



ARTIGOS

KNOWLEDGE AND ATTITUDES TOWARD HIV AND PEOPLE LIVING WITH HIV (PLWH) AMONG PUBLIC HEALTH MIDWIVES IN THE GALLE DISTRICT, SRI LANKA

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ABSTRACT

This cross-sectional study aimed to assess HIV-related knowledge and attitudes of PHMs, the frontline community health workers in Sri Lanka. Two-hundred and ninety-one PHMs were recruited. PHMs' knowledge level was good (79.9% of answers were correct) but could be improved. Those more knowledgeable about HIV and with higher education demonstrated a more positive attitude toward PLWH. A more negative attitude, less training and older age were associated with having a stronger intention to engage in extra precautionary behaviors. PHMs need further HIV training to improve their knowledge to better educate the community. By reducing PHMs' misperceptions about HIV, they may develop a more positive attitude and thus help reduce the general public's stigma associated with PLWH.

Keywords: HIV, PLWH, Stigma, attitude, community health workers, midwives, Asia, Sri Lanka.

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RESUMO

Este estudo transversal teve como objetivo avaliar o conhecimento e as atitudes das parteiras na saúde pública (*PHMs*) em relação ao HIV, os profissionais de saúde comunitários da linha de frente no Sri Lanka. Duzentos e noventa e uma *PHMs* foram recrutadas. O nível de conhecimento das *PHMs* era bom (79,9% das respostas estavam corretas), mas poderia ser melhorado. Aqueles mais bem informados sobre o HIV e com educação superior demonstraram uma atitude mais positiva em relação às pessoas que vivem com HIV (*PLWH*). Uma atitude mais negativa, menos treinamento e maior idade foram associados a uma intenção mais forte de se envolver em comportamentos de precaução extra. As *PHMs* precisam de mais treinamento em HIV para melhorar seus conhecimentos e educar melhor a comunidade. Ao reduzir as percepções equivocadas das *PHMs* sobre o HIV, eles podem desenvolver uma atitude mais positiva e, assim, ajudar a reduzir o estigma do público em geral associado às *PLWH*.

Palavras-chave: HIV, PLWH, estigma, atitude, agentes comunitários de saúde, parteiras, Ásia, Sri Lanka.

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INTRODUCTION

Stigma associated with HIV and people living with HIV (PLWH) has been prevalent since the HIV epidemic started in the 1980s. In particular, the experiences of discrimination and stigmatization in healthcare settings weaken people's willingness to engage in HIV testing, disclose HIV status, request care and comply with treatment¹.

Even though early studies showed that factors such as age, gender, education, knowledge, and religion did not show consistent associations with healthcare workers' negative attitude toward PLWH², some studies did show associations between such factors and negative attitude. In general, healthcare workers who are older, less trained and less knowledgeable, have more fear of infection and those who have less contact with PLWH tend to demonstrate more negative attitudes³⁻⁷.

Although the number of new HIV infections and PLWH has been increasing in Sri Lanka since 1990, few studies have been done in the country of this topic. Even though some studies have examined the association of factors with healthcare workers' stigma associated with HIV, community health workers' attitudes have not been studied much. Since Sri Lankan Public Health Midwives' (PHMs) interaction with people

living in the community now extend beyond midwifery, it is important to know whether PHMs are knowledgeable and trained to reach out to PLWH. This topic is particularly interesting to study in the Galle District as it has had a high cumulative rate of reported HIV cases per 100,000 populations from 1987 to 2015 (6th out of 25 districts)⁸.

This study first aimed to assess PHMs' knowledge and attitudes toward PLWH in the Galle District in Sri Lanka. Second, the study sought to examine factors associated with such knowledge, attitudes and stigma, and third, to assess the association of knowledge, attitude, stigma with engaging in extra precautionary behaviors.

METHODS

STUDY SETTING AND PARTICIPANT RECRUITMENT

This cross-sectional study was conducted in the Galle District, Sri Lanka from June 2015 to August 2015. Participants consisted of 291 PHMs working in the Galle District. This includes nearly all PHMs of the Galle District except those who were not present at one of their monthly meetings due to sickness, maternity leave or other personal reasons.

PROCEDURES

Two questionnaires were adapted for this study. First, to assess attitudes toward people living with HIV, a standardized brief questionnaire measuring stigma and discrimination among health facility staff was adapted⁹. This questionnaire was chosen to assess healthcare workers' attitudes and to allow the results to be compared across other regions and countries. Second, to measure the knowledge level of PHMs, the 18-item HIV Knowledge Questionnaire (HIV-KQ-18) was utilized¹⁰. The questions focus on sexual transmission of HIV and has previously been used among low income, low literacy, heterosexual subjects¹⁰. Before translating the English version of these 2 questionnaires into Sinhalese, a few changes were made to fit the local setting. Data were collected during the PHMs' monthly meeting, and the procedures were approved by the ethics review boards at Duke University and the University of Ruhuna.

MEASURES

Drivers of HIV-related stigma

Characteristics of Participants. The PHMs' age, education level, marital status, religion, years of experience in healthcare, HIV clinic and HIV training experience were reported.

Knowledge. Two questions from the HIV-KQ-18 were deleted: one question was deemed

sensitive content in the Sri Lanka setting (*Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex.*), and one (*A natural skin condom works better against HIV than does a latex condom*) appeared less relevant since natural skin condoms are not commonly available in Sri Lanka. Part of one question (*putting their tongue in their partner's mouth*) was also deemed culturally sensitive and deleted.

HIV-related stigma.

Secondary stigma. (3 items) Stigma toward the PHMs from others (friends, family, colleagues) due to their care for PLWH were asked.

Attitude to PLWH. (5 items) Participants stated their opinions in 5 items that negatively describe PLWH (e.g., *People living with HIV should feel ashamed of themselves, HIV is punishment for bad behavior*) on a scale from 0 (Strongly disagree) to 3 (Strongly agree).

Attitude to pregnant women with HIV. (5 items) Participants gave their opinion to 4 items that negatively describe pregnant women with HIV (e.g., *Pregnant women who refuse HIV testing are irresponsible, Women living with HIV should not get pregnant if*

they already have children) on the scale from 0 (Strongly disagree) to 3 (Strongly agree).

Attitude to at-risk population. (4 items) At-risk populations were defined as people who inject illegal drugs, men who have sex with men and female/male sex workers. Items assessed their willingness to treat the at-risk populations. If they agreed or strongly agreed on not providing treatment to these groups, additional reasons for that answer were given.

Consequence of HIV-related stigma.

Extra infection precaution. (4 items) Participants were asked whether they use extra precautions (e.g., double gloves, special infection-control supplies) that they usually do not use when they treat patients who do not have HIV.

ANALYSIS

After tabulating summary statistics of participant characteristics, knowledge level was calculated by summing correct answers. To identify underlying attitude and stigma factors, an exploratory factor analysis (EFA) was conducted. Items having the same answer format were kept and used for the EFA. Six items asking about facility policy and other healthcare workers were excluded since they did not reflect PHMs' attitudes nor

stigma toward PLWH. Four items measuring "fear" were also excluded due to many missing values. Four items asking "extra infection precaution" were deliberately excluded and instead considered to be consequences of HIV-related stigma.

After obtaining 4 meaningful attitudes/stigma factors, the association between characteristics of participants and knowledge level were examined. Thereafter, to assess how characteristics of participants and knowledge level were associated with attitudes/stigma factors, t-test and Anova test were used. A multiple linear regression model was used to predict each of the 4 factor scores by age, job category, marital status, education level, HIV clinic experience, training and knowledge level.

Finally, logistic regression analysis was used to assess the relationship of characteristics of participants, knowledge and attitudes/stigma factors with 4 extra precautionary behaviors (avoiding physical contact, using double glove when treating PLWH, using gloves all the time and using special measures when treat PLWH).

RESULTS

PARTICIPANTS

PHMs were quite homogenous in terms of religion, marital status, education and

experience in taking care of HIV patients. Most PHMs were Buddhist (99.3%), married (94.8%), high school graduates (83.8%), had no experience in a HIV-clinic (96.9%) and had not seen any PLWH in the past 12 months (99.6%). Only 1 PHM answered that she had observed 1 HIV patient in the past year.

Most PHMs had extensive working experience but had not received many trainings related with HIV. Mean age was 44.2 ± 9.7 years (min: 27, max: 62) and average years of working as PHM was 16.9 ± 8.6 years (min: 1.5, max: 34). Only 17% had received training about HIV stigma and more than half (54.6%) had never received any training about any of the following subjects: HIV stigma, infection control, patient's confidentiality and stigma toward at-risk population.

HIV-RELATED KNOWLEDGE

Table 1 presents the 16 questions that were asked of PHMs and their answers, as well as whether the answer was correct. The mean number of correct answers was 12.8 ± 1.9 (min: 4, max: 16) out of 16 ($\alpha = 0.46$). As inferred from the average score, PHMs were generally knowledgeable of HIV transmissions, but there was some confusion relating to a few items. Approximately one in five PHMs incorrectly answered that *"Coughing and sneezing could spread HIV"*

(22.3%), *"All pregnant women with HIV will have a baby born with HIV"* (23%) and *"Using Vaseline or baby oil with condoms could lower the chance of getting HIV"* (23.7%). Almost 30% incorrectly answered that a person cannot get HIV from oral sex.

There were some items where a fair number of PHMs did not know if the statement was true or false. Approximately one in four of respondents answered that they "don't know" whether *"Taking a test for HIV one week after sex will tell a person if she/he has HIV"* (24.1%) which is a false statement. Nearly one third of PHMs did not know whether there exists an HIV vaccine.

Table 1 | Knowledge (n=291)

Item	Correct	Wrong	Don't know
Having sex with more than one partner can increase a person's chance of being infected with HIV (T)	96.2%	2.4%	1.4%
Showering, or washing one's genitals/private parts, after sex keeps a person from getting HIV (F)	95.5%	1.7%	2.4%
A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV (F)	94.2%	2.1%	3.4%
People are likely to get HIV by kissing, if their partner has HIV (F)	93.1%	5.2%	1.4%
A person can get HIV by sharing a glass of water with someone who has HIV (F)	89.3%	7.9%	2.4%
A person will NOT get HIV if she or he is taking antibiotics (F)	89.0%	1.7%	8.9%
People who have been infected with HIV quickly show serious signs of being infected (F)	88.3%	6.5%	4.8%
A woman cannot get HIV if she has sex during her period (F)	87.6%	5.5%	6.5%
A woman can get HIV if she has anal sex with a man (T)	82.1%	8.6%	8.9%
There is a female condom that can help decrease a woman's chance of getting HIV (T)	81.4%	7.9%	10.7%
Coughing and sneezing DO NOT spread HIV (T)	74.6%	22.3%	2.7%
Taking a test for HIV one week after having sex will tell a person if she or he has HIV (F)	70.1%	5.8%	24.1%
There is a vaccine that can stop adults from getting HIV (F)	62.9%	4.5%	32.3%
A person can get HIV from oral sex (T)	61.2%	28.9%	10.0%
All pregnant women infected with HIV will have babies born with HIV (F)	60.8%	23.0%	15.8%
Using Vaseline or baby oil with condoms lowers the chance of getting HIV (F)	52.2%	23.7%	24.1%
Total score	79.9%	9.9%	10.0%

Source: authors' own.

FACTOR ANALYSIS OF HIV-RELATED ATTITUDES AND STIGMA SCALE

After conducting EFA with 17 items (187 observations), 4 attitudes/stigma factors were obtained: Attitude to at-risk population (Factor 1), Attitude to people living with HIV (Factor 2), Secondary stigma (Factor 3), and Attitude to reproduction among pregnant women with HIV (Factor 4). After orthogonal rotation (varimax), each participant's standardized factor score (mean=0, s.d.=1) was obtained, representing the extent of PHM's negative attitudes and stigma (higher factor scores indicate more negative attitudes and worse stigma).

Attitude to at-risk populations (Factor 1) included participants' willingness to interact with individuals who are considered at-risk. The more reluctant they were to interact with these groups, the higher their scores were for this factor. Attitude to PLWH (Factor 2) included stereotypes and negative emotional reactions (e.g. blame, shame) to PLWH, including pregnant women. The more negative attitudes and stronger negative beliefs about PLWH reported, the higher the scores. Secondary stigma (Factor 3) is stigma experienced from the public, friends, family and colleagues due to caring for PLWH (High score indicates PHMs worry and care a lot of other people's reaction to themselves). The last factor, attitude to reproduction,

indicates attitude to pregnancy in women living with HIV (higher score means higher stigma relating to reproduction in HIV positive women).

PREDICTORS OF KNOWLEDGE, ATTITUDES AND STIGMA RELATED TO HIV/AIDS (BIVARIATE ANALYSES)

Parametric test (Two-sample t-test or a one way Anova test) was used to test if there were any differences between/among groups in terms of their knowledge, attitudes and stigma.

As presented in Table 2a, significant differences in knowledge were found between the group that had received at least 1 training and the group that had received no training ($\mu=13.02$ vs. 12.60 , $p<0.05$). Among age groups, significant differences were found for 2 factors: attitude to PLWH ($p<0.001$) and secondary stigma ($p<0.05$). Education level was also one of the significant predictors. Attitude to at-risk populations ($p<0.05$) and reproduction in pregnant women with HIV ($p<0.01$) were significantly different by education level. Years of working experience was divided into 4 groups and showed significant difference of attitude toward PLWH ($p<0.001$) among the groups. Participants who had worked more than 20 years showed more negative attitudes than those who had worked less.

PREDICTORS OF KNOWLEDGE, ATTITUDES AND STIGMA RELATED TO HIV/AIDS (MULTIPLE LINEAR REGRESSION)

In this multiple linear regression model, knowledge level was added as a predictor of attitudes/stigma factor while all the predictors that were used in the bivariate analyses were kept.

As presented in Table 2b, training ($\beta=0.468$, $p<0.05$) remained a significant and positive predictor of knowledge. More knowledge was positively associated with better attitude toward at-risk population ($\beta=-0.125$, $p<0.05$) and lower secondary stigma ($\beta=-0.105$, $p<0.05$). Age and education level also remained significant predictors of secondary stigma and attitude to reproduction. PHMs older than 50 ($\beta=-0.877$, $p<0.05$) showed lower secondary stigma compared to those under 30. A more positive attitude to reproduction of HIV positive women was observed for PHMs with higher education, including high school ($\beta=-0.819$, $p<0.05$) and college ($\beta=-1.525$, $p<0.01$), compared to those with a middle school education.

While years of working experience did not remain significant in the model, marital status became a significant predictor. Married ($\beta=0.444$, $p<0.01$) PHMs showed higher secondary stigma compared to unmarried PHMs.

CONSEQUENCES OF KNOWLEDGE, ATTITUDES, STIGMA AND OTHER FACTORS

The relationships of predictors (knowledge, attitudes, stigma, demographic information) with the extra precautionary behaviors are summarized in the Table 3.

In unadjusted logistic regression, PHMs who have more negative attitudes toward at-risk populations (OR=2.24; 95% CI 1.44-3.49) and PLWH (OR=1.65; 95% CI 1.01-2.68) were more likely to avoid physical contact with PLWH. Older PHMs also showed higher odds (OR=2.52; 95% CI 1.03-6.15) of avoiding physical contact than the younger PHMs. In contrast, the more knowledgeable they were, the less likely were they to avoid physical contact with PLWH (OR=0.79; 95% CI 0.66-0.94).

Similarly, PHMs having more negative attitudes toward PLWH (OR=1.67; 95% CI 1.19-2.34) and older PHMs (OR=5.61; 95% CI 2.93-10.75) were more likely to wear gloves during all the aspect of care. On the contrary, having at least 1 training was associated with the lower odds of wearing glove all the time (OR=0.41; 95% CI 0.19-0.92).

In the adjusted logistic regression model, attitudes toward at-risk population, toward PLWH, and age remained as significant predictors for avoiding physical contact and for wearing gloves during all the aspect of care.

Table 2a | Predictors of knowledge, attitudes and stigma related to HIV/AIDS (Bivariate)

Predictors	Knowledge				Attitude to at-risk population				Attitude to PLWH			Secondary stigma			Attitude to reproduction		
	n	mean	(s.d)	<i>p</i>	n	mean	(s.d)	<i>p</i>	mean	(s.d)	<i>p</i>	mean	(s.d)	<i>p</i>	mean	(s.d)	<i>p</i>
Age																	
under 40	112	12.87	(1.88)		70	0.01	(0.92)		-0.26	(0.96)		0.24	(1.27)		-0.10	(0.96)	
40-49	71	13.10	(2.03)		47	-0.24	(0.77)		-0.28	(0.86)		0.00	(0.94)		-0.18	(1.02)	
50+	107	12.49	(1.76)		69	0.16	(1.18)		0.43	(0.97)	***	-0.24	(0.63)	*	0.20	(0.99)	
Professional category																	
SPHM	15	12.33	(1.50)		9	-0.03	(0.52)		0.51	(0.70)		0.14	(1.10)		-0.06	(1.08)	
PHM	276	12.81	(1.90)		178	0.00	(1.02)		-0.03	(1.01)		-0.01	(1.00)		0.00	(1.00)	
Marital status																	
Single	15	13.27	(1.39)		11	0.23	(1.43)		0.15	(1.11)		-0.39	(0.22)		0.01	(0.74)	
Married	276	12.76	(1.90)		176	-0.01	(0.97)		-0.01	(1.00)		0.02	(1.02)		0.00	(1.02)	
Education																	
ordinary	12	12.58	(2.27)		7	0.35	(1.41)		0.49	(0.82)		-0.37	(0.15)		0.97	(0.59)	
advanced	244	12.74	(1.89)		160	-0.07	(0.94)		0.01	(1.01)		-0.02	(0.94)		0.02	(0.98)	
diploma	23	13.22	(1.65)		14	0.28	(1.18)		-0.33	(1.04)		0.30	(1.33)		-0.63	(0.88)	
graduate	12	13.08	(1.68)		6	0.93	(1.14)	*	-0.02	(0.62)		0.41	(1.99)		-0.12	(1.33)	**
Working experience																	
less than 10	92	12.82	(2.01)		55	0.07	(0.97)		-0.33	(1.02)		0.16	(1.24)		-0.12	(1.02)	
10-19	71	13.11	(1.73)		50	-0.16	(0.93)		-0.22	(0.79)		0.12	(1.11)		-0.05	(0.91)	
20-29	112	12.59	(1.88)		73	0.05	(1.06)		0.36	(1.02)		-0.19	(0.68)		0.08	(1.05)	
30+	16	12.56	(1.71)		9	0.07	(1.05)		0.36	(0.74)	***	-0.12	(0.78)		0.38	(0.88)	
HIV clinic experience																	
Yes	9	13.67	(1.12)		6	0.06	(1.04)		-0.49	(1.14)		0.79	(1.65)		-0.47	(0.60)	
No	279	12.76	(1.90)		180	0.00	(1.00)		0.02	(1.00)		-0.03	(0.97)	*	0.02	(1.01)	
Training																	
At least 1 training	132	13.02	(1.74)		95	0.04	(1.09)		0.05	(0.97)		0.07	(1.12)		0.08	(1.00)	
None	159	12.60	(1.97)	*	92	-0.04	(0.90)		-0.05	(1.03)		-0.08	(0.86)		-0.08	(1.00)	

 p*<0.05, *p*<0.01, ****p*<0.001

Table 2b | Predictors of knowledge, attitudes and stigma related to HIV/AIDS (multiple linear regression)

Predictors	Knowledge			Attitude to at-risk population			Attitude to PLWH			Secondary stigma			Attitude to reproduction		
	Coef.	(S.E.)	p	Coef.	(S.E.*)	p	Coef.	(S.E.)	p	Coef.	(S.E.*)	p	Coef.	(S.E.)	p
Age (ref. under 30)															
40-49	0.17	0.51		0.15	0.26		-0.38	0.30		-0.43	0.39		-0.27	0.31	
50+	-0.38	0.62		0.53	0.39		0.10	0.37		-0.88	0.43	*	0.15	0.38	
PHM	0.21	0.54		0.20	0.25		-0.07	0.35		-0.38	0.34		0.26	0.36	
Married	-0.43	0.52		-0.14	0.39		-0.19	0.31		0.44	0.16	**	-0.09	0.32	
Education(ref. middle)															
Advanced level(high)	0.04	0.59		-0.19	0.43		-0.17	0.40		0.24	0.15		-0.82	0.41	*
Diploma(college)	0.42	0.74		0.25	0.55		-0.25	0.50		0.41	0.42		-1.53	0.51	**
Graduate	0.26	0.82		0.79	0.57		0.00	0.57		0.60	0.70		-0.97	0.58	
HIV clinic experience	0.68	0.64		0.15	0.45		-0.33	0.40		0.83	0.64		-0.39	0.41	
Working experience(yr)															
less than 10	0.37	0.47		-0.26	0.22		0.35	0.28		0.30	0.38		0.13	0.29	
10-19	0.15	0.62		-0.36	0.35		0.64	0.38		0.38	0.44		-0.03	0.39	
30+	0.32	0.81		-0.39	0.48		0.51	0.52		0.72	0.52		-0.01	0.53	
At least 1 training	0.47	0.23	*	0.07	0.16		0.06	0.15		0.25	0.15		0.16	0.15	
Knowledge				-0.12	0.05	*	-0.05	0.04		-0.11	0.05	*	0.00	0.04	
R square	0.05			0.12			0.15			0.13			0.10		
Numer of observations	287						185								

Source: authors' own.

Notes:* Robust regression was used in two models (attitude to at-risk population, secondary stigma) to manage heteroscedasticity in their results.

*p<0.05, **p<0.01, ***p<0.001

Table 3 | The relationship of knowledge, attitudes, stigma, demographic predictors with the precautionary behaviors (unadjusted and adjusted logistic regression)

Predictors	Avoid physical contact						Wear glove all the time				Wear double glove		Use special measure	
	Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Unadjusted			
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)		
Attitude to at-risk pop.	2.24	(1.44-3.49)	***	2.18	(1.28-3.69)	**	1.33	(0.96-1.83)	1.45	(0.95-2.21)	1.04	(0.72-1.49)	1.07	(0.76-1.51)
Attitude to PLWH	1.65	(1.01-2.68)	*	1.61	(0.88-2.95)		1.67	(1.19-2.34)	**	1.62	(1.06-2.45)	*	1.11	(0.78-1.57)
Secondary stigma	1.29	(0.87-1.91)		1.48	(0.90-2.45)		0.97	(0.70-1.34)		1.08	(0.74-1.57)		0.81	(0.59-1.13)
Attitude to reproduction	1.12	(0.69-1.81)		0.93	(0.53-1.66)		1.33	(0.96-1.85)		1.42	(0.95-2.10)		1.26	(0.88-1.81)
Knowledge	0.79	(0.66-0.94)	**	1.05	(0.74-1.49)		0.89	(0.77-1.03)		1.08	(0.84-1.39)		0.92	(0.78-1.08)
Age														
under 30	1.00			1.00			1.00			1.00			1.00	
40-49	1.81	(0.66-4.95)		4.11	(0.69-24.68)		1.61	(0.77-3.37)		0.88	(0.30-2.61)		1.60	(0.78-3.30)
50+	2.52	(1.03-6.15)	*	2.83	(0.45-17.65)		5.61	(2.93-10.75)	***	4.62	(1.77-12.02)	**	2.19	(1.09-4.38)
Education														
Ordinary level	1.00			1.00			1.00			1.00			1.00	
Advanced level(high)	0.49	(0.10-2.48)		0.28	(0.02-3.52)		0.68	(0.20-2.30)		2.31	(0.28-18.70)		1.16	(0.23-5.78)
Diploma(college)	0.37	(0.04-3.14)		0.22	(0.00-10.28)		0.28	(0.06-1.41)		2.56	(0.16-41.86)		0.35	(0.06-2.12)
Graduate	0.78	(0.09-6.98)		0.98	(0.04-26.77)		0.45	(0.08-2.67)		2.11	(0.11-39.44)		0.76	(0.10-5.96)
Married	0.51	(0.13-1.92)		0.30	(0.05-1.94)		–			–			1.31	(0.40-4.28)
At least 1 training	1.54	(0.75-3.18)		1.88	(0.59-6.03)		0.60	(0.35-1.01)		0.41	(0.19-0.92)	*	0.54	(0.30-0.96)

Source: authors' own

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

DISCUSSION

This study assessed PHMs' HIV-related knowledge and attitudes toward PLWH. Even though these PHMs had very little experience with PLWH, their knowledge level was generally good. They provided 79.9% correct answers to the knowledge questions (16 items). Those more knowledgeable about HIV and with higher education demonstrated a more positive attitude toward PLWH. PHMs who were older, had less training or had a more negative attitude, showed a stronger intention to engage in extra precautionary behaviors.

KNOWLEDGE

Sri Lankan PHMs' knowledge level was within the range that has been observed in other studies from other Asian countries: from Indonesia (69.4%), Bangladesh (78%), Fiji (80%), south Korea (85.9%) that utilized the same questionnaire (HIV-KQ-18) with similar populations, such as nurses or nursing students^{6,11-13}.

FACTORS ASSOCIATED WITH ATTITUDES AND STIGMA

Knowledge. Participants with higher knowledge showed a more positive attitude and lower stigma toward PLWH. This is consistent with the associations with knowledge and attitude found in previous studies^{5,14}.

Age and education. Older participants tended to have more negative attitudes toward PLWH and at-risk populations but also showed less secondary stigma than younger participants. This is comparable with previous studies from elsewhere showing older participants have more negative attitude toward PLWH than their younger counterparts^{5,6}. However, these associations have not been consistent: in a systematic review, some studies indicated that senior healthcare workers had better attitude to PLWH, while in others, younger health care workers showed more positive attitude toward at-risk populations². Our results may be due to the fact that *education level* is more influential than age per se, with older participants having lower education.

Although the older participants had more negative attitudes toward PLWH, they exhibited less secondary stigma. This may be in part because they have more work experience and may be more familiar with the community members.

Marital status. Married PHMs demonstrated higher secondary stigma than those who were single. This result is comparable with previous studies^{5,14}: married healthcare workers in Indonesia showed more negative attitude than the single workers⁵ and medical students in Vietnam having more family members showed more negative attitude¹⁴. Having more family members might lead to

more cautious attitudes to individuals outside the family.

ASSOCIATIONS OF KNOWLEDGE, ATTITUDES AND STIGMA WITH PRECAUTIONARY BEHAVIORS

Participants with more negative attitudes and those who were older and less trained indicated that they would take more precautionary behaviors. Since most participants had little or no actual experience working directly with PLWH, this finding is of course only related to hypothetical future encounters.

Avoidance of physical contact. More negative attitudes to at-risk populations was associated with more avoidance of physical contact. The less the PHMs were willing to provide treatment to this group, the more they were likely to avoid physical contact with PLWH. On the other hand, knowledge and education level were not strongly related with such behaviors. It is likely that attitudes play an important role for behavior.

Wearing gloves during all aspects of care. In this case, a more negative attitude to PLWH was associated with greater intention to wear gloves. Furthermore, older participants had greater intention to wear gloves, while the less trained ones had lower intention.

IMPLICATIONS

Training will enhance knowledge and should lead to more positive attitudes toward PLWH. Institutional support, such as written policies and measures to protect both patients' confidentiality and PHMs from infection, might improve PHMs' attitude toward PLWH¹⁵.

In addition, it is also important to emphasize to the PHMs the importance of maintaining patient confidentiality. One of the major reasons why PLWH in Sri Lanka seek care from non-government organizations (NGOs) or other HIV-specific clinics, instead of local clinics, was the perceived lack of confidentiality in local clinics^{16,17}. However, only 23% participants had received training on this topic.

STRENGTHS AND LIMITATIONS OF THE STUDY

This study provides the first analyses of HIV-related knowledge and attitudes among PHMs in Sri Lanka. However, the results and implications of this study should be interpreted with caution. The study was cross sectional, and, since the survey was self-administered, there may be some social expectation that influences their responses.

The study team confirmed that there is no written policy to protect HIV patients from discrimination in the MOH; but despite this, 15.3% of participants still answered that there a written policy exists. Finally, the

result can only be generalized to PHMs elsewhere in Sri Lanka since the study was limited to one district.

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