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Pharmacy Workers' Sexually Transmitted Diseases/Human Immunodeficiency Virus Knowledge in Fuzhou, China: Implications for Human Immunodeficiency Virus Testing, Treatment, and Prevention Strategies

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Abstract

Background—Pharmacies play a special role in providing treatment services for patients with sexually transmitted diseases (STDs) in China. There is a need to study the STD/human immunodeficiency virus (HIV) knowledge among pharmacy workers in retail pharmacies.

Method—A total of 200 pharmacy workers were recruited from 120 randomly selected retail pharmacies in Fuzhou, China. A self-administrated questionnaire was used to collect information of demographics, working experience, pharmacy structure and clientele profile, and pharmacy workers' attitudes toward traditional Chinese folk remedies and their STD/HIV knowledge.

Results—Work-related training during the past 6 months, holding pharmacist license, and years of being a pharmacy worker showed significant association with STD/HIV knowledge. Work-related training also significantly associated with provision of consultation. Years of education and medical training, however, failed to show significant association with STD/HIV knowledge.

Conclusions—In order to improve service quality and avoid misdiagnosis and inappropriate treatment of STD/HIV, on-the-job training or continuous education for pharmacy workers should be required, implemented, and monitored as part of the national effort for STD control and treatment.

Timely counseling, early diagnosis and proper treatment have been identified as the key components of prevention strategies for both sexually transmitted diseases (std) and human immunodeficiency virus/acquired immunodeficiency syndrome (hiv/aids).^{1,2} To facilitate these strategies, a sound health system with the capacity of effective service delivery was necessary.¹ However, such a system may not exist in every country, especially in developing countries.

Several studies have demonstrated that in many developing countries, patients with symptomatic STDs usually seek health care in pharmacies or private clinics rather than public health facilities.^{3–7} The same pattern of health-seeking behavior also happens in China,^{8–13} although STD services are available in most public hospitals and eligible HIV/AIDS patients can receive free services from government-designated public health facilities.^{14–17} Therefore, the role of pharmacy in STD/HIV prevention and control could not be ignored.

In China, the preference of pharmacy in seeking health services for STD/HIV patients has been reported by several studies^{8–13}; however, most of them were conducted among the clients of pharmacies. The STD/HIV knowledge of pharmacy workers and the services that they provided have not been well studied. The objectives of this study were to examine STD/HIV knowledge among pharmacy workers and the services they provided in retail pharmacies in Fuzhou, China.

METHOD

Study Site, Participants, and Procedure

This study was part of a National Institute of Mental Health Collaborative STD/HIV Prevention Trial being conducted with 5 populations at risk for HIV and STDs in China, India, Peru, Russia, and Zimbabwe.¹⁸ This article will focus on results from a survey of retail pharmacy workers in the study area for the main study of market vendors in China.¹⁹

This study was conducted in retail pharmacies in Fuzhou city, the capital of Fujian Province, eastern China. These pharmacies are usually located in urban communities and are easily accessible to their clients. To obtain a representative sample, pharmacies were selected using a 2-stage randomization sampling method. The first-stage sampling was conducted at the community level. Each community was defined as the area surrounding a local food market. There were approximately 60 food markets in our study site¹⁹ of which 40 were randomly selected. In the second stage, 3 pharmacies were selected randomly from each of the 40 food markets. To be eligible, the participating pharmacies needed to have at least 5 employees. A total of 120 pharmacies were randomly selected on the basis of the above criteria.

Pharmacy workers were selected by using a convenience sampling method. From each pharmacy, at least 2 workers were randomly approached and an informed consent was obtained. To be eligible for this study, participants had to be 18 years or older and had to have worked at selected pharmacies for a minimum of 3 months. They were not required to have a license. Exclusion criteria included failing to give informed consent or having permanent disability. A total of 205 pharmacy workers were contacted of whom 200 were eligible and agreed to participate in this study. All participants were compensated 20 RMB (US\$2.50) in cash for their participation.

Instrument and Measurement

The Pharmacy Worker Survey, a self-administrated, paper-pencil questionnaire was developed and reviewed by all Community Advisory Committee members of this study to be both scientific and practical, and also fit the local situation well. The survey contained a total of 45 questions and addressed the following areas: demographics, working experience, pharmacy structure and clientele profile, and pharmacy workers' attitudes toward traditional Chinese folk remedies and their STD/HIV knowledge.

STD/HIV knowledge was the main outcome of interest, measured by 11 questions on the transmission, diagnosis, and treatment of common STDs and HIV infection. Based on the recommendation of Community Advisory Committee members and the fact that many pharmacy workers may not have professional education background, all questions used in this session were about basic knowledge and principles in the fields of STD/HIV transmission,

diagnosis, and treatment (Table 1). The questions were divided into 2 sections. The first section included 5 uncorrelated questions intended to evaluate their knowledge about some key points of STD/HIV transmission and treatment. The second section used case vignettes to evaluate how the subjects would act in a certain situation. For each question, 1 point was given if the answer was correct or acceptable; otherwise, no point was given for that question. The highest possible STD/HIV knowledge score was 11 (range: 0–11). The higher score a participant got, the better was his/her STD/HIV knowledge.

Demographic and employment information included gender, age, education, medical training, work-related training, pharmacist licensure status, years of being a pharmacy worker, and years of working at the current pharmacy.

Pharmacy background and clientele profile included number of staff, years of operation, services provided (client consultation, physician in residence, products available), distribution of clients' gender, age, and average spending. Client consultation was used as a general measurement of services provided. It could include both empirical treatment and referral.

Analysis

All data were analyzed using SAS 9.1 (SAS Institute, Inc., Cary, NC). First, the distribution of demographic, pharmacy background, providing consultation, and STD/HIV knowledge were examined. Second, Pearson correlations were generated to examine the correlations between STD/HIV knowledge and age, gender, years of education, highest medical training, work-related training in past 6 months, licensure status, years of being a pharmacy worker, number of staff, and providing consultation. Third, multiple linear regression was performed to examine relationships between STD/HIV knowledge (dependent variable) and 8 demographic and other background variables (age, gender, years of education, highest medical training, work-related training in past 6 months, license status, year of being a pharmacy worker, and number of staff). The variables in regression analysis are either our interests or potential confounders. Among the 8 independent variables, age, years of education, years of being a pharmacy worker, and number of staff were measured as continuous variables in correlation and regression analyses; gender, work-related training in past 6 months and licensure status were measured as dichotomous variables in correlation and regression analyses.

RESULTS

As shown in Table 2, among the 200 participants, 87.5% were women. Age distribution indicated that 42% participants were aged between 21 and 30 years and about 26% were aged from 31 to 40 years. Of all the participants, 59.5% reported having received 10 to 12 years of school education, which is equivalent to a high school education in China; 27% had received 13 to 15 years of school education, which is equivalent to a college education. In terms of the highest medical training received, 32.5% had a trade school education or higher. About 76.5% participants had received work-related training in the past 6 months. The majority received training from local Food and Drug Administrative and health bureaus (73.2%). The 3 main purposes of training were pharmacology, continued education, and position orientation. Only 4 (2.0%) subjects reported that they had been trained for STD/HIV-related knowledge. Providing consultation was a common practice because over 90% of subjects reported that they usually provide consultation to their customers. The majority of participants (83.5%) did not have a pharmacist license at the time when the survey was administered. More than half of all participants reported being a pharmacy worker for less than 5 years, followed by 5 to 10 years (30.5%), 11 to 20 years (7.5%), and more than 21 years (7%). The number of staff was used as an indicator of pharmacy's size. There were 63.5% participants who reported 10 or fewer staff members in their pharmacies; 31% reported between 11 and 20 staff members.

Table 3 shows the correlation between STD/HIV knowledge and 8 independent variables. Among all the independent variables age ($r = 0.187$, $P = 0.0079$), work-related training in the past 6 months ($r = 0.222$, $P = 0.0016$), holding a pharmacist license ($r = 0.222$, $P = 0.0016$), and years of being a pharmacy worker ($r = 0.280$, $P < 0.0001$) were significantly associated with STD/HIV knowledge. Subjects who were male ($r_{\text{female}} = -0.321$, $P < 0.0001$), older in age ($r = 0.434$, $P < 0.0001$), had higher education ($r = 0.280$, $P < 0.0001$), and higher medical training ($r = 0.152$, $P = 0.0320$) were more likely to hold a pharmacist's license. Participants with work-related training in the past 6 months were more likely to provide consultation service ($r = 0.182$, $P = 0.0097$). However, higher STD/HIV knowledge was not found to be associated with more consultation service ($r = 0.02$, $P = 0.7755$). Female workers tended to be younger than male workers ($r = -0.222$, $P = 0.0016$) and were more likely to be trained in the past 6 months ($r = 0.147$, $P = 0.0377$). Participants who had a higher educational background were more likely to have received higher medical training ($r = 0.520$, $P < 0.0001$). The number of staff in the pharmacy failed to show any associations with any other variables.

We further examined the association between STD/HIV knowledge and each of the independent variables after taking other variables into consideration. As presented in Table 4, after controlling other variables in the model, only work-related training in the past 6 months ($b = 0.905$, $P = 0.002$), holding a pharmacist license ($b = 0.770$, $P = 0.050$), and years of being a pharmacy worker ($b = 0.068$, $P = 0.002$), remained significantly associated with STD/HIV knowledge. The effect of age ($b = -0.013$, $P = 0.421$), however, was no longer significant in the multiple linear regression model.

DISCUSSION

Various factors have been identified that could affect an individual's health-seeking behavior for STD/HIV service, such as convenience, cost and quality of service, perceived stigma and discrimination, and confidentiality.^{9,20–23} The decisions of whether to seek health care and where to seek health care were based on the balance of all these factors. Public hospitals may have better service quality but the cost is high and perceived stigma and discrimination are usually common; informal private settings and pharmacies are convenient and with less embarrassment but their service quality are doubtful. Public STD clinic may reach the best balance between cost, quality, and confidentiality. However, the deeply rooted sexual stigma in social construct may prevent its utilization.^{4,8,9,20–23} Patients with STD/HIV usually give more weight to less stigma and discrimination, better confidentiality protection, and lower cost, which make pharmacies a popular setting for them, especially in developing countries.^{5–8, 21–23} This study provides evidence that the STD/HIV knowledge among retail pharmacy workers may be inadequate to provide appropriate STD/HIV care.

Given the popularity of pharmacy in providing STD/HIV care in developing countries, syndromic management of STD had been implemented in pharmacies in many countries.^{24–28} The low capability of recognizing common STDs indicated by this study may undermine the implementation of such approach. Among the 3 vignettes, only the first has an accurate diagnosis rate of 84%, the rest 2 are only 37% and 21%. The limited STD/HIV knowledge among pharmacy workers in this study shows that pharmacy in China has not been ready to play an active role in either diagnosis/treatment or prevention. However, several studies have demonstrated that pharmacy workers do provide empirical treatment to patients with STD in China.^{8,11–13} A serious outcome of such unstandardized empirical treatment is the antimicrobial resistance caused by misuse of medicine,¹ which may damage all the efforts the country has made to control the epidemic. Continuous education and on-the-job training seems to be an effective method to correct this deficiency. Numerous studies have demonstrated the effectiveness of various continuous education programs for pharmacists.^{29–32} Consistent with previous studies, this study showed that having work-related training in the past 6 months was

significantly associated with better STD/HIV knowledge. Controlling for other potential confounders did not change the estimate, although there may have been confounders that we did not include. The proportion of pharmacies providing on-the-job training, especially STD/HIV-related training was extremely low, which is unfortunate and likely to compromise the service quality.

A comprehensive HIV/AIDS care network has been established in China during the past 5 years.^{14,15} STD services are also available in most public hospitals and local Center for Disease Control and Prevention. Patients with STD/HIV can get good diagnosis, treatment, and care at low or no costs from those public health facilities. Therefore, improving the utilization of these services will become the key focus of STD/HIV prevention and control policies. Less stigma and better accessibility have made pharmacies the first choice of health care for many patients with STD/HIV.^{8,11–13} Given the existence of STD/HIV care system in the country, this health-seeking behavior also makes pharmacies an ideal place to provide counseling and referral service rather than empirical diagnosis and treatment. Thus, the problem of antimicrobial resistance can be significantly reduced. Several studies have reported that trained pharmacy workers were more likely to advise condom use, partner notification, seeing doctor, and providing counseling.^{29–32} We have consistent findings in this study. Although we did not measure STD/HIV-related consultation, those who had been trained in the past 6 months were more likely to provide consultation to their clients in comparison with their colleagues. Given the importance of training on consultation service, more studies will be needed to evaluate the possibility of using pharmacies as primary sites for counseling and referral.

There are several limitations to this study. First, as a cross-sectional study without follow-up, we cannot measure the long-term effect of on-the-job training, although the concern of this issue has been addressed by previous studies.^{33,34} Second, this study can only present associations rather than causations. In addition, the observed associations may be confounded by some unknown/uncontrolled confounders. For example, the association observed between holding a pharmacist license and STD/HIV knowledge could result from the possibility that licensed pharmacists have better training and utilization of the knowledge than that among the nonlicensed pharmacy workers. Third, focusing on self-reported data only is subject to measurement errors, which could introduce bias. Finally, this study was conducted among pharmacy workers who worked in retail pharmacies in Fuzhou city, China, so the results may not be generalizable to pharmacy workers in other settings, such as hospitals and clinics, or other geographic areas. However, given that there is enough evidence to show that a high proportion of patients use retail pharmacies as the primary source of care, our findings address a significant gap in the current literature in examining the impact of STD/HIV knowledge of pharmacy workers.

CONCLUSION

Retail pharmacies should play a more active role in providing STD/HIV-related prevention and referral services, especially in a country where a comprehensive treatment and care system have been established. In order to facilitate such a role and avoid unnecessary empirical treatment of STD/HIV, on-the-job training or continuous education for pharmacy workers should be required, implemented, and monitored as part of the national effort for STD/HIV control and treatment.

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TABLE 1
Questions and Their Answers in the HIV/STD Knowledge Section

Number	Questions	Answers*
Section one		
1	People infected with genital herpes (HSV-2) can only pass the infection to someone else during the time that they have blisters or sores in the genital region	(1) True, (2) False , (3) Don't know
2	What is the treatment for early stage syphilis?	(1) Intramuscular injection of penicillin , (2) Acycloguanosine oral use, (3) Ofloxacin oral use, (4) Don't know
3	Which STDs cannot be completely cured?	(1) Syphilis, (2) Herpes , (3) Gonorrhea, (4) Don't know
4	People who have another sexually transmitted disease such as <i>Chlamydia</i> infection, herpes, and gonorrhea are at greater risk for contracting HIV.	(1) True , (2) False, (3) Don't know
5	Chloromycetin is not suitable for which populations?	(1) Pregnant woman, (2) Young kids, (3) Both of the above , (4) None of the above, (5) Don't know
Section two		
6	If a female customer told you that she had urination pain and saw blood in the urine, the most likely diagnose is ...	(1) Gonorrhea, (2) Urinary tract infection , (3) Syphilis, (4) Vaginitis, (5) Don't know
7	If this female customer in the above question asks your opinion on treatment, what would you suggest her to use/do?	(1) Acycloguanosine oral use, (2) <i>Ofloxacin oral use</i> , (3) Suggest to see a doctor and get tested , (4) Don't know
8	If a male customer told you that he had a burning sensation when urinating as well as some white discharge, the most likely diagnose is ...	(1) Gonorrhea , (2) Urinary tract infection, (3) Syphilis, (4) Testitis, (5) Don't know
9	If this male customer in the above question asks your opinion on treatment, what would you suggest him to use/do?	(1) Acycloguanosine oral use, (2) <i>Cefixime oral use</i> , (3) Suggest to see a doctor and get tested , (4) Don't know
10	If a male customer told you that he had a soft, moist, pink swellings in the genital area, most likely he is infected by:	(1) Trichomonas, (2) Bacteria, (3) Herpes Virus, (4) HPV , (5) Don't know
11	If this male customer in the above question asks your opinion on treatment, what would you suggest him to use/do?	(1) Cefixime oral use, (2) <i>Tell him there is no cure</i> , (3) Suggest to see a doctor and get tested , (4) Don't know

* Correct answer is bold. Acceptable answer is italic.

TABLE 2
Demographic Characteristics, Other Background Variables and STD/HIV Knowledge (n = 200)

Characteristics	Percentage (No.)
Gender	
Male	12.5 (25)
Female	87.5 (175)
Age (by the end of 2006) (mean = 31.6, SD = 10.2)	
≤20	12.0 (24)
21–30	42.0 (84)
31–40	26.0 (52)
41–50	13.5 (27)
≥51	6.5 (13)
Years of school education (mean = 12.8, SD = 2.1)	
≥16	9.0 (18)
13–15	27.0 (57)
10–12	59.5 (119)
7–9	4.0 (8)
≤6	0.5 (1)
Highest medical training	
Vocational high school medical degree and lower	67.5 (135)
Associated degree and higher	32.5 (65)
Work-related training in the past 6 mo	
Yes	76.5 (153)
From local FDA and health bureau	73.2 (112)
From working pharmacy	14.4 (22)
From pharmaceutical company	6.5 (10)
No	23.5 (47)
STD/HIV-related training in the past 6 mo	
Yes	2.0 (4)
No	98.0 (196)
Usually provide consultation to customers	
Yes	90.5 (181)
No	9.5 (19)
Whether hold a pharmacist license	
Yes	16.5 (33)
No	83.5 (167)
Years of being a pharmacy worker (by the end of 2006) (mean = 6.7, SD = 6.8)	
≤5	55.0 (110)
6–10	30.5 (61)
11–20	7.5 (15)
≥21	7.0 (14)
Number of staff working in pharmacies (mean = 11.2, SD = 9.9)	
≤10	63.5 (127)

Characteristics	Percentage (No.)
11–20	31.0 (62)
≥21	5.5 (11)
Score of STD/HIV knowledge (mean = 6.7, SD = 1.8)	
1–6	47.5 (95)
7–11	52.5 (105)

TABLE 3
Correlation Coefficients and Significance Levels Among Selected Variables (n = 200)

	1	2	3	4	5	6	7	8	9	10
1. STD/HIV knowledge	1.000									
2. Female	-0.083	1.000								
3. Age	0.187 [†]	-0.222 [†]	1.000							
4. Education	0.034	-0.110	-0.098	1.000						
5. Associated degree or higher	0.019	-0.125	-0.016	0.520 [§]	1.000					
6. Work-related training in past 6 mo	0.222 [†]	0.147 [*]	0.136	0.008	0.082	1.000				
7. Holding license	0.222 [†]	-0.321 [§]	0.434 [§]	0.280 [§]	0.152 [*]	0.056	1.000			
8. Years of being a pharmacy worker	0.280 [§]	-0.101	0.593 [§]	-0.136	-0.027	0.092	0.236 [‡]	1.000		
9. Number of staff	-0.045	0.078	0.041	-0.056	-0.091	0.123	-0.027	-0.047	1.000	
10. Provide consultation	0.020	0.032	0.089	-0.055	0.043	0.182 [‡]	0.098	0.083	0.016	1.000

* <0.05;

[†] <0.01;

[‡] <0.001;

[§] <0.0001

TABLE 4

Multiple Linear Regression Examining Correlates of STD/HIV Knowledge Score (n = 200)

	Regression Coefficient	Standardized Estimate	P
Female	−0.277	−0.052	0.478
Age	−0.013	−0.074	0.421
Years of school	0.025	0.029	0.726
Associated degree and higher	−0.165	−0.044	0.582
Work-related training in the past 6 mo	0.905	0.217	0.002
Holding pharmacist license	0.770	0.161	0.050
Years of being a pharmacy worker	0.068	0.261	0.002
No. staff members	−0.009	−0.050	0.466