

Injury prevention program in primary care: process evaluation and surveillance

Rosa Gofin, Dina De Leon, Barry Knishkowsky, Hava Palti

Abstract

Objectives—To carry out process evaluation and surveillance in a community oriented primary care program for injury prevention among children 0-2 years old (n = 306).

Setting—Mother and child health clinic in a defined area of Western Jerusalem.

Methods—An injury prevention program was integrated into the routines of the mother and child health clinic. The program consisted of injury surveillance and counselling using a developmental approach, regarding car safety and the prevention of falls, burns, suffocation, poisonings, cuts, drowning, and electrocution. Process evaluation and surveillance were based on records integrated into the child's personal file in the clinic.

Results—Process evaluation indicated that counselling coverage was 73% in the 0-5 month age group and decreased to 48% in the second year of life. The mean number of topics discussed with the parents was 6.6 (out of nine) for the 0-5 months age group, 13.6 (out of 18) for the 6-11 month group, and 15.7 (out of 18) for those 1-2 years old. Injury surveillance activities were complete for 66% of the children, incomplete in 32%, and not done in 2%.

Conclusions—The results indicate that it is feasible to integrate an injury prevention program into primary care, and that process evaluation is important in detecting problems and improving performance of the program's activities.

(*Injury Prevention* 1995; 1: 35-39)

Keywords: injury prevention program, surveillance, process evaluation.

has been routinely included, following the community oriented primary care (COPC) approach. This method of delivering health care was introduced into the practice in the early 1970s.⁵ The practice of COPC entails the integration of primary clinical care for individuals and families with community health programs. It requires a defined population and the delivery of intervention programs dealing with identified major health conditions after their diagnosis in the community. Surveillance, monitoring, and evaluation are then built into the program.

The initial case for action was based on a preliminary examination of the injury problem in Israel. A study carried out in Jerusalem among children aged 0-17 years old found that for each case of death there were 43 hospitalizations and 1732 admissions to emergency rooms.^{6,7} About one in every 10 children attended an emergency room per year due to an unintentional injury or poisoning. The rates are lower than those found in the Statewide Childhood Injury Prevention Program surveillance system in Massachusetts⁸ or those in the Northeastern Ohio trauma study,⁹ where about one in five children visit an emergency room as a consequence of injuries. However, our rates are closer to those found in France¹⁰ and Sweden,¹¹ where about one in 10 children visit the emergency room as a consequence of injuries. The differences between the studies may be related to differences in the age groups studied, methods, accessibility or use of medical services, as well as actual differences due to different environments and behaviours. The rate of visits to the emergency room increased markedly after the first year of life, reaching the highest frequency among 2 year olds, with a rate of 129.7/1000. The main reasons for consultation were falls, being struck by blunt or sharp objects, and the aspiration of foreign bodies. Road accidents, burns, and poisonings, although less frequent, more often required hospitalization.

Community diagnosis of injury prevention practices of mothers of 0-2 year olds served by the mother and child health clinic was carried out.¹² Mothers were questioned regarding preventive behaviours in relation to falls, poisonings, burns, suffocation, electrocution, drowning, and car safety, following a developmental approach. Unsafe behaviour conducive to suffocation, scalds, or car safety was reported with relatively higher frequency than for other cases. Only 24% of mothers of 0-1 year olds and 2% of mothers of 1-2 year olds reported following all safety practices out of 11 and 17 items studied, respectively. Observations about safety in the home, using a

Prevention of injuries is considered an essential component of child health care. The Canadian Task Force on the periodic health examination,¹ the US Preventive Services Task Force,² and the Hall report on surveillance³ have recommended counselling on injury prevention as part of routine care during early childhood. Furthermore, the American Academy of Pediatrics has suggested a specific schedule and content of counselling according to the developmental stages of the child through The Injury Prevention Program (TIPP).⁴

In the framework of the maternal and child health clinic of the Hadassah Community Health Center in Jerusalem, injury prevention

Department of Social Medicine, Hadassah Medical Organization and the Braun School of Public Health and Community Medicine-Hebrew University and Hadassah, Jerusalem, Israel
R Gofin
D De Leon
B Knishkowsky
H Palti

Correspondence to:
Dr Rosa Gofin, Department of Social Medicine, Hadassah Ein Karem, POB 12000, Jerusalem 91120, Israel.

specifically designed checklist dealing with risks conducive to falls, suffocation, cuts, scalds, poisoning, and electrocution were carried out among a sample of children in the second year of life. The findings revealed that 33% had 8–11 of 23 possible risks.

Mothers reported that 9% of the infants and 30% of 1–2 year olds had had an injury in the last two weeks. Most of these were minor and treated at home. The percentage among the older age group is higher than in other populations where only those requiring emergency care were studied.^{8 11 13} Our rates are similar to those reported by the National Health Interview Survey in the US¹⁴ for children under 6 years old, where 35% experienced an injury. However, in that population only injuries requiring medical attention or causing at least one day of restricted activity were included. Recall bias, differences in definitions, and methods make comparisons difficult.

An injury prevention program for infants and toddlers was, therefore, planned and implemented by the clinic team. Surveillance was also incorporated into the clinic routine.

This report presents a process evaluation of the counselling and surveillance activities of the program two years after its implementation.

Population and methods

The mother and child health clinic at the Community Health Center of the Department of Social Medicine—Hadassah Medical Organization and the Braun School of Public Health and Community Medicine – Hebrew University and Hadassah, gives preventive care to pregnant women and children in a

geographically defined area of Kiryat Hayovel, a neighborhood of Western Jerusalem. The service is available to the entire population living in the area ($n = 15\ 000$) and only a small fee (\$60) is required for three years of care. The core health team is composed of two part time physicians and four part time nurses. All have training in public health and epidemiology.

Routine care for the child population includes surveillance of growth and development, immunizations, and hearing and vision screening. COPC programs on different areas of health promotion such as prevention of anemia, verbal stimulation, and promotion of breast feeding are integrated into the service.^{15–17}

The population in the present report included children aged 0–2 years old born between January 1989 and June 1990 who were exposed to the injury prevention program for at least one year ($n = 306$). They represented 95% of all children enrolled. The remaining 5% were not included due to lack of appropriate records.

Forty six per cent of the children were boys; 42% were the first child in the family; 20% of the mothers were ≤ 25 years of age, 65% were 26–35, and 15% were ≥ 36 years old; 10% had < 12 years of education, 31% had 12, and 59% had > 12 years of education; 25% were foreign born and the remaining 75% were first or second generation Israeli.

The injury prevention program

The program deals with the most frequent or severe types of injuries among 0–2 year olds, and aims to decrease the incidence of injuries through safer practices of the parents and a safer environment. The counselling program is incorporated into the encounter with the nurse at each routine visit. Advice is given on different topics according to the developmental stage of the child, and utilizes a checklist (see table). The topics covered are: falls, poisonings, burns, suffocation, electrocution, drowning, and car safety. The checklist is used to remind the nurse about the topics to discuss with the parents. For each of the topics there are different items covered in the three age groups: 0–5 months, 6–11 months, and 1–2 years. A total of nine items should be covered in the first period and 18 items each in the second and third periods. Messages are given in a positive way stressing a safe and stimulating environment.

At each encounter, the nurse recorded in the appropriate place if she discussed the item with the parent. The checklist was used to assess the number of times and the number of items discussed. Posters and leaflets on the prevention of injuries and first aid are available in the clinic.

Before starting the program, in-service training for the health team was provided, dealing with topics such as the size of the injury problem in Israel and in the community; causes, circumstances and severity of injuries; risky environments; developmental stages; hazards; and prevention advice on relevant

Checklist of topics to be discussed with parents at different ages

Topic	0–5 months	6–11 months	1–2 years
Falls			
Bed	/	/	/
Side rails, space between rails			
Mattress height, stability			
Changing table	/	/	/
Stroller: harness, hanging bags	/	/	/
Window bars, balcony rails, stair rails, remove furniture under windows		/	/
Bath tub		/	/
Burns			
Bath: water temperature	/	/	/
Hot beverages	/	/	/
Vaporizer, heaters	/	/	/
Smoking	/	/	/
Kitchen		/	/
Pots facing back, matches			
Table cloths hanging			
Car safety			
Position up to 9 kg and over 9 kg, harness, seat belt	/	/	/
Choking, suffocation			
Nylon bags, pacifier around neck	/	/	/
Nuts, candy, popcorn, size of food		/	/
Size of toys		/	/
Poisonings			
Medicines, cleaning materials, pesticides		/	/
cosmetics, remove, keep in original containers			
Cuts, bruises			
Scissors, knives out of reach, sharp edges		/	/
Drowning			
Bath tub, swimming pool, sea		/	/
Electrocution			
Electric outlets, antielectrocution device, electrical cords		/	/

Each item discussed may be checked up to three times for the same period.

topics at each age. A film on the use of car seats was shown. Emphasis was given to the use of positive messages to increase the awareness of parents to home and environmental safety. The messages encouraged parents to set limits for their children while allowing for a safe and stimulating environment. The training also included instruction on the use of the checklist for guidance and recording.

'Counselling coverage' was defined as the percentage of mothers who received counselling at least once in each of the three age periods studied. 'Frequency of counselling' was defined as the number of times it was done while 'topic coverage' was the number of items discussed during each age period.

The surveillance of injuries was carried out by the physicians during the child's routine visits to the clinic at 1, 3, 9, 12, and 24 months. On those visits parents were asked to report on injuries (whether or not medically treated) that were experienced by the child at any time between the visits. Then cause, circumstances, nature, location, and treatment were recorded in a standard form which is an integral component of the child's medical file.

'Complete surveillance' was defined as injury surveillance at all preventive visits for which the child was brought to the clinic during the period under study.

Results

Counselling coverage was 73% in the 0–5 month period, but decreased to 58% from 6–11 months and to 48% during the second year of life. Only 5% did not receive any counselling during the entire period. Coverage increased with increasing frequency of visits to the nurse. The average number of visits during the two year period was nine, and was lower in the second than in first year of life. Mothers who did not receive any counselling were more often Israeli born, belonged to higher social class, and had more higher education when compared to those who received counselling. With respect to frequency of counselling, 76% were counselled 1–2 times, and the remaining

24% three or more times. The mean number of items discussed with the mothers (topic coverage) in each period was 6.6 out of a total of nine in those with children aged 0–5 months; 13.6 out of 18 among those 6–11 months old; and 15.7 out of 18 among 1–2 year olds. The percentage receiving counselling on specific topics during each period is shown in the figure. The topics discussed most frequently were falls, burns, and suffocation. For all of them the frequency decreased with increasing age.

Surveillance activities were complete for 66% of children and incomplete for 32%, while among the remaining 2% no surveillance was carried out. No statistically significant difference in completeness of surveillance was seen according to any of the sociodemographic variables.

The results of the surveillance showed that there were 43 children who suffered injuries, or 9.5/100 child years. The most frequent causes of injury were falls (78.3%), burns (6.5%), collision with blunt objects (6.5%); 4.4% were hurt when caught between objects and the remaining 4.3% were due to other causes. There were no significant differences between boys and girls in the frequency of accidents. Most of the injuries occurred around the home (83%), with the living room and bedroom being the most frequent place of injury, followed by the kitchen. Contusions and hematomas were the most frequent types of injury, and the face and head the most frequent parts of the body affected. Thirty nine per cent of the children received medical attention in a clinic or emergency room and one child was hospitalized because of fracture of the nasal bone.

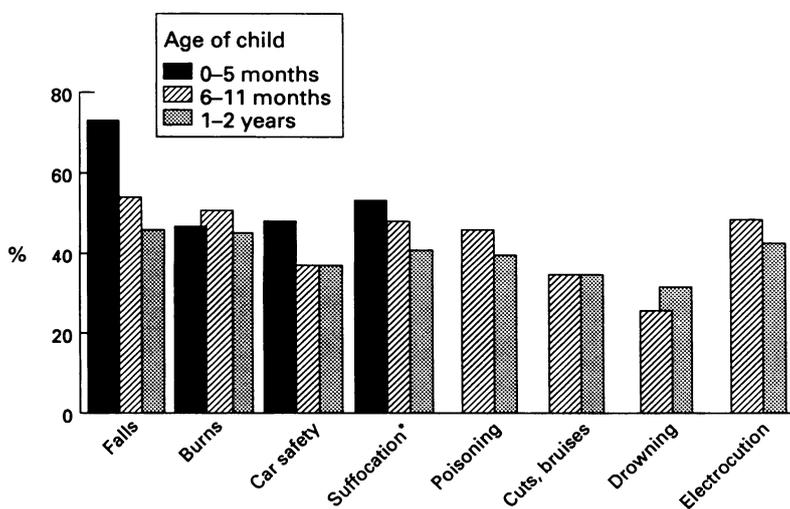
Four nurses were interviewed to obtain their impressions about the program. They felt that injury prevention is a high priority in infant and child care. However, they reported that there is not always time for advice about all components of the different COPC programs integrated into the practice. They also noted that mothers are not as interested in the counselling, as in other, more pressing or acute problems. In addition, they expressed the need for more intensive and continuous training and for finding innovative ways to promote safety. Finally, they expressed the need for computer recording, as is done with the other clinic programs.

No clear reason was given by the doctors for incomplete surveillance of injuries.

Discussion

Process evaluation is one of the elements recommended by Abramson to assess the quality of a health intervention program.¹⁸ In this paper we have addressed several aspects of process evaluation, including accessibility and coverage.

The accessibility of this program can be considered to be high. It is given by the maternal and child health service of the Community Health Center, integrated into the routine activities of the clinic, and is affordable



Topic discussed with parents (%) by age group; *suffocation includes choking.

because it is included in the small fee paid for comprehensive preventive care.

A structured injury prevention program has the advantage of increasing the advice given to parents—which was rarely done before the introduction of the program—and also of using the professional's time more efficiently.^{19,20} In our setup, the role of the nurse is essential for counselling, as she is the team worker who sees the patient most frequently. In Israel, nurses in maternal and child health clinics are the key health care providers for routine activities such as growth monitoring, immunizations, screening for hearing and vision, development assessment, and for specific health promotion activities including counselling and family support. Although no studies of the cost efficiency of this division of care are available, it appears to be an efficient use of resources.

The counselling coverage was higher in the first six months of life and thereafter decreased, mainly in the second year of life. One of the reasons may be the decrease in the number of visits to the clinic, which limits the opportunity for a counselling encounter. Furthermore, as mentioned above, counselling on injury prevention is only one of several activities carried out during these visits. Nurses and mothers may not always find injury prevention to be a priority topic. This may be particularly true for the small percentage of mothers with higher education who did not receive any counselling, perhaps because it was assumed that they are more aware of safety matters. A decrease in counselling to stimulate verbal development in the second year of life was also found in the same practise when such a program was started.¹⁶

Repeated messages on the same issue may be effective.²¹ Although the messages were tailored to the developmental stage of the child, nurses reported that they did not always have new information to convey and that many parents seemed to be aware of the safety issues discussed with them. Nevertheless, it is reassuring that few safety topics were left undiscussed. Some preference in the selection of topics was noted, with falls and burns being the most frequently discussed at all ages. This may be due to the greater relevance of those topics or the order in which they appear in the checklist. The lower frequency of counselling on car safety may be due to the fact that only about two thirds of parents have cars.¹² The checklist could be adapted to other settings by the inclusion of topics relevant to the specific population. In ours, for example, falls due to baby walkers were not included because this has not been identified as a hazard. As another example, burns due to house fires are rare because of the type of stone construction in the city. Hence, no advice on smoke detectors in private housing is given.

The results of this study were presented to the staff whose feedback was included in the plans for the future to improve training and the counselling coverage and recording. Changes in routines in relation to the frequency of counselling and the number of topics covered at each meeting were discussed. As a result of

these discussions the specific guidelines suggested by TIPP of the American Academy of Pediatrics⁴ were adopted. The number of times that each topic is discussed is now being computerized.

Surveillance is an essential aspect of a COPC program to provide the basis for an ongoing watch of the health condition(s) under consideration. Other injury surveillance systems in primary care have been described, but not connected to an intervention program.²²⁻²⁴

The integration of these two activities is important because surveillance allows for the appraisal of new or changing needs in the population, thus providing a basis for continuation, adaptation, or discontinuation of the program. Another important aspect of surveillance in the primary care setting is that it offers an opportunity for gathering data on injuries that do not get to an emergency room, thus providing a more complete picture of the injury problem in a community. The injury incidence found in such systems may, however, underestimate the true situation due to incompleteness and recall bias. In our case, recall may be a particular problem because of the relatively long intervals between visits. This may be overcome by sharing the task of injury surveillance between nurses and physicians.

Although counselling on injury prevention is widely recommended, its effectiveness has been debated. Indeed, other strategies such as legislation and change of environment or products have been shown to be more effective.^{25,26} A combination of these approaches may, however, optimize effectiveness because counselling is necessary to clarify issues even when legislation exists. Legislation regarding car seat use is an example where increased but often incorrect use results after such a law is passed.²⁷

More studies are needed to study the effectiveness of counselling alone or in combination with other methods. An evaluation of our own program is currently being designed¹⁸ to examine whether there were changes in practices and a decrease in the incidence of injuries.

The COPC approach has proved to be a feasible strategy for injury prevention in our setting. This approach may be introduced in other settings, especially those in which curative and preventive practices are integrated, by adapting the content, timing, and frequency of counselling and surveillance. Process evaluation is important in detecting problems with its implementation and in improving the performance of the program routines.

In addition to the clinic or outreach activities, it is essential for primary care practitioners to promote change at the community or national level by working together with different agencies, institutions, or organizations in multidisciplinary teams. The community itself should be involved in the prevention of injuries. Combining these different strategies should enhance the reduction of childhood injuries and contribute to a safer community.

We thank the nurses who were involved in the program and Ms Bella Adler, MA, for preparing the data.

- 1 Canadian Task Force on the Periodic Health Examination. The periodic health examination. *Can Med Assoc J* 1979; 121: 1193-254.
- 2 US Preventive Task Force. Counselling to prevent household and environmental injuries: *Am Fam Physician* 1990; 42: 135-41.
- 3 Hall DMB, ed. *Health for all children*. Oxford Medical Publications, New York: Oxford University Press, 1989.
- 4 Krassner L. TIPP usage. *Pediatrics* 1984; 74 (suppl): 976-80.
- 5 Kark SL. *The practice of community oriented primary health care*. New York: Appleton Century Crofts, 1981.
- 6 Gofin R, Palti H, Adler B, Edet E. Childhood injuries. A population based study of emergency room visits in Jerusalem. *Paediatr Perinat Epidemiol* 1989; 3: 174-88.
- 7 Gofin R, Palti H, Israeli I. The incidence of childhood and adolescent injuries and its outcome. A population based study. *Isr J Med Sci* 1991; 27: 566-71.
- 8 Gallagher SS, Finison K, Guyer BF, et al. The incidence of injuries among 87,000 Massachusetts children and adolescents: results of the 1980-81 statewide injury prevention program surveillance system. *Am J Public Health* 1984; 74: 340-7.
- 9 Baranick JI, Chatterjee BF, Greene YC, et al. Northeastern Ohio trauma study: I. Magnitude of the problem. *Am J Public Health* 1983; 73: 746-51.
- 10 Tursz A, Crost M, Guyot MM, et al. Childhood accidents. A registration in public and private medical facilities of a French health care area. *Public Health* 1985; 99: 156-64.
- 11 Westfelt JARN. Environmental factors in childhood accidents. A prospective study in Goteborg, Sweden. *Acta Paediatr Scand (Suppl)* 1982; 29: 6-75.
- 12 Gofin R, Palti H. Injury prevention practices of mothers of children 0-2 years old. A developmental approach. *Early Child Development and Care* 1991; 71: 117-26.
- 13 Troop PA. Accidents to children: an analysis of inpatients admissions. *Public Health* 1986; 100: 278-85.
- 14 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.)
- 15 Gofin R, Palti H, Adler B. Time trends of hemoglobin levels and anemia prevalence in a total community. *Public Health* 1992; 106: 11-8.
- 16 Palti H, Zilber N, Kark S. A community-oriented early intervention program integrated in a primary preventive child health care service—evaluation of activities and effectiveness. *Community Medicine* 1982; 4: 302-14.
- 17 Palti H, Valderrama R, Pogrund R, Kurtzman H. Evaluation of the effectiveness of a structured breast feeding promotion program integrated into the mother and child health services in Jerusalem. *Isr J Med Sci* 1988; 24: 342-8.
- 18 Abramson JH. The objectives of evaluative studies. *Survey methods in community medicine*. 4th Ed. Edinburgh: Churchill Livingstone, 1990: 47-56.
- 19 Bass JL, Mehta KA, Ostrovsky M, Halperin SF. Educating parents about injury prevention. *Pediatr Clin North Am* 1985; 32: 233-41.
- 20 Reissinger KS, Bires JA. Anticipatory guidance in pediatric practice. *Pediatrics* 1980; 66: 889-92.
- 21 Kelly B, Sein C, McCarthy PL. Safety education in a pediatric primary care setting. *Pediatrics* 1987; 79: 818-24.
- 22 Gofin R, Lison M, Morag C. Injuries in primary care practices. *Arch Dis Child* 1993; 68: 223-6.
- 23 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.
- 24 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.
- 25 Sewell CM, Hull F, Fenner J, Graft H, Pine J. Child restraint law effects on motor vehicle accident fatalities and injuries. The New Mexico experience. *Pediatrics* 1986; 78: 1079-84.
- 26 Clarke A, Walton WW. Effect of safety packaging on aspirin ingestion by children. *Pediatrics* 1979; 63: 687-93.
- 27 Czernakowski W, Muller M. Misuse, mode and effects analysis—an approach to predict and quantify misuse of child restraint systems. *Accid Annal Prev* 1993; 25: 323-33.



Car seat: miracle or muck-up?

An intriguing story: a 2 year old was found in a car seat, skidding down the middle of an icy highway after her parents' car swung out of control and came to rest in the path of an approaching welding truck (lorry). It appears the car hit the truck and then went spinning down a steep, 7 metre embankment. The truck driver removed the child, still in her safety seat, from further harm from oncoming traffic. Apparently, the child was 'strapped into her tethered car seat' but none the less was thrown, along with her father who was also in the rear seat, through 'a gaping hole' behind the back seat. She sustained a broken leg, a bruised lung, and a cut to her head from broken glass; her father was described as 'dazed but unhurt . . . standing amid some of the twisted metal that had been torn from their car'.

What intrigues me are questions like: do people appreciate how marvellously effective car seats can be? Will they now understand how important it is for the child to be well secured in the car seat? Was this seat properly tethered? Why was there a gaping hole in the rear of the car to which the seat had presumably been attached? Was the father also restrained (as the law requires) and if so, did this save his life? Why were the road safety engineers satisfied to leave the verge of a potentially icy roadway unprotected?

Canadian Press, *Montreal Gazette*, 16 Nov 1994