An investigation of stigmatizing attitudes towards people living with HIV/AIDS by doctors and nurses in Vientiane, Lao PDR

Savina Vorasane 1*, Masamine Jimba 2, Kimiyó Kikuchi 2, Junko Yasuoka 2, Keiko Nanishi 2, Jo Durham 3 and Vanphanom Sychareun 4

Abstract

Background: Despite global efforts, HIV-related stigma continues to negatively impact the health and well-being of people living with HIV/AIDS. Even in healthcare settings, people with HIV/AIDS experience discrimination. Anecdotal evidence suggests that healthcare professionals in the Lao People’s Democratic Republic, a lower-middle income country situated in Southeast Asia, stigmatize HIV/AIDS patients. The purpose of this study was to assess HIV stigmatizing attitudes within Laotian healthcare service providers and examine some of the factors associated with HIV/AIDS-related stigma among doctors and nurses.

Methods: A structured questionnaire, which included a HIV-related stigma scale consisting of 17 items, was self-completed by 558 healthcare workers from 12 of the 17 hospitals in Vientiane. Five hospitals were excluded because they had less than 10 staff and these staff were not always present. The questionnaire was pre-tested with 40 healthcare workers. Descriptive statistical analysis was performed and comparisons between groups undertaken using chi-square test and t-test. Bivariate and multiple linear regression analyses were carried out to examine the associations between stigmatizing attitudes and independent variables.

Results: Out of the 558 participating healthcare workers, 277 (49.7%) were doctors and 281 (50.3%) were nurses. Nearly 50% of doctors and nurses included in the study had high levels of stigmatizing attitudes towards people living with HIV/AIDS. Across the different health professionals included in this study, lower levels of HIV/AIDS knowledge were associated with higher levels of stigmatizing attitudes towards people living with HIV/AIDS. Stigmatizing attitudes, including discrimination at work, fear of AIDS, and prejudice, were lower in healthcare workers with more experience in treating HIV/AIDS patients.

Conclusions: This study is the first to report on HIV/AIDS-related stigmatization among healthcare workers in Lao PDR. Stigmatizing attitudes contribute to missed opportunities for prevention, education and treatment, undermining efforts to manage and prevent HIV. Reversing stigmatizing attitudes and practices requires interventions that address affective, cognitive and behavioral aspects of stigma. Alongside this, health professionals need to be enabled to enact universal precautions and prevent occupational transmission of HIV.

Keywords: HIV-related stigma, Discrimination, Healthcare workers, Lao PDR

* Correspondence: savinavn@gmail.com

1Department of Radiology, Mahosoth hospital, Vientiane, Lao PDR

Full list of author information is available at the end of the article

© The Author(s). 2017 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.
Background

Despite global progress in the treatment and care of HIV positive individuals and community education, HIV-related stigma and discrimination continues to prevent people from accessing HIV testing, treatment and care [1–9]. Stigma in the healthcare sector has often been found to be particularly pernicious, and a contributor to poor health outcomes [9–11]. There are at least three major pathways to HIV stigma within healthcare facilities [10], namely the fear of contracting HIV, not being aware of potentially stigmatizing attitudes and behaviors and the impact of stigma, and associating HIV with immoral behavior [10]. Aside from access to services, other critical reasons for reducing HIV/AIDS-related stigma is the negative affect stigma has on a person's self-concept and mental health [12–14], life satisfaction [15], and quality of life [15, 16].

A commonly used definition of stigma in the HIV/AIDS literature is “prejudice, discounting, discrediting, and discrimination directed at people perceived to have AIDS” ([17] p. 1107) and is informed by the work of Goffman [18]. It relates to the prejudicial feelings, stereotypical perceptions, discriminatory behaviors and actions, or social devaluation of HIV infection and related illnesses, as well as the activities associated with HIV-infection, and people living with HIV/AIDS (PLWHA) [19, 20]. It can be perceived and experienced, either internally or externally, by PLWHA. It can be enacted by those who are HIV-negative, including healthcare workers [8, 20, 21]. Stigma's presence and its enactment are separate stigmatizing processes, where the devaluation of an attribute or trait contributes to negative beliefs. These beliefs are then enacted, creating distance either in perceived, or real, similarity from the devalued characteristic [22]. The ways in which stigma is enacted and perceived is also shaped by broader societal attitudes, and is thus dynamic and a result of both socio-cognitive and structural factors, created at the intersection of culture, power, and difference [20, 23, 24]. While similar to stigma, the focus of prejudice is on human characteristics, for example race or PLWHA, rather than deviant behavior and identities, disease and disabilities [25]. HIV prejudice, therefore, is a negative emotion, attitude or reaction towards PLWHA, and includes negative cognitive schemas or beliefs regarding PLWHA and can be partly explained by the fear that surrounds the disease. Discrimination towards PLWHA is the behavioral response of prejudice [8, 25] and can be understood in terms of social processes of power and domination with some groups, in this case PLWHA, that serve to devalue the stigmatized [21, 26].

High levels of HIV-related stigma have been identified in countries with lower levels of HIV prevalence and limited access to antiretroviral therapy (ART) [26–29]. At the individual level, HIV-related stigma has been associated with insufficient levels of HIV/AIDS knowledge [30], fear of casual transmission at the workplace [3, 26, 31] and low exposure to PLWHA [6, 30]. The purpose of this study was to assess HIV stigmatizing attitudes within healthcare service providers in the Lao People's Democratic Republic (PDR) and examine some of the factors associated with HIV/AIDS-related stigma among doctors and nurses. Our overall intent was to inform policy discussions and develop effective interventions.

The Lao PDR has an estimated HIV prevalence of 0.3% among 15–49 years old and, based on the Asian Epidemic Model, is considered a low HIV prevalence country [32]. There have been few empirical studies that have examined and measured HIV-related stigma in healthcare workers in the Lao PDR. Anecdotal information, however, suggests that healthcare professionals in Lao PDR may engage in stigmatization of, and discrimination against, PLWHA [33, 34]. One report for example, noted that 12% of 84 PLWHA in Vientiane stated they had experienced stigmatizing attitudes from medical professionals [34]. Some medical workers have also been reported as trying to avoid or even refusing to care for PLWHA [34]. The practices and factors that are related to health worker discrimination towards HIV/AIDS patients in Lao PDR are, however, largely undocumented. Yet, understanding HIV-related stigma and discrimination in the Lao healthcare sector is particularly important, given the potential for increased transmission as the country rapidly integrates into regional and global markets [32]. This is characterized by increased migration, livelihood diversification and changing socio-cultural norms, and there are concerns that the potential exists for a generalized or concentrated HIV epidemic [32].

Methods

A cross-sectional study was conducted in Vientiane, Lao PDR. Vientiane has nine districts, and was estimated to have a population of 797,130 in 2012 [35]. The dataset supporting the conclusions of this article is available in the Open Science Framework repository [osf.io/c6t4u].

Study setting

The setting was public healthcare facilities in Vientiane, Lao PDR. Healthcare services in Lao PDR are primarily public, with the private health sector limited mainly to licensed pharmacies, clinics and informal providers [36]. The public healthcare facilities in Lao PDR consist of four central teaching (referral) hospitals, five regional hospitals, 13 provincial hospitals, 127 district hospitals, and approximately 746 health centers [36]. HIV/AIDS care wards are only in the referral (central) hospitals. Vientiane has four central teaching hospitals, four regional hospitals, nine district hospitals, and 213 health
centers. From the nine districts in Vientiane, a convenience sampling method was used, with four districts (Saysettha, Chanthabouly, Sisattanak and Sikhottabong) selected. This yielded a sample of four central (referral) hospitals, four regional (non-referral) hospitals and four district hospitals for the study, making a total of 12 out of a possible 17 hospitals being selected (see Fig. 1). The other five district hospitals were excluded because they either had less than 10 healthcare workers or staff were not always present.

**Study population and sampling**

There are 14,189 public sector health workers, with Ministry of Health staff and other health staff from the ministries of National Security and National Defense making up approximately 30% of total health work force [37]. The majority of doctors and nurses work in Vientiane. All doctors and nurses who were employed at the 12 sampled hospitals, who were working on the day of distribution of questionnaires, and who agreed to participate in the study voluntarily were included in the study. There are two types of nurses in the Lao healthcare system, namely registered nurses, who have higher levels of vocational training (e.g., diploma in nursing) associated with more years of instruction, and practical nurses, who have a certificate of nursing only with a shorter period of training. For the purpose of this study, both registered and practical nurses were included in the sample.

The sample size was calculated using Power and Precision V4 software [38]. To achieve an effect size of 0.2 [6], a type one error of 0.05, and a power of 80%, a sample size of 458 was required. In order to mitigate the effect of missing data, however, we aimed to recruit 600 eligible participants into the study. In total, 595 agreed to participate, however, 36 did not return the completed questionnaire and one respondent’s questionnaire had to be discarded due to incomplete information. As a result, data of 558 participants were included in the analysis.

**Data collection**

Data was collected in 2012, using a self-administered, structured questionnaire (Additional file 1).

The questionnaire included information on sociodemographic characteristics of the healthcare workers, and a HIV-related stigma scale consisting of 17 items and which was initially developed for healthcare providers in China [39]. In addition, HIV/AIDS knowledge was evaluated using a 10-item scale that has previously been used among health professionals in China [11]. The questionnaire was translated from English into Lao, and subsequently back-translated into English by a
native speaker, to ensure semantic and content validity. Pre-testing of the questionnaire was undertaken with 40 healthcare professionals prior to data collection. Based on this, minor changes were made to some of the wording of items without changing the meaning. Prior to completing the questionnaire, all participants indicated their willingness to participate in the study by signing an informed consent form with their initials. To ensure confidentiality, identification numbers were used in place of personal names. No incentives or compensation for the time that participants took to compete the questionnaire was provided.

Prior to conducting the survey, two research assistants were provided one-day training on the study objectives and procedures, and on how to deal with potential problems that might arise during the survey. The research team was divided into two groups to distribute the self-administered questionnaire to the participants at the selected hospitals. Participants anonymously filled out the self-administered questionnaires and returned them to the principal investigator and research assistants.

**Dependent variable**
The dependent variable (stigmatizing attitude) was measured by using the 17-item HIV-related stigma scale developed by Stein and Li [39]. The scale consists of five subscales: (1) discriminatory intent at work, (2) prejudiced attitudes, (3) internalized shame, (4) fear of PLWHA, and (5) opinion about healthcare for HIV/AIDS patients [39]. The subscale discriminatory intent at work consists of four items (items Q408-Q411) and assess respondents’ discriminatory actions while providing care to patients at their work places. The subscale prejudiced attitudes consists of four items (items Q401-Q404) that evaluate respondents’ feelings of prejudice toward PLWHA. The subscale internalized shame consists of three items (items Q415-Q417) and assess respondents’ feelings of shame in providing care to HIV/AIDS patients. Fear of AIDS, includes three items (items Q412-Q414) and measures a feelings of fear towards PLWHA. The subscale opinion about healthcare for HIV/AIDS patients, consists of three items (items Q405-Q407) and evaluates feelings of not being able to provide good care to HIV/AIDS patients. Each item in the scale was scored using a five-point Likert scale, ranging from (1) strongly agree to (5) strongly disagree, where, based on the scale guidelines, higher scores indicate higher levels of stigmatizing attitudes towards PLWHA [39]. In this study, the scale demonstrated good internal consistency with a Cronbach’s alpha score of 0.81.

**Independent variables**
The independent variables included the socio-demographic characteristics of the healthcare workers, including sex, age, religion, ethnicity, education level, and marital status [40, 41]. Information related to participants’ professional characteristics included type and level of profession, institution of employment, number of years of professional experience in medical or nursing field, experience (duration) of giving care to PLWHA, and experience of formal HIV/AIDS training [30]. Other independent variables included the duration of providing care to PLWHA, and the number of HIV/AIDS cases encountered during their work experience [6, 30]. In addition, we assessed their HIV/AIDS knowledge using a 10-item scale which was previously used among health professionals in China (Li et al., 2007). Items were coded (1) for correct answers or (0) for incorrect answers or “unknown” responses. Results for the 10 items were totaled. Higher scores indicated higher general knowledge of HIV/AIDS. Scores equal to or exceeding 9 points, the median score, were defined as high knowledge scores.

**2.5. Data analysis**
Data entry and all statistical analyses were conducted using Stata/SE 11 [42]. Descriptive statistical analysis was used to describe the socio-demographic characteristics and the professional characteristics of respondents and scores on the HIV stigma scale. Comparisons between groups were performed by chi-square test and t-test. Bivariate and multiple linear regression analyses were carried out to examine the associations between stigmatizing attitudes and independent variables.

Before running the multiple linear regression models, the relationships between all continuous and dichotomous independent variables were examined using the Spearman rank correlation coefficient test to check for collinearity. High Spearman correlations were found between the following items: ‘age’ and ‘years of working experience in the medical professional’ (rs = 0.874); ‘ever provided care to PLWHA’ and ‘number of HIV/AIDS cases’ (rs = 0.966); and ‘ever provided care to PLWHA’ and ‘length of time provided care to HIV/AIDS patients’ (rs = 0.967). Furthermore, a high Spearman correlation was found between ‘number of HIV/AIDS cases encountered’ and ‘duration of providing care to PLWHA’ (rs = 0.946). Due to the multicollinearity in the data, three independent variables were removed from the multiple linear regression models, namely ‘age’, ‘ever provided care to PLWHA’, and ‘number of HIV/AIDS cases encountered’.
encountered. \( P \)-value less than 0.05 was taken as the significance level for all analyses.

**Ethical considerations**

The study was approved by the Research Ethics Committee of the Graduate School of Medicine of the University of Tokyo and by the Ethics Committee of the University of Health Sciences in Lao PDR. During the data collection, the completed questionnaires were kept in a locked filing cabinet at the Faculty of Postgraduate Studies, the University of Health Sciences, Vientiane, with the key held by the principal investigator. Subsequently, the completed questionnaires were taken to Japan and stored in a locked cabinet at the Department of Community and Global Health, Hongo Campus, the University of Tokyo.

**Results**

**Socio-demographic characteristics of the participants**

The socio-demographic characteristics of respondents are provided in Table 1. As seen, out of the 558 participating healthcare workers, 277 (49.7%) were doctors and 281 (50.3%) were nurses. The mean age of doctors was 39 years, standard deviation (SD) 9.9 SD and the mean age of nurses was 35 years, SD 9.8. Most of the respondents were female (66.3%) and, of these, 146 (52.7%) were doctors, compared to 131 (47.3) doctors being male. There were also more female nurses than male nurses (224, 79.7% and 57, 20.3% respectively). The majority (83%) of doctors had an education level equal to, or higher than Bachelor degree, whereas only 10.3% of nurses had completed a Bachelor degree.

**Professional characteristics and HIV/AIDS care-related characteristics of the participants**

Table 2 shows the professional characteristics and HIV-related knowledge and attitudes of participants. Of the total number of participants, registered nurses, at 31.7%, constituted the largest of the four professional groups (general doctors, physician specialists, registered nurses, and practical nurses). Most of the participants (66.1%) were working in referral hospitals (Table 2). Compared to doctors, a

| Table 1 | Socio-demographic characteristics of participants |
|---------|-----------------------------------------------|
| Variables | Total (n = 558) | Doctors (n = 277) | Nurses (n = 281) |
| Age (years) | n (%) | n (%) | n (%) |
| 20–29 | 160 (28.7) | 55 (19.9) | 105 (37.4) |
| 30–39 | 159 (28.5) | 84 (30.3) | 75 (26.7) |
| 40–49 | 166 (29.8) | 88 (31.8) | 78 (27.7) |
| 50–59 | 66 (11.8) | 43 (15.5) | 23 (8.2) |
| 60 or more | 7 (1.2) | 7 (2.5) | 0 0 |
| Gender | Female | 370 (66.3) | 146 (52.7) | 224 (79.7) |
| Male | 188 (33.7) | 131 (47.3) | 57 (20.3) |
| Religion | Christian | 19 (3.4) | 9 (3.2) | 10 (3.6) |
| Buddhism | 539 (96.6) | 268 (96.8) | 271 (96.4) |
| Ethnicity | Highland people | 22 (4.0) | 13 (4.7) | 9 (3.2) |
| Lowland people | 536 (96.0) | 264 (95.3) | 272 (96.8) |
| Education level | < Bachelor | 299 (53.6) | 47 (17.0) | 252 (89.7) |
| ≥ Bachelor | 259 (46.4) | 230 (83.0) | 29 (10.3) |
| Marital status | Single | 168 (30.1) | 73 (26.3) | 95 (33.8) |
| Married | 377 (67.6) | 201 (72.6) | 176 (62.6) |
| Divorce | 8 (1.4) | 2 (0.7) | 6 (2.2) |
| Widow | 5 (0.9) | 1 (0.4) | 4 (1.4) |
significantly higher proportion of nurses were working in referral hospitals (72.2% vs. 59.9%, \( p = 0.002 \)). Less than half of the respondents had provided care to HIV/AIDS patients, with only 17.9% providing care to HIV/AIDS patients for more than three years (47.1% of doctors and 53.1% of nurses).

In terms of HIV-related training and knowledge, just under half (47.1%) of participants had attended formal HIV training, and 155 (56%) of doctors and 170 (60.5%) of nurses demonstrated a high level of knowledge on the HIV knowledge scale. Regarding stigmatizing attitudes, 45.7% of all participants showed high levels of stigmatizing attitudes towards PLWHA (44.8% of doctors and 46.6% of nurses).

**Factors associated with stigmatizing attitudes of doctors and nurses towards PLWHA (whole scale)**

The results of bivariate linear regression analysis among doctors are shown in Table 3. They show that several factors were found to be significantly associated with HIV/AIDS stigmatizing attitudes and discriminatory intent. Doctors who had provided care to HIV patients

| Table 2 The professional characteristics and HIV-related knowledge and attitudes of participants |
|---------------------------------|---------------------------------|---------------------------------|------------------|------------------|
| Variables                        | Total (n = 558) | Doctors (n = 277) | Nurses (n = 281) | p-value |
|---------------------------------|-----------------|------------------|-----------------|---------|
| n (%)                           | n (%)           | n (%)            | n (%)           |
| **Type of service provider**    |                 |                  |                 |         |
| General doctor                  | 159 (28.5)      | 159 (57.4)       | 169 (60.1)      | 0.002   |
| Physician specialist            | 118 (21.2)      | 118 (42.6)       | 104 (37.0)      |         |
| Practical nurse                 | 104 (18.6)      | 104 (37.0)       | 104 (37.0)      |         |
| Registered nurse                | 177 (31.7)      | 177 (63.0)       | 177 (63.0)      |         |
| **Institution of practice**     |                 |                  |                 |         |
| Non referral hospital           | 189 (33.9)      | 111 (40.1)       | 78 (27.8)       | 0.002   |
| Referral hospital               | 369 (66.1)      | 166 (59.9)       | 203 (72.2)      |         |
| **Year of work experience in medical professional** | | | |
| 1–5 years                       | 188 (33.7)      | 88 (31.8)        | 100 (35.6)      | 0.614   |
| 6–15 years                      | 159 (28.5)      | 80 (28.9)        | 79 (28.1)       |         |
| 16 years or longer              | 211 (37.8)      | 109 (39.3)       | 102 (36.3)      |         |
| **Provide care to HIV/AIDS patients** | | | | |
| No                              | 333 (59.7)      | 164 (59.2)       | 169 (60.1)      | 0.822   |
| Yes                             | 225 (40.3)      | 113 (40.8)       | 112 (39.9)      |         |
| **Length of time that provide care to HIV/AIDS patients** | | | | |
| Non                             | 333 (59.7)      | 164 (59.2)       | 169 (60.1)      | 0.671   |
| \( \leq 3 \) years             | 125 (22.4)      | 66 (23.8)        | 59 (21.0)       |         |
| > 3 years                       | 100 (17.9)      | 47 (17.0)        | 53 (18.9)       |         |
| **Number of HIV/AIDS cases encountered** | | | | |
| None                            | 333 (59.7)      | 164 (59.2)       | 169 (60.1)      | 0.955   |
| \( \leq 3 \) cases             | 108 (19.3)      | 55 (19.9)        | 53 (18.9)       |         |
| > 3 cases                       | 117 (21.0)      | 58 (20.9)        | 59 (21.0)       |         |
| **Training for HIV/AIDS**       |                 |                  |                 |         |
| No                              | 295 (52.9)      | 147 (53.1)       | 148 (52.7)      | 0.925   |
| Yes                             | 263 (47.1)      | 130 (46.9)       | 133 (47.3)      |         |
| **HIV/AIDS knowledge** (mean 8 ± 1.5 SD, median 9) | | | | |
| Low (score 0–4)                 | 7 (1.3)         | 2 (0.7)          | 5 (1.8)         | 0.245   |
| Medium (score 5–8)              | 226 (40.5)      | 120 (43.3)       | 106 (37.7)      |         |
| High (score ≥ 9)                | 325 (58.2)      | 155 (56.0)       | 170 (60.5)      |         |
| **Stigmatized attitudes** (mean 38 ± 7.9 SD, median 39) | | | | |
| Low (score ≤ 39)                | 303 (54.3)      | 153 (55.2)       | 150 (53.4)      | 0.660   |
| High (score > 39)               | 255 (45.7)      | 124 (44.8)       | 131 (46.6)      |         |
higher levels of HIV/AIDS knowledge were less likely to demonstrate stigmatizing attitudes towards PLWHA (Coef. = -0.09, 95% CI: -0.17 to -0.02, p = 0.013 and Coef. = -0.69, 95% CI: -1.34 to -0.04, p = 0.036 respectively).

Similar results were found for nurses. Nurses who had provided care to HIV patients (Coef. = -2.70, 95% CI: -4.66 to -0.74, p = 0.007), and for a longer duration (Coef. = -0.11, 95% CI: -0.18 to -0.04, p = 0.001), who had encountered more HIV/AIDS cases (Coef. = -0.01, 95% CI: -0.017 to -0.004, p = 0.001), and had received HIV/AIDS training (Coef. = -2.30, 95% CI: -4.23 to -0.37, p = 0.001) were less likely to show stigmatizing attitudes towards PLWHA.

| Characteristics                      | Bivariate     |                |         |         | Multivariate |                |         |         |
|--------------------------------------|---------------|---------------|---------|---------|--------------|---------------|---------|---------|
|                                      | Coef. | 95% CI     | p-value | Coef. | 95% CI     | p-value |
| Doctors (n = 277)                    |       |            |         |       |             |         |
| Age*                                 | 0.04  | -0.04 - 0.13 | 0.357   | -     | -           |         |
| Gender (Male)                        | 1.12  | -0.68 - 2.92 | 0.222   | 0.50  | -1.35 - 2.35 | 0.595  |
| Religion (Buddhism)                  | 2.22  | -2.85 - 7.31 | 0.389   | 1.27  | -3.72 - 6.28 | 0.615  |
| Ethnicity (Lowland people)           | 0.79  | -3.47 - 5.05 | 0.716   | -0.75 | -6.97 - 5.46 | 0.811  |
| Education level (≥ Bachelor)         | -2.17 | -4.56 - 0.21 | 0.075   | -1.44 | -3.84 - 0.94 | 0.235  |
| Type of health care service provider (Physician specialist) | 0.56  | -1.25 - 2.39 | 0.543   | 1.50  | -0.38 - 3.39 | 0.118  |
| Institution of practice (Referral hospital) | -1.45 | -3.28 - 0.38 | 0.121   | -1.03 | -3.13 - 1.07 | 0.336  |
| Year of working experience in medical professional | 0.42  | -0.65 - 1.49 | 0.440   | -0.07 | -0.81 - 0.65 | 0.830  |
| Provide care to HIV/AIDS patients* (Yes) | -2.47 | -4.29 - 0.66 | 0.008   | -     | -           |         |
| Length of time that provide care to HIV/AIDS patients (100 days) | -0.11 | -0.19 - 0.04 | 0.003   | -0.09 | -0.17 - 0.02 | 0.013  |
| Number of HIV/AIDS cases encountered* | -0.005 | -0.015 - 0.003 | 0.223   | -         | -           |         |
| Training for HIV/AIDS (Yes)          | -1.01 | -2.81 - 0.79 | 0.270   | -0.31 | -2.18 - 1.54 | 0.736  |
| HIV/AIDS knowledge                   | -0.90 | -1.54 - 0.27 | 0.005   | -0.69 | -1.34 - 0.04 | 0.036  |
| Nurses (n = 281)                     |       |            |         |       |             |         |
| Age*                                 | -0.06 | -0.16 - 0.03 | 0.181   | -     | -           |         |
| Gender (Male)                        | 0.86  | -1.54 - 3.27 | 0.481   | -0.13 | -2.58 - 2.30 | 0.910  |
| Religion (Buddhism)                  | 0.19  | -5.04 - 5.44 | 0.941   | 1.90  | -4.74 - 8.56 | 0.572  |
| Ethnicity (Lowland people)           | -1.22 | -6.74 - 4.28 | 0.662   | -1.04 | -6.44 - 4.35 | 0.703  |
| Education level (≥ Bachelor)         | -1.35 | -4.54 - 1.83 | 0.405   | -0.47 | -3.69 - 2.73 | 0.769  |
| Type of health care service provider (Registered nurse) | -2.84 | -4.83 - 0.86 | 0.005   | -2.26 | -4.25 - 0.27 | 0.026  |
| Institution of practice (Referral hospital) | -0.26 | -2.43 - 1.90 | 0.810   | 0.82  | -1.37 - 3.02 | 0.460  |
| Year of working experience in medical professional | -0.59 | -1.74 - 0.54 | 0.303   | -0.04 | -0.85 - 0.77 | 0.920  |
| Provide care to HIV/AIDS patients* (Yes) | -2.70 | -4.66 - 0.74 | 0.007   | -         | -           |         |
| Length of time that provide care to HIV/AIDS patients (100 days) | -0.11 | -0.18 - 0.04 | 0.001   | -0.09 | -0.16 - 0.02 | 0.017  |
| Number of HIV/AIDS cases encountered* | -0.01 | -0.017 - 0.004 | 0.001   | -         | -           |         |
| Training for HIV/AIDS (Yes)          | -2.30 | -4.23 - 0.37 | 0.019   | -1.33 | -3.31 - 0.64 | 0.187  |
| HIV/AIDS knowledge                   | -0.47 | -1.11 - 0.16 | 0.145   | -0.24 | -0.88 - 0.39 | 0.455  |

* Independent variables of: age, provide care to HIV/AIDS patients and number of HIV/AIDS cases encountered were not put in the model for multivariate analysis because of multicollinearity.
0.019) were less likely to report stigmatizing attitudes towards PLWHA. Multiple linear regression analysis revealed that nurses who had provided care to PLWHA for a longer duration were less likely to manifest stigmatizing attitudes (Coef. = -0.09, 95% CI: -0.16 – -0.02, p = 0.017) and that registered nurses were less likely than practical nurses, to exhibit stigmatizing attitudes towards PLWHA (Table 3).

Factors associated with stigmatizing attitudes of doctors and nurses towards PLWHA (subscals)

Discriminatory attitudes

Table 4 shows that doctors who had cared for PLWHA patients (Coef. = 1.05, p < 0.001), had more years of experience in providing care to PLWA (Coef. = -0.04, p < 0.001), had received HIV/AIDS training and had higher level of HIV/AIDS knowledge (Coef.

| Characteristics                      | Discrimination intent at work | Prejudiced attitudes | Internalized shame | Fear of AIDS | No Good care for HIV patients |
|--------------------------------------|------------------------------|----------------------|--------------------|-------------|-------------------------------|
|                                      | Coef. | p-value | Coef. | p-value | Coef. | p-value | Coef. | p-value | Coef. | p-value |
| Doctors (n = 277)                    |       |         |       |         |       |         |       |         |       |         |
| Age                                  | 0.01  | 0.112   | 0.003 | 0.827   | 0.02  | 0.049   | 0.003 | 0.810   | -0.01 | 0.344   |
| Gender (Male)                        | 0.25  | 0.286   | -0.31 | 0.364   | 0.58  | 0.035   | 0.16  | 0.565   | 0.44  | 0.053   |
| Religion (Buddhism)                  | 0.98  | 0.141   | -0.27 | 0.774   | 0.68  | 0.380   | 1.15  | 0.139   | -0.31 | 0.625   |
| Ethnicity (Lowland people)           | 0.65  | 0.241   | -0.41 | 0.608   | 0.65  | 0.313   | 0.49  | 0.454   | -0.59 | 0.268   |
| Education level (≥ Bachelor)         | 0.14  | 0.655   | -1.07 | 0.018   | -0.69 | 0.057   | -0.27 | 0.460   | -0.26 | 0.376   |
| Type of health care service provider (Physician specialist) | 0.28  | 0.227   | -0.42 | 0.222   | 0.46  | 0.097   | 0.12  | 0.668   | 0.11  | 0.609   |
| Institution of practice (Referral hospital) | 0.01  | 0.966   | -0.95 | 0.006   | -0.45 | 0.107   | 0.31  | 0.269   | -0.36 | 0.119   |
| Year of work experience in medical professional | 0.13  | 0.150   | -0.11 | 0.402   | 0.16  | 0.110   | 0.05  | 0.614   | -0.14 | 0.106   |
| Provide care to HIV/AIDS patients (Yes) | -1.05 | <0.001 | -0.34 | 0.317   | -0.35 | 0.200   | -0.49 | 0.082   | -0.22 | 0.331   |
| Length of time that provide care to HIV/AIDS patients (100 days) | -0.04 | <0.001 | -0.009 | 0.510 | -0.02 | 0.094 | -0.03 | 0.014 | -0.02 | 0.028 |
| Number of HIV/AIDS cases encountered | -0.001 | 0.204 | 0.001 | 0.569 | -0.002 | 0.049 | -0.001 | 0.270 | -0.0008 | 0.469 |
| Training for HIV/AIDS (Yes)          | -0.62 | 0.008   | -0.38 | 0.264   | 0.18  | 0.506   | 0.05  | 0.832   | -0.24 | 0.280   |
| HIV/AIDS knowledge                   | -0.16 | 0.045   | -0.09 | 0.416   | -0.27 | 0.004   | -0.19 | 0.050   | -0.16 | 0.038   |
| Nurses (n = 281)                     |       |         |       |         |       |         |       |         |       |         |
| Age                                  | -0.01 | 0.468   | -0.02 | 0.188   | 0.01  | 0.371   | -0.02 | 0.188   | -0.02 | 0.030   |
| Gender (Male)                        | 0.26  | 0.402   | -0.91 | 0.047   | 0.53  | 0.161   | 0.64  | 0.091   | 0.33  | 0.257   |
| Religion (Buddhism)                  | 0.15  | 0.825   | 1.32  | 0.187   | 0.06  | 0.938   | -0.76 | 0.358   | -0.57 | 0.373   |
| Ethnicity (Lowland people)           | 0.14  | 0.502   | 0.16  | 0.873   | -0.23 | 0.788   | -0.62 | 0.476   | -1.02 | 0.132   |
| Education level (≥ Bachelor)         | 0.03  | 0.935   | -0.72 | 0.233   | -0.19 | 0.692   | 0.005 | 0.991   | -0.46 | 0.240   |
| Type of health care service provider (Registered nurse) | -0.61 | 0.018 | -0.32 | 0.394 | -0.97 | 0.002 | -0.78 | 0.014 | -0.13 | 0.575 |
| Institution of practice (Referral hospital) | 0.05  | 0.843   | 0.07  | 0.852   | -0.16 | 0.628   | 0.08  | 0.797   | -0.32 | 0.230   |
| Year of work experience in medical professional | -0.02 | 0.769 | -0.15 | 0.276 | 0.11  | 0.349 | -0.12 | 0.294 | -0.21 | 0.171 |
| Provide care to HIV/AIDS patients (Yes) | -0.25 | 0.315 | -1.12 | 0.003 | -0.56 | 0.070 | -0.46 | 0.141 | -0.29 | 0.232 |
| Length of time that provide care to HIV/AIDS patients (100 days) | -0.01 | 0.144 | -0.05 | <0.001 | -0.01 | 0.201 | -0.02 | 0.095 | -0.01 | 0.141 |
| Number of HIV/AIDS cases encountered | -0.001 | 0.186 | -0.004 | 0.001 | -0.002 | 0.015 | -0.002 | 0.003 | -0.0004 | 0.569 |
| Training for HIV/AIDS (Yes)          | -0.42 | 0.095   | -0.53 | 0.150   | -0.48 | 0.113   | -0.22 | 0.472   | -0.64 | 0.007   |
| HIV/AIDS knowledge                   | -0.13 | 0.105   | 0.07  | 0.565   | -0.16 | 0.100   | -0.15 | 0.118   | -0.08 | 0.282   |
was less likely to have discriminatory attitudes towards PLWHA. The only statistically significant difference observed with regard to nurses, was that compared to practical nurses, registered nurses were less likely to have discriminatory attitudes (Coef. = −0.61, p = 0.018).

Multiple linear regression showed that doctors with more experience in years with HIV/AIDS patients (Coef. = −0.03, p = 0.001) or with formal HIV/AIDS training, were less likely to show discriminatory intent at work (Coef. = −0.51, p = 0.032). While compared to practical nurses, registered nurses were less likely to hold discriminatory attitudes, (Coef. = −0.56, p = 0.031, Table 5).

### Prejudiced attitudes

As seen in Table 4, doctors educated to bachelor level or above (Coef. = −1.07, p = 0.018) and who worked at referral hospitals (Coef. = −0.95, p = 0.006) were also less likely to have prejudiced attitudes relative to their less educated counterparts and those employed at non-referral hospitals. Factors associated with lower levels of prejudiced attitudes in nurses were providing care to PLWHA at least once (Coef. = −1.12, p = 0.003) and for longer durations (Coef. = −0.05, p < 0.001), and exposure to more PLWHA (Coef. = −0.004, p = 0.001). Male nurses were less likely than female nurses to have prejudiced attitudes towards PLWHA (Coef. = −0.91, p = 0.047).

Multiple linear regression analysis revealed doctors working at referral (central) hospitals were less than

### Table 5 Factors associated with stigmatized attitudes (subscales) of doctors and nurses towards PLHA (Multiple linear regression analysis)

| Characteristics                        | Discrimination intent at work | Prejudiced attitudes | Internalized shame | Fear of AIDS | No good care for HIV patients |
|----------------------------------------|------------------------------|----------------------|--------------------|--------------|-------------------------------|
|                                        | Coef. | p-value | Coef. | p-value | Coef. | p-value | Coef. | p-value | Coef. | p-value |
| **Doctors (n = 277)**                  |       |         |       |         |       |         |       |         |       |         |
| Gender (Male)                          | 0.15  | 0.508   | −0.37 | 0.268   | 0.32  | 0.246   | 0.16  | 0.546   | 0.22  | 0.342   |
| Religion (Buddhism)                    | 0.17  | 0.859   | 0.18  | 0.896   | −0.15 | 0.888   | 1.15  | 0.138   | 0.56  | 0.548   |
| Ethnicity (Lowland people)            | 0.63  | 0.239   | −0.87 | 0.282   | 0.71  | 0.268   | −0.24 | 0.797   | −0.64 | 0.231   |
| Education level (≥ Bachelor)          | 0.36  | 0.288   | −0.81 | 0.110   | −0.62 | 0.128   | −0.44 | 0.276   | −0.23 | 0.493   |
| Type of health care service provider (Physician specialist) | 0.43  | 0.062   | 0.30  | 0.444   | 0.86  | 0.005   | 0.008 | 0.978   | 0.39  | 0.114   |
| Institution of practice (Referral hospital) | 0.02  | 0.917   | −0.79 | 0.040   | −0.49 | 0.125   | 0.51  | 0.069   | −0.49 | 0.056   |
| Year of work experience in medical professional | 0.16  | 0.058   | −0.22 | 0.101   | 0.10  | 0.354   | 0.04  | 0.669   | −0.17 | 0.049   |
| Length of time that provide care to HIV/AIDS patients (100 days) | −0.03 | 0.001   | 0.001 | 0.903   | −0.02 | 0.187   | −0.03 | 0.020   | −0.02 | 0.095   |
| Training for HIV/AIDS (Yes)            | −0.51 | 0.032   | −0.32 | 0.346   | 0.30  | 0.272   | 0.32  | 0.258   | −0.09 | 0.689   |
| HIV/AIDS knowledge                     | −0.11 | 0.181   | −0.04 | 0.711   | −0.24 | 0.014   | −0.16 | 0.090   | −0.13 | 0.097   |
| **Nurses (n = 281)**                   |       |         |       |         |       |         |       |         |       |         |
| Gender (Male)                          | 0.08  | 0.783   | −1.09 | 0.015   | 0.41  | 0.281   | 0.55  | 0.149   | 0.09  | 0.741   |
| Religion (Buddhism)                    | −0.13 | 0.881   | 1.40  | 0.147   | 0.10  | 0.923   | −0.59 | 0.478   | 0.22  | 0.786   |
| Ethnicity (Lowland people)            | 0.53  | 0.453   | −1.39 | 0.280   | −0.23 | 0.790   | −0.13 | 0.901   | −0.06 | 0.150   |
| Education level (≥ Bachelor)          | 0.18  | 0.668   | −0.54 | 0.358   | −0.23 | 0.653   | 0.15  | 0.774   | −0.008 | 0.984 |
| Type of health care service provider (Registered nurse) | −0.56 | 0.031   | −0.13 | 0.724   | −0.92 | 0.003   | −0.73 | 0.021   | 0.03  | 0.904   |
| Institution of practice (Referral hospital) | 0.25  | 0.389   | 0.34  | 0.397   | 0.16  | 0.649   | 0.27  | 0.428   | −0.20 | 0.442   |
| Year of work experience in medical professional | 0.01  | 0.888   | −0.04 | 0.781   | 0.13  | 0.234   | −0.03 | 0.754   | −0.18 | 0.042   |
| Length of time that provide care to HIV/AIDS patients (100 days) | −0.008 | 0.398   | −0.06 | <0.001  | −0.09 | 0.432   | −0.01 | 0.234   | −0.02 | 0.812   |
| Training for HIV/AIDS (Yes)            | −0.34 | 0.170   | −0.24 | 0.523   | −0.36 | 0.234   | −0.01 | 0.957   | −0.58 | 0.014   |
| HIV/AIDS knowledge                     | −0.08 | 0.298   | 0.03  | 0.762   | −0.08 | 0.394   | −0.09 | 0.380   | −0.04 | 0.553   |

NB: For independent variables such as: age, provide care to HIV/AIDS patients and number of HIV/AIDS cases encountered did not put in the model for multivariate analysis, because of multicollinearity.
those working at non-referral (regional/district) hospitals, to express prejudiced attitudes (Coef. = −0.79, p = 0.040). Male nurses were less likely than their female counterparts to express prejudiced attitudes (Coef. = −1.09, p = 0.015). In addition, nurses with more experience of working with HIV/AIDS patients were less likely to express prejudiced attitudes (Coef. = −0.06, p < 0.001).

Internalized shame

Male doctors (Coef. = 0.02, p = 0.049) and those of older age (Coef. = 0.58, p = 0.035), were more likely to exhibit internalized shame towards PLWHA than were female doctors and those of younger age. Other factors associated with doctors expressing lower level of internalized shame were more contact with HIV/AIDS cases (Coef. = −0.002, p = 0.049) and had higher HIV/AIDS knowledge levels (Coef. = −0.27, p = 0.004). In terms of nurses, factors associated with having less internalized shame were being a registered nurse (Coef. = −0.97, p = 0.002) and having come into contact with more PLWHA (Coef. = −0.002, p = 0.015) as seen in Table 4.

Multiple linear regression analysis revealed doctors with higher levels of HIV/AIDS knowledge were less likely than those with lower levels, to have internalized shame regarding PLWHA (Coef. = −0.24, p = 0.014) or to harbor internalized shame (Coef. = 0.86, p = 0.005) compared to physician specialists (Table 5). As seen in Table 5, registered nurses were less likely to have internalized shame (Coef. = −0.92, p = 0.003) than practical nurses.

Fear of AIDS

Doctors with more years of experience in providing care to PLWHA patients being less likely than those with less experience, to exhibit fear towards PLWHA (Coef. = −0.03, p = 0.014). As with feelings of internalized shame, factors associated with nurses having less fear of AIDS were being a registered nurses (Coef. = −0.78, p = 0.014) and being exposed to more PLWHA (Coef. = −0.002, p = 0.003; Table 4).

Multivariate analysis revealed that doctors with longer experience with HIV/AIDS were less likely to be fearful of HIV/AIDS (Coef. = −0.03, p = 0.020) than their less experienced colleagues and that registered nurses were less likely to be fearful of HIV/AIDS (Coef. = −0.73, p = 0.021) than practical nurses.

Good care for HIV patients

Doctors who had provided care to PLWHA for more years (Coef. = −0.02, p = 0.028) and those who had higher HIV/AIDS knowledge levels (Coef. = −0.16, p = 0.038) were less likely to have feelings of not providing good care for HIV/AIDS patients. For nurses, being older (Coef. = −0.02, p = 0.030), having more years of working experience (Coef. = −0.21, p = 0.021) and receiving HIV/AIDS training (Coef. = −0.64, p = 0.007) were associated with lower levels of feelings of not providing good care (Table 4).

Multiple linear regression showed that doctors and nurses with longer years of working experience with HIV/AIDS patients were less likely than their less experienced counterparts to have feelings of not providing good care for those patients (Coef. = −0.17, p = 0.049, Coef. = −0.18, p = 0.042 respectively, Table 5). Furthermore, nurses with formal HIV/AIDS training were less likely to have feelings of not providing good care for HIV/AIDS patients (Coef. = −0.58, p = 0.014; Table 5).

Discussion

This study is the first to report on HIV/AIDS-related stigmatization among healthcare workers in Lao PDR. Of concern, is just under half of participants had been provided with formal HIV training, and nearly 50% of doctors and nurses included in the study had high levels of stigmatizing attitudes towards PLWHA. These attitudes can contribute to missed opportunities for prevention, education, and treatment, and thereby undermine Lao PDR’s efforts to manage and prevent HIV. Across the different health professionals included in this study, lower levels of HIV/AIDS knowledge were associated with higher levels of stigmatizing attitudes towards PLWHA. Higher level of HIV/AIDS knowledge was associated with lower likelihood of internalized shame among doctors. These results were not consistent with the previous study in China [11], though they reflect the findings of previous studies from Nigeria and Belize [1, 6, 43].

This study suggested that stigmatizing attitudes, including discrimination at work, fear of AIDS, and prejudice, among doctors and nurses are less likely with longer periods of experience in treating PLWHA. Doctors, for example, who worked at referral (central) hospitals, where HIV/AIDS care wards have been established, had lower levels of prejudiced attitudes towards PLWHA than those who worked at regional and district hospitals. The assumption is, that through working with PLWHA, healthcare personnel gain more experience and familiarity with HIV/AIDS and, thus, acquire greater willingness to provide better care to HIV/AIDS patients. This finding was similar to that of a study from India [31]. Given these doctors were also working at central level facilities, it may also be that there was a higher level of institutional support and resources to manage HIV/AIDS patients [11]. Institutional level support should include gloves for invasive procedures, sharps containers, soap and water or disinfectant for handwashing, and post-exposure prophylaxis, in case of work-related potential exposure to HIV. It should also include making sure relevant policies, handwashing procedures or other critical
information in key areas in the healthcare setting are visible to support health workers [10]. Health workers being able to protect themselves through universal precautions is important not only in preventing patient to health worker transmission but also in reducing health worker stigma and discrimination towards PLWHA due to fear of causal contact [10].

Physician specialists also showed greater feelings of shame, than did general doctors, stemming from their work in caring for PLWHA in the present study. Since physician specialists may feel that they have more knowledge and higher social standing than general doctors, they might be prone to feeling more shame in interacting with PLWHA [30]. In addition, among nurses, male nurses reported a lower level of prejudiced attitudes than did female nurses. The association could stem from the male-dominated nature of the Lao PDR, as a result of which, women are typically held to a higher moral standard than men and is consistent with studies in China [11] and Belize [6]. It may also relate to the highest prevalence of HIV being in high risk populations, such as sex workers [44], who are mainly perceived to be women and often experience stigmatization, compounded by the criminalization of act of selling sex in the Lao PDR [32].

HIV-related stigma within healthcare settings has been attributed to misperceptions surrounding transmission, a review conducted by Chambers and colleagues [24], however, highlighted how emotions also contribute to HIV-related stigma. Studies undertaken in Nigeria also suggest that medical or scientific education related to HIV is unlikely on its own, to be sufficient in terms of changing practices, and that attitudes and cultural beliefs also need to be addressed [45–48]. This study illustrates that prejudice can also be present in practitioners despite them having a level of understanding about HIV transmission. It supports other research that has highlighted the need for HIV knowledge and awareness raising interventions to take into account not only people’s knowledge needs, but to also acknowledge and address affective aspects as decision making [24]. This relates to the moral aspects of stigma, and the interconnections between moral attributions and the devaluation of certain social groups which, in turn, reinforce the status quo and serve to maintain dominant social values and constructions of what is right and good [24, 49].

Addressing HIV stigma in healthcare workers, therefore, requires a holistic approach that addresses knowledge and fear, creates an enabling environment for the consistent implementation of universal precautions (including sterile rubber gloves, working autoclaves, and access to free HIV testing for providers), and addresses the social and emotional aspects that shape stigmatizing attitudes and practices an increase willingness to work with PLWHA [11, 24, 50]. This may also explain, at least in part, why doctors working at the central level referral hospitals with HIV/AIDS care wards had lower levels of prejudiced attitudes towards PLWHA, as these providers are more likely to have had the capacity to implement universal precautions.

This study had several limitations that should be taken into account in interpreting the results. Firstly, the study used a convenience sampling method to select participants, as a result of which the results might not be generalizable to all healthcare workers and may have led to an under or over-representation of some groups of health workers. Given those who worked at referral hospitals, where HIV/AIDS care wards have been established, had lower levels of prejudiced attitudes towards PLWHA than those working in district hospitals, excluding five district hospitals due to size, means there may be some under reporting of negative attitudes. Secondly, as the issues dealt with were of a sensitive nature, there is a risk of social desirability bias in the doctors’ and nurses’ responses and thus stigmatizing attitudes could be under reported. A self-administered questionnaire, however, was used, by which every participant was free to respond to the questions privately, thus minimizing the risk of such bias. Another limitation of the study is that the questionnaire did not include questions related to knowledge of or perceived capacity to implement universal precautions, which can influence attitudes to working with PLWHA. Despite such limitations, this study is the first study in Lao PDR to assess the stigmatizing attitudes of doctors and nurses towards PLWHA. The results provide information to policy-makers and health facility administrators, suggesting the need for continued education about HIV to health professionals.

Conclusion
This study reveals that health professionals in Vientiane, Lao PDR, often hold stigmatizing attitudes towards PLWHA, and this has been observed elsewhere in low HIV prevalence settings. The study potentially provides a baseline against which interventions could be designed, implemented and evaluated. Given the relatively low levels of formal HIV training and the association between low levels of knowledge and stigmatizing attitudes, addressing the knowledge needs at the individual level is likely to be an important first step in reversing these negative attitudes. Integrating HIV knowledge into pre- and in-service training of doctors and nurses could help to address this. Training should include knowledge of HIV transmission and the application of universal precautions [51]. It should also include building an understanding of what stigma is, how it manifests and the harmful health effects of stigma on individuals, families, the community and the healthcare system [51].
It is also important that education programs address the shame and blame directed at PLWHA, by providing all healthcare workers opportunities to reflect on the underlying values that lead to the shame and blame and to assist them in delinking PLWHA with practices and professions, such as sex work, that are often considered immoral in Lao society. In a low prevalence country such as Lao PDR, exposure of health professionals to PLWHA may be relatively low. Yet, stigmatizing attitudes and prejudice were lower among doctors and nurses with longer periods of experience in treating PLWHA. Given this, including PLWHA in training sessions to provide, with prior training and support, testimonials and co-facilitation can help health workers understand the pernicious effect of stigma [10]. Ongoing monitoring of healthcare worker attitudes and behavior towards individuals with HIV/AIDS is also important, and can be used to evaluate change. Findings from such evaluations can also be fed back to health workers, as a way of helping to build a culture where stigmatizing attitudes are not tolerated.

In addition to interventions at the individual and healthcare facility level, consideration should be given to decriminalizing sex work and amending the current HIV Law which, under Article 69, makes it a criminal offence for a person to deliberately spread HIV infection to others [32]. Such laws can have stigmatizing effects and act as deterrence in accessing HIV services [32]. Progressively increasing access to HIV healthcare services at all levels, including ART, is also important in terms of reducing stigma, as well as providing access to all of those who need it. Ultimately, investing in effective HIV-stigma reduction interventions is important not only from an individual perspective, but also to enhance the uptake of early HIV testing and treatment compliance, given their important role in preventing further HIV transmission.

Additional file

Additional file 1: Questionnaire for doctors’ and nurses’ views on people living with HIV/AIDS. Questionnaire for doctors and nurses views on people living with HIV/AIDS. (DOCX 29 kb)

Abbreviations

AIDS: acquired immune deficiency syndrome; ART: antiretroviral therapy; HIV: Human immunodeficiency virus; PDR: People’s Democratic Republic; PLWHA: People living with HIV/AIDS

Acknowledgements

The authors would like to thank all the participants in this study who gave up their time to complete the survey and the reviewers for their constructive comments.

Funding

No funding was provided for this research.

Availability of data and materials

The dataset supporting the conclusions of this article is available in the Open Science Framework repository [osf.io/c664u].

Authors’ contributions

SV contributed to design the research program data collection, and writing the preliminary report. MJ, KK, JY, KN and VS assisted in the study design, data collection and synthesizing data. JD assisted with analyzing and synthesizing the data and revising the manuscript. All authors contributed to and read manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of the Graduate School of Medicine of the University of Tokyo and by the Ethics Committee of the University of Health Sciences in Lao PDR (No 1539/UHS). All participants indicated their willingness to participate in the study by signing an informed consent form with their initials.

Author details

1. Department of Radiology, Mahasoth hospital, Vientiane, Lao PDR.
2. Department of Community and Global Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan.
3. School of Public Health, The University of Queensland, Brisbane, Australia.
4. Dean of the Faculty of Postgraduate Studies, University of Health Sciences, Ministry of Health, Vientiane, Lao PDR.

Received: 23 May 2016 Accepted: 1 February 2017
Published online: 10 February 2017

References

1. Reis C, Heisler M, Amowitz LL, Moreland RS, Mafeni JO, Anyamele C, Iacopino V. Discriminatory attitudes and practices by health workers toward patients with HIV/AIDS in Nigeria. PLoS Med. 2005;2(8):e743–52.
2. Hassain MB, Kippax S. HIV-related discriminatory attitudes of healthcare workers in Bangladesh. J Health Popul Nutr. 2010;28(2):199–207.
3. Letamo G. The discriminatory attitudes of health workers against people living with HIV. PLoS Med. 2005;2(8), e261.
4. Paxton S, Gonzales G, Uppakaew K, Abraham KK, Okta S, Green C, Nair KS, Parwati Merati T, Thephthien B, Marin M, et al. AIDS-related discrimination in Asia. AIDS Care. 2005;17(4):413–24.
5. Darzinger R. Discrimination against people With HIV and AIDS In Poland. Br Med J. 1994;308(6937):1145–7.
6. Andrewin A, Chien L-Y. Stigmatization of patients with HIV/AIDS among doctors and nurses in Belize. AIDS Patient Care STDs. 2008;22(11):897–906.
7. Nyblade L, Laura N, Aparna J, Manal B, Li L. A brief, standardized tool for measuring HIV-related stigma among health facility staff: results of field testing in China, Dominica, Egypt, Kenya, Puerto Rico and St. Christopher & Nevis. J Int AIDS Soc. 2013;16(3):1–11.
8. Wagner AC, Hart TA, McShane KE, Margoese S, Girard TA. Health care provider attitudes and beliefs about people living with HIV: Initial validation of the health care provider HIV/AIDS Stigma Scale (HPASS). AIDS Behav. 2014;18(12):2397–408.
9. Kinsler JJ, Wong MD, Sayles JN, Davis C, Cunningham WE. The effect of perceived stigma from a health care provider on access to care among a low-income HIV-positive population. AIDS Patient Care STDs. 2007;21(8):584–92.
10. Nyblade L, Stangl A, Weiss E, Ashburn K. Combating HIV stigma in health care settings: what works? J Int AIDS Soc. 2009;12(1):15.
11. Li L, Wu Z, Wu S, Zhao Y, Jia M, Yan Z. HIV-related stigma in health care settings: A survey of service providers in China. AIDS Patient Care STDs. 2007;21(10):753–62.
12. Fife BL, Wright ER. The dimensionality of stigma: A comparison of its impact on the self of persons with HIV/AIDS and Cancer. J Health Soc Behav. 2000;41(1):50–67.
13. Gonzalez A, Solomon SE, Zvolensky MJ, Miller CT. The interaction of mindful-based attention and awareness and disengagement coping with HIV/AIDS-related stigma in regard to concurrent anxiety and depressive symptoms among adults with HIV/AIDS. J Health Psychol. 2006;11(3):403–13.

14. Lee RS, Kochman A, Sikkema KJ. Internalized stigma among people living with HIV/AIDS. AIDS Behav. 2002;6(4):309–19.

15. Geer et al. Uys LR, Wantland D, Makoka L, Chinwa M, Dalmini P, Kohi TW, Mullan J, Naidoo JR, Cuca Y, et al. Perceived HIV stigma and life satisfaction among persons living with HIV infection in five African Countries: A longitudinal study. Int J Nurs Stud. 2007;44(4):475–86.

16. Hobember WL, Human S, Arudo J, Rosa ME, Hamilton MJ, Corless L, Robinson N, Nichols PK, Wantland DJ, Moezzi S, et al. Exploring HIV stigma and quality of life for persons living with HIV infection. J Assoc Nurses AIDS Care. 2009;20(3):161–8.

17. Herk GM. AIDS and stigma. Am Behav Sci. 1999;42(7):1106–16.

18. Goffman E. Stigma: Notes on the management of spoiled identity. Englewood Cliffs: Prentice-Hall; 1963.

19. Eamphas VA, Chaudori SR. From conceptualizing to measuring HIV stigma: A review of HIV stigma mechanism measures. AIDS Behav. 2002;6(3):1160–77.

20. Link BG, Phelan JC. Conceptualizing stigma. Annu Rev Sociol. 2001;27(1):363–85.

21. Parker R, Aggleton P. HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. Soc Sci Med. 2003;57(11):13–24.

22. Herk GM, Caprino JP, Wdaman KS. Stigma, social risk, and health policy: Public attitudes toward HIV surveillance policies and the social construction of illness. Health Psychol. 2003;22:533–40.

23. Mahajen AP, Sayles JN, Patel VA, Remien RH, Sawiars SR, Ortiz DJ, Sekeres G, Coates TJS. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. AIDS (London, England). 2008;22:567–79.

24. Chambers L, Rueda S, Baker D, Wilson M, Deutsch R, Raefer E, Roukie S, Team T, Stigma, HIV and health: a qualitative synthesis. BMC Public Health. 2015;15(1):848.

25. Phelan J, Link BG, Dovidio JF. “Stigma and Prejudice: One Animal or Two?” Soc Sci Med. 2006;63(3):538–67.

26. Nylblade L, MacQuarrie K. Can we measure HIV/AIDS-related stigma and discrimination? Current knowledge about quantifying stigma in developing countries. Washington, DC: USAID; 2006.

27. Genberg BL, Hlavka Z, Konda KA, Maman S, Chariyalertsak S, Chingono A, Mbwambewo J, Modiba P, Van Rooyen H, Celentano DD. A comparison of HIV/AIDS-related stigma in four countries: Negative attitudes and perceived acts of discrimination towards people living with HIV/AIDS. Soc Sci Med. 2009;68(12):2279–87.

28. Rourke M, HIV/AIDS interventions in low prevalence countries: a case study of Albania. Int Soc Sci J. 2005;57(186):639–48.

29. Öktem P. The role of the family in attributing meaning to living with HIV and its stigma in Turkey. SAGE Open. 2015;5(4).

30. Deacon H, Bouille A. Commentary: Factors affecting HIV/AIDS-related stigma and discrimination by medical professionals. Int J Epidemiol. 2007;36(1):185–6.

31. Kermode M, Holmes W, Langkham B, Thomas MS, Gifford S. HIV-related knowledge, attitudes & risk perception amongst nurses, doctors & other healthcare workers in rural India. Indian J Med Res. 2005;122(3):258–64.

32. National Committee for the Control of AIDS. Lao PDR country progress report. Global AIDS response progress country report. Vientiane: National Committee for the Control of AIDS; 2016.

33. Leukai X. Reducing discrimination for HIV/AIDS patients needs to be addressed. Vientiane: Vientiane Times; 2009. p. 1.

34. Lavarn V. Report about stigmatization and discrimination among people living with HIV in Vientiane Capital, Lao PDR. In: Vientiane Vientiane Capital Committee for Control AIDS STI, Ministry of Health. 2011.

35. Lao Statistics Bureau. Statistical Yearbook. Vientiane: Lao Statistics Bureau, Ministry of Planning and Investment; 2012.

36. Akhkhavong K, Papphasrangan C, Phosay C, Vongkolbham M, Phommavong C, Pholensa S. Lao People’s Democratic Republic Health System Review. In: Health Systems in Transition, vol 4. Geneva: World Health Organisation; 2014.

37. Lao PDR health service delivery profile - WHO Western Pacific Region [http://www.wpro.who.int/health_services/service_delivery_profile_lapdr. pdf?ua=1]. Accessed 3 Jan 2013.

38. Biostat. Power and precision (Version 2). Englewood: Biostat; 2000.

39. Stein JA, Li L. Measuring HIV-related stigma among Chinese service providers: Confirmatory factor analysis of a multidimensional scale. AIDS Behav. 2008;12(5):89–95.

40. Draz NY, Neelands TB. Development and validation of a culturally appropriate HIV/AIDS stigma scale for Puerto Rican health professionals in training. AIDS Care. 2009;21(10):259–70.

41. Cianelli R, Ferret L, Norr KF, McCreary L, Irazabal L, Females M, Minner S. Stigma related to HIV among community health workers in Chile. Stigma Res Action. Stigma Res Action. 2011;1(1):3–10.

42. StateCorp. State Statistical Software: Release 12. College Station: StateCorp LP; 2011.

43. Amoran OE. HIV-related stigmatizing attitude and practice among health care workers in Northern Nigeria. J Infect Dis Immun. 2011;3(1):226–32.

44. Ministry of Health. Integrated Biological and Behavioural Survey (IBBS). Lao PDR. Vientiane Ministry of Health; 2014.

45. Ezedinachi EN, Ross MW, Meremiku M, Essien EJ, Emed CB, Ekure E, Ita O. The impact of an intervention to change health workers’ HIV/AIDS attitudes and knowledge in Nigeria: a controlled trial. Public Health. 2002;116(2):106–12.

46. Uwakwe CB. Systematized HIV/AIDS education for student nurses at the University of Ibadan, Nigeria: Impact on knowledge, attitudes and compliance with universal precautions. J Adv Nurs. 2000;32(2):416–24.

47. Earl CE, Penney PJ. Rural nursing students’ knowledge, attitudes, and beliefs about HIV/AIDS: A research brief. J Assoc Nurses AIDS Care. 2003;14(4):70–3.

48. Petro-Nustas W, Kulwicki A, Zumot AF. Students’ knowledge, attitudes, and beliefs about AIDS: A cross-cultural study. J Transcult Nurs. 2002;13(2):118–25.

49. Mills EA. From the physical self to the social body: expressions and effects of HIV-related stigma in South Africa. J Community Appl Soc Psychol. 2008;18:503.

50. Pulerwitz J, Oanh K, Akinwolerewda D, Ashburn K, Nyblade L. Improving hospital-based quality of care by reducing HIV-related stigma: Evaluation results from Vietnam. AIDS Behav. 2015;19(2):2246–56.

51. Oanh KTH, Ashburn K, Pulerwitz J, Ogden J, Nyblade L. Improving hospital-based quality of care in Vietnam by reducing HIV-related stigma and discrimination, a Horizons Final Report. Washington, D.C: Population Council; 2008.