Randomised controlled trial assessing the impact of increasing information to health visitors about children’s injuries

D Kendrick, A Pritchard, J Cloke, M Barley

Abstract

**Aims**—To assess the effect on health visitor action of providing community health visitors with information on all injury attendances in children under 5 attending an accident and emergency (A&E) department and of providing additional information about each injury.

**Methods**—Children under 5 years attending the A&E department at Queen’s Medical Centre, Nottingham between October 1998 and April 1999 were studied, using a randomised controlled trial with a 2×2 factorial design. All attendances or selected attendances (all children under 1, burns and scalds, poisonings, head injuries, and repeat attendances in preceding six months) were notified. Provision of standard (diagnosis, circumstances surrounding injury, and disposal) or additional information (standard information plus place of injury, number of A&E attendances for injury in previous year, and any information recorded about safety equipment) was noted.

**Results**—Many notifications (56%) do not result in any action. Health visitors were nearly twice as likely to take action of some kind and three times as likely to undertake a home visit on receipt of notifications for selected attendances than on those for all attendances. A greater number of actions per notification were taken on receipt of information about selected attendances. Providing additional information had little effect on the action taken.

**Conclusions**—A selective policy for notifying community health visitors of child injury attendances at A&E results in a greater proportion of attendances in which the health visitor takes action and in a greater number of actions per attendance being taken. The utility of notifying all injury attendances is questionable, as many do not result in any action.

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Keywords: health visitor; injury; A&E

Unintentional injuries are common and result in one in five children attending an accident and emergency (A&E) department each year. In 1994 more than 400 liaison health visitors or nurses were in post in the UK. One of their responsibilities is to notify community health visitors about children who have attended A&E departments as a result of an unintentional injury, in order that the community health visitor can fulfil their role in terms of injury prevention. It has been recommended that all children attending the A&E department should be notified to community health visitors, but this is not routine practice in all A&E departments. We have been unable to find any evidence suggesting that notifying all attendances produces better outcomes than notifying selected attendances.

The information provided within the notification varies between A&E departments and has been found to be inadequate, mainly in terms of insufficient information on the circumstances surrounding the injury and previous injury attendances. Previous work suggests that knowledge of how the injury happened, severity of the injury, and occurrence of previous injuries is important for health visitors in deciding what action to take on receipt of a notification.

There has been little research on what happens in the community following notification. Post accident home visits have been suggested as the appropriate action following notification, and one of the aims of which is to prevent future injuries. However, several surveys of self reported practice indicate that health visitors frequently do not undertake post accident home visits and that both parents and health visitors can find such visits difficult. We have been unable to find any published studies assessing the frequency and range of actions taken by health visitors in relation to specific injury attendances. In addition we have been unable to find any well designed studies showing the effectiveness of post accident visits.

The policy in Nottingham for many years has been to notify selected attendances for unintentional injury and to provide information on diagnosis, circumstances surrounding the injury, and disposal. This study has been undertaken to describe the range and frequency of health visitor action on receipt of notification, and to assess the effect on health visitor action of notifying all A&E department attendances to children under 5 and of providing additional information on each attendance. This information can then be used to help with the decision making process about whether to notify all attendances and the information to provide on each notification.

**Methods**

The study took place in the only A&E department in Nottingham. The study population...
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Injuries to children under 1 year

- Burns and scalds
- Poisonings
- Head injuries
- Repeat injury attendance in past six months.

The information provided on the notification form in the standard information group comprised:

- Diagnosis
- Circumstances surrounding injury
- Disposal—e.g. discharge, referral to general practitioner, follow up at fracture clinic, etc.

The information provided in the additional information group comprised the standard information plus:

- Place of injury
- Number of A&E attendances for unintentional injury in past 12 months
- Any information recorded regarding safety equipment on A&E records.

These additional items were chosen as injury prevention within, as opposed to without, the home is acknowledged as an important role for health visitors, and previous attendances have been highlighted as predictors of future injuries and as an item of information inadequately provided in notifications in previous research and and absence of safety equipment was identified by health visitors in the focus groups (described below) as a trigger for them in taking action on receipt of a notification.

The liaison clerk and the research assistant (AJP) completed the notifications. They were sent to the community health visitors wherever possible within 48 hours of the child attending A&E.

**Primary and secondary outcome measures**

The primary outcome measure was a post accident home visit undertaken by the health visitor on receipt of notification. We chose this as the primary outcome rather than repeat injury attendances as only 1 in 36 children in Nottingham attend A&E more than once a year, so the sample size required to show a significant reduction in repeat attendances would be extremely large. The sample size calculation indicated that 174 attenders in each of the four treatment groups would allow detection of a relative risk of 2.0 with 90% power at the 5% significance level, based on an estimated post accident home visit rate of 15% in the selected notified and standard information provided group.

Secondary outcome measures included taking any action at all and a range of actions taken on receipt of notification such as discussion of injury prevention in clinic, discussing the injury with other professionals, phoning the family, using the information for constructing a profile, referring the child or family to other professionals, obtaining safety equipment for the family, and the total number of actions undertaken. The actions undertaken on receipt of notification were ascertained by a telephone survey, by the research assistant, of health visitors who were asked to provide details of actions recorded in the child’s records, and
their reasons for those actions. The research assistant was masked to the treatment group at this stage by using a database containing only the child’s name, date of birth, and date of attendance. The interview schedule was developed from a focus group of health visitors employed by a neighbouring community trust undertaken by two members of the research team (DK, AJP).

### DATA ANALYSIS

The data were entered into an Access database and validated by checking a 1 in 10 sample of records against the original notification forms and telephone questionnaires. They were analysed using SPSS for Windows, version 8.0 and EPI-INFO, version 6. All analyses have been undertaken on an intention to treat basis. Comparisons between intervention groups have been made using logistic regression and odds ratios with 95% confidence intervals have been calculated. Interactions between the intervention groups have been assessed, and where significant interactions have been found (p < 0.05) data have also been analysed for each intervention group separately; otherwise the groups were combined. The number of actions taken by health visitors by intervention group has been compared using the Kruskal–Wallis test.

### RESULTS

A total of 998 attendances were randomised. The notifications for 881 attendances (88.3%) were followed up to ascertain health visitor action from 142 health visitors (fig 1). A total of 117 notifications could not be followed up for the following reasons: child no longer on health visitor caseload (n = 29); health visitor unable to find records (n = 38); health visitor declined to give information (n = 28); the health visitor or general practitioner for the child was not known (n = 18); and other reasons (n = 4) including vacant caseloads, health visitor on long term sick leave, and the child not being known to the health visitor.

Table 1 shows the type of injury received by each child. Very few children (n = 25, 2.5%) suffered more than one injury per attendance. For these children the first injury recorded on the A&E record was used in the analysis. The mean ages of children attending in each group were as follows: all injury attendances and additional information, mean = 2.36 (SD 1.25); all injury attendances and standard information, mean = 2.54 (SD 2.68); selected injury attendances and additional information, mean = 1.44 (SD 1.10); and selected injury attendances and standard information, mean = 1.34 (SD 1.06).

Health visitors were three times more likely to undertake a home visit and almost twice as likely to take action on receipt of information on selected injury attendances than on all injury attendances (table 2). Restricting the analysis to children aged over 1 year to account for higher health visitor contact rates in infants as part of routine child health surveillance produced very similar results (odds ratio (OR) for home visit = 2.90 (95% CI 1.68, 5.01); OR for taking any action = 1.69 (1.17, 2.44)). Providing health visitors with additional information did not increase the likelihood of them taking any action or of undertaking a home visit (table 2). There was a significant interaction between the intervention groups only for discussing the injury in clinic. Notifications for selected injury attendances were more likely to result in the health visitor discussing the injury in clinic but only when additional information was also provided. No differences were found between intervention groups for the other secondary outcomes. Health visitors receiving notifications on selected injury attendances took a greater number of actions per notification than those receiving information on all injury attendances (median number of actions for selected injuries = 1 (interquartile range (IQR) 0, 1), and for all injuries = 0 (IQR 0, 1); Kruskal–Wallis test χ² = 19.79, 3 degrees of freedom, p < 0.001).

Providing additional information did not significantly increase the proportion of health visitors who considered they had received sufficient information regarding the injury (83.4% versus 80.9%; OR 1.19 (95% CI 0.84, 1.68) p = 0.32).

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**Injury attendances at A&E in study period, n = 998**

<table>
<thead>
<tr>
<th>Randomisation</th>
<th>All injuries + additional information n = 312</th>
<th>All injuries + standard information n = 312</th>
<th>Selected injuries + additional information n = 177</th>
<th>Selected injuries + standard information n = 177</th>
</tr>
</thead>
<tbody>
<tr>
<td>Followed up</td>
<td>All injuries + additional information n = 276 (88.5%)</td>
<td>All injuries + standard information n = 279 (89.4%)</td>
<td>Selected injuries + additional information n = 155 (82.9%)</td>
<td>Selected injuries + standard information n = 155 (82.9%)</td>
</tr>
</tbody>
</table>

### Table 1 Injury mechanisms of treatment groups at baseline (%)

<table>
<thead>
<tr>
<th>Injury mechanism*</th>
<th>All injuries + additional information n = 312</th>
<th>All injuries + standard information n = 312</th>
<th>Selected injuries + additional information n = 177</th>
<th>Selected injuries + standard information n = 177</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laceration</td>
<td>104 (33.3)</td>
<td>83 (26.6)</td>
<td>15 (8.0)</td>
<td>12 (6.4)</td>
</tr>
<tr>
<td>Bruising</td>
<td>43 (13.8)</td>
<td>54 (17.3)</td>
<td>22 (11.8)</td>
<td>30 (16.0)</td>
</tr>
<tr>
<td>Head injury</td>
<td>32 (10.3)</td>
<td>33 (10.6)</td>
<td>35 (18.7)</td>
<td>30 (16.0)</td>
</tr>
<tr>
<td>Fracture</td>
<td>19 (6.1)</td>
<td>15 (4.8)</td>
<td>5 (2.7)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Poisoning</td>
<td>17 (5.4)</td>
<td>22 (7.1)</td>
<td>39 (20.9)</td>
<td>44 (23.5)</td>
</tr>
<tr>
<td>Dislocation</td>
<td>25 (8.0)</td>
<td>22 (7.1)</td>
<td>7 (3.7)</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Burns/scald</td>
<td>12 (3.9)</td>
<td>23 (7.4)</td>
<td>43 (23.0)</td>
<td>47 (25.1)</td>
</tr>
<tr>
<td>Foreign body</td>
<td>12 (3.9)</td>
<td>18 (5.8)</td>
<td>4 (2.1)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Other†</td>
<td>48 (15.4)</td>
<td>42 (13.5)</td>
<td>17 (9.1)</td>
<td>16 (8.6)</td>
</tr>
</tbody>
</table>

*Injury mechanisms in italics fulfil the criteria for the selected injury attendance group.
†Includes sprains and strains, avulsion, inhalation, no injury diagnosed, injury unspecified.
Table 2  Action taken by health visitor on receipt of notification (percentage)

<table>
<thead>
<tr>
<th>Action taken</th>
<th>Treatment group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Selected injuries</td>
</tr>
<tr>
<td></td>
<td>n = 326</td>
</tr>
<tr>
<td>Home visit</td>
<td>62 (19.0)</td>
</tr>
<tr>
<td>Discussed in clinic</td>
<td>82 (25.2)</td>
</tr>
<tr>
<td>Placed family</td>
<td>42 (12.9)</td>
</tr>
<tr>
<td>Discussed with other professionals</td>
<td>5 (1.5)</td>
</tr>
<tr>
<td>Referred to other professionals</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Obtained safety equipment</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Used information for profile</td>
<td>61 (13.4)</td>
</tr>
<tr>
<td>Any action</td>
<td>174 (53.4)</td>
</tr>
</tbody>
</table>

*Significant interaction between treatment groups (likelihood ratio test \( \chi^2 = 4.1, 1 \text{ df}, p = 0.04 \)). Selected injuries and complete information versus all injuries and complete information, OR 2.24 (1.42, 3.55). All injuries and standard information versus all injuries and complete information, OR 1.18 (0.78, 1.84). Selected injuries and standard information versus all injuries and complete information, OR 1.32 (0.79, 2.19).

Table 3  Outcome of A&E attendance by treatment group (%)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>All injuries + additional information n = 276</th>
<th>Selected injuries + additional information n = 171</th>
<th>All injuries + standard information n = 279</th>
<th>Selected injuries + standard information n = 155</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharged</td>
<td>167 (60.5)</td>
<td>81 (47.4)</td>
<td>175 (62.7)</td>
<td>88 (56.8)</td>
</tr>
<tr>
<td>Referred to GP</td>
<td>52 (18.8)</td>
<td>35 (20.5)</td>
<td>42 (15.1)</td>
<td>24 (15.5)</td>
</tr>
<tr>
<td>Referred to fracture/A&amp;E clinic/burns unit</td>
<td>41 (14.9)</td>
<td>41 (24.0)</td>
<td>46 (16.5)</td>
<td>28 (18.1)</td>
</tr>
<tr>
<td>Other</td>
<td>16 (5.8)</td>
<td>14 (8.2)</td>
<td>16 (5.7)</td>
<td>15 (9.7)</td>
</tr>
</tbody>
</table>

\( \chi^2 = 15.7, 9 \text{ df}, p = 0.07 \).

More attendances in the selected injury attendance and additional information group resulted in follow up at the fracture clinic, A&E clinic, or burns unit, although this was of borderline statistical significance (table 3). This did not seem to be important in determining whether the health visitor took action, as 45.5% of attendances followed up at the fracture or A&E clinic or burns unit resulted in the health visitor taking action compared to 43.4% of those with other outcomes (\( \chi^2 = 0.22, 1 \text{ df}, p = 0.64 \)). The factors most frequently given as being important in influencing health visitor decisions about the actions that they took did not differ by treatment group except that the all injury attendances and additional information group were more likely to report knowledge of previous injuries as a factor that influenced their decision (table 4).

Discussion

We have found that many notifications do not result in any action and that notifying selected attendances results in a greater proportion resulting in home visits and a greater number of actions per notification than providing health visitors with information concerning all injury attendances. Providing additional information increased the likelihood of a health visitor discussing the injury in clinic, but had no effect on any other action.

Why are health visitors more likely to take action when receiving information only on selected injury notifications? There was little difference in the factors perceived to influence decisions about action between the groups; so it seems unlikely that perceived severity or preventability could explain the differences in action, despite these previously being suggested as being important. In addition, although the selected injury attendances resulted in hospital follow up slightly more often, taking action did not appear to be related to hospital follow up. The difference in action cannot be explained by perceptions of adequacy of the information received, as this also did not differ between groups. Workload may be a possible explanation. This was infrequently mentioned as an important factor in the decision not to take action (n = 47, 5.3%), but health visitors may be reluctant to admit that this may influence their decisions. It is possible that the number of notifications received is related to the decision about taking action. Perhaps notifying all injuries results in health visitors receiving too much information, or the impact of the notification is lessened as a result of health visitors becoming accommodated to receiving a large number of notifications.

What are the implications for practice? If one of the purposes of notification is to try to

Table 4  Reasons most commonly given by health visitors for action taken by treatment group (%)

<table>
<thead>
<tr>
<th>Reason for action</th>
<th>All injuries + additional information n = 276</th>
<th>Selected injuries + additional information n = 171</th>
<th>All injuries + standard information n = 279</th>
<th>Selected injuries + standard information n = 155</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of family</td>
<td>132 (47.8)</td>
<td>84 (49.1)</td>
<td>131 (47.0)</td>
<td>83 (53.5)</td>
<td>( \chi^2 = 1.89, 3 \text{ df}, p = 0.60 )</td>
</tr>
<tr>
<td>How injury occurred</td>
<td>67 (24.3)</td>
<td>40 (23.4)</td>
<td>72 (25.8)</td>
<td>26 (16.8)</td>
<td>( \chi^2 = 4.83, 3 \text{ df}, p = 0.18 )</td>
</tr>
<tr>
<td>Type or severity of injury</td>
<td>53 (19.2)</td>
<td>31 (18.1)</td>
<td>68 (24.4)</td>
<td>36 (23.2)</td>
<td>( \chi^2 = 3.66, 3 \text{ df}, p = 0.30 )</td>
</tr>
<tr>
<td>Have regular contact with family</td>
<td>36 (13.0)</td>
<td>33 (19.3)</td>
<td>49 (17.6)</td>
<td>30 (19.4)</td>
<td>( \chi^2 = 4.39, 3 \text{ df}, p = 0.22 )</td>
</tr>
<tr>
<td>Age or development of child</td>
<td>48 (17.4)</td>
<td>27 (15.8)</td>
<td>51 (18.3)</td>
<td>19 (12.3)</td>
<td>( \chi^2 = 2.89, 3 \text{ df}, p = 0.41 )</td>
</tr>
<tr>
<td>Previous injury</td>
<td>58 (21.0)</td>
<td>20 (11.7)</td>
<td>22 (7.9)</td>
<td>15 (9.7)</td>
<td>( \chi^2 = 23.81, 3 \text{ df}, p &lt; 0.001 )</td>
</tr>
</tbody>
</table>
prevent future injuries, there are several research questions that need addressing in order to do this. Firstly, which injuries should be notified? To answer this we need to know whether some types of injury predict future injury better than others. There is some evidence that hospital admissions for burns and poisonings predict future admissions for the same injuries, but little evidence for other types of injury. We also need to know whether more severe injuries predict future injury better than minor injuries. Again there is some evidence that hospital admission for injury predicts future admission, and some evidence that accident attendance predicts future admission. However, these studies did not measure injury severity, and social factors and proximity to hospital have been found to be important in determining hospital attendance and admission. Research measuring injury severity is needed to examine this relation further. Once we know which injuries to notify, we need to know the effectiveness of the actions health visitors take on receipt of notifications, and how acceptable they are to families whose children have suffered an injury. Health visitors, and parents, have expressed concern over post accident visits as they may have the potential to increase parental guilt and to be disempowering for parents. These concerns must be taken seriously; we cannot assume that post accident visits are only beneficial. Only one study has examined the effect of notifications and post accident follow up visits on repeat attendance. A 40% reduction in repeat attendances was reported. Insufficient data are provided in the paper to verify this claim, and the acceptability of the visits to parents was not reported. The effects of other health visitor actions on receipt of notifications have not been examined. Further work is required to assess the effectiveness, and acceptability, of the range of actions taken by health visitors using rigorous methodology. Within this we must not forget that the notification system is also used for child protection purposes and the impact of any changes made for the purposes of unintentional injury must also be evaluated in terms of intentional injury.

In conclusion, the notification system needs more thought to define its purpose in terms of unintentional injury prevention. The research questions outlined above need answering so that decisions regarding the system can be evidence based. From the data presented here, systems notifying all unintentional injury attendances may be inefficient in terms of use of resources, as a smaller proportion of notifications will result in any action. In addition the effectiveness, and the acceptability of the action that they result in is not known.

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