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A randomized trial to assess the effectiveness of an infant home safety programme

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The aim of this study was to test an intervention aimed at addressing the risk of injury in infants 2 – 12 months of age. A non-blinded, randomized controlled trial was conducted, whereby parents were randomly assigned to either a control or one of two intervention groups. Parents completed questionnaires regarding safety behaviours and injuries at the 2 (baseline), 6 and 12 month immunization visit at the community health unit. During the 2 month visit to the health unit, the two intervention groups received a home safety kit containing nine items, an instructional brochure and a risk assessment checklist. Subjects randomized to the safety kit plus home visit group also received a standardized home visit from a community health nurse. Two of the 14 parental safety behaviours showed a significant increase in use among parents in the intervention groups. Neither of the interventions was associated with a reduction in parent-reported injuries among children. It was concluded that home visitation may provide a beneficial adjunct to the provision of safety devices and may increase use by parents.

Keywords: Randomized controlled trial; Infant home safety; Safety behaviours

1. Introduction

Unintentional injuries are the fourth leading cause of death for infants under 1 year of age and the majority of these injuries occur in the home (Beaulne 1997). Overall, falls have been reported in US and Canadian population-based studies to be the leading cause of injury in this age group (Agran et al. 2003, Pickett et al. 2003). Infants are at an increased risk for fall injuries due to the weight of their heads being higher in proportion to their bodies (Sewell and Gains 1993), as well as their increasing mobility as they learn to crawl. They are also more susceptible to serious burns, poisoning and choking (Wilson et al. 1991) and to drowning due to their lack of motor skills (Canadian Red Cross Society 2003). Due to these increased susceptibilities, infants are highly dependent on adult provision of a safe environment and protection from contact with hazards (Finney et al. 1993, Pickett et al. 2003). Hu et al. (1996) conducted a community-based survey among Canadian parents and found that while knowledge about injuries as a leading cause of death among children and beliefs about preventability were high, parents lacked understanding of specific

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types of injury risks and their countermeasures. The majority of unintentional injuries occur in the home (Beauline 1997). Even in the presence of favourable attitudes and beliefs towards home injury prevention practices among parents, barriers to childproofing include low family income and poor housing quality (Gielen et al. 1995). The provision of safety devices, free of charge or at reduced cost, to help address these barriers has been recommended from several studies (Gielen et al. 1995, 2002, Sznajder et al. 2003).

While there is research-based evidence that providing safety devices to parents improves safety behaviours, including the use of these devices and the removal of hazards in the home, there is little evidence that providing these devices actually translates into the reduction of injuries (Sznajder et al. 2003, Lyons et al. 2004, Watson et al. 2005). Furthermore, parental safety behaviours to enhance infant safety have been defined and measured with considerable heterogeneity across intervention studies, making direct comparisons of results difficult. Evaluation of home-based parent education that included both prenatal and infancy home visitation by nurses among families deemed to be at high risk for preventable injuries have reported reductions in injury-related outcomes. Olds et al. (1986) reported that participants who received home visits by a nurse, prenatally and for 2 years after their child’s birth, reported fewer injury-related emergency department visits among the intervention groups as compared with those in the comparison group, who received either developmental/sensory screening alone or combined with free transportation to clinic appointments.

In a Canadian randomized controlled trial (RCT) targeting parents of children under 8 years of age, provision of home safety and child injury information, instructions for reducing hazards and coupons for discounts on safety devices were evaluated (King et al. 2005). At 36 month follow-up, more parents in the intervention group (63%) reported changes in knowledge, beliefs or practices concerning the prevention of home injuries than parents in the control group (43%), who received a pamphlet with general safety information. The rate of injury-related physician visits was lower for the intervention group (rate ratio = 0.74; 95% CI 0.63 to 0.87).

Therefore, research evidence has shown the potential effectiveness of safety kit provision on parental home safety behaviours and injury reduction among young children. There is also evidence that home visitation may result in a reduction of injuries for children aged up to 2 years. This study aimed to test the effectiveness of a safety kit intervention for improving parental safety behaviours and reducing infant injuries, coupled with the added benefit of providing a home visit along with the safety kit as compared to receiving the kit alone on study outcomes.

The current study tested a developmentally targeted intervention aimed at addressing the injury risks of infants aged 2–12 months. First, it was hypothesized that parent-reported use of safety measures and removal of hazards would be higher among those who received a home visit and a safety kit compared to those who received a safety kit alone or those who received the usual care from the health unit. Second, it was hypothesized that the rate of infant injuries would be lower among parents who received a home visit and a safety kit compared to those in the safety kit alone and control groups.

2. Method
2.1. Design
A three-arm parallel, non-blinded, randomized control trial was conducted of new parents who were randomly assigned to one of three groups: 1) home visit plus safety kit; 2) safety kit alone; 3) control group.

2.2. Setting
Subjects were recruited from the single public health unit serving the Chilliwack area in the eastern Fraser Valley of British Columbia. This health unit serves a population of approximately 70,000, with 82% of the population living in urban communities or suburban neighbourhoods and the balance in the rural hillsides and farming areas.

2.3. Subjects
Eligibility criteria included parents of a new infant born at Chilliwack General Hospital and residing in the District of Chilliwack, British Columbia. Parents who were non-English speaking, lived on a First Nations reserve (served by Stö:lo Nation Health clinic) or whose infant was transferred to a tertiary paediatric facility in the neonatal period were excluded.

2.4. Recruitment
Standard protocol within the Chilliwack Health District requires that all new mothers are offered a home visit by a community-based nurse. The visit is arranged prior to hospital discharge or by telephone after discharge. During the study period (1 April 2001 to 1 August 2003), at the initial contact with the nurse, mothers were given an information letter describing the study. Mothers who had declined a home visit (5%) were mailed an information letter, followed by a telephone call 10 days later to see if they were willing to participate. Written consent from the participant was obtained by the community health nurse prior to hospital discharge or at the initial home visit. Non-participants completed a form documenting reasons for refusal as well as demographic information.
2.5. Randomization

Participants were randomized to one of three groups: 1) home visit plus safety kit; 2) safety kit alone; 3) control group. Allocation to groups was accomplished by means of random numbers generator. Group allocation was documented and concealed in sequentially numbered opaque envelopes, which were then opened when the infant was brought by the parent to the community health unit for their first immunization at 2 months of age. At this time, safety kits were distributed to parents in the home visit plus safety kit and safety kit alone groups.

2.6. Home visitation

Subjects randomized to receive a home visit were contacted by a single community health nurse to arrange a mutually convenient time for a home visit. The nurse followed a standardized protocol, which included an introduction and outline of the visit and a walk through each room of the home, using a 41-item checklist to identify potential hazards in the home (selected from Bablouzian et al. 1997 SafeHome Report). When identified, parents were taught how to remove or modify these hazards to mitigate the potential risks.

2.7. Home safety kit

Items contained in the home safety kit were selected following a review of relevant literature as well as a review of causes of injury-related mortality and morbidity for infants younger than 12 months from the Canadian Hospital Injury Reporting & Prevention Program at British Columbia Children’s Hospital (British Columbia Injury Research and Prevention Unit 2000). The nine home safety kit items included a smoke alarm, a coupon for 50% savings on a safety gate, corner cushions for sharp-edged tables, cabinet locks, blind cord windups that keep dangling cords out of reach of infants, water temperature card, doorstoppers, electrical outlet covers and a poison control sticker. A brochure was included that described how each kit item could be used to prevent injuries from falls, burns, poisoning and choking/strangulation. A two-page risk assessment checklist was also included in the safety kit to allow parents to walk through each room of their home and determine the presence of specified hazards.

2.8. Control groups

The control group received the standard services provided by the community health unit for families with newborn infants. This included growth assessment, advice and information on feeding, child development and immunization.

2.9. Outcomes

Primary outcomes included parent-reported use of preventive safety measures and removal of potential hazards in the home. The secondary outcomes included attitudes towards safety, use of the nine safety kit items and rates of parent-reported medically attended injuries. Both primary and secondary outcomes were evaluated using a questionnaire completed at the 2 month (baseline), 6 month and 12 month immunization visits with the community health nurse.

The primary outcome, measured by 14 questions, addressed the use of preventive measures (e.g. is your home hot water adjusted to a safe temperature?), presence of hazards in the home and use of safety devices (e.g. fire extinguisher). These questions were selected from several published instruments including the SafeHome Report (Bablouzian et al. 1997), Nottingham Safe at Home Questionnaire (Kendrick 2000) and Safety Behavior Among Parents of Preschoolers (Glik et al. 1993).

Attitudes towards safety were assessed using three questions. The first assessed how serious an issue parents considered infant home injuries to be and was measured using a 5-point Likert scale ranging from ‘not an issue’ to ‘a very serious issue’. The second question addressed parents’ perceptions of the preventability of most infant injuries in the home, also using a 5-point Likert scale ranging from ‘not at all preventable’ to ‘almost completely preventable’. Finally, perceptions of injury likelihood for six different types of injuries were measured using a 5-point Likert scale ranging from ‘least likely’ to ‘most likely’. The first two attitudinal questions were developed by the study authors while the third question was modified from the Nottingham Safe at Home Questionnaire (Kendrick 2000). In addition, parents were asked if they used each of the nine kit items and if they had found these items useful.

Medically attended injuries were assessed using parental reports and were defined as those that had been treated by a physician or at hospital and that had occurred during the last 12 months and were documented. Additional questions addressed the location of the injury as home or elsewhere. These questions were selected from the Nottingham Safe at Home Questionnaire (Kendrick 2000). Minor wording modifications were made to the questions to reflect the Canadian study setting. In addition, the age of the infant, type of injury (measured using 12 possible response categories) and the body part injured (measured using 11 possible response categories) were documented (Statistics Canada 1996).

2.10. Sample size determination

For the primary outcome, a sample size of 200 per group with 80% power and type I error of $p = 0.05$ allowed for the
detection of an absolute increase of 15% from a baseline of 30%, in the proportion of parents reporting use of at least two of the nine kit items. Community health nurses in the District of Chilliwack had reported that over the previous 2 years, 30% of families, on average, used at least two or more safety devices in the home.

2.11. Statistical analyses

Data were analysed using SPSS software (version 11.0; SPSS Inc., Chicago, IL, USA). Comparability of subjects across study groups was assessed using \( \chi^2 \) statistics.

2.11.1. Parental safety behaviours and removal of hazards. Cronbach's alpha for the 14 behavioural items was calculated to be 0.306. This was not high enough to allow a consolidation of these items into one score and, as a result, the 14 behavioural items were analysed individually. Implementation of safety behaviours across groups was compared using logistic regression, controlling for behaviours implemented at enrolment. The use of safety kit items was compared across the two intervention groups using logistic regression. Odds ratios (ORs), with a 95% confidence level, were calculated using standard error estimates from the logistic model.

2.11.2. Safety kit item use. The use of each individual safety kit item was assessed, in a univariate analysis, using the \( \chi^2 \) statistic to assess differences between intervention groups. Mean number of kit items was compared across the intervention groups using the t-test for 6 and 12 months. In addition, the use of safety kit items was compared across the two intervention groups using logistic regression, in order to control for characteristics of subjects not evenly balanced among groups. In constructing the multivariate models, each variable was entered individually and the one that was most statistically significant was returned, based on the \( p \)-value.

2.11.3. Attitudinal measures. Parental attitudes were found to be highly skewed towards 'positive' answers and Likert scale measures were collapsed to binary responses. Parental responses to the question 'how serious an issue do you consider infant home injuries to be, compared to other causes of hospitalization?' were categorized as either positive (serious/very serious issue) or negative (somewhat/minor/not an issue). Similarly, responses to the question 'do you think that most infant injuries in the home could be prevented?' were categorized as either positive (quite/almost completely preventable) or negative (somewhat/not very/not at all preventable). Positive responses were compared among groups using logistic regression.

2.11.4. Injury outcomes. Injury rates were calculated from binary 'yes/no' responses. Rates of injury across intervention groups were compared using logistic regression.

Figure 1. Flow of participants through the trial.
3. Results

A total of 600 out of 811 eligible parents consented to participate in the study (figure 1). Overall, 483 parents (80.5%) completed questionnaires at all three follow-up times. The overall response rates for the 2, 6 and 12 month surveys were 95.3%, 90.5% and 81.2% respectively. Among the 202 subjects randomized to a home visit plus safety kit, home visits were completed with 185 participants (91.6%). The groups were similar across all socio-demographic characteristics, measured using $\chi^2$ analysis (table 1).

3.1. Parental safety behaviours

In the logistic regression, the association of the following baseline variables were examined, income, single parenthood, first baby, education level, home ownership and employment, in relation to the study groups to determine the effect on parental behaviours and attitudes. The income variable was retained in the model as it had the strongest influence on the ORs.

3.1.1. Parental safety behaviours and removal of hazards.

3.1.1.1. Safety kit vs. control. At 6 months, there were no differences found between the safety kit and control groups for any of the 14 behavioural measures. At 12 months, 69.3% (n = 113) of parents in the safety kit group reported having their hot water adjusted to a safe temperature, compared to 53.7% (n = 80) of those in the control group (OR 2.21, 95% CI 1.32 to 3.69), adjusted for income (see table 2). There were no differences found between groups for any of the other behavioural variables (see table 2).

3.1.1.2. Safety kit plus home visit vs. control. At 6 months, the odds of having the hot water temperature adjusted safely was significantly higher for the safety kit plus home visit group compared to the control group (OR 2.25, 95% CI 1.37 to 3.71), adjusted for income (see table 3). At 12 months, a higher proportion of parents in the safety kit plus home visit group (69.9%, n = 121), compared to the control group (53.7%, n = 80), also reported safe adjustment of their home hot water temperature (OR 2.6, 95% CI 1.57 to 4.46), adjusted for income (see table 3).

Table 1. Comparison of baseline socio-demographic characteristics between the three groups. Values are numbers (percentage) of responses by participants.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total n = 574</th>
<th>Kit + Home visit (n = 193)</th>
<th>Kit (n = 197)</th>
<th>Control (n = 184)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single parent (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22/190 (11.6)</td>
<td>24/187 (12.8)</td>
<td>15/177 (8.5)</td>
<td></td>
<td>0.40</td>
</tr>
<tr>
<td>First baby</td>
<td>96/193 (49.7)</td>
<td>99/194 (51.0)</td>
<td>87/182 (47.8)</td>
<td></td>
<td>0.82</td>
</tr>
<tr>
<td>Education level</td>
<td>68/187 (36.4)</td>
<td>77/186 (41.4)</td>
<td>58/176 (33.0)</td>
<td></td>
<td>0.255</td>
</tr>
<tr>
<td>High school or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renting</td>
<td>71/191 (37.2)</td>
<td>73/192 (38.0)</td>
<td>78/181 (43.1)</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td>Unpaid work</td>
<td>98/193 (50.8)</td>
<td>111/197 (56.3)</td>
<td>106/184 (57.6)</td>
<td></td>
<td>0.36</td>
</tr>
<tr>
<td>Household income (less than $20 000)</td>
<td>25/175 (14.3)</td>
<td>40/184 (21.7)</td>
<td>25/172 (14.5)</td>
<td></td>
<td>0.36</td>
</tr>
<tr>
<td>Baby’s gender (% male)</td>
<td>93/176 (52.8)</td>
<td>90/179 (50.3)</td>
<td>85/164 (51.8)</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Mother’s age (&lt;20 years)</td>
<td>20/188 (10.6)</td>
<td>16/187 (8.6)</td>
<td>17/172 (9.9)</td>
<td></td>
<td>0.78</td>
</tr>
</tbody>
</table>

Table 2. Parental self-reported preventive safety behaviours and removal of hazards: safety kit vs. control: 12 months*.  

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n)</th>
<th>Control (%)</th>
<th>Kit (n)</th>
<th>Kit (%)</th>
<th>Odds ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lights</td>
<td>144/146</td>
<td>98.6</td>
<td>161/162</td>
<td>99.4</td>
<td>2.90</td>
<td>0.25 – 34.10</td>
</tr>
<tr>
<td>Clutter</td>
<td>135/144</td>
<td>93.8</td>
<td>152/162</td>
<td>93.8</td>
<td>0.91</td>
<td>0.34 – 2.42</td>
</tr>
<tr>
<td>Unattended</td>
<td>69/148</td>
<td>46.6</td>
<td>89/161</td>
<td>55.3</td>
<td>1.23</td>
<td>0.74 – 2.06</td>
</tr>
<tr>
<td>Walker</td>
<td>117/148</td>
<td>79.1</td>
<td>140/162</td>
<td>86.4</td>
<td>1.90</td>
<td>1.00 – 3.62</td>
</tr>
<tr>
<td>Toy</td>
<td>126/144</td>
<td>87.5</td>
<td>139/156</td>
<td>89.1</td>
<td>1.36</td>
<td>0.61 – 3.00</td>
</tr>
<tr>
<td>Choke</td>
<td>134/147</td>
<td>91.2</td>
<td>136/163</td>
<td>83.4</td>
<td>0.55</td>
<td>0.27 – 1.14</td>
</tr>
<tr>
<td>Blinds</td>
<td>125/146</td>
<td>85.6</td>
<td>145/161</td>
<td>90.1</td>
<td>1.79</td>
<td>0.86 – 3.71</td>
</tr>
<tr>
<td>Hot</td>
<td>147/149</td>
<td>98.7</td>
<td>158/163</td>
<td>96.9</td>
<td>0.56</td>
<td>0.10 – 3.17</td>
</tr>
<tr>
<td>Exting (fire extinguisher)</td>
<td>98/148</td>
<td>66.2</td>
<td>94/162</td>
<td>58.0</td>
<td>0.86</td>
<td>0.48 – 1.57</td>
</tr>
<tr>
<td>Homehot</td>
<td>80/149</td>
<td>53.7</td>
<td>113/163</td>
<td>69.3</td>
<td>2.21</td>
<td>1.32 – 3.69</td>
</tr>
<tr>
<td>Meds</td>
<td>147/149</td>
<td>98.7</td>
<td>160/163</td>
<td>98.2</td>
<td>3.05</td>
<td>0.26 – 35.32</td>
</tr>
<tr>
<td>Plants</td>
<td>112/147</td>
<td>76.2</td>
<td>123/160</td>
<td>76.9</td>
<td>1.12</td>
<td>0.62 – 2.04</td>
</tr>
<tr>
<td>Tub</td>
<td>145/149</td>
<td>97.3</td>
<td>159/163</td>
<td>97.5</td>
<td>0.91</td>
<td>0.20 – 4.21</td>
</tr>
<tr>
<td>Pools</td>
<td>104/144</td>
<td>72.2</td>
<td>105/161</td>
<td>65.2</td>
<td>0.85</td>
<td>0.49 – 1.47</td>
</tr>
</tbody>
</table>

*Adjusted for income and baseline measure of dependent variable.
Additionally, at 12 months, 79% of parents (n = 136) in the kit plus home visit group reported that they kept plants out of reach compared to 76.3% (n = 112) in the control group (OR 1.90, 95% CI 1.03 to 3.52), adjusted for income. There were no differences found between groups for any of the other behavioural variables (see table 3).

3.1.1.3. Attitudinal outcomes. At 12 months, parental attitudes regarding preventability did not differ among groups as 82% (n = 132) of parents in the safety kit alone group reported that they considered infant injuries to be almost/ completely or quite preventable, compared with 82.2% (n = 139) of parents in the kit plus home visit group and 81.5% (n = 119) in the control group. No significant differences emerged in a multivariate analysis, adjusted for income at baseline.

Similarly, at 12 months, parental attitudes regarding the seriousness of infant injuries did not differ among groups, as 80.7% (n = 130) of parents in the kit only group reported that they considered infant injuries very serious or serious, compared with 83.4% (n = 141) in the kit plus home visit group and 83.0% (n = 122) in the control group. No significant differences emerged in a multivariate analysis, adjusted for income at baseline.

3.1.1.4. Safety kit item use. Use of the hot water temperature cards was significantly higher in the kit plus home visit group as compared with the kit only group (OR 2.38, CI 1.42–3.97). No significant differences were found between groups with regard to the reported use of any of the other eight safety kit items (see table 4).

3.1.1.5. Injury outcomes. Injury rates did not differ between study groups. Of the parents in the kit group, 10% (n = 16) reported that their infant had been injured compared to 10.3% in the control group (OR 1.03, CI 0.49–2.18). Of the parents in the kit and home visit group, 9.3% (n = 16) reported that their infant had been injured compared to 10.3% (n = 15) in the control group (OR 1.05, CI 0.50–2.21).

Table 3. Parental self-reported preventive safety behaviours and removal of hazards: safety kit plus home visit (HV) vs. control: 12 months*.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n)</th>
<th>Control (%)</th>
<th>Kit + HV (n)</th>
<th>Kit + HV (%)</th>
<th>Odds ratio (R)</th>
<th>95% CI</th>
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<td>Lights</td>
<td>144/146</td>
<td>98.6</td>
<td>169/171</td>
<td>98.8</td>
<td>1.25</td>
<td>0.17 – 9.32</td>
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<td>135/144</td>
<td>93.8</td>
<td>160/169</td>
<td>94.7</td>
<td>1.44</td>
<td>0.51 – 4.09</td>
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<td>69/148</td>
<td>46.6</td>
<td>84/170</td>
<td>49.4</td>
<td>1.15</td>
<td>0.69 – 1.92</td>
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<td>117/148</td>
<td>79.1</td>
<td>147/173</td>
<td>85.0</td>
<td>1.53</td>
<td>0.83 – 2.82</td>
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<td>87.5</td>
<td>158/169</td>
<td>93.5</td>
<td>2.31</td>
<td>0.97 – 5.49</td>
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<td>91.2</td>
<td>150/173</td>
<td>86.7</td>
<td>1.68</td>
<td>0.32 – 1.42</td>
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<td>150/171</td>
<td>87.7</td>
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<td>0.64 – 2.49</td>
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<td>147/149</td>
<td>98.7</td>
<td>167/172</td>
<td>97.1</td>
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<td>0.11 – 4.29</td>
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<td>110/172</td>
<td>64.0</td>
<td>1.22</td>
<td>0.67 – 2.21</td>
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<td>98.7</td>
<td>121/173</td>
<td>99.7</td>
<td>2.65</td>
<td>1.57 – 4.46</td>
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<tr>
<td>Meds</td>
<td>80/149</td>
<td>53.7</td>
<td>171/173</td>
<td>98.3</td>
<td>1.20</td>
<td>0.16 – 8.91</td>
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<td>Plants</td>
<td>112/147</td>
<td>76.2</td>
<td>136/172</td>
<td>79.1</td>
<td>1.90</td>
<td>1.03 – 3.52</td>
</tr>
<tr>
<td>Tub</td>
<td>145/149</td>
<td>97.3</td>
<td>172/173</td>
<td>99.4</td>
<td>3.51</td>
<td>0.36 – 34.31</td>
</tr>
<tr>
<td>Pools</td>
<td>104/144</td>
<td>72.2</td>
<td>112/172</td>
<td>65.1</td>
<td>0.76</td>
<td>0.44 – 1.32</td>
</tr>
</tbody>
</table>

*Adjusted for income and baseline measure of dependent variable.

Table 4. Safety kit item use at 12 months*.

<table>
<thead>
<tr>
<th>Safety kit items</th>
<th>Kit n (%)</th>
<th>Kit + HV n (%)</th>
<th>Odds ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke alarm</td>
<td>101 (61.6%)</td>
<td>111 (64.2%)</td>
<td>1.15</td>
<td>0.72–1.83</td>
</tr>
<tr>
<td>Stair gate coupon</td>
<td>64 (39%)</td>
<td>57 (32.9)</td>
<td>0.80</td>
<td>0.50–1.27</td>
</tr>
<tr>
<td>Blind cord windups</td>
<td>82 (50.0%)</td>
<td>95 (54.9%)</td>
<td>1.20</td>
<td>0.77–1.88</td>
</tr>
<tr>
<td>Drawer latches</td>
<td>106 (64.6%)</td>
<td>123 (71.1%)</td>
<td>1.32</td>
<td>0.82–2.13</td>
</tr>
<tr>
<td>Corner cushions</td>
<td>69 (42.1%)</td>
<td>75 (43.4%)</td>
<td>0.92</td>
<td>0.58–1.46</td>
</tr>
<tr>
<td>Door stops</td>
<td>86 (52.4%)</td>
<td>97 (56.1%)</td>
<td>1.17</td>
<td>0.75–1.83</td>
</tr>
<tr>
<td>Outlet caps</td>
<td>140 (85.4%)</td>
<td>157 (90.8%)</td>
<td>1.51</td>
<td>0.74–3.06</td>
</tr>
<tr>
<td>Water temperature test card</td>
<td>104 (63.4%)</td>
<td>135 (78%)</td>
<td>2.38</td>
<td>1.42–3.97</td>
</tr>
<tr>
<td>Poison control emergency number</td>
<td>98 (59.8%)</td>
<td>120 (69%)</td>
<td>0.64</td>
<td>0.40–1.03</td>
</tr>
</tbody>
</table>

*Adjusted for income.
†Referent group.
4. Discussion

The study findings showed that parents in both intervention groups (i.e. safety kit and safety kit plus home visit) were more likely than those in the control group to report having their home hot water temperature adjusted to a safe level. Furthermore, parents receiving a home visit in addition to the safety kit were more likely to report having used the hot water temperature-testing card than those receiving the safety kit alone. Parents receiving a safety kit plus home visit were also more likely than those in the control group to report having plants placed out of reach of infants. However, no differences were found, between study groups, in parents’ perceptions towards seriousness or preventability of infant injuries and in the levels of parent-reported infant injuries.

4.1. Attitudes

High levels of parental concern for the prevention of injuries were common to all groups. These findings are consistent with those of King et al. (2001), who also reported no significant changes in parental attitudes towards injury risk and preventability and suggested that levels of awareness at baseline were too high to be affected by the home visiting intervention.

4.2. Behavioural changes and injury reduction

The results did not demonstrate that the safety kit or the safety kit plus home visit interventions were associated with a reduction in injuries. However, despite the fact that behavioural changes were found with regard to using the water temperature card and safe adjustment of water temperature levels, this study was not large enough to demonstrate an overall subsequent reduction in injuries. This is consistent with Watson et al. (2005), who reported an absence of injury reduction despite finding positive behavioural changes.

The optimal intervention to improve safety practices and reduce injuries is unclear. One RCT, which utilized a home visit in combination with education materials as compared with educational materials only, reported positive parental safety behaviour changes and injury reductions (King et al. 2001, 2005). This intervention, which was aimed at families with children under 8 years of age, consisted of a single home visit that included home and child safety injury prevention information, instructions for reducing hazards in the home and coupons for discounts on safety devices. Participants in the intervention group reported higher levels of change in knowledge, beliefs and practices and fewer parent-reported injuries compared with those in the control group. This study suggested that parental safety behaviours may be improved and injuries reduced by way of home visitation without the added provision of safety equipment.

Other studies, however, have shown evidence that a combined intervention approach is associated with increased safety behaviour uptake among parents. Sznajder et al. (2003) reported an increased uptake of safety behaviours among parents with children less than 1 year of age, who were randomized to receive home visit safety counselling combined with a safety kit as compared to counselling alone. This study found that safety improvements were significantly higher among parents who received a safety kit in addition to counselling.

Another recent study also provides some evidence for a positive effect from a combined home visitation and safety equipment intervention for improving parental safety practices. Watson et al. (2005) conducted a randomized trial with families who had children less than 5 years of age. In this study, the intervention group received home safety consultation and free of charge equipment for those families in financial need while the control group received the usual provided care. Findings included an increase in safety practices among intervention families at both the 1 and 2 year follow-up, but found no differences in medically attended injuries or admissions to hospital.

Another reason that this and other studies, which include a home visitation component, fail to show major parental safety behaviour improvements and no injury reductions may be that a one-time home visit is inadequate to facilitate major behavioural changes. Studies have documented the potential effectiveness of more extensive home visitation. In a randomized study designed to prevent child abuse and neglect, the authors reported finding that children whose mothers had received home visits from nurses were seen in the emergency department fewer times and were less frequently seen by physicians for accidents and poisonings than those in the comparison group (Olds et al. 1986). The home visit component of this study was extensive and involved multiple home visits during pregnancy and after the child’s birth, following the child until 2 years of age. As suggested by King et al. (2001), successful home visitation programmes may require a number of visits to develop a therapeutic relationship to address broader maternal and child health issues that may affect safety behaviours.

In the current study, only two of 14 parental safety behaviours showed significant increased uptake among parents in the intervention groups as compared to controls. This suggests that the intervention was minimally effective at changing parental safety behaviours. The clinical significance of this finding is also minimal since the intervention was associated with a 16% increase in the proportion of parents reporting having their hot water temperature safely adjusted. With regard to parental use of kit items, only the water temperature testing card showed...
safety devices may increase the use of those devices by
established. Home visitation as an adjunct to provision of
parental behaviour change and injury reductions have been
should focus on interventions for which effectiveness for
controls. Additionally, those who also received a home visit
were more likely than those in the control group to report having their
hot water temperature adjusted to a safe level. Parents may
have found the water temperature testing card to be
particularly useful since the card was attached to its own
instructional pamphlet.

Finally, although the safety kit and home visit intervention
for this study was developed specifically to target the
patterns of injuries that occur among infants, the types of
injuries that infants typically sustain may not have been
adequately addressed by the intervention. For example,
falls have been shown by several researchers to be the
leading cause of injury for infants aged 0–12 months
(Agran et al. 2003, Pickett et al. 2003). Although the intervention in the present study did attempt to address this
cause of injury by providing parents with a 50% discount
coupon for stair gates, more effective interventions that
directly target the main causes of infant injuries still need to
be developed and evaluated.

5. Limitations
The present study is limited by a lack of observational data
to verify the parental reports regarding use of safety devices
and preventive measures. Second, blinding of the nurses
was not possible as they were responsible for distributing
the kit to the participants. This study did not have suffi-
cient power to measure injury outcomes and was limited to
examining trends. Following families into the child’s second year, as they became more mobile, may have improved the ability to detect changes in rates of
injuries.

6. Conclusions and implications
It has been demonstrated that more parents in both
intervention groups reported that the hot water tempera-
ture was adjusted to a safe level in comparison to the
controls. Additionally, those who also received a home visit
were more likely to report behavioural changes than those
who received the safety kit alone. Home safety programmes
should focus on interventions for which effectiveness for
parental behaviour change and injury reductions have been
established. Home visitation as an adjunct to provision of
safety devices may increase the use of those devices by parents.

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