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Original Research

Population-based incidence and cost of non-fatal injuries in Iran: a consistent under-recognized public health concern

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ABSTRACT

Objectives: To investigate the incidence and determinants of non-fatal injuries, and the cost imposed on victims in an Iranian population aged 15–64 years.
Design: Cross-sectional household survey.
Methods: Three-stage probability sampling was conducted for selection of a representative sample of Iranians. Data on the demographics, history and cost of injury were obtained from face-to-face interviews and telephone calls.
Results: In total, 7886 subjects were included in this study. The annual incidence rate of all injuries was 905 (95% confidence interval 853–957) per 1000 population (approximately nine injuries per ten Iranians). The mean (±standard error) incidence rates of first aid injuries (FAIs; medical care not required) and medical-attended injuries (MAIs; medical treatment sought) were 737 ± 24 and 168 ± 12 per 1000 population, respectively. Young, urban females were at highest risk for FAIs, and single males were at highest risk for MAIs. The most common injury description was as follows: non-paid work (activity), home

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(place), inanimate mechanical force (mechanism), upper limb (site of injury) and open wound (type of injury). For MAIs, the most common place of treatment was hospital. Traffic-related injuries had the highest total cost and the lowest out-of-pocket cost. Total and out-of-pocket costs of non-fatal injuries in Iran in 2011 have been estimated to be US$6,111,138,000 and US$1,480,411,000, respectively.

Conclusion: Non-fatal injuries are an under-recognized public health problem. Cost-control policies are essential to reduce the out-of-pocket cost of injuries.

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Introduction

Worldwide, injury is one of the main causes of mortality and morbidity. The worldwide burden of injuries is expected to increase in the forthcoming decade,[1] and developing countries are responsible for more than two-thirds of the total.[2] However, despite the higher burden of injuries in low- and middle-income countries, they lack strong injury surveillance systems. Precise estimation of injuries is essential for the implementation of injury surveillance systems, especially in developing countries.[3]

Accurate estimation of the cost of injuries is necessary for policy making.[4] In this regard, fatal injuries represent the 'tip of the iceberg'. Non-fatal injuries account for a huge proportion of the iceberg which is not typically visible.[5] Knowledge of the cost of non-fatal injuries is crucial. In fact, the cost of non-fatal injuries goes beyond the direct, indirect and medical costs. Injuries affect the quality of life and impress a majority of people.[6] As a major public health problem, numerous calls have been made to unveil the global injury situation.[4,7]

Multiple data sources are used to estimate the incidence of injuries in developing countries.[8] However, most studies rely on hospital records,[9] and therefore do not include the large proportion of injuries that did not present for medical treatment.[7] These injuries will impose a hidden cost on the patient, society and the healthcare system.[4] Only a population-based study can provide an estimate for such injuries.[8]

In Iran, injuries are the leading cause of the burden of disease calculated by disability-adjusted life years.[10] In comparison with other countries, Iran ranks top in terms of mortality and morbidity.[11]

Nevertheless, the epidemiology of injuries in Iran has not been clarified. Only a limited number of studies have evaluated the incidence of injuries in selected regions in Iran.[12,13] Moreover, the majority of domestic studies have been based on selected samples and on hospital records.[14,15] For example, hospital-based data for traumatic spinal cord injury showed an incidence of 10.5 per million population in Tehran.[16] However, the same researchers reported that the population-based incidence of traumatic spinal cord injury in Tehran was 72.45 (98.4 in males and 46.5 in females) per million population.[17,18] The authors concluded that this 6.9-fold difference was due to the non-recording of prehospital deaths in the hospital-based data, and possible overestimation of incidence in the population-based data using DISMOD software.

Based on another important database, the injury admission rate to university hospital emergency departments has been reported to be 1.4% per year in Iran.[14] However, based on the same data in the same time period, the injury admission rate to the university hospital emergency department of Kashmar (an international safe community in Iran) was 4.6% per year.[13] The 3.3-fold higher rate in Kashmar suggests precise injury registration, and may be an important achievement of safe community designation.

Finally, there is some evidence to show that some patients, especially girls in rural areas of west and south-east Iran, injured by self-immolation and suicide are recorded as burns victims in Iran.[19] This may be due to the victim's family providing the wrong information for legal and cultural reasons.

To the best of the authors' knowledge, this is the first study to evaluate the cost of non-fatal injuries in Iran. This was a national household study on Iranians aged 15–64 years.[20] This study investigated the incidence and determinants of non-fatal injuries, and the total and out-of-pocket costs for 2011.

Methods

Study design and sampling

This cross-sectional study of 15–64-year-old Iranians was handled within the framework of the Iran Mental Health Survey.[21] Details on the study protocol can be found elsewhere.[20] In brief, three-stage sampling was conducted. In the first stage, 1525 primary sampling units (PSUs) were selected at random with probability proportional to size regarding the number of households and according to the block enumerations of the 2006 Iranian Census. Next, six households in each PSU were selected by systematic random sampling. One member of each household was chosen using Kish Grid tables.[22] In total, 9150 subjects were approached. The corresponding precision of the survey for assessing the incidence of injury ranging from 0.001 to 0.1 was 0.79×10^{-3} to 7.53×10^{-3}.

Study variables and coding

Data were collected in the following categories via face-to-face interviews: demographics [age, gender and location (urban vs rural)]; insurance and education (having medical insurance, having complementary insurance and years of full-time education); family characteristics (head of household, marital status and number of children); and personal history (retired, unemployed, student, disabled and suicide history). Subjects were asked about their injuries using a questionnaire that had previously been validated and found to be reliable.[23] According to the Short Form Injury Questionnaire (SFIQ7),

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