



Major Article

Occupational exposure to bloodborne pathogens among health care workers in Botswana: Reporting and utilization of postexposure prophylaxis



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Background: This study assessed reporting behavior and satisfaction with postexposure prophylaxis (PEP) systems among health care workers (HCWs) at risk for occupational bloodborne pathogen exposure (BPE) in 3 public hospitals in Botswana.

Methods: A cross-sectional survey among HCWs provided information on perceptions, attitudes, and experiences with occupational exposures, reporting, and postexposure care. HCWs potentially in contact with blood or body fluids were surveyed using audio computer-assisted self-interview.

Results: Between August 2012 and April 2013, 1,624 HCWs completed the survey; most were women (72%), and almost half (48%) were nurses. Sixty-seven percent of them had ever received training related to BPE management; 62% perceived themselves to be at high risk for BPE. Among the 426 HCWs who were exposed to sharps injuries or splashes in the last 6 months, 160 (37%) reported the exposure. Of these, 111 of the 160 (69%) received PEP, and 79 of the 111 (71%) completed their medication. Whereas >92% of the total HCWs had ever been tested for HIV, only 557 (37%) were tested in their own health facility. Most HCWs (87%, n = 1,406) reported they would be interested in testing themselves. Of HCWs who reported an exposure, less than half (49%, n = 78) were satisfied with existing reporting systems.

Conclusions: Underreporting of occupational exposures and dissatisfaction with PEP management is common among HCWs. Improved PEP management strategies and regular monitoring are needed.

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Bloodborne pathogen exposure (BPE) can result from percutaneous injuries (PIs) (ie, needlestick, other sharps injuries) or through contact of blood or body fluids with mucous membranes or nonintact skin. BPE poses a risk of transmission of HIV, hepatitis B (HBV), hepatitis C (HCV), and other pathogens to health care workers (HCWs).^{1,2}

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Globally, it has been estimated that 3.35 million HCWs experience PI with a contaminated sharp object every year.² As a consequence of occupational exposures, 66,000 HBV, 16,000 HCV, and 1,000 HIV infections occur among HCWs each year.² The World Health Organization estimates that HCWs in Africa, the Eastern Mediterranean, and Asia average 4 needlestick injuries per year.³ The Centers for Disease Control and Prevention estimate that 385,000 PIs occur among HCWs in U.S. hospitals per year.⁴ Only a few studies have been published on PIs in developing countries⁵⁻⁷; however, PIs in these settings account for 90% of occupationally exposed cases.^{2,3} Most developing countries do not have well-established surveillance systems for monitoring occupational BPE to blood and body fluids, limiting the accuracy of estimates.

The efficacy of available postexposure prophylaxis (PEP) regimens is approximately 81% for HIV⁸ and 85%-95% for HBV, using a combination of HBV immune globulin and vaccine series.⁹ Although PIs are one of the most common types of injury reported by HCWs, it is believed that they are vastly underreported. Various studies indicate that underreporting of BPE is prevalent in health care facilities worldwide, with rates of underreporting ranging from 19%-86%.^{9,10} Prompt reporting of needlestick injuries is important, not only for management of the exposure (the efficacy of PEP regimens is approximately 81% for HIV⁸ and 85%-95% for HBV⁹), but also for identification of workplace hazards and evaluation of prevention measures.²

Occupational exposure reporting and management systems are important elements of workplace safety programs in health facilities and are integral to preventing infections after BPE.¹¹ In Botswana and the rest of Sub-Saharan Africa, limited data are available on reporting practices of BPE among HCWs. An assessment conducted in health care facilities in Botswana between 2003 and 2004 found that 26% of nurses sustained needlestick injuries annually; however, no information was presented on how many of these injuries were reported.¹² The aim of the current study is to assess current reporting behavior and satisfaction with PEP systems among HCWs at risk for occupational BPE in 3 public hospitals in Botswana, a country with an HIV prevalence of 23% among adults.¹³

METHODS

Study design and setting

A cross-sectional study was conducted in 3 public hospitals in Botswana: a referral hospital and 2 district hospitals. The 3 health facilities were selected using convenience sampling, prioritizing sites that were easily accessible (within a 3-hour drive by car) for study staff based in the country's capital, Gaborone.

Study population

From August 2012-April 2013, a survey was conducted among all eligible, consenting HCWs at the 3 facilities using a structured questionnaire administered by the audio computer-assisted self-interview (ACASI; Nova Research Company, Bethesda, MD) system. Eligible participants included HCWs employed in the facilities whose activities involve potential contact directly with patients or with blood or other body fluids from patients. This included nurses, doctors, clinical officers, dentists, laboratory workers, HIV testing and counseling counselors, phlebotomists, janitors, clinical interns, medical and nursing students, mortuary workers, cleaners, waste handlers, drivers transporting laboratory samples, and laundry workers. Additional eligibility criteria included being at least 18 years old, able to read and understand English or Setswana, and able to provide written consent.

Data collection

The structured questionnaire included questions about demographics, HCW cadre, and perceptions, attitudes, and experiences with occupational BPE and PEP. The questionnaire was administered in English and Setswana.

ACASI data were collected using encrypted password-protected tablets that had been programmed using the Questionnaire Development System software (Nova Research, Bethesda, MD). The ACASI software was programmed to include skip patterns and internal data checks to avoid implausible answers. Data collected were automatically saved into an encrypted and password-protected database and

backed up daily onto a secure external hard drive. Data were checked periodically for completeness and duplicate entries prior to final analysis.

Statistical analysis

Descriptive statistics were computed for variables of interest. Associations between selected covariates and the outcome of interest were examined using the SAS GLIMMIX procedure, with facility as a random effect to control for correlation within facility. Variables with $P < .25$ in bivariate analysis were included in an initial multivariable model. Backward stepwise elimination was used until all variables in the model had $P < .05$. Adjusted odds ratios (aORs) and 2-sided 95% confidence intervals (CIs) are presented. Analyses were performed with SAS version 9.2 (SAS Institute, Cary, NC).

Ethical considerations

This study was approved by the Columbia University Medical Center Institutional Review Board, the Centers for Disease Control and Prevention Institutional Review Board, and the Botswana Health Research Development Committee.

RESULTS

Demographic characteristics of the participants

Out of the 1,697 eligible HCWs invited to participate in the study, 1,624 (96%) completed the interview, 24 (1%) did not complete the interview (usually because of emergency calls after they initiated the survey), 48 (3%) did not show up for their scheduled appointment for the survey, and 1 (0%) refused to participate. The demographic characteristics of participants are shown in Table 1. Most respondents were women (72%). Most (70%) were between 21 and 39 years old. Nearly half (48%) were nurses. More than half (61%) had their current job for <5 years.

Table 1

Demographic characteristics of occupational exposure survey participants in Botswana, June 2012-April 2013 (N = 1,624)

Variables	n	%
Sex		
Male	459	28
Female	1,165	72
Age (y)		
<20	21	1
21-39	1,136	70
40-59	453	28
>60	14	1
HCW cadre		
Nurse	771	47
Medical doctor/officer/HCT counselor	98	6
Laboratory workers	66	4
Support staff*	204	13
Others	485	30
Work experience in this facility (y)		
>1	308	19
1-5	678	42
6-10	286	18
>10	352	22

HCT, HIV counseling and testing; HCW, health care worker.

*Includes laundry workers, waste handlers and cleaners.

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