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ORIGINAL RESEARCH

Comparison of HIV-Related Knowledge Between POL and Non-POL Providers in the Adapted White-Coat and Warm-Heart Intervention Project in a Chinese Tertiary Hospital

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Background: The adapted white-coat and warm-heart intervention (AWWI) project, which includes the popular opinion leader (POL) intervention program, has been shown to control and prevent human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) effectively. However, there is a lack of evaluation of POL providers, who are responsible for disseminating training knowledge. Therefore, this study investigated the changes in the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores over time in POL and non-POL providers.

Methods: The study was conducted from March 2019 to February 2020 with nurses from the Xiangya Hospital of Central South University. Demographic data, including age, sex, years of working, education level, professional role, department, and previous contact with HIV-infected individuals, were recorded at baseline. The knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores were self-reported by the participants at baseline, 1-month, 3-month, and 6-month were collected.

Results: Among 401 participants, 62 received training and were considered POL providers. There were no significant differences in age, sex, years of working, education level, professional role, department, and previous contact with HIV-infected individuals between POL and non-POL providers ($P>0.05$). The knowledge of HIV/AIDS scores (9.6 ± 1.7, 10.1 ± 1.6 and 10.1 ± 1.7; 9.0 ± 1.6, 9.7 ± 1.7, 10.2 ± 1.7 and 10.1 ± 1.7) were increased, while the prejudicial attitude scores (18.6 ± 5.8, 17.5 ± 6.7 and 17.4 ± 6.0; 19.5 ± 5.6, 17.2 ± 6.0 and 18.3 ± 5.5) and avoidance behavior scores (16.8 ± 5.4, 15.9 ± 6.1 and 16.4 ± 5.6; 18.1 ± 4.7, 16.3 ± 5.2 and 16.9 ± 5.1) were decreased at 1-months, 3-months, and 6-months in both POL providers and non-POL providers. The knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores did not differ significantly between POL and non-POL providers at any time ($P>0.05$).

Conclusion: Both POL and non-POL providers showed similar improvements in HIV-related knowledge. This implies that the POL intervention programs in the AWWI project is an effective way to reduce stigma related to HIV.

Keywords: HIV, POL, adapted white-coat and warm-heart intervention, nurses

Introduction

Acquired immunodeficiency syndrome (AIDS), which is caused by human immunodeficiency virus (HIV), is one of the most devastating infectious diseases. The HIV epidemic remains a serious public health problem throughout the world, although there has been remarkable progress in the prevention and treatment of HIV, and the incidence and number of deaths attributed to this disease have decreased. Nevertheless, several complex challenges related to the HIV epidemic

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have yet to be solved.[1,2] It is clear that this epidemic is inextricably linked to social stigma,[3,4] which is related to the fear of contracting HIV, a misunderstanding how HIV is transmitted, and social and moral perceptions about HIV.[5,6] Therefore, raising awareness of HIV and reducing stigma are crucial to prevent and treat HIV.

A popular opinion leader (POL) is defined as a leader in their field who is respected and trusted by their peers. POL providers can continuously intervene with their peers through words and actions to influence and change their behaviors.[7] The adapted white-coat and warm-heart intervention (AWWI) is a specific tool consisting of behavioral and structural components, including training for POL providers (15% of the personnel). After receiving training, POL providers disseminate the knowledge they obtain from their training and demonstrate preventive measures to their peers. These actions ensure information is distributed effectively to alter risky behavior of people living with HIV. Indeed, we have confirmed that application of POL training as part of the AWWI project effectively reduced HIV-related stigma among healthcare workers in a tertiary hospital.[8] However, there is a lack of evaluation of the POL providers responsible for the disseminate training knowledge. In other word, it is not clear whether non-POL providers, who have not received training as part of the AWWI project, can obtain the same HIV-related knowledge from POL providers.

Therefore, this study investigated the changes in knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores over time in POL and non-POL providers.

Methods

Study Participants

The participants were recruited between March 2019 and February 2020 from 40 nursing units in the Xiangya Hospital of Central South University. A detailed description of the study design can be found in the publication on the AWWI project.[8] Briefly, the 40 nurse units with a total of 790 study participants were randomly divided into the intervention and control groups. Overall, 779 of the participants completed the 6-month follow-up evaluation, with 401 and 378 participants in the intervention and control groups, respectively. Participants with less than 1 year of work experience and who could not participate in the entire study process (eg, practice nurses and nurses on maternity leave or business trips) were excluded. Furthermore, in the control group training on the AWWI was not provided and only follow-up visits and assessments were performed and excluded from this study. The participants in the intervention group were enrolled in this study.

This study was approved by the Ethics Committee of Xiangya Hospital (No. 201702019). All participants provided written informed consent.

Identification of POL

POL provides are individuals who are trusted, respected, and influential among their colleagues, who take the recommendations of POL providers seriously. To identify the POL providers, recruitment notices were sent to each unit in the intervention group. Each nurse manager recommended suitable nurses with different professional titles in each unit for the POL training. From these nurses, 2–4 of them were recruited from each unit.[8]

Intervention

The POL providers received the AWWI training as previously described.[8] Briefly, they received initial training for approximately 90 min once a week for 4 weeks. After each training session, the 62 POL providers were asked to disseminate the training knowledge and to demonstrate the skills to their colleagues (non-POL providers). Furthermore, the POL providers were asked to discuss the results of their conversations with their colleagues at the next session. At 1-month, 3-months, and 6-months after the training, the POL providers were recalled to attend a 90-min meeting to share their experiences in spreading their knowledge of HIV and discrimination among their colleagues.

Evaluated Effects of the Intervention

Three scales were used to evaluate the effects of the intervention: a knowledge of HIV/AIDS scale, a prejudicial attitude scale, and an avoidance behavior scale. These instruments were developed by Li et al of the University of California at Los Angeles. The white-coat and warm-heart intervention (WWI) program research team first applied these scales in 2013 in a study examining HIV stigma in medical staff in China.[9,10]

The knowledge of HIV/AIDS scale includes 12 items, each scored 0 or 1, so the total score is 0–12. The higher the score, the higher the level of the knowledge of HIV/AIDS. The Chinese version of the scale has shown excellent internal reliability (Cronbach's $\alpha = 0.80$).

The prejudicial attitude scale includes 8 items, each scored 1–5, for a total score of 8–40. The items include "people who got HIV/AIDS through sex or drug use got what they deserved" and "HIV is a punishment for bad behavior." The higher the score, the more pronounced the prejudicial attitude toward HIV. The Chinese version of the scale showed good internal consistency (Cronbach's $\alpha = 0.73$).

The avoidance behavior scale includes 8 items, each scored 1–5 for a total score of 8–40. The higher the score, the higher level of the avoidance behavior regarding HIV. The Chinese version of this scale showed excellent internal consistency (Cronbach's $\alpha = 0.84$).

Data Collection

Demographic data of the participants—including age, sex, years of working, education level, professional role, department, and previous contact with HIV-infected individuals—were recorded at baseline. The knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scale scores were self-reported at baseline, 1-month, 3-months, and 6-months.

Statistical Analysis

SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA), GraphPad Prism version 10 (GraphPad Software, San Diego, CA, USA), and Free Statistics version 1.7.1 (Beijing, China) were used for statistical analysis. Continuous variables with a normal distribution and homogeneity of variance are expressed as the mean ± standard deviation were analyzed with Student's *t*-test. Otherwise, continuous variables are expressed as the median and interquartile range and were analyzed with non-parametric tests. The categorical variables were analyzed with the chi-square test or Fisher's exact test. Repeated measures analysis of variance (ANOVA) was used to analyze the changes in the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores over time. For all analyses, $P < 0.05$ was considered to indicate a statistically significant difference.

Results

The Clinical Characteristics of POL and Non-POL Providers

A total of 401 participants were enrolled in this study (Figure 1). The mean age was 31.3 ± 6.8 years. The proportion of previous contact with HIV-infected individuals was 80.5%. The baseline knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores were 9.0 ± 1.7, 22.5 ± 5.2, and 20.5 ± 4.3, respectively (Table 1).

Of the 401 participants, 62 (15.5%) received training and were considered POL providers; the remaining 339 (84.5%) were non-POL providers. There were no significant differences in age, sex, years of working, education level, professional role, department, and previous contact with HIV-infected individuals between POL and non-POL. In addition, the baseline knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores did not differ significantly between POL and non-POL providers (Table 1).

Evaluation of the Effects of the Intervention Over Time

After training, the knowledge of HIV/AIDS total scores showed a tendency to increase, while the prejudicial attitude and avoidance behavior total scores showed a tendency to decrease (Table 2).

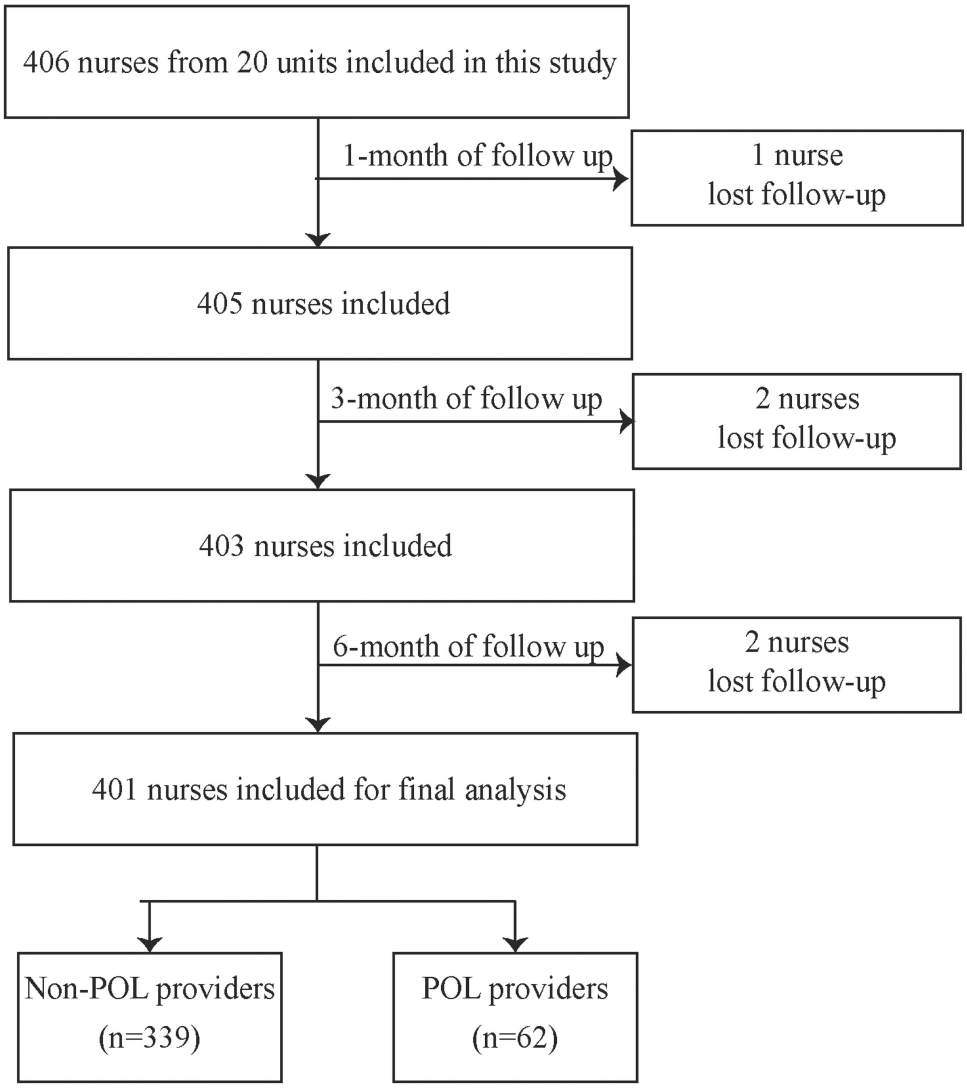

Figure 1 Flow chart of this study.
Abbreviations: POL, Popular Opinion Leader.

Moreover, after the intervention, the knowledge of HIV/AIDS scores showed a tendency to increase, while the prejudicial attitude and avoidance behavior scores showed a tendency to decrease over time for both POL and non-POL providers. At 3-months, the knowledge of HIV/AIDS score was highest, while the avoidance behavior score was the lowest (Figure 2).

Comparison of the Effects of the Intervention Between POL and Non-POL Providers Over Time

Table 3 shows the results of repeated measures ANOVA for the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores. The group factors showed no significant differences for the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores between POL and non-POL providers. The time factors showed significant differences for the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores ($P < 0.05$). The interaction of groups and time factors showed no significant differences for the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores.

Table 1 The Baseline Clinical Characteristics Between POL Providers and Non-POL Providers

Variables	Total (n=401)	Non-POL (n=339)	POL (n=62)	P-value
Age (years), (Mean ± SD)	31.3 ± 6.8	31.2 ± 6.8	31.7 ± 7.2	0.581
Age, n (%)				0.428
≤30	256 (63.8)	220 (64.9)	36 (58.1)	
31-40	91 (22.7)	73 (21.5)	18 (29.0)	
≥41	54 (13.5)	46 (13.6)	8 (12.9)	
Sex, n (%)				1.000
Male	2 (0.5)	2 (0.6)	0 (0.0)	
Female	399 (99.5)	337 (99.4)	62 (100.0)	
Years of working (years), (Median, IQR)	7.0 (5.0, 12.0)	7.0 (5.0, 12.0)	7.0 (5.0, 9.0)	0.949
Years of working, n (%)				0.077
≤10	293 (73.1)	243 (71.7)	50 (80.6)	
11-20	61 (15.2)	51 (15.0)	10 (16.1)	
≥21	47 (11.7)	45 (13.3)	2 (3.3)	
Education level, n (%)				0.057
Secondary	2 (0.5)	1 (0.3)	1 (1.6)	
Associate's degree	97 (24.2)	75 (22.1)	22 (35.5)	
Bachelor's degree	280 (69.8)	243 (71.7)	37 (59.7)	
Master's degree	22 (5.5)	20 (5.9)	2 (3.2)	
Professional role, n (%)				0.968
Nurse	44 (11.0)	38 (11.2)	6 (9.7)	
Senior nurse	235 (58.6)	197 (58.1)	38 (61.3)	
Supervisor nurse	118 (29.4)	100 (29.5)	18 (29.0)	
Co-chief superintendent nurse	4 (1.0)	4 (1.2)	0 (0.0)	
Department, n (%)				0.163
Surgery	206 (51.4)	169 (49.9)	37 (59.7)	
Internal medicine	123 (30.6)	105 (31.0)	18 (29.0)	
Obstetrics-gynecology	30 (7.5)	25 (7.4)	5 (8.1)	
*Others	42 (10.5)	40 (11.7)	2 (3.2)	
Previous contact with HIV-infected individuals, n (%)				0.498
Yes	323 (80.5)	275 (81.1)	48 (77.4)	
No	78 (19.5)	64 (18.9)	14 (22.6)	
Outcome measures, (Mean ± SD)				
Knowledge of HIV/AIDS	9.0 ± 1.7	9.0 ± 1.6	9.0 ± 1.9	0.928
Prejudicial attitude	22.5 ± 5.2	22.6 ± 5.3	22.4 ±4.7	0.058
Avoidance behavior	20.5 ± 4.3	20.6 ± 4.4	20.5 ± 4.1	0.899

Notes: *Others including pediatric, ophthalmology and otorhinolaryngology, and dermatology.
Abbreviations: POL, Popular Opinion Leader; AIDS, Acquired Immune Deficiency Syndrome; HIV, Human Immunodeficiency Virus; SD, Standard Deviation.

Table 2 The Total Intervention Effects of the Participants

Variables	T1	T2	T3
	Total (n=401)	Total (n=401)	Total (n=401)
Outcome measures, (Mean ± SD)			
Knowledge of HIV/AIDS	9.7 ± 1.7	10.2 ± 1.7	10.1 ± 1.7
Prejudicial attitude	19.3 ± 5.6	17.3 ± 6.4	18.1 ± 5.6
Avoidance behavior	17.9 ± 4.8	16.3 ± 5.4	16.8 ± 5.2

Notes: T1, time point after the first month of training; T2, time point after the third month of training; T3, time point after the sixth month of training.
Abbreviations: AIDS, Acquired Immune Deficiency Syndrome; HIV, Human Immunodeficiency Virus; SD, Standard Deviation.

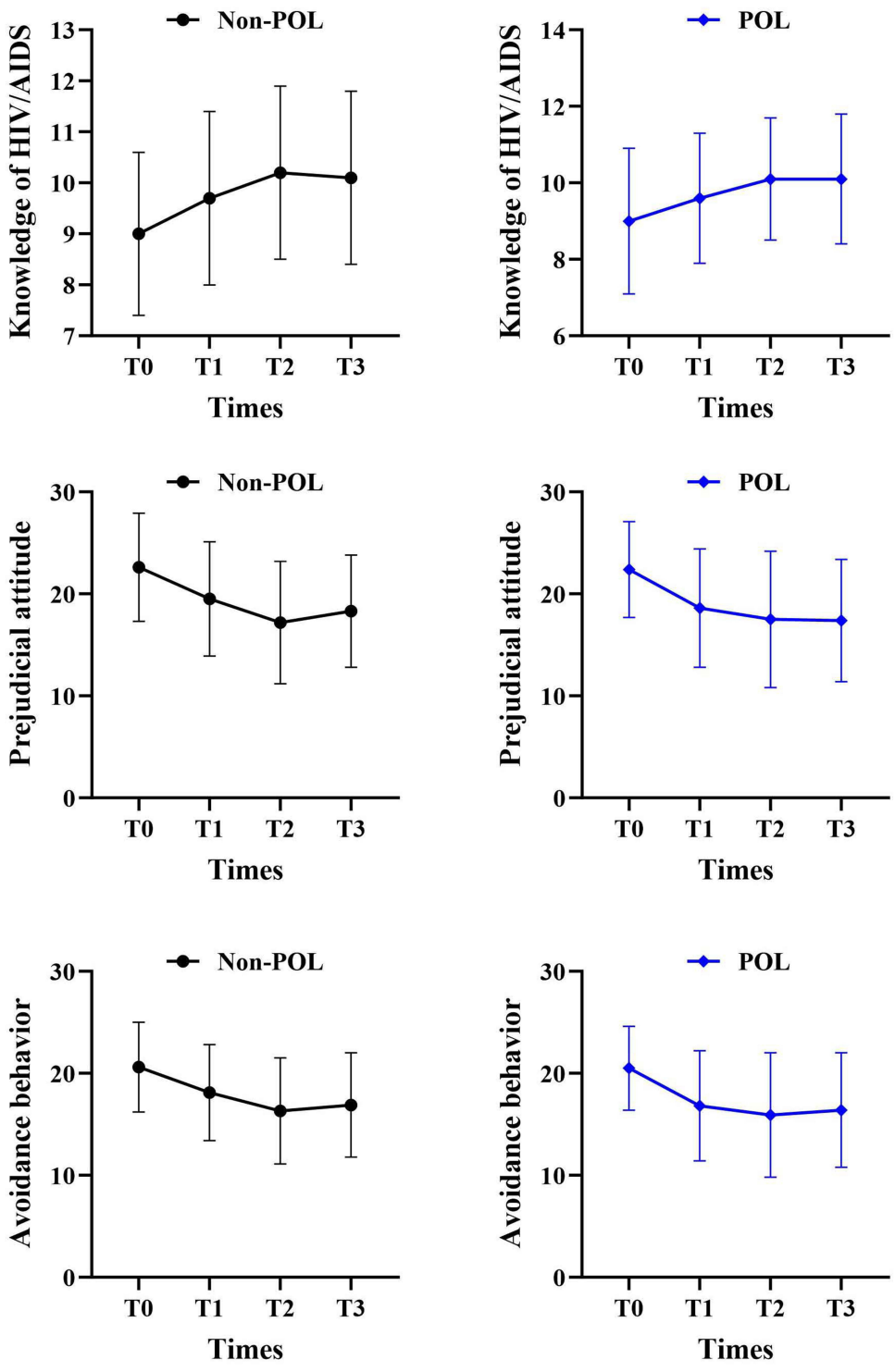

Figure 2 Plots of over time for outcome measures between the POL providers and non-POL providers. Data expressed as mean ± standard deviation.
Abbreviations: POL, Popular Opinion Leader; AIDS, Acquired Immune Deficiency Syndrome; HIV, Human ImmunodeficienPOL, Popular Opinion Leader; AIDS, Acquired Immune Deficiency Syndrome; HIV, Human Immunodeficiency Virus.

Table 3 The Intervention Effects for Four Time Points Between POL Providers and Non-POL Providers

Variables	T0		T1		T2		T3		Greenhouse-Geisser		
	Non-POL (n=339)	POL (n=62)	Non-POL (n=339)	POL (n=62)	Non-POL (n=339)	POL (n=62)	Non-POL (n=339)	POL (n=62)	P -value	F	Partial Eta-Squared
Outcome measures (Mean ± SD)											
Knowledge of HIV/AIDS	9.0 ± 1.6	9.0 ± 1.9	9.7 ± 1.7	9.6 ± 1.7	10.2 ± 1.7	10.1 ± 1.6	10.1 ± 1.7	10.1 ± 1.7			
Group factors									0.837	0.042	<0.001
Time factors									<0.001	27.997	0.066
Interaction									0.984	0.047	<0.001
Prejudicial attitude	22.6 ± 5.3	22.4 ± 4.7	19.5 ± 5.6	18.6 ± 5.8	17.2 ± 6.0	17.5 ± 6.7	18.3 ± 5.5	17.4 ± 6.0			
Group factors									0.467	0.530	0.001
Time factors									<0.001	55.367	0.122
Interaction									0.453	0.869	0.002
Avoidance behavior	20.6 ± 4.4	20.5 ± 4.1	18.1 ± 4.7	16.8 ± 5.4	16.3 ± 5.2	15.9 ± 6.1	16.9 ± 5.1	16.4 ± 5.6			
Group factors									0.221	1.500	0.004
Time factors									<0.001	48.374	0.108
Interaction									0.483	0.816	0.002

Notes: T0, time point before the training; T1, time point after the first month of training; T2, time point after the third month of training; T3, time point after the sixth month of training.
Abbreviations: POL, Popular Opinion Leader; AIDS, Acquired Immune Deficiency Syndrome; HIV, Human Immunodeficiency Virus; SD, Standard Deviation.

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Discussion

Differently from the WWI project previously applied to county-level hospitals in China, in the present study the AAWI was implemented in a tertiary hospital. In this study, 15% of the participants—the POL providers—received training based on Rogers' diffusion innovation theory.[11] These providers are respected, trusted, and influential and can disseminate training knowledge and related skills to their colleagues in their daily work to reduce stigma related to HIV. In previous studies, we have shown that the AWWI project can improve the level of knowledge of HIV/AIDS and reduce prejudicial attitude and avoidance behavior in nurses over time. However, there has been a lack of evaluation of the POL providers responsible for disseminating the knowledge they gain through training. Specifically, prior to this study the different effects of the intervention on POL and non-POL providers had not yet been fully elucidated.

In this study, we found that at 1-month, 3-months, and 6-months after training, the knowledge of HIV/AIDS scores increased, and the prejudicial attitude and avoidance behavior scores decreased in both POL and non-POL providers. Yin et al[12] found that providing culturally congruent education and training about HIV and care and having hospitals that promote policies may reduce HIV-related stigma. In their systematic review, Mohammadifirouzeh et al[13] confirmed that face-to-face educational interventions can reduce stigma related to HIV among health care providers. Furthermore, He et al[14] found that integrated educational interventions could improve knowledge of risk reduction for HIV infections in nurses. In addition, Geibel et al[15] confirmed that a targeted stigma reduction intervention can rapidly improve provider attitudes and increase service satisfaction among young people. These are similar to our findings. Of note, Davtyan et al[16] found that the effectiveness of another intervention was reduced after 3 months among health care providers. Therefore, the intervention effects of AWWI were durable for 6 months in this study. However, the knowledge of HIV/AIDS scores decreased, and the prejudicial attitude and avoidance behavior scores tended to increase at 6-months compared with 3-months. This can be explained by forgetting curve theory: Forgetting starts immediately after learning the action. Specifically, 66.3% is forgotten after 1 day, 74.6% after 6 days, and approximately 79% after 31 days.[17] Of course, more sustained interventions might be needed in the future.

We found that the knowledge of HIV/AIDS, prejudicial attitude, and avoidance behavior scores did not differ significantly between POL and non-POL providers. In other words, the intervention program of the POL in AWWI project was successful. After all, a small number of participants as POL providers to receive the AWWI training, but they can disseminate the knowledges to others (non-POL providers), and the non-POL providers also obtained similar intervention effects as the POL providers. This kind of intervention measure is worth recommending. Our findings differ from Li et al,[10] who reported a significantly higher level of message diffusion and lower levels of prejudicial attitude and avoidance in POL providers compared with non-POL providers. This discrepancy could be due to two methodological differences: First, Li et al[10] examined county-level hospitals, while our data come from a tertiary hospital with a higher level of medical care knowledge. Second, Li et al[10] examined different time points.

This study has some limitations. First, the data of nurses was from a single tertiary hospital, and it is necessary to expand to more hospitals and medical staff, including doctors, in the future. Second, the number of the POL providers in this study was relatively small. Third, the identification of the nurses who should receive the POL training was based on the recommendations of nurse managers and was not objectively validated. Finally, the participants self-reported their scores for the three scales, so there is potential for bias.

Conclusions

Both POL and non-POL providers showed similar improvements in HIV-related knowledge. This implies that the POL intervention programs in the AWWI project is an effective way to reduce stigma related to HIV.

Abbreviation

AIDS, Acquired Immunodeficiency Syndrome; AWWI, Adapted White-coat and Warm-heart Intervention; ANOVA, Analysis of Variance; POL, Popular Opinion Leader.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of Xiangya Hospital (Number: 201702019). All participants provided written informed consent.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

There were no conflicts of interests for this work.

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