Community-based study of unintentional injuries among preschool children in Damascus

H. Bashour[1] and M. Kharouf[1]

دراسة مجتمعية حول الإصابات غير المتعمدة بين الأطفال الذين لم يلتحقوا بعد بالمدارس في دمشق

هيام بشور، ميادة خاروف

الخلاصة: أجري مسح منزلي استعادي حول إصابات الأطفال بين 1125 طفلا لم يبلغوا سن الالتحاق بالمدرسة في دمشق من أجل تقصي عوامل الاختطار. وقد استغرقت الدراسة 12 شهراً في أربعة مناطق سكنية: منطقة زراعية ريفية، ومنطقة ريفية ولكنها ليست زراعية، ومنطقة حضرية على أطراف المدينة، ومنطقة حضرية. وكانت أكثر من 75٪ من الأمهات يعتقدن بإمكانية تلافي هذه الإصابات. وخلال العام الذي سبق الشروع في هذه الدراسة، تمَّ التبليغ عن حدوث 261 إصابة، بمعدل وقوع يصل إلى 23٪. وكانت أكثر الإصابات حدوثاً (52٪ منها) بسبب السقوط، وأغلبها (73.9٪) حدثت داخل المنزل. وعلى هذا فإن نمط المسكن هو المؤشر الذي يمكن من خلاله التنبؤ بإمكانية حدوث الإصابات.

ABSTRACT To assess injuries among 1125 preschool children in Damascus, and to investigate the risk factors, a retrospective home survey of childhood injuries for a period of 12 months was carried out in 4 areas of residence: agricultural rural, non-agricultural rural, periurban and urban. More than 75% of mothers believed that injuries were preventable. During the year preceding the study, 261 injuries were reported, an incidence of 23%. The most frequent injuries were from falls, 52.0%, and most injuries (73.9%) occurred inside the home. Area of residence was the only independent predictor for the occurrence of childhood injuries.

Étude communautaire sur les traumatismes non intentionnels chez les enfants d'âge préscolaire à Damas

RÉSUMÉ Afin d'évaluer les traumatismes chez 1125 enfants d'âge préscolaire à Damas et d'étudier les facteurs de risque de ces traumatismes, une enquête ménage rétrospective sur les traumatismes chez l'enfant a été menée sur une période 12 mois dans quatre milieux : rural agricole, rural non agricole, périurbain et urbain. Plus de 75 % des mères estimaient que les traumatismes étaient évitables. Au cours de l'année ayant précédé l'enquête, 261 traumatismes avaient été déclarés, ce qui correspond à une incidence de 23 %. Les traumatismes les plus fréquents étaient dus à des chutes (52,0 %) et la majorité des traumatismes (73,9 %) se produisaient au domicile. Le type d'environnement était le seul facteur prédictif indépendant de la survenue de traumatismes chez les enfants.

[1]Department of Family and Community Medicine, Faculty of Medicine, Damascus University, Syrian Arab Republic (Correspondence to H. Bashour: hbashour@scs-net.org).
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Introduction

Homes should be a haven of safety for young children, nevertheless, they represent the most frequent site of injury occurrence. Injuries are the leading cause of death in childhood and a significant cause of morbidity [*1,2*]. The size of this public health problem differs between developed and developing countries [*3*]. In most industrialized countries, including Canada and the United States of America, unintentional injuries rank as the number one cause of death and a leading cause of hospitalization for children older than 1 year [*4*]. Most of those injuries occurred at home.

Injuries also account for significant health service utilization, presenting an enormous social and economic burden. The impact of childhood injury is immense in terms of the direct financial cost and the enormous emotional toll of death and disability. Injury prevention thus deserves highest priority from those responsible for improving child health [*5*].

Two population-based studies carried out in Syria in 1996 and 2001 reported that injuries were the leading cause of death among children aged 1–4 years [*6,7*]. There is no surveillance system to monitor the occurrence of childhood injuries in the country. Data from hospitals and emergency departments, although available, are not the ideal source to study epidemiological features of childhood injuries owing to their poor quality. Furthermore, such sources would only report the serious and fatal cases. A national study of injuries among preschool children in 2001 reported 10.4% prevalence, 50% of which occurred at home [Ministry of Health, unpublished report (*A study of the prevalence of accidents among preschool children*), 2001]. The epidemiological literature has identified demographic and social characteristics as well as behaviours of both children and their parents as risk factors for childhood injury [*8*].

To date, most research has been conducted in industrialized countries, and only a few studies have been done in developing countries. Our study aimed to assess the magnitude of injuries among preschool children in Damascus and to investigate their risk factors. We took into consideration a wide range of aspects of children and their families in an attempt to identify the most significant risks. The findings should serve as a basis for formulating community-based intervention for possible testing and implementation.

Methods

Study population

Children under 5 years of age residing in 4 different areas in Damascus, the capital of Syria, were recruited for this study. Administratively, Damascus consists of 2 provinces, the city and rural Damascus. The areas of residence were: rural (agricultural); rural (non-agricultural); peri-urban and urban. Children were identified via a house-to-house survey in the selected areas. The main selection criteria apart from the areas of residence included the total population (minimum 5000; Ministry of Health criterion for establishing a health centre is population $\geq$ 5000) and the existence of a defined health centre that served the area. The areas selected were: Kaissa (rural, agricultural); Khyaret Dannoun (rural, non-agricultural); Daff Al-Shok (peri-urban), and Al-Adawi (urban).

After stratifying for the type of area (urban or rural), areas were selected randomly from an official list of areas/populations served by health centres which was provided by the Directorate of Health Districts, Ministry of Health. A sampling frame that included all areas with a population of approximately 5000 persons was formu-

lated as a base for random selection. The minimum sample size was calculated on the basis of estimating prevalence using a 95% confidence and an 80% power and an estimated prevalence of 10%; acceptable level of error was 2%. The sample size was increased by a factor of 1.5 to allow for the sampling design. Thus the required sample was estimated at 1296.

The population of Kaissa are mainly engaged in agricultural work. A small river crosses the village, and the houses are isolated from each other. In Khyaret Dannoun, people are mainly engaged in manual labour. The village is located in rather desert-like area close to an industrial compound and the houses are close to each other. Daff Al-Shok is a peri-urban area where the houses are very crowded and not well constructed. The people are mainly engaged in small businesses. Al-Adawi is an urban area in Damascus with tower-like buildings.

Data collection

Two questionnaires were used to serve the purpose of the study. The first was a census-like form for the house-to-house survey to identify families with children under 5 years old. The second, the main tool of the study, was a semi-structured questionnaire enquiring about occurrence of injuries. An injury was defined in this study as any accident that occurred to the child and required medical attention, not necessary professional (i.e. home management was included). The questionnaire collected demographic data on the family and the child; history of injuries in the previous year; mother's knowledge related to childhood injuries; and environmental description of the home. It was administered to only 1 randomly selected child in families which included > 1 child aged < 5 years. This was done to avoid the clustering effect that may arise from collecting data from the same family.

A score was given for the child's home environment by the field workers. The score was based on their assessment of the environmental hazards existing in the home. The field workers were supplied with a checklist of 60 items adapted from the safety guides of the Home Safety Council [*9*] which they used as a guide in scoring the home environment using a scale from 0 to 10 rather than exactly scoring the checklist due to the extensiveness of the list and its relative irrelevance to all houses. All data were collected by 2 young female sociologists who were specially trained to implement the study tools.

Informed consent of the parents was obtained before the interview, and the community representatives were informed about the study. The study proposal was cleared by ethical review boards at the Faculty of Medicine, Damascus University. The field work lasted from early January 2004 to July 2004.

We carried out a classification of the injuries based on Chapter XX (External causes of morbidity and mortality) of the *International classification of diseases,* version 10 (ICD-10) [*10*].

Statistical analysis

Data from the 2 questionnaires were checked before data entry. Missing values were allowed for in the analysis. Data were analysed using *SPSS* for Windows, version 11. Descriptive statistics were used to examine the characteristics of the participants. The chi-squared test was used to compare proportions, and the *t*-test to compare means. Significance level was 0.05. Stepwise multiple regression was performed to identify risk factors remaining independently significant after adjustment for the other variables.

Results

A total of 1817 houses were surveyed in the 4 areas we studied. This included all the houses in the rural and suburban sites, and a similar number of houses from the urban site. The families were nuclear in 83.1% of all surveyed families. This ranged from 29.2% in Kaissa (rural agricultural site) to 90.0% in Al-Adawi (urban site). A total of 1125 eligible children were enrolled in the study. Mothers were the respondents in 95.4% of cases, with no refusals to participate.

The characteristics of the children under study and their families are shown in Table 1. Mean family size was 6.1 [standard deviation (SD) = 2.9]. Around 75% of the children were > 2 years old. More than half the mothers had ≤ 6 years of school education; 34.1% of the fathers had a small business.

The incidence of childhood injuries, calculated retrospectively for the year preceding the study, was 23.2% (Table 2). Almost 75% of injuries occurred inside the home. The injured child was on his/her own in 40.9% of cases. The most frequent type of injury was cuts. The classification was based on the detailed history of the injury as described by the mother. The most frequent cause of childhood injuries was falls. All injuries were mild (manageable at home) or moderate (required medical attention).

Almost 80% of mothers thought that accidents were preventable (Table 3). In their opinion, the causes of the most dangerous childhood injuries were road accidents.

As assessed by the field workers, the mean score for home safety was low, 3.7 (SD 2.9) from a maximum of 10 (Table 4). This was not surprising as field workers were requested to note all possible hazards in the house.

On bivariate analysis of the potential risk factors for childhood injury, the relationship was significant for site (type of location), birth order and number of residents in the house (Table 1).

However, in the logistic regression model, which included all variables, area of residence was the only independent predictor. Living in a rural non-agricultural type of location compared with an urban setting was associated with a significant increase in odds of having an injury [adjusted odds ratio (OR) = 3.8; 95% CI: 2.3–6.3]. Living in a rural agricultural area was also associated with a significant increase in the odds of having an injury (adjusted OR = 2.1; 95% CI: 1.3–3.4).

Discussion

Unintentional injury constitutes a major public health problem that could be assessed by the resulting morbidity and mortality. This study calls attention to unintentional injury as a major cause of morbidity among preschool children living in different settings in Damascus. The incidence reported in this study exceeds that previously reported in the country, 10.4%, by the Ministry of Health study [Ministry of Health, unpublished report (*A study of the prevalence of accidents among preschool children*), 2001]. However it compares quite well with other community-based studies in developing countries, around 12%–30%, although recall periods differed [*3,11–13*]. The injury pattern found in this study is generally similar to that in many other countries in the Region such as Jordan, Islamic Republic of Iran, and United Arab Emirates [*12,14,15*].

This study uncovered a significant relationship between type of location (rural) where the child lives and the occurrence of injury. We believe that further exploration of this relationship is warranted in future studies. A study in a Brazilian squatter settlement also reported a high prevalence

Table 1 **Sociodemographic characteristics of children under 60 months in 4 areas of Damascus and association with occurrence of injury over a 12-month period, *n* = 1125**

Characteristic	Total		Injury reported		*P*-value
	No.	%	No.	%	
Sex					0.312
Male	582	51.7	139	23.9	
Female	543	48.3	122	22.5	
Age (months)					0.43
1–12	24	2.1	6	25.0	
13–24	259	23.0	52	20.1	
25–59	842	74.8	201	23.9	
Birth order					0.04
1st	294	26.3	81	27.6	
2nd–4th	521	46.6	104	20.0	
≥ 5th	302	27.0	74	24.5	
Place of residence					< 0.001
Khyaret Dannoun (rural, non-agricultural)	262	23.3	92	35.1	
Kaissa (rural, agricultural)	386	34.3	89	23.1	
Daff Al-Shok (peri-urban)	283	25.2	56	19.8	
Al-Adawi (urban)	194	17.2	24	12.4	
Mother's age (years)					0.130
≤ 20	91	8.1	26	28.6	
21–30	587	52.5	146	24.9	
31–40	364	32.6	70	19.2	
≥ 41	76	6.8	17	22.4	
Mother's education (years)					0.053
≤ 6	630	56.3	158	25.1	
7–12	418	37.4	93	22.2	
≥ 13	71	6.3	9	12.7	
Mother's working status					0.14
Housewife	975	86.7	233	23.9	
Working outside the home	125	11.1	26	20.8	
Working inside the home	25	2.2	2	8.0	
Father's age (years)					0.297
≤ 20	2	0.2	0	–	
21–30	366	32.7	91	24.9	
31–40	487	43.5	118	24.2	
≥ 41	264	23.6	51	10.3	
Father's education (years)					0.690
≤ 6	432	38.7	106	24.5	
7–12	583	52.3	133	22.8	
≥ 13	100	9.0	21	21.0	
House ownership					0.07
Yes	794	70.6	172	21.7	
No	331	29.4	89	26.9	

Total not always 1125 due to missing data.

Table 2 **Occurrence of injuries in children under 60 months in 4 areas of Damascus over a 12-month period, *n* = 1125**

Variable	No.	%
Injury reported		
Yes	261	23.2
No	864	76.8
Place		
Inside the home	190	73.9
Outside the home	67	26.1
Type		
Cuts	124	48.4
Burns	59	23.0
Bruising/fracture	28	10.9
Other	45	17.6
Cause		
Fall	133	52.0
Exposure to inanimate mechanical forces	48	18.8
Exposure to fire & flames	30	11.7
Exposure to hot substances	26	10.2
Exposure to electric current	8	3.1
Accidental poisoning	5	2.0
Exposure to animate mechanical forces	4	1.6
Accidental drowning	2	0.8
Child had a companion at the time of the injury		
Yes	152	59.1
No	105	40.9
Outcome		
Complete recovery	237	90.8
Consequences	24	9.2

The total is not always the same owing to missing data.

Table 3 **Mothers' perception of childhood injuries**

Perception of mother	No.	%
Injuries are preventable		
Yes	882	78.6
No	240	21.4
Most dangerous cause of injury		
Road accident	451	34.9
Exposure to fire	305	23.6
Drowning	209	16.2
Exposure to electricity	140	10.8
Falls	112	8.7
Poisoning	74	5.7
Reasons for childhood injuries		
Lack of attention and care	597	74.8
Child's hyperactivity	85	10.6
Being outside the home	64	8.0
Do not know	42	5.3
God's will	10	1.3

The total is not always the same owing to missing data.

of injuries (30%), which was related to the rough topography of the location [*11*]. A study in Uganda found, however, higher incidence of injury in urban settings [*16*]. Rural and urban differences in the occurrence of childhood injuries, although well reported in the literature, showed varied results. Acknowledging the importance of type of location in our study raises questions about the importance of environment in any injury prevention programme.

Homes, in general, were not safe for children, and the outside environment was very much problematic in rural areas, where children spend more time outside the home. In addition, they are prone to many hazards in poorly structured houses. The rural population in the Syrian Arab Republic is about 50% of the total population, thus, serious consideration of the findings is warranted. What further complicates the issue is the low socioeconomic status of rural families. The higher occurrence of childhood injury in 2 areas of our study could be an indication of the combination of poor housing, risky recreation spaces, and the use of off-site toilet arrangements in the dark as major causes.

Our findings are, however, surprising in other ways: there was no correlation with the age and sex of the child, as has been reported previously [*17*]. Also, socio-

Table 4 **Relationship between the occurrence of injuries and characteristics of the home in children under 60 months in 4 areas of Damascus**

Characteristic	Injuries reported		*P*-value
	Yes Mean (SD)	No Mean (SD)	
Size of family	6.2 (3.1)	6.1 (2.8)	0.68
No. resident at house	9.0 (6.6)	8.1 (5.5)	0.03
Score for home environment (total = 10)	3.7 (2.9)	3.3 (2.9)	0.08

SD = standard deviation.

demographic characteristics did not correlate with childhood injury, except for number of residents in the house (this could be a proxy-indicator of the poor socioeconomic status of families). Furthermore, we found no significant correlation between the occurrence of childhood injuries and the score given to the home environment. This is not surprising as the tool used to assess the home environment was very sophisticated for the setting.

Child safety programmes need to be tailored to the home environment in different settings. Interestingly, most of the women in this study perceived behavioural issues such as lack of attention and care to be responsible for childhood injuries; they did not, however, fully appreciate the role of the child's environment.

The main limitation of this study was the long recall period that was used. Thus we presume the occurrence of unintentional injuries may have been under-estimated. A recent study from Tanzania recommended a recall period as short as 3 months for non-fatal injuries [*18*]. We do not, however, think that recall problems affected our main conclusion regarding the difference between rural and urban areas.

Our findings support the role of environment in the occurrence of childhood injuries, and also call for this issue to be considered in injury prevention programmes and rural development projects. There is also a need for further research on the determinants of childhood injuries in developing countries.

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