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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 2007American 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, and additional research is necessary to further describe the effectiveness of these primary prevention efforts.

What is already known on this topic?

- Primary care providers routinely provide injury prevention (IP) counselling during healthcare visits.
- One prior review in 1993 by Bass *et al* supported the inclusion of IP information in the paediatric primary care setting.

What this study hopes to add?

- Published outcomes-based IP-related counselling for young children in the primary care setting is infrequent, but the majority of the existing studies demonstrated effectiveness.
- Further research is necessary to identify the most effective IP-related counselling in the primary care setting.

INTRODUCTION

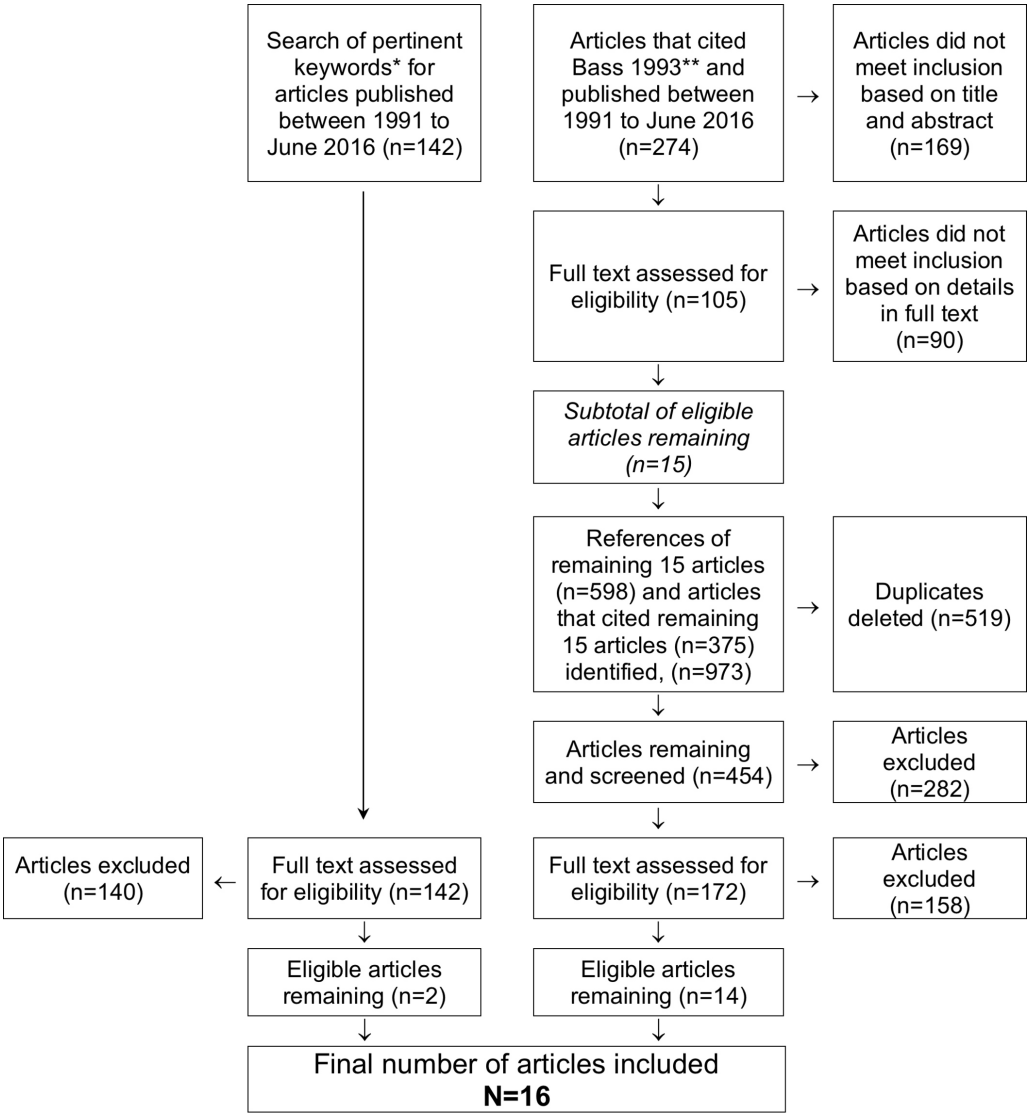
Background

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

addressed, and little training in and comfort with IP counselling have been cited as barriers.[7–9] Also, with no reimbursement by insurance companies for these efforts, IP conversations may be less emphasised and given less time during visits. To overcome some of these barriers, physicians have tried providing tailored messages through cellphone applications, computerised kiosks or standardised screening tools.[10–14] However, despite recommendations and because of the barriers and the inconsistent strategies employed among PCPs, IP screening and counselling is infrequently employed.

Gaps remain in our understanding about what works in an office setting to promote safe behaviours and prevent future injuries. In 1993, Bass and colleagues published a critical review of the literature regarding the effectiveness of IP counselling in the primary care setting.[15] Their study used a panel from an AAP injury panel to review journal articles from May 1964 to July 1991 focused on childhood unintentional IP counselling in the primary care setting. Twenty articles met inclusion criteria, 18 of which showed positive effects of counselling, and 15 for which physicians performed counselling. They found that the published evidence at that time demonstrated that counselling resulted in greater knowledge, less risky behaviours and a reduction in injury occurrence. The purpose of this paper is to present a review of the IP literature published in the quarter century since the Bass publication in order to examine new research and



*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 pediatric or paediatric or children and (D) office-based. All duplicate articles were deleted, and the remaining articles were independently reviewed by the authors to

Table 1 Study characteristics and outcomes

	Study characteristics			Outcomes assessed		
	Controlled	Randomised intervention	Investigators blinded	Educational (including reported behaviours)	Behavioural (observed)	Injuries
Clamp and Kendrick[16]	X			X		
Kendrick *et al*[17]	X	X	X	X		X
Gielen *et al*[18]	X	X		X	X	
Nansel *et al*[19]	X	X		X		
Mock *et al*[20]	X			X		
Tan *et al*[21]	X	X	X	X		X
Watson *et al*[22]	X	X		X	X	X
McDonald *et al*[23]	X	X		X		
Kendrick *et al*[24]	X	X	X	X		
Sangvai *et al*[25]	X	X	X		X	X
Pless *et al*[26]	X	X		X	X	
Nansel *et al*[27]	X	X	X	X		
Powell *et al*[28]	X	X		X		
van Beelen *et al*[29]	X	X		X		
Franz *et al*[30]				X		
Brixey *et al*[31]	X					X

Table 2 Target injuries, sample size and effects demonstrated

	Target safety behaviours	Sample size	Positive effect demonstrated	No effect demonstrated
Clamp and Kendrick[16]	▶ Fire, electric outlet, sharp object, poison safety and injuries from doors	▶ 165	▶ Use of fireguards, smoke alarms, electric outlet covers, locks on cupboards and door slam devices ▶ Safe practice in storage of sharp objects and medicines, and safety regarding windows, fireplaces, sockets, smoke alarms and door slams	▶ No differences in proportion of families regarding stairway safety behaviour or storage of cleaning materials.
Kendrick *et al*[17]	▶ Any unintentional injury seen at an emergency department. ▶ Equipment provided: stair gates, fireguards, cupboard locks and smoke alarms.	▶ 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. ▶ No difference in secondary outcome measures. ▶ No differences between in scores for perceptions of risk of injury or risk of hazards.
Gielen *et al*[18]	▶ Hot water, smoke alarm, baby walker, stair, poison and safety.	▶ 196		▶ No differences in knowledge or behaviours.
Nansel *et al*[19]	▶ Car, burn/fire, drowning, poison and fall	▶ 85 intervention ▶ 89 control	▶ Greater adoption of home and car safety behaviours among group receiving tailored information	
Mock *et al*[20]	▶ Bike helmets, hot water temperature, smoke detector, child passenger and road traffic safety	▶ 1124 children before counselling ▶ 625 after it had been given	▶ Increase in mean per cent safe response scores ▶ Improved use of bicycle helmets in middle and lower socioeconomic groups ▶ •Increased use of car seats by children aged 0–4 years in lower socioeconomic group	▶ Even with improvement, overall use of safety devices suboptimal even after counselling with discrepancies between socioeconomic strata ▶ Minimal to no changes seen regarding knowledge on crossing roads safely, burn and prevention
Tan *et al*[21]	▶ Infant walkers	▶ 708	▶ Decreased walker use after intervention	▶ No difference in walker injuries between groups
Watson *et al*[22]	▶ Falls, fires, poisoning and window falls	▶ 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]	▶ Smoke alarm, poison, fall and child passenger safety	▶ 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]	▶ Baby walker safety	▶ 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 ▶ Some evidence they were less likely to recommend walker to friend or agree that they help children to walk more quickly	
Sangvai *et al*[25]	▶ Child safety seats ▶ Smoke detectors ▶ Safe storage of hazardous substances and poisons ▶ Tap water temperature ▶ Gun storage	▶ 160 intervention ▶ 159 control	▶ More likely to have: smoke detectors present and functional and hazardous substances not found in low cabinets	▶ No difference in rate of medically attended injuries
Pless *et al*[26]	▶ Knowledge and behaviours related to window blind cords and cords from clothing drawstrings	▶ 369 intervention ▶ 439 control		▶ No difference in behaviour (cutting cords) or injury related to window blind cords or clothing drawstrings

Continued

Table 2 Continued

	Target safety behaviours	Sample size	Positive effect demonstrated	No effect demonstrated
Nansel *et al*[27]	▶ Car, burn, fall, poison, airway obstruction and drowning	▶ 305 (three arms)	▶ More likely to adopt new injury prevention behaviour	
Powell *et al*[28]	▶ Home—falls, burns and drowning	▶ 371	▶ Increase in education in both groups following discussion	
van Beelen *et al*[29]	▶ 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	▶ No significant differences for other specific behaviours
Franz *et al*[30]	▶ Crib, hot water and child passenger safety	▶ 84 (pretest and post-test)	▶ Increased knowledge	
Brixey *et al*[31]	▶ Any unintentional injury	▶ 1368		▶ No difference in groups; very small sample of injured patients

Since the publication of McDonald *et al*[23] 2005, syrup of ipecac has no longer been recommended to be used by parents.

assess for eligibility and discussed by the team to alleviate any controversies. A complete flow chart of the search strategy can be found in figure 1.

Determination of study characteristics and outcomes

After the literature search was completed, the study characteristics (whether the study was controlled, randomised and/or blinded) and outcomes assessed (injuries, behaviour changes and/or education changes) were summarised. Also summarised were the target safety behaviours, the sample size and any demonstrated effect.

RESULTS

From the search of articles that referenced the Bass article, we identified 14 studies that met our inclusion criteria, and from our keyword search, we identified two additional articles that met inclusion criteria.[16–31] Of the 16 articles, 12 were randomised controlled trials, 3 were non-randomised trials and 1 was a pretest and post-test study (table 1). The investigators were blinded in five of the studies, but participants were not blinded in any. Fourteen studies measured a change in knowledge or reported behaviour change, four included observed behaviour change and five measured changes in injury outcomes. The most common topics covered were fall prevention, poison prevention, burn prevention, fire safety and traffic safety (table 2).

For fall prevention, eight of the studies demonstrated positive changes on knowledge or behaviour, while three studies did not. Similarly, positive changes for poison prevention were seen in seven studies, one did not demonstrate any changes in education or behaviour and one showed both positive and no effect for different aspects of poisoning. Regarding burn prevention and fire safety (including hot water safety, smoke alarms, fireguards and fireplaces), positive changes in knowledge and/or behaviours were seen in seven of the studies, while no effects were demonstrated in four of the studies that measured these outcomes. Changes in traffic safety knowledge or behaviour were seen in four of the studies, with one additional study showing positive effects for some aspects of road traffic safety but minimal to no change with other aspects. Overall, 13 of the 16 studies had positive effects demonstrated for certain outcomes, while 10 showed no differences between study groups for other outcomes.

DISCUSSION

In this update to the 1991 Bass article, we found increasingly 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, door slam devices, windows, stairs, walkers, bathing and cribs) 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. To the extent that this is true in this case, our work may be biased towards reporting a more favourable 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

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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