



Effectiveness of a knowledge-contact program in improving nursing students' attitudes and emotional competence in serving people living with HIV/AIDS

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ABSTRACT

This study compared the effectiveness of an AIDS knowledge-only program (knowledge) with a combined program of AIDS knowledge and contact with people having HIV/AIDS (PHA) (knowledge-contact) in reducing nursing students' stigma and discrimination towards PHA and in enhancing their emotional competence to serve PHA. Eighty-nine nursing students from two universities in Hong Kong were randomly assigned to either the knowledge or the knowledge-contact condition. All participants completed measures of AIDS knowledge, stigmatizing attitudes, fear of contagion, willingness to treat, positive affect, and negative affect at pre-test, post-test, and six-week follow-up. Findings showed that in both groups, significant improvement in AIDS knowledge, stigmatizing attitudes, fear of contagion, willingness to treat, and negative affect were found at post-test. The effects on AIDS knowledge, fear of contagion, willingness to treat, and negative affect were sustained at follow-up for both groups. Inter-group comparisons at post-test showed that the effectiveness of knowledge-contact program was significantly greater than knowledge program in improving stigmatizing attitudes. No significant difference between the two groups was found at follow-up. Findings showed the short-term effect of contact in improving nursing students' attitudes and emotional competence in serving PHA. Implications for research and training of nursing staff were discussed.

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Introduction

The health care setting is a context where stigmatization and discrimination against people having HIV/AIDS (PHA) or suspected PHA are found (Nyblade, 2006; Paxton et al., 2005). A review of previous studies showed that about 10%–20% of health care workers, including nurses, doctors, dentists and laboratory technicians hold negative attitudes towards PHA (Foreman, Lyra, & Breinbauer, 2003). Some studies also reported that health care workers exhibited discriminatory behaviors towards PHA in the form of inappropriate comments, breaches of confidentiality, delayed treatment, or refusal of treatment (Foreman et al., 2003; Paxton et al., 2005; Reidpath & Chan, 2005a).

A recent qualitative focus group study in Hong Kong reported that seven PHA who had full-blown AIDS experienced different levels of disapproval and discrimination from medical doctors, dentists, nurses, or physiotherapists when seeking medical and dental treatments (Wong & Wong, 2006). These discriminatory

behaviors included written words (e.g., writing big letters of "HIV" on patients' medical records), facial expression (e.g., staring at patients), verbal insults (e.g., asking embarrassing questions; blaming patients for not disclosing their status), and administrative arrangements (e.g., moving patients to the last appointment, breach of confidentiality) (Wong & Wong, 2006). As a result of stigma and (fear of) discrimination, PHA's physical and psychosocial well-being are in jeopardy. Adverse effects include delayed treatment seeking, prolonged risk of transmission to others, poor treatment adherence, increased risk of disability and drug resistance, mood problems, isolation and relationship problems (Foreman et al., 2003; Heijnders & van der Meij, 2006; Paxton et al., 2005).

Previous research studies suggested several possible reasons for health care workers' negative attitudes and discriminatory behaviors towards PHA. They included inadequate knowledge about the disease (i.e., its infection route, course, and treatment) (Bishop, Oh, & Swee, 2000; Lau, Cheung, & Lee, 1996; Leasure, McKenney, & Merrill, 1995; Pisal et al., 2007; Robb, Beltran, Katz, & Foxman, 1991; Wu et al., 2002), persistent worry and exaggerated fear of contraction through the caring of PHA (Brown, Macintyre, & Trujillo, 2003; Figarotto, Grade, & Zegans,

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1991; Foreman et al., 2003; Gershon et al., 1994; Wu et al., 2002), and inadequate awareness of and sensitivity to the negative consequences of discrimination towards PHA (Brown et al., 2002; Foreman et al., 2003; Kempainen, O'Brien, & Corpuz, 1998). As nurses are important frontline health care workers responsible for the caring of PHA, developing a program that can effectively reduce their worries and fears, and clarify their myths and misunderstanding towards AIDS and PHA is deemed necessary. It can potentially reduce the distress encountered by nurses and PHA and improve the quality of nursing care. In Hong Kong, most nursing students undergo placements in hospitals during their study and thus may need to take care of PHA. A timely program that can enhance nursing students' AIDS knowledge, attitudes, and emotional competence in serving PHA is, therefore, important.

Inadequate knowledge and training

Studies revealed that health care workers lacked accurate and adequate knowledge about AIDS and the caring of PHA. Wu et al. (2002) found that a considerable number of health care workers in China had not received AIDS training and among them, 46%–62% were misinformed of the transmission means of HIV. In another study of 177 nurses in Northeastern China (Chen & Han, 2004), their mean score on a basic HIV/AIDS knowledge test was 6.66 out of 12. In Singapore, 10%–25% of the doctors, dentists, and nurses who participated in a nation-wide survey wrongly believed that HIV could be transmitted by mosquitoes (Bishop et al., 2000). Owing to their inadequate AIDS knowledge, AIDS was perceived by them as highly contagious, incurable, and having a high mortality rate (Wight, Aneshensel, Murphy, Miller-Martinez, & Beals, 2006). In Hong Kong, the results of a survey of 4615 health care workers, comprising 70% doctors and nurses and 30% medical laboratory technicians, occupational therapists, radiographers, physiotherapists and optometrists, showed that respondents had only moderate levels of AIDS knowledge (Lau et al., 1996): 87% had not attained adequate AIDS knowledge, and 73% reported inadequate skills to take care of PHA. Moreover, health care workers with low levels of AIDS knowledge showed more avoidance towards PHA and less willingness to serve PHA (Lau et al., 1996). Thus, inadequate AIDS knowledge, fear of contagion, and low perceived self-efficacy in the caring of PHA can lead to anxiety, which in turn exacerbates their discrimination towards PHA (Brown et al., 2003; Dijker & Raeijmaekers, 1999).

Effectiveness of program on AIDS knowledge

In light of the general inadequacy in knowledge about AIDS and the resultant fear of working with PHA, educational programs have been developed to enhance nurses' (Carney, Werth, & Martin, 1999) and physical therapists' (Held, 1993) competency in serving PHA. They involved teaching AIDS knowledge and infection control skills. However, the effectiveness of these programs was mixed. Most programs were found to be effective in increasing AIDS knowledge and tolerance to PHA, but failed to reduce stigmatizing attitudes and fear of contracting HIV (Brown et al., 2003; Held, 1993; Herek, Capitanio, & Widaman, 2002; Uwakwe, 2000). One possible explanation was that fear of contagion was a symbolic response to threats or disapproval of the actual or presumed lifestyles of PHA rather than the infection of the disease (Heijnders & van der Meij, 2006; Meisenhelder & LaCharite, 1989). In other words, their fear was a reaction to the requirement of providing care to those whom they perceived behaved against social and cultural values.

Perception and attitudes towards PHA

Often, PHA are perceived by the general public as a homogenous group engaging in immoral behavioral practices. They are easily associated with the perception of sexual promiscuity, homosexuality, and intravenous drug use, which are considered the major reasons for contracting HIV (Cole & Slocumb, 1993; UNAIDS, 2002). Men who are infected are likely to be seen as having anal sex with men or as patronizing sex workers, whereas women who are infected are regarded as promiscuous or engaging in commercial sex (UNAIDS, 2002). For example, 67% of respondents in a public survey in United States primarily associated AIDS with men who have sex with men (Herek & Capitanio, 1999). Owing to the association of HIV/AIDS with groups who are already being stigmatized in the society, PHA suffer from layered stigma (Herek, 1999; Reidpath & Chan, 2005b; UNAIDS, 2002).

Effectiveness of contact with PHA

Contact refers to interactions with the stigmatized individuals or groups. It is considered to be an important strategy for reducing stigmatizing attitudes (Heijnders & van der Meij, 2006). It can be direct (face-to-face) or indirect (e.g., through media), and in different contexts (e.g., personal, social, or work contact). A meta-analytic article by Pettigrew and Tropp (2006) found that intergroup contact reduced prejudice and was effective across different target groups, age groups, geographical areas, and context settings. They also demonstrated that Allport's (1954) proposed optimal situational conditions characterized by equal status, cooperation, common goals, and institutional support was not necessary for intergroup contact to achieve positive outcomes. Many studies in their review obtained significant positive effects even though the key conditions suggested by Allport were not present. Nonetheless, the presence of Allport's optimal conditions during contact generally enhanced positive attitudes.

Moreover, increasing intergroup knowledge, reducing intergroup fear and anxiety, and enhancing intergroup empathy and perspective taking were three main mediators for the contact-prejudice effect (Pettigrew & Tropp, 2008). Although the three mediators were inter-related, fear and anxiety accounted for the largest contact-prejudice effect, whereas knowledge had the lowest. Similar findings for the effects of intergroup contact on negative perceptions and negative emotions have been reported by others (Corrigan & Penn, 1999; Desforges et al., 1991). For example, the more one viewed people with mental illness on an individual basis and in a less stereotyped way (Couture & Penn, 2003), the greater the reduction in his/her perceived dangerousness and the resultant fears towards him/her after contact (Alexander & Link, 2003).

Previous studies on contact with PHA showed promising results in reducing public negative attitudes and behaviors towards PHA. Patsdaughter, Grindel, O'Connor, and Miller (1999), for example, reported that nursing students had less fear towards PHA after serving them. In a study of physiotherapy and occupational therapy students, and family medicine residents, results showed that they had increased comfort and sensitivity in treating PHA after attending live sharing sessions given by PHA (Solomon, Guenter, & Stinson, 2005). Some studies also found that after having more personal or work contacts with PHA, people showed more empathy towards them and were more willing to interact with them (Bektas & Kulakac, 2007; Herek & Capitanio, 1997; Tyer-Viola, 2007). In general, contact with PHA helped reduce fear and anxiety (Nyblade, 2006), and increased sensitivity and understanding towards PHA.

In sum, previous studies showed that adding some forms of contact (even filmed presentation) with a stigmatized group (e.g.,

people with mental illness) to education resulted in a broader and more enduring impact on stigma reduction in term of reduced avoidance, segregation, and coercion towards the group (Chan, Mak, & Law, 2009; Corrigan, Larson, Sells, Niessen, & Watson, 2007). Moreover, the affective components of contact (e.g., fear, anxiety, empathy) had greater impact than the cognitive components (e.g., knowledge) in stigma reduction (Pettigrew & Tropp, 2008).

Overview of this study

Various types of education programs have been developed to improve the attitudes, emotions, and behaviors of health care workers towards PHA. It was generally agreed that the programs would be more effective if they were multi-faceted, including components of AIDS knowledge, infection control skills, discussion on attitudinal issues, and contact with PHA (e.g., Brown et al., 2003; Foreman et al., 2003). In particular, studies suggested that programs including contact with the stigmatized group produced broader and more enduring positive results (e.g., Bektas & Kulakac, 2007; Corrigan et al., 2007; Johns, 2004; Tyer-Viola, 2007).

Nonetheless, previous studies had limitations. Nurses and nursing students, who form a large and important group of front-line health care workers in taking care of PHA, were not well studied. Furthermore, many studies lacked a comparison group to examine the effectiveness of the intervention (e.g., McCann & Sharkey, 1998; Pisal et al., 2007), and others did not have a follow-up assessment to examine the sustainability of the intervention effects (e.g., Uwakwe, 2000). In addition, most studies investigated the effectiveness of programs with mixed components.

The purpose of the present study was to compare the effectiveness and sustainability of an AIDS knowledge-only program (knowledge) with a combined program of knowledge and contact with PHA (knowledge-contact) on nursing students' attitudes, behaviors, and emotions towards PHA. It was hypothesized that the knowledge-contact program would be more effective than knowledge-only program in improving nursing students' stigmatizing attitudes, fear of contagion, willingness to treat PHA, and emotional well-being. As for improvement in AIDS knowledge, it was hypothesized that both programs would have similar effect. The changes achieved from the knowledge-contact program were hypothesized to be more sustainable than the knowledge program.

Method

Participants

The study was conducted from August to December 2008. One hundred and two nursing students enrolled in the bachelor's program in nursing in Hong Kong were recruited. Among them, 89 attended the program and returned the questionnaires at pre-test, post-test, and follow-up. The sample was 83% female, and had a mean age of 20.8 years ($SD = 1.43$). They were quite evenly distributed across 4 years of undergraduate training (Year 1 = 29.2%, Year 2 = 32.6%, Year 3 = 15.7%, Year 4 = 22.5%). The majority (59.5%) reported having no religious belief, whereas 40.5% reported having a religious affiliation (Christian = 32.6%, Catholic = 4.5%, and Buddhist = 3.4%).

Regarding their previous education on AIDS knowledge, 54% of participants had no prior AIDS-related training, 28.7% had 1–3 h, 10.3% had 4–6 h, 1.1% had 7–9 h, and 5.7% had 9 or more hours. As for their personal contact with PHA, 98.9% of participants reported no contact, whereas 1.1% indicated having contact with 1–2 PHA. In regards to their placement experience in hospital or clinic, 25.9%

had no placement experience, whereas 74.1% had placement experience with a mean number of 48.7 placement days ($SD = 55.65$). As for their work contact with PHA, 87.6% of them indicated no experience in caring for PHA, 10.1% had experience in caring for 1–2 PHA, and 2.3% had experience in caring for 3–4 PHA.

Procedures

Three universities in Hong Kong offering a bachelor's program in nursing were invited to participate in this study. Two of them agreed to participate. Invitation emails with details of the program, the consent form, and the pre-test questionnaire were then sent to the nursing students of these two universities via respective nursing faculties. One hundred and two nursing students enrolled in the program by returning the signed consent form and completed the questionnaire one week before the program (pre-test) via email. Participants were randomly assigned to either the knowledge ($n = 47$) or knowledge-contact ($n = 55$) condition, with their year of study counterbalanced to ensure a relatively equal distribution of students from each year of study across conditions.

Eighty-nine participants eventually showed up on the day of the program, with 39 in the knowledge condition and 50 in the knowledge-contact condition. At the end of the program, they completed the questionnaire. Follow-up assessment was conducted via email six weeks after the program. One hundred percent completion rate was achieved at post-test and at six-week follow-up.

The study received ethics approval from the Survey and Behavioral Research Ethics Committee of the Chinese University of Hong Kong, and written informed consent was obtained from all participants prior to the intervention. All participants who had attended the program and completed the questionnaires were given a certificate of attendance.

Program

Knowledge

The knowledge component of the program consisted of a 50-min standardized lecture and a question-and-answer session. It was given by a retired nurse who was a volunteer of a non-governmental organization (NGO) offering AIDS support and prevention programs to the Hong Kong community. The retired nurse was experienced in promoting AIDS knowledge and prevention measures in community settings.

The content of the lecture covered factual information on HIV/AIDS transmission and progression, preventive measures of HIV/AIDS transmission, and some important points on standard precautions. Previous studies on nurses or nursing students reported that these were effective components in improving their attitudes, behaviors, and confidence in treating PHA (McCann & Sharkey, 1998; Pisal et al., 2007; Uwakwe, 2000). In this study, the retired nurse was invited to be the presenter of a standardized lecture because of her similar background with the nursing students and her expertise in the nursing field. Her similarity with the participants and her expertise might enhance the effectiveness of the intervention (Myers, 2005).

Knowledge-contact

The knowledge session was given by the same retired nurse as the knowledge group. In-vivo contact with PHA followed immediately after the knowledge session. The contact was a 50-min sharing session given by two male PHA (one homosexual, one heterosexual), who were volunteers of the same collaborating NGO. The two PHA had no obvious symptoms and both of them had recovered from opportunistic infections for many years. A female AIDS care worker of the NGO served as the moderator of the contact

session. The two PHA and the AIDS care worker were trained and experienced in giving informal sharing sessions to different community groups to promote the message of anti-stigma and anti-discrimination against PHA.

The contact with PHA aimed to provide opportunities for nursing students to have direct contact and communication with PHA so as to address their myths, reduce their fears and overcome their biases towards PHA, to enhance their understanding of the needs and feelings of PHA, and to increase their awareness of the presence of discrimination in health care settings and its negative impact on PHA. Key components of the session included the two PHA expressing: (1) their past positive and negative interactions with nurses so as to bring out the powerful impact of nurses' attitudes and behaviors on the well-being of PHA; (2) the physical changes and psychological struggles they had undergone before they could live with the disease so as to elicit empathy from nursing students; and (3) their hopes and wishes so as to widen nursing students' perspective in understanding the PHA. A question-and-answer period was arranged at the end of the session for nursing students to clarify further issues or to express their opinions and feelings about the contact experience.

Outcome measures

A set of questionnaires in Chinese was developed with reference to five previous studies (Held, 1993; Lau et al., 1996; Li et al., 2007; Mak et al., 2006; McCann & Sharkey, 1998) and comments given by a working group of the present study. Members of the working group included a professor in clinical psychology, a professor in nursing, several PHA, and an experienced staff person from the NGO which provides services and support to PHA in Hong Kong. Measures were either developed for this study or were selected from previous studies and translated into Chinese using the back-translation approach.

AIDS knowledge

The scale consisted of 20 items adopted from two previous studies on health care workers (Held, 1993; Lau et al., 1996). The items generally fell into the categories of transmission mode (e.g., HIV can be transmitted by blood and blood products), symptoms (e.g., AIDS is a set of symptoms resulting from the damages to human immune systems), infection control (e.g., To prevent HIV infection, appliances used for treating the HIV/AIDS patients should be sterilized), progression (e.g., Most of HIV-infected people will progress to AIDS in 8–12 years time without any treatment), and treatment (e.g., There is no drug to treat or control the majority of the complications resulting from HIV infection). For the first 17 items, participants were asked to indicate "yes", "no" or "don't know" for each item, and for the last three items, they needed to choose one correct answer for each item (e.g., The chance of being infected by an HIV-contaminated needle-stick injury is: (a) less than 1%, (b) 5%; (c) 10%; (d) 20%). Correct answers were given one point and wrong or "don't know" answers were given zero points. Higher scores indicated better knowledge about the disease.

Stigmatizing attitudes

Fifteen items were developed with reference to four previous studies (Held, 1993; Lau et al., 1996; Mak et al., 2006; McCann & Sharkey, 1998) measuring stigmatizing attitudes towards PHA. Sample items were: Patients with HIV/AIDS are revolting; I am reluctant to have physical contact with patients with HIV/AIDS to whom I provide the care; Nurses should be assigned to care for patients with HIV/AIDS on a voluntary basis only. All items were rated on a 6-point Likert scale from (1) *strongly disagree* to (6) *strongly agree*, with a higher score indicating a higher level of

stigmatizing attitudes towards PHA. The internal consistency of the scale across three assessment periods in the present study was satisfactory (Cronbach's alphas = 0.83 in pre-test, 0.80 in post-test, and 0.87 in follow-up).

Fear of contagion

The scale consisted of four items and they were based on three previous studies (Held, 1993; Lau et al. 1996; Li et al., 2007). The four items were: I am fearful of contracting HIV when caring for patient with HIV/AIDS; The major concerns I have about caring for a patient with HIV/AIDS are 'will I get AIDS?'; I am more frightened when caring for a patient with HIV/AIDS than a patient with other infectious disease; and If I care for patients with HIV/AIDS, I shall worry about putting my family, friends, or colleagues at risk. All items were rated on a 6-point Likert scale from (1) *strongly disagree* to (6) *strongly agree*, with a higher score indicating a higher level of fear. The internal consistency of the scale in the present study was satisfactory (Cronbach's alphas = 0.75 in pre-test, 0.77 in post-test and 0.84 follow-up).

Willingness to treat

The scale was a 3-item scale developed based on two previous studies (Held, 1993; Lau et al., 1996) to measure nursing students' willingness to treat PHA. The 3 items were: If I am allowed to choose, I will not choose to serve patients with HIV/AIDS; I would refuse to care for patients with HIV/AIDS; and I am willing to take care of patients with HIV/AIDS. The items were rated on a 6-point Likert scale from (1) *strongly disagree* to (6) *strongly agree*, with a higher score indicating a higher level of willingness to treat. Its internal consistency in the present study was satisfactory (Cronbach's alphas = 0.81 in pre-test and post-test, and 0.80 in follow-up).

Emotional well-being

The Positive Affect Negative Affect Scale (PANAS, Watson, Clark, & Tellegan, 1988) was used to measure the emotional well-being of the nursing students when asked to take care of PHA. PANAS was a brief scale consisted of 20 items measuring two primary dimensions of mood: positive affect and negative affect. Two hypothetical vignettes related to caring of a patient (one being specified as an AIDS patient, the other's diagnosis not specified) were created. The vignette was as follows: A patient with AIDS/A patient is admitted to your ward today. The patient is bedridden. You are assigned to take full responsibility in caring for the patient today, including feeding the patient and changing napkins for the patient. You are also required to periodically draw blood of the patient for medical examinations. Participants were asked to indicate how much they experienced each mood on a scale ranging from (1) *very slightly or not at all* to (5) *extremely* upon reading the two vignettes.

The scores obtained from the unspecified patient vignette were treated as baseline scores of the positive affect and negative affect of nursing students when they needed to take care of a newly admitted patient. The order of the two vignettes was alternated so that in each group, half of the nursing students read the AIDS patient vignette first and the remaining half read the vignettes in the reversed order. Positive affect and negative affect were separately scored. The total score of positive affect was the net differences of the scores obtained from the two vignettes (i.e., the scores obtained from the AIDS patient vignette minus the scores obtained from non-AIDS patient vignette). The total score of negative affect was calculated by the same method. A higher score in positive or negative affect indicated a higher degree of the respective mood level. The internal consistency of the scales in the present study was satisfactory (Cronbach's alphas of the positive affect and negative affect across the two vignettes ranged from 0.82 to 0.89 in pre-test, 0.84 to 0.90 in post-test, and 0.91 to 0.94 in follow-up).

Data analysis

Analyses were conducted using SPSS 16.0 for Windows. First, one-way analysis of variance (ANOVA) and Chi-square tests were used to examine the differences in demographics between the knowledge group and the knowledge-contact group. Second, Pearson's correlation coefficients were calculated to examine the inter-correlations among the outcome variables. Third, a repeated measures multivariate analysis of variances (MANOVA) was used to examine the multivariate main effect of group (knowledge vs. knowledge-contact) and time (pre-test, post-test, follow-up), and interaction effect (group \times time). If a significant effect was found, post hoc analysis using univariate *t*-tests to examine the simple effect of group at pre-test, post-test and follow-up, and repeated measures ANOVA to examine the simple effect of time within each group would be carried out. To avoid inflated alpha, Bonferroni-adjusted comparisons were adopted when using repeated measure MANOVA and ANOVA and *t*-tests with the alpha value adjusted to 0.017 (0.05/3). Partial eta squared to estimate effect sizes for repeated measures MANOVA and ANOVA was adopted in this study. Eta square of 0.01, 0.06, and 0.14 are by convention interpreted as small, medium, and large effect sizes, respectively (Green & Salkind, 2003).

Results

Preliminary analyses

There were no significant differences between the two groups across all demographic characteristics, AIDS education, contact with PHA, and placement experience.

Correlations among outcome variables

Pearson correlation coefficients were computed and reported in Table 1. At pre-test, AIDS knowledge was significantly correlated with stigmatizing attitudes only. Stigmatizing attitudes, fear of contagion, willingness to treat, and negative affect were significantly inter-correlated. No correlation between positive affect and other outcome variables was found.

At post-test and follow-up, AIDS knowledge was no longer correlated with stigmatizing attitudes, $ps > 0.05$ ($r = -0.03$ at post-test and $r = -0.16$ at follow-up, $ps > 0.05$). Significant correlations were still found among other outcome variables ($rs = 0.64-0.80$, $ps < 0.01$), except that stigmatizing attitudes were no longer correlated with negative affect ($r = 0.09$ at post-test and $r = -0.14$ at follow-up, $ps > 0.05$).

Intervention effects on outcome variables

Table 2 shows the means and standard deviations of the outcome variables, namely, AIDS knowledge, stigmatizing attitudes, willingness to treat, fear of contagion, positive affect, and

negative affect, of the knowledge group and knowledge-contact group at pre-test, post-test, and follow-up.

In light of the inter-correlations among outcome variables (except with positive affect), a repeated measures MANOVA was used to examine the multivariate time, group and interaction effects on AIDS knowledge, stigmatizing attitudes, willingness to treat, fear of contagion, and negative affect, and a repeated measures ANOVA was used to examine the effects on positive affect.

The multivariate results showed a significant time effect, $F(10, 56) = 26.10$, $p < 0.001$, partial $\eta^2 = 0.82$, and interaction effect, $F(10, 56) = 2.15$, $p = 0.04$, partial $\eta^2 = 0.28$. The effect sizes were large. The Mauchly Sphericity test was significant for AIDS knowledge and fear of contagion; however, the Greenhouse-Geisser correction did not change the results of any of these effects. Follow-up repeated measures ANOVA showed that there was a significant interaction effect for AIDS knowledge and stigmatizing attitudes, and significant time effect for AIDS knowledge, stigmatizing attitudes, willingness to treat, fear of contagion, and negative affect. No interaction, time or group effect for positive affect was found.

AIDS knowledge

A significant interaction effect was found, $F(2, 130) = 4.97$, $p = 0.01$, partial $\eta^2 = 0.07$. The effect size was medium. Within the knowledge group, there was a significant time effect, $F(2, 68) = 44.68$, $p < 0.001$, partial $\eta^2 = 0.57$. The effect size was large. Subsequent Bonferroni-adjusted pairwise comparisons showed that as compared with pre-test, AIDS knowledge was significantly better at post-test, $p < 0.001$, and follow-up, $p < 0.001$. However, there was a significant drop in AIDS knowledge score at follow-up, $p < 0.001$, suggesting a decreasing effect over time after the intervention.

Within the knowledge-contact group, a significant time effect was also found, $F(2, 82) = 31.92$, $p < 0.001$, partial $\eta^2 = 0.44$. The effect size was large. AIDS knowledge was significantly better at post-test, $p < 0.001$, and the effect sustained at follow-up, $p < 0.001$.

Stigmatizing attitudes

A significant interaction effect was found, $F(2, 130) = 3.64$, $p = 0.03$, partial $\eta^2 = 0.05$. The effect size was small. At post-test, the knowledge-contact group ($M = 2.27$, $SD = 0.50$) had significantly less stigmatizing attitudes than the knowledge group ($M = 2.63$, $SD = 0.53$), $t(87) = 3.21$, $p < 0.01$.

A significant time effect was found in the knowledge group, $F(2, 76) = 3.40$, $p = 0.02$, partial $\eta^2 = 0.10$, and the knowledge-contact group, $F(2, 98) = 22.84$, $p < 0.001$, partial $\eta^2 = 0.32$. The effect size was large in both groups. Bonferroni-adjusted pairwise comparisons showed that there was significantly less stigmatizing attitudes at post-test than pre-test in both the knowledge group, $p = 0.03$, and the knowledge-contact group, $p < 0.001$. No significant difference, however, was found between pre-test and follow-up in both groups, suggesting a fading out of the effect.

Willingness to treat

A significant time effect was found, $F(2,130) = 20.54$, $p < 0.001$, partial $\eta^2 = 0.24$. The effect size was large. As compared with pre-test, nursing students were significantly more willing to treat PHA at post-test in both the knowledge group, $p < 0.01$, and the knowledge-contact group, $p < 0.001$. The change was still significant at follow-up in the knowledge group, $p = 0.03$, and the knowledge-contact group, $p < 0.001$. However, in the knowledge-contact group, the degree of willingness in follow-up was significantly less than post-test, $p < 0.001$, suggesting a decreasing effect over time.

Table 1
Pearson's correlation coefficients among outcome variables at pre-test ($n = 89$).

	1	2	3	4	5
1. AIDS knowledge	–				
2. Stigmatizing attitudes	–0.24*	–			
3. Fear of contagion	0.02	0.65**	–		
4. Willingness to treat	0.14	–0.73**	–0.68**	–	
5. Positive affect	0.14	–0.12	–0.06	0.20	–
6. Negative Affect	–0.14	0.35**	0.29**	–0.23*	–0.08

* $p < 0.05$. ** $p < 0.01$.

Table 2
Means and standard deviations of outcome variables across conditions.

Outcome variables		Knowledge			Knowledge-contact		
		Pre-test	Post-test	Follow-up	Pre-test	Post-test	Follow-up
AIDS knowledge	M (SD)	12.91 (2.23)	16.69 (1.42)	15.35 (1.67)	14.02 (2.48)	16.50 (1.28)	15.92 (1.71)
Stigmatizing attitudes	M (SD)	2.81 (0.68)	2.63 (0.53)	2.69 (0.60)	2.74 (0.54)	2.27 (0.50)	2.58 (0.65)
Fear of contagion	M (SD)	4.20 (0.90)	3.60 (0.87)	3.60 (1.02)	3.78 (0.78)	3.07 (0.82)	3.23 (0.91)
Willingness to treat	M (SD)	3.88 (0.91)	4.26 (0.87)	4.21 (0.84)	4.08 (0.79)	4.73 (0.75)	4.40 (0.76)
Positive affect	M (SD)	0.10 (0.41)	0.12 (0.32)	0.01 (0.44)	0.04 (0.40)	0.14 (0.25)	0.14 (0.41)
Negative affect	M (SD)	0.46 (0.51)	0.19 (0.44)	0.16 (0.40)	0.34 (0.45)	0.12 (0.28)	0.15 (0.39)

Fear of contagion

A significant time effect was found, $F(2, 130) = 27.30$, $p < 0.001$, partial $\eta^2 = 0.30$. The effect size was large. Within the knowledge group, nursing students had significantly less fear of contagion at post-test, $p < 0.001$, and at follow-up, $p < 0.001$. The same pattern was found in the knowledge-contact group at post-test, $p < 0.001$, and follow-up, $p < 0.001$.

Negative affect

A significant main effect of time, $F(2, 130) = 10.85$, $p < 0.001$, partial $\eta^2 = 0.14$, was found. The effect size was large. Between pre-test and post-test, there was a marginally significant difference in the knowledge group, $p = 0.06$, and a significant difference in the knowledge-contact group, $p < 0.01$. Between pre-test and follow-up, a significant difference was found in both the knowledge group, $p = 0.05$, and the knowledge-contact group, $p < 0.01$. These results indicated that nursing students had significantly less negative affect at post-test and the effect sustained at follow-up in both groups.

Positive affect

No interaction and main effects were found, suggesting that there was no difference on positive affect among nursing students across time and group.

Discussion

This study compared the effectiveness and sustainability of an AIDS knowledge-only program with a combined program of AIDS knowledge and contact with PHA in the enhancement of nursing students' attitudinal and emotional competence to serve PHA. Results showed that adding contact with PHA into the program significantly increased the effectiveness of the intervention in reducing the stigmatizing attitudes among nursing students at post-test. However, the effect was not sustained for long. No significant difference between the two groups was found at follow-up, six weeks after the program. As for the improvement on AIDS knowledge, there was no significant difference between knowledge and knowledge-contact program at pre-test, post-test and follow-up. However, the improvement in the knowledge-contact program was more sustainable than in the knowledge program. In the knowledge-contact group, there was no difference in the improvement between post-test and six-week follow-up, whereas in the knowledge group, the improvement dropped significantly from post-test to follow-up.

The present study added to a growing body of studies suggesting the importance of contact with PHA in stigma reduction. It further clarified its effectiveness in different areas. The combined program was more effective than the knowledge-only program in reducing stigmatizing attitudes towards PHA. However, it did not add value in increasing their willingness to treat, reducing their fear of contagion and negative emotions from serving PHA. More importantly, the results of this study revealed that adding one-off

contact with PHA to AIDS knowledge program provided significant but short-term effect. This result might be explained by previous findings on intergroup contact that contact itself could lead to positive outcomes; however, greater effect was generally achieved when key situational components such as frequent exposures, cooperative interaction, institutional support, and real life opportunities were included (Allport, 1954; Heijnder & van der Meij, 2006; Pettigrew & Tropp, 2008). In other words, the enhanced effect due to these optimal conditions might be seen in more sustained effects (Pettigrew & Tropp, 2006).

In the present study, the standardized lecture on AIDS knowledge was delivered by a retired nurse. Her similarity with the nursing students and her expertise in the nursing field might have intensified her persuasive power (Myers, 2005), and thus the effectiveness of the intervention. The role of peer educators in comparison to professionals in modifying knowledge and attitude towards PHA has become an important issue. Thus, both similarity and expertise need to be combined as they were here.

While the findings of this study provided new insights to the development of programs to reduce stigma towards PHA, several limitations should be noted. First, working within pragmatic constraints of expectations from nursing departments to deliver substantive programs to their students and the limited number of participants, it was not feasible or ethical to include a no-intervention control group. Previous studies have shown the support of education in reducing HIV stigma (Carney et al., 1999; Held, 1993), thus having a no-intervention control group was not justified.

Second, in measuring the subjective feelings of nursing students, two hypothetical vignettes were used. It was uncertain whether the findings from the hypothetical situation could be generalized to real situations. Third, despite improvements in stigmatizing attitudes among nursing students after the program, it was unclear whether their self-reported changes led to actual behavioral change. Future studies could be strengthened by assessing their psychological and behavioral reactions in real situations. For example, nurses may be asked to take care of PHA after the intervention program with behavioral observations made during service provision.

Despite its shortcomings, the present study contributes to the development of training programs to enhance nursing students' attitudes and emotional competence in serving PHA by demonstrating the effectiveness of an AIDS knowledge-contact program in comparison to a knowledge-only program.

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