

## Short communication

# Injuries caused by falls from trees in Tehran, Islamic Republic of Iran

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الإصابات الناجمة عن السقوط من الأشجار في طهران بجمهورية إيران الإسلامية  
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**الخلاصة:** مع أن السقوط من الأشجار نادر الحدوث، فإن عواقبه قد تكون وخيمة. وقد تم في ستة مستشفيات بطهران، على مدى 13 شهراً، تسجيل 49 حالة سقوط من فوق الأشجار، وذلك من إجمالي من تم تسجيلهم من المصابين برضوح، والبالغ 8500 حالة، مما يمثل نسبة 0.57%. وقد تم تحليل البيانات لتحديد المميزات الديموغرافية والمميزات السريرية، فوجد أن العمر الوسطي للمصابين يبلغ 31 عاماً (يتراوح مجال العمر من 6 إلى 74 عاماً) وكان 21 مصاباً (أي 42.9%) دون سن العشرين. وكانت الساحات الرياضية والمنزلية والترفيهية من أكثر الأماكن التي تحدث بها الرضوح. وقد حدث معظم الرضوح أثناء فترة الراحة وكانت نسبة ضئيلة لا تتجاوز (3 مصابين أي 6.1%) ذات صلة بأداء العمل المهني. ولقد عانى 11 مصاباً (أي 22.4%) من كسر بالعمود الفقري واستمرت إصابة اثنين منهم بشلل سفلي، ونُقِلَ اثنان آخران مصابان بكسور صدرية وفقرية وخيمة مع شلل سفلي، إلى مستشفيات أخرى بقصد العلاج. ونظراً لوخامة هذا النمط من الإصابة ولاسيما في صغار السن، فإن من الضروري أن تُبَدَّلَ جهود حثيثة من أجل توفير وقاية فعالة من هذه الإصابات.

**ABSTRACT** Although falls from trees are rare, the consequences can be severe. Over 13 months in 6 hospitals in Tehran 49 (0.57%) of 8500 registered trauma patients had fallen from trees. The mean age was 31 years (range 6 to 74 years) and 21 (42.9%) were aged < 20 years. Home and recreational/sports grounds were the most common sites of trauma. Most falls occurred during leisure time; only 3 (6.1%) were occupation-related. Eleven patients (22.4%) sustained a fracture of the spinal column; 2 of them became permanently paraplegic and 2 others who had severe thoracic vertebral fractures and paraplegia on first observation were transferred to other hospitals for treatment. Due to the severity of this type of injury, especially among the young, effective preventive efforts may be necessary.

## Les traumatismes causés par une chute d'un arbre à Téhéran (République islamique d'Iran)

**RÉSUMÉ** Bien qu'il soit rare qu'une personne tombe d'un arbre, les conséquences peuvent être graves. Sur une période de 13 mois, 49 (0,57 %) des 8500 patients traumatisés enregistrés dans 6 hôpitaux à Téhéran étaient tombés d'un arbre. L'âge moyen était de 31 ans (extrêmes : 6-74 ans) et 21 (42,9 %) avaient moins de 20 ans. La maison et les terrains de jeu/de sport étaient les lieux où les traumatismes survenaient le plus fréquemment. La plupart des chutes survenaient pendant les loisirs ; seules 3 chutes (6,1 %) étaient liées au travail. Onze patients (22,4 %) ont subi une fracture de la colonne vertébrale ; 2 d'entre eux ont été atteints de paraplégie motrice permanente et 2 autres qui présentaient des fractures des vertèbres dorsales et une paraplégie lors de la première observation ont été transférés dans d'autres hôpitaux pour traitement. En raison de la gravité de ce type de traumatismes, notamment chez les jeunes, des efforts efficaces de prévention peuvent être nécessaires.

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## Introduction

Falls are a common cause of accidents in the world [1-4]. Yet falls from trees are uncommon, and so little is known about the characteristics of this type of injury. It is an occupational injury among traditional farmers in developing countries [5,6] and most reports of injuries due to falling from trees are from the tropics [7].

This kind of trauma can cause severe injuries leading to paraplegia and quadriplegia. For example, in parts of the eastern forest belt of southern Nigeria, falls from trees account for more spinal cord injuries than injuries due to road traffic accidents [7]. The present study aimed to describe the characteristics and clinical consequences of falls from trees among patients admitted to 6 hospitals in Tehran, the capital city of the Islamic Republic of Iran.

## Methods

The study group were patients admitted to emergency rooms in 6 general hospitals in Tehran from 23 August 1999 to 21 September 2000. These hospitals are situated in different regions of the city: Imam Hossain hospital in the western part, Moayeri and Sina hospitals in the central part, Hafteteer hospital in the southern part, and Imam Khomeini and Shariatti hospitals in the eastern part. Trauma patients who were hospitalized for more than 24 hours and had sustained injuries within 7 days prior to admission were included in the study. Patients who suffered from burns and poisonings were excluded, since there are other specialized referral centres for these patients in Tehran.

The data was collected using a questionnaire, designed and validated at the Sina Trauma Research Centre. During the study, trained physicians visited trauma pa-

tients in emergency rooms and wards and filled in the questionnaire. The collected data included: patients' demographic details; how and where the injury occurred; length of hospital stay and source of reimbursement for care; clinical signs on admission; anatomical site of injury; Injury Severity Score and Glasgow Coma Scale score; prehospital care and procedures performed during hospitalization.

Descriptive analysis was performed using *SPSS* software, version 10.0 for Windows. Injuries were grouped into standard categories based on *ICD-9* [8].

## Results

During the 13 months, 8500 trauma patients were admitted to the study hospitals; 3100 had been injured due to a fall. Falling from trees accounted for 49 (1.6%) of all injuries from falls.

All the falls from trees were reported to be accidental. Most of these patients sustained injuries during leisure time; only 3 injuries (6.1%) were occupation-related. Homes (40.8% of cases) and recreational/sports grounds (32.7%) were the most common places where trauma occurred. The height of falling could not be established accurately, but the maximum falling height was estimated to be about 7 metres. Most falls had occurred in the 3rd month of the summer (23 August-21 September) and on Tuesdays with 12 (24.0%) cases occurring on this day. The type of tree could not always be identified, but it was most often a fruit tree such as mulberry or apple.

The mean age of patients was 31 years (range 6 to 74 years) and 21 (42.9%) were under 20 years of age (Table 1). Furthermore, 17 patients (34.7%) were students. Most patients (46, 93.9%) were male.

Table 1 Distribution of patients falling from trees by age and sex

| Age (years) | Males No. | Females No. |
|-------------|-----------|-------------|
| < 10        | 10        | 0           |
| 11-20       | 11        | 0           |
| 21-30       | 8         | 0           |
| 31-40       | 5         | 0           |
| 41-50       | 3         | 1           |
| 51-60       | 2         | 0           |
| 61-70       | 4         | 2           |
| 71-80       | 3         | 0           |
| 80+         | 0         | 0           |

All patients had a normal Glasgow Coma Scale score of 15 except for 1 patient with a reduced score of 14. The majority of the patients had suffered only mild or moderate injuries; the Injury Severity Score was rated mild for 31 cases (63.3%), moderate for 15 (30.6%) and severe for 3 (6.1%). No internal organ injuries were detected among the patients. The most common anatomical site of injury was the upper limbs, followed by the lower limbs and spinal column, respectively (Table 2). Eleven patients (22.4%) sustained a fracture of the spinal column, 4 of them became permanently paraplegic (2 who had severe thoracic vertebral fractures were transferred to other hospitals for treatment). One patient had Colle's fracture in both arms.

The average length of hospitalization was 6.1 days (range 1 to 37 days), and no patients were admitted to the intensive care unit. Only 20 patients (40.8%) had a source

Table 2 Distribution of patients falling from trees according to anatomical site of injury

| Site of injury                                  | No. of patients |
|---|-----------------|
| <i>Head and neck</i>                            |                 |
| Mandibular fracture                             | 2               |
| Skull vault fracture                            | 1               |
| Dental fracture                                 | 1               |
| Total   | 4               |
| <i>Spinal column, thorax and pelvic</i>         |                 |
| Spinal fracture with neurological deficit       | 4               |
| Spinal fracture with no neurological deficit    | 7               |
| Ilium fracture                                  | 1               |
| Acromioclavicular dislocation                   | 1               |
| Rib fracture with pneumothorax                  | 1               |
| Total   | 14              |
| <i>Upper limbs</i>                              |                 |
| Humerus fracture (lower end)                    | 3               |
| Colle's fracture                                | 8               |
| Colle's fracture with ulnar and radius fracture | 1               |
| Ulnar and radius fracture (shaft)               | 3               |
| Ulnar and radius fracture (lower end)           | 1               |
| Radius fracture (body) & wrist dislocation      | 1               |
| Thumb fracture                                  | 1               |
| Total   | 18              |
| <i>Lower limbs</i>                              |                 |
| Femur fracture (neck)                           | 3               |
| Femur fracture (pretrochanteric)                | 4               |
| Femur fracture (body)                           | 1               |
| Femur fracture (lower end)                      | 2               |
| Patellar fracture                               | 4               |
| Tibia fracture                                  | 2               |
| Calcaneus fracture                              | 2               |
| Toe fracture                                    | 1               |
| Total   | 19              |
| <i>All sites<sup>a</sup></i>                    | 55              |

<sup>a</sup>Some patients had more than 1 injury.

of reimbursement for hospital care. Among the patients, 28 (57.1%) had received pre-hospital care.

## Discussion

Disability resulting from trauma is a major problem for the health services especially when it involves the young [9]. Meanwhile, patients with spinal cord injuries carry a heavy burden, as they will be afflicted for years, sometimes for the rest of their lives. In addition to the acute morbidity, people with spinal cord injuries will suffer from chronic problems as they age, such as chronic bladder infections and postural problems [10,11].

As mentioned earlier, there are few published reports about falling from trees. Eboong reported 60 patients who had fallen from trees in Nigeria [5]. Males were prominent; 78% of cases were farmers and only 22% were schoolchildren and the most important injuries were vertebral fractures. In addition, all 6 patients who had sustained fracture dislocation of the cervical spine suffered from permanent quadriplegia [5]. Okonkwo described 72 patients who were treated for spinal cord injuries, among whom the most common cause of injury was falling from trees (41% of the patients). The 40–49 year age group was at the greatest risk [7]. Toe reported 36 patients who had sustained spinal col-

umn injuries. Among them, 25 (70%) had fallen from trees. The majority of the cases were young male farmers and injuries to the thoracolumbar area were prominent [6].

Compared with other reports, a few points of interest have emerged from this study. Children and adolescents were prominent (42.9% of cases). The most common sites of accidents were home and recreational/sports grounds (40.8% and 32.7% of cases respectively) and most falls occurred during leisure time. Only in 3 cases (6.1%) was the injury considered occupational. Spinal column fractures were the most serious injuries among our patients (22.4% of cases).

Due to the accidental nature of these injuries and high morbidity rates among young people, especially for severe spinal cord injuries, effective education programmes in the Islamic Republic of Iran for high risk groups seems necessary. The most common reason for climbing trees among children and adults was to pick the fruit, so restrictions on planting fruit trees in public places might reduce the temptation to climb trees. Planting fruit trees which do not grow tall, such as cherry and black cherry, or covering the ground below trees with soft ground or grass may reduce the severity of injuries in those who fall from trees.

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### Accidents and injuries

Each year unintentional injuries account for more than 400 000 deaths globally, the majority in children and adolescents. Most of these occur in low- and middle-income countries. Many of those who survive these injuries suffer life-long disabling health consequences. Information on WHO's work in the prevention of accidents and injuries is available at: <http://www.who.int/ceh/risks/cehinjuries/en/>