



Home and leisure activities and childhood knee injuries

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KEYWORDS

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Summary

Aim: To assess the relative occurrence of non motor-vehicle knee injuries and identify important clusters that can be targeted for preventive interventions.

Methods: The study subjects covered 2167 children (0–14 years) who suffered non motor-vehicle knee injuries out of 66 870 registered during a three-year period in an established Emergency Department Injury Surveillance System (EDISS). A more serious joint injury was identified in 263 (12%) children, whereas the remaining 1904 children had only soft tissue knee injuries.

Results: The incidence of non motor-vehicle knee injuries was estimated at 6.5 per 1000 children-years. Both the incidence of knee injuries and the male-to-female ratio increase with increasing age, reflecting the gender and age pattern of physical activity. Three clusters were identified: The first consisted of more serious knee injuries among older children, frequently resulting after a fall from stairs or a collision in school during winter months; the second cluster consisted of rather minor knee injuries occurring mostly among younger girls at home or in playgrounds, following a fall after stumbling or hit by an object while playing, especially during the summer; the third cluster comprised injuries among older boys, sustained mainly subsequent to overexertion in a sports area.

Conclusion: Knee injuries tend to be more common among boys but more serious among girls. More and less serious knee injuries tend to fall into distinct clusters that could facilitate prioritisation of preventive measures.

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Introduction

Injuries constitute an important cause of childhood morbidity in economically developed countries and knees are among the most commonly injured body parts in children⁸. Children are involved in a wide

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range of physical activities, among which sports are only a fraction. Apart from sport knee injuries, however, there are few studies concerning acute knee injuries¹⁷. Description of patterns and identification of factors predicting the severity of knee injuries among children may facilitate the development and implementation of relevant preventive strategies.

The epidemiology of knee injuries among adults has been studied more extensively¹⁴. Childhood bones, however, are more porous than adult bones. The proportionally more extensive harvesian canal system makes them more vulnerable to compression rather than tension injuries compared to the bones of adults¹¹. Additionally, children tend to engage in different types of physical activity in comparison to adults. Thus, inferences from studies about knee injuries and the potential for their prevention among adults may not be strictly applicable to childhood population groups.

We have undertaken a study aiming at estimating the incidence of knee injuries among Greek children, assessing their severity and depicting important time-, place-, and person-coordinates of their severity. Knee injuries resulting from road traffic crashes or those intentionally inflicted were excluded, because their patterns of occurrence are generally different.

Patients and methods

The pattern of unintentional, motor vehicle unrelated knee injuries among children (0–14 years old) was studied using data retrieved from the Emergency Department Injury Surveillance System (EDISS) database established in the Hellenic Center for Research and Prevention of Injuries among the Young. All types of childhood injuries treated at the Emergency Departments (ED) of participating hospitals are regularly recorded in this database. Specifically, data are contributed by four hospitals across the country, two of which have defined population coverage, namely the district hospital of Volos in the Magnesia region of the Greek mainland and the district hospital of Kerkyra in the island of Corfu. The other two hospitals are in the Greater Athens area: the Aglaia Kyriakou Children's hospital (one of the two major children's teaching hospitals) and the Asclipeion of Voula Trauma hospital. The latter two hospitals cover about 28.9% of the ED visits of the underlying childhood population⁵. Specially trained health visitors interview in person every injured child who visits the ED and his/her escort. Pre-coded questionnaires, which cover sociodemographic variables (gender, age), event characteristics (place,

activity, mechanism, time) and nature of injury (type of injury, injured body part, number of injuries, treatment) are used.

The study subjects consisted of children with the indicated type of injuries who visited the Emergency and Accident Departments of the collaborating hospitals during the three-year period from January 1st, 1996 to December 31st, 1998. During this period a total of 66 870 children with injuries were recorded in EDISS. Among them, the knee was reported as injured in 2615 (3.9%). In 139 of these children no injury was eventually diagnosed or detailed information was missing. Knee injuries among the remaining 2476 children were due to motor-vehicle crashes in 305 instances whereas four injuries were reported as intentionally inflicted. Therefore, for 2167 children (82.9%), knee injuries were unintentional and unrelated to motor-vehicle crashes. The study population was divided into two groups: the first, consisted of children who suffered an injury of the knee joint that was considered more serious (fracture, dislocation, sprain), whereas the second group included children with less serious injuries concerning soft tissues in the knee area (bruise, abrasion, open wound and other). Nationwide estimates of incidence of unintentional motor vehicle unrelated knee injuries by gender and age were estimated using previously derived sampling ratios⁵. Further analysis of the data was performed through simple cross tabulations. Subsequently, multiple logistic regression was undertaken and the adjusted odds ratios (ORs) for a more rather than less serious knee injury were calculated for specified categories of the predictor variables. "Explanatory" variables in the multiple logistic regression model were included after preliminary examination of the data. Criteria for inclusion were either biosocial relevance, irrespectively of statistical significance, or evidence for statistical associations. The existence of modification by age was checked by directly comparing the age-specific regression coefficients¹². The risk profiles of more versus less serious childhood knee injuries by mechanism of injury as well as time-, place- and person parameters were ascertained through cluster analysis³. This procedure identifies relatively homogeneous groups of cases based on a combination of characteristics.

Results

The incidence of childhood knee injuries, excluding those that were intentional or related to motor vehicles is shown in Table 1. Denominator data were abstracted from the National Statistical Service of

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