

Attitudes and Beliefs of Singapore Health Care Professionals Concerning HIV/AIDS

G D Bishop, H M L Oh, H Y Swee

Department of Social Work and Psychology
National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260
G D Bishop, BA, MS, PhD, Associate Professor
H Y Swee, BA, Department of Medicine
Changi General Hospital, 2 Simei St 3, Singapore 529889
H M L Oh, MBBS, MMed (Int Med), Consultant
Correspondence to: A/Prof G D Bishop

ABSTRACT

Aim of Study: This study examines the beliefs and attitudes of Singapore doctors, dentists, and nurses concerning HIV/AIDS and persons living with HIV/AIDS (PWAs).

Method: A mail survey was done of all doctors and dentists in Singapore as well as a random sample of 1,500 nurses from the Singapore Nursing Board Register.

Results: The results showed that respondents held accurate beliefs concerning transmission of HIV via sex and needle sharing but a significant proportion also expressed belief in transmission via everyday social contact. Respondents were aware of universal precautions when treating persons with HIV/AIDS but tended to be overly cautious in low/no risk situations. A substantial proportion of respondents indicated little or no knowledge or experience with AIDS-related conditions and the majority believed that most health care professionals are unprepared to care for PWAs. Further, there was evidence of substantial stigmatisation and fear of treating PWAs, both of which were significantly and negatively correlated with accuracy of beliefs about HIV transmission and universal precautions.

Conclusion: These results point to important misconceptions about HIV/AIDS held by Singapore health care professionals as well as stigma towards and fear of treating PWAs. These are areas that need to be addressed through better professional education concerning HIV/AIDS. This education needs to address both the factual misconceptions about HIV/AIDS as well as the stigma associated with this disease and the fears that health care professionals have of treating PWAs.

Keywords: AIDS, HIV, attitudes, health care professionals, Singapore

INTRODUCTION

In order for health care professionals to be effective agents for AIDS education and also provide appropriate and humane care for persons with human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) they need to be knowledgeable about HIV and AIDS and adopt caring and non-judgmental attitudes towards persons living with HIV/AIDS (PWAs). Yet there still exist a number of misconceptions about HIV/AIDS as well as negative attitudes that serve to reduce the effectiveness of health care professionals in these areas⁽¹⁻³⁾.

Stigmatisation and fear are central topics in a psychosocial understanding of HIV/AIDS⁽⁴⁻⁶⁾. Research on the attitudes and beliefs about HIV/AIDS in various countries including Singapore has noted considerable fear of interacting with PWAs⁽⁵⁻⁷⁾. Such fears are also found among health care professionals and are intensified by the possibility of contracting HIV through contact with infected blood and body fluids^(3,8,9). Concern about the potential for contracting HIV during patient care is very real and has led to the development of universal precautions for preventing such transmission⁽¹⁰⁾. Stigmatisation by health care professionals of PWAs also appears to be widespread with such stigmatisation identified among the reasons why some health care professionals are reluctant to treat PWAs. Numerous reports on health care professionals' attitudes and beliefs about HIV/AIDS have pointed to significant negative attitudes held concerning PWAs, blaming of PWAs for their condition and other indications of stigmatisation^(3,8,11). Further, stigmatisation has been shown to be associated with misconceptions about how HIV is spread as well as demands for repressive measures against PWAs⁽¹⁾.

The survey reported here was undertaken to examine Singapore health care professionals' knowledge of HIV/AIDS and universal precautions when treating HIV infected patients as well as their attitudes and beliefs concerning HIV/AIDS and PWAs. Situated near established epicentres of the AIDS epidemic, Singapore currently has a relatively low rate of HIV infection. As of the end of 1997, 731 Singaporeans were reported to have been infected with HIV since 1985 when the first case of HIV infection was detected here. Of these, 241 have died, 133 have full blown AIDS and the rest are asymptomatic⁽¹²⁾. HIV infection is a notifiable condition in Singapore and currently, all Singaporeans with HIV infection or AIDS are treated at the Communicable Disease Centre of the Tan Tock Seng Hospital. One result of this segregation of patients with HIV/AIDS is that many health care professionals in Singapore have little or no direct contact with such patients. However, the number of cases of HIV infection continues to grow and with that increase comes an increased likelihood for health care professionals of coming in contact with PWAs.

To date, only two studies of the attitudes and beliefs of Singapore's health care professionals concerning HIV/AIDS have been published. In 1987 Lee, Yong, and Tan⁽¹³⁾ surveyed the attitudes and beliefs of Singapore doctors and dental surgeons using a mail survey. Their findings indicated widespread concern about treating PWAs as well as perceived inadequacy by respondents in their knowledge and experience with AIDS-related conditions. Sixty-four percent of the 770 respondents felt that nurses taking care of PWAs are at high risk of getting AIDS; 71% felt that they would have difficulty with the sexual practices of PWAs and 80% felt that their staff would be very upset if they were to treat PWAs. Also, a large portion indicated little or no knowledge or experience with various AIDS-related conditions. Nine years later, Chan et al⁽¹⁴⁾ conducted another mail survey assessing doctors' and dental surgeons' knowledge, attitudes, beliefs and practices concerning HIV/AIDS. The results of this survey indicated that doctors and dental surgeons were well versed in the facts of the sexual transmission of HIV but a significant number believed in transmission through respiratory and oral routes. More than 90% of the respondents indicated that they were comfortable dealing with questions related to HIV transmission

and prevention and roughly 80% felt comfortable dealing with issues relating to the diagnosis and clinical manifestations of the disease. However, less than half felt comfortable with questions related to its treatment. More than 80% agreed that physicians have an ethical responsibility to treat PWAs but only half would do so if given a choice.

In addition to these published studies, there have been at least two unpublished studies of Singapore health care providers' beliefs and attitudes concerning HIV/AIDS. A study of 217 doctors at a tertiary care hospital in Singapore⁽¹⁵⁾ found that most were knowledgeable about HIV but one in five did not practice universal precautions. Another one in five did not provide counselling prior to HIV tests; one in seven believed that HIV could be transmitted through the air or via the oral-fecal route and three in ten did not believe that condoms are effective in preventing the spread of HIV. Similarly, an unpublished study of nurses in five local hospitals⁽¹⁶⁾ found that nurses had a good knowledge of HIV/AIDS but one third did not practice universal precautions and attitudes toward PWAs were strongly influenced by the mode of transmission, with gay men being most heavily stigmatised. These surveys provide useful information on the attitudes and beliefs of Singapore's health care providers with respect to HIV/AIDS but have a number of limitations. Firstly, the information on nurses is very limited. Only one unpublished study is available and even that is limited to nurses in specific hospitals and only covers a limited range of topics. This is unfortunate as nurses are closely involved in the care of PWAs and those nurses working with PWAs are likely to spend more time in direct contact with patients than are doctors or dentists. In addition, nurses often play an important role in educating lay people concerning health matters. Secondly, none of these studies has gone below the surface on questions relating to universal precautions to examine misconceptions that health care providers have about precautions and only one⁽¹⁶⁾ examined stigmatising attitudes that health care professionals may hold toward PWAs. Finally, none of these studies has explored the relationships between misconceptions that health care providers have concerning routes of HIV transmission, erroneous beliefs about universal precautions and concerns about treating patients. The research reported here was undertaken to extend previous findings by including a representative sample of nurses and also explicitly considering questions relating to specific misconceptions held by health care professionals concerning modes of HIV transmission, erroneous beliefs about universal precautions, stigmatisation of PWAs, fears related to treating PWAs and the relationships among these variables.

METHOD

Sample. Data for this study were obtained between October 1996 and May 1997 through questionnaires mailed to 4,150 doctors, 1,180 dentists^a and 1,500 nurses in Singapore. All doctors and dentists in Singapore were included in the sample whereas the nurses were a random sample obtained from the Singapore Nursing Board Register. Respondents were sent a copy of the questionnaire through the mail with a cover letter describing the study and asking for their participation and a pre-addressed stamped envelope for returning the questionnaire to the investigators. For doctors and dentists, reminder cards were sent to all respondents two weeks after the initial mailing asking them to return the questionnaire if they had not already done so. The nurses were given four weeks to return the questionnaire, after which a second questionnaire was sent to those who had not yet responded. Altogether, 2,310 questionnaires were returned for an overall response rate of 33.8%. Of these, 1,253 questionnaires were returned from doctors, 377 from dentists and 680 from nurses, contributing to the response rates of 30.2%, 39.9% and 45.3%, respectively. Of those who returned the questionnaire, 42 doctors, 12 dentists and 36 nurses indicated that they were not currently practising and thus, were eliminated from the sample.

Analysis of the demographics for the final sample indicated that doctors and dentists were predominantly male, 68.6% and 60.3%, respectively, whereas nurses were predominantly female, 93.5%. Ages ranged from 19 to 84 years with doctors being slightly older, $M = 39.4$, than dentists, $M = 36.3$, or nurses, $M = 37.1$. Respondents from all three groups were typically Singaporean, Chinese, and married. Nurses were less likely to be Singaporean, 78.1%, than either doctors, 88.3%, or dentists, 88.4%, and also less likely to be Chinese, 75.% vs 89.2% and 92.0%. Doctors were more likely to be married, 67.3%, than either dentists, 60.2%, or nurses, 57.4%. The largest group of both doctors and dentists reported practising in private clinics, 44.6% and 74.1%, respectively, whereas the largest group of nurses reported practising in restructured hospitals, 36.3%. Among doctors, 55.2% reported that they had treated one or more patients with HIV/AIDS with 80.7% of dentists and 64.3% of nurses indicating treatment of PWAs. Not surprisingly, the differences between groups on each of the demographic variables were statistically significant at $p < .001$.

Questionnaire. The questionnaire for this study was in English and took up four pages, printed double sided on two sheets. Topics covered included beliefs about possible routes by which HIV can be transmitted, beliefs about universal precautions for health care professionals, self-ratings of knowledge and experience with respect to different AIDS-related conditions as well as general attitudes and beliefs about HIV/AIDS and persons living with HIV/AIDS. In addition, the first section of the questionnaire asked about the demographic characteristics of the respondents, including their age, race, gender, marital status, nationality, type of practice and whether they had ever treated PWAs. To ascertain beliefs about the ways in which HIV can be transmitted, respondents were given a list of 11 possible routes and asked to indicate their beliefs about which of them were ways in which HIV could be spread using a four-point scale ranging from Strongly Disagree through Strongly Agree. Beliefs about universal precautions were ascertained by asking respondents to indicate their agreement or disagreement, using the same four-point scale, with eight statements about universal precautions, four of which were correct and four of which were incorrect. For knowledge and experience with AIDS-related conditions, respondents were presented with six conditions (AIDS, candida, Kaposi's sarcoma, lymphoma, opportunistic infections and pneumocystis) and asked to separately rate their knowledge and experience for each as being none, low, moderate, or high. These questions were only asked of doctors and nurses, as dentists are generally not directly involved in treating the conditions listed and hence these questions were felt to be less relevant to them. Finally, beliefs and attitudes about AIDS as a disease and PWAs were assessed by asking respondents to agree or disagree with a series of statements concerning different AIDS-related issues.

RESULTS^b

Beliefs about HIV transmission. The first question addressed concerns beliefs about the ways in which HIV can be transmitted. Data on these beliefs are presented in Table I. The percentages of respondents agreeing with each item were computed and compared using one-way ANOVA and pairwise t-tests using the arcsin transformation for proportions^(17,18). As can be seen in this table, the respondents were well informed about the fact that HIV can be spread through sex and the sharing of needles with an infected person. More than 98% of respondents from all three groups agreed that HIV can be spread in these ways and no differences were obtained between groups. Also, about 80% of respondents in each group indicated that one could get HIV through blood transfusions outside of Singapore which, given the lack of adequate blood screening in some countries in the surrounding region, is an accurate perception. At the same time, less than 20% saw a risk of HIV transmission from blood transfusions in Singapore which has stringent screening for all blood donations.

Although respondents expressed accurate views concerning HIV transmission through blood and sexual contact, there was also a substantial proportion of respondents who appeared to believe in HIV transmission through everyday social contact. Fifty-nine percent of doctors, 52.8% of dentists and 66.8% of nurses agreed that HIV could be passed through kissing and approximately 25% of doctors and dentists and 35% of nurses believed that it can be contracted through being coughed or sneezed on by an infected person. A further 10.6% of doctors, 11.8% of dentists and 25.2% of nurses agreed that HIV can be passed by mosquitoes and insects whereas 8.3% of doctors, 7.5% of dentists and 15.8% of nurses believe that one can get HIV by working near an infected person. In each of these cases, statistically significant differences were obtained between groups with nurses showing more agreement with these routes of transmission than doctors or dentists. All three groups also indicated concerns about providing care for

PWAs with between 25% and 30% of each group agreeing that one can get HIV by providing care for an infected person. Differences between groups were not statistically significant for this item. Fortunately, only 1% to 3% of respondents indicated that they believed that HIV could be spread by shaking hands with an infected person.

We also examined the overall accuracy of the respondents' beliefs about HIV transmission by computing the percentage of correct answers to the items in Table I. Comparison of the accuracy scores using one-way ANOVA indicated significant differences between groups, $F(2, 2208) = 28.38$, $p < .0001$, with nurses having the lowest scores, $M = 77.03$, which differed significantly from scores for both doctors, $M = 82.77$, and dentists, $M = 82.81$, which did not differ from each other.

Beliefs concerning universal precautions. Data on beliefs about universal precautions are given in Table II. These data indicate both accurate and inaccurate beliefs. The vast majority of respondents agreed that universal precautions include washing one's hands immediately after coming in contact with blood or other body fluids and the use of protective eye-wear when there may be splashing of blood or body fluids. For the latter item, nurses showed significantly less agreement than did dentists. Doctors did not differ significantly from either dentists or nurses. Respondents also agreed with the statement that health care professionals have no need to fear being infected if they follow universal precautions and indicated that they were careful to use universal precautions with all patients. For this item, doctors showed the least agreement whereas dentists showed the most agreement. Respondents also generally disagreed with the statement that universal precautions are necessary only with patients known to have AIDS or be HIV infected. Agreement for this item was significantly greater among doctors and nurses than among dentists.

Although respondents showed strong agreement with correct items about universal precautions, responses to three incorrect items indicated that they tend to be overly cautious. Sixty-four percent of doctors along with 71% of dentists and 86% of nurses agreed that special disinfectants are required for cleaning blood spills even though this is not true. Further, more than half of all doctors, 71.7% of dentists and 80.4% of nurses believe that rooms of patients with AIDS or HIV infection require special cleaning procedures and between 52% and 80% of respondents believe that protective gloves are required whenever one comes in contact with a patient who is possibly HIV infected regardless of the presence of blood or open wounds. Statistically significant differences were obtained between groups for these items with doctors showing the least agreement and nurses showing the most agreement with the items concerning blood spills and cleaning of patient rooms, whereas dentists showed the greatest agreement concerning the use of protective gloves.

Understanding of universal precautions was also examined by computing the percentage of the eight items which each respondent answered correctly. Comparisons of these scores between groups by one-way ANOVA indicated significant differences between the groups, $F(2, 2208) = 33.84$, $p < .0001$, with the mean for nurses, $M = 64.56$, being significantly lower than the means for either doctors, $M = 71.01$, or dentists, $M = 68.04$, which did not differ significantly from each other.

Self-rated knowledge and experience with AIDS-related conditions. Turning next to self-rated knowledge and experience with AIDS-related conditions (Table III), we find that a substantial percentage of doctors and nurses see themselves as lacking in these areas. Also, statistically significant differences were obtained between the two groups for all items. Dentists did not answer these questions, even though a high proportion reported treating PWAs or persons infected with HIV, as they are generally not directly involved in the treatment of the conditions listed. For lymphoma, only 34.6% of doctors saw themselves as having a moderate or high level of knowledge as compared with 61.7% of nurses with similar percentages for AIDS. Candida ranked as the condition for which the largest percentage of doctors saw themselves as having moderate or high levels of knowledge (72%) and was the only condition for which the percentage of doctors indicating a moderate or high level of knowledge exceeded that for nurses, 55.6%. For opportunistic infections, 46.7% of doctors and 53.1% of nurses indicated a moderate or high level of knowledge whereas the corresponding figures for pneumocystis were 30.1% and 40.5% and those for Kaposi's sarcoma were 13.7% and 33.2%. To examine the overall self-ratings of knowledge, responses (1 = none, 2 = little, 3 = moderate and 4 = high) for each respondent were summed across diseases to obtain an overall knowledge score. Coefficient α for this scale was 0.84. Comparison of doctors and nurses indicated significantly higher scores for nurses, $M = 14.40$, than doctors, $M = 13.32$, $t(1815) = 6.60$, $p < .0001$.

Next we find that the percentage of doctors and nurses, seeing themselves as having a moderate or high level of experience with the listed conditions, was substantially lower than the percentages for knowledge. Again, all differences between doctors and nurses were statistically significant at $p < .001$ and for all conditions except candida, nurses were more likely to report a moderate or high level of experience than doctors. For lymphoma, only 13% of doctors as compared with 39.3% of nurses, indicated moderate or high levels of experience while for AIDS, the corresponding figures were 4.6% and 15.1%. For candida, 50% of doctors reported moderate or high levels of experience as compared with 34.2% of nurses. For opportunistic infections, the figures were 22.6% for doctors compared with 38.2% for nurses, whereas the corresponding figures for pneumocystis were 9.2% and 20.5% and for Kaposi's sarcoma, 1.6% and 13.6%. As with knowledge, an overall experience score was computed by summing responses across diseases, $\alpha = 0.80$. Here as well, nurses had significantly higher scores, $M = 11.16$, than did doctors, $M = 6.96$, $t(1798) = 9.57$, $p < .0001$.

Beliefs about HIV/AIDS. Next we examined the respondents' beliefs about the various aspects of HIV/AIDS by asking them to indicate their agreement or disagreement with a series of belief statements. These statements and their responses are given in Table IV. Statements are classified according to whether they are concerned with treatment issues, reflect AIDS-stigma, or relate to other issues. Looking first at statements related to treatment issues, we find that more than three-fourths of the respondents in our study felt that all doctors, dentists or nurses should be trained in the treatment of patients with HIV/AIDS while at the same time, two-thirds or more felt that most members of their profession are unprepared to care for PWAs and between 65% and 76% felt that it is best to train a few specialists to care for AIDS patients and that HIV-infected patients should be treated in special clinics. For each of these items except the one concerning special clinics, significant differences were found between groups. Of the three groups, nurses showed the greatest agreement with the statements that all health care professionals should be trained to treat PWAs and that a few specialists should be trained to treat such persons. However, doctors showed the greatest agreement with the statement that most health care professionals are unprepared to treat patients with AIDS or HIV infection. Respondents also expressed concern about the possible hazards of treating PWAs with between 72% and 92% of respondents agreeing that needlestick injuries as well as exposure to open wounds carry a high risk of transmitting HIV; 39% to 56% stating that health care professionals who treat PWAs are at a high risk of getting AIDS and 62% to 66% indicating that they are fearful of getting AIDS from patients with AIDS or HIV infection. Differences between groups concerning fear of getting HIV from patients were not statistically significant whereas differences on the items concerned with needlesticks, open wounds and risk of getting AIDS from patients were. Dentists and nurses expressed greater concern about needlesticks than did doctors whereas dentists expressed greater concerns about open wounds than did doctors or nurses and nurses indicated greater concern about getting AIDS from patients than did either doctors or dentists. Half to two-thirds of respondents agreed that "people in the health care system seem to be unwilling to treat persons with AIDS or who are HIV-infected", with doctors and dentists more likely to show agreement than nurses. On the positive side, more than two-thirds of the doctors and roughly 60% of dentists and nurses indicated that they would not be upset if they were asked to care for PWAs. Interestingly, whereas 60% of doctors and 69% of dentists felt that their staff would be upset if they treated PWAs, only about one-third of the nurses stated that they would be "very upset if AIDS or HIV-infected patients were treated where I work".

Concerns about treating PWAs were further explored by combining six of the items concerned with perceived dangers as well as reluctance to treat PWAs (Table IV) into a Fear of Treatment Scale. Responses for each of the items were added together to obtain a summed score after reversing the item "I would not be upset if I were asked to take care of patients with AIDS or who are HIV infected". Coefficient α for this scale was 0.67. Higher scores on this scale indicate greater treatment fear. Comparison of the means for this scale indicated significant differences between groups, $F(2,2205) = 20.07$, $p \leq .0001$, with doctors, $M = 16.02$, scoring significantly lower than either dentists, $M = 17.21$, or nurses, $M = 16.79$, who did not differ from each other.

Turning now to statements reflecting AIDS-stigma, we find a combination of derogation of and sympathy for individuals with HIV/AIDS. On the one hand, the respondents indicated negative feelings about individuals with HIV/AIDS and those at high risk through agreement with such statements as "Homosexuals and other persons at high risk of AIDS/HIV have endangered society through their high risk activities", 78.7% to 85.3%, "Because of AIDS, I am less tolerant of people who engage in casual sex", 39.5% to 61.0%, "I am more fearful of homosexuals because of AIDS", 40.0% to 54.1%, and "AIDS is punishment for immoral behaviour", 27.6% to 36.2%. On the other hand, 63.6% of doctors, 52.7% of dentists and 53.9% of nurses indicated that they were sympathetic to the misery caused by AIDS among homosexuals and persons engaging in casual sex and more than 50% of each group stated that they would feel comfortable working with a male homosexual. Differences between groups were statistically significant for all but two of these items with nurses expressing the most negative attitudes and doctors generally expressing the least negative attitudes.

To further examine the overall levels of stigma concerning PWAs and those at high risk for HIV infection, the eight items in this section were summed to form an overall Stigma Scale, following the reversal of the items "I am sympathetic to the misery caused by AIDS among homosexuals and persons who engage in casual sex", and "I would feel comfortable working with a male homosexual". Coefficient α for the Stigma Scale was 0.78. Comparison of the means for the three groups indicated that the groups differed significantly from each other, $F(2,2192) = 42.91$, $p \leq .0001$, with nurses showing the highest levels of stigma, $M = 20.13$, dentists next, $M = 18.79$, and doctors having the lowest levels, $M = 18.08$. All pair-wise comparisons were statistically significant.

Respondents generally agreed that everyone carrying HIV will eventually develop AIDS, 48.8% to 63.6% and felt that people are engaging in less casual sex because of AIDS, 52.4% to 63.3%. Also, there was general disagreement with the statement that reports of AIDS have been exaggerated, 76.6% to 86.7% disagreeing, and that there is nothing that can be done to protect oneself from getting AIDS, 94.7% to 97% disagreeing. Significant differences were found only for the second item with doctors showing significantly more disagreement than dentists. Nurses showed responses between those for doctors and dentists and did not differ significantly for either group.

Correlations between accuracy, knowledge, stigmatisation and treatment fear. Finally, to examine the relationship among accuracy of knowledge of HIV transmission, accuracy of beliefs about universal precautions, knowledge and experience with HIV-related conditions, stigmatisation and treatment fear, correlations were computed between the summary scores for these variables. These correlations, presented in Table V, indicate that accuracy of beliefs about universal precautions and accuracy of knowledge of HIV transmission were significantly and positively correlated with each other and both were significantly and negatively correlated with stigma and treatment fear. Also, stigma was significantly and positively correlated with treatment fear. Knowledge of AIDS-related conditions showed statistically significant but weak relationships with accuracy of HIV transmission and universal precautions as well as AIDS stigma. Experience with AIDS-related conditions was uncorrelated with any of these three variables. Both knowledge and experience with AIDS-related conditions were significantly and negatively related to treatment fear, although these correlations were quite modest in size.

DISCUSSION

It is reassuring that nearly all of the respondents had accurate beliefs about the spread of HIV through sexual and blood contact. However, the number of Singapore health care professionals who believe that HIV can be transmitted through what has been termed casual contact is disturbing. Half to two-thirds of the respondents agreed that HIV can be contracted through kissing, with nurses being the most likely to endorse this fallacy. Although there has been one case reported in which HIV may have been transmitted through so called "deep kissing", in which the originally seronegative partner was apparently infected through contact with infected blood in the partner's saliva⁽⁹⁾, this is at most a very uncommon route of transmission and kissing cannot generally be characterised as a way in which HIV is transmitted. In addition, one-fourth to one-third of respondents believed that HIV can be contracted by being coughed or sneezed on and more than a quarter believed that one can get it by providing care for an infected person and from 10% to 25% believed in transmission by mosquitoes or other insects. Generally, nurses held less accurate beliefs about HIV transmission than did doctors or dentists.

These data raise concerns about the kinds of advice that some health care professionals may be giving lay people about HIV transmission and indicate that there is still much to be done in educating Singapore health care professionals concerning the lack of transmission via everyday social contact. It is interesting to note that the pattern of results obtained with health care professionals parallels those found in a recent survey of our general population⁽⁷⁾. In that survey, respondents also had accurate beliefs about transmission via sex and shared needles but indicated belief in casual social transmission. The extent of belief in casual transmission was generally higher in the general population; for instance, approximately 45% of lay respondents believed that HIV could be transmitted by mosquitoes or other insects as compared with 10% to 15% in the present survey, but the patterns were similar and the percentages not as different as one might like. For example, roughly 40% of lay respondents agreed with transmission through being sneezed or coughed on as compared with 25% to 35% among health care professionals. As a whole, these data argue that much more attention needs to be given to educating health care professionals about the nature of HIV transmission and the evidence demonstrating that HIV is only transmitted through intimate blood and sexual contact and not through casual social transmission. Such education for health care professionals can also be expected to have an indirect impact on the beliefs of the lay public concerning HIV transmission, with health care professionals providing their patients and others with a more accurate understanding of HIV and its transmission.

Turning to universal precautions, we find a similar combination of accurate and inaccurate beliefs. On the one hand, all three groups agreed that one should immediately wash our hands after coming in contact with patients' blood or body fluids, that protective eyewear is necessary where there might be splashing of blood or body fluids and felt that there was no need to fear being infected with HIV if one is careful with universal precautions. On the other hand, there is also evidence that health care professionals tend to be overly cautious. This was revealed in their agreement with three incorrect items. Despite the fact that none of these are part of the universal precautions as detailed by the Centres for Disease Control⁽¹⁰⁾, half to four-fifths of respondents agreed that special disinfectants are required for cleaning up blood spills, special procedures are necessary for cleaning the rooms of PWAs and protective gloves are required whenever having contact with a PWA regardless of the presence of blood or open wounds. It would appear that the respondents were adopting a "better safe than sorry" approach. While this is an understandable approach, such actions also tend to further stigmatise PWAs and present unnecessary psychosocial barriers in treatment. As such, steps need to be taken to counter these inaccurate beliefs. Not surprisingly, beliefs about universal precautions correlated significantly and positively with the beliefs about HIV transmission. Specifically, those health care professionals with more accurate beliefs about HIV transmission also had more accurate beliefs about universal precautions, indicating that misconceptions about universal precautions are related to the belief in the transmission of HIV through casual contact.

This relationship again highlights the necessity of correcting misconceptions health care professionals have about the ways in which HIV is and is not transmitted. Finally, it is interesting to note that of the three groups, doctors were the least likely to state that they used universal precautions with all of their patients and had the lowest belief in their effectiveness. More than four out of five doctors indicated that they were careful to use universal precautions with all patients and saw them as effective. However, this points to the need to convince the one in five disagreeing in these two areas of the effectiveness of universal precautions and the need to practice them.

Knowledge and experience with AIDS-related conditions is another area where deficiencies were evident. For only a minority of conditions did more than half of the doctors or nurses rate their knowledge or experience as being moderate or high with all but one of these being related to knowledge. Only for candida did 50% of doctors rate their experience as being moderate or high. This latter is almost certainly a result of the fact that candida infection is common and frequently seen in a setting of diabetes mellitus and antibiotic therapy. Oropharyngeal and esophageal candidiasis are included as AIDS-related conditions but candida is certainly not specific to AIDS leading to the high ratings for knowledge and experience. In many respects, the overall pattern of results indicating generally low knowledge and experience with AIDS-related conditions is not surprising since care for PWAs in Singapore is localised in one hospital. Despite this localisation, however, 55% of doctors and 64% of nurses stated that they had treated one or more PWAs, although in most cases, the number of patients treated was small. The relatively low levels of rated knowledge and experience corroborates the finding by Chan et al⁽¹⁴⁾, that less than half of the respondents in their study were conversant with the treatment of AIDS-related conditions and points to the need for more intensive efforts to train doctors and nurses in dealing with these conditions. Interestingly, a higher proportion of nurses reported high or moderate levels of knowledge and experience than did doctors. However, this finding most likely reflects different standards between groups for what constitutes moderate to high levels of knowledge and experience.

In their responses to questions concerning AIDS as a disease and in particular those items relating to stigma and fear of treating PWAs, respondents showed a mixture of positive and negative attitudes. There was a high level of agreement that all health care professionals should be trained to treat PWAs but also agreement that most are unprepared to treat such persons and a more than half of the respondents in each group agreed that the people in the health care system seem unwilling to provide such treatment. There was also a fair amount of fear of treating PWAs as evidenced by questions concerning the likelihood of getting HIV from needlestick injuries or open wounds and more than three in five respondents stated that they were fearful of getting AIDS from HIV-infected patients. Evidence was also found for stigmatisation in that roughly four out of five respondents in each group agreed that individuals at high risk for HIV have endangered society with their activities and approximately 30% of respondents in each group agreeing that AIDS is punishment for immoral behaviour. Conversely, roughly three in five respondents in each group indicated that they would not be upset if they were asked to care for PWAs. Overall, dentists and nurses showed the highest levels of AIDS treatment fear and stigma, although the differences between professions were not marked.

It is instructive to note that treatment fear and stigma were significantly and positively correlated and that each was significantly and negatively correlated with accuracy of beliefs about HIV transmission and universal precautions. This indicates that stigma and treatment fear are inversely related to basic knowledge about the ways in which one contracts HIV and ways in which one can avoid such exposure in health care settings. Although causality cannot be attributed on the basis of these correlations, these findings are consistent with the possibility of effecting a reduction of stigma and treatment fear through correcting misconceptions about HIV transmission and the use of universal precautions. It is also interesting to note that neither knowledge nor experience with AIDS-related conditions was strongly associated with stigma or treatment fear. Even though three of the possible four correlations were statistically significant, they were small in size. This suggests that neither increased medical knowledge of AIDS-related conditions nor greater experience with them is likely to have much effect on stigma or treatment fear. Rather, it would seem more effective to directly address misconceptions about HIV transmission and universal precautions as an approach to reducing stigma and treatment fear. In addition, stigma and treatment fear need to be addressed directly in their own right.

CONCLUSION

On the whole, the results of this study point to a number of positive aspects of the knowledge and beliefs of the Singapore health care professionals concerning HIV/AIDS. However, they also point to several areas of deficiency, particularly relating to misconceptions about HIV transmission through casual contact, over-cautiousness with universal precautions, knowledge and experience with AIDS-related conditions, and stigma towards and fear of treating PWAs, that need to be addressed through better professional education concerning HIV/AIDS. Of particular importance is education to correct misconceptions that health care professionals have concerning the transmission of HIV through casual social contact.

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FOOTNOTES

a. In Singapore, the term dental surgeons is used to designate individuals with degrees in dentistry whereas dentists includes individuals who, though registered, learned dentistry through apprenticeship. The sample included in this study includes all individuals registered with the Singapore Dental Board. The vast majority of dental respondents (95.1%) indicated that they had either a degree or post-graduate training. The term dentist as used in this report refers to anyone registered with the Singapore Dental Board.

b. Due to the large sample sizes as well as the large number of comparisons between groups, α for all between groups comparisons was set at .001. Although this is a conservative approach, it serves to reduce the likelihood that differences might be statistically significant solely by chance and eliminates consideration of differences that are statistically significant but trivial in actual size.

Table I - Beliefs about contracting AIDS (% agreeing)

HIV can be spread by:

	Doctors	Dentists	Nurses	p
Having sex with an infected person	99.7a	99.7a	98.7a	ns
Sharing needles with an infected person	99.4a	99.4a	98.3a	ns
Receiving a blood transfusion outside of Singapore	82.9a	77.8a	81.7a	ns
Kissing an infected person	59.0a	52.8a	66.8	< .001
Being coughed or sneezed on by an infected person	25.4a	25.7ab	35.4a	< .001
Providing care for an infected person	25.8a	26.5a	29.2a	ns
Mosquitoes and insects	10.6a	11.8a	25.2	< .001
Receiving a blood transfusion in Singapore	13.2a	12.6ab	19.6b	< .001
Working near an infected person	8.3a	7.5a	15.8	< .001
Shaking hands with an infected person	1.2a	3.1a	1.2a	ns

Notes: Respondents were also asked about the spread of HIV through donating or giving blood. However, this item is not included here as the phrasing of the item proved to be ambiguous as to whether the person was giving or receiving the blood donation.

a,b means in the same row with a common subscript not significantly different at $p < .001$.

Table II - Universal precautions (% agreeing)

Item	Doctors	Dentists	Nurses	p
Universal precautions include washing one's hands immediately if one comes into contact with a patient's blood or body fluids	97.3a	95.2a	95.6a	ns
Protective eyewear is required in any situation in which there might be splashing of blood and other body fluids	97.0ab	98.9a	93.9b	< .001
I am always careful to use universal precautions with all patients	83.7	98.3	94.2	< .001
If a health care professional is careful about using universal precautions when treating patients, there is no need to fear being infected with HIV	81.1	91.0a	88.3a	< .001
Special disinfectants are required for cleaning up blood spills if a patient is known or believed to be infected with HIV or have AIDS	64.2a	71.1a	86.3	< .001
Universal precautions for avoiding HIV infection require that rooms of patients with AIDS or HIV infection be cleaned using special procedures	50.6	71.7a	80.4a	< .001
Protective gloves are required whenever coming into contact with a patient who might have AIDS or be HIV infected, regardless of the presence of blood or open wounds	52.2	80.1	67.0	< .001
Universal precautions are necessary only with patients who have known to be infected with HIV or have AIDS	16.2a	8.9	17.3a	< .001

a,b means in the same row with a common subscript not significantly different at $p < .001$.

Table III - Knowledge and experience with AIDS-related conditions

Condition	Percentage of indicating moderate or high levels of		
	Doctors	Nurses	p
I. Knowledge			
Lymphoma	34.6	61.7	< .001
AIDS	37.7	65.5	< .001
Candida	72.0	55.6	< .001
Opportunistic infections	46.7	53.1	< .001
Pneumocystis	30.1	40.5	< .001
Kaposi's sarcoma	13.7	33.2	< .001
II. Experience			
Lymphoma	13.0	39.3	< .001
AIDS	4.6	15.1	< .001
Candida	50.0	34.2	< .001
Opportunistic infections	22.6	38.2	< .001
Pneumocystis	9.2	20.5	< .001
Kaposi's sarcoma	1.6	13.6	< .001

Table IV - Beliefs about HIV/AIDS (% agreeing)

Items	Doctors	Dentists	Nurses	p
A. Treatment issues				
All doctors/dentists/nurses ¹ in the community should be trained to treat AIDS or HIV infected patients	76.9a	82.0ab	88.3b	< .001
Needle stick injuries carry a high risk of transmitting HIV*	72.1	87.1a	90.0a	< .001
HIV-infected patients should be treated in special clinics for such patients	68.1a	74.4a	74.8a	ns
Exposure to open wounds carries a high risk of transmitting HIV*	81.8a	91.9	79.0a	< .001
It is best to train a few specialists to care for people with AIDS or HIV infection	70.6ab	65.2a	76.5b	< .001
I am fearful of getting AIDS from patients who have AIDS or who are HIV infected*	61.9a	61.9a	65.8a	ns
Most doctors/dentists/nurses ¹ are unprepared to care for patients with AIDS or HIV infection	84.0	66.2a	68.1a	< .001
Doctors/dentists/nurses ¹ who take care of AIDS/HIV positive patients are at high risk of getting AIDS*	39.4a	40.0a	56.5	< .001
I would not be upset if I were asked to take care of patients with AIDS or who are HIV infected*	68.0a	60.2ab	57.3b	< .001
I would not want (my staff) ² to draw blood from someone with AIDS or who is HIV infected	43.7a	_ c	39.9a	ns
People in the health care system seem to be unwilling to treat persons with AIDS or who are HIV infected	68.9a	67.1a	52.0	< .001
Professional journals have provided sufficient or adequate information to train nurses to care for patients with AIDS	40.9	62.5a	62.1a	< .001
Professional associations have provided adequate training opportunities for professionals to care for AIDS/HIV infected patients	21.5	38.9	52.3	< .001
If I were to treat AIDS/HIV-infected patients, my staff would be very upset/I would be very upset if AIDS or HIV infected patients were treated where I work* ⁽³⁾	60.2a	68.9a	33.9	< .001
B. AIDS-stigma				
Homosexual and other persons at high risk of AIDS/HIV have endangered society through their high risk activities**	78.7a	79.6ab	85.3b	< .001
Because of AIDS, I am less tolerant of people who engage in casual sex**	39.5	50.1	61.0	< .001
I am more fearful of homosexuals because of AIDS**	40.0a	45.7ab	54.1b	< .001
I am sympathetic to the misery caused by AIDS among homosexuals and persons who engage in casual sex**		63.6	52.7a	53.9a
I .001				
I would feel comfortable working with a male homosexual**	58.9a	56.4a	51.1a	ns
AIDS is punishment for immoral behaviour**	27.6a	30.3ab	36.2b	< .001
People with AIDS/HIV have brought this problem on themselves**	32.7a	28.9a	41.4	< .001
I would feel uncomfortable working with a colleague who is known to engage in casual sex**	32.7a	41.2a	40.0a	ns
C. General beliefs				
Everybody who carries HIV will eventually develop AIDS	48.8a	54.6ab	63.6b	< .001
People are engaging in less casual sex since the onset of AIDS	56.5a	63.3a	52.4a	ns
The reports of AIDS have been exaggerated	13.4a	23.4b	18.7ab	< .001
There is nothing a person can do to protect himself from getting AIDS	3.0a	5.3a	4.1a	ns

Notes:

- a,b : Percentages with common subscripts not different from each other at p I .001.
c : This question was not asked of dentists.
1 : The profession listed was matched to the sample.
2 : Material in parentheses added for questionnaires sent to doctors.
3 : Statement before the slash was used for questionnaires sent to doctors and dentists whereas the statement after the slash was used for questionnaires sent to nurses.
* : Questions making up the Fear of Treatment Scale
** : Questions making up the AIDS Stigma Scale

Table V - Correlations between summary variables

Scale	1	2	3	4	5
1. HIV transmission					
2. Universal precautions	0.37**				
3. Knowledge of AIDS-related conditions ¹	0.07*	0.08*			
4. Experience with AIDS-related conditions ¹	0.01	0.04	0.62**		
5. AIDS stigma	-0.30**	-0.27**	-0.08*	-0.03	
6. Treatment fear	-0.33**	-0.31**	-0.19**	-0.11**	0.44**

Notes:

* p < .01

** p < .001

¹ Includes only doctors and nurses