Outcomes after injury prevention counselling in a paediatric office setting: a 25-year review

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ABSTRACT

Objective Injury is the leading cause of death and acquired disability in children. Primary care providers routinely provide age-appropriate injury prevention (IP) counselling during healthcare visits. The objective was to review evaluations of the effectiveness of office-based paediatric IP counselling research.

Design This review identified studies from July 1991 to June 2016 of children <5 years and their caretakers to determine the effectiveness of office-based counselling on IP knowledge, behaviours and outcomes. Studies were included if they had: (1) an intervention for a family with a child <5 years of age; (2) an unintentional injury mechanism addressed during counselling; (3) one or more mechanisms recommended to be discussed for children <5 years in the 2007 American Academy of Pediatrics Policy Statement; (4) counselling occurring in the office setting; (5) an assessment of an outcome (eg, change in knowledge, behaviour or injury occurrences); and (6) English-language publication. Study characteristics (whether the study was controlled, randomised and/ or blinded), target safety behaviours, the sample size, outcomes assessed (injuries, behaviour changes and/or education changes) and demonstrated effects were summarised.

Results Sixteen articles met inclusion criteria. Twelve articles were randomised controlled trials, three were non-randomised trials and one was a pretest and post-test study. Fourteen articles measured a change in knowledge or reported behaviour, four included observed behaviour change and five measured change in injury outcomes. Thirteen of the 16 studies had positive effects demonstrated for certain outcomes, including for fall, poisoning, burn, fire, traffic injury and drowning prevention, while 10 showed no differences between study groups for other outcomes.

Conclusions Published outcomes-based IP-related counselling research in the primary care setting for young children is infrequent, but the majority of the existing studies demonstrated effectiveness.

INTRODUCTION

Background

Injuries continue to cause more deaths in US children than all non-communicable and infectious diseases combined.1 However, these deaths are only a small part of the problem. For every child that dies, approximately 25 children are hospitalised and 925 are treated in emergency departments, costing close to $300 billion annually to US citizens.2 3 Injury prevention (IP) advocates continue to find ways to address this problem through new product innovations, passing legislation or making environments safer for children. Another technique is to educate families about potential age-appropriate risks so that caregivers are aware of potential hazards, and they can implement preventative strategies. Primary care providers (PCPs) have typically been tasked with screening families for risk of unintentional injuries and providing age-appropriate safety counselling. Professional societies and national task forces encourage PCPs to have these conversations at every office encounter.4 6 The American Academy of Pediatrics (AAP), in its Bright Futures recommendations for health maintenance, recommends specific topics for IP counselling at each well-child visit.

Several factors make the provision of IP counselling during well-child visits challenging. Lack of time during visits, a plethora of recommended topics that need to be...
Search of pertinent keywords* for articles published between 1991 to June 2016 (n=142)

Articles that cited Bass 1993** and published between 1991 to June 2016 (n=274)

Articles did not meet inclusion based on title and abstract (n=169)

Full text assessed for eligibility (n=105)

Articles did not meet inclusion based on details in full text (n=80)

Subtotal of eligible articles remaining (n=15)

References of remaining 15 articles (n=598) and articles that cited remaining 15 articles (n=375) identified, (n=973)

Duplicates deleted (n=519)

Articles remaining and screened (n=454)

Articles excluded (n=282)

Articles excluded (n=140)

Full text assessed for eligibility (n=142)

Full text assessed for eligibility (n=172)

Articles excluded (n=158)

Eligible articles remaining (n=2)

Eligible articles remaining (n=14)

Final number of articles included N=16

*Keyword search: (counseling or "anticipatory guidance") AND (unintentional injury or safety) AND (child or childhood or pediatric or paediatric or children) AND (office or primary care or clinic) for publications between 7/1/1991 to 6/1/2016

** Bass JL, Christoffel KK, Widome M, et al. Childhood injury prevention counseling in primary care settings: a critical review of the literature. Pediatrics. 1993 Oct;92(4):544-50.

Figure 1 Flow chart of search strategy.
evidence on the effectiveness of office-based IP counselling encouraging behaviour changes and prevention of injuries to children <5 years of age.

**METHODS**

**Study team**

Four authors and one study research assistant completed the review. All authors have had recent leadership roles in the AAP’s Council on Injury, Violence and Poison Prevention, and each has contributed extensively to the IP literature.

**Article selection**

The goal of the project was to review all evaluations of the effectiveness of office-based paediatric IP counselling research studies that were published after Bass’ article.15 Using Google Scholar, the study team identified all peer-reviewed articles published between 1 July 1991 and 1 June 2016 that referenced the Bass article. Since Bass’ article was instrumental in showing patient behaviour change and injury reduction following paediatric office counselling, we began with all published studies that cited the report by Bass. All articles chosen were initially vetted by one research assistant to ensure they met inclusion criteria. These criteria included: (1) an intervention for a family with a child <5 years of age; (2) an unintentional injury mechanism addressed during counselling; (3) one or more mechanisms recommended to be discussed for children <5 years in the 2007 AAP Policy Statement; (4) counselling occurring in the office setting; (5) an assessment of an outcome (eg, change in knowledge, behaviour or injury occurrences); and (6) English-language publication. One-time behavioural surveys and other observational study designs were not included. Age less than or equal to 5 years was chosen in order to focus on preschoolers who spend a significant amount of time at home. Also, children of this age commonly attend well-child visits with their parent/guardian, and these caregivers are the ones that would primarily be making the behaviour change after receiving counselling. Full manuscripts of those identified by the research assistant were then reviewed by the four authors to ensure that all inclusion criteria were met and to resolve any discrepancies. Conflicts between reviewers on design or outcome were discussed as a team and resolved by consensus. After the initial articles were chosen, references of all articles that met inclusion were reviewed, and they went through the same process as above.

In order to be as inclusive as possible, the study team also performed a literature review using key search terms to attempt to ensure that all office-based IP counselling papers with an outcome that met our inclusion criteria were reviewed. The key words chosen included: (A) counseling or ‘anticipatory guidance’, (B) unintentional injury or safety, (C) child or childhood or paediatric or paediatric or children and (D) office-based. All duplicate articles were deleted, and the remaining articles were independently reviewed by the authors to

| Study characteristics | Outcomes assessed |
|-----------------------|-------------------|
| Controlled Randomised intervention | Educational (including reported behaviours) | Behavioural (observed) | Injuries |
| Clamp and Kendrick16 | X | X |
| Kendrick et al17 | X | X | X | X |
| Gielen et al18 | X | X | X | X |
| Nansel et al19 | X | X | X |
| Mock et al20 | X | X |
| Tan et al21 | X | X | X | X |
| Watson et al22 | X | X | X | X |
| McDonald et al23 | X | X | X |
| Kendrick et al24 | X | X | X |
| Sangvai et al25 | X | X | X | X |
| Pless et al26 | X | X | X | X |
| Nansel et al27 | X | X | X |
| Powell et al28 | X | X | X |
| van Beelen et al29 | X | X | X |
| Franz et al30 | X | X | X |
| Brixey et al31 | X | X | X |

Table 1: Study characteristics and outcomes
### Table 2  Target injuries, sample size and effects demonstrated

| Target safety behaviours | Sample size | Positive effect demonstrated | No effect demonstrated |
|--------------------------|-------------|------------------------------|------------------------|
| Clamp and Kendrick 16   | 165         | Use of fireguards, smoke alarms, electric outlet covers, locks on cupboards and door slam devices | No differences in proportion of families regarding stairway safety behaviour or storage of cleaning materials. |
| Kendrick et al 17       | 1124 intervention. 1028 control. | More confident in dealing with choking incidents and more likely to know correct action for bleach ingestion. | No difference in injury frequencies. |
| Gielen et al 18         | 196         | Greater adoption of home and car safety behaviours among group receiving tailored information | No differences in knowledge or behaviours. |
| Nansel et al 19         | 85 intervention 69 control | Increase in mean per cent safe response scores | Even with improvement, overall use of safety devices suboptimal even after counselling with discrepancies between socioeconomic strata |
| Mock et al 20           | 1124 children before counselling 625 after it had been given | Improved use of bicycle helmets in middle and lower socioeconomic groups | Minimal to no changes seen regarding knowledge on crossing roads safely, burn and prevention |
| Tan et al 21            | 708         | Decreased walker use after intervention | No difference in walker injuries between groups |
| Watson et al 22         | 3428 families (3995 children) | More likely to be safe with stairs, smoke alarms, windows and storage of cleaning products/ sharp objects | Intervention group had higher attendance rate for injury in primary care, but no other differences injury outcomes seen |
| McDonald et al 23       | 70 intervention 74 control | More knowledge about inappropriateness of young children riding in the front seat of a car, less likely to believe that teaching a child to mind you is the best way to prevent injuries and more likely to report that they have syrup of ipecac and know how to use it* | No difference in groups for seven other safety items and three other belief items |
| Kendrick et al 24       | 539 intervention 635 control | Less likely to: own or use walker, plan to use walker with their next child or agree that walkers keep children safe | No difference in rate of medically attended injuries |
| Sangvai et al 25         | 160 intervention 159 control | More likely to have: smoke detectors present and functional and hazardous substances not found in low cabinets | No difference in behaviour (cutting cords) or injury related to window blind cords or clothing drawstrings |
| Pless et al 26          | 369 intervention 439 control | Knowledge and behaviours related to window blind cords and cords from clothing drawstrings | |
From the search of articles that referenced the Bass article, we found increased rigor in the promotion of IP knowledge, self-reported safe behaviours and injury outcomes for children aged <5 years. In particular, there was increased knowledge and self-reported safe behaviours surrounding fire and burn safety (fireguards, smoke alarms and electric outlets), home safety (locks on cupboards, doors, stair guards and windows), and road traffic safety (helmets, car seats and seat belts). Notably, nearly all the studies focused on knowledge and behaviours and not injury outcomes, the gold standard for injury-related research.


discussion

In this update to the 1991 Bass article, we found increasing rigorous evidence of the benefit of office-based IP counselling on the promotion of IP knowledge, self-reported safe behaviours and injury outcomes for children aged <5 years. In particular, there was increased knowledge and self-reported safe behaviours surrounding fire and burn safety (fireguards, smoke alarms and electric outlets), home safety (locks on cupboards, doors, stair guards and windows), and road traffic safety (helmets, car seats and seat belts). Notably, nearly all the studies focused on knowledge and behaviours and not injury outcomes, the gold standard for injury-related research.

Our study is subject to several limitations. Perhaps most important is the possibility of publication bias. Just as in all reviews, negative studies are more likely to remain unpublished. Investigators may be more motivated to write, and journals may be more interested in publishing articles that found an effect of IP counselling than truly exists. It is also possible that we did not find all eligible studies in our search. We attempted to prevent this through a systematic approach, including the use of broad search terms initially and inspection of the references of papers. We also reviewed all articles that cited the original Bass paper. We also limited our search to English language publications that may have excluded articles of value.

Table 2 Continued

| Target safety behaviours | Sample size | Positive effect demonstrated | No effect demonstrated |
|--------------------------|-------------|------------------------------|------------------------|
| Nansel et al27           | Car, burn, fall, poison, airway obstruction and drowning | 305 (three arms) | More likely to adopt new injury prevention behaviour |
| Powell et al28           | Home—falls, burns and drowning | 371 | Increase in education in both groups following discussion |
| van Beelen et al29       | Falls, poisoning, drowning and burns | 1292 | Increase in safe behaviour for stairs, storage of cleaning products, bathing of child, drinking of hot fluids, using rear hotplates and composite safety score |
| Franz et al30            | Crib, hot water and child passenger safety | 84 (pretest and post-test) | Increased knowledge |
| Braxey et al31           | Any unintentional injury | 1368 | No difference in groups; very small sample of injured patients |

Since the publication of McDonald et al30 2005, syrup of ipecac has no longer been recommended to be used by parents.
from non-English journals. We only reviewed studies that provided evidence of IP counselling for children aged ≤5 years.

We conclude that, in the past quarter century since the review of the same topic by Bass, there is accumulating evidence of the benefit of IP counselling done in the clinical setting on the knowledge, self-reported safety behaviours and injury outcomes among children aged <5 years. Given the magnitude of the problem of childhood injury and its contribution to child morbidity and mortality, clinicians who care for children should continue to provide such counselling to protect their patients. Further research should be undertaken to better refine what aspects of counselling are most effective for different injury types.

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