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Improving Universal Precautions and Client Teaching for Rural Health Workers: A Peer-group Intervention

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Abstract

Health workers can contribute to HIV prevention by minimizing HIV transmission in health facilities and increasing Client teaching. We offered a peer-group intervention for Malawian rural health workers to build their universal precautions and teaching skills. A quasi-experimental design using independent sample surveys and observations compared health workers in an intervention and delayed intervention control district at baseline and at 15 and 30 months post-intervention. Controlling for demographic factors, the intervention district had more reported HIV teaching at 15 and 30 months and also had higher universal precautions knowledge and fewer needle stick injuries at 30 months. Observations at 15 and 30 months post-intervention showed higher levels of teaching in the intervention district. Observed glove wearing and hand washing were also higher at 30 months. This intervention should be made available for health workers in Malawi and provides a potential model for other high HIV prevalence countries.

Keywords

client teaching; health workers; HIV prevention; Malawi; peer-group intervention; universal precautions

Health workers are well positioned to be HIV prevention leaders because they are respected in local communities as health experts and they have frequent contact with clients and families. (Rahlenbeck, 2004; Talashek et al., 2007; Tarwireyi & Majoko, 2003). Health workers have daily opportunities to show leadership by using universal precautions to minimize HIV transmission in health facilities and by teaching clients about HIV and other health promotion issues. Potential contributions of rural health workers are especially important in countries like Malawi where over 80% of people live in rural areas (National Statistical Office, 2005). However, there are few published studies of HIV prevention interventions for health workers. This paper describes the effects of a peer-group intervention on universal precautions and client teaching for rural health workers in Malawi. These data are part of a larger study to mobilize district health workers as HIV prevention leaders (Norr et al., 2006).

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Background

HIV Prevention Needs of Health Workers in Africa

There is clear evidence that African health workers' potential to be HIV prevention leaders is not yet realized. Previous studies have documented inconsistent use of universal precautions (Garbus, 2003; Nsubuga & Jaakkola, 2005; Reis et al., 2005; Sadoh, Fawole, Sadoh, Oladimeji, & Sotiloye, 2006; Talashek et al, 2007; Walusimbi & Okonsky, 2004). Two recent studies found that one-third or more of health workers had a needle stick injury in the past year (Dieleman et al., 2007; Nsubuga & Jaakkola, 2005). African health workers have expressed high anxiety about occupational exposure and reluctance to report injuries because of potential discrimination by other workers (Dieleman et al., 2007; Kiragu et al., 2007; Tarwireyi & Majoko, 2003). While there are fewer studies of client teaching, the available evidence suggests that there is need for improvement in the frequency and effectiveness of health workers' teaching interactions. Factors linked to the lack of health workers' HIV prevention leadership include individual worker knowledge gaps and demoralization; an overburdened health system with inadequate staffing, supplies, and increased patient load and acuity; and cultural norms that stigmatize HIV and inhibit open discussion of sexuality (Adebajo, Bamgbala & Oyediran, 2003; Aisien & Schobowale, 2005; Chelenyane & Endacott, 2006; Fuglesang, 1997; Garbus, 2003; Hesse, Adu-Aryee, Entsu-Mensh & Wu, 2006; Lugalla et al., 1999; Rahlenbeck, 2004; Raviola, Maachoki, Mwaikambo, & Delveccchio Good, 2002; Reis et al., 2005; Sadoh et al., 2006; Smit, 2005; Talashek et al., 2007; Uwakwe, 2000; Walusimbi & Okonsky 2004).

Although nearly all health systems in Africa have provided at least some HIV prevention training for workers, few of these efforts have been formally evaluated or published. In Nigeria, two different interventions led to significant improvements in health workers' HIV-related knowledge, attitudes and self-assessed counseling ability (Ezedinachi et al., 2002; Uwakwa, 2000), but only one of these intervention increased universal precautions practices (Ezedinachi et al., 2002). Training for mental health care providers in South Africa led to increased knowledge and greater comfort with giving HIV care (Collins, Mestry, Wainberg, Nzama & Lindegger, 2006). There have also been reports in some African countries of successful training of health workers for HIV counseling and testing and/or home-based care (Ezedinachi et al., 2002; McCreary, Mkhonta, Popovich, Dresden, & Mndebele, 2004). However, there is evidence that many health workers continue to feel unprepared regarding HIV. For example, only about half of the workers in four Ugandan hospitals said they had been trained for all the HIV-related tasks they were expected to perform (Dieleman et al., 2007).

Peer-groups for HIV Prevention

Peer-group and peer leader interventions based on behavioral change theories have reduced risky behaviors in Africa and other regions (Ezedinachi et al., 2002; Kebaatswe & Norr, 2002; Merson, Dayton, & O'Reilly, 2000; Norr, Norr, McElmurry, Tlou, & Moeti, 2004). Peer interventions have been widely used in the workplace, and, despite limitations in their evaluation, these programs appear to have been successful (Mahajan, Colvin, Rudatsikira, & Ettl, 2007). However there are no published studies of peer group interventions for health workers.

To partially address this need, we developed and tested a peer-group intervention for rural health workers in Malawi called *Mzake ndi Mzake* (Friend to Friend in Chichewa, the local language). The intervention differs in several ways from the usual in-service training programs health workers receive. As described in Norr et al. (2006) intervention implementation is guided by the World Health Organization's primary health care model of

health worker-community collaboration, building on the existing health care system to deliver the intervention in rural communities. The conceptual model also incorporates behavioral change theories and contextual tailoring to guide the content and learning processes of the intervention. The peer groups are highly interactive skill-building sessions with an emphasis on rehearsing specific skills. Groups are co-facilitated by a pair of trained health worker volunteers, enhancing health workers' capacity to sustain the program. In this report, we describe the impacts of this peer-group intervention on rural health workers' universal precautions and client teaching.

Methods

Study Design

We used a two-group, quasi-experimental design to test effects of the intervention (Norr et al., 2006). Two rural districts in central Malawi were randomly assigned to the intervention or control condition. We used this design rather than an experimental design with random assignment of individuals because the intervention encouraged participants to share what they learned, posing a potential threat of control group contamination. Because staff turnover was high, we wanted to see if changes persisted despite turnover. Therefore we used independent (unmatched) random samples of intervention and control health workers at baseline, 15-months and 30-months post-intervention.

Sample and Participants

The intervention and control districts were similar in size and shared many regional economic, political, social, and cultural characteristics, but participating sites were sufficiently distant to minimize contamination. We consulted with each district team to select the health centres, choosing sites where there were no other HIV prevention projects. At the district hospitals, each survey was a convenience sample stratified by type of unit and by shift to include all types of workers. At the rural health centres we interviewed all workers present on the day of the survey.

All types of workers at the health facilities were included in the study because their family and neighbors regard them as sources of health information. We divided workers into three broad categories (See Table 1). Clinicians and technicians, including doctors, clinical officers, nurses and technicians, made up about a third of our sample at each time period. They have one or more years of professional training. Most provide direct patient care and supervise clinical support workers. Clinical support workers included auxiliary nurses, patient attendants, and community workers with training of six months or less who have direct patient or community contact. About half the sample at each time period were clinical support workers. Non-clinical workers with no patient care responsibilities included administrators, clerks, guards, and maintenance and service personnel. The proportion of non-clinical workers varied from 11% to 29% at the three time points. There were no significant differences in job distribution between the control and intervention district samples for any of the three time points.

There were no differences between control and intervention health workers in age (mean age of about 37 years) or gender (about half were male). The proportion of health workers with only a primary school education was higher in the control district, although the difference was significant only at the 15-month survey. Food security was better in the intervention district at both post-intervention evaluations. This food security measure was developed after the baseline survey was completed. A composite economic variable from available items showed the same pattern at baseline: the intervention district was slightly better off economically. There were also significant differences in tribe: the intervention district had a

higher proportion of Ngoni. There were slightly more Catholics in the control district but this difference was not significant.

The Intervention

The *Mzake ndi Mzake* peer-group intervention for district community members consists of six sessions focusing on: the HIV pandemic and stigmatization; HIV, AIDS and testing facts; prevention of HIV and other sexually transmitted infections (STIs); partner negotiations; condom use and how to contribute to community HIV prevention. Based on our formative evaluation of health workers (Talashek et al., 2007), four new sessions were added for health workers only: a non-technical overview of HIV treatment and symptom management, universal precautions, teaching individuals and families, and ethical questions. Each session lasts about 90-120 minutes. In contrast to most health worker training programs, the intervention emphasizes rehearsal of key skills with corrective feedback, such as correctly washing hands or beginning a conversation about condoms with a client.

Data Sources and Variables

The survey items and observation checklist were developed for this study, guided by our formative evaluation of health workers (Talashek et al., 2007). A small pilot established the survey items' feasibility and comprehensibility. Repeated pilot observations refined the observation checklist items, and we established inter-rater reliability (coefficient of agreement >.85) during observer training. To reduce bias, observations were made by trained nursing faculty who were not from the health facility being evaluated and were not involved in any other aspect of the research.

The variables, number of items and scoring procedures related to universal precautions and client teaching are listed in Table 2. Survey variables included overall knowledge about universal precautions and four subscales (hand washing, glove wearing, sharps and cleaning knowledge); reported glove wearing and hand washing in the last month, reported teaching or counseling of clients and families about issues related to HIV in the last month, and reported needle stick injuries (included only in the 30-month survey). Observations were made on health care workers engaged in an activity with clients and/or requiring use of universal precautions. The two universal precautions variables we examined were appropriate glove wearing and hand washing. Observers also judged whether there was an opportunity to teach, and if so, whether the health worker did any teaching. We also observed teaching related specifically to HIV, but the number of observations in this rural setting where HIV teaching would have been appropriate was too small for stable results. If a client was heavily sedated, in pain or other distress, or under age 10, we judged the situation as inappropriate for teaching. Many encounters were with infants or young children or acutely ill clients. If the behavior was not required or not appropriate, the variable was coded as missing and dropped from analysis.

Procedure

We obtained ethical reviews and approvals from the review boards at both the University of Illinois at Chicago and the University of Malawi. We also obtained approval from relevant officials in the Ministry of Health, district leaders, and the participating health facilities. Then we conducted the baseline interviews. Interviewers were trained using mock interviews with constructive feedback. After health workers gave written informed consent, the interviews were conducted in Chichewa.

We then offered the *Mzake ndi Mzake* peer-group intervention to all interested health workers in the intervention district sites. After the research team facilitated the first peer-

groups, two trained volunteer health workers co-facilitated the remaining peer-groups. A total of 243 district hospital workers and 93 rural health centre workers participated.

Finally, we evaluated the impact of the intervention with surveys and observations at 15-month and 30-month assessments. During the intervening months, about 25 volunteer health workers offered the intervention to rural adults and adolescents in villages served by the five rural health centres. The same procedures used at baseline were used at the 15-month and 30-month surveys. Observations were conducted anonymously to protect the worker's identity; we obtained verbal informed consent of both health worker and client. Observations occurred in different inpatient and outpatient units, on different days of the week, and at different times to represent the variety of health worker activities where client teaching, universal precautions, or both were relevant.

Results

Health Worker Surveys

At baseline, overall universal precautions knowledge and the knowledge subscales measures were higher in the control district, and the differences were statistically significant for total universal precautions knowledge and the hand washing and cleaning subscales (Table 3). There were no significant differences in reported hand washing, glove wearing, or teaching behaviors.

At 15-months post-intervention, overall universal precautions knowledge, which had been significantly higher in the control district at baseline, was the same in the two districts (Table 4). The percent correct was higher in the intervention district than in the control district for cleaning knowledge and glove wearing knowledge, but these differences were not statically significant. Reported glove wearing and hand washing behaviors were higher in both intervention and control districts than at baseline, and there were no significant differences between intervention and control groups. Reported HIV-related teaching of clients and families was significantly higher in the intervention district, both in t-test comparisons and in multivariate regression analysis controlling for the demographic variables of gender, education, tribe, religion, and job category.

At 30-months post-intervention, total universal precautions knowledge and three of the four subscales were all significantly higher in the intervention district compared to the control district (Table 5). There were no significant differences in reported glove wearing and hand washing. There continued to be significantly higher teaching in the intervention district. Health worker in the intervention district also reported fewer needle stick injuries. Universal precautions knowledge, reported teaching and reported needle stick injuries remained significant in multiple regression analyses controlling for gender, education, tribe, religion and job category.

Observations of Universal Precautions Behaviors & Teaching

For the 15-month observations, all three outcome variables were higher in the intervention district, but only observed teaching was statistically significantly higher in the intervention district than the control district (Table 6). For the 30-month observations, the intervention district had significantly higher levels of glove wearing, hand washing, and client teaching than in the control district.

Discussion

Rural health workers in Malawi who participated in the *Mzake ndi Mzake* peer-group intervention had higher universal precautions knowledge and behaviors and more frequent

teaching to clients about HIV than workers in a similar control district. We used two complementary data collection methods, surveys and observations. The survey data identified more reported HIV-related teaching at 15-months post-intervention and higher universal precautions knowledge, reported teaching, and fewer needle stick injuries at the 30-month measurement. Observations at 15 and 30 months post-intervention showed higher levels of glove wearing, hand washing, and client teaching on all topics, including HIV, in the intervention district. These same rural health workers also had higher general HIV knowledge, more positive attitudes, fewer risky sexual behaviors, and increased HIV testing and community involvement in HIV prevention after participating in the intervention (Norr, Jere, Mbeba, Crittenden & Kaponda, 2008). Together, these results document the potential benefits of an HIV prevention intervention for all rural health workers.

Unique features of this intervention that may have contributed to its success include: collaboration with the health system management team to organize implementation, use of volunteer health workers as peer group facilitators, and inclusion of both clinical and non-clinical workers. The high involvement of workers, nearly all of whom participated in the intervention and some of whom became peer leaders, shows that health workers have high commitment to preparing themselves for HIV prevention. HIV prevention training for lower level workers is important because they perform many patient care activities and have opportunities to teach. In Malawi district health management teams have some discretionary control over their budget, and the involvement of the management team may have encouraged them to remedy supply shortages and other system barriers to HIV prevention.

This research has limitations that should be noted. It was necessary to use a quasi-experimental design in order to avoid control group contamination. However, this design provides less clear causal inference than an experiment. Social desirability bias is also a limitation. After the intervention, health workers were more aware of the “correct” response to questionnaire items or the “correct” behavior to be observed. We used anonymous observations by outside observers, not the study team, and remained in a unit long enough for the health workers to become accustomed to the presence of observers. These procedures helped reduce observer bias and workers' perceived pressure to perform and fear of being evaluated. However, these threats to valid observation cannot be ruled out. This is one of the few studies to report sustained differences between intervention and control groups 30 months after a peer-group intervention, and the relatively long follow-up strengthens the study. However, this long period between the intervention and the evaluation also raises the possibility that unrelated historical changes may have produced the differences observed. Most changes in the context of HIV prevention in Malawi, including the national expansion of testing and treatment, affected both the intervention and control districts. According to our discussions with the health management teams in both districts, neither district experienced any new HIV prevention-related programs or events other than these national programs. Thus, while changes over time unrelated to the intervention cannot be ruled out as a threat to validity, these changes are not likely to account for the differences between the intervention and control districts.

Implications

There is growing recognition that strengthening the health care system is an essential component of overall HIV prevention (Merson, O'Malley, Serwadda & Apisuk, 2008; Potts et al., 2008). Changing unsafe practices maintains the confidence of health workers and the public and controls the potential spread of HIV and many other infections. Increasing health workers' teaching about HIV and other health topics is equally important and helps to prepare health workers to introduce expanding services such as testing and treatment. The *Mzake ndi Mzake* peer-group intervention can be effective in improving rural health

workers' universal precautions knowledge and behaviors and HIV prevention teaching with clients. This intervention should be made available for health workers in Malawi and also may have wider applicability for health workers in other African countries with high HIV prevalence.

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Table 1

Demographic characteristics of rural health workers.

	Baseline		15-month Evaluation		30-month Evaluation	
	Control (*n*=89)	**Intervention (*n*=99)**	**Control (*n*=93)**	**Intervention (*n*=99)**	**Control (*n*=196)**	**Intervention (*n*=221)**
Age (years) Mean (s.d.)	37.0 (8.4)	38.7 (10.1)	35.5 (8.8)	37.6 (10.2)	36.0 (8.7)	36.7 (9.7)
Gender (% male)	50.6	46.5	46.2	44.4	56.6	56.6
Educational level (%)						
Primary school or less	33.7	31.3	30.1	16.3*	28.7	24.0
Some secondary school	36.0	38.4	23.7	39.8	25.1	21.3
MSCE or greater	30.3	30.3	46.2	43.9	44.6	42.1
Tribe (%)						
Ngoni	40.4	55.6*	33.3	64.6*	31.3	59.3*
Chewa & others	59.6	44.4	66.7	35.4	68.7	40.7
Religion (%)						
Catholic	28.1	18.2	23.9	18.4	23.4	18.1
Protestant & others	71.9	81.8	76.1	81.6	76.6	81.9
Job (%)						
Clinicians/technicians	32.6	34.3	34.8	37.8	28.1	26.2
Clinical support staff	49.4	36.4	53.3	51.0	48.0	45.2
Non-clinical staff	18.0	29.3	12.0	11.2	24.0	28.5
Food security (%) [a]						
Struggles to provide			8.6	1.0*	26.2	17.6*
Enough, little left over			40.9	34.3	25.1	21.3
Adequate all the time			50.5	64.6	48.7	61.1

[a] These items not included in Baseline Questionnaire.

* Statistically significant ($p < 0.05$).

Table 2

Variables from Health Worker Interview & Observation.

Variables and items		# of items	Scores' range
Survey			
Universal precautions (UP) knowledge			
Total UP knowledge	Average % of the 4 following knowledge indices: gloves, hand washing, sharps, cleaning	22	0-100%
Glove use	% correct of 15 items (blood, body fluids, IV, garbage, death, bed, meds, cleaning floor/equipment, giving or preparing food, feeding, lifting, torn gloves, after each patient)	15	0-100%
Hand washing	% correct of 3 items (before client, touched blood, after contaminated equipment or surfaces)	3	0-100%
Sharps	% correct of 2 items (needle re-cap; sharps disposal)	2	0-100%
Cleaning	% correct of 2 items (when to clean exam tables; what cleans contaminated surfaces)	2	0-100%
Self-reported universal precautions and teaching behaviors			
Glove wearing	Mean of 4 items [5 Always–1 Seldom/ Never] (blood, bodily fluids; garbage; start IV; contaminated equipment)	4	1-5
Hand washing	Mean of 7 items [5 Always-1 Seldom/ Never] (between patients, blood contact, before and after start IV, before and after injections, after handling contaminated equipment or garbage)	7	1-5
HIV-related teaching	% done in the past month of 5 actions (talk to patients re: HIV/AIDS status, safer sex/condoms; talk to families re: stigma, protection in care of PLWA; encouraged HIV test)	5	0-100%
Needle stick injury*	If had injury from needle exposed to blood [1=Yes/0=No]	1	0-1
Observation			
Universal precautions behaviors			
Gloves worn	Wore gloves where the potential for contamination existed in at least one of 5 possible observed situations [1=Yes/0=No]	1	0-1
Hands washed	Washed hands where the potential for contamination existed in at least one of 7 possible observed situations [1=Yes/0=No]	1	0-1
Teaching			
Provided teaching	Provided teaching on any health promotion topic, including HIV or AIDS, if appropriate to the interaction [1=Yes/0=No]	1	0-1

* This item is only available for 30-month interview.

Table 3

Baseline reported universal precautions and HIV teaching.

		Baseline means or percentages	
		Control (*n* = 89)	**Intervention (*n* = 99)**
Universal precautions knowledge			
Total UP knowledge	%	85.49*	73.95
Glove wearing knowledge	%	90.17	82.95
Hand washing knowledge	%	96.18*	83.23
Sharps knowledge	%	63.48	55.61
Cleaning knowledge	%	92.13*	75.26
Universal precautions and teaching self-reported behavior			
Glove wearing behavior	Mean (s.d.)	3.61 (.71)	3.69 (.52)
Hand washing behavior	Mean (s.d.)	3.85 (.27)	3.92 (.19)
Teaching or counseling clients and families	%	31.01	37.78

*Statistically significant ($p < 0.01$).

Table 4

15-month reported universal precautions and HIV teaching.

		Comparisons of means or per cents		Multiple regression (OLS) coefficient for Intervention-control [a]	
		Control (*n* = 93)	**Intervention (*n* = 99)**	**β**	**Std. error**
Universal precautions knowledge					
Total UP knowledge	%	80.45	80.52	-.31	1.97
Glove wearing knowledge	%	82.04	84.79	2.02	1.88
Hand washing knowledge	%	92.31	91.41	-1.20	2.61
Sharps knowledge	%	70.56	68.48	-2.60	4.39
Cleaning knowledge	%	77.42	77.78	-.65	4.46
Universal precautions and teaching self-reported behavior					
Glove wearing behavior	Mean (s.d.)	4.56 (.81)	4.49 (.76)	-.09	.12
Hand washing behavior	Mean (s.d.)	4.43 (.65)	4.15 (.90)	-.30	.13
Teaching or counseling clients and families	%	54.50	67.46*	14.58*	4.22

[a] Controlling for gender, education, tribe, religion, and job category.

* Statistically significant ($p < 0.05$).

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Table 5

30-month reported universal precautions, HIV teaching and needle-stick injury.

		Comparisons of means or per cents		Multiple regression (OLS) coefficient for Intervention-control [a]	
		Control (*n* = 93)	**Intervention (*n* = 99)**	**β**	**Std. error**
Universal precautions knowledge					
Total UP knowledge	%	76.66	82.28*	5.07*	1.43
Glove wearing knowledge	%	77.87	83.10*	5.45*	1.50
Hand washing knowledge	%	94.82	99.70*	4.31*	1.36
Sharps knowledge	%	61.58	63.47	3.17	2.90
Cleaning knowledge	%	73.72	82.58*	6.01*	3.12
Universal precautions, teaching and needle stick injury self-reported behavior					
Glove wearing behavior	Mean (s.d.)	4.71 (.66)	4.67 (.82)	-.04	.08
Hand washing behavior	Mean (s.d.)	4.69 (.69)	4.66 (.66)	-.05	.07
Teaching or counseling clients and families	%	50.12	62.10*	9.83*	3.42
Needle stick injury	%	18.37	11.31*	-.66*	.32

[a] Controlling for gender, education, tribe, religion, and job category.

* Statistically significant ($p < 0.05$).

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Table 6

15- and 30-month observations of universal precautions behavior and teaching.

		Comparison of percentages	
		Control	**Intervention**
15-month post evaluation			
Gloves worn	% (*n*)	72.00 (50)	83.56 (73)
Hands washed	% (*n*)	73.03 (89)	81.82 (99)
Used opportunity to teach	% (*n*)	44.83 (87)	61.25* (80)
30-month post evaluation			
Gloves worn	% (*n*)	61.90 (168)	76.32* (228)
Hands washed	% (*n*)	66.67 (237)	74.35* (347)
Used opportunity to teach	% (*n*)	61.11 (162)	70.20* (245)

*Statistically significant ($p < 0.05$).