

ORIGINAL ARTICLE

Awareness of occupational post-exposure prophylaxis against HIV infection among health workers in Nyanza province, Kenya

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Abstract

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This study attempts to determine the awareness of occupational post-exposure prophylaxis among health workers in Nyanza province, Kenya. A cross-sectional study was conducted to collect data related to knowledge, attitude, availability, and management support of post-exposure prophylaxis. Four hundred and thirteen health workers in rural and urban health facilities responded to this self-administered questionnaire.

Eighteen percent of the respondents reported being exposed to at least one kind of occupational risk. The highest percentage (57.9%) of health workers affected by occupational post-exposure prophylaxis was among nurses. The majority (69.7%) of the exposures were caused by needle stick injuries, while 21% were exposed to the splashing of body fluids on mucous membranes. Health workers in rural areas had a higher awareness than those who worked in urban areas (74.5% versus 67.5%). The chi-square test revealed that the variables associated with level of awareness were attitude and management support. After multiple logistic regression was performed, it was found that a health worker who had a positive attitude and who worked with the support of higher management was more likely to have a high level of awareness (Adj OR 2.82; 95% CI 1.50-5.30 and Adj OR 1.91; 95% CI 1.03-3.52 respectively).

It is recommended that health workers should be encouraged to have a more positive attitude towards their behavior. In addition, a support system should be set up and health workers should use a facility-based review of universal precaution procedures in order to decrease occupational exposure.

Keywords: awareness, health workers, HIV infection, occupational post-exposure prophylaxis

ความตระหนักรต่อการใช้ยาเพื่อป้องกันการติดเชื้อ เอชไอวีจากการประกอบอาชีพของบุคลากร ด้านสุขภาพในจังหวัดนายาช่า ประเทศไทย

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บทคัดย่อ

แซมอล โอมอนดิ สุพัตรา ศรีวัฒนากร และ บังอร เทพเทียน
ความตระหนักรต่อการใช้ยาเพื่อป้องกันการติดเชื้อเอชไอวีจากการประกอบอาชีพของบุคลากร
ด้านสุขภาพในจังหวัดนายาช่า ประเทศไทย
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การวิจัยนี้มีวัตถุประสงค์เพื่อประเมินระดับความตระหนักรต่อการใช้ยาเพื่อป้องกันการติดเชื้อเอชไอวีหลังการสัมผัส
สารคัดหลังจากการประกอบอาชีพของบุคลากรในจังหวัดนายาช่า ประเทศไทย เก็บข้อมูลที่เกี่ยวข้องกับ
ความรู้ ทัศนคติ และการปฏิบัติตามมาตรการการติดเชื้อ กับบุคลากรผู้ปฏิบัติงานในสถานพยาบาลจำนวน 413 ราย
จากเขตชนบท 204 รายและเขตเมือง 209 ราย โดยใช้ตัวอย่างแบบสอบถามด้วยตนเอง

ผลการวิเคราะห์ข้อมูล พบว่า ผู้ตอบแบบสอบถามร้อยละ 18 เคยสัมผัสกับสารคัดหลังจากการทำงาน
กลุ่มเสี่ยงในการสัมผัสสารคัดหลังคือพยาบาล คิดเป็นร้อยละ 57.9 โดยส่วนใหญ่การสัมผัสสารคัดหลังเกิดจากเข้ม
นิยม (ร้อยละ 69.7) และสารคัดหลังกระเด็นมาถูกร่างกาย (ร้อยละ 21) บุคลากรเขตชนบทมีระดับความตระหนักร
ต่อการสัมผัสสารคัดหลังมากกว่าเขตเมือง (ร้อยละ 74.5 และร้อยละ 67.5) จากการทดสอบไก่กำลังสองพบว่า
ตัวแปรที่มีความสัมพันธ์กับความตระหนักรต่อการติดเชื้อ คือ ทัศนคติ และระบบสนับสนุนการปฏิบัติงาน เมื่อวิเคราะห์ด้วยสถิติ
การถดถอย logistic พบว่า บุคลากรที่มีทัศนคติและระดับการสนับสนุนการปฏิบัติที่ดี เป็นปัจจัยที่สำคัญ

ต่อระดับความตระหนักรต่อการติดเชื้อ (Adj OR 2.82; 95% CI 1.50-5.30 and Adj OR 1.91; 95% CI 1.03-3.52 ตามลำดับ)
เพื่อกระตุ้นให้เกิดความตระหนักรต่อการปฏิบัติตามมาตรการป้องกันการติดเชื้อ ควรจัดให้มีระบบสนับสนุน
ในการปฏิบัติงานมากขึ้น โดยการทบทวนสิ่งอำนวยความสะดวกต่าง ๆ ในสถานพยาบาลพร้อมกับกระบวนการ
ปฏิบัติตามมาตรฐานป้องกันการติดเชื้อ อันจะทำให้ลดความเสี่ยงต่อการสัมผัสสารคัดหลังจากการปฏิบัติงาน
ต่อไป

คำสำคัญ: ความตระหนักรต่อการติดเชื้อเอชไอวี
การใช้ยาเพื่อป้องกันการติดเชื้อเอชไอวีหลังสัมผัสสารคัดหลังจากการประกอบอาชีพ

Introduction

From its discovery and subsequent description by scientists in the early 1980s to date, HIV/AIDS has been a major public health problem¹. Thirty-four million people are infected with HIV worldwide; 66% of them being in sub-Saharan Africa²⁻⁴. According to the CDC and the Kenya National AIDS and STI Control Council (NASCOP), in 2012 HIV prevalence among the adult population in Kenya was 6.3%⁵, with highest prevalence reported in Nyanza province at 14.9%⁶.

Occupational exposure to HIV occurs when a health worker is exposed to potentially infectious blood, blood products or body tissue in the course of his/her duties. This commonly occurs through percutaneous needle stick injuries and also mucosal exposure to infectious materials⁷⁻¹¹. The chance of infection following percutaneous injury is 0.3%, while mucosal exposure poses a 0.09% risk of infection^{12,13}. HIV infection is, however, not an instantaneous event, offering a window of opportunity for intervention¹⁴.

Occupational post-exposure prophylaxis (PEP) against HIV infection is a medical intervention intended to prevent HIV infection in a health worker who has been exposed. The process involves immediate cleaning of the site with soap and water and testing the HIV status of the patients and health workers as part of the risk assessment¹³. In Kenya, those at risk of infection are given a combination of three antiretroviral drugs (ARVs); lamivudine, zidovudine or tenofovir and Kaletra (lopinavir/ritonavir) for a period of 28 days. The ARVs are started as soon as possible following exposure, but in any case not later than 72 hours^{5,9,15}.

From retrospective studies, it was discovered that occupational PEP can lower the chances of infection by up to 81%^{14, 16}. Occupational PEP against HIV infection was introduced in Kenya in 2001⁹. Occupational exposure among health workers in western Kenya was determined by Siika et al. to be 20% in 2001.

Although there are no previous studies to indicate the level of awareness about occupational PEP among health workers in Kenya, a high prevalence of HIV has been reported in this region; the authors therefore sought to address the gap in the research with a view towards designing interventions. The study sought to assess the level of awareness of health workers in an urban facility (Nyanza Provincial Hospital), and rural facilities (Suba district) about potentially lifesaving occupational PEP against HIV infection and to determine the independent factors associated with the level of awareness. The level of awareness about occupational PEP was used as a proxy indicator for the readiness of health workers to use PEP when exposed.

Nyanza Provincial Hospital is the regional referral facility, offering a range of specialized services in addition to being a teaching and internship hospital. The rural facilities (44) are in a resource-constrained district, with no consultants, and serving the population with the highest HIV prevalence in the country, at 26%.

Methods

Health personnel who routinely take care of patients or handle patient samples were targeted in this study. Administrative health staff were excluded.

Stratified sampling was used to arrive at the calculated sample size of 423 (including 10% in addition to the minimum sample size to allow for drop-outs or failures to respond). Due to the low number of health personnel in the rural facilities, all those who met the inclusion criteria and were willing to participate in this study were recruited, a total of 204 health workers. The urban facility was classified by cadre, and the number of participants needed was calculated based on the proportionate representation of each cadre in the total workforce. Participants were chosen per cadre by random sampling, for a total of 209 from the urban facility. The respondents were drawn from those working in an urban setting (Nyanza Provincial General Hospital), and those in rural health facilities (Suba district). The response rate in this study was 96.5%.

A self-administered anonymous questionnaire was given to the participants and 413 completely filled-in questionnaires were returned. The questionnaire consisted of six parts.

1) The socio-demographic characteristics section had eight questions designed to obtain information about the respondents, e.g. age, sex, gender, marital status, cadre, work station, experience and department of deployment. The question on department of deployment was applicable only for provincial hospital employees.

2) The awareness section is a set of four questions which sought to elicit not just the health worker's understanding of occupational post-exposure prophylaxis against HIV infection, but the readiness or intention of the health worker to practice occupational PEP if exposed. The questions touched on factors that might hinder the practice of PEP, for example testing the

HIV status of the health worker as part of the process, and the side effects and accessibility of ARVs. Health personnel who responded correctly to the questions in this section were considered to be aware, while those that did not answer correctly were considered as not being aware.

3) The attitude section consisted of 13 questions which assessed the respondent's attitude towards the principles, processes and practices of occupational post-exposure prophylaxis against HIV infection. Specifically, we assessed attitudes regarding perceptions of individual risk of infection, potential benefits of occupational PEP, and access to/availability of post-exposure prophylaxis services at the department or station.

4) The knowledge section consisted of 15 questions. They included indications for PEP, initiation of PEP, duration of ARVs in occupational post-exposure prophylaxis and the current drug regimen in Kenya. The management support system section assessed the level of management support, which acts as a reinforcing factor towards awareness and intention to practice occupational PEP. Questions in this section included the availability of reporting tools, training about PEP, supportive supervision and staff reviews of occupational PEP and universal precautions. Frequency of occupational exposure was determined in the practice section, for health personnel who had had injuries/exposure in the 12 months prior to the study.

5) Furthermore, the practice of occupational post-exposure prophylaxis was also assessed among the exposed.

The reliability of the questionnaire was assessed using the Kuder-Richardson formula (KR-20) for the knowledge section and Cronbach's Alpha for the

attitude section. A five-point Likert scale was used for attitude measurement. The results of the pretest were acceptable: the KR-20 for knowledge was 0.827 and the internal consistency/reliability for attitude was 0.76.

Descriptive statistics such as frequency, percentage and mean were used to describe variables, and inferential statistics such as the chi-square test and multiple logistic regression were used to analyze independent variables and their association with the dependent variable. Approval for this study was granted by the Mahidol University Review Board and the ethics review committee of Nyanza Provincial Hospital.

Results

Of the 425 questionnaire distributed, 413 completely filled-in questionnaires were returned. Of those, 204 respondents were from rural facilities and 209 were from urban facilities.

Practice

In all, 18% of the respondents reported occupational exposure in the year preceding the study. Nurses were most affected, with 57.9% of the total of those exposed being from the nursing cadre. While the majority had had a single exposure within the year, 23% had had multiple exposures.

Needle-stick injuries were the commonest cause of exposure (69.7%), while 21% reported splashing of body fluids on the mucous membranes. HIV testing was done on 76% of source patients; the rest were not tested for reasons ranging from lack of test kits

to not knowing the test was necessary to the assumption that the patient was HIV-negative.

Most of the exposed health workers (72%) started ARV treatment following exposure; the others did not follow risk assessment, or because they need not meet the criteria (patient HIV-negative or health worker HIV-positive). Of those health workers receiving treatment, 98% took the first dose of ARVs within three days, as recommended.

Nearly half of the health workers did not complete the four week course of ARVs for varied reasons including adverse effects (69%), or the patient testing HIV-negative if he/she had not been tested before prophylaxis began.

The level of awareness of occupational post-exposure prophylaxis was 74.5% among the health workers in the rural facilities and 67.5% in the urban facility. In the year prior to the survey, 18% of health workers had had occupational exposure.

The population of rural health workers is generally younger than the urban group; they have fewer years of work experience, as shown in Table 1. The median age of health workers in rural areas is 29 (QD = 7), while the median for urban areas is, (QD = 13.5). The median number of years worked (experience) is four years (QD = 4.75) for rural health workers and six years (QD = 14.5) for urban health workers. The majority of the respondents in both groups are married. More than half of the health workers are nurses, making up 58% and 52% of the total workforce in urban and rural areas respectively.

วารสารสาธารณสุขและการพัฒนา
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Table 1 Distribution of respondents by socio-demographic factors and areas studied

Variables	Rural (n = 204)		Urban (n = 209)	
	n	%	n	%
Age group				
20-40	189	92.7	157	75.1
41-50	12	5.9	38	18.2
51-60	3	1.5	14	6.7
Gender				
Male	102	50	84	40.2
Female	102	50	125	59.8
Marital status				
Single	62	30.4	66	31.6
Married	137	67.2	125	59.8
Divorced	1	0.5	3	1.4
Widowed	4	2.0	15	7.2
Educational level				
Certificate	47	23.0	25	11.3
Diploma	142	69.6	128	61.2
Higher National Diploma	8	3.9	18	8.6
Bachelor's degree	7	3.4	35	16.8
Master's degree	0	0	3	1.4
Facility				
Provincial hospital	-	-	209	100
District hospital	74	36.3	-	0
Health center	95	46.6	-	0
Dispensary	35	17.2	-	0
Cadre				
Medical officer	3	1.4	14	6.8
Clinical officer	39	19.2	49	23.4
Nurse	106	52.2	122	58.4
Laboratory technician	30	14.8	16	7.7
VCT counselor	26	12.3	8	3.8
Department				
OPD	-	-	66	32.0
Wards	-	-	94	45.6
Theater	-	-	2	1.0
Special clinics	-	-	18	8.7
Maternity	-	-	26	12.6
Work experience				
1-10 years	181	88.7	139	66.5
11-20 years	18	8.8	33	15.8
21-30 years	5	2.5	33	15.8
31-40 years	0	0	4	1.9

The level of awareness of occupational post-exposure prophylaxis was 74.5% among the health workers in the rural facilities and 67.5% in the urban facility.

Most of the health workers in the rural facilities (53.9%) have a negative attitude towards the accessibility of occupational PEP services, while 66% in the urban facility have a positive attitude. The table below shows attitude towards perceived risk of infection, benefits of PEP and access to PEP services.

The knowledge level on occupational post-exposure prophylaxis is marginally higher among health workers in the rural facilities compared to those in the urban facility. The median score for knowledge is 73.3% in rural areas compared to 66.7% in the urban setting.

The management support level is slightly higher among the rural health workers compared to their colleagues in the urban facility as shown in the table overleaf.

Table 2 Distribution of respondents by dependent, and independent variables and study area

Variable	Rural (n = 204)		Urban (n = 209)	
	n	%	n	%
Awareness				
Aware	152	74.5	141	67.5
Not aware	52	25.5	68	32.5
Knowledge				
Good	153	75	127	60.8
Fair	44	21.6	67	32.1
Poor	7	3.4	15	7.2
Attitude towards risk of exposure				
Positive	95	46.6	123	58.9
Negative	109	53.4	86	41.1
Attitude towards potential benefits of PEP				
Positive	114	55.9	104	49.8
Negative	90	44.1	105	50.2
Attitude towards accessibility of PEP services				
Positive	94	46.1	138	66.1
Negative	110	53.9	71	33.9
Management support				
High	121	59.3	122	58.4
Low	83	40.7	87	41.6

There was no association between the socio-demographic factors and awareness of occupational post-exposure prophylaxis against HIV infection. However, chi-square analysis shows an association between attitude and awareness of occupational PEP,

both in the rural setting (*p*-value = 0.025) and the urban facility (*p*-value <0.001). Management support was also shown to be associated with the dependent variable among the health workers in the urban facility.

Table 3 Association between awareness and independent variables

Variable	Rural			Urban		
	Not aware		p-value	Not aware		p-value
	Aware	(%)		Aware	(%)	
Attitude						
Positive	81.9	18.1	0.025	Positive	76.9	23.1
Negative	68.2	31.8		Negative	51.9	48.1
Knowledge						
Good	77.7	22.2	0.065	Good	70.1	29.9
Fair	68.2	31.8		Fair	65.7	34.3
Poor	42.9	57.1		Poor	53.3	46.6
Management support						
High	61.8	51.9	0.209	High	64.5	45.6
Low	38.2	48.1		Low	35.5	54.4

The results for multiple logistic regression (Table 4) reveal that predictors for awareness were: having a positive attitude and high level of management support. Attitude is a strong predictor of awareness of occupational post-exposure prophylaxis in the

urban setting (Adj OR 2.82, CI 95% of OR, 1.50 to 5.30). Management support is strongly associated with awareness of occupational post-exposure prophylaxis among health workers in the urban facility (Adj OR 1.91, CI 95% of OR 1.03 to 3.52).

Table 4 Multiple logistic regression for predictors of awareness of occupational PEP in health workers

Variable	Rural			Variable	Urban		
	Adjusted OR	95% CI	p-value		Adjusted OR	95% CI	p-value
Knowledge				Knowledge			
Good	3.41	0.71-16.39	0.130	Good	1.29	0.40-4.08	0.670
Fair	2.11	0.40-11.07	0.376	Fair	1.41	0.43-4.63	0.569
Poor	1			Poor	1		
Attitude				Attitude			
Positive	1.89	0.95-3.74	0.070	Positive	2.82	1.50-5.30	0.001
Negative	1			Negative	1		
Management Support				Management Support			
High	1.28	0.67-2.48	0.455	High	1.91	1.03-3.52	0.040
Low	1			Low	1		

Discussion

Suba district, a resource-constrained and difficult-to-reach district, is staffed by younger and less experienced health workers compared to the urban provincial hospital. Due to the hardships in this rural district, there is high staff turn-over, and nearly half of the current staff is employed by health partners, namely USAID and CDC, through their local agencies, in support of the fight against HIV/AIDS¹⁷.

More health workers in the urban facility have a positive attitude towards occupational post-exposure prophylaxis against HIV infection than in the rural areas. There is a negative attitude in the rural area, particularly as regards access to and availability of services linked to PEP, e.g. laboratory services and counseling services and ARVs. Paradoxically, the

knowledge level regarding occupational post-exposure prophylaxis against HIV infection is higher in the rural area than in the urban facility. Some of the facilities, especially dispensaries, have only one or two health workers, and do not offer antiretroviral therapy services; hence even in cases of occupational injury/exposure, these health workers must self refer to the nearest major facility for PEP services. De Baets et al. conducted a study in Zimbabwe and found that a negative attitude among health workers towards occupational PEP persisted even after training in PEP, if they do not have the services at their facility¹⁸. Knowledge levels were found to increase, however, following training.

Most of the health workers have a good level of knowledge on occupational post-exposure prophylaxis

against HIV infection. More than 80% know the drugs currently used for PEP in Kenya, although nearly half of the health workers still believe Nevirapine, a drug known for severe side effects in the immuno-competent, is used for PEP. This drug was abandoned for its severe and fatal side effects in those not immunosuppressed⁹. There is also a high level of knowledge on indications for PEP, its initiation and the duration of treatment. These levels are higher than those from earlier studies in Kenya, Nigeria, and Malaysia^{9, 19, 20}. Decentralization of ART services that were previously provided only in major facilities and by consultant physicians, has led to the training of health workers from all cadres in managing HIV conditions. This, in effect, has led to higher levels of knowledge on HIV and its management, including PEP.

Awareness of health workers is 74% among rural health workers and 67% among the urban-based health personnel. Fear of HIV testing and the side effects of ARVs are the major hindrances towards occupational post-exposure prophylaxis against HIV infection.

In this study, 18% of the respondents had had an occupational injury in the previous year. Nurses were the most at risk and needle stick injuries were the commonest cause of occupational injury. Higher incidences of injury have been reported by Honda, and by Hiransunkul in Thailand^{7, 8}. Similarly higher figures were found in studies in Ethiopia and Nigeria^{10, 11}. The present study did not include consultants working in the surgical field, which is listed as one of the most frequent areas for injury²¹.

One of the limitations of the study is that it is not representative of the country, as the samples

were drawn from only one province. The study was not able to investigate the actual practice of PEP, and it was limited to awareness. Because of this, the number of health workers who were HIV negative at the time of exposure is not known; nor is the eventual outcome after they began post-exposure prophylaxis. Nor was the status of the source patients determined; hence it cannot be presented. Lack of previous studies is acknowledged as a limitation and a weakness of the study, as sufficient and reliable references with regards to awareness of occupational post-exposure prophylaxis cannot be made. Furthermore, the study relied on recall of events that had occurred over the previous 12 months; hence recall bias is another limitation of this study.

Conclusion

Negative attitude and low management support are major hindrances towards achieving a high level of awareness of occupational post-exposure prophylaxis against HIV infection. Lack of adequate facilities in rural health facilities contributes to the negative attitude of health workers towards occupational post-exposure prophylaxis. Similarly, inadequate supervision and review meetings on PEP among health personnel affect their level of awareness of occupational PEP.

This study recommends that universal precautions, health worker safety and occupational PEP should be emphasized by all, especially managers, to improve knowledge, attitude and practice. Decentralization of PEP services should be considered in order to ensure that any health worker can access the services at their own workplace without the need for referral.

A prospective cohort study should be carried out to determine actual practice regarding PEP and the

bottlenecks impeding its success, as this is a potentially lifesaving practice for health workers.

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