American Journal of Infection Control 41 (2013) e85-e88

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

A 5-year surveillance of occupational exposure to bloodborne pathogens in a university teaching hospital in Monterrey, Mexico

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Key Words:
Percutaneous injuries
Exposure of body fluids to mucosal membranes
Hepatitis B virus
Hepatitis C virus
Human immunodeficiency virus
Medical personal in training

Background: Occupational exposure to bloodborne pathogens (OEBPs) is a serious health and safety concern for health care providers. Lack of experience of medical personal in training could make them more susceptible for acquiring infections by these infectious agents.
Methods: We conducted a 5-year retrospective review of all reported occupational exposures. Characteristics, risk factors, and management of the accidents were obtained from OEBP database.
Results: A total of 951 events were analyzed, and 94.3% occurred in medical personnel in training; of those, 87.4% were percutaneous injuries. The emergency room was the hospital ward with more events recorded (34.1%), followed by the internal medicine and surgical wards. A hollow needle was used in 59.1% of the events, a suture needle in 10.7%, and a lancet in 8.8%. Most of events were recorded in the morning shift (38.3%). The months with fewer reports of events were January, July, and December, and the months with the highest reports were the combined months of October 2006 through 2011.
Conclusion: A high incidence of OEBP in medical personnel in training was detected; this high frequency correlates with the dynamics of the student population during the year and the hands on practice that the nursing and medical students receive.

Occupational exposures to bloodborne pathogens (OEBPs) are a serious occupational health and safety concern for health care providers (HCPs) worldwide.[1] These include percutaneous injuries (PI), like a needlestick, and injuries from sharp devices, or exposure of mucosal membranes (EMM) to body fluids. The affected HCP has a serious risk for acquiring diseases derived from exposure to bloodborne pathogens, such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV); therefore, OEBP are a frightening and distressing experience for the injured worker.[2,3]

In a multicenter study of 15 national surveillance systems for health care workers in hospitals and 45 exposure prevention programs in hospitals, the estimated number of PI sustained by hospital-based HCPs was 384,325 annually.[4] On the other hand, in university hospitals in Japan, there were only 259 reported accidents over a 7-year period[5]; both studies showed that nurses are more prone to these injuries. Among other factors, the lack of experience of medical personal in training (MPT) in teaching hospitals could make them more susceptible to PI. The aim of this study was to describe the characteristics of OEBP, identify risk factors, and examine management strategies in a university hospital in northeastern Mexico.

METHODS

Study setting

We conducted a retrospective review of all OEBPs reported to the hospital epidemiology unit in Dr. Jose Eleuterio Gonzalez University Hospital in Monterrey, Mexico, during a 5-year period (January 2006 through December 2011). The university hospital is a public, 420-bed, teaching hospital in which medical students, postgraduate medical doctors, and nurses assist in patient care. Every year, approximately 300 new fellows enter the house staff from medical and surgical wards. Every trimester and semester, the hospital exchanges nursing students and medical students

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Conflicts of interest: None to report.

http://dx.doi.org/10.1016/j.ajic.2013.01.008

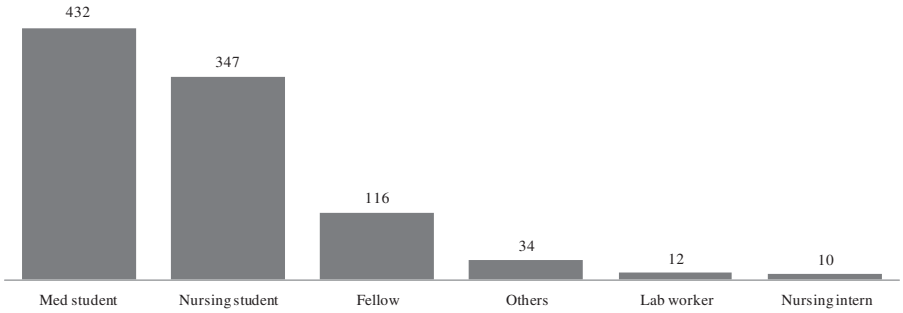

Fig 1. Occupational exposures by health care provider category over 5 years. Others: (a) External physician: 8; (b) Others: 6; (c) Dental student: 5; (d) Employee: 5; (e) Nurse: 5; (f) Maintenance staff: 3; (f) Respiratory technician: 2.

from 4 to 6 nursing schools and 1 medical school: There are approximately 150 nursing students, from 100 to 115 medical students, and from 400 to 420 fellows, 763 registered nurses and 25 respiratory technicians.

Assessment of occupational exposure to bloodborne pathogens

All personnel who experience an OEBP were instructed to report the event to the hospital epidemiology unit. Those involved in the incident are required to complete a structured form personally. If their reports are incomplete, a person in charge of analysis re-examined the cases and completed the reports. Individual assessment was made for each OEBP to identify risk factors and ensure that the proper postexposure prophylaxis and follow-up was offered. No HCP was obligated to report the injury, but they were encouraged to do so. The epidemiology unit follows international guidelines for the management of needlestick injuries and mucocutaneous exposure.[6]

During the study period, the hospital gave a sharps and needle safety course to all new personnel and to all MPTs but had not initiated a hospital-wide policy for needle and sharps safety devices. Many HCPs still follow recap practices during the management of sharp devices, in spite of multiple interventions to abandon those practices. Although many diseases can be transmitted by mucocutaneous or percutaneous exposure, the hospital focuses mainly on prevention of infection by HBV, HCV, and HIV.

Data collection and statistical analysis

Different variables were collected from the OEBP database, including time of shift, hospital area where the accident occurred, device used while the accident occurred, type of accident, and job description on of the HCP, among others. Descriptive and nonparametric analyses were used. The χ^2 test was used when comparing percentages and the Wilcoxon test for continuous variables. We considered a P value of .05 or less to be statistically significant.

RESULTS

Characteristics of OEBP

We recorded a total of 951 OEBP during the study period. Characteristics of the accident were available for 948 out of the 951 OEBP reported. Of these, 834 (87.7%) were PI, and 117 (12.3%) were EMM. A total of 905 (94.11%) OEBP occurred in MPT. Medical students accounted for 432 (45.42%), nursing students for 347 (36.48%), and fellows for 116 (12.19%; Fig 1). The majority of events were recorded in the emergency room, with a total of 324 (34.06%), followed by the internal medicine wards with 160 (16.8%). One hundred one (10.6%) occurred in the surgical wards, whereas 66 (6.9%) were in the operating room and 65 (6.8%) in the obstetrics and gynecology wards, with the remaining accidents in other areas. There was a higher proportion of OEBP in the emergency room, internal medicine wards, and surgical wards than in other hospital areas ($P < .001$ for each; Fig 2).

The mean number of OEBP per month was 17.2 during the study period; when analyzing the 5-year period, July, December, and January were the months with fewer reports, with a mean of 9.4, 9.2, 11.6 accidents per month, respectively. The highest number of incidents occurred in October and February, with a mean of 21 per month (Fig 3).

Risk factors

A hollow needle was used during 561 of the 948 OEBP (59.1%), a suture needle in 102 (10.7%), and a lancet in 84 (8.8%). A total of 395 OEBP occurred during phlebotomy, 173 during drug administration, 111 during a surgical procedure, 81 during suturing, 75 during the infiltration of a local anesthetic, and 113 during other interventions. When analyzing the action performed during the accident, we found that 431 (45.4%) happened during the procedure, 300 (31.6%) occurred during recapping of a needle, 128 (13.5%) during disposal of the material, and the remaining OEBP occurred during transport or before the procedure. The time of shift was recorded in 885 out of 948 OEBP, with 339 (38.3%) occurring in the morning, 267 (30.1%) at night, 180 (20.3%) in the afternoon, and 99 (11.1%) on the weekends.

Management

Serologic tests were obtained from 668 source patients, of whom 145 (21.7%) were positive for a known bloodborne pathogen (62 with HIV [46.2%], 55 with HCV [40.6%], 9 HBV [9.7%], 3 [2%] coinfected with HIV and HCV, and 2 [1.4%] coinfected with HIV and HBV). Of the HCPs who were exposed to HIV ($n = 67$), all received initial doses of postexposure prophylaxis (PEP) for HIV; of those, 34 completed a full 28-day course. Only 2 patients abandoned PEP because of adverse effects, whereas 32 completed the 4-week course (94.1% adherence). We recorded 1 HIV seroconversion.[7] Eleven HCP were exposed to HBV (5 had complete vaccination and 6 incomplete vaccination); none of them received PEP and had no seroconversion.

DISCUSSION

Our university hospital, like many other teaching hospitals, has a very dynamic renewal of medical and nursing students and offers