SHORT REPORT

Educational programmes and sharps injuries in health care workers

S. Brusaferro¹, Laura Calligaris¹, F. Farneti¹, F. Gubian¹, C. Londero¹ and V. Baldo²

Background
Sharps injuries in health care personnel still represent a significant problem worldwide. Many studies show a reduction in sharps injuries following the introduction and use of different protection devices, but few studies focus on the role of training programmes in the prevention of such injuries.

Aims
To analyse the influence of training programmes on sharps injuries in health care workers (HCW).

Methods
The study was carried out in a 350-bed university hospital in north-eastern Italy with 700 HCW. Training courses on biological risk for physicians, nurses, ancillary operators and laboratory technicians have been in place since 1998. Data on all sharps injuries reported by HCW between 1998 and 2006 were analysed together with information on HCW who attended the training courses.

Results
Between 1998 and 2006, there was a reduction in the incidence of sharps injuries from 11 to 4% (P < 0.01). During the same period, the number of trained HCW increased from 26 to 69% (P < 0.01). Trained personnel had a statistically significant lower relative risk (RR) for injury with RR = 0.06 (95% CI 0.02–0.18).

Conclusions
A continuous educational effort for HCW leads to a reduction of sharps injuries.

Key words
Healthcare workers’ training; needlestick injuries; primary prevention.

Introduction
Sharps injuries in health care workers (HCW) still represent a significant problem in health care settings.

Frequency of needlestick injuries varies from 14 to 839 per 1000 HCW per year [1,2]. The cost of such injury is between US$3.8 and US$51 each, excluding long-term treatment for possible infectious diseases [3] and human costs in terms of anxiety and stress.

Many studies suggest that a reduction in sharps injuries is possible with the introduction and use of different needle protection devices [4–6], but few studies focus on the role of training programmes in the prevention of such injuries [7,8].

This study analysed the influence of biological hazards training programmes on sharps injuries in HCW in a teaching hospital.

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The topics covered included the importance and availability of protection devices, biological hazards for HCW and prevention of the most frequent behavioural errors related to injuries.

We used density incidence (DI) to compare results from year to year (DI = total number of sharps injuries per year/total number of actual working hours carried out in 1 year by the health care personnel \( \times 1\,000\,000 \)).

Ethical approval was not required for this study since data were anonymous and HCW were not identified by name but by a code on the database. Data analysis was conducted using Epi Info 2000 [9] to calculate the chi-square value and the relative risk with 95% confidence interval, assuming as significant a \( P \) level \(< 0.05\).

**Results**

Over 9 years, the DI of sharps injuries reduced from 77/1\,000\,000 to 32/1\,000\,000 worked hours (\( P < 0.01 \)). Stratifying by occupation, reduction of the DI of sharps injuries in nurses reached significant levels (\( P < 0.01 \)), whereas in physicians, laboratory technicians and ancillary operators, differences in DI year on year were not significant.

Table 1 shows that risk of sharps injuries in trained HCW was significantly lower compared to those who were not specifically trained.

Overall, in 2006, 69% of HCW were trained. In each occupational group the staff receiving training increased significantly (\( P < 0.01 \)) from 1998 to 2006 (Table 2).

The sharps injury decrease was mainly due to risk reduction related to syringe disposal (\( P < 0.01 \)). Also, routine assistance of the patient was an activity where injuries decreased significantly (\( P < 0.05 \)), whereas risks in operating room activity and laboratory procedures were not significant (data not shown).

**Discussion**

Incidence of sharps injuries in this study was reduced from 85 venepunctures per year (11%) in 1998 to 32 venepunctures per year (4%) in 2006. The training seemed to be successful in reducing incidence of injuries, but a stratified analysis showed that the reduction was significant only among nurses, and only syringe disposal and routine assistance to the patient were really modified.

**Table 1. Injury RR of participants of the formative courses**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of HCW (1 January)</th>
<th>Number of total injuries in HCW</th>
<th>% of trained personnel</th>
<th>Number of injuries among trained personnel</th>
<th>RR trained/not trained personnel</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>768</td>
<td>85</td>
<td>26</td>
<td>19</td>
<td>0.8</td>
<td>0.50–1.31</td>
</tr>
<tr>
<td>1999</td>
<td>744</td>
<td>80</td>
<td>33</td>
<td>17</td>
<td>0.6</td>
<td>0.24–0.68</td>
</tr>
<tr>
<td>2000</td>
<td>727</td>
<td>77</td>
<td>41</td>
<td>17</td>
<td>0.4</td>
<td>0.24–0.68</td>
</tr>
<tr>
<td>2001</td>
<td>725</td>
<td>71</td>
<td>41</td>
<td>16</td>
<td>0.4</td>
<td>0.24–0.70</td>
</tr>
<tr>
<td>2002</td>
<td>723</td>
<td>63</td>
<td>51</td>
<td>14</td>
<td>0.3</td>
<td>0.16–0.51</td>
</tr>
<tr>
<td>2003</td>
<td>721</td>
<td>54</td>
<td>59</td>
<td>12</td>
<td>0.2</td>
<td>0.11–0.37</td>
</tr>
<tr>
<td>2004</td>
<td>718</td>
<td>46</td>
<td>64</td>
<td>11</td>
<td>0.18</td>
<td>0.09–0.34</td>
</tr>
<tr>
<td>2005</td>
<td>714</td>
<td>38</td>
<td>67</td>
<td>6</td>
<td>0.04</td>
<td>0.04–0.22</td>
</tr>
<tr>
<td>2006</td>
<td>708</td>
<td>32</td>
<td>69</td>
<td>4</td>
<td>0.06</td>
<td>0.02–0.18</td>
</tr>
</tbody>
</table>

**Table 2. Trained personnel from 1998 to 2006 stratified by professional category**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ancillary operators</td>
<td>143 (39)</td>
<td>137 (43)</td>
<td>132 (55)</td>
<td>132 (55)</td>
<td>131 (59)</td>
<td>131 (61)</td>
<td>130 (68)</td>
<td>130 (72)</td>
<td>128 (74)</td>
<td>&lt;0.01 (+35)</td>
</tr>
<tr>
<td>Physicians</td>
<td>204 (6)</td>
<td>198 (9)</td>
<td>194 (19)</td>
<td>193 (19)</td>
<td>193 (29)</td>
<td>192 (31)</td>
<td>192 (33)</td>
<td>190 (36)</td>
<td>188 (39)</td>
<td>&lt;0.01 (+34)</td>
</tr>
<tr>
<td>Nursing personnel</td>
<td>302 (39)</td>
<td>296 (48)</td>
<td>292 (54)</td>
<td>292 (54)</td>
<td>291 (64)</td>
<td>291 (79)</td>
<td>290 (83)</td>
<td>291 (85)</td>
<td>289 (87)</td>
<td>&lt;0.01 (+48)</td>
</tr>
<tr>
<td>Technical personnel</td>
<td>119 (13)</td>
<td>113 (22)</td>
<td>109 (29)</td>
<td>108 (30)</td>
<td>108 (42)</td>
<td>107 (51)</td>
<td>106 (63)</td>
<td>103 (68)</td>
<td>103 (70)</td>
<td>&lt;0.01 (+57)</td>
</tr>
<tr>
<td>Total HCW</td>
<td>768 (26)</td>
<td>744 (33)</td>
<td>727 (41)</td>
<td>725 (41)</td>
<td>723 (51)</td>
<td>721 (59)</td>
<td>718 (64)</td>
<td>714 (67)</td>
<td>708 (69)</td>
<td>&lt;0.01 (+43)</td>
</tr>
</tbody>
</table>
These results suggest that many sharps injuries can be prevented following an educational programme in needle disposal [10].

The contribution of the educational programmes in reducing sharps injuries is emphasized in this study by the fact that in the later years, no new protection devices, changes in existing protocols or guidelines for preventing sharps injuries were implemented. As a consequence, any possible bias due to the adoption of more effective tools in the prevention of sharps injuries can be excluded.

One limitation of this study is the small number of HCW. Another limitation could be under-reporting. Nevertheless, there is no reason to believe that under-reporting has changed during the last few years in our setting: if this had been the case, all types of accident are likely to have decreased, not just sharps injuries.

A global risk management approach is usually considered the most effective strategy; but in this study, a reduction in sharps injuries was explained by the impact of only one intervention: training.

Key points

- Over 9 years, the incidence of sharps injuries was significantly reduced among health care workers in an acute hospital setting.
- The sharps injury decrease was mainly due to risk reduction related to syringe disposal.
- Sharps injuries can be prevented using an educational programme.

Conflicts of interest

None declared.

References