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# Sharps Injury Prevention for Hospital Workers

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**Objectives.** The purpose of this study was to collect data on self-reported sharps injuries to develop best practices to reduce them. **Methods.** Data on sharps injuries were collected for the period of January–October 2008 using Adverse Event Notification Forms already in use at Sema Hospital. **Results.** On average, 0.2% of all self-reported injuries were sharps injuries averaging one injury per month. Housekeeping staff sustained 64% of such injuries, nurses sustained 36% (5 incidents). Outpatient clinics experienced the most injuries at 28%, followed by the Internal Diseases Inpatient Unit with 21% and the Medical Waste Room with 14%. Injuries often occurred during contact with medical waste bags (28%) and while replacing full sharp-boxes (14%). **Conclusion.** In summary, reducing needle stick injuries is an important component of the occupational and patient safety program at Sema Hospital. The research described in this study allowed the hospital to provide targeted interventions to increase awareness of the risks of needle stick injuries and reduce such injuries. The steps used in the study can be used in any health care organization in the world to design a customized improvement plan to reduce risk and injury.

hospital infection control    hospital infections    needlestick injuries  
occupational health in hospitals    protective measures    sharps injuries

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## 1. INTRODUCTION

Occupational health and safety risks are high in organizations providing health care, particularly in hospitals [1]. Hospitals are complex organizations where employees use electronic devices, carry heavy weights, are exposed to chemicals, use radioactive material and equipment, are exposed to biological material that carry risk of infection, and regularly use sharp tools [1, 2]. All these activities put health care workers' health and safety at risk on a daily basis [3, 4].

A significant portion of a health care worker's day is spent on activities related to the direct provision of patient care. As a result, even the smallest mistake can result in serious and irreversible outcomes [5, 6]. Of course, the level of risk each health care worker is exposed to varies

according to profession, occupation and division. Of all health care workers, nurses, physicians, dentists, orderlies and janitors carry the highest risk of being exposed to blood-borne agents. As nurses spend the most time with patients and provide the most direct patient care, nurses are also the employee group most susceptible to worksite-related medical problems [7, 8].

Contaminated sharps present a significant risk of infection both to health care workers and to patients. It is not uncommon for health care workers to become infected by a patient while providing health care [9]. Health care workers do not give enough importance to preventative measures when coming in contact with potentially infectious materials or to procedures in place regarding post-contact monitoring. There is also insufficient awareness of inadequate risk

awareness, benefits of adhering to standard measures, importance of notification and serologic observation. A study revealed that 41.8% of health care workers had not had a hepatitis B virus (HBV) vaccine and had no information about their serologic condition [10]. Health care workers face the risk of injury from sharp-perforating tools on a daily basis in surgery rooms, beside the patient bed (while providing services like blood collection, injections, small procedures, and resuscitation), in the outpatient setting (while providing small procedures and dressing wounds) and in laboratories (broken test tubes pose a major risk) [11]. In the USA, 16000 health care workers are subject to HIV (human immunodeficiency virus) infected needle stick injuries and 1800000 health care workers are injured on the job on an annual basis. Each year 5000 health care workers contract HBV, hepatitis C (HCV) and HIV due to occupational injuries [12]. A study carried out in Turkey revealed that 97.4% of health care workers in that country were subject to injuries caused by sharp and perforating objects and that 1.9% of the injured developed HBV infections [13].

These injuries are dangerous because of the infectious agents originating from blood and other bodily fluids. The most prominent agents are HBV, HCV and HIV. The quantity of transmitted viral agents must be great enough to infect an individual. On the other hand, the type and path of injury as well as the properties of the sharps responsible for the injury are also significant factors. The amount of inoculum is lower with injuries caused by lancet and surgical suture needle. On the other hand, the risk of contamination is much higher with injuries caused by luminous needles and catheters [14].

The occurrence of HBV in health care workers in developed countries such as the USA, Denmark and the UK is relatively high. Approximately 6 million people in Turkey are carriers of this virus and risk infecting others. The probability of getting infected by HBsAg positive individuals as a result of injury is 6–30%. The rates identified for health care workers in Turkey are not higher than the rate for the general public. A review of the overall

findings of all conducted studies incorporating 14223 health care workers, revealed the rate of HBsAg positive individuals to be 4.8%. The rate among blood donors was 5.2%. Risk of contamination is extremely high when needle stick injuries are coupled with contact with damaged/weak skin or mucus [14].

The rate of HCV in Turkey is reported at 0.3–1.8% with no indication of increased risk among health care workers (0.7% amongst 3994 health care workers). Needle stick injuries are important in infection [15].

The risk of health care workers getting infected by HIV is lower when compared to HBV infections. The average rate of HIV infection in all percutaneous injuries has been identified to be 0.3%. Centers for Disease Control and Prevention (CDC) data from 2001 revealed 137 suspicious and 57 proven HIV infections amongst health care workers. Twenty-four of the confirmed cases were nurses, while 19 were laboratory workers [16]. Out of 52 health care workers labelled by the CDC as confirmed occupational HIV infections, 45 were caused by percutaneous injuries, 42 of which were related to the use of luminous needles [17].

This study of sharps injuries was conducted as part of the hospital's efforts to further develop procedures to prevent occupational accidents, ensure occupational safety and protect health care workers in accordance with infection prevention and control standards. The purpose of this study is to collect data on self-reported sharps injuries to develop best practices to reduce them.

## 2. DESIGN AND METHODOLOGY

Data was collected between January and October 2008 at Sema Hospital, a 135-bed general acute hospital with 600 employees. The hospital treats an average of 400 ambulatory patients on a daily basis. Information on sharps injuries was evaluated according to the following data collection method. This method was developed by a quality improvement workgroup that was established to reduce sharps injuries in the hospital. The method involved four steps:

- Data collection. Data on sharps injuries were collected by month, occupational group, care unit and cause of injury. Adverse Event Notification Forms already in use for notification of adverse events within Sema Hospital were used to collect the data.
- Data analysis. Data was evaluated within the context of the hospital’s Infection Control Program, which was developed in accordance with the Joint Commission’s infection control and prevention standards and CDC guidelines.
- Identification and implementation of improvement opportunities. After collecting baseline data, members of the quality improvement workgroup identified improvement opportunities and developed a workplan to implement solutions.
- Training. The Deputy Chief Medical Officer and the Infection Control Nurse provided training to all hospital health care workers.

**3. RESULTS**

**3.1. Data Collection**

Between January and October 2008, 14 adverse event notification forms were submitted. Nine were submitted by housekeeping personnel, five by nurses.

**3.2. Data Analysis**

A review of the number of sharps injuries on a monthly basis reveals that July accounted for 50% of such injuries throughout the 10-month study period with a total of 7 incidents (Figure 1). Monthly sharps injury incidents for January, February, March and April remained at one for each calendar month, accounting for 0.07% of incidents per month. No sharps injuries were recorded in May and October, while such injuries for June, August and September again rose to one incident per month (0.07%).

Figure 2, which examines sharps injuries by occupation, indicates that 64% (9 incidents) of such injuries were sustained by housekeeping staff and 36% (5 incidents) by nurses.

Figure 3, examining needle stick injuries by department, indicates that outpatient clinics experienced the largest group with 28% (4 incidents); followed by the Internal Diseases inpatient department with 21% (3 incidents) and the Medical Waste Room with 14% (2 incidents). Only one incident (0.07%) was recorded in each of the following departments: general surgery, radiology, angio, cardiovascular surgery and laboratories.

Figure 4, examining the causes behind needle stick injuries, indicates that the most common reason was contact with medical waste bags with 28% (4 incidents); followed by attempts at

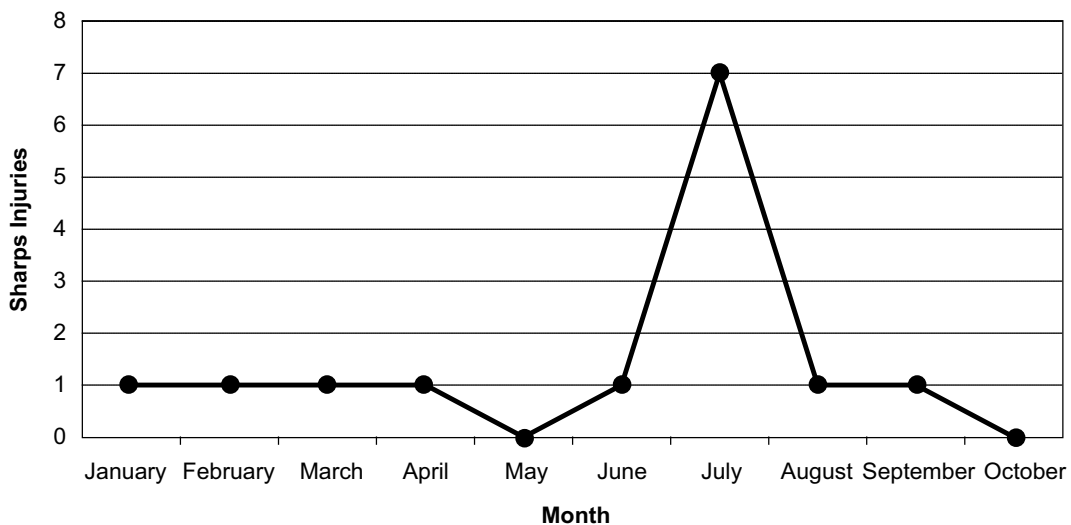


Figure 1. Sharps injury distribution by month in 2008.

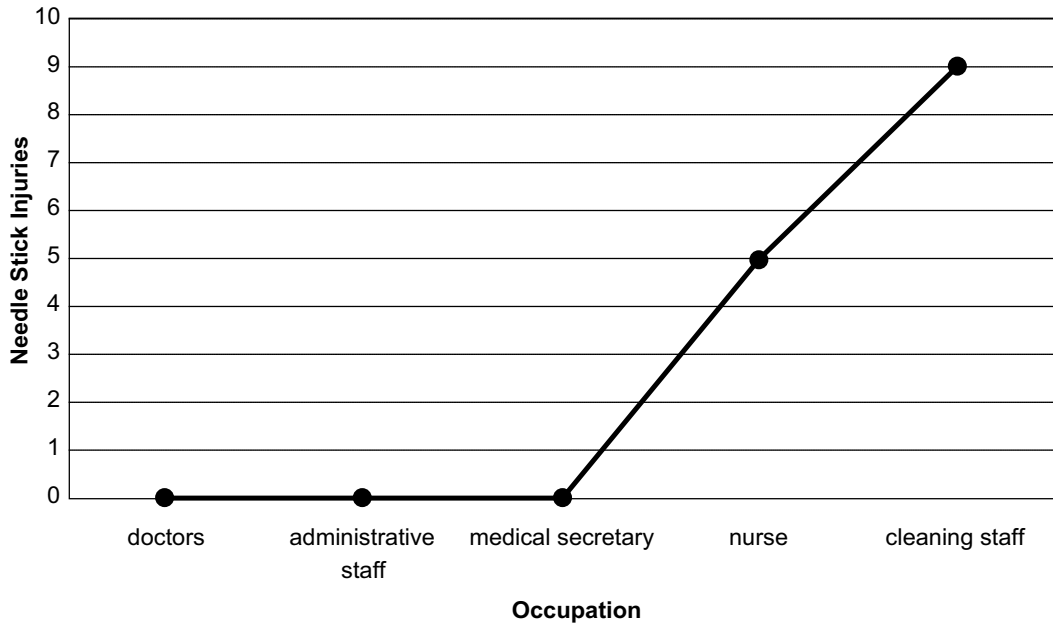


Figure 2. Needle stick injuries by occupation.

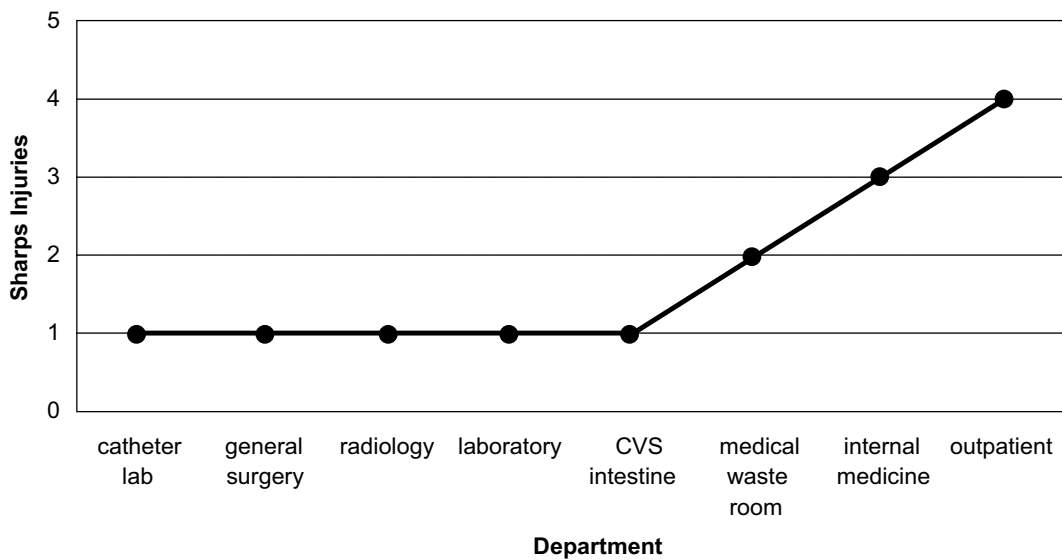
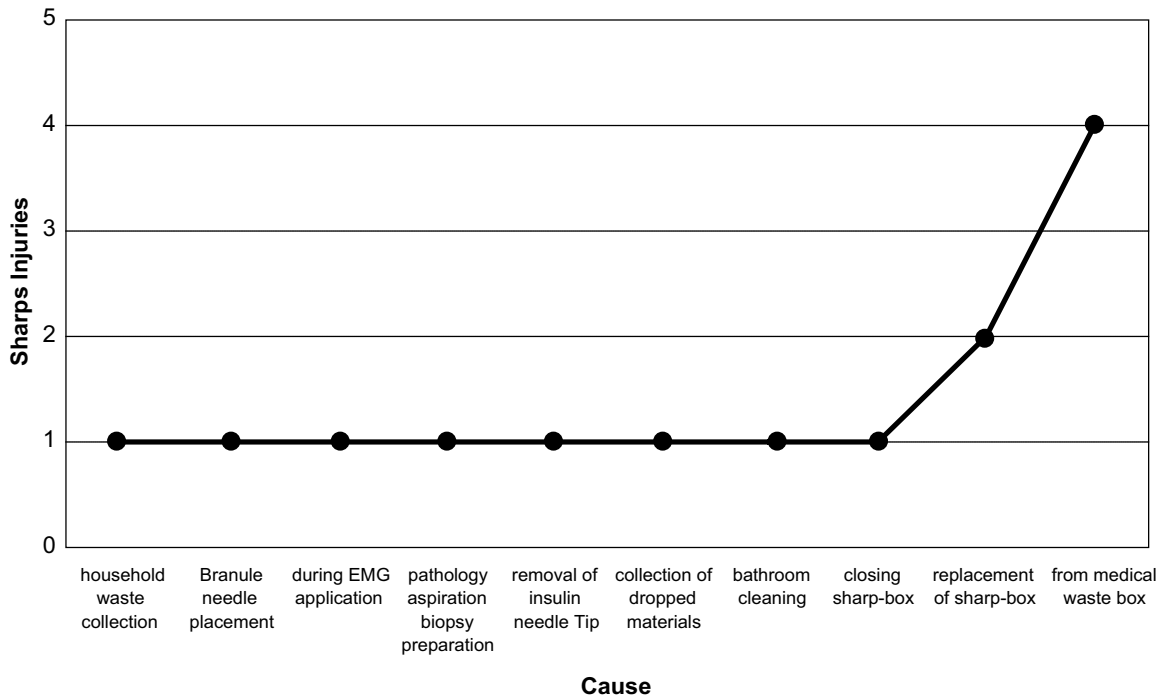


Figure 3. Sharps injuries by department. Notes. CVS—cardiovascular surgery.

replacing full sharp-boxes with 14% (2 incidents) and during medical waste collection, whilst closing sharp-box, during cleaning the bathrooms, collecting dropped object from the floor, removing insulin needle tips, during electromyography, during placement of intravenous tubing using Branule needles, and preparation of pathology aspiration biopsy all accounting for 0.07% each (one incident each).

The spike in sharps injuries in July (7 injuries at a rate of 50%) may be related to the reduced number of total health care workers as a result of annual vacations, implying that workers may have been hurrying to complete tasks. The data also revealed that 31% of sharps injuries occurred at the Internal Medicine unit. An analysis of employee and patient numbers suggests that there had been a drop in staff



**Figure 4. Sharps injuries by cause.** Notes. EMG—electromyography.

numbers related to annual vacations. In July 2008, 30% of nursing staff took vacations of 1–2 weeks each. The injury rate fell to 0% with the end of annual vacations and completion of the training program.

### 3.3. Identification and Implementation of Improvement Opportunities

After collecting baseline data, members of the quality improvement workgroup identified improvement opportunities and developed a workplan to implement solutions. The hospital's Waste Control Procedure mentioned in the Infection Control Program was revised and the Waste Disposal Chart reorganized to ensure that waste was disposed of in the correct waste container. The revised charts were visibly placed in all areas where waste is generated. Additional sharp-box containers were placed in appropriate locations for the disposal of sharps. Sharp-box containers within these areas were specifically fixed above floor level, at an easily accessible height with the intention of preventing unintentional tipping of such containers. Sharp-box adaptable treatment trays were purchased to

reduce the number of sharps injuries; they were distributed to departments in accordance with the number of beds.

### 3.4. Training

The Deputy Chief Medical Officer and the Infection Control Nurse provided a 90-min training program on factors causing sharps injuries and preventive measures to all health care workers. The participation rate for this training was 95%.

## 4. DISCUSSION

A study of nurses working in the Mugla provincial centre (Southwestern Turkey) identified that 51.9% of 391 nurses were subject to injuries caused by a sharp tool in a 6-month period and that 80.4% of those injuries were inflicted by injectors [18]. While the Mugla study found the monthly needle stick injury rate to be 11.85%, our study saw a monthly rate of needle stick injuries of only 0.2%.

Greene, Berry, Arnold, et al. examined 58 injuries among anaesthesia personnel at 9 hospitals and found that 39 injuries were caused by contaminated material (all being needles) and that 19 injuries were caused by noncontaminated materials or materials considered ambiguous (contamination undetermined). Most injuries were observed to occur on the hands of health care workers. Eight percent of contaminated percutaneous injuries occurred during any one stage of multistage procedures whilst 13% occurred during placement of protective needle caps and 41% following the completion of the procedure [19].

Our study revealed that most sharps injuries (64%) occurred amongst housekeeping staff (9 incidents). The comparatively lower rates seen amongst housekeeping staff in a review of the literature could be attributed to a lack of notification of adverse events by this group, which is often outsourced. During the quality improvement workgroup meetings, the Waste Control Procedure mentioned in the Infection Control Program was revised and the Waste Disposal Chart reorganised to ensure the waste was disposed of in the correct container. Every available size of sharp-box, specifically designed for disposal of sharps, was purchased and distributed to correct locations. Health care workers were given a 90-min training program on factors causing sharps injuries and preventive measures.

In a review of reported sharps injuries by department, the outpatient clinics constituted the largest group with 28% (4 incidents). Most injuries were related to improper disposal of medical waste in household waste containers. A review of the causes of sharps injuries revealed that most injuries occurred when an employee came in contact with medical waste bags (28% of injuries or 4 incidents). In all four incidents, sharps had been disposed of in medical waste containers instead of sharp-boxes. Health care workers were retrained on sharps disposal and all personnel were instructed to effectively use sharp-box compatible treatment trays. Compliance was tracked by regular inspection by charge nurses and the infection control nurse.

## 5. CONCLUSION

In summary, reducing needle stick injuries is an important component of the occupational and patient safety program at Sema Hospital. The research described in this study allowed the hospital to provide targeted interventions to increase awareness of the risks of needle stick injuries and reduce such injuries. The steps used in the study can be used in any healthcare organization in the world to identify risky practices and to design a customized improvement plan to reduce risk and injury.

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