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Incidence of fall-related injuries in Iran: A population-based nationwide study

Soheil Saadat [a], Nima Hafezi-Nejad [a,b], Yalda Soleiman Ekhtiari [b], Afarin Rahimi-Movaghar [c], Abbas Motevalian [d], Masoumeh Amin-Esmaeili [e], Vandad Sharifi [f], Ahmad Hajebi [g], Reza Radgoodarzi [e], Mitra Hefazi [e], Vahid Eslami [h], Hasti Karimi [h], Kazem Mohammad [a], Vafa Rahimi-Movaghar [a,*]

[a] Sina Trauma and Surgery Research Center, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[b] School of Public Health, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[c] Iranian National Center for Addiction Studies (INCAS), Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[d] Department of Public Health, Faculty of Public Health, Iran University of Medical Sciences, Tehran, Iran
[e] Department for Mental Health and Substance Use, Iranian Research Center for HIV/AIDS (IRCHA), Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[f] Department of Psychiatry, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[g] Mental Health Research Centre, Tehran Psychiatric Institute, Iran University of Medical Sciences (IUMS), Tehran, Iran
[h] Students Scientific Research Center (SSRC), Tehran University of Medical Sciences (TUMS), Tehran, Iran

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ABSTRACT

Background: Fall-related injuries are considered to be a leading cause of morbidity and disability worldwide. The aim of this study was to investigate the incidence of fall-related injuries and its determinants in Iran.

Methods: A cross-sectional household survey of a representative sample of 15–64 years old Iranians was carried out in 2011. A three-stage cluster sampling design was used. Total of 1525 clusters were randomly selected. Six households in each cluster were randomly selected, and one member of each household was interviewed. Data on the demographics and history of fall-related injury were obtained using the previously validated and reliability tested Short Form Injury Questionnaire 7 (SFIQ7). In all, 7886 subjects responded to the survey.

Results: The incidence rate of all fall-related injuries was 59 (95%CI: 45–72) per 1000 person-year. The incidence rate of First Aid Fall-Related Injuries (FAFRIs) and Medical Attended Fall-Related Injuries (MAFRIs) were 30 ± 5 and 28 ± 12, respectively. Homes were the most common place of falls (52.5%). For all and MAFRIs, the most common activity leading to fall injury was walking (37.8% and 47.6%, respectively) whereas for FAFRIs was playing (31.9%). For all and FAFRIs, the most common description was as follows: upper limb as the injured organ (52.0% and 61.2%, respectively) and superficial wound as the most prevalent type of injury (39.0% and 61.8%, respectively). However, for MAFRIs, lower limb injuries (52.9%) and fracture (43.6%) were more pronounced. Risk factors for MAFRI were as follows: paid work activity (OR: 3.11; 95%CI: 2.07–4.67), playing (OR: 14.64; 95%CI: 6.34–33.80), walking (OR: 57.09; 95%CI: 28.95–112.59), driving (OR: 2.86; 95%CI: 1.23–6.63), and recreation activities (OR: 44.11; 95%CI: 14.04–138.54). Higher age and education were the other risk factors for MAFRI, as well as residing in rural areas.

Conclusion: This study revealed considerable incidence of fall injuries in Iranian population especially in rural regions who need access to protective equipment. People need to be warned about the constant risk of fall even during non-avoidable activities such as walking, playing, driving and paid/unpaid working especially in older ages. Implementation of fall prevention measures, home and behavioural modifications are recommended.

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* Corresponding author at: Sina Trauma and Surgery Research Center, Sina Hospital, Hassan-Abad Square, Imam, Khomeini Ave., Tehran University of Medical Sciences (TUMS), Tehran 11365-3876, Iran. Tel.: +98 915 342 2682/216 675 7010; fax: +98 216 675 7009.
E-mail addresses: v_rahimi@yahoo.com, v_rahimi@sina.tums.ac.ir (V. Rahimi-Movaghar).

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Introduction

According to the World Health Organization (WHO), unintentional injuries are the sixth cause of death all over the world. World deaths from injury increased from 4.3 million in 1990 to 4.8 million in 2013. However, age-standardised rates decreased 21% during the same period. In 2013, 973 million people had injuries that needed healthcare and 4.8 million people died of injuries. The age distribution of injury death is not the same. For example, in children from 1 to 59 months, injury death is more common than death from cancer or ischaemic heart disease. However, the reverse is true in old age [1]. Meanwhile falls are one of the causes of unintentional injuries which are commonly defined as "inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest in furniture, wall or other objects" [2]. Around the world an estimated 424,000 fatal falls occur each year of which over 80% are in low- and middle-income countries [3]. Falls are considered to be one of the major public health problems worldwide [4,5] and are associated with increased mortality, hospitalization, a variety of serious health consequences and disabilities and reduced quality of life [6–10]. Falls and fall-related injuries are increasing, and the health care cost due to these injuries is on the rise [6,11,12]. It is estimated that the annual direct and indirect cost of fall-related injuries reach $55 billion U.S. dollars by 2020 [13]. Fall-related injuries also have socio-economic consequences such as psychological limitations, low work efficiency, and loss of work and independence [8,9]. In recent decades, growing awareness of the burden of fall-related injuries and their health consequences has led to more attention to this health problem. Elucidating the epidemiological characteristics of falls in all different age groups is mandatory for developing risk control strategies [6,14].

In Iran, injuries caused 28% of the total burden of diseases and injuries calculated by Disability Adjusted Life Years. In addition, fatal injuries were the most common cause of years of life lost in the 5–44-year age group [15]. Specifically, falls are one of the 15 major contributors to the burden of diseases and injuries in Iran [16]. Nevertheless, a few studies have focused on the incidence of fall-related injuries and their associated factors. All previous reports were handled in a number of selected regions and were based on the hospital records in Iran [17–19]. Our study was part of the population-based national survey project of mental health and disorders in Iran. The aim of this study was to estimate the incidence of fall-related injuries and its associated factors in Iran for the year 2011.

Methods

Study design and population

This study was a part of a cross-sectional household study of the 15–64 years old Iranians. It was handled within the framework of Iranian Mental Health Survey (IranMHS) [20]. People who had Iranian nationality ranging from 15 to 64 years old were included in this study. The sample size was computed based on the objectives of a national project. A total of 6100 simple random samples were designed to be selected. By considering the design effect of 1.2 for cluster sampling with six households in each cluster, and a response rate of 80%, 9150 subjects were selected.

The fieldwork was distributed among all 46 universities of medical sciences in Iran. A three-stage cluster sampling design was used for this study. At first, 1525 clusters were randomly selected with probability proportional to size regarding the number of households and according to the block enumerations of the Iran's 2006 national census. Correlation of outcomes with cluster size was calculated which showed no significant difference. Therefore, there was no clustering effect to be adjusted for standard errors and confidence intervals. At the second stage, six households in each cluster were selected by systematic random sampling methods. Finally, one of the family members of each household was chosen using Kish Grid tables [21]. Standardization of the survey aspects including definitions, methods and measurements was done by consulting with injury specialists and epidemiologists.

Instrument and interviewers

The instrument was the Short Form Injury Questionnaire (SFIQ7), a researcher-made, semi-structured questionnaire, which was a part of the national survey of mental health questionnaires. Injury specialists confirmed the face and content validity of the questionnaire and the reliability of the questionnaire were also confirmed by a pilot study [22].

The questionnaires were completed through interviews with selected subjects. The interviewers were selected from people who had, at least, a bachelor degree in psychology or consultation and were the residence of the related geographical area who were familiar with the local language. Each interviewing team included one male and one female interviewer. All interviewers (230 persons) were trained for a week on how to conduct the interview. Each interviewer received a guide booklet and pictorial cards for the items of the questionnaire.

Conducting the survey

Each interviewer team approached the selected households during at least three separate dates after receiving the address of the selected clusters and identifying the residential units. After introducing themselves and briefly describing the project, a list of family members who met the eligibility criteria was made with the help of the head of the family or the most informed member. Then, one of the family members was selected for interview using Kish grid method. In the next step, an interview was conducted with selected member at a defined time.

In this part of the survey, trained interviewers interviewed with selected member of each household, asking for the history of injury. One interviewer was assigned for each 42 participants (7 clusters). Subjects were asked for the occurrence of any kind of injury/injuries regardless of its severity in the past 12 and 3 months. We did not use the data of 12 months because of high rate of recall bias. For each injury occurred during the past 3 months, causes, activity, mechanism, site, type and place of injury, type and the place of the treatment were attained. This was subsequently matched to the International Classification of Diseases v.10 (ICD10-2012). If a participant had more than one injury, we accounted all injuries during past three months and collected details of data related to each injury. In terms of fall-related injuries, we divided fall injuries into First Aid Fall-Related Injuries (FAFRIs) and Medical Attained Fall-Related Injuries (MAFRIs) groups based on the details of the specific coding and definitions which were described before [23]. An event was considered medical attended if the victim has sought any type of medical care from a third party health care provider. The field work was performed from winter through spring, 2011. Data on demographics variables including age, sex, marital status and residential areas, years of education, the number of children, insurance type, employment and job status and the annual income were also collected. Almost all Iranian have basic support of general insurance for medicine and hospitalizations which supported 70–90% of costs in 2011. However, there are specific complementary insurances for higher degree of all medicines and all types of hospitalizations without almost any payment by the patient.

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