J HEALTH POPUL NUTR 2002 Sep;20(3):271-278
ISSN 1606-0997 $ 5.00+0.20

Knowledge on, and Attitude Toward, HIV/AIDS among Staff of an International Organization in Bangladesh

Mohammad Tajul Islam[1], Golam Mostafa[2], Abbas Uddin Bhuiya[2], Sarah Hawkes[3], and Andres de Francisco[4]

[1]United Nations Children's Fund, GPO Box 58, Dhaka 1000, Bangladesh, [2]ICDDR,B: Centre for Health and Population Research, GPO Box 128, Dhaka 1000, Bangladesh, [3]Clinical Research Unit, London School of Hygiene & Tropical Medicine, Keppel Street, London WC1E 7 HT, UK, and [4]Global Forum for Health Research, c/o World Health Organization, 1211 Geneva 27, Switzerland

ABSTRACT

Two hundred and ninety-three randomly-selected members of the staff of ICDDR,B: Centre for Health and Population Research were surveyed anonymously in June 1998, using a pre-tested and self-administered questionnaire, to assess their knowledge on, and attitude toward, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS). All except 4 (1.4%) heard of AIDS. Main sources of information were radio and television (93%), newspapers and magazines (84.8%), posters and leaflets (70.2%), and friends (59.2%). About 94% of the respondents believed that HIV might spread in Bangladesh. Only 61.6% knew about the causative agent for AIDS. More than 96% had knowledge that HIV could be detected through blood test. The respondents were aware that unprotected sexual intercourse (92%), transfusion of blood and blood components (93.8%), sharing unsterile needles for injections (94.1%), and delivery of babies by infected mothers (82.7%) could transmit HIV. Similarly, the respondents had the knowledge that HIV infection could be prevented by using condom during sexual intercourse (85.5%), having sex only with an HIV-negative faithful partner (87.2%), avoiding transfusion of blood not screened for HIV (88.9%), and taking injections with sterile needles (86.5%). However, only 33.0% had the knowledge that HIV-infected persons can look healthy, and 56.4% were unaware of transmission through breastmilk. Most members of the staff, particularly at lower level, had misconceptions about transmission and prevention of HIV/AIDS. More than 40% of the respondents had the attitude that HIV-infected persons should not be allowed to work, while another 10% did not have any idea about it. The findings of the study suggest that the members of the Centre's staff have a satisfactory level of essential knowledge on HIV/AIDS, although half of them have poor attitudes toward persons with HIV/AIDS. Therefore, preventive strategy for the staff should be directed toward behaviour change communication.

Key words: HIV; HIV infections; Acquired immunodeficiency syndrome; Sexually transmitted diseases; Disease transmission; Knowledge, attitudes, practice; Cross-sectional studies; Bangladesh

Correspondence and reprint requests should be addressed to: Dr. Mohammad Tajul Islam
Health and Nutrition Section
United Nations Children's Fund
GPO Box 58
Dhaka 1000
Bangladesh
Email: mtislam@unicef.org
Fax: +880-2-933 5641

INTRODUCTION

The prevalence of human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) in Bangladesh is still low, although infection rate is increasing since 1994, especially among heterosexual males and injecting drug users (1-3). About half of all males and probably a lower proportion of females in

Bangladesh experience premarital and/or extramarital sexual relations (4). Other published data indicate the prevalence of high-risk behaviours for transmission of HIV in segments of Bangladeshi population, which include casual unprotected sex, heterosexual and homosexual activities (5,6).

There is already a high prevalence of HIV seropositivity among commercial sex workers in major cities of India, Myanmar, Thailand, and Cambodia (7,8). Results of a study in northern Thailand showed high incidence (20.3 per 100 person-years) of HIV infection among brothel-based commercial sex workers despite national efforts for HIV control (9). Thus, the proximity of high-prevalence countries will be a risk factor, if high-risk contacts occur between nationals of these countries.

It is still not uncommon to have transfusion-related HIV infection in general population (10-12). Results of studies with multi-transfused thalassaemia patients attending thalassaemia clinics in New Delhi and rural Bengal, India, showed HIV seropositivity to be 9% and 0.9% respectively (13,14). In Bangladesh and other Asian countries, blood is not always screened for HIV, and much of the supply is from professional blood donors (15-19). Unfortunately, many donors have multiple sex partners and are positive for sexually transmitted diseases (STDs) and HIV (15,19,20).

Since an accessible, affordable and complete cure for HIV/AIDS and an effective vaccine to prevent HIV infection may not be available in the near future, primary prevention to control the spread of HIV infection is through awareness and changing behaviour remains at the highest priority for HIV control programmes. Awareness about HIV/AIDS among general population of Bangladesh is very low (21). In addition, information about awareness among educated people, particularly in institutional setting, is lacking. This study was conducted at the ICDDR,B: Centre for Health and Population Research to have baseline information for staff-education programme on HIV/AIDS. The findings may also be useful elsewhere in Bangladesh for those designing interventions for the control of HIV/AIDS among people at work.

MATERIALS AND METHODS

This cross-sectional study was conducted in June 1998 at the ICDDR,B: Centre for Health and Population Research and was approved by the Centre's Research Review and Ethical Review Committees. ICDDR,B, an international non-government and non-profit organization for health research and training, is located in Dhaka, the capital city of Bangladesh. The study population comprised all 1,436 members of the staff of ICDDR,B, except 133 personnel on daily-wage basis and 28 core trainers trained in HIV/AIDS. Personnel on daily-wage basis were excluded because of very rapid turnover and not having any employee number.

All eligible members of the staff were stratified according to their job levels as follows:

Job Level 1: General Services Category 1 (GS 1), GS 2, Health Workers, and Community Health Workers (low-income group)

Job Level 2: GS 3 to GS 5 and Fellow Nurses (middle-income group)

Job Level 3: GS 6, Nursing Officers, Fellow Doctors, Research Fellows, National Officers Category A (NO-A), NO-B, NO-C, NO-D, NO-E, and international staff (high-income group)

A systematic random sample of 350 personnel was taken proportionate to the job levels (Level 1: 134 or 38.2%, Level 2: 141 or 40.4%, and Level 3: 75 or 21.4%) using the employee number from the Centre's database.

A pre-tested self-administered questionnaire was used for data collection. The questionnaire was in English with Bengali translation. Most questions were close-ended, while one question was open-ended and a few were mixed. Data were recorded anonymously, and confidentiality was maintained; only age, sex, education and level of staff were known. The core trainers helped the respondents, if explanations on any questions were required. The completed questionnaire was collected in a box placed at different departments of the Centre. The principal investigator opened the boxes after completion of data collection. Data were entered into computer using FoxPro and analyzed using the EPI Info (version 6.04b) programme.

Frequency and proportions were calculated to assess the extent of knowledge in different job levels. Chi-square test, as appropriate, was used for determining the association between knowledge on HIV/AIDS and job levels.

RESULTS

In total, 293 (83.7%) responses were received. The responses were higher at Job Level 1 (84.3%) and 2 (90.1%) than at Job Level 3 (70.7%). An initial analysis

of data showed that all but 4 (1.4%) of the respondents heard of AIDS. Therefore, 289 sets of questionnaire were further analyzed to assess knowledge and attitude of the staff.

General characteristics of respondents

Table 1 shows the general characteristics of the respondents (n=289) by job level. The large majority (73.1%) of the respondents was aged 30-49 years, and about 58% were males. A small number (7.3%) had very low education, whereas 30% were highly educated (education level: masters, MBBS, and above).

Knowledge on causative agent for AIDS, and detection and transmission of HIV infection

About 62% of the respondents were aware of the causative agent for AIDS (Table 3). Awareness about the causative agent was significantly lower among the lower-level staff (p<.001). More than 96% could correctly mention that HIV infection can be detected by testing blood.

They were fully aware that HIV is transmitted through unprotected sexual intercourse (92%), transfusion of blood and blood components (93.8%), sharing unsterile needles with infected persons (94.1%), from infected mothers to their babies (82.7%), through breastmilk (43.6%), and to health professionals through needle-stick injury (67.8%) (Table 3). There was no significant difference between job levels and knowledge on modes of transmission of HIV.

Table 1. General characteristics of respondents by job level

Characteristics	Job level						Total		p value
	I (n=109)		II (n=127)		III (n=53)		(n=289)		
	No.	%	No.	%	No.	%	No.	%	
Age (years) (mean±SD)	37.0±8.2		38.6±9.1		42.3±7.9		38.7±8.6		<0.001
20-29	20	18.3	23	18.1	3	5.7	46	15.7	
30-39	50	45.9	43	33.9	15	28.3	108	36.9	
40-49	33	30.3	44	34.6	27	50.9	104	36.2	
50-65	6	5.5	17	13.4	8	15.1	31	11.3	0.001
Sex: Male	57	52.3	72	56.7	38	71.7	167	57.8	0.06
Education									
Up to Class V	19	17.4	2	1.6	0	0.0	21	7.3	
Class VI to SSC	68	62.4	29	22.8	0	0.0	97	33.6	
HSC to graduate	22	20.2	54	42.5	8	15.1	84	29.1	
MBBS, masters, and equivalent	0	0.0	42	33.1	34	64.2	76	26.3	
Postgraduate degree in medicine, PhD, etc.	0	0.0	0	0.0	11	20.8	11	3.8	

Sources of HIV/AIDS information

Radio and television (93.1%), newspapers and magazines (84.8%), and posters and leaflets (70.2%) were the important sources of information on HIV/AIDS (Table 2). However, 59% of the respondents heard about HIV/AIDS from their friends, while radio and television were the most important source of information for the lower-level staff. Ninety-four percent of the respondents believed that HIV/AIDS might spread in Bangladesh.

Table 2. Sources of information on HIV/AIDS by job level

Source	Job level						Total (n=289)	
	I (n=109)		II (n=127)		III (n=53)			
	No.	%	No.	%	No.	%	No.	%
Radio and television	104	95.4	119	93.7	46	86.8	26	93.1
Newspapers and magazines	83	76.1	113	89.0	49	92.5	245	84.8
Posters and leaflets	63	57.8	96	75.6	44	83.0	203	70.2
Friends	62	56.9	81	63.8	28	52.8	171	59.2
Seminars and workshops	40	36.7	43	33.9	38	71.7	121	41.9
Others	7	6.4	5	3.9	8	15.1	20	6.9

However, members of the staff had misconceptions that HIV could be transmitted through hand-shakes (10%), social kissing (12.5%), contaminated clothes (19.4%), sharing food (12.8%), sharing room and toilet (18%) with

HIV-infected persons, and through mosquito and other similar insect bites (17%) (Table 3). The misconceptions were significantly higher among the lower-level staff, except for transmission through sharing food with HIV-infected persons.

Table 3. Knowledge of staff on causative agent for AIDS and detection and transmission of HIV infection by job level

Knowledge of staff	Job level						Total		p value
	I (n=109)		II (n=127)		III (n=53)		(n=289)		
	No.	%	No.	%	No.	%	No.	%	
Knowledge about causative agent for AIDS									
Knew	46	42.2	90	70.9	42	79.2	178	61.6	<0.001
Did not know	63	57.8	37	29.1	11	20.8	111	38.6	
Correct knowledge on detection of HIV infection: HIV infection can be detected through blood test	102	93.6	123	96.9	53	100	278	96.2	0.11
Correct knowledge on how HIV is transmitted: HIV is transmitted through									
Unprotected sexual intercourse	96	88.1	118	92.9	52	98.1	266	92.0	
Transfusion of blood/blood components	98	89.9	121	95.3	52	98.1	271	93.8	
Sharing unsterile needles with HIV/AIDS-infected persons	98	89.9	121	95.3	53	100	272	94.1	
Through infected mothers to babies during pregnancy or childbirth	88	80.7	103	81.1	48	90.6	239	82.7	0.24
Breastmilk	53	48.6	52	40.9	21	39.6	126	43.6	0.40
Needle-stick injury	74	67.9	82	64.6	40	75.5	196	67.8	0.36
Misconception (incorrect knowledge about transmission of HIV: HIV can be transmitted through									
Hand-shakes	18	16.5	11	8.7	0	0.0	29	10.0	0.004
Social kissing	16	14.7	20	15.7	0	0.0	36	12.5	0.009
Contaminated clothes	28	25.7	27	21.3	1	1.9	56	19.4	0.001
Sharing food with HIV-infected persons	17	15.6	18	14.2	2	3.8	37	12.8	0.09
Sharing room/toilet with HIV-infected persons	22	20.2	29	22.8	1	1.9	52	18.0	0.003
Mosquito and other insects	29	26.6	18	14.2	2	3.8	49	17.0	<0.001

Knowledge on prevention of HIV/AIDS, symptoms, and attitude of staff toward HIV-infected persons

The respondents had correct knowledge that HIV can be prevented by using condom during sexual intercourse (85.5%), having sex with a HIV-negative single faithful partner (87.2%), avoiding transfusion of blood and blood products not screened for HIV (88.9%), and using sterile needle during injections (86.5%) (Table 4). There was a significant association between job levels and knowledge regarding prevention of HIV/AIDS, except having sex with an HIV-negative faithful partner.

Only 33.0% of the respondents (Level 1: 20.2%, Level 2: 31.5%, and Level 3: 62.3%) had knowledge that HIV-infected persons can look healthy. About half (37.6% at Level 1: 37.9%, Level 2: 44.9%, and Level 3: 77.4%) of the respondents had the attitude that HIV-infected staff should be allowed to work.

DISCUSSION

Prevention of HIV/AIDS infection through continuing education is a key strategy for the control of the HIV/AIDS epidemic at least until vaccines and drugs are available, accessible, and affordable. The present study yielded important findings as it was conducted in an international research organization working in health research. Most workers had heard of HIV and fear that it may spread in Bangladesh, knew about blood test and about transmission and protection. However, very few (33%) believed that an HIV-positive person can look healthy, and a considerable group (40%) believed that HIV-positive persons should not be allowed to work.

Our survey included all levels of the staff. The overall response rate was 83%, with better responses from the lower and mid-level staff. The response rates in other

studies to assess knowledge on, and attitude toward, HIV/AIDS varied from 65% to 95.5% (22-25).

Studies in Thailand and Israel among high school students found television, newspapers, and periodicals as the principal sources of information on HIV (26,27). Findings of a similar study conducted on professional nurses showed that television, radio, and popular newspapers were the most frequently-used sources of information on HIV/AIDS (28). In our study, the predominant sources of information on HIV/AIDS were radio and television (93.1%), followed by newspapers and magazines (84.8%). However, 59% of the respondents also received information on HIV from their friends. This finding may suggest that a peer-education approach, where members of the staff receive information on HIV/AIDS from their fellow colleagues, is possible if peer-educators are selected carefully and motivated, and enough support is obtained from the management.

As expected, members of the staff at higher job levels were more educated and, thus, tended to have better knowledge on HIV/AIDS. Most (94%) respondents believed that HIV had the potential to spread in Bangladesh.

Results of a knowledge, attitude and practice (KAP) survey conducted on staff at hospitals in Pune, India, showed that 65% of the lower-level staff did not hear about AIDS, and 13.5% of resident physicians thought that HIV is not transmitted through blood (26). Compared to this, only 4 (3.5%) of the lower-level staff of ICDDR,B had not heard of HIV/AIDS, and 6% of all staff did not know that HIV is transmitted through blood and blood components.

A study in Israel found that 89% of students were aware of the major routes of transmission of HIV (27). Results of a study at four hospitals in Tanzania showed that 96% of nurses had satisfactory knowledge on HIV/AIDS (24). Findings of a study at the Aarhus University showed that students and employees had very good knowledge on AIDS and transmission of HIV (25). A study on professional nurses to assess their knowledge and understanding of HIV/AIDS infection at the University of Natal, South Africa, revealed good knowledge of general information, including mode of transmission (30). However, a study of AIDS-related knowledge, attitude, and beliefs of qualified nurses in Scotland showed that a substantial proportion of them did not have basic information on HIV/AIDS (31). Similarly, a study in Italy showed that health workers' perceptions of scientific knowledge on HIV were poor with wrong behavioural attitude (23).

Table 4. Correct knowledge of staff on prevention of HIV, symptoms, and attitude of staff toward HIV-infected persons by job level

Knowledge of staff	Job level						Total		p value
	I (n=109)		II (n=127)		III (n=53)		(n=289)		
	No.	%	No.	%	No.	%	No.	%	
Correct knowledge on HIV prevention:									
HIV can be prevented by:									
Using condom during sexual intercourse	86	78.9	109	85.8	52	98.1	247	85.5	0.005
Having sex only with an HIV-negative faithful partner	92	84.4	112	88.2	48	90.6	252	87.2	0.49
Avoiding blood transfusion not screened for HIV	90	82.6	116	91.3	51	96.2	257	88.9	0.017
Taking injection with sterile needle	87	79.8	112	88.2	51	96.2	250	86.5	0.012
An HIV-infected person									
Always shows symptoms	52	47.7	63	49.6	12	22.6	127	43.9	
Can look healthy	22	20.2	40	31.5	33	62.3	95	32.9	
Don't know	35	32.1	24	18.9	8	15.1	67	23.2	<0.001
Should HIV-infected persons be allowed to work?									
Should be allowed	41	37.6	57	44.9	41	77.4	139	48.1	
Should not be allowed	50	45.9	61	48.0	9	17.0	120	41.5	
Don't know	18	16.5	9	7.1	3	5.7	30	10.4	

Compared to these studies, the ICDDR,B staff had good knowledge on common modes of transmission of HIV, such as unprotected sexual intercourse (92%), transmission through blood and blood components (93.8%), sharing unsterile needles for injections (94.1%), and from infected mothers to their babies during pregnancy and delivery (82.7%). However, more than half (56%) of the Centre's staff did not know about the transmission of HIV through breastmilk, and the distribution of this knowledge was similar amongst all job levels. A study in South India found that 63% of students and faculties of colleges did not know that breast-feeding is a mode of transmission of HIV (32).

Sixty-two percent of the respondents in our study were aware of the causative agent of AIDS. Sixty-seven percent were not aware of asymptomatic stage of HIV infection, which is similar to the finding of a study conducted on Canadian and American physicians (35% and 26% respectively) (33). About 15% of the respondents did not have adequate knowledge on prevention of HIV/AIDS. Our data suggest that a sizeable number of the respondents still have some misconceptions about transmission of HIV. Thus, lack of awareness of HIV/AIDS may contribute to possible risk behaviours by the staff.

HIV cannot spread in the workplace unless there is a sexual contact or an exchange of blood with an infected person. HIV does not spread by daily and routine activities, such as sitting next to someone, shaking hands, or working with others. HIV cannot be transmitted through sharing public transportation, cups or glasses, plates or eating utensils, food, water or air, through toilets, touching, hugging, coughing or sneezing. However, there may be some risk of acquiring HIV infection in a limited number of occupations, such as working in the health sector, unless necessary precautions are taken. In our study, 41% of the respondents believed that HIV-infected persons should not be allowed to work. Another 10% did not make any comments on this. These findings may suggest the existence of uncertainty and fear among part of the staff. The reasons for such disparity may be inadequate information specific to transmission of HIV at the workplace. Adequate information will be important to shape future educational strategies for the workplace.

Results of studies conducted to assess the knowledge and attitudes of human resource managers and persons in educational institutions in Singapore showed that managers and students have good knowledge on transmission of HIV comparable to the findings of our study (22,34). However, their attitudes toward infected workers were unfavourable. Nineteen percent of students in a study in Israel had the attitude that HIV-positive students should not be allowed to continue their studies as they can endanger their fellow students (27). Similarly, a survey conducted among physicians and employees of a tertiary teaching hospital in Macon showed negative attitude toward HIV-positive patients (35). Members of the staff, who may be infected with HIV, must be protected from any discrimination or stigmatization by co-workers, unions, or employers. There is no reason to fear people who are HIV-infected or have AIDS. They need our support to minimize their physical and mental sufferings. Information and education are, therefore, essential to help make sure that HIV-infected workers can also be accepted without prejudice.

Findings of this study suggest that the staff of ICDDR,B had satisfactory levels of knowledge on transmission and prevention of HIV/AIDS, although more than two-thirds of them were not aware of the asymptomatic stage of HIV infection. Moreover, about half of them had unfavourable attitudes toward HIV-infected persons. Therefore, preventive strategy for HIV/AIDS for the staff should be directed to an information, education and communication programme. As the possible risk behaviours of the staff are unknown, a behaviour survey is recommended for designing an effective intervention to prevent HIV/AIDS.

ACKNOWLEDGEMENTS

This study was conducted at the ICDDR,B: Centre for Health and Population Research with support from the Ford Foundation (Grant no. 950-0960). The Centre acknowledges with gratitude the commitment of the Ford Foundation to the Centre's research efforts. The authors are grateful to Prof. Japhet Killewo, Head, Reproductive Health Programme, ICDDR,B, for his input and valuable suggestions which have greatly enriched the paper. We also thank the core trainers for their help in data collection.

REFERENCES

1. Islam M, Mitra AK, Mian AH, Vermund SH. HIV/AIDS in Bangladesh: a national surveillance. *Int J STD AIDS* 1999;10:471-4.
2. Sarkar S, Islam N, Durandin F, Siddiqui N, Panda S, Jana S *et al*. Low HIV and high STD among commercial sex workers in a brothel in Bangladesh: scope for prevention of larger epidemic. *Int J STD AIDS* 1998;9:45-7.

3. Azim T, Islam MN, Bogaerts J, Mian MAH, Sarker MS, Fattah KR *et al*. Prevalence of HIV and syphilis among high risk groups in Bangladesh. *AIDS* 2000;14:210-1.
4. Caldwell B, Pieris I, Barkat-e-Khuda, Caldwell J, Caldwell P. Sexual regimes and sexual networking: the risk of an HIV/AIDS epidemic in Bangladesh. *Soc Sci Med* 1999;48:1103-6.
5. Gibney L, Choudhury P, Khawaja Z, Sarker M, Vermund SH. Behavioural risk factors for HIV/AIDS in a low-HIV prevalence Muslim nation: Bangladesh. *Int J STD AIDS* 1999;10:186-94.
6. Report on the Second National Expanded HIV Surveillance, 1999-2000, Bangladesh. Dhaka: AIDS and STD Control Programme, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of Bangladesh, 2000. 86 p.
7. India: prostitutes and the spread of AIDS. *Lancet* 1990;1:1332.
8. Joint United Nations Programme on HIV/AIDS. Global HIV, AIDS and STD surveillance; report on the global HIV/AIDS epidemic. Geneva: Joint United Nations Programme on HIV/AIDS, 1997: 14-26.
9. Kilmarx PH, Limpakarnjanarat K, Mastro TD, Saisorn S, Kaewkungwal J, Korattana S *et al*. HIV-1 seroconversion in a prospective study of female sex workers in northern Thailand: continued high incidence among brothel-based women. *AIDS* 1998;12:1889-98.
10. Ray K, Ramesh V, Karmakar SN, Misra RS. Increasing trend of HIV seropositivity in a sexually transmitted diseases centre and epidemiology of HIV seropositive individuals. *Int J STD AIDS* 1996; 7:48-50.
11. John TJ, Babu PG, Saraswathi NK, Jayakumari H, Selvaraj R, Kaur A *et al*. The epidemiology of AIDS in the Vellore region, southern India. *AIDS* 1993;7:421-4.
12. Angyo IA, Okpeh ES, Onah J. Paediatric AIDS in Jos, Nigeria. *West Afr J Med* 1998;17:268-72.
13. Sen S, Mishra NM, Giri T, Pande I, Khare SD, Kumar A *et al*. Acquired immunodeficiency syndrome (AIDS) in multitransfused children with thalassemia. *Indian Pediatr* 1993;30:455-60.
14. Sur D, Chakraborty AK, Mukhopadhyay. A study of HIV infection in thalassaemia patients of rural Bengal. *Indian J Public Health* 1998;42:81-7.
15. Kendela P. India: HIV banks. *Lancet* 1991;338: 436-7.
16. Banerjee K, Rodrigues J, Israel Z, Kulkarni S, Thakar M. Outbreak of HIV seropositivity among commercial plasma donors in Pune, India. *Lancet* 1989;2:166.
17. Khawaja ZA, Gibney L, Ahmed AJ, Vermund SH. HIV/AIDS and its risk factors in Pakistan. *AIDS* 1997;11:843-8.
18. Tripathy SP, Malaviya AN, Singh YN, Chaudhuri K, Varghese T, Seth P. HIV antibody screening of commercially available blood products in India. *Indian J Med Res* 1991;93:15-8.
19. Gibney L, Choudhury P, Khawaja Z, Sarker M, Islam N, Vermund SH. HIV/AIDS in Bangladesh: an assessment of biomedical risk factors for transmission. *Int J STD AIDS* 1999;10:338-46.
20. Chattopadhya D, Riley LW, Kumari S. Behavioural risk factors for acquisition of HIV infection and knowledge about AIDS among male professional blood donors in Delhi. *Bull World Health Organ* 1991;69:319-23.
21. Bhuiya A, Hanifi SMA, Hossain M, Aziz A. Effects of an AIDS awareness campaign on knowledge about AIDS in a remote rural area of Bangladesh. *Int Q Commun Health Educ* 1999-2000;19:51-63.
22. Wansaicheong AS, Wong ML. A needs assessment and proposal for HIV education among human resource managers in Singapore. *Singapore Med J* 1998;39:53-8.
23. Brusaferro S, Martina P, Puzzolante L, Gasparini V. Epidemiological study on knowledge, attitudes and behaviour of health care workers with respect to HIV infection. *Med Lav* 1997;88:495-506.
24. Kohi TW, Horrocks MJ. The knowledge, attitudes and perceived support of Tanzanian nurses when caring for patients with AIDS. *Int J Nurs Stud* 1994; 31:77-86.
25. Andersen MR, Nielsen I, Norrelund H, Petersen SB, Ronberg AM, Wiencke AK *et al*. AIDS–knowledge, behavior and attitude at the University of Aarhus in 1990. *Ugeskr Laeger* 1993;155:402-6.
26. Tuchinda S, Chotpitayasunondh T, Teeraratkul A. Knowledge, attitude and practices of senior high school students regarding human immunideficiency virus infection. *J Med Assoc Thai* 1998; 81:130-5.
27. Brook U. AIDS-related knowledge and attitude of high school students in Holon, Israel. *J Trop Pediatr* 1993;39:382-4.
28. Irving KL, Ferguson E, Cox T, Farnsworth WJ. Nurses' evaluations of sources of information about HIV and AIDS. *J R Soc Health* 1997;117:298-303.
29. Menon V, Bharucha K. Acquired immunideficiency sundrome and health care professionals. *J Assoc Physic India* 1994;42:22-3.

30. Chamane NJ, Kortenbout W. Professional nurses' knowledge and understanding of AIDS/HIV infection. *Curationis* 1997;20:43-6.
31. Plant ML, Foster J. AIDS-related experience, knowledge, attitudes and beliefs amongst nurses in an area with a high rate of HIV infection. *J Adv Nurs* 1993;18:80-8.
32. Ambati BK, Ambati J, Rao AM. Dynamics of knowledge and attitudes about AIDS among the educated in southern India. *AIDS Care* 1997; 9:319-30.
33. Brachman P, Jr., Kozarsky P, Cetron M, Jacob MS, Boonitt B, Wongsrichanalai J *et al*. Knowledge and attitudes of hospital based physicians and trainees about HIV infection in the United States, Canada, India and Thailand. *Arch Intern Med* 1996;156: 761-6.
34. Lim VK, Teo TS, Teo AC, Tan KT. HIV and youths in Singapore—knowledge, attitudes and willingness to work with HIV-infected persons. *Singapore Med J* 1999;40:410-5.
35. Smith MU, Goudeau RE, Katner HP, Farmer JT. Human immunodeficiency virus infection: knowledge of the disease and attitudes toward related issues and policies among health care workers in a low-incidence nonurban hospital. *South Med J* 1993;86:537-44