Injuries in primary care practices

R Gofin, M Lison, C Morag

Abstract

A study of injuries among 0–15 year old children attending primary care clinics in a low social class and a middle class neighbourhood was carried out during a period of one year. Data were collected in a structured form by the physicians while the patient was in the clinic. The rate of injuries was 121·3/1000 children per year in the clinic from the lower social class neighbourhood and 70·7/1000 children per year in the clinic from the middle class neighbourhood. Injuries in playgrounds, and on pavements and streets occurred in higher proportions in the low social class than in the middle class neighbourhood clinics. The most frequent causes of injuries were falls and being struck and injured by cutting/piercing instruments; these caused mostly contusions and lacerations. The clinic was the first place of treatment in 65% of the cases in the middle class area and in 45% in the lower social class area; 28% and 10% respectively were referred to the hospital for additional treatment.

Data from primary care clinics should be considered when estimating the incidence of injuries in the community, in planning intervention programmes, and future research.

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Injuries are one of the most preventable health problems, but they nevertheless constitute the main cause of death for 1–19 year old children in developed countries,¹ as well as being an important cause of hospitalisation,^{2–4} consultation in accident emergency departments,^{2–5} and consequent disabilities.^{6–7}

After a workshop on community oriented primary care,⁸ which was organised by the School of Public Health and Community Medicine of Hadassah and the Hebrew University for paediatricians working in community primary care clinics of the Sick Fund of the General Federation of Labour in Israel, two of the participants identified injuries as one of the priority health problems requiring intervention in their practices. Together with staff from the school a study was planned to determine the feasibility of carrying out surveillance of injuries as part of routine primary care services delivered by the physicians. The incidence, circumstances, causes, nature, treatment, and disposition of injuries treated in their clinics were studied. Comparisons were made between the practice located in a low social class neighbourhood and the other in a middle class area.

Population and methods

The practices were located in two cities in the coastal plain of Israel. According to the 1983 census in the lower social class and middle class area 13% and 40% of the population respectively were professionals, 42% and 58% of the women aged 15–60 were employed, and the median years of schooling was 10·4 and 12·2 respectively.⁹ Eighty percent of the population in these communities had medical insurance with the General Federation of Labour Sick Fund. The clinics studied were open six days a week during morning and afternoon hours and performed similar activities in both locations.

The study population covered children 0 to 15 years old registered in the practices of the two physicians in the lower social class neighbourhood (n=2765) and of one physician in the middle class neighbourhood (n=1582). The sample was selected by randomly choosing one week each month from September 1987 to August 1988 in which all visits due to injuries were registered by the physicians on a specially designed form while the patient was in the clinic. Parents or carers accompanying the child were asked about sociodemographic information (age and sex of the child, mother's origin, education, age and working status, social class according to an adaptation of the British Registrar General's occupational grade,¹⁰ number of children in the family) causes, circumstances surrounding the injury, and care provided before reaching the clinic. The nature and location of the injury were registered by the physician. This procedure took about three minutes for each case.

Data was analysed using the SPSSX program.¹¹ Rates/1000 children per year were calculated by dividing the number of children in the sample by the denominator population and then multiplying the results by a factor of 4·3 (52/12). Confidence intervals (95%) were calculated using the Poisson approximation to the binomial distribution,¹² and χ^2 tests were performed to compare proportions based on the sample figures.

Results

The incidence of childhood injuries (table 1) was 1·7 times higher in the clinic in the lower social class neighbourhood than that in the clinic in the middle class neighbourhood. In both, the rates increased with age. The differences between the two clinics were larger among the 0–4 and 5–9 year olds than among the 10–15 year olds. Boys attended the clinic 1·9 times more than girls in both clinics at all age groups.

Department of
Social Medicine,
Hadassah Medical
Organization,
The Braun School of
Public Health
and Community Medicine
of Hadassah and
the Hebrew University
R Gofin

Israel General
Federation of Labour
Sick Fund (Kupat Holim)
M Lison
C Morag

Correspondence to:
Dr Rosa Gofin,
Department of
Social Medicine,
School of Public Health
and Community Medicine,
PO Box 1172,
Jerusalem 91010,
Israel.

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There were statistically significant differences in the proportion of children attending the two clinics in respect of social class, mother's education and work outside the home, probably reflecting the sociodemographic structure of the two populations (table 2).

CIRCUMSTANCES SURROUNDING THE INJURY

There was a higher percentage of attendances due to injuries in the summer months (June to August) in both clinics. There was no specific pattern of consultation by day of the week or time of the day in either clinic. About 50% of the injuries occurred on a free school day (Saturday or holiday) in both clinics.

The majority of the injuries took place in the

home and while playing in a playground. The differences by place of occurrence in the two clinics were statistically significant, $p=0.027$ (table 3). About half the injuries that occurred at home were among 0–4 year olds (50% in the lower social class and 57% in the middle class area). Injuries that occurred in playgrounds in the lower social class area involved broken glass and litter more frequently than in the middle class area. The involvement of other children, whether in ball games or rough play, was more frequent in the lower social class area.

CAUSES AND NATURE OF INJURIES

The causes of injuries (table 4) were falls, being struck by objects and other children, cutting/piercing instruments, road accidents (riding on bicycles: 10 children, and as passenger of a car: one child), and, with less frequency, burns (scalds by hot liquids, hot irons, and matches), and bites/stings. There were no cases of poisoning. Whether the injuries occurred at home, in schools, playgrounds or on streets or pavements, falls were the most frequent cause of injuries, followed by being struck.

The injuries resulted mostly in contusions/haematomas and cuts and with less frequency burns and fractures. Falls caused contusions, haematomas, and one of the fractures. Lacerations were caused by glass, piercing instruments, falls, and being struck. The bicycle accidents caused lacerations, contusions, and haematomas.

The head was the part of the body most affected followed by upper and lower extremities. Injuries to the head and face included one child with broken teeth, one child with eye injuries (both caused by being struck by blunt objects), and seven with injuries to lips, nose, or ears. Four children required the removal of fingernails. Fractures were in the upper limbs and ribs. The number of head injuries decreased with increasing age. The differences in the two areas are presented in table 4.

TREATMENT AND DISPOSITION

In 65% of the cases in the middle class area and in 45% of the cases in the lower social class area the clinic was the first place of treatment. For the rest of the children treatment was given before their arrival, either in the school/ kindergarten/day care centre or by parents or other lay persons. Thirty one percent of the children in each clinic were released to their homes; 58% in the clinic in the lower social class area and 41% in the clinic in the middle class area needed to return for follow up and 10% and 28% respectively were sent to hospital for further treatment. Among the latter were children with fractures. In both clinics all children who suffered burns and those who were involved in road accidents were treated at the clinic and did not require referral.

Discussion

The present study reports on injuries that were treated in two primary care practices. Very few

Table 1 Injury incidence rate/1000 children per year in two primary care clinics by age

Age (years)	Clinic area			
	Middle class		Lower social class	
	No	Rate (95% CI)	No	Rate (95% CI)
0–4	532	56.5 (22.7 to 116.5)	776	110.8 (67.5 to 171.2)
5–9	655	65.6 (31.5 to 120.7)	893	115.6 (74.1 to 171.9)
10–15	395	98.0 (44.9 to 185.9)	1096	117.7 (79.4 to 168.0)
Total	1582	70.7 (46.1 to 103.6)	2765	121.3* (94.6 to 148.3)

CI=confidence interval.

*Includes four children with missing age.

Table 2 Sociodemographic characteristics of the injured children by clinic (%)

	Clinic area		p Value
	Middle class (n=26)	Lower social class (n=78)	
Social class:			
I-II	39.1	11.3	
IIINM	17.4	16.1	
IIIM-V	43.4	72.6	0.01
Mother's education (years):			
0–8	11.5	38.0	
9–11	23.1	39.4	
≥12	65.4	22.6	0.000
Mother's age (years):			
20–24	4.0	13.3	
25–29	20.0	24.0	
30–34	20.0	25.3	
≥35	56.0	37.3	0.334
No of children in family:			
1–2	50.0	37.2	
3	34.6	33.3	
≥4	15.4	29.5	0.317
Mother's work:			
Outside home	60.0	35.2	
Housewife	40.0	64.8	0.000

There were 1–3 missing values in the middle class neighbourhood and 4–7 in the lower social class neighbourhood.

Table 3 Place of occurrence of injury by clinic (%)

Place of occurrence	Clinic area	
	Middle class (n=24)	Lower social class (n=76)
Home	33.3	23.7
Playground	25.0	38.2
Educational facilities	12.5	17.1
Street/pavement	12.5	19.7
Other	16.7	1.3
Total	100.0	100.0

Table 4 Cause, nature, and location of injury by clinic (rate/1000 children per year)

	Clinic area			
	Middle class		Lower social class	
	No	Rate (95% CI)	No	Rate (95% CI)
Cause:				
Fall	10	27.2 (13.0 to 50.0)	32	49.8 (33.9 to 70.1)
Struck by object	10	27.2 (13.0 to 50.0)	23	35.8 (22.7 to 53.7)
Piercing	4	10.9 (3.0 to 27.8)	9	14.0 (6.4 to 26.6)
Fire/flames	0	—	4	6.2 (1.7 to 15.9)
Road accident	1	2.7 (0.0 to 15.1)	10	15.5 (7.5 to 28.6)
Bites/stings	1	2.7 (0.0 to 15.1)	0	—
Nature:				
Contusions/haematomas	19	51.6 (31.1 to 80.6)	37	57.5 (40.4 to 79.3)
Lacerations	12	32.6 (16.9 to 57.0)	42	65.3 (47.1 to 88.3)
Burns	0	—	4	6.2 (1.7 to 15.9)
Fractures	2	5.4 (0.7 to 19.6)	2	3.1 (0.4 to 11.2)
Strains/sprains	0	—	2	3.1 (0.4 to 11.2)
Other	1	2.7 (0.0 to 15.1)	1	1.5 (0.0 to 8.7)
Location:				
Head	8	21.7 (9.4 to 42.8)	31	48.2 (32.7 to 68.4)
Face:				
Eyes	1	2.7 (0.0 to 15.1)	0	—
Lips/nose/ears	0	—	7	10.9 (4.4 to 22.4)
Teeth	0	—	1	1.5 (0.0 to 8.7)
Upper extremity	10	27.2 (13.0 to 50.0)	19	29.5 (17.8 to 46.1)
Lower extremity	7	19.0 (7.6 to 39.2)	21	32.7 (20.2 to 49.9)
Chest	1	2.7 (0.0 to 15.1)	2	3.1 (0.4 to 11.2)

CI=confidence interval.

*A child may have more than one type of injury and may be injured in more than one location.

studies have been reported in such locations.^{6 13} Continuing surveillance of childhood injuries, based on interview with parent or carer when attending a primary care clinic has not been reported previously. Other studies were based on review of records and postal interviews after the injury occurred.

Comparison of incidence rates with these other studies is difficult because of the different methodologies used, different sociodemographic characteristics of the population, patterns of utilisation of services, and the availability and accessibility of medical care. These factors may explain the lower rates in our study than those reported by a general practice serving a mixed lower and upper middle class area in England where more than one out of every five children aged 0–15 years consulted for injuries per year.¹³ They are also lower than those of a report from a Health Maintenance Organization practice in the US serving a highly educated population where the rate was 139/1000 children aged 0–14.⁶

The difference in rates between the two practices may indicate an overall higher risk in the neighbourhood where lower social class and poorer education may lead to a home environment less protective of childhood activities as well as to a neglected outdoor environment. This may be more evident among children in the two younger age groups than among 10–15 year olds. Patterns of behaviour of the older age group may be less dependent on family background and environment and more related to risk taking characteristics of adolescents. Although social class, educational, and ethnic differences in injury rates have been observed in different populations,^{14–17} no definite conclusions could be drawn from the present study as denominator data for calculation of specific rates or for the comparison of proportions were not available. The differences in rates between

the two practices may also be explained by the parents' pattern of care seeking behaviour and the availability and accessibility of medical care. The selection of source of care may be affected not only by the nature of the injury, as perceived by the carers, but by their expectation of the treatment needed. Hospital emergency services are covered by the Sick Fund and their facilities are located in the two communities within easy reach of the populations under study. Parents may decide to take their child to the hospital directly without attending the primary care clinic in the neighbourhood. Visiting another primary care clinic where the child is not registered is unlikely. There was no information available as to different patterns of use of other health services for injuries or for other health conditions.

The higher occurrence of injuries among boys compared with girls is a well known phenomenon.¹⁸ Some of these differences might be due to differences in exposures to the risks and to differences in the children's behaviour.

In a relatively high percentage of the consultations the clinic was the second place of treatment. For children who received first aid in schools, kindergartens, or day care centres, the community clinic may provide the required treatment without the necessity of attending an accident and emergency department which was required for a few children. The experience of the physician and the facilities available in the clinic may affect the management of the injured child in terms of treatment and follow up.

The present study points to several factors. (1) To estimate the total incidence of childhood injuries occurring in the population, other sources of care besides those in hospital should be taken into account. Basic sociodemographic information should be available to allow for comparisons between different clinics and sources of care. (2) It is feasible to gather information as part of routine care in the clinic. The use of a specially designed form and the collection of information on a sample basis contributed to the ease of the procedure. The increasing availability of computers may facilitate the collection of data. (3) The findings of studies such as the one presented here should be the basis for the development of community oriented programmes for the promotion and improvement of the health of children, through activities in the clinic and changes in the environment. They also provide a basis for future research by clinicians in their practices.

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- 1 Tackett A. Accident mortality in children, adolescents and young adults. *World Health Stat Q* 1986;39:232–56.
- 2 Gallagher SS, Finison K, Guyer BF, Goodenough S. The incidence of injuries among 87 000 Massachusetts children and adolescents: results of the 1980–81 statewide childhood injury prevention program surveillance system. *Am J Public Health* 1984;74:340–7.
- 3 Gofin R, Israeli I, Palti H. The epidemiology of accidental injuries among children and adolescents. *Isr J Med Sci* 1991;27:566–71.
- 4 Tirez L, Garros B, Maurette P, et al. Incidence, causes and severity of injuries in Aquitaine, France: a community

- based study of hospital admissions and deaths. *Am J Public Health* 1985;75:1429-32.
- 5 Gofin R, Palti H, Adler B, Edet E. Childhood injuries: a population study of emergency room visits in Jerusalem. *Paediatr Perinat Epidemiol* 1989;3:174-88.
 - 6 Rivara FP, Calogne N, Thompson R. Population-based study of unintentional injury incidence and impact during childhood. *Am J Public Health* 1989;79:990-4.
 - 7 Department of Health and Human Services. *Persons injured and disability days due to injuries. United States, 1980-81. Vital and health statistics*. US Department of Health and Human Services. Public Health Service. Hyattsville, Maryland: National Center for Health Statistics. 1985. Series 10 No 149.
 - 8 Gofin J, Mainemer N, Kark SL. Community health in primary care. A workshop on community oriented primary care. In: Laaser U, Senault R, Viefhues H, eds. *Primary health care in the making*. Heidelberg: Springer-Verlag, 1985:17-21.
 - 9 Central Bureau of Statistics. *Classification of geographical units according to the socioeconomic characteristics of the population*. Jerusalem: State of Israel, Central Bureau of Statistics, 1987 (1983 census of population and housing; publications No 15).
 - 10 Kark SL, Peritz E, Shiloh A, Slome C. Epidemiologic analysis of the hemoglobin picture in parturient women in Jerusalem. *Am J Public Health* 1964;54:947-60.
 - 11 SPSS Inc. *Statistical package for the social sciences (SPSSX). User's guide*. New York: McGraw Hill, 1983.
 - 12 Beyer WH, ed. *Handbook of tables for probability and statistics*. Cleveland, Ohio: The Chemical Rubber Co, 1968:239.
 - 13 Agass M, Mant D, Fuller A, Coulter A, Jones L. Childhood accidents: a practice survey using general practitioners' records and parental reports. *Br J Gen Pract* 1990;40:202-5.
 - 14 Brown GW, Davidson S. Social class, psychiatric disorder of mother and accidents to children. *Lancet* 1978;i:378-80.
 - 15 Larson CP, Pless BI. Risk factors for injuries in a 3 year old birth cohort. *Am J Dis Child* 1988;142:1052-7.
 - 16 Rivara FP. Epidemiology of childhood injuries. I. Review of current research and presentation of conceptual framework. *Am J Dis Child* 1982;136:399-405.
 - 17 Williams BC, Kotch JB. Excess injury mortality among children in the United States. Comparison of recent international statistics. *Pediatrics* (suppl) 1990;86:1067-77.
 - 18 Rivara F, Bergman AB, LoGerfo JP, Weiss NS. Epidemiology of childhood injuries II. Sex differences in injury rates. *Am J Dis Child* 1982;136:502-6.