ABSTRACT

Little is known about the risks to Guatemalan health care workers from accidental exposures to potentially infectious material. We studied occupational accidents at one of Guatemala’s national hospitals to describe their frequency and setting. The current study was conducted on a cohort of health care workers seen at the Acquired Immune Deficiency Syndrome (AIDS) specialty clinic of the Hospital General San Juan de Dios in Guatemala City. Hospital personnel suffering from an accident were referred to the clinic for care and detailed information regarding the accident was collected. When possible, source patients were tested for Human Immunodeficiency Virus (HIV). Two hundred sixty-five accidents were reported between July 1999 and June 2003. The incidence of occupational exposures to potentially infectious bodily fluids was 1.27 exposures per week (8.19 exposures per 100 beds yearly). Of those reporting exposures, 54% were medical students, 19% residents, 16% nurses, 6% laboratory staff, and 3% cleaning staff members. Forty-eight percent of accident victims had a less than satisfactory hepatitis B vaccination status, defined as less than two immunizations. Eighty-two percent of the exposures were percutaneous and 14% were mucocutaneous. The clinic could determine HIV infection status of 118 source patients; 40 of these were HIV-infected. This study documents the clear risk of HIV and Hepatitis B transmission posed to health care workers at a national hospital in Guatemala. The relatively low incidence of accidents undoubtedly reflects underreporting. Guatemalan hospitals and medical schools need to address and reduce occupational exposures to their staff and trainees.

INTRODUCTION

Health care workers (HCW) face important risks due to their exposure in the workplace to potentially infectious pathogens. Routes of exposure include direct contact (body to body), indirect contact (e.g. from a contaminated instrument), droplet contact, airborne transmission, and common vehicle transmission. (Bolyard et al., 1998) Following needle-stick injury (NSI) transmission of Human Immunodeficiency Virus (HIV) occurs at a rate of about 0.3% per injury, hepatitis B infection occurs in 23 to 37% of cases (higher if the source patient is Hepatitis B e antigen positive) and Hepatitis C seroconversion is in the 0 to 7% range. (United States Public Health Service, 2001) The World Health Organization has estimated that each year percutaneous injuries to HCW account for 1000 HIV infections, 66,000 HBV infections and 16,000 HCV infections. (Prüss-Ustün et al., 2003) These infections are simply one aspect of the large problem of unsafe injecting practices, a major focus of the WHO (2004a)

Although the risks and prevention strategies surrounding occupational exposures to potentially infectious materials are well known, there is little literature concerning occupational risks in Guatemala. Anecdotal reports suggested that some HCW avoided Acquired Immune Deficiency Syndrome (AIDS) patients
due to worries over becoming infected with HIV. In 1999, a program was established at the AIDS specialty clinic within the Hospital General San Juan de Dios to evaluate and treat HCW who suffered exposures to potentially infectious bodily fluids. We were interested not only in providing post-exposure prophylaxis to HCW (when indicated), but also to understand how the hospital might better prevent the exposure of HCW to hospital-acquired infections. In this paper, we describe the findings from the initial four years of operation of this program.

MATERIALS AND METHODS

Setting: The Hospital General San Juan de Dios in Guatemala City is a teaching hospital and the tertiary referral center for northern Guatemala. The hospital contains 809 beds and employs approximately 2,200 health care workers, including physicians, residents, nurses, laboratory staff, and custodial staff. There are no available data documenting the prevalence of Hepatitis B or C among patients on the hospital wards. A 1999 study found that 5.6% of the patients on the medical and surgical wards were infected with HIV. (Samayoa et al., 2003) The Clinica Familiar Luis Angel Garcia (CFLAG), an HIV specialty clinic within the hospital, provides HIV testing, psychological consultation, and treatment services. At Hospital General, CFLAG serves as the sole provider of HIV/AIDS health care.

Programs for HCW with NSI: In 1999, CFLAG established a program for reporting and managing occupational exposures to potentially infectious materials. This program was publicized throughout the hospital wards. For HCW suffering an accident, the CFLAG offers HIV testing, psychological consultation, and post-exposure prophylactic treatment (PEP). PEP is carried out following CDC guidelines (United States Public Health Service, 2001); the most commonly used medications are Combivir or Trivizir. Although this service is made available without cost to any health care worker within the hospital, it is limited due to the hours of operation of the clinic: Monday through Friday, 8am to 1pm. Reporting and treatment is solely on a self-referral, walk-in basis. HCW presenting to the hospital’s occupational health service when the clinic is closed are referred to the Guatemalan Social Security Institute (IGSS) for evaluation after NSI. Other than referring HCW to CFLAG or IGSS, there are no other hospital programs for managing an occupational exposure.

Subjects: All HCW suffering an exposure to potentially infectious material were eligible to be seen at the clinic and were included in the study.

Data Collection: Data for this study were collected prospectively beginning in 1999 when the clinic started offering services to HCW. All HCW who reported an exposure to CFLAG were asked to fill out a questionnaire. The questionnaire included information on their demographics, occupational status, type and circumstances of injury, history of any previous injury, history of reporting any previous injuries, the HIV status of the HCW, how many Hepatitis B vaccinations the HCW had received and the identity (if known) of the source patient. HCW were offered HIV & Hepatitis B testing; not all wished to have it done. When the source patient could be identified, the patient was approached by the clinic staff and offered HIV and HBV testing. Such testing was done in a voluntary manner. Because the clinic follows all HIV patients on the wards, they knew the HIV-serostatus of some source patients.

Laboratory testing: All HIV testing (either of HCW or source patients) was done on a voluntary basis and
with informed consent. HIV infection was diagnosed by two positive highly sensitive ELISA tests. Testing for Hepatitis C was not available at the hospital.

**Data Analysis:** Data were collected and all analysis was done using EPI-INFO 6.04.

**Ethical Aspects:** Data for this study were collected during routine clinical care. The analysis and publication of the data were approved by the Ethics Committee of the Hospital General and the Institutional Review Board of Montefiore Medical Center.

### RESULTS

**Incidence:** During the period between June 1999 and July 2003, a total of 265 exposures were reported. The incidence of reported exposures was 1.27 per week. The yearly incidence was 8.2 exposures per 100 beds. The proportion of HCW who report accidents per year was 3.09%. This estimate does not include those HCW who were referred to IGSS.

**Health Care Workers:** Of the 265 subjects reporting an exposure, 159 were female and 106 were male. There were 143 medical students, 50 residents, 41 nurses, 16 laboratory technicians, 8 members of the custodial and maintenance staff, and 7 subjects with “other” occupations. The median age of those reporting an exposure was 24 (mean 26.1). Of the staff HCW who reported an exposure, 64.3% had worked for five years or less; this is not surprising given the large number of trainees. In addition, 44% reported having previous exposures, and of those, 82.7% had between one and three previous accidents. One hundred three subjects indicated that they had previous accidents that went unreported. The subjects who did not report previous accidents either provided no reason for not reporting (25.3%), did not believe the accident was important (65.0%), or were unaware of the ability to report an injury (9.7%). Of those reporting an injury, 48.3% had a less than satisfactory hepatitis B vaccination status, which we defined as less than two immunizations. Specifically, 73% of the nursing staff, 47% of medical students, and 31% of residents reported having a less than satisfactory hepatitis B vaccination status.

**Post-exposure prophylaxis:** Thirty-four percent of the HCW received post-exposure prophylaxis for HIV infection from the clinic. We documented no cases of HIV infection among HCW who had suffered accidents.

**Circumstances of the accident:** Percutaneous injuries accounted for 81.5% of the exposures; 14.3% were mucocutaneous exposures; data on 11 accidents were missing. The common types of instruments that lead to percutaneous exposure included phlebotomy needles (43%), suturing needles (9%), scalpels (8%), and catheter needles (5%). Some of the common causes of injury included manipulating or recapping a blood-drawing syringe (58%), accident during a suturing procedure (10%), and an accident during a surgical procedure (9%). Of the reported accidents, 33% were from the department of surgery, 24% from medicine, 18% from pediatrics, 11% from Obstetrics/Gynecology, 9% from Emergency Medicine, and 5% from the Laboratory services. Sixty-five percent of those reporting an exposure felt that the situation in which the accident occurred was not an emergency.

**Source patients:** Of 265 source patients, clinic staff was able to determine the HIV infection status of only 118. Forty of these were HIV infected; assuming all untested source patients were negative, this represents a 15% HIV prevalence among the source patients (40/265).

### DISCUSSION

This study documents a clear risk of HIV and Hepatitis B transmission posed to HCW at a teaching hospital in Guatemala with 3% of HCW reporting an accident and a minimum of 15% of source patients being HIV infected. Nearly half of the HCW were not sufficiently protected against Hepatitis B transmission. The majority of HCW reporting exposures were medical students and residents. The largest proportion of exposures appears to be the result of manipulating or recappping phlebotomy needles.

Undoubtedly, our finding that about one accident occurs a week represents an undercount. Nearly half the HCW in our study stated that they had suffered a previous, unreported accident. In addition, we relied on self-referral and the clinic was only available on weekdays from 8am to 1pm. Exposures occurring at night or on the weekend may have gone undocumented.

Medical students and residents reported the majority of accidents. In our study 193 medical students and residents reported an accident. This suggests an increased vulnerability of medical trainees, perhaps due to inexperience (Osborn, 1999; Shalom, 1995). It is also true that trainees do most of the phlebotomy and insertion of intravenous catheters in the hospital. However, we suspect there is also underreporting by the permanent members of the hospital staff. In a study done by Benitez (Benitez et al., 1999) at a teaching hospital in Spain, underreporting of percutaneous exposures was associated with the length of professional service, with a declining tendency to report an exposure with increasing years of service. It is particularly disconcerting in this study that 65% of those reporting a prior accident stated that they did not think it was important to report accidents.

Comprehensive and effective strategies for the reduction of HIV, HBV and HCV transmission in health care
settings have been outlined by the World Health Organization (2004a; 2004b) as well as the U.S. Centers for Disease Control (United States Public Health Service, 2001) and National Institute for Occupational Safety and Health (2004), as well as others (National Alliance for the Primary Prevention of Sharps Injuries, 2004).

Primary prevention strategies include: universal precautions, decreasing or reducing the use of sharps, the creation of safer sharps (Alvarado-Ramy et al., 2003), improved personal protective equipment, adequate sharps disposal (Hatcher, 2002; Weltman, 1995) and immunization against Hepatitis B (Cardo and Bell, 1997) Simple instruction to prevent HCW from recapping phlebotomy needles represents an effective and inexpensive intervention to reduce risk. Secondary prevention measures include post-exposure prophylaxis against HIV and Hepatitis B immunoglobulin. For institutions interested in tracking and preventing NSI, the Exposure Prevention Information Network, EPINet, has developed software that provides standardized methods for recording and tracking percutaneous injuries and blood and body fluid contacts (University of Virginia Health System, 2004).

Health care workers are sometimes reluctant to care for HIV-infected patients because they have fears of contracting tuberculosis and HIV infection. These fears can lead personnel to stigmatize and avoid AIDS patients. They constitute an important barrier to care and add to the suffering of AIDS patients. It is imperative that hospitals, such as the Hospital General, which face a large (and growing) AIDS patient population address these fears in a forthright and realistic manner. The occupational safety of HCW concerns hospitals, the schools that train HCW, HCW unions and student associations. Health care workers and trainees, like patients, deserve the best treatment available and should not be exposed to unnecessary risks in the course of their work caring for others.

REFERENCES


