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Development of an Intervention to Increase Occupational Postexposure Prophylaxis in Sub-Saharan Africa

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Keywords

HIV prevention; *infection control*; *needlestick injuries*; *occupational injuries*; *postexposure prophylaxis*

Bloodborne pathogen exposures (BPE) through sharps injuries or splashes are common, and result in considerable health risk to health care workers (HCW). Each year, approximately three million HCW worldwide experience injuries with a contaminated sharp object (Pruss-Ustun, Rapiti, & Hutin, 2005). Of those, approximately 90% occur in developing countries (World Health Organization [WHO], 2003). In 2000 alone, BPE resulted in an estimated 66,000 hepatitis B infections, 16,000 hepatitis C infections, and 1,000 HIV infections worldwide (Pruss-Ustun et al., 2005). In sub-Saharan Africa, more recent cross-sectional surveys of HCW have indicated high rates of BPE that vary widely by country and health cadre (Aynalem & Dejenie, 2014; Mashoto, Mubyazi, Makundi, Mohamed, & Malebo, 2013; Ogoina et al., 2014), and low rates of reporting exposures or otherwise following standardized prevention procedures (Adib-Hajbaghery & Lotfi, 2013).

Effective management of occupational exposures, including postexposure prophylaxis (PEP), is necessary to reduce risk to HCW (WHO, 2003). Components of effective PEP management include: (a) policies and reporting structures conducive to reporting all exposures; (b) appropriate stock of testing supplies and PEP medication to prevent infections

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in exposed persons; and (c) supportive social norms, knowledge, and attitudes of staff to report occupational exposures in health facilities. A study in Kenya (Taegtmeyer et al., 2008) demonstrated that an intervention was able to increase knowledge of PEP and HIV testing in HCW, but stigma toward HIV testing and low risk perception remained significant barriers to PEP uptake. We conducted formative research in Zambia, Tanzania, and Botswana to identify key factors in BPE incidence, reporting, and PEP uptake to inform the development of a multi-component intervention strategy for health facilities.

Methods

In 2012, we conducted formative research in nine health facilities in Zambia, Tanzania, and Botswana. Large regional or district hospitals within driving distance of each country's capital were selected by convenience. A mix of qualitative and quantitative methods were used: key informant interviews of facility and ministry of health staff, reviews of facilities' PEP registers, and an audio computer-assisted self-interview (ACASI) of all HCW in each site were conducted (Table 1).

This project was reviewed and approved by the Institutional Review Board of Columbia University Medical Center, the U.S. Centers for Disease Control and Prevention, and the national ethics committees in each country. Participants provided informed consent to participate. No identifying information was collected during the ACASI survey, and no incentives were provided for participation.

Results

Key informant interviews identified facility and national-level factors that hindered effective PEP management, such as limited reporting systems, insufficient training materials, and insufficient staff assigned to monitor facility infection prevention/control practices. At the time of the assessment, most facilities (7/9) did not have a formal standard operating procedure for occupational BPE reporting. Of the facilities that recorded occupational BPE for 2011 with either a formal register ($n = 2$) or informal counter-book (i.e., notebooks containing handwritten columns for documenting exposure events; $n = 3$), recorded exposures ranged from 2 to 40 cases per facility.

The number of recorded BPE contrasted markedly with HCW self-reported experiences. Across the nine facilities, ACASI responses indicated that 62.9% (2073/3298) of individual HCW had ever experienced a BPE (defined in the survey as a needle prick, splash, or human bite); 39.3% (1295/3298) had experienced a BPE in the previous 6 months. Of those who had recently experienced a BPE, 35.6% (462/1295) indicated the exposure had been reported. Excluding those who could not remember whether the incident had been reported ($n = 139$) and others who did not list a reason, the main reasons HCW identified for not reporting their most recent exposures included not perceiving the injury to be serious in general (25.1%, 170/678), believing the instrument to have been unused (188/678, 27.7%), and not knowing where to report (10.6%, 72/678). More country-specific results of these ACASI interviews have been presented elsewhere (Kassa et al., 2016; Lahuerta et al., 2013; Selenic et al., 2013).

From May 2013 to May 2014, a series of information sessions for health workers and management staff were delivered to reach the majority of staff in each of the health facilities where our formative research was conducted (Table 2). Pathways to PEP was a multi-component intervention that operated on and addressed barriers at the policy, management, and individual staff levels. The intervention was comprised of (a) information sessions for health facility managers; (b) facility-wide operational plans for PEP management; (c) cadre-specific information sessions for all HCW in the facility (i.e., clinical staff and nonclinical staff such as janitors); and (d) distribution of reminder materials (e.g., posters, calendars, key chains). Information sessions were driven by evidence-based behavior change theories (Glanz, Lewis, & Rimer, 2002; Petty & Cacioppo, 1986; Witte & Allen, 2000) to increase HCW perceptions of their personal threats of acquiring HIV through BPE; enhance beliefs that effective treatment was available and accessible; address perceived barriers to action (i.e., identifying reasons, such as HIV stigma, for why some people did not report BPE) and ways to overcome those barriers; and enhance perceived benefits and cues to action (i.e., ongoing aids to recall the recommended action). Sessions were designed to support formation of strong attitudes in support of reporting BPE and taking PEP (Petty & Cacioppo 1986). By the conclusion of each series of information sessions, staff-led teams from each health facility had developed or updated their operational plans for PEP management. Reminder materials were also distributed throughout each of the facilities.

Discussion

From our formative research activities, we confirmed that BPE were common for HCW in sub-Saharan Africa, and that effective interventions at the facility, management, and staff levels were needed to increase routine reporting of BPE and PEP management. Consistent with our findings that some facilities lacked BPE reporting tools and systems, another cross-sectional survey of HCW in Tanzania identified this as a key limitation for characterizing the risk of exposure to HIV and other blood-borne pathogens in HCW and monitoring the extent to which interventions to reduce risk were effective (Mashoto et al., 2013).

A wide range of effective behavioral interventions to address sexual and injection risk for HIV at the individual, small group, and community levels have been identified (http://www.effectiveinterventions.org). There have also been a variety of strategies reported to reduce the number and severity of occupational BPE (Hoffmann, Buchholz, & Schnitzler, 2013; Zafar et al., 2009). However, few effective interventions to increase reporting of occupational BPE by HCW and PEP management have been reported. This approach is an important accompaniment to other methods that can prevent or reduce HCW exposures, as complete elimination of risk in health care settings is unlikely. Identifying and addressing barriers to reporting at the policy, facility, and individual HCW levels are critical to an effective approach.

Informal feedback from health facility management and staff also supported the approach of designing interventions based on individual facility challenges, and tailoring messages for specific cadres of HCW. The pending evaluation will include measures of change in the number of documented BPE exposures at each health facility and the proportion of HCW who self-reported having experienced a BPE and initiated PEP. Findings will guide wider

adoption of strategies to improve BPE reporting and PEP management. A standardized video, based on this intervention approach, will also be developed to support broader dissemination.

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Table 1

Formative Methods to Inform Pathways to PEP Intervention for Health Facility Management and Health Care Workers

Country	Health Facilities *N*	2011 PEP Register Entries *N*	Key Informants[c] *N*	ACASI Interviews *N*
Zambia	3	Incomplete[a]	10	1,331
Tanzania	3	15	4	973
Botswana	3	47[b]	8	1,624

Note. ACASI = audio computer-assisted self-interview; PEP = postexposure prophylaxis.

[a]All health facilities in Zambia had national reporting tools on site, but data for 2011 were not available.

[b]One health facility in Botswana did not use a register for recording occupational bloodborne pathogen exposures at the time of the assessment.

[c]Only one response per country was recorded for Ministry of Health key informants, whereas within each country, more than one key informant interview was recorded for some facilities.

Table 2

Number of Participants in Pathways to PEP Management and HCW Information Sessions by Country

Country	Approximate Eligible Participants[a] *N*	Management Session Participants *N*	HCW Session Participants *N*	
			Clinical	Non-clinical
Zambia	1,386	96	937	239
Tanzania	1,172	90	806	577
Botswana	2,109[b]	42	1,108	425

Note. HCW = health care worker; PEP = postexposure prophylaxis.

[a]Eligible participants included all clinical and management staff (e.g., physicians, nurses, and nurse assistants) as well as nonclinical staff whose positions put them at potential risk for bloodborne pathogen exposures (e.g., janitors and mortuary staff). Some HCW may have participated in both a management session and an HCW session.

[b]Excluding students.