

Assessing HIV/AIDS Knowledge and Stigmatizing Attitudes among Medical Students in Universiti Putra Malaysia

B H Chew, MMed (FAM MED)*, AT Cheong, MMed (FAM MED)**

*Department of Family Medicine & Unit of Medical Education, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia, **Department of Family Medicine, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia

SUMMARY

Objective: Medical students are future doctors who are trained to treat all kind of diseases including people living with HIV/AIDS (PLWHA) without prejudice. This study was to determine the factors associated with knowledge on HIV/AIDS and stigma towards PLWHA among medical students.

Methods: This was a cross sectional study with stratified random sampling conducted in a public university, Malaysia. The participants were preclinical-year (year 1 and year 2) and clinical-year (year 3 and year 4) medical students. Simple randomisation was carried out after stratification of medical students into preclinical and clinical-year. The self-administered questionnaires were consisted of socio-demographic data, items assessing HIV/AIDS knowledge and items assessing stigmatisation attitudes towards PLWHA.

Results: We had 100% response rate of 340 participants. Pre-clinical and clinical year medical students each contributed 170 (50%). Majority was female (64.1%). About two-thirds (60.6%) was Malay, followed by Chinese (31.2%) and Indian (7.1%). Pre-clinical students were significantly more stigmatizing in subscale of "attitudes towards imposed measures" ($t=3.917$, $p<0.001$), even with adjustment for previous encounter and ethnicity ($B= 1.2$, 95% CI 0.48 to 1.83, $p= 0.001$). On the other hand, clinical students were found to be significantly less comfortable in handling HIV/AIDS cases ($t=0.039$, $p=0.039$), even after controlled for previous encounter and ethnicity ($B=0.6$, 95% CI 0.29 to 0.98, $p< 0.001$).

Conclusion: Clinical encounter with PLWHA was associated with higher knowledge in HIV/AIDS. Medical students in preclinical years were having stigmatizing attitude towards imposed measures compared to the clinical years who had more stigmatizing attitude in being less comfortable with PLWHA.

KEY WORDS:

knowledge on HIV/AIDS, stigma, people living with HIV/AIDS (PLWHA), Medical Students

INTRODUCTION

Medical education is one of the professional trainings that aim to turn a lay person into a professional, a doctor in this context. Transformation in theoretical perspectives and teaching strategies are abound in medical education in order to produce tomorrow doctors who are not only knowledgeable and skilful but also behave professionally^{1,2}. A newly graduated doctor is almost instantly employed to be a house officer in this country. From day one in the hospital, they are expected to clerk all patients who are admitted into their ward³. Thus, their professional behaviour with the patient does impress, impact and decide on the course of the disease, treatment adherence and prognosis of the patient, especially patient with serious and frightening conditions such as human immunodeficiency virus (HIV) infection and acquired immune deficiency syndrome (AIDS)^{4,5}.

HIV/AIDS is one of the major health burdens worldwide. Globally, it was estimated that 33.3 million of people living with HIV (adults and children) in 2009; adult women comprised 15.9 million and children 2.5 million⁶. Although the HIV incidence and mortality has been falling worldwide (except Eastern Europe and Central Asia) over the last decade, the level of overall new infections and the number of people living with HIV/AIDS (PLWHA) were still high. In Malaysia, up to December 2011, there were about 112 thousands PLWHA with majority of them were young adults aged between 13 to 49 years⁷. With increasing PLWHA, any effective health care systems in the world will need to equip its facilities for prevention and treatment of PLWHA, more importantly to encourage positive attitude among its health care professionals in dealing with PLWHA. Health care professionals especially doctors and nurses are expected to deliver equal and unbiased care to these patients.

Stigma is an attribute of social relation that exists when the following components occur: labelling, stereotyping, separation, status loss and discrimination⁸. HIV related stigma poses multiple consequences on physical and psychological well-being of PLWHA including affecting their quality of life⁹⁻¹¹. In this country, it was reported that perceived stigma from health care providers and community was a major barrier for PLWHA to access prevention and treatment services from health care system^{5,12}. Furthermore, studies have shown that presence of stigmatization and

This article was accepted: 18 December 2012

Corresponding Author: Chew Boon How, Department of Family Medicine, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia Email: chewboonhow@yahoo.com / chewbh@medic.upm.edu.my

discriminatory behaviours towards PLWHA in health care professionals would further jeopardize the care to them^{13,14}. There was a lack of evidence of these behaviours among the medical students. Medical school has a role to play at the institutional level of the multifaceted and multilevel stigma reduction strategies¹⁵. Hence, this study was set out to examine the medical students' knowledge and stigmatizing attitude in providing care to PLWHA.

MATERIALS AND METHODS

This was a cross-sectional study conducted from January to June 2010. This study was approved by Universiti Putra Malaysia medical ethics committee and conformed to the provisions of the Declaration of Helsinki in 1995 (and revised in Edinburgh 2000).

Medicine Program in Universiti Putra Malaysia

Faculty of Medicine and Health Sciences at this university has started Doctor of Medicine undergraduate program since 1996 adopting curriculum from University of Nottingham, United Kingdom. Based on integrated principle and student-centred learning concept, this program spans over five years (10 semesters) divided into three phases: Preclinical Phase in year one and two teaching the organ systems, family health, public health and epidemiology, scientific methods, research methodology and project, problem-based learning (PBL) and early clinical experience; Early Clinical Phase in year three consists of introductory teaching and learning in the hospitals; Clinical Phase in year four and five, medical students receive increasing levels of clinical education with attachment to tertiary hospital in Kuala Lumpur, Serdang and Kajang¹⁶. The number of medical graduates was about 100 to 130 each year.

The Study Participants

The study population consisted of the first to the fourth year medical student except those who refused, were repeating their academic year, on leave and students who participated in the pilot of this study. First and second year medical students were stratified as the pre-clinical year medical students (PCMS) while the third and fourth years medical students were the clinical year medical students (CMS). Fifth year students were not involved in this study because they were on leave during the data collection period. Simple random sampling was used to select 170 participants from each category of students. The sample size was calculated based on the 0.88 estimated standard deviation of stigmatizing attitude mean scores of a previous study in Belize¹⁷, desired precision at 0.1 and p value of less than 0.05 was considered statistically significant at 95% confidence interval, the $Z_{1-\alpha/2}$ value is 1.96 and $n = (1.96)^2 (0.88)^2 / (0.1)^2$ was about 300. An estimated non-response rate of 15% of this calculated sample size of 40 was included to give the total sample size of 340.

The Socio-demographic Questionnaire

One questionnaire was self-developed by the investigators to capture demography characteristics comprised gender, date of birth, ethnicity, religion, religiosity, academic year and previous encounter with people living with HIV/AIDS. Religiosity was defined as adherence to the teaching/ceremony/way of life of one's religion; encounter

referred to personally had known, seen or interacted with a person diagnosed with HIV/AIDS. Two questionnaires were to assess the knowledge on HIV/AIDS and stigmatizing attitude. The permission to use the later two questionnaires was obtained from the original author who developed and conducted similar study earlier¹⁷.

The Questionnaires on HIV/AIDS Knowledge and Stigmatizing Attitudes

HIV/AIDS knowledge was assessed using six items for which the overall number of accurate responses was calculated and used in the analyses (items are listed in Table II). The items assessing stigmatizing attitudes were ranked on five-point Likert-type scales. Responses to each statement ranged from 1 (strongly disagree) to 5 (strongly agree). A score of 1 was regarded as least stigmatizing and 5 being most stigmatizing. Therefore, a higher score indicates a more stigmatizing attitude or a higher frequency of committing a discriminatory act. There are nine items fitted into three subscales: (1) Attitudes toward imposed measures- 4 items, Cronbach α 0.71. These measures are coercive in nature, such as isolation and quarantine and mandatory testing for the PLWHA; (2) Attitudes of blame/judgment- 3 items, Cronbach α 0.60; and (3) Comfortableness in dealing with HIV/AIDS patients- 2 items, Cronbach α 0.83. These items were summed and averaged to give stigmatization overall scores and for each subscale which were then used in the analysis.

These questionnaires were piloted with 20 medical students for face validity as well as the acceptability of their content with local culture. The demography questionnaire was modified and improved but we left the questionnaires on knowledge and stigmatizing attitude on HIV/AIDS intact as they were found acceptable by the participants in the pilot study.

The Setting

The identified students were approached in person with the questionnaires, information sheet and consent form. After giving their written consent, the students were to complete the questionnaires in privacy. Each questionnaire was checked for completion as best possible. On occasions where there were questions unanswered, the questionnaire was returned to the student with additional explanations given to assist in answering. Confidentiality was ascertained throughout.

Statistical Analyses

Data were analysed using SPSS version 19. Information recorded on the questionnaires was manually checked for missing values, data-entry errors and consistency. Outliers and extreme values were double checked for transcription errors. Statistical assumptions were ascertained before statistical analysis. Multiple linear regressions with stepwise method was carried out to examine the predictors for stigmatizing attitudes as a whole and for each of the subscales.

RESULTS

A total of 340 participants were recruited with 100% response rate, equal proportion from both the pre-clinical and clinical.

Table I: Characteristics of Study Population according to Academic Year

	Pre-clinical n (%)	Clinical n (%)	Total n (%)	P value*
Gender				
Male	62 (36.5)	60 (35.3)	122 (35.9)	0.821
Female	108 (63.5)	110 (64.7)	218 (64.12)	
Total	170 (100)	170 (100)	340 (100)	
Ethnicity				
Malay	119 (70.0)	87 (51.2)	206 (60.6)	0.005
Chinese	40 (23.5)	66 (38.8)	106 (31.2)	
Indian	10 (5.9)	14 (8.2)	24 (7.1)	
Others	1 (0.6)	3 (1.8)	4 (1.2)	
Total	170 (100)	170 (100)	340 (100)	
Previous Encounter				
Yes	21 (12.4)	72 (42.4)	93 (27.4)	< 0.001
No	149 (87.6)	98 (57.6)	247 (72.6)	
Total	170 (100)	170 (100)	340 (100)	
Religion				
Islam	90 (52.9)	91 (53.5)	181 (53.2)	0.405
Buddhism	63 (37.1)	51 (30.0)	114 (33.5)	
Christian	9 (5.3)	14 (8.2)	23 (6.8)	
Hindu	7 (4.1)	12 (7.1)	19 (5.6)	
Taoism	1 (0.6)	2 (1.2)	3 (0.9)	
Total	170 (100)	170 (100)	340 (100)	
Level of Religiosity				
Religious	118 (69.4)	131 (77.1)	249 (73.2)	0.111
Not Religious	52 (30.6)	39 (22.9)	92 (26.8)	
Total	170 (100)	170 (100)	340 (100)	

*Pearson Chi-square

Table II: Proportion of correct answer for the questions testing on the Knowledge on HIV/AIDS according to the academic years, n= 340

Knowledge on HIV/AIDS	Pre-clinical, n (%)*, n= 170	Clinical, n (%)*, n= 170	P value†
1. One can contract HIV infection by sharing meals with an HIV-infected person. (False)	145 (85.3)	159 (93.5)	0.021
2. Procedures for avoiding Hepatitis B and HIV infection are similar. (True)	109 (64.1)	130 (76.5)	0.017
3. Most newborns born to HIV-positive women have HIV/AIDS infection at birth. (False)	24 (14.1)	70 (41.2)	< 0.001
4. After needle stick injury with a needle from an HIV-infected person, the chance of contracting HIV virus is less than 1%. (True)	42 (24.7)	61 (35.9)	0.033
5. After needle stick injury with a needle from an HIV-infected patient, immediately gently expressing blood from the puncture site reduces the risk of contracting HIV infection. (True)	71 (41.8)	76 (44.7)	0.662
6. Through sexual contact gonorrhoea is more easily transmitted than HIV virus. (True)	110 (64.7)	114 (67.1)	0.732

†Chi-square Fisher-Exact (two sided) test *Percentage within the academic year

The mean age for pre-clinical and clinical medical students were 20.5 (SD 0.72) and 22.3 (SD 0.53) years old, respectively. Demography characteristics were comparable between the two groups in terms of gender (about two thirds were female students) and level of religiosity (about 70% of them self-reported to be religious in their own faith). However, ethnic backgrounds of the two pre-clinical and clinical groups were significantly different ($\chi^2= 13.02$, $p= 0.005$). Medical students in clinical years reported to have significantly encountered more PLWHA than students in pre-clinical ($\chi^2= 38.50$, $p< 0.001$) (Table I).

Knowledge scores were significantly higher for the medical students in clinical years (3.59 SD 1.11) compared to those in the pre-clinical (2.95 SD 1.14) ($t= 5.17$, $p<0.001$) (Table II).

Higher knowledge scores were shown among medical students who reported to have previous encounters with PLWHA ($t=5.462$, $p<0.001$). Knowledge score did not correlate with stigmatizing attitude or associated with any other variables under the study (namely gender, ethnicity, religion and religiosity). Gender and religiosity were not associated with stigmatizing attitudes.

The highest stigmatizing score was noted in the subscale "attitudes of blame/judgment" (mean 3.32 SD 0.73), followed by "attitudes toward imposed measures" (mean 3.04 SD 0.74). The lowest stigmatization score was in the subscale "comfortableness in dealing with HIV/AIDS patients" (mean 2.55 SD 0.77). The item, "I feel more sympathetic toward people who get AIDS from blood transfusions than those who

Table III: Attitudes Toward HIV/AIDS Patients Among Medical Students

Item	Strongly disagree ^a , n (%)	Disagree, n (%)	No opinion, n (%)	Agree, n (%)	Strongly Agree, n (%)	Score Mean (SD)
Attitudes of blame/judgment						
1. I feel more sympathetic toward people who get AIDS from blood transfusions than those who get it from intravenous drug abuse.	10 (2.9)	27 (7.9)	23 (6.8)	111 (32.6)	169 (49.7)	3.32 (0.73) 4.18 (1.06)
2. I feel that if a child contracts the HIV/AIDS virus from its mother through mother-to-child or vertical transmission, the mother is to blame for the child's disease.	49 (14.4)	111 (32.6)	86 (25.3)	67 (19.7)	27 (7.9)	2.74 (1.16)
3. I have little sympathy for people who get AIDS from sexual promiscuity.	39 (11.5)	70 (20.6)	100 (29.4)	99 (29.1)	32 (9.4)	3.04 (1.16)
Attitudes toward imposed measures						
1. All patients admitted to the hospital should be HIV-tested.	25 (7.4)	97 (28.5)	50 (14.7)	107 (31.5)	61 (17.9)	3.04 (0.74) 3.24 (1.25)
2. Relatives/sexual partners of patients with HIV/AIDS should be notified of the patient's status even without his/her consent.	43 (12.6)	64 (18.8)	53 (15.6)	98 (28.8)	82 (24.1)	3.33 (1.36)
3. Patients with HIV/AIDS should be cared for and treated in their own hospitals and facilities, away from other patients who do not have HIV/AIDS.	55 (16.2)	127 (37.4)	55 (16.2)	76 (22.4)	27 (7.9)	2.69 (1.21)
4. A health professional with HIV/AIDS should not be working in any area of health care that requires patient contact.	50 (14.7)	86 (25.3)	80 (23.5)	93 (27.4)	31 (9.1)	2.91 (1.22)
Comfortableness dealing with HIV/AIDS patients						
1. I am comfortable providing health services to clients who are HIV positive. ^b	3 (0.9)	22 (6.5)	93 (27.4)	174 (51.2)	48 (14.1)	2.55 (0.77) ^b 3.71 (0.82)
2. I am comfortable putting a drip in someone who is showing signs of AIDS. ^b	14 (4.1)	68 (20.0)	125 (36.8)	105 (30.9)	28 (8.2)	3.19 (0.99)

^aThe scores for responses were as follows: "strongly disagree"= 5; "disagree"= 4; "no opinion"= 3; "agree"= 2; "strongly agree"= 1.

^bReverse coding applied to these items when scores allotted.

SD, standard deviation.

get it from intravenous drug abuse," had the highest stigmatization score at 4.18 (SD 1.06) and with over 80% of the students agreeing with this statement. The other items that had a mean score of more than three were "Relatives/sexual partners of patients with HIV/AIDS should be notified of the patient's status even without his/her consent", had over 50% of the students agreeing with the statement; "All patients admitted to the hospital should be HIV-tested," had a mean stigmatization score of 3.24 (SD 1.25). Detailed results of each item are displayed in Table III. CMS were significantly less comfortable in dealing with PLWHA as compared to PCMS ($t=0.039$, $p=0.039$); even after adjusting for previous encounter and ethnicity, the CMS had on the average 0.6 points (95% CI 0.29 to 0.98, $p<0.001$) higher stigmatizing attitude in feeling uncomfortable in dealing with PLWHA. Whereas, the PCMS were having significant more stigmatizing attitudes towards imposed measures ($t=3.917$, $p<0.001$) and no different in "attitude of blame and judgement towards PLWHA" when compared to CMS ($p=0.47$). After adjusting for previous encounter and ethnicity, the PCMS had on the average 1.2 points (95% CI 0.48 to 1.83, $p=0.001$) higher stigmatizing attitude in the imposed measures subscale. Medical students who had previous encounter with PLWHA tend to show lesser stigmatizing attitudes towards imposed measures ($p=0.052$) and felt more comfortable in dealing with PLWHA ($p=0.059$).

DISCUSSION

CMS had significantly better knowledge in HIV/AIDS and more previous encounters with PLWHA when compared to the PCMS, which would be expected as a result of more educational experience in medical school when compared to the PCMS. However, in this study we found that knowledge in HIV/AIDS was not associated with stigmatizing attitude. Final year pharmacy and medical students in Universiti Science Malaysia, most of whom scored highly in their knowledge about HIV transmissibility (80-90%), about 10-15% of these students expressed unwillingness to provide care for PLWHA and more than 70% of them were of the opinion that patients with HIV/AIDS should be cared for separately¹⁸. These differences in biomedical knowledge in term of the seriousness of the HIV infection, fear of contagion and future interest in working with PLWHA between the first and final year medical students were reported in Sweden. The authors observed that the lower correlation between the perceived seriousness of the tested medical conditions including HIV infection and fear in the final year students could be improved with education and professionalization that increased knowledge on the diseases¹⁹. Conversely, higher knowledge associated with lower stigmatizing attitude was reported among other health sciences students and pharmacists in South America and Hong Kong general public^{20,21}. This non-concurrence between knowledge and stigmatizing attitude in our study and in Belize where the same knowledge in HIV/AIDS scale was used could probably

due to the knowledge scoring items that were not adequate in number and topics coverage such as injecting drug use, homosexuality, commercial sex and commercial blood donation which were included in the other studies^{21,22}. Furthermore, there were many different scales being used in different studies to assess disease knowledge and in a number of these studies HIV/AIDS knowledge was imparted via additional training program or structured workshop²³. Thus, it is possible that studies that gauged HIV/AIDS knowledge via questionnaire without any sorts of educational activity, such as us, did not find significant relationship between knowledge and discriminatory attitude²⁴. The other possibility is that for knowledge to effect changes on the medical students' attitude, it requires time, personal experience and convincing role model^{25,26}. These factors should be included in future works on the influence of the learning experience and the medical students' stigmatizing attitudes.

Academic year, having previous encounter with PLWHA and ethnicity of the medical student were significant predictors of stigmatizing attitudes towards PLWHA. PCMS were more likely to have imposed measures towards PLWHA. This attitude might be attributed by their lack of previous encounter of PLWHA in clinical settings and self-protection for fear of contagion. Discriminatory acts were found to decrease with increased contacts with HIV-infected patients ($P < 0.001$), other people living with HIV or AIDS ($P < 0.001$), and homosexuals ($P < 0.001$) among the general practitioners in New South Wales²⁷. Even though PCMS in our study appeared to have this stigmatizing attitude, they were not more blaming of or uncomfortable with PLWHA compared to the medical students in clinical years.

CMS were feeling more uncomfortable as compared to the preclinical students despite having more previous encounter with PLWHA and knowledge in HIV/AIDS. CMS who were having more clinical encounters with PLWHA, could have been having more unpleasant clinical experience that led them to feel uneasy with or inadequate in managing PLWHA. The final year medical students in two medical schools in Sweden expressed less interest in working with PLWHA though they thought HIV infection is less serious and had less fear compared to the first year medical students¹⁹. Thus, it was highly possible that the process of professionalization in medical curriculum contributed predominantly to the student's knowledge but not convincing enough to change their behaviour or value system. Reversely, it was possible that the students themselves did not appreciate the right attitude needed in dealing with PLWHA as exemplified by a role model. It was reported in previous study that house officers who were one generation younger than the staff doctors, generally valued content-expert knowledge rather than other aspects of being a doctor that is related to healthcare delivery such as interpersonal skills, professional behaviour, care processes and systems²⁸.

Teaching and learning of medical conditions that are stigmatized such as HIV/AIDS requires a combined pedagogical approaches, from both the "acquisition" and "participation" learning metaphors as described by Sfard²⁹. The acquisition part can be effected by effective process-

oriented instruction spanning through the cognitive, affective and metacognitive levels throughout the preclinical as well as clinical academic years³⁰. The participation learning would be the clinical attachments to various medical setting that are providing services to PLWHA such as infectious ward, specialist clinic, general practice clinic, counselling unit etc. It cannot be over-emphasized that transition of guidance from external to internal (self) and from generic to personal, needs educated teacher (of the learning process), admired clinician-teacher (as a role model) and supportive faculty (in having conducive teacher:student ratio, formal recognition of teacher etc.)³⁰. With these measures in place, it is possible to encourage individualised learning, socialisation, professionalization, reflection and feedback for the effective transformation of knowledge and clinical experience into desirable behaviour towards PLWHA among the medical students^{1,31}. To have students teaching other students on having the right attitudes toward PLWHA and knowledge on HIV/AIDS is an interesting approach³². This approach is feasible if there are senior medical students who are willing to spend their time out of already tight academic schedule and capable of training and teaching their junior medical students drawing from their past experience, on supportive reasons for close encounter and positive ways of dealing with PLWHA.

The knowledge scale that was used in this present study, though was acceptable to the students might not be adequate to differentiate between the two groups of the students. Items that assess culturally-influenced clinical knowledge areas such as injecting drug use, homosexuality, commercial sex and commercial blood donation could be important in affecting stigmatizing attitudes among the medical students. The other limitation would be the social-desirability bias in answering questionnaire assessing stigmatizing attitude in the lecture hall with friends sitting close next to each other. However, we believe this was minimal as the questionnaire was self-administered and returned immediately after completion leaving minimal chances for discussion among the students. Future studies in assessing medical students stigmatizing attitudes towards PLWHA should begin with a validated scale that covers wider knowledge areas in HIV/AIDS. More effort to elucidate medical students' perception of stigmatizing attitudes towards PLWHA is laudable.

We recommend the measures below in order to reduce the stigmatizing attitudes among the medical students: during related teaching sessions, both the group lectures and bedside teachings, the medical teachers should provide comprehensive experience that address all the possible prejudice and discriminatory health beliefs in the students;^{33,34} a PLWHA could be engaged to speak of his or her life experience and interact with the students in person or in virtual form (watching a documentary);^{35,36} clinical encounters with PLWHA should be increased and be supervised by an experienced physician who was a proven good role model in clinical practice and teaching;^{23,37} a structured program as an elective or weekend seminar could be prepared with the above-mentioned components for knowledge enhancement and cognitive exercise for students to improve their skills in handling PLWHA^{38,39}.

CONCLUSION

More medical students in their clinical years had previous encounters with PLWHA compared to pre-clinical years. Clinical encounter with PLWHA was associated with higher knowledge of HIV/AIDS but this knowledge did not modify stigmatizing attitudes among the students. Medical students in preclinical years had stigmatizing attitude towards imposed measures compared to the clinical years' students who had more stigmatizing attitude in being less comfortable with PLWHA. There are remedial measures in teaching approach and student's learning experience that can be employed to improve the current medical students and future doctors' professional attitude towards PLWHA.

ACKNOWLEDGEMENTS

We express our gratitude to the Dean of the Faculty of Medicine and Health Sciences, UPM for her support and permission to conduct this study. We would like to record our appreciation to the Medical Research Ethical Committee for granting approval to carry out this study. We would like to acknowledge three second year medical students Lee Kuan Peng, Julia Bt Adam, Chua and Walter Lim Yung Chwen for data collection assistance and initial data handling with the statistical software. We want to thank all the participating medical students in Universiti Putra Malaysia without your cooperation this study was impossible.

REFERENCES

- Mann KV. Theoretical perspectives in medical education: past experience and future possibilities. *Med Educ* 2011; 45(1): 60-8.
- Tomorrow's Doctors (2009): General Medical Council, 2009.
- Malaysian Medical Council. A Guidebook for House Officer. Putrajaya: Malaysian Medical Council, 2008.
- Coetzee B, Kagee A, Vermeulen N. Structural barriers to adherence to antiretroviral therapy in a resource-constrained setting: the perspectives of health care providers. *AIDS Care* 2011; 23(2): 146-51.
- Choi P, Kavaseri R, Desai MM, Govindasamy S, Kamarulzaman A, Altice FL. Prevalence and correlates of community re-entry challenges faced by HIV-infected male prisoners in Malaysia. *Int J STD AIDS* 2010; 21(6): 416-23.
- Joint United Nations Programme on HA. Global report: UNAIDS report on the global AIDS epidemic 2010. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS), 2010.
- Disease Control Division. The Global AIDS Response Progress Report 2012. Reporting period: January 2010 – December 2011. Putrajaya: Ministry of Health, Government of Malaysia, 2012.
- Earnshaw VA, Chaudoir SR. From Conceptualizing to Measuring HIV Stigma: A Review of HIV Stigma Mechanism Measures. *AIDS Behav* 2009; 13: 1160-77.
- Das S, Leibowitz GS. Mental health needs of people living with HIV/AIDS in India: a literature review. *AIDS Care* 2011; 23(4): 417-25.
- Singh M, Garg S, Nath A, Gupta V. An Assessment of Felt Needs and Expectations of People Living With HIV/AIDS Seeking Treatment at NGOs in Delhi, India. *AsiaPac J Public Health* 2009.
- Hasanah C, Zaliha A, Mahiran M. Factors influencing the quality of life in patients with HIV in Malaysia. *Qual Life Res* 2011; 20(1): 91-100.
- Mahajan AP, Sayles JN, Patel VA, Remien RH, Sawires SR, Ortiz DJ, et al. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. *AIDS* 2008; 22: S67-S79.
- Young SD, Bendavid E. The relationship between HIV testing, stigma, and health service usage. *AIDS Care* 2010; 22(3): 373-80.
- Maman S, Ablor L, Parker L, Lane T, Chirowodza A, Ntongwisangu J, et al. A comparison of HIV stigma and discrimination in five international sites: the influence of care and treatment resources in high prevalence settings. *Soc Sci Med* 2009; 68(12): 2271-8.
- Heijnders M, Van Der Meij S. The fight against stigma: An overview of stigma-reduction strategies and interventions. *Psychol Health Med* 2006; 11(3): 353-63.
- Program Guide Book: Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 2008.
- Andrewin A, Chien LY. Stigmatization of patients with HIV/AIDS among doctors and nurses in Belize. *AIDS Patient Care STDS* 2008; 22(11): 897-906.
- Ahmed SI, Hassali MA, Bukhari NI, Sulaiman SA. A comparison of HIV/AIDS-related knowledge, attitudes and risk perceptions between final year medical and pharmacy students: A cross sectional study. *HealthMed* 2011; 5(2): 326-35.
- Brorsson A, Hellquist G, Björkelund C, Råstam L. Serious, frightening and interesting conditions: differences in values and attitudes between first-year and final-year medical students. *Med Educ* 2002; 36(6): 555-60.
- Balfour L, Corace K, Tasca GA, Best-Plummer W, Macpherson PA, Cameron DW. High HIV knowledge relates to low stigma in pharmacists and university health science students in Guyana, South America. *Int J Infect Dis* 2010; 14(10): e881-7.
- Lau JTF, Tsui HY. Discriminatory attitudes towards people living with HIV/AIDS and associated factors: a population based study in the Chinese general population. *SexTransm Infect* 2005; 81(2): 113-19.
- Chan KY, Yang Y, Li ZR, Stooev MA, Reidpath DD. Interrelationships between HIV/AIDS and risk behavior prejudice among medical students in Southern China. *Curr HIV Res* 2009; 7(6): 601-11.
- Pickles D, King L, Belan I. Attitudes of nursing students towards caring for people with HIV/AIDS: thematic literature review. *J Adv Nurs* 2009; 65(11): 2262-73.
- Weyant RJ, Bennett ME, Simon M, Palaisa J. Desire to treat HIV-infected patients: similarities and differences across health-care professions. *AIDS* 1994; 8(1): 117-22.
- Deary IJ, Smith R, Mitchell C, MacLennan WJ. Geriatric medicine: does teaching alter medical students' attitudes to elderly people? *Med Educ* 1993; 27(5): 399-405.
- Fitzpatrick SB, O'Donnell R, Getson P, Sahler OJZ, Goldberg R, Greenberg LW. Medical students' experiences with and perceptions of chronic illness prior to medical school. *Med Educ* 1993; 27(4): 355-59.
- Birmingham S, Kippax S. HIV-related discrimination: a survey of New South Wales general practitioners. *Aust N Z J Public Health* 1998; 22(1): 92-7.
- Kuper A, Nedden NZ, Etchells E, Shadowitz S, Reeves S. Teaching and learning in morbidity and mortality rounds: an ethnographic study. *Med Educ* 2010; 44(6): 559-69.
- Sfard A. On Two Metaphors for Learning and the Dangers of Choosing Just One. *Educational Researcher* 1998; 27(2): 4-13.
- Gordon J, Hazlett C, Ten Cate O, Mann K, Kilminster S, Prince K, et al. Strategic planning in medical education: enhancing the learning environment for students in clinical settings. *Med Educ* 2000; 34(10): 841-50.
- Irby DM, Cooke M, O'Brien BC. Calls for Reform of Medical Education by the Carnegie Foundation for the Advancement of Teaching: 1910 and 2010. *Acad Med* 2010; 85(2): 220-7.
- Kent A, Myer L. Teaching HIV/AIDS in South Africa. *Clin Teach* 2004; 1(2): 94-6.
- Elford J. Moral and social aspects of AIDS: a medical students' project. *Soc Sci Med* 1987; 24(6): 543-9.
- Rohn EJ, Sankar A, Hoelscher DC, Luborsky M, Parise MH. How do social-psychological concerns impede the delivery of care to people with HIV? Issues for dental education. *J Dent Educ* 2006; 70(10): 1038-42.
- Yiu JW, Mak WW, Ho WS, Chui YY. Effectiveness of a knowledge-contact program in improving nursing students' attitudes and emotional competence in serving people living with HIV/AIDS. *Soc Sci Med* 2010; 71(1): 38-44.
- Lau JTF, Tsui HY, Chan K. Reducing discriminatory attitudes toward people living with HIV/AIDS (PLWHA) in Hong Kong: An intervention study using an integrated knowledge-based PLWHA participation and cognitive approach. *AIDS Care* 2005; 17(1): 85-101.
- Mahajan AP, Sayles JN, Patel VA, Remien RH, Sawires SR, Ortiz DJ, et al. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. *AIDS* 2008; 22 Suppl 2: S67-79.
- Li X, Zhang L, Mao R, Zhao Q, Stanton B. Effect of social cognitive theory-based HIV education prevention program among high school students in Nanjing, China. *Health Educ Res* 2011. 10.1093/her/cyr001.
- Houston S, Ray S, Chitsike I, Mielke J, Chingono A, Mutetwa S, et al. Breaking the silence: an HIV-related educational intervention for medical students in Zimbabwe. *Cent Afr J Med* 2005; 51(5-6): 48-52.