

Intervention study of needle stick injury in Iran

Sina Mobasherizadeh, MSc, Sayed A. Abne-Shahidi, MD, Nazafarin A. Mohammadi, BPH, Fereshteh Abazari, BS.

ABSTRACT

Objectives: Injury resulting from contaminated sharp devices among health care workers (HCWs) is one of the most important concerns in medical centers. This can lead to dangerous infections such as human immunodeficiency virus, hepatitis B virus 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.

Saudi Med J 2005; Vol. 26 (8): 1225-1227

Injury by contaminated sharp devices and needles is one of the most serious occupational hazards for health care workers (HCWs).^{1,2} Some of these injuries cause dangerous infections such as hepatitis C virus (HCV), hepatitis B virus (HBV) and human immunodeficiency virus (HIV) in such workers.^{1,4} Eighty-six percent of blood-borne infections related to job are caused by needle stick injuries in America.⁵ According to Occupational Safety and Health Administration research, each second HCW is injured by needle stick in the world; and altogether, more than one million HCWs are injured by contaminated sharp devices every year. Out of this number, 16,000 people are afflicted with HCV, 66,000 with HBV and 200-5,000 with HIV.¹ More than 80% of needle stick injury cases can be prevented by preventative methods, for example, by

using safe needle devices and training HCWs to dispose of them properly. Using preventative methods can prevent the staff against blood-borne infections as well as reduce the high cost of following up.⁶⁻¹² In the United States, the cost of following up needle stick injuries in injured staff amounts to \$3,000, and the cost of treating one afflicted with dangerous infections is approximately \$1 million; while safe needle devices cost 28 cents.⁸⁻¹² In Iran, the cost of following up contaminated needle stick injuries in injured staff is approximately one million Saudi Riyals (SR); whereas the cost of a safe needle device is lower than SR6,000. In Iran, like many other countries, appropriate methods of collecting and disposing of sharp devices are not fully observed; therefore, many HCWs are injured by needle sticks every year.

From Sadi Hospital, Isfahan, Iran.

Received 18th January 2005. Accepted for publication in final form 30th May 2005.

Address correspondence and reprint request to: Dr. Sina Mobasherizadeh, Head of Infection Control, Sadi Hospital, Isfahan, Iran. Tel. +98 (31) 16277812. Fax. +98 (31) 16282205. E-mail: mobasherizadeh@yahoo.com

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 0.2-4.7.¹ 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).

Intervention	Glasses n (%)	Needle of suture n (%)	Scalple n (%)	Angiocut n (%)	Needle n (%)
Before intervention (N=87)	0 (0)	1 (1.1)	1 (1.1)	5 (5.7)	47 (54)
After intervention (N=87)	0 (0)	3 (3.4)	0 (0)	2 (2.3)	13 (14.8)

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

Intervention	Blood transfusion n (%)	Injection n (%)	Recapping n (%)	Waste disposal n (%)	Handling of solid line n (%)	Suturing n (%)
Before intervention (N=48)	3 (6.3)	13 (27.1)	22 (45.8)	7 (14.6)	1 (2.1)	2 (4.2)
After intervention (N=17)	4 (23.5)	3 (17.6)	1 (5.9)	5 (29.4)	1 (5.9)	3 (17.6)

needle devices and suitable training, it was reduced from 45.8% to 5.9%. In a similar study, Richard et al¹³ 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 al¹⁴ proved that 62.5% of injuries resulted from sharp devices. According to a survey by Trim,¹⁵ more than 100,000 HCWs are injured by sharp devices in Britain every year.¹⁵ 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

1. Prüss-Üstün A, Rapiti E, Hutin Y. Sharps injuries: global burden of disease from sharps to health-care workers. Geneva: WHO; 2003. p. 1-40
2. Ducl G, Fabry J, Nicolle L. World Health Organization. Prevention of Hospital Acquired Infection. 2nd ed. WHO/CDS/CSR/EPH/2002. Available from: URL: <http://www.who.int/emc> Access:6/2005
3. Centers for Disease Control and Prevention. Evaluation of Safety Devices for preventing percutaneous Injuries Among Health Care Workers During phlebotomy procedures – Minneapolis – St. Paul, New York City, and San Francisco. *MMWR Morb Mortal Wkly Rep* 1997; 46: 21-23.
4. Elmiyeh B, Whitaker IS, James MJ, Chahal CAA, Galea A, Alshafi K. Needle-Stick injuries in the National Health Service: a Culture of Silence. *J R Soc Med* 2004, 97: 326-327.
5. Centers for Disease Control and Prevention. Guideline for Infection Control in Health Care Personnel. *Infect Control Hosp Epidemiol* 1998; 19: 291-354.
6. Fowler C. Needle Stick Injuries and Subsequent Disease: First-person Accounts From Three nurses. *J Emerg Nurs* 1999; 25: 93-101 .
7. International Health Care worker Safety Center. Estimated Annual Number of U.S. Occupational Percutaneous Injuries Mucocutaneous Exposure to Blood or Potentially At-Risk Biological Substances. *Advances in Exposure Prevention* 1998; 4: 386-395.
8. Chiarello L. Selection of Safer Needle Devices: A Conceptual Framework for Approaching Product Evaluation. *Am J Infect Control* 1995; 23: 386-395.
9. Ippolito G, Puto V, Petrisillo N, Pugliese G, Wispelwy B, Tereskerz PM, et al. Prevention, Management & Chemoprophylaxis of Occupational Exposure to HIV. *Advances in Exposure Prevention*. Charlottesville (VA): International Health Care Worker Safety Center, University of Virginia; 1997.
10. Jegger J. Reducing Occupational Exposure to Bloodborne Pathogens: where we Stand a Decade Later? *Infect Control Hosp Epidemiol* 1996; 17: 573-575.
11. McCormick R. Selecting Safety Products for Evaluation. In: Pugliese G, Salahuddin M, editors. Sharps Injury Prevention program. A Step-By-Step Guide. Chicago (IL): American Hospital Association; 1999.
12. Elliot S, Walker D. Safer Needle Devices: Protecting Health Care Workers. Washington (DC): GPO OSHA; 1997. p. 1-19.
13. Richard VS, Kenneth J, Ramaprabha P, Kirepakaran H, Chandy GM. Impact of introduction of sharps containers and of education programmes on the pattern of needle stick injuries in a tertiary care center in India. *J Hosp Infect* 2001; 47: 163-165.
14. Klontz KC, Gunn RA, Caldwell JC. Needle stick injuries and hepatitis B immunization in Florida paramedics: a statewide survey. *Ann Emerg Med* 1991; 20: 1310-1313.
15. Trim JC. Raising awareness and reducing the risk of needle stick injuries. *Prof Nurse* 2004; 19: 259-264.