

A Knowledge, Attitudes, Beliefs and Practices (KABP) Survey on HIV Infection and AIDS Among Doctors and Dental Surgeons in Singapore

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Abstract

An anonymous postal questionnaire survey studying the knowledge, attitudes, beliefs and practices on human immunodeficiency virus (HIV) infection was conducted among all registered medical and dental practitioners in Singapore in 1996. In all, 1523 replies were received, yielding a response rate of 29.3%. The level of knowledge regarding transmission and prevention was generally good, although there were a number who believed that HIV could be transmitted by the respiratory and oral routes. However, knowledge regarding diagnosis and medical management was unsatisfactory. Although a large majority felt they had the ethical obligation to treat HIV patients, only half of them indicated their willingness to do so if they were given the choice. The majority (62.3%) supported the idea of routine preoperative HIV testing for patients, but fewer (40%) supported mandatory HIV testing for health care workers. Dentists seemed more sensitive to issues involving transmission in the workplace, and 95% of them practised universal precautions. Continuing medical education on HIV infection is required to improve and maintain the level of knowledge and competency of doctors and dentists in Singapore.

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Introduction

The acquired immunodeficiency syndrome (AIDS) epidemic is a global health crisis of increasing proportions. Up till the end of 1996, 11 years after the first human immunodeficiency virus (HIV) infection was described in Singapore, there have been 558 notifications of HIV infections, of which 269 had developed AIDS.¹ There are certainly many more HIV infections which are undetected in the country. It has been estimated that at the beginning of 1996, South and Southeast Asia had 6.5 million people living with HIV infection² and this region has the most rapidly growing HIV epidemic in the world. In the early years there was much misunderstanding and misconceptions of HIV infection and AIDS, even among the medical profession.

In a study conducted by Lee et al³ among 770 doctors and dentists in 1987, it was found that the majority expressed personal inadequacies in dealing with AIDS/HIV infection. The study recommended equipping professionals with the appropriate knowledge, attitudes and skills needed for the care of persons living with HIV

infection and AIDS (PWA for short). A knowledge, attitudes, beliefs and practices (KABP) study on 410 nurses in 5 Singapore general hospitals in 1993 found that while nurses had a high level of knowledge of HIV/AIDS, universal precautions were, however, practised by only two-thirds of them. The study also found their attitudes towards PWA were strongly influenced by social factors and the mode of acquisition of the infection. Nurses prioritised their level of care in descending order thus-renal transplant recipients, women, paediatric/haemophiliac, intravenous drug users, and finally gay men (Goh A et al. A KAPB survey on HIV among nurses in institutional practice in Singapore. International Conference on AIDS; 1993 June 6 to 11). This study stressed the need to inculcate non-judgemental attitudes in health care workers.

A recent study by Lam et al among doctors in a local tertiary care hospital revealed that the majority of doctors had the basic knowledge of HIV, but there were disturbing trends viz. 20% did not practice universal precautions, another 20% did not provide pre-test HIV

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counselling, 30% thought that proper condom use would not prevent the transmission of HIV, 20% doubted that the blood issued by the blood transfusion service was completely safe, 16% thought that homosexual practice was the commonest mode of transmission in Singapore, and 14% thought that HIV could be transmitted through respiratory or oro-faecal route. The researchers recommended educational seminars and workshops as a solution (Lam MS et al. HIV knowledge, attitudes, practice and beliefs among doctors in TTSH. TTSH Annual Scientific Meeting; 1995).

Information from surveys on the lay population in Singapore also reveals serious misconceptions. In an in-home survey of 429 Singaporeans, it was found that although virtually all were aware that HIV is contracted through sexual contact and the sharing of needles during intravenous drug use, many still believed that it was either somewhat or very likely for HIV to be transmitted through casual non-sexual contact, by giving blood, or from mosquitoes and other insects. Furthermore, many (42%) expressed the belief that PWA could be identified through visible symptoms, or membership in "high-risk groups", and a significant percentage (47%) indicated a lack of concern about the disease.⁴ These results indicate the need to address these misconceptions through continuing public education campaigns.

Aims

We sought to study the knowledge, attitudes, beliefs and practices of doctors and dental surgeons in Singapore. We also sought to compare results from this study with those of the 1987 study on health care professionals to gauge the success or otherwise of educational efforts directed at these groups in Singapore.

Materials and Methods

A self-administered postal survey questionnaire was used to obtain information from all registered doctors and dental surgeons in Singapore. The questionnaire used in the 1995 study in Tan Tock Seng Hospital was adapted with changes. It comprised 38 questions organised into 4 sections, covering biodata, knowledge, attitudes and beliefs, and practices with respect to HIV infection and AIDS.

The questionnaire was anonymous, and a prepaid self-addressed envelop was attached to expedite its completion and return. Information on the nature of the practice viz. general practitioners (GP), specialists or non-specialists in government or Health Corporation of Singapore (HCS) hospitals, private dentists, or dentists in institutional practice, were also obtained.

Statistical Analysis

The knowledge, attitudes, beliefs and practices responses were analysed according to subgroups-the

types of medical or dental practice, years after graduation, and whether respondents knew friends or relatives who were infected with HIV. For the analysis according to the types of practice, the results were also analysed according to groupings based on government or private practice, and whether the respondent was a doctor or a dentist.

The answers to the section on knowledge were scored for each respondent and the mean scores were calculated for each group. The mean scores for the various groups were compared and the differences were analysed using the t-test.

The differences in attitudes and beliefs were analysed using the Kruskal-Wallis One Way ANOVA test; further sub-group comparisons were performed using the Mann-Whitney U Wilcoxon Rank Sum test.

The practices of the various groups were analysed using the Fisher's exact test.

Results

In all, 5248 questionnaires were mailed out to 2550 GPs (48.6%), 1750 doctors in institutional practice (33.3%), and 948 dental surgeons (18.1%). Fifty-two questionnaires were returned because of unknown or inaccurate addresses, giving a total of 5196 questionnaires assumed to have been delivered.

Of these 1523 were returned, yielding a response rate of 29.3%.

Biodata

Almost two-third were males, 70.2% were married, 28% were single, 1.3% were divorced or separated. Ninety per cent were Chinese, 6.9% were Indians, 1.1% were Malays, and 2% of other races.

The majority (65%) of respondents were below the age of 40 years, with 16% over 50 years of age (Table I). As can be expected from their age distribution, the majority (60%) had graduated in the preceding 14 years (Table II).

The largest group of respondents were GPs (33.5%), although this was lower than the proportion of questionnaires sent out to GPs (48.6%) (Table III).

TABLE I: NUMBER OF RESPONDENTS BY AGE GROUPS

Age group (y)	Number	%
<25	15	0.98
25 to 29	342	22.46
30 to 34	340	22.32
35 to 39	293	19.24
40 to 44	150	9.85
45 to 49	134	8.80
>40	247	16.22
No reply	2	0.13
Total	1523	100

TABLE II: NUMBER OF RESPONDENTS BY YEARS AFTER GRADUATION

No. of years graduated	Number	%
0 to 4	259	17.01
5 to 9	395	25.94
10 to 14	262	17.20
15 to 19	201	13.20
20 to 24	143	9.39
>24	263	17.27
Total	1523	100

TABLE III: NUMBER OF RESPONDENTS BY TYPE OF PRACTICE

Type of practice	Number	%
General Practitioner	510	33.49
Private Specialist	172	11.29
MOH/HCS Specialist	289	18.98
MOH/HCS Non-specialist	311	20.42
Private Dentist	171	11.23
MOH/HCS Dentist	60	3.94
No reply	10	0.66
Total	1523	100

MOH: Ministry of Health; HCS: Health Corporation of Singapore

Knowledge (Table IV)

One hundred and thirty respondents (8.5%) said that they personally knew a friend or a relative who had contracted HIV infection or developed AIDS.

More than 93% were comfortable dealing with ques-

tions relating to HIV transmission and prevention, 80.4% and 78.9% were comfortable dealing with questions concerning diagnosis and clinical manifestations respectively. This compares with only 48.9% who were conversant with questions relating to treatment. Doctors who knew a friend or relative with HIV/AIDS were more confident than those who did not, when dealing with questions in all categories, viz. 94% versus 93% for transmission/prevention, 88% versus 80% for diagnostic tests, 85% versus 78% for clinical manifestations, and 62% versus 48% for treatment.

Almost all respondents knew that HIV could be transmitted by sexual intercourse, blood transmission, intravenous drug use, and vertically from mother to child. On the other hand, 12.5% thought that HIV could be transmitted via the respiratory route or were unsure. Furthermore 21% thought that HIV could be transmitted via the oro-faecal route, and 8.7% did not know.

One out of 5 respondents did not think that condoms were effective in protecting against HIV transmission. Only 4 out of 5 respondents correctly answered that the commonest mode of transmission in Singapore was through heterosexual intercourse, while 13.1% thought that homosexual intercourse was the commonest mode of transmission. Most respondents were wrong or unsure of the number of HIV infections reported in Singapore at the time of the survey. A significant minority (8.7%) believed that blood from the blood bank was unsafe. Over 85% agreed that autoclaving will render surgical instruments free of HIV.

A large majority knew that both HIV infection as well

TABLE IV: KNOWLEDGE OF HIV/AIDS

Question	Correct (%)	Incorrect (%)	Don't know (%)	No reply (%)
HIV transmission possible by				
- sexual intercourse	99.6			0.4
- blood transmission/IVDU	99.3			0.7
- mother to child	96.2	1.8	1.3	0.7
- respiratory route	86.5	4.8	7.7	
- oro-faecal route	68.4	21	8.7	1.9
Latex condoms are effective	77.4	20.2	1.9	0.5
Most common mode of transmission in Singapore	80.8	15.3	3.5	0.4
The total number of HIV infections is close to 400	35.7	42	21.4	0.9
Blood from the Blood Centre is safe because of interview/testing	87	8.5	3.7	0.8
Autoclaving effective in sterilising	85.6	7.8	6.1	0.5
Anonymous testing available	57.6	26.5	15.4	0.5
Both HIV and AIDS notifiable	93.6	3.3	3	0.1
HIV confirmatory test is WB	59.5	4.3	36	0.2
CD4 lymphocyte count is most useful test of immune function	46	7.9	45.1	
Available anti-HIV medications	24.3	75.7		

IVDU: intravenous drug user

as AIDS were notifiable by law in Singapore. The availability of anonymous HIV testing in Singapore was however known to only slightly more than half of respondents (57.5%). Almost 60% knew that the Western Blot test was the confirmatory test used locally for HIV infection; however, a significant minority answered this incorrectly (26.5%) or were unsure (15.4%). The CD4 count was correctly identified as the single most useful measure available at the time of survey in assessing immune competence by only 46% of respondents, while 45.1% were unsure and 7.9% answered incorrectly. Only 24.3% correctly named all the anti-HIV medications available in Singapore at the time of the survey.

The mean scores for respondents who had graduated 0 to 9 years, 10 to 19 years, and 20 or more years previously were 77.05%, 71.91% and 69.92%, respectively. t-tests for any two groups were all significant ($P < 0.05$).

Doctors scored higher than dentists (74.69% versus 67.85%), respondents in hospital practice scored higher than those in private practice (77.21% versus 70.84%), and respondents who knew a family member or friend with HIV infection scored higher than those who did not (77.65% versus 71.75%); these differences were all statistically significant ($P < 0.05$).

Attitudes and Beliefs (Table V)

A large majority (82.9%) believed that there was an ethical obligation for medical professionals to treat PWA. If given a choice, almost half the respondents said that they would be willing to provide medical care to PWA; however, a significant minority (38.5%) indicated their reluctance.

Over 4 out of 5 respondents (81.3%) held the opinion that mandatory testing of “high-risk” groups was necessary to prevent the spread of HIV. Three-quarters (75.8%) thought that anonymous HIV testing would encourage more effective detection of infected individuals and facilitate early treatment.

Routine preoperative HIV testing of patients was advocated by 62.3% of respondents, while 24.2% of respondents did not support this. The responses of the various groups were different and were statistically significant (Kruskal-Wallis test $P < 0.05$) with GPs agreeing most with the statement, and government non-specialists agreeing the least. Health care professionals from the private sector agreed more strongly than those in the government/HCS service (Mann-Whitney Wilcoxon Rank Sum test $P < 0.05$), while dentists were more in favour of testing than doctors but the difference was not significant (Mann Whitney Wilcoxon Rank Sum test $P = 0.73$).

Sixty-two per cent thought that routine HIV testing of patients without consent was necessary if it was needed for the management of the patient; on the other hand, only 38.4% thought this was warranted if knowledge of the serostatus was not needed for patient management. The large majority (85.9%) thought it necessary for doctors to know the serostatus of PWA who are transferred into their care even without the consent of the patient.

Mandatory HIV testing of all health care workers was advocated by 40%, whilst 45.6% were against it.

Over three-quarters (76.8%) agreed that HIV-infected doctors should inform their patients if they performed invasive procedures. Opinions differed between the various groups—government/HCS dentists agreed the

TABLE V: STATEMENTS ON ATTITUDES AND BELIEFS

Statements	Strongly disagree (%)	Disagree (%)	Unsure (%)	Agree (%)	Strongly agree (%)	No reply (%)
Physicians have the ethical obligation to treat HIV	2	8.8	5.4	61	21.9	0.9
Mandatory testing of high-risk groups necessary	4.1	9.4	4.5	35.5	45.8	0.7
Anonymous HIV testing is useful	3.5	10.6	9.9	49.1	26.7	0.2
Advocate routine preoperative HIV testing of patients	3.6	20.6	13	41.2	21.1	0.4
Doctors allowed to do HIV test without consent if needed for management	6.5	23.2	8	40.9	21.1	0.3
Doctors allowed to do HIV test without consent even if NOT needed for management	14.6	35.1	11.4	27.9	10.5	0.5
Doctors have right to know HIV status of PWA who are transferred to their care without prior consent	2.7	6.6	4.5	47.4	38.5	0.3
Advocate mandatory testing of all health care workers	9.7	30.3	14.1	34.1	11.5	0.3
HIV positive doctors obliged to inform patients if they perform invasive procedures	3.6	7.7	11.2	47.3	29.5	0.7
HIV positive doctors obliged to inform patients even if they do not perform invasive procedures	13.3	42.7	18.3	17.3	7.8	0.6

PWA: persons living with AIDS/HIV

most, and government/HCS non-specialist doctors agreed the least with this statement (Kruskal-Wallis test $P < 0.05$). Private doctors/dentists agreed more strongly with the statement than their counterparts in the government/HCS service, this difference was statistically significant (Mann-Whitney Wilcoxon Rank Sum test $P < 0.05$). The difference between doctors and dentists was not statistically significant even though doctors agreed more strongly than dentists (Mann-Whitney Wilcoxon Rank Sum test $P = 0.66$).

Over one-quarter (25.1%) thought it was necessary for HIV-infected doctors to inform their patients even if they did not perform invasive procedures. The attitudes were again different between the different groups, and they were statistically significant (Kruskal-Wallis test $P < 0.05$), with government/HCS dentists again agreeing most with the statement, and government/HCS non-specialist doctors again agreeing the least. Private doctors/dentists felt more strongly than government/HCS doctors/dentists; and dentists agreed more with the statement than doctors; both these differences were statistically significant (Mann-Whitney Wilcoxon Rank Sum test $P < 0.05$).

Practices (Table VI)

Almost one in three respondents had had some experience in treating HIV patients, albeit the majority had cared for only 1 or 2 PWA before.

Universal precautions were practised by over 70% of respondents. Seventy-seven per cent of those in private practice adopted universal precautions compared to 69% of those in government/HCS practice. More dentists (95%) than doctors (69%) practised universal precautions. Both these differences were statistically significant (Fisher's exact test $P < 0.05$).

About one in four had ever ordered an HIV test without pre-test counselling. One-third of doctors compared with 15% of dentists; and 50% of government/HCS doctors compared to 15% of private doctors/den-

tists had ever conducted HIV antibody tests without counselling. These differences were statistically significant (Fisher's exact test $P < 0.05$).

One in ten respondents had ever ordered an HIV test without the consent of the patient. Thirteen per cent of doctors compared to 0% of dentists; 8% of government/HCS compared to 13% of private doctors/dentists had ever performed the test without informed consent from the patients. These differences were statistically significant (Fisher's exact test $P < 0.05$).

Discussion

The figure of 8.5% of respondents who personally knew a friend or relative with HIV infection is surprisingly high, bearing in mind that there have been relatively few infections detected so far in Singapore, about 400 at the time of the survey. This could mean that respondents may be a biased sample of the total health care professionals in Singapore, those who had contact with HIV infections being more likely to reply to the questionnaire.

It is not surprising to find that most medical practitioners thought they were conversant with issues dealing with transmission, prevention, diagnosis and clinical manifestations, and the majority were not conversant with management questions. These opinions were confirmed in the answers to specific knowledge questions of the various categories.

Although most of the responses to the known routes of transmission were correct, the significant number who thought that HIV could be transmitted via the respiratory and oral routes is alarming. This may mean that counselling of patients by these respondents would be inaccurate and lead to continued perpetration of misconceptions of the disease by the general public. The same can be said for the use of condoms in preventing HIV, 1 in 5 respondents did not think that condoms were effective if used properly, therefore they may not be providing accurate information to their patients, who in turn may then not practice protective sexual intercourse when they are in high-risk situations.

It is also surprising that 1 in 5 respondents were still under the impression that homosexual intercourse was the commonest mode of HIV transmission in Singapore. Since 1991 heterosexual sex has been the most common mode of transmission. This fact has been emphasised on numerous occasions in mass media public education campaigns. The number of HIV infections detected in Singapore is also updated periodically in press releases from the Ministry of Health. Yet most respondents could not answer this question correctly. This could mean that either the campaigns and press releases had not reached this group or that they did not believe the messages, instead preferring to cling onto the preconceived idea that the epidemic only affected certain high-risk groups.

TABLE VI: EXPERIENCE IN TREATING HIV PATIENTS

	Yes (%)	No (%)	No reply (%)
Ever treated HIV positive patient	30.6*	68.5	0.9
Universal precautions with all patients	71.8	27.3	0.9
Ever done HIV test without pretest counselling	24.6	74.3	1.1
Ever done HIV test without consent	10.4	88.4	1.2

* No. of patients treated	% of doctors
1	10.6
2	9.4
3 to 9	8
10 or more	2.6
Total	30.6

The 8.7% who did not think that blood from the Singapore Blood Transfusion Service (SBTS) was safe despite thorough careful donor selection through predonation questionnaire/interview and HIV screening could comprise those who thought that blood could be HIV contaminated but remain undetectable by HIV antibody testing because of the "window period". The SBTS should increase its efforts to allay these fears and doubts by providing results from their internal auditing and use of newer methods like HIV antigen tests which are now routinely performed on all donated blood. Furthermore, the SBTS recommends that blood/blood products should not be given without good indications.

It is unsatisfactory that only 60% correctly knew that the Western Blot was the confirmatory HIV test used locally. In the course of work, it is very likely that at some time, most, if not all, health care professionals will be called upon to order blood tests and to interpret results. The more specific questions dealing with management issues were the most poorly answered. This is not surprising as the medical care of HIV is centred in one hospital, the Communicable Disease Centre (CDC) of the Tan Tock Seng Hospital. Doctors and dentists in other hospitals or in private practice would not find the need to keep up with advances in HIV medicine. Doctors in government and HCS hospitals are also complacent in keeping up with HIV medicine as they can "palm off" cases to the CDC.

Overall, younger respondents fared better than older ones in the knowledge section. This maybe the result of undergraduate teaching of HIV and AIDS. Those in hospital practice fared better than private practice, indicating that continuing medical education was more effective for the former than the latter. The finding that those who knew of a family member or relative with the infection also did better is not unexpected.

These findings indicate the need for greater efforts in educating doctors and dentists about HIV infection and AIDS.

It is heartening to know that the large majority (82.9%) thought there was an ethical obligation for doctors and dentists to treat PWA. This compares well with the 70% who expressed their responsibility to care for PWA in the 1987 survey.³ Emanuel has stated that "physicians have an obligation to treat HIV patients, it is derived from the concept of medicine as a profession and from the physician's professional role. When a person joins the profession, he or she professes a commitment to these ideals and accepts the obligation to serve the sick. The obligation is neither chosen nor transferable; it is constitutive of the professional activity".⁴ This figure is all the more positive in the light of the fact that very little discussion has occurred in medical and dental circles regarding the ethical and professional obligations of practitioners towards HIV infection. It is interesting to

note that even though over 80% thought they were ethically obliged to treat PWA, 38.5% would choose not to provide medical care for PWA if given a choice. This may reflect their concerns of contracting the infection in the workplace, therefore these fears need to be addressed and discussed.

Although three out of four respondents thought that anonymous testing, where no identifying information is recorded, is useful for detection and early treatment of HIV infection, only 57.5% knew that such a facility existed in Singapore. This means that greater publicity of this facility, operated by Action for AIDS, is warranted, and there may be an indication that anonymous HIV testing should be made available in other sites as well.

Routine preoperative testing is another controversial area which has received much discussion in the local context. There are many facets to the issue, including cost-benefit and risk-benefit calculations, false positive results, false sense of security because of false negative results, breaches of confidentiality, testing without consent, rights to privacy and so on. In their 1992 report,⁶ the Royal College of Pathologists stated that routine testing of patients prior to invasive procedures is not recommended because 1) there is no scientific evidence to show that knowledge of the patient's HIV status reduces the rate at which health care workers (HCWs) sustain exposures to blood, 2) it is not cost effective, and 3) it would not obviate the need to protect HCWs undertaking invasive procedures from exposing themselves to blood because the risk of transmission of other blood borne diseases still remain. The report and recommendations were circulated by the Ministry of Health to government/HCS hospitals in 1992. In our study, over 60% of respondents supported routine preoperative testing of patients, more so among those in the private sector than those in government/HCS hospitals. It seems that doctors in public sector hospitals were more informed about HIV infection and therefore more at ease with the very low risks of transmission in the workplace particularly when universal precautions were practised. Private sector hospitals and practitioners in future should be included in all educational programmes as well.

About the same percentage (62%) thought HIV testing of patients was necessary even without consent if the result was needed for management of the patient, whereas a lower number (38.4%) thought it was necessary even if the HIV result would not affect management of the patient. Once again discussions and workshops may help to allay these fears.

In comparison to patient testing, only 40% of respondents agreed that there should be routine testing of all HCW. Calls for the routine testing of HCWs increased after the highly publicised case of the HIV-infected Florida dentist who transmitted the infection to a few of

his patients.^{7,8} Once again the issues for and against routine testing of HCWs are varied and complex. The Royal Society of Pathologists report has supported voluntary testing of HCWs who perform invasive procedures and who recognise themselves to be at higher risk of HIV infection, and HIV-infected HCWs should not undertake invasive procedures.⁶ The American Medical Association has also urged seropositive HCWs to warn their patients or to cease practising. In our survey, three-quarters were of the opinion that HIV-infected doctors who performed invasive procedures should inform their patients of their serostatus, and one-quarter thought this was necessary even if the doctor did not perform invasive procedures. It is interesting that it was the government/HCS dentists who were most for HIV-infected doctors informing their patients; this may be the result of sensitisation by the Florida dentist case.^{7,8}

Over the last 10 years there has been a marked increase in the number of doctors and dentists who had cared for patients with HIV infection, from 5% in 1987 to 30% in 1996, reflecting the increasing epidemic locally. This underlines the continual need for continuing medical education among doctors and dentists, to arm them with the knowledge and skills to manage HIV infected patients. With more cases appearing, it is conceivable that primary health care physicians may one day take on the primary care of HIV infected persons in Singapore, as they have in many other countries throughout the world.

Universal precautions were reported to be practised by only 71.8% of respondents, similar to the results of the nurses survey by Goh et al (A KAPB survey on HIV among nurses in institutional practice in Singapore., International Conference on AIDS; 1993 June 6 to 11). This is unsatisfactory and steps should be taken to increase the figure. The larger proportion of dentists than doctors practising universal precautions could be the result of greater awareness of nosocomial infection stemming from the Florida case. In a study of needle-stick injuries (NSIs) among house officers (HOs) in a major hospital in Singapore,⁹ 171 NSIs were reported, giving a NSI rate of 1.2 per HO per month, 90% of HO reported that they frequently resheathed used needles, 61% felt that they were at mild to moderate risk of contracting NSIs. Injuries were 4.65 times more common among junior HOs than among senior HOs. The authors recommend early intensive education and generous provision of needle disposal systems to reduce NSI, and adequate regular hospital-wide surveys in addition to a voluntary reporting system to gauge effectiveness of the measures. The most recent guidelines for preventing HIV transmission in health care settings were circulated by the Ministry of Health in July 1994.¹⁰

The significant minority of respondents who had ever ordered HIV testing without pre-test counselling

underline the need for periodic reminders to all practitioners on the need for such counselling, and also to familiarise practitioners with the issues to be addressed in pre-test counselling. Similarly the practitioners should be reminded that it is necessary to obtain consent before a HIV test can be conducted, and of the possible medico-legal consequences of performing a HIV test without consent.

Conclusions

In spite of the fact that AIDS/HIV infection has been in Singapore for 12 years, and the interest and attention that the infection has received internationally and locally, there are still large gaps in the level of knowledge and understanding among members of the medical and dental profession. These deficiencies must be addressed now. Issues and concerns with regard to HIV testing of patients and HCW need to be highlighted and discussed in workshops and forums. Clear guidelines on ethical and professional matters should be drawn up proactively to avoid and minimise problems which may arise as a result of the greater number of cases which we expect to see in the next few years. Greater attention should also be placed on prevention in hospitals. Policies on HIV transmission in the health care setting must be in place, and resource allocation must be a priority for health care workers who acquire HIV infection on the job.

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