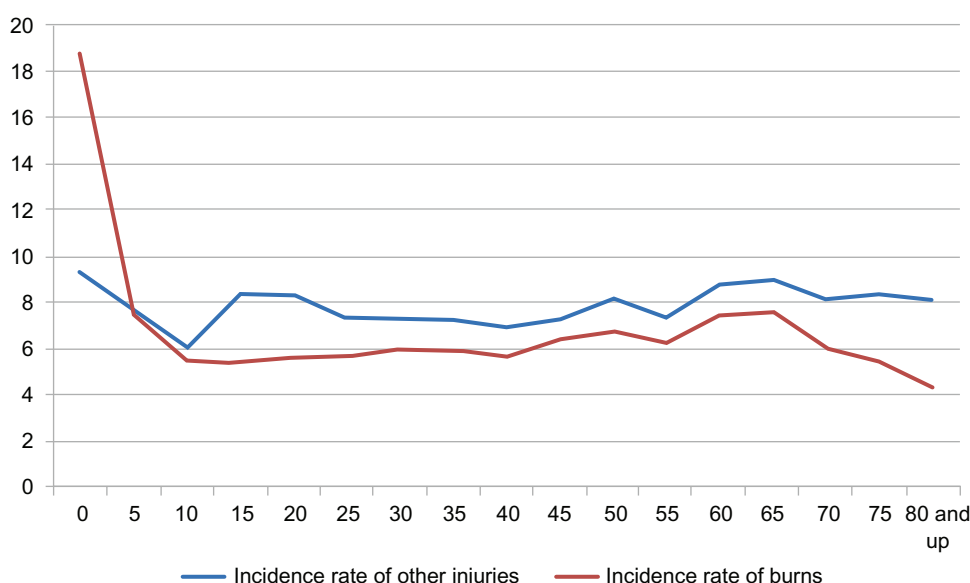
Kind of injury	Under 15 years	Reproductive age	Above 49 years	Total
Amputation	116	134	53	303
Bleeding	152	218	56	426
Brain trauma	342	217	91	650
Bumping	1604	2669	921	5194
Burn	32,182	32,620	8593	73,395
Contusion	1047	1165	454	2666
Cuts and lacerations	11,909	24,963	5085	41,957
Eye injury	189	267	22	478
Fractures	3189	3174	2265	8628
Multiple	52	87	32	171
Others	199	300	52	551
Pain	280	413	119	812
Poisoning	1755	6280	295	8330
Shock	67	69	18	154
Suffocation	147	164	34	345
Crush injuries	3534	3734	1272	8540
Total	56,764	76,474	19,362	152,600

and hospitals, respectively. Of the female cases, 1029 died, 174 became disabled, and the remainder improved or were undergoing therapy when reported. Multivariate analysis found that age group, injury mechanism, and injured body part were significant predictors of death. On bivariate analysis, women of reproductive age had the highest likelihood of death compared with those who were younger or older. The adjusted odds ratio of death, through multivariate analysis, for the reproductive age group remained higher than for childhood injuries, but was slightly lower than the figure for the group aged 50 years and older. The adjusted odds ratios from the multivariate analysis are given in Table 3.

Among women of reproductive age, the risk of dying after injury was 5.5 times higher for burns versus other types of injury (95% confidence interval 4.6–6.6).

Discussion

In this study, the incidence of injuries were found to be higher among preschool-aged children. This is in line with previous overall and injury-specific studies.^{6,7} Younger middle-aged women, although they had lower incidence rates, had higher mortality rates, indicative of higher case fatality in the early reproductive years. Consistent results from multivariate analysis indicated that women of reproductive age had a

**Figure 3** Age-adjusted incidence rates for Iranian female burn injury victims versus other types of injuries.

Notes: x axis, age groups of five-year intervals except for over 80 years; y axis, age-adjusted rates as per 1000.

Table 3 Adjusted odds ratios for injury death predictors derived from logistic regression analysis of Iranian national registry data

Death predictors	OR [95% CI]		
	Reference group		
Injury mechanism			
Attack and sting			
Collision with sharp objects	0.1	0.0390539	0.3863006
Collision with substance	0.5	0.1582152	1.535345
Contact with hot objects	1.9	0.7130849	5.57533
Exposure to fire	27.6	10.28564	74.12296
Hot liquids	0.8	0.2783321	2.064572
Falls	1.8	0.6655159	5.115443
Overthrown (fall at the same level)	0.5	0.1512783	1.404848
Foreign body	2.8	0.8299897	9.202418
Chemical materials	30.4	10.95673	84.18282
Violence	6.1	2.008061	18.58508
Others	7.4	2.533444	21.49362
Suicide	31.8	11.78978	85.76353
Overcome by smoke	28.6	10.08895	80.84251
Using drugs or poisons	3	1.074721	8.577741
Falling debris	9.8	3.072298	31.24254
Drowning	222.9	69.42403	716.0821
Electric shock	21.7	6.829051	68.69778
Age group			
<15 years			
Reproductive age	1.7	1.409415	1.986962
Beyond reproductive age	2.1	1.689494	2.628329
Body part			
Head and neck injuries and brain trauma	2.6	1.980075	3.407706

higher likelihood of death compared with younger women. Although this group of injury victims are not well addressed in the research literature, some burn studies have reported such a pattern.⁸

The mortality slope was found to start increasing after the age of 10 years, and remaining high for up to the first two decades of life. In Iranian culture, women are responsible for doing household chores, mainly cooking and cleaning. Some young females are employed in households that are not their own, while others are obliged to work in their home as family members.⁹ The risk may decrease in later life for two reasons; the first is that women become more skilled as they get older, and the second is that, through the later phase of their reproductive life, their daughters grow older and share both the responsibilities and the risks.

The majority of injuries among women of reproductive age were burns, which are among the leading causes of death and disability worldwide.¹⁰ Traffic accidents rank first in injury morbidity and mortality in many countries, including Iran. Burns rank second in childhood and third overall among injuries in Iran.^{11,12} Although little research has focused on injuries in the reproductive age group, some

regional studies have found burns to be catastrophic injuries during pregnancy.^{13–15} Nevertheless, when it comes to domestic injuries among women of reproductive age, our research showed that burns are the leading cause of both morbidity and mortality. This could be due to the fact that cooking at home is the most important domestic responsibility of women in Iran. Burns, cuts, and lacerations may be the most common risks of unsafe cooking practices. A major concern in this regard would be safety procedures for cooking at home. Cooking safety is dependent on the safety of cooking appliances, and unsafe behaviors and a dangerous cooking environment all need to be addressed in prevention work.^{16–18} Although women of reproductive age are at higher risk of cooking-related injuries, cooking is not the sole source of domestic injuries in women and, like other family members, they are also susceptible to other sources of injury.

As could be inferred from Table 1, women of reproductive age are more likely to be involved in violence and injuries related to suicide. We found that self-inflicted burns were 50 times more likely to be fatal compared with suicide by poisoning. Self-inflicted burns are shown to be a major public health problem in Iran, and particularly so among young women.^{19,20} The attention of health policy-makers in Iran needs to be drawn to this problem. Regardless of regional variations in suicide patterns, mortality from suicide is undoubtedly a major public health problem. According to a World Health Organization report, approximately one million people worldwide died as a result of suicide in 2000.²¹

A large number of staff are currently employed in the Iranian health care system to work specifically in the field of reproductive health and primary health care in childhood, so it seems quite reasonable to consider possible integration of a focused national injury prevention and safety promotion program into the current health service package delivered to women of reproductive age.

Like any other register-based study, we were able to study only the most important variables of interest in injury research because of the minimum data requirement in national registers. Underregistration of death counts is common in death registry systems, and it is even higher in event-disease registers that also collect information about outcome measures, including mortality.²² Our study is not an exception, and the injury incidence and mortality rates presented here should be interpreted as minimum rates due to inevitable underestimation.

Disclosure

The authors report no conflicts of interest in this work.

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