Injury by contaminated sharp devices and needles is one of the most serious occupational hazards for health care workers (HCWs). Some of these injuries cause dangerous infections such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus among such people. The documentation of needle stick injuries started in Sadi Hospital, Isfahan, Iran in 2003, and our objective was to study cases of injuries by sharp devices before and after the implementation of intervention methods.

Methods: In an intervention survey of the type of before and after study, we studied injuries by needle and other sharp devices among 87 HCWs in Sadi Hospital, a private hospital in Isfahan, Iran, during the years 2003-2004. The groups under study were workers and paramedical staff; and the wards under study included surgery, internal, lab, x-ray and laundry. We entered and evaluated the data in SPSS software.

Results: In the first phase of the study in 2003, 55.2% of those injured had been injured by sharp devices. After intervention in 2004, this percentage was reduced to 19.5% (p < 0.05). At the beginning of the study, 26.4% of the injured had been injured by sharp devices more than twice, and at the end of the study this number was reduced to 2.3% (p < 0.05). Also, injuries resulting from recapping were 45.8% at the beginning of the study, which was reduced to 5.9% at the end (p < 0.05).

Discussion: With regard to this study and other studies carried out in other countries, a large number of injuries by contaminated sharp devices can be prevented by implementing suitable educational programs regarding disposal of sharp devices, and by using safe needle devices.

In this intervention study, cases of injuries by sharp devices were studied in Sadi Hospital before and after the implementation of intervention methods, for example, training for disposal of sharp devices and using safe needle devices.

**Methods.** In an intervention survey of the type before and after study, 87 HCWs of Sadi Hospital, a private hospital in Isfahan, Iran with 125 beds, were studied. This study was carried out in 3 phases during the years 2003–2004. In the first phase, injuries by contaminated sharp devices were studied among HCWs. In the second phase, intervention methods consisting of using safe needle devices and training were carried out; and in the third phase, injuries by contaminated sharp devices were studied again in 2004. The condition for such staff to be studied was to be working during the survey. Randomly classified sampling was carried out based on population in each group in the hospital. In this study, cases of injuries resulting from uncontaminated needles were omitted, and a questionnaire consisting of 2 parts was prepared. The first part contained people’s biography consisting of their work place, education, sex and work experience; and the second part included 11 questions consisting of time, place and ways of injuries; 2 questions were about methods of follow up and steps taken after the injuries; and the remaining 4 questions were about standard precautions related to needle stick injuries while working. Filling out each questionnaire took less than 8 minutes. The obtained data were entered in SPSS software and evaluated.

**Results.** In this survey, injuries by contaminated sharp devices among HCWs of Sadi Hospital were studied during the years 2003-2004. In 2003 at the beginning of the survey, 55.2% of the staff were injured by contaminated sharp devices. After intervention in 2004, this percentage decreased to 19.5% ($p < 0.05$) (**Table 1**). At the beginning of the study, 26.4% of the HCWs had been injured by contaminated sharp devices more than twice. After the intervention, and at the end of the study, this percentage decreased to 2.3% ($p < 0.05$). Before the intervention, 57.7% paramedical staff and 43.8% of workers had been injured by contaminated sharp devices. After the intervention, they decreased to 15.9% and 31.6%. Also, injuries while recapping were 45.8% before intervention, which were reduced to 5.9% at the end of study ($p < 0.05$) (**Table 2**). Among hospital wards, the surgery ward showed the highest injuries.

**Discussion.** Health Care Workers are always subject to injuries caused by contaminated sharp devices, so that in most countries in the world the statistics of injuries by contaminated sharp devices have been of great concern. According to World Health Organization estimates, the frequency of injuries per person per year is between 0.2-4.7. In the survey carried out in Sadi Hospital in 2003, 55% of the staff had been injured by contaminated sharp devices at least once in that year. Also, in surgery wards, where invasive procedure and emergency cases are more prevalent, there were more injuries compared to other wards. Therefore, in an intervention method, with an educational program for suitable disposal of contaminated sharp devices, and also by using safe needle devices, injuries resulting from sharp devices were reduced to 19.5% in 2004. Also, this survey revealed that most injuries occurred while recapping. After using safe

**Table 1** - Incidence of needle stick injuries among health care workers before and after intervention (N = 87).

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Glasses n (%)</th>
<th>Needle of suture n (%)</th>
<th>Scalpel n (%)</th>
<th>Angiocut n (%)</th>
<th>Needle n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before intervention (N=87)</td>
<td>0 (0)</td>
<td>1 (1.1)</td>
<td>1 (1.1)</td>
<td>5 (5.7)</td>
<td>47 (54)</td>
</tr>
<tr>
<td>After intervention (N=87)</td>
<td>0 (0)</td>
<td>3 (3.4)</td>
<td>0 (0)</td>
<td>2 (2.3)</td>
<td>13 (14.8)</td>
</tr>
</tbody>
</table>

**Table 2** - Comparison among ways of needle stick injuries in health care workers before (N=48) and after (N = 17) intervention.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Blood transfusion n (%)</th>
<th>Injection n (%)</th>
<th>Recapping n (%)</th>
<th>Waste disposal n (%)</th>
<th>Handling of solid line n (%)</th>
<th>Suturing n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before intervention (N=48)</td>
<td>3 (6.3)</td>
<td>13 (27.1)</td>
<td>22 (45.8)</td>
<td>7 (14.6)</td>
<td>1 (2.1)</td>
<td>2 (4.2)</td>
</tr>
<tr>
<td>After intervention (N=17)</td>
<td>4 (23.5)</td>
<td>3 (17.6)</td>
<td>1 (5.9)</td>
<td>5 (29.4)</td>
<td>1 (5.9)</td>
<td>3 (17.6)</td>
</tr>
</tbody>
</table>
needle devices and suitable training, it was reduced from 45.8% to 5.9%. In a similar study, Richard et al showed that injuries by contaminated needles were 69.2% in 1995. Also, 73% of all injuries occurred among workers in 1995. After using safe needle devices, this number decreased to 12% in 1998. In another survey, Klontz et al proved that 62.5% of injuries resulted from sharp devices. According to a survey by Trim, more than 100,000 HCWs are injured by sharp devices in Britain every year. It can be inferred from this study and others conducted in different countries, that HCWs are always exposed to dangerous sharp devices, and some wrong habits such as recapping, as well as inconvenient management in disposing of sharp devices cause such injuries among the staff. Therefore, it is possible to minimize this problem by appropriate planning and suitable training in this regard, and by using safe needle devices in health care centers.

References