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Comparing the magnitude of discriminatory attitudes toward people living with HIV/AIDS and toward people with mental illness in the Hong Kong general population

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Abstract

The study compared the level of discriminatory attitudes toward people living with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) (PLWHA) and people with mental illness (PMI) and investigated factors associated with the absolute and relative levels of these discriminatory attitudes. An anonymous cross-sectional telephone survey interviewed 604 Chinese adults aged 18-50 years from the general Hong Kong population. Discriminatory attitudes toward both groups are prevalent, and with that toward PLWHA stronger than that toward PMI. Over half (58%) would rather make social contact with PMI than with PLWHA. Among other factors, respondents who perceived PLWHA to be promiscuous or perceived PLWHA to cause apprehensiveness in others had a higher likelihood of being more discriminatory toward PLWHA than toward PMI. These respondents were also more willing to make social contact with PMI than with PLWHA. Factors such as those related to less sympathy or unfavorable perceptions toward PLWHA were associated with discriminatory attitudes toward both PLWHA and PMI. Discriminatory attitudes toward the two groups were positively correlated with one another ($r = 0.58$, $P < 0.001$). PLWHA face stronger discriminatory attitudes than PMI. Value-laden judgment and less frequent opportunities for personal interaction with PLWHA may partially explain the differences. Discriminatory attitudes toward different social groups may share similar underlying roots.

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Introduction

People living with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) (PLWHA) are often discriminated against by others [1–4]. Such discrimination toward PLWHA would compromise the effectiveness of HIV prevention and care programs [5]. People with mental illness (PMI) form another group facing much societal discrimination [6–8]. Different categories of mental illnesses were associated with different levels of negative opinions [9]. Experiencing discrimination or stigma also adversely affects the quality of life of these patients [10, 11]. Few studies have, however, compared the degree of discrimination toward these two groups of patients [12].

Previous studies have identified that some background and social factors such as gender [4, 13], age [4, 13–15], education level [4, 13, 15, 16] and experience of personal interaction with PMI or PLWHA [17–20] were associated with discriminatory attitudes toward PMI or PLWHA, though mixed findings have been reported [21–24]. Nevertheless, there may be attitudinal factors that are

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only relevant to discrimination against PLWHA. Examples include misconceptions about the modes of HIV transmission [4, 14, 16] and value-laden judgment (those whose own behaviors were believed to be responsible for contracting the disease were less likely than others to be supported by the general public) [25, 26].

In Hong Kong, discriminatory attitudes toward PMI have been prevalent [7, 27–29]. Discrimination toward PLWHA in Hong Kong has also been reported in the general adult population [4], in the workplace [30], among service providers [31], among adolescents [32, 33], etc. An unpublished local study by Lau *et al*. [14] demonstrated that stigmatization toward social groups that are vulnerable for HIV infection (e.g. men who have sex with men, drug users) is also associated with stigmatization toward PLWHA.

This study aims to compare the magnitude of discriminatory attitudes toward PLWHA and PMI in the general adult population in Hong Kong. The study investigated characteristics of those who were more discriminatory toward PLWHA than toward PMI. It also tested the hypotheses as to whether these discriminatory attitudes toward PLWHA and toward PMI were correlated with each other. The study also sought to determine whether there were common factors that were associated with discriminatory attitudes toward both PLWHA and PMI.

It was pointed out that the sociocultural aspects of infectious diseases are often less well-known than the epidemiological aspects of infectious diseases [34]. Cultural interpretation of contagion of infectious diseases involves guiding principles that are related to social organization, supernatural powers, etc. and in some societies, there are 'diseases of guilt' and illness that expresses breach of a social rule [34]. Other studies have also reported some diseases (e.g. malaria) which are interpreted as having a supernatural cause [35]. With regard to HIV/AIDS, some people may regard PLWHA as personally responsible for contracting the disease or being punished by the gods. Discriminatory attitudes toward PLWHA have therefore to be understood in a social–cultural context.

Methods

Study population and sampling

A telephone survey, conducted in August 2002, interviewed a random sample of 604 Chinese adults of age 18–50 years from the general population in Hong Kong. Random telephone numbers were selected from up-to-date telephone directories. The household telephone coverage is almost 100% in Hong Kong [36]. Of each sampled household, a member aged 18–50 years and whose past birthday was closest to the day of the interview was invited to participate in the study. Interviews were conducted between 6.00 p.m. and 10.30 p.m. to avoid over-representing unemployed individuals. Unanswered telephone calls were attempted at least two more times on separate evenings before being classified as invalid. The overall response rate, defined as the number of completed questionnaires divided by the number of completed and incomplete questionnaires plus refusals and non-contacts of eligible respondents, was 49.3%, which is comparable with other local telephone surveys [7, 37–39]. Informed verbal consent was obtained from the respondents before the interview commenced.

Measurements

A measurement instrument in Chinese, the Discriminatory Attitude Score (DAS), measuring discriminatory attitudes toward PLWHA was developed in Hong Kong. The items were selected by a process of a literature review, interviewing a group of local PLWHA and a pilot study. It has been used in the local adult [14] and adolescent populations [33]. To measure discriminatory attitudes toward PMI, the instrument was modified by replacing the word 'PLWHA' by 'PMI'. In the original DAS, there were 19 items covering social, personal and legal aspects of discriminatory attitudes. As the item regarding criminalizing sexual activity of PLWHA was not applicable for PMI, it was removed and the present study used a modified 18-item version of DAS (for details about the full version of DAS, see [14]). In this study, the

Cronbach α for DAS(PLWHA) and DAS(PMI) were 0.89 and 0.83, respectively.

Additionally, respondents were asked about their perceptions toward PLWHA and PMI as to whether their sickness is a punishment that they deserve, whether they should feel ashamed of themselves and whether they would make their colleagues apprehensive (see Table II). Respondents were also asked whether they believe that the majority of PLWHA is promiscuous and whether PMI deserve sympathy. The degree of sympathy expressed toward PLWHA contracting HIV via four different modes (blood transfusion, homosexual behaviors, injecting drug use and commercial sex) was also measured and an average sympathy score (ranging from 1 to 10) was calculated for each of these four groups of PLWHA contracting HIV via the four aforementioned modes. They were also asked whether they were more willing to make social contact with PMI than with PLWHA.

Items related to HIV-related knowledge, including the long latency period (A person infected with HIV can remain looking healthy for a long period of time after infection), asymptomatic property of transmission (A healthy-looking person can transmit HIV to others) and the window period (How much time should one wait to take an HIV antibody test, if he/she suspects himself/herself to be exposed to a risk of HIV infection, in order to know about the HIV status) were asked. The number of correct responses to these three questions was recorded. In addition, respondents were asked to mention three routes of HIV transmission and the number of correct responses was recorded. Respondents were also asked about whether they have known someone who is PLWHA or PMI. Data on respondents' sociodemographic characteristics, including gender, age, marital status, religion, monthly household income and housing type were collected.

Statistical analysis

Within-individual responses for individual corresponding items of DAS(PLWHA) and DAS(PMI) were compared using Wilcoxon signed-rank test. The mean DAS(PLWHA) and DAS(PMI) scores were also compared by using a paired *t*-test. The percentages of respondents giving more discriminatory responses either in the DAS(PLWHA) or in the DAS(PMI) were enumerated. Univariate logistic regression analyses were performed to identify factors associated with whether or not respondents had more negative perceptions, or were more willing to make social contact with PMI than with PLWHA, or were more discriminatory toward PLWHA than toward PMI (a five-point difference in the two DAS. As there is no pre-determined cutoff point for comparing differences between two scales, the authors chose a cutoff point that categorized the respondents into two tiers, with one containing approximately one-third of all respondents and the other representing two-thirds of the respondents). Variables with significant univariate odds ratios were then used as candidate variables for multivariate stepwise logistic regression models. Similar univariate and multivariate analyses were also performed to investigate factors that are significantly associated with higher DAS(PLWHA) and higher DAS(PMI) (higher scores defined as those >75th percentile). Statistical analyses were performed using SPSS for Windows 11.01 (SPSS Inc., Chicago, IL, USA) and $P < 0.05$ was taken as statistically significant.

Results

Background characteristics of the respondents

Of the respondents, 48.2% were male; 51.3% were 18–35 years of age; 43.7% were single; 37.6% had received some post-secondary education (>11 years of formal education); 72.3% did not have any religion and 41.1% had a monthly household income of HK$20 000 or less (≤US$2565); 32.5% were living in public housing estates; 5% and 54.2%, respectively, reported having some PLWHA or PMI acquaintance. Further, 87.9% perceived that PMI deserve sympathy and 40.5% perceived that the majority of PLWHA is promiscuous.

Of the respondents, 62.4% knew about the long latency period of HIV infection; 77.5% were aware

of asymptomatic transmission of HIV; only 39.2% knew that HIV antibody could not be detected within 3 months after the infection; 35% gave <2 correct answers to these three questions. Further, 39.9% were able to mention three correct modes of HIV transmission.

The aforementioned data on the background characteristics were not tabulated.

Comparing item responses indicating discriminatory attitudes and negative perceptions toward PLWHA and toward PMI

The results are tabulated in Table I. It is seen that among all respondents, 13 out of the 18 items used in this study demonstrated significantly more discriminatory attitudes toward PLWHA, as compared with PMI (12 items for males and 13 items for females); only two items revealed significantly more discriminatory attitudes toward PMI than toward PLWHA. Similarly, the mean values of the DAS(PLWHA) were significantly higher than that of DAS(PMI) ($P < 0.001$, Table I). The DAS(PLWHA) and DAS(PMI) were significantly correlated with each other ($r = 0.58$, $P < 0.001$).

In 13 out of the 18 items, >20% of the respondents gave more discriminatory ratings to PLWHA items as compared with the corresponding PMI items; the reverse was true only for three of the 18 items (data not tabulated).

Of all respondents, 58% felt more willing to make social contact with PMI than with PLWHA (Table II). With regard to PLWHA, 19% of the respondents believed that PLWHA's sickness is a punishment that they deserve, 12.7% felt that they should feel ashamed of themselves and 56.4% thought that they would make their colleagues apprehensive. By contrast, only 1%, 1% and 44.2% of the respondents reported these attitudes toward PMI, for the same three items, respectively (Table II).

Relatedly, the within-individual differences in the item scores of these three perception items related to PLWHA and PMI were compared. The five responses of these three items ranged from strongly disagree to strongly agree. A positive difference between the PLWHA item score minus PMI item score (e.g. PLWHA/PMI should be ashamed of themselves) indicates that the respondent had more negative perceptions toward PLWHA than PMI. In this study, the respondents demonstrated greater negative perceptions toward PLWHA than PMI as evidenced by a positive difference in scores for 51.5%, 42.9% and 30.7%, of the respondents for the three aforementioned perception items, respectively (see Table II). Respondents demonstrating more negative perceptions toward PMI than PLWHA was, however, relatively rare (2.2%, 1.0% and 18.1%, respectively, for these 3 items, Table II). The patterns for male and female respondents were similar (Table II). Moreover, the paired comparisons of the item scores (on a five-point anchor) related to the three types of negative perceptions toward PLWHA and PMI were statistically significant ($P < 0.05$, Wilcoxon signed-rank test, data not tabulated).

A number of sociodemographic variables such as older age and ever married were significantly associated with respondents having more negative perceptions toward PLWHA as compared with PMI. Less sympathy toward PLWHA and perceptions that the majority of PLWHA is promiscuous were also significantly associated with more negative perceptions toward PLWHA as compared with PMI (Table III).

Factors associated with cases whose DAS(PLWHA) was five points higher than their DAS(PMI)

A five-point difference (DAS(PLWHA) − DAS(PMI)) was arbitrarily chosen to represent a noticeable within-individual difference in discriminatory attitudes toward PLWHA and PMI (reasons stated in the Statistical analysis). A total of 37.7% of the respondents demonstrated a difference of >5 points. From Table IV, both univariate and multivariate analyses showed that respondents who were ever married, were residing in public housing estates, were less sympathetic toward PLWHA, believed that PLWHA were promiscuous and who perceived that PLWHA caused apprehensiveness in their colleagues were more likely than to have a difference of >5 points between DAS(PLWHA)

Table I. *Discriminatory attitudes toward PLWHA and toward PMI (n = 604)*

% Exhibiting discriminating attitudes[a]	Male				Female				All			
	PLWHA %	PMI %	Difference[b]	P^f	PLWHA %	PMI %	Difference[b]	P^f	PLWHA %	PMI %	Difference[b]	P^f
You would avoid having physical contact with PLWHA/PMI. (agree)[c]	60.5	28.5	32.0	<0.001	64.9	37.7	27.2	<0.001	62.7	33.3	29.4	<0.001
It is necessary to enact a law prohibiting PLWHA/PMI visitors from visiting HK (agree)[c]	43.8	23.7	20.1	<0.001	50.3	24.0	26.3	<0.001	47.2	23.8	23.4	<0.001
Insurance companies should refuse PLWHA's/PMI's insurance. (agree)[c]	30.2	7.6	22.6	<0.001	27.5	8.0	19.5	<0.001	28.8	7.8	21.0	<0.001
You would avoid making contact with PLWHA/PMI friends. (agree)[c]	40.9	20.6	20.3	<0.001	37.4	21.8	15.6	<0.001	39.1	21.2	17.9	<0.001
PLWHA/PMI should be prohibited from using public medical facilities. (agree)[c]	16.8	2.7	14.1	<0.001	22.4	3.2	19.2	<0.001	19.7	3.0	16.7	<0.001
All PLWHA/PMI medical staff should be dismissed. (agree)[c]	52.9	37.5	15.4	<0.001	54.0	36.4	17.6	<0.001	53.5	36.9	16.6	<0.001
You would be willing to make personal contact with PLWHA/PMI. (disagree)[d]	32.0	14.4	17.6	<0.001	31.3	19.9	11.4	<0.001	31.6	17.2	14.4	<0.001
You would refuse to work with PLWHA/PMI. (agree)[c]	23.7	14.8	8.9	<0.01	22.0	13.1	8.9	<0.001	22.8	13.9	8.9	<0.001
Employers should refuse to employ PLWHA/PMI staff. (agree)[c]	23.8	15.5	8.3	<0.01	24.9	17.9	7.0	<0.01	24.4	16.7	7.7	<0.001
PLWHA/PMI should move out of their home and not live with their family members. (agree)[c]	14.4	6.2	8.2	<0.001	13.5	6.7	6.8	<0.001	13.9	6.5	7.4	<0.001
You would object to PLWHA/PMI service facilities in your neighborhood. (agree)[c]	27.2	18.6	8.6	<0.01	31.9	26.2	5.7	<0.01	29.7	22.5	7.2	<0.001
It is necessary to enact a law making PLWHA/PMI publicly disclose their HIV status. (agree)[c]	16.2	10.3	5.9	<0.001	23.6	16.9	6.7	<0.001	20.0	13.7	6.3	<0.001
Physicians should have the right to determine whether to serve PLWHA/PMI or not. (agree)[c]	23.0	25.4	−2.4	0.940	30.4	20.4	10.0	<0.001	26.8	22.8	4.0	<0.01

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Table I. *Continued*

% Exhibiting discriminating attitudes[a]		Male				Female				All			
		PLWHA %	PMI %	Difference[b]	P^f	PLWHA %	PMI %	Difference[b]	P^f	PLWHA %	PMI %	Difference[b]	P^f
PLWHA/PMI should try to minimize their attendance of public activities. (agree)[c]		24.7	21.4	3.3	0.266	27.2	24.6	2.6	0.224	26.0	23.1	2.9	0.101
You would want your PLWHA/PMI neighbors to move away. (agree)[c]		16.8	16.8	0.0	0.856	17.6	19.5	−1.9	0.405	17.2	18.2	−1.0	0.634
You would not feel uncomfortable if you had PLWHA/PMI neighbors. (disagree)[d]		28.2	27.5	0.7	0.876	26.8	33.5	−6.7	<0.05	27.5	30.6	−3.1	0.144
All PLWHA/PMI school staff should be dismissed. (agree)[c]		33.3	38.5	−5.2	<0.05	34.8	40.9	−6.1	<0.05	34.1	39.7	−5.6	<0.01
PLWHA/PMI should be prohibited from looking after their children aged <18 years (agree)[c]		27.5	38.8	−11.3	<0.001	30.7	39.0	−8.3	<0.01	29.1	38.9	−9.8	<0.001
Item average		29.77	20.49	9.28	31.73	22.76	8.97	30.78	21.66	9.12			
Discriminatory Attitudes Score (DAS(PLWHA)/DAS(PMI))[e]	Mean	47.56	43.20	4.36	<0.001[g]	48.35	44.15	4.2	<0.001[g]	47.96	43.69	4.27	<0.001[g]
	SD	10.50	8.13			10.19	8.52			10.34	8.34		
	Cronbach alpha	0.89	0.82			0.89	0.85			0.89	0.83		

[a]There were two sets of similar statements, one set refers to PLWHA and another refers to PMI. All statements were anchored on a five-point scale, from strongly disagree to strongly agree. [b]Difference in the two percentages. [c]Agreed or strongly agreed with the statement. [d]Disagreed or strongly disagreed with the statement. [e]Summative scores of the above mentioned 18 discriminatory items, one for PLWHA (DAS(PLWHA)) and one for PMI (DAS(PMI)). [f]Wilcoxon signed-rank test. [g]Paired *t*-test.

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Table II. *Negative perceptions*[a] *toward PLWHA and toward PMI*

	Male	Female	All
% Respondents having negative perceptions			
PLWHA's sickness is a punishment that they deserve. (% agree)[b]	17.5	20.4	19.0
PLWHA should feel ashamed of themselves. (% agree)[b]	12.4	13.1	12.7
PLWHA would not make other colleagues apprehensive. (% disagree)[c]	55.7	57.1	56.4
PMI's sickness is a punishment that they deserve. (% agree)[b]	1.0	1.0	1.0
PMI should feel ashamed of themselves. (% agree)[b]	1.4	0.6	1.0
PMI would not make other colleagues apprehensive. (% disagree)[c]	41.6	46.6	44.2
% Respondents with more negative perception toward PLWHA than toward PMI			
PLWHA/PMI's sickness is a punishment that they deserve. (agree)	52.9	50.2	51.5
PLWHA/PMI should feel ashamed of themselves. (agree)	42.3	43.5	42.9
PLWHA/PMI would not make other colleagues apprehensive. (disagree)	31.3	30.1	30.7
% Respondents with more negative perception toward PMI than toward PLWHA			
PLWHA/PMI's sickness is a punishment that they deserve. (agree)	1.4	2.9	2.2
PLWHA/PMI should feel ashamed of themselves. (agree)	1.0	1.0	1.0
PLWHA/PMI would not make other colleagues apprehensive. (disagree)	17.2	18.9	18.1
% Respondents who would rather make social contact with PMI than with PLWHA. (agree)[b]	58.8	57.2	58.0

[a]There were two similar sets of question items, referring to PLWHA and PMI, respectively. These items were measured on a five-point scale (from strongly disagree to strongly agree). [b]Agreed or strongly agreed with the statement. [c]Disagreed or strongly disagreed with the statement.

and DAS(PMI). One perception item related to PLWHA (feel ashamed of themselves) was univariately but not multivariately significant in this regard (Table IV).

Relative willingness to make social contact with PLWHA and PMI

As shown in Table II, 58% of all respondents would rather make social contact with PMI than with PLWHA. Those with a lower education level, those who did not have any PLWHA acquaintances, those who reported less sympathy toward PLWHA, those believed that that PLWHA are promiscuous and that PLWHA would make other colleagues apprehensive were both univariately and multivariately significantly associated with a relatively higher willingness to make social contact with PMI than PLWHA (Table IV).

Factors associated with DAS(PLWHA) and DAS(PMI)

The results of the univariate and multivariate analyses are listed in Table V. It can be seen that the factors associated with the two DAS were very similar and most of the significant factors were associated with both DAS(PLWHA) and DAS(PMI). Multivariately, higher DAS(PLWHA) was associated with lower education attainment, not being acquainted with PLWHA, lower sympathy score (toward PLWHA), the perception that PLWHA should feel ashamed of themselves, feeling that PLWHA would make other colleagues apprehensive and the belief that most of the PLWHA were promiscuous. Factors associated with DAS(PMI) included age, whether or not they were acquainted with a PMI and whether they believed that PMI would make colleagues apprehensive. Other factors related to PLWHA, such as the sympathy score, and the perception that PLWHA should feel ashamed of themselves were also associated with discriminatory attitudes toward PMI (Table V).

Discussion

Consistent with the results documented in other local studies [7, 27–29], there exists a substantial level of discrimination toward PMI. However, it is very clear that the level of discriminatory attitudes

Table III. *Factors associated with respondents having more negative perceptions to PLWHA, as compared with PMI*

		Perceived PLWHA more negatively[a] (PLWHA/PMI's sickness is a punishment that they deserve)		Perceived PLWHA more negatively[a] (PLWHA/PMI should feel ashamed of themselves)		Perceived PLWHA more negatively[a] (PLWHA/PMI would not make other colleagues apprehensive)	
		OR_U[b]	OR_M[c]	OR_U[b]	OR_M[c]	OR_U[b]	OR_M[c]
Gender	Male	1.00	—	1.00	—	1.00	—
	Female	0.90		1.05		0.95	
Age groups (years)	18–35	1.00	1.00	1.00	—	1.00	—
	36–50	1.39*	ns	1.21		0.85	
Education level	⩽Secondary 5	1.00	—	1.00	—	1.00	—
	⩾Matriculation	0.86		0.97		0.87	
Marital status	Married/else[d]	1.00	1.00	1.00	—	1.00	—
	Single	0.66*	ns	0.79		0.94	
Religion	Yes	1.00	—	1.00	—	1.00	—
	No	0.85		1.08		0.99	
Housing type	Others	1.00	—	1.00	1.00	1.00	—
	Public housing	0.86		0.69*	0.68*	1.16	
Household income (HK$)	⩽20 000	1.00	—	1.00	1.00	1.00	1.00
	>20 000	0.83		0.97	ns	0.66*	0.66*
	Others[e]	0.73		0.53*	ns	0.65	0.65
Number of correct answer to the three HIV-related knowledge items[f]	<2	1.00	—	1.00	—	1.00	—
	⩾2	0.93		0.99		0.92	
Number of correct HIV transmission routes mentioned	<2	1.00	—	1.00	—	1.00	—
	⩾2	0.92		0.95		0.92	
Having PLWHA acquaintance	No	1.00	—	1.00	—	1.00	—
	Yes	0.61		0.56		0.68	
Average sympathy score (toward PLWHA)	⩾4	1.00	1.00	1.00	1.00	1.00	—
	<4	1.90***	1.64**	1.51*	ns	0.96	
The majority of PLWHA is promiscuous[g]	Else[h]	1.00	1.00	1.00	1.00	1.00	—
	Agree[i]	2.47***	2.29***	2.09***	2.18***	1.15	
Having PMI acquaintance	No	1.00	—	1.00	—	1.00	—
	Yes	1.34		1.21		0.90	
PMI deserve sympathy[g]	Else[j]	1.00	—	1.00	—	1.00	—
	Disagree[k]	1.10		0.84		0.82	

[a]Within-individual score difference for PLWHA and corresponding PMI item (PLWHA − PMI > 0). [b]Univariate odds ratios (OR). [c]Odds ratios obtained from stepwise multivariate logistic regression using univariately significant variables as candidate variables. [d]'Else' included those divorced, separated or widowed, etc. [e]'Others' included other answers like 'not certain', or 'did not want to tell', etc. [f]The three HIV-related knowledge items included 'A person infected with HIV can remain looking healthy for a long period of time after infection', 'A healthy-looking person can transmit HIV to others' and 'the window period of HIV detectability'. [g]The item was measured on a five-point scale (from strongly disagree to strongly agree). [h]Answers included 'strongly disagree', 'disagree' or 'undecided'. [i]Agreed or strongly agreed with the statement. [j]Answers included 'strongly agree', 'agree' or 'undecided'. [k]Disagreed or strongly disagreed with the statement. *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. ns, not significant. —, not considered as candidate variables in the stepwise multivariate analysis as such were univariately non-significant.

and negative perceptions toward PLWHA are much stronger than those related to PMI. Close to 60% of the respondents admitted that they would rather make social contact with PMI than with PLWHA. Although both PLWHA and PMI appear to experience high levels of stigmatization, the situation appears much worse for PLWHA. It should be noted that respondents were asked to express their

Table IV. *Factors associated with relative willingness to contact PLWHA/PMI and a within-individual difference of (DAS(PLWHA) − DAS(PMI)) > + 5 points*

		(DAS(PLWHA) − DAS(PMI)) > + 5 points		More willing to make social contact with PMI than with PLWHA	
		OR_U[a]	OR_M[b]	OR_U[a]	OR_M[b]
Background factors					
Gender	Male	1.00	—	1.00	—
	Female	1.16		0.94	
Age groups (years)	18–35	1.00	—	1.00	—
	36–50	1.04		1.21	
Education level	⩽Secondary 5	1.00	—	1.00	1.00
	⩾Matriculation	0.75		0.66*	0.68*
Marital status	Married/else[c]	1.00	1.00	1.00	—
	Single	0.68*	0.65*	0.82	
Religion	Yes	1.00	—	1.00	—
	No	0.71		0.79	
Housing type	Others	1.00	1.00	1.00	1.00
	Public housing	1.48*	1.68**	1.49*	ns
Household income (HK$)	⩽20 000	1.00	1.00	1.00	—
	>20 000	0.76	ns	0.99	
	Others[d]	0.51*	ns	0.75	
HIV-realted factors					
Number of correct answer to the three	<2	1.00	—	1.00	—
HIV-related knowledge items[e]	⩾2	1.03		1.24	
Number of correct HIV transmission	<2	1.00	—	1.00	—
routes mentioned	⩾2	0.90		0.79	
Having PLWHA acquaintance	No	1.00	—	1.00	1.00
	Yes	0.49		0.29**	0.33*
Average sympathy score (toward PLWHA)	⩾4	1.00	1.00	1.00	1.00
	<4	1.73**	1.56*	1.76**	1.45*
PLWHA's sickness is a punishment	Else[g]	1.00	—	1.00	1.00
they deserve[f]	Agree[h]	1.36		2.36***	ns
PLWHA should feel ashamed of	Else[g]	1.00	1.00	1.00	1.00
themselves[f]	Agree[h]	1.78*	ns	2.82***	ns
PLWHA would not make other	Else[i]	1.00	1.00	1.00	1.00
colleagues apprehensive[f]	Disagree[j]	2.99***	2.90***	2.17***	2.16***
The majority of PLWHA is promiscuous[f]	Else[g]	1.00	1.00	1.00	1.00
	Agree[h]	1.87***	1.60*	2.28***	1.81**
PMI-related factors					
Having PMI acquaintance	No	1.00	—	1.00	—
	Yes	1.26		1.07	
PMI deserve sympathy[f]	Else[i]	1.00	—	1.00	—
	Disagree[j]	0.59		0.67	
PMI would not make other	Else[i]	1.00	—	1.00	—
colleagues apprehensive[f]	Disagree[j]	1.11		0.98	

[a]Univariate odds ratios (OR). [b]Odds ratios obtained from stepwise multivariate logistic regression using univariately significant variables (including marginally significant ones, $P < 0.1$) as candidate variables. [c]'Else' included those divorced, separated or widowed, etc. [d]'Others' included other answers like 'not certain', or 'did not want to tell', etc. [e]The three HIV-related knowledge items included 'A person infected with HIV can remain looking healthy for a long period of time after infection', 'A healthy-looking person can transmit HIV to others' and 'the window period of HIV detectability'. [f]The item was measured on a five-point scale (from strongly disagree to strongly agree). [g]Answers included 'strongly disagree', 'disagree' or 'undecided'. [h]Agreed or strongly agreed with the statement. [i]Answers included 'strongly agree', 'agree' or 'undecided'. [j]Disagreed or strongly disagreed with the statement. *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. ns, not significant. —, not considered as candidate variables in the stepwise multivariate analysis as the variable was univariately non-significant.

Table V. *Background, PLWHA- and PMI-related factors associated with DAS(PLWHA) and DAS(PMI)*

		Univariate analysis		Multivariate analysis	
		DAS(PLWHA) (>75th percentile) OR_U	DAS(PMI) (>75th percentile) OR_U	Model 1[a] DAS(PLWHA) (>75th percentile) OR_M	Model 2[a] DAS(PMI) (>75th percentile) OR_M
Background factors					
Gender	Male	1.00	1.00	—	—
	Female	1.05	1.23		
Age groups (years)	18–35	1.00	1.00	1.00	1.00
	36–50	1.61*	2.54***	ns	2.71***
Education level	⩽Secondary 5	1.00	1.00	1.00	1.00
	⩾Matriculation	0.44***	0.49**	0.44**	ns
Marital status	Married/else[b]	1.00	1.00	1.00	1.00
	Single	0.53**	0.41***	ns	ns
Religion	Yes	1.00	1.00	—	—
	No	0.86	0.96		
Housing type	Others	1.00	1.00	—	—
	Public housing	1.27	1.11		
Household income (HK$)	⩽20 000	1.00	1.00	1.00	1.00
	>20 000	0.67*	0.56**	ns	ns
	Others[c]	0.85	1.09	ns	ns
HIV-related factors					
Number of correct answer to the three HIV-related knowledge items[d]	<2	1.00	1.00	1.00	1.00
	⩾2	0.66*	0.65*	ns	ns
Number of correct HIV transmission routes mentioned	<2	1.00	1.00	—	—
	⩾2	0.65	0.77		
Having PLWHA acquaintance	No	1.00	1.00	1.00	1.00
	Yes	0.10*	0.11*	0.12*	ns
Average sympathy score (toward PLWHA)	⩾4	1.00	1.00	1.00	1.00
	<4	2.79***	2.39***	1.97**	1.86**
PLWHA's sickness is a punishment they deserve[e]	Else[f]	1.00	1.00	1.00	1.00
	Agree[g]	3.13***	2.68***	ns	ns
PLWHA should feel ashamed of themselves[e]	Else[f]	1.00	1.00	1.00	1.00
	Agree[g]	5.35***	3.63***	3.76***	2.58**
PLWHA would not make other colleagues[e] apprehensive	Else[h]	1.00	1.00	1.00	1.00
	Disagree[i]	6.46***	1.59*	8.56***	ns
The majority of PLWHA is promiscuous[e]	Else[f]	1.00	1.00	1.00	1.00
	Agree[g]	3.18***	2.39***	1.98**	ns
PMI-related factors					
Having PMI acquaintance	No	1.00	1.00	—	1.00
	Yes	0.88	0.50***		0.49***
PMI deserve sympathy[e]	Else[h]	1.00	1.00	—	1.00
	Disagree[i]	0.40	0.34*		ns
PMI would not make other colleagues apprehensive[e]	Else[h]	1.00	1.00	1.00	1.00
	Disagree[i]	1.85**	2.37***	ns	2.18***

The two summative scores, DAS(PLWHA) and DAS(PMI) were dichotomized into 1 (>75th percentile) and 0 (⩽75th percentile).Univariate odds ratios (OR). Odds ratios obtained from stepwise multivariate logistic regression using univariately significant variables as candidate variables. [a]A stepwise multivariate logistic regression model using univariately significant background factors, PLWHA-related factors and PMI-related factors as candidate variables. [b]'Else' included those divorced, separated or widowed, etc. [c]'Others' included other answers like 'not certain', or 'did not want to tell', etc. [d]The three HIV-related knowledge items included 'A person infected with HIV can remain looking healthy for a long period of time after infection', 'A healthy-looking person can transmit HIV to others' and 'the window period of HIV detectability'. [e]The item was measured on a five-point scale (from strongly disagree to strongly agree). [f]Answers included 'strongly disagree', 'disagree' or 'undecided'. [g]Agreed or strongly agreed with the statement. [h]Answers included 'strongly agree', 'agree' or 'undecided'. [i]Disagreed or strongly disagreed with the statement.

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. ns, not significant; —, not considered as candidate variables in the stepwise multivariate analysis as such were univariately non-significant.

general views on each of these two groups as a whole, rather than report on their personal experiences with individual PLWHA or PMI.

Of the respondents, 40.5% believed that the majority of PLWHA is promiscuous. Those with this belief were more likely than others to be more discriminatory, hold more negative perceptions toward PLWHA than toward PMI and to be more willing to make social contact with PMI than with PLWHA. Discrimination toward PLWHA may be a reflection of value-laden judgment and disapprobation of their presumed lifestyles which may partially explain why the observed magnitude of discriminatory attitudes toward PLWHA is consistently stronger than that toward PMI.

DAS(PLWHA) and DAS(PMI) were strongly correlated with each other and a set of sociodemographics and perception factors predicted both scales. It is speculated that discrimination toward different diseased groups in a society may have both common and unique features. Reduction of discriminatory attitudes in one group may bring about changes in another group. Therefore, in addition to addressing the unique features of a particular social group, education campaigns should thereby also address general principles of discrimination and promote social acceptance of different marginalized groups as a whole. To compare discriminatory attitudes toward different social groups, a 'general' instrument needs to be developed. The DAS used in this study suggest the feasibility of such an instrument. Further studies may apply DAS to other social groups subjected to discrimination.

Consistent with the results of different studies [17, 18], respondents who were acquainted with PLWHA were more likely than others to be less discriminatory toward PLWHA. The prevalence of HIV in Hong Kong is, however, low [40]. PLWHA were also unwilling to disclose their HIV-positive status to others (even including their family members) and many of the PLWHA felt discrimination to be one of the major problems that they faced [41]. Only two PLWHA who passed away had disclosed their identity to the general public in Hong Kong. HIV education programs involving them have been shown to be effective [42]. Similar findings have been reported in other countries [43]. Lacking a chance to interact with PLWHA and to remove potential misunderstandings is therefore an obstacle for removing discrimination toward PLWHA. The social environment therefore also discourages PLWHA to disclose their HIV status to others, resulting in a vicious cycle.

Respondents acquainted with PMI also tended to be less discriminatory toward PMI. Those acquainted with PLWHA would be less likely than others to express that they are more willing to make social contact with PMI than with PLWHA. About 50% and 5% of the respondents, respectively, were acquainted with PMI or some PLWHA. Hence, the general public therefore has more opportunities for removing discrimination toward PMI through personal interaction with PMI, as compared with the case of PLWHA. Again, this may also partially explain why PLWHA are more likely to be discriminated in Hong Kong, as compared with PMI.

The Hong Kong government enacted the Disability Discrimination Ordinance to reduce discrimination toward disabled people, including those with chronic diseases such as HIV/AIDS or mental illness. With regard to PLWHA and PMI, there is no apparent policy differential between the two groups and governmental committees have been set up for both groups to tackle discrimination-related issues. The intensity of education efforts for the PMI group may, however, be stronger than that of the PLWHA group, due to the longer history of the anti-discriminatory campaigns and larger number of stakeholders involved in the PMI group.

The aforementioned arguments are supported by the study results that those who were not acquainted with PLWHA and believed that the majority of PLWHA is promiscuous were more likely than others to be those having stronger discriminatory attitudes toward PLWHA, as compared with the case of PMI. Other factors include having a lower socioeconomic status, showing less sympathy toward PLWHA and holding the perception that PLWHA would make other colleagues apprehensive.

Consistent with other studies in the international literature, those with lower education level and lower socioeconomic status were more likely than

others to be discriminatory toward PLWHA [16]. Age, marital status and HIV-related knowledge were univariately but not multivariately significant, possibly due to the inclusion of the average sympathy score variable in the multivariate models. Religion was however not significantly associated with DAS(PLWHA). It is speculated that though religious people are thought to be more sympathetic toward disadvantaged groups in society, they may also be more conservative and more likely to exercise value-laden judgments toward PLWHA. Further studies are warranted.

Stigma has been defined as 'an attribute that is deeply discrediting' and that reduces the status of an individual possessing the undesirable characteristics in the eyes of society [44]. The concept has been widely used and elaborated [45–48]. Yet, the measuring of this construct has been criticized as too vaguely defined and too individually focused [45]. Different components such as labeling, stereotyping, separating, emotional reactions, status loss and discrimination and dependence of stigma on power have been mentioned [46]. Similarly, different measures have been presented (such as opinions about mental illness and community attitudes toward the mentally ill). We adopt an approach of collecting items that PLWHA would believe to represent cases of discrimination against them. We are not addressing stigma in a broad sense, but only as it is related to discrimination.

The study has several limitations. First, the results are self-reported and reporting bias due to social desirability may exist. The study is, however, anonymous. Further, if reporting bias exists, discrimination would most likely be sharper than what was reported. As the primary goal is to compare the magnitude of discriminatory attitudes toward PLWHA and PMI, reporting bias for both groups, if exist, would have been counterbalanced. Second, telephone surveys were conducted. However, many HIV-related or PMI-related studies or those investigating discrimination were based on data collected by telephone surveys [e.g. 7, 4, 14, 29]. Third, the overall response rate was ~50%, and selection bias may exist. The response rate is, however, comparable with local surveys [7, 37–39] and the age composition of the sample is comparable with those of the Census data [49]. We acknowledge that there are different types of mental illness, which may be associated with different level of discriminatory attitudes [9]. However, as there is no study showing that the Hong Kong general public is able to distinguish between different types of mental illness, we use the global term 'PMI'. This approach has also been used in other local studies [7, 27–29]. Concerning the content of the questionnaire, questions concentrated more on HIV-related topics but few questions were related to PMI. This is due to the limited length of the questionnaire. There is a difference between held attitudes and enacted stigma, which is defined as actual experience of discrimination [50]. The questions of this study focused on attitudes rather than actual behaviors, as exposure to encounters with PMI and PLWHA may not be very prevalent in Hong Kong. It is well-acknowledged that attitudes do not necessarily predispose one's actual behaviors [51]. Caution should thus be taken when interpreting the results. Studies of discriminatory attitudes have been reported [1, 2, 4] and such studies are still meaningful. The study, however, has the strength of asking the same DAS questions for PLWHA and PMI to the same respondents, so that within-individual differences in discriminatory tendencies were assessed directly.

It can be seen that PLWHA face stronger discriminatory attitudes as compared with PMI. Value-laden judgment (such as commercial sex, homosexual behaviors, etc. being immoral) and lack of chances for personal interaction with PLWHA may be among the causes that account for the differences. Opportunities to interact with PLWHA would be very infrequent where HIV prevalence is low.

There is a common Chinese saying 'what you plant is what you get' reflecting the belief that one is expected to be punished by the gods if he/she did something wrong. The traditional Chinese culture disapproves of such behaviors as homosexuality and commercial sex [52]. That is possibly why this study shows that many respondents believed that the disease is a punishment received by the PLWHA. That is possibly why Hong Kong,

although a modernized society with a large proportion of the population attaining a higher education level, still exhibits a very high level of discriminatory attitudes toward PLWHA. It is speculated that discrimination against PLWHA would be strong in other Chinese societies.

The observations from this study may apply to other societies. It can also be argued that although different social groups may each possess unique characteristics, discrimination toward various groups may share common features. Education programs should address general principles and may in such manners target on multiple groups. The policy implications are that advocacy activists working for different marginalized groups should be made aware of the 'layering effects' of discrimination [53]. There is a compelling need for them to undertake collaborative efforts and form strategic alliances. Efforts to promote a more positive image for PLWHA, and to convince the public that they are victims of a disease, are warranted. Further studies comparing discriminatory attitudes toward different social groups in order to understand both the common and particular features related to discrimination are also warranted.

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Conflict of interest statement

None declared.

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