QUALITY OF LIFE ASSESSMENT AMONG PATIENTS LIVING WITH HIV/AIDS AT A TERTIARY CARE HOSPITAL IN THAILAND

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Abstract. HIV/AIDS remains one of the most serious public health problems in Thailand. This study aimed to assess the health-related quality of life (HRQOL) and its related factors among people living with HIV/AIDS (PLWHA) in Thailand. A cross-sectional study was conducted with 259 patients at a tertiary care hospital. HRQOL was assessed using the Thai version of the Medical Outcomes Study HIV Health Survey (MOS-HIV) questionnaire. Socio-demographics and clinical status were measured using a self-administered questionnaire. Multiple linear regression models were used to explore associations between socio-demographic status, clinical status, and HRQL. Multiple linear regression analyses showed that employment status was strongly related to better overall physical and mental health summary scores (PHS, MHS). In addition, patients with disclosure of HIV status, aged over 50 years, and having at least a rating of good health in the nurses' opinion were the independent positive predictive factors for overall PHS. While being on antiretroviral therapy (ART) and good compliance with ART were positive predictive factors for overall MHS. Improving and strengthening quality of life among PLWHAs are important goals for HIV/AIDS services. Regular assessment of HRQL can provide potential information for intervention to improve quality of life.

Keywords: health-related quality of life, MOS-HIV questionnaire, people living with HIV/AIDS, Thailand

INTRODUCTION

The UNAIDS/WHO epidemiological fact sheet, 2011, estimated the number of people living with HIV/AIDS (PLWHA) in Thailand at 490,000 cases, with decreasing incidence over the past decade (WHO, 2011). Although there is no cure for HIV/AIDS, medications have been highly effective in fighting HIV and its complications. During the decade since the advent of highly active antiretroviral therapy (HAART), mortality among PLWHA sharply decreased, with improvement in the length of survival time for PLWHA in Thailand. Therefore, HIV/AIDS infection

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is now considered a manageable chronic disease, which can impact all aspects of the lives of patients. Therefore, the aim of treatment for PLWHA is not only to increase longevity, but also to improve their quality of life.

Health-related quality of life (HRQOL) is an important concept to assess the impact and quality of health care systems. It comprises multidimensional concepts that include domains related to physical, mental, emotional, and social functioning. Previous studies suggest that physical manifestations, gender, CD4 cell count, duration of HIV infection, ART, psychological well-being, social support systems, coping strategies, and psychiatric co-morbidities are important predictors of QOL in this population (Douaihy and Singh, 2001; Jia *et al*, 2007; Figuero *et al*, 2011). Additionally, several studies have demonstrated a correlation between the survival of PLWHA and HRQOL (Cunningham *et al*, 2005; de Boer-van der Kolk *et al*, 2010).

Previous studies on HRQOL in Thailand have used the WHOQOL-100, WHOQOL-BREF, MOS-HIV, and SF-36 as tools for assessment of health-related quality in both HIV and non-HIV infected populations (Mahatnirunkul *et al*, 1998; Ichikawa and Natpratan, 2004; Phungrassami *et al*, 2004; Khumsaen *et al*, 2012). However, questions in these tools were translated directly from English to Thai and had not been modified according to Thai culture and real daily-life activities.

The present study aimed to 1) assess HRQOL among HIV-infected patients by the MOS-HIV tool that was modified for specific use in Thai population taking culture and daily-life activities into consideration, 2) determine factors affecting quality of life among this population, and 3) to be informative for local and national policy makers to improve HRQOL of Thai HIV-infected patients.

MATERIALS AND METHODS

Study designs and setting

A cross sectional study was conducted at a tertiary care hospital in Thailand from January to August 2012. Participants were HIV-infected persons who attended a HIV outpatient clinic. A table of random numbers technique was used to recruit participants in this study. Sample size required for this study was 259 (Figuero *et al*, 2011).

The inclusion criteria were: a) age >15 years, b) a duration of illness for at least 3 months from the date of illness notification, and c) an ability to understand Thai language. The exclusion criteria were: a) the patient had not being frequently seen by our doctors and b) refusal to participate in the study. Trained researchers (HIV care nurses) were available to assist the completion of questionnaires for those who needed.

Ethical considerations

Written informed consent was obtained from all participants in a private interview room. The data were collected in case record forms and entered into SPSS program on a laptop computer. The paper documents were kept in a locked cabinet accessible only by the investigators. The laptop computer was password-protected and can be accessed by the investigators only. Names or other identifiers such as medical record numbers were not included in the case record forms or in the SPSS database. All paper documents were destroyed and electronic data were deleted after the study was completed. The ethics review committee of the Fac-

ulty of Medicine, Thammasat University, approved this study protocol (Ref No. 019/2555; 2012 Feb 14).

Measures and instrument

Information was gathered regarding the socio-demographic and clinical status of the respondents. The socio-demographic status included age, gender, religion, residence, education level, employment status, income level, expense for treatment, marital status, domestic situation, and sexual orientation (heterosexual, homosexual, or bisexual). The clinical status included HIV/AIDS stage, CD4-cell count, viral load, HIV transmission group, duration of HIV infection, type of ART regimen, duration of ART, ART adherence, lipodystrophy, hospitalization in the past 3 months, and the nurses' opinion on patient health status.

A Thai version of the Medical Outcome Study HIV Health Survey (MOS-HIV) questionnaire was used for measuring HRQoL of HIV/AIDS patients. The internal consistency coefficient was high (Cronbach's alpha > 0.7). A Thai version of MOS-HIV consists of a 35-item questionnaire that was specifically designed to measures quality of life in PLWHA. The MOS-HIV has two summary scores for the physical and mental health, and 11 domains, which include the following: Physical Function (PF), General Health Perception (GH), Role Functional (RF), Pain (P), Social Functional (SF), Mental Health (MH), Energy/Fatigue (EF), Cognitive Functional (CF), Health Distress (HD), Overall Quality of Life (QL), and Health transition (HT) (Chaiyalertsak *et al*, 2011).

Statistical analysis

Descriptive statistics including frequency, percentage, range, mean, and standard deviation were calculated for the socio-demographic and clinical factors as appropriate. The item scores from 11 domains of the MOS-HIV were converted to a range 0 (worst health) to 100 (best health) using standard procedures and were expressed as means and standard deviations.

The association between the independent variables and dependent variables (physical and mental health scores) were studies with an unpaired *t*-test. Subsequently, univariate analysis of variance (ANOVA) was used to compare differences between groups when required. Multiple linear regression analyses were performed to examine the socio-demographic and clinical variables on physical and mental health scores. The significance level was set at $p < 0.05$.

RESULTS

Of 259 patient interviews, 56.8% were male and 43.2% were female. The socio-demographic data and clinical data of the 259 subjects are shown in Table 1. The mean age of the participants was 42.2 ± 9.1 years and the median age was 42 years. About one-third of the participants had less than THB 10,000 monthly incomes. Most of the patients were employed (91.1%), and 85.5% of patients were covered by health benefits schemes, with the majority of participants (54.0%) having social insurance. The most common type of cohabitation was living with partner or child (59.0%). Over half of the participants (56.1%) were married. Men were more often single than women were, and women were more often widowed ($p<0.000$).

Regarding the mode of transmission, male patients were mostly infected through sexual transmission (88.3%), with the majority through heterosexual transmission (67.2%) and homosexual

Table 1
Socio-demographic and clinical data of the study participants.

Characteristic	Values
Age (yrs) (mean±SD)	42.2 ± 9.1
21-30, *n* (%)	24 (9.1)
31-40, *n* (%)	87 (33.6)
41-50, *n* (%)	96 (37.0)
>50, *n* (%)	52 (20.3)
Sex, *n* (%) male	148 (56.8)
Domicile, *n* (%)	146 (56.4)
Insurance status, *n* (%)	
Social security scheme	140 (54.0)
Civil servant benefits scheme	73 (28.2)
Self supported	38 (14.5)
Universal coverage scheme	8 (3.3)
Education, *n* (%)	
Primary school	67 (25.9)
Secondary school	137 (52.9)
Bachelor degree	42 (16.2)
Higher than bachelor degree	13 (5.0)
Income level (THB/month), *n* (%)	
<10,000	71 (27.4)
10,000-20,000	102 (39.4)
20,001-30,000	53 (20.3)
>30,000	33 (12.9)
Employment status, *n* (%)	
Employed	236 (91.1)
Unemployed	23 (8.9)
Domestic situation, *n* (%)	
Living with spouse/children/both	153 (59.0)
Living alone	41 (15.8)
Living with parents	30 (11.6)
Living with relatives	25 (9.5)
Living with friends	10 (4.1)
Marital status, *n* (%)	
Married	145 (56.1)
Single	54 (20.7)
Widowed	30 (11.6)
Separated/divorced	30 (11.6)
HIV transmission, *n* (%)	
Heterosexual	198 (76.4)
Homosexual	23 (8.9)
Bisexual	10 (3.9)
Injecting drug use	5 (1.9)
Blood transfusion	1 (0.4)
Unknown	22 (8.5)

Characteristic	Values
Duration of HIV/AIDS infection (yrs) (mean±SD)	6.8 ± 4.3
<1	17
1-3	39
>3-5	60
>5-10	110
>10	33
CD4 count, *n* (%)	
<200 cells/μl	17 (6.6)
201-350 cells/μl	62 (23.9)
351-500 cells/μl	73 (28.2)
>500 cells/μl	107 (41.3)
Viral load, *n* (%)	
<40 copies/ml	226 (87.3)
40-400	7 (2.7)
401-1,000	2 (0.8)
>1,000	7 (2.7)
Not tested	17 (6.5)
Antiretroviral (ARV) treatment, *n* (%)	
No	19 (7.3)
Yes	
NNRTI based regimen (NVP)	142 (54.8)
NNRTI based regimen (EFV)	76 (29.4)
PI based regimen	18 (7.0)
Double boosted PI	4 (1.5)
Duration of ARV treatment, *n* (%)	
<6 months	41 (17.1)
6-12 months	24 (10.0)
1-3 years	67 (27.9)
3-5 years	62 (25.8)
>5 years	46 (19.2)
Compliance, *n* (%)	
≥95%	238 (99.2)
<95%	2 (0.8)
Lipodystrophy, *n* (%)	
No	212 (88.3)
Yes	28 (11.7)
Disclosure of HIV-infected status, *n* (%)	
Yes	189 (73.0)
No	70 (27.0)
Hospitalization in the past 3 months, *n* (%)	
No	248 (95.6)
Yes	11 (4.4)
Nurses' opinion of patient health status, *n* (%)	
Excellent	17 (6.5)
Very good	179 (69.1)
Good	59 (22.8)
Fair	3 (1.2)
Poor	1 (0.4)

Table 2
Means and standard deviations for the Medical Outcomes Study HIV health survey (MOS-HIV) questionnaire domains.

Dimensions	Mean	Median	SD[a]	Range[b]
Overall physical health summary score (PHS)	80.1	84.3	14.9	74.4-90.1
General Health Perception (GH)	62.4	65.0	17.9	50.0-75.0
Physical Functioning (PF)	86.8	91.0	19.1	83.0-100.0
Role function (RF)	86.5	100.0	28.8	100.0-100.0
Social function (SF)	88.1	100.0	19.9	80.0-100.0
Pain (P)	76.8	77.8	21.1	66.7-100.0
Overall mental health summary score (MHS)	76.2	77.2	12.5	69.0-84.0
Cognitive Functioning (CF)	83.5	90.0	16.0	75.0-95.0
Mental Health (MH)	71.2	72.0	15.9	60.0-84.0
Energy/Fatique (EF)	71.7	75.0	17.7	60.0-85.0
Health Distress (HD)	80.2	85.0	19.9	70.0-100.0
Quality of life (QL)	72.0	75.0	23.7	50.0-100.0
Health transition (HT)	78.3	75.0	16.3	75.0-100.0

[a]Standard deviation; [b]Interquartile range.

transmission (15.3%), respectively. The majority of female patients were infected through heterosexual transmission (88.5%).

Regarding the disclosure of HIV status, the female patients more frequently disclosed their HIV status to their spouse compared with male patients (82.7% and 65.7%, $p<0.003$). The summary of scores for the MOS-HIV questionnaire is shown in Table 2.

In comparing patient's characteristics and the MOS-HIV scores, we found that patients who took ART reported significantly higher scores in GH, CF, MH, EF, HD, QL, and MHS ($p = 0.008$, 0.008, 0.001, 0.021,0.004, 0.043, and 0.001, respectively), and those who had good compliance of ARV treatment reported higher scores in SF, CF, MH, EF, HT, PHS, and MHS ($p =$ 0.007, 0.017, 0.044, 0.001,0.012, 0.018, and 0.070, respectively). Women had lower scores than men did in PF ($p = 0.000$) with no differences in other domains. Patients who disclosed their HIV status to their spouse had higher scores in MH ($p =$ 0.044). Compared to other age groups, patients over 50 years of age had lower scores in PF, RF, and PHS ($p = 0.033$, 0.006, and 0.015, respectively). Furthermore, patients hospitalized in the past 3 months reported lower scores in PF, SF, P and PHS ($p = 0.022$,0.050, 0.002, and 0.015, respectively). In employment status, patients who were employed reported higher GH, PF, RF, CF, MH, EF, HD, PHS, and MHS ($p =$0.049, 0.000, 0.000, 0.008, 0.017, 0.003,0.031, 0.000, and 0.003, respectively).

In addition, patients who were reported by nurses to have poor or fair health status had lower scores in GH, PF, SF, P, CF, HT, PHS and MHS (p=0.005, 0.006, 0.000, 0.046, 0.009, 0.021, 0.000, and 0.025, respectively). Patients who had been infected with HIV/AIDS less than 3 years reported lower scores in RF ($p =$ 0.048). Those who were not covered by health benefits schemes had lower scores

Table 3
Factors associated with health related quality of life among people living with HIV/AIDS patients.

Independent variables	Physical health summary scores		
	β	95% CI	*p*-value
Employed (No/Yes)	-0.185	-17.2, -3.6	0.003
Disclosure of HIV-infected status (No/Yes)	-0.130	-8.3, -0.4	0.032
Age >50 years old	-0.129	-9.2, -0.3	0.036
Nurses' opinion of patient health status			
Poor/Fair	-0.329	51.1, -20.4	0.000
Good	-0.308	-19.6, -3.7	0.004
Very good/excellent	-0.250	-15.4, -0.7	0.032
	Mental health summary scores		
	β	95% CI	*p*-value
Employment (No/Yes)	-0.152	-13.2, -1.3	0.017
ARV treatment (No/Yes)	-0.655	-49.9, -12.3	0.001
Compliance above 95% (No/Yes)	-0.495	-39.9, -4.2	0.016

in HD ($p = 0.034$). Moreover, divorced patients reported significantly lower scores in P, MH, HD, QL, HT, PHS, and MHS (p=0.026, 0.001, 0.008, 0.049, 0.033, 0.038, and 0.001, respectively).

Regarding the source of HIV infection, patients who did not know the source of HIV infection had the lowest scores in RF and PHS ($p = 0.037$ and 0.023). Monthly income was significantly related to HRQL. Patients who had lower monthly income (THB <10,000) had lower scores in GH, CF, EF, and HD ($p = 0.004$, 0.039, 0.009, and 0.015, respectively), and those patients who living alone had lower scores in PF ($p = 0.000$) with no differences in other domains. We found no significant differences for gender, domicile, domestic situation, education background, CD4 cell count, viral load, ART regimen, duration of ART, and lipodystrophy in any of the domains in the MOS-HIV questionnaire.

To assess the socio-demographic and clinical status on overall physical and mental health summary scores, multiple regression analyses were conducted. Table 3 shows the significant associations of the independent variables and overall summary scores of MOS-HIV. For the overall physical health summary scores, results indicated significant regression coefficients for employment, age, disclosure of HIV-infected status, and the nurses' opinion on patient's health status. Being employed, being younger than 50 years old, disclosing their HIV status to their spouse or family, as well as having at least good health status were significantly associated with better physical health-related quality of life. For the overall mental health summary scores, significant regression coefficients were found for employment, receiving ART, and good compliance of ART. Being employed, receiving ART, and having good compliance of ART were related to a better mental health related quality of life.

DISCUSSION

HIV infection is a chronic disease. After HAART was introduced, HIV-infected people could remain healthy and live for long periods. The aim of this study was to evaluate the health-related quality of life in our HIV/AIDS patients in order to establish the factors that contribute to quality of life. In this study, we found that the level of quality of life of HIV/AIDS patients was moderate. The factors that influence mean scores of PHS and MHS agree with Figuero *et al* (2011). Moreover, we found an association between the nurses' opinion on patient health status and HRQL. The patients with good to excellent health perception by nurses had higher scores in PHS.

Women reported lower scores in PF than men did. While other studies have shown that women have significantly lower scores in many domains (Cedrerfjall *et al*, 2001; Cowdery and Pesa, 2002; Murri *et al*, 2003). Many women with HIV/AIDS are burdened by the responsibility to take care of their husband and child(ren). Regarding age, we found patients over 50 years of age had lower scores in PF, RF, and PHS. Kohli *et al* (2005) reported similar findings.

In terms of disclosure, patients who disclosed their HIV had higher scores in MH. Disclosure can facilitate social support from spouse and family, which has been shown to play an important role in enhancing coping, self-esteem, and involvement in health-promoting behavior (Murphy *et al*, 2000).

Contrary to other studies, we did not find significant relationships between ART regimen, viral load, CD4 cell count, and HRQL domains. Ruiz Perez *et al* (2005) and Rao *et al* (2007) reported that the CD4 cell count has a positive correlation to HRQL and a negative one between viral load and HRQL.

Our findings of a positive association between the length of HIV infection and RF may be explained by adaptation and learning how to manage the negative consequences of HIV infection as the period of time after diagnosis of the disease lengthens. However, previous researchers reported that increased length of HIV/AIDS duration was negatively associated with HRQL (Bing *et al*, 2000; Jia *et al*, 2007).

To hide their HIV status, many patients are forced to seek services far from their local communities. Therefore, patients cannot use the universal healthcare coverage scheme (a transformed scheme by combining Health cards and Health welfare project together and expanded to cover the rest of population who are not under civil servant benefit scheme and social security scheme including uninsured person), and they must pay for medical services. Our results showed that 15% of patients were self-supported and had a negative correlation to HD. Regarding income level, being employed and living with either spouse or children or both were significantly associated with higher HRQL.

The importance of these demographic variables has been widely documented (Hays *et al*, 2000; Marcelin *et al*, 2007). Being employed was associated with higher HRQL in all domains. This finding is consistent with Swindells *et al* (1999). Pereira and Canavarro (2011). In addition, we found significantly higher HRQL among patients who are on ARV treatment with good compliance. Hospitalization in the past 3 months was associated with lower scores in SF, P, PF and PHS, as some authors have suggested (Zinkernagel *et al*, 2001; Murri *et al*, 2003).

Overall, these findings are important to help develop a predictive model for classifying the HRQL of HIV infected patients. By using the multiple logistic regression model, we found that being employed, disclosure of HIV status, and patient with a rating of at least good health in the nurses' opinion were the independent positive predictive factors for overall PHS. Being employed, on ART treatment, and good compliance with ART were positive predictive factors for overall MHS. Previous researchers found that the positive predictive factor for PHS was the time on antiretroviral treatment >1 year as well as aged over 50 years was a positive predictive factor for overall MHS (Huang *et al*, 2013). Another study reported that female gender and hospitalization in the previous year were predictive factors of poorer quality of life scores in overall PHS, while absence of depression and no hepatitis C virus co-infection were protective factors in overall MHS of the MOS-HIV questionnaire regression model (Jia *et al*, 2007).

The limitations of our study included a cross sectional study design and that all participants were recruited from health-care setting. Therefore, the difference we reported may reflect other factors apart from those assessed.

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REFERENCES

Bing EG, Hays RD, Jacobson LP, *et al*. Health-related quality of life among people with HIV disease: results from the multicenter AIDS cohort study. *Qual Life Res* 2000; 9: 55-63.

Cedrerfjall C, Languis-Eklof A, Lidman K, Wredling R. Gender difference in the perceived health related quality of life among patients with HIV infection. *AIDS Patient Care STD*S 2001; 15: 31-9.

Chaiyalertsak S, Wansom T, Kawichai S, Ruangyuttikarna C, Kemerer V, Wu AW. Reliability and validity of Thai versions of the MOS-HIV and SF-12 quality of life questionnaires in people living with HIV/AIDS. *Health Qual Life Outcomes* 2011; 15: 9-15.

Cowdery JE, Pesa JA. Assessing quality of life in women living with HIV infection. *AIDS Care* 2002; 14: 235-45.

Cunningham WE, Crystal S, Bozzette S, Hays RD. The association of health-related quality of life with survival among persons with HIV infection in the Unites States. *J Gen Intern Med* 2005; 20: 21-7.

de Boer-van der Kolk IM, Sprangers MA, Prins JM, Smit C, de Wolf F, Nieuwkerk PT. Health-related quality of life and survival among HIV-infected patients receiving highly active antiretroviral therapy: a study of patients in the AIDS therapy evaluation in the Netherlands (ATHENA) cohort. *Clin Infect Dis* 2010; 50: 225-63.

Douaihy A, Singh N. Factors affecting quality of life in patients with HIV infection. *AIDS Read* 2001; 11: 450-75.

Figuero BLS, Luque BP, Martin PT, Sagrado GM, Bouza EJM. Assessment of factors influencing health-related quality of life in HIV-infected patients. *HIV Med* 2011; 12: 22-30.

Hays RD, Cunningham WE, Sherbourne CD, *et al*. Health-related quality of life in patients with human immunodeficiency virus infection in the United States: results from the HIC cost and services utilization study. *Am J Med* 2000; 108: 714-22.

Huang ZJ, Tian M, Dai SY, Ye DQ. Feasibil-

ity, reliability and validity of the Chinese simplified version of the MOS-HIV health survey among AIDS patients in China. *Qual Life Res* 2013; 22: 403-7.

Ichikawa M, Natpratan C. Quality of life among people living with HIV/AIDS in northern Thailand: MOS-HIV health survey. *Qual Life Res* 2004; 13: 601-10.

Jia H, Uphold CR, Zheng Y, Wu S, Chen GJ, Findley K. A further investigation of health-related quality of life over time among men with HIV infection in the HAART era. *Qual Life Res* 2007; 16: 961-8.

Khumsaen N, Aoup-Por W, Thammachak P. Factors influencing quality of life among people living with HIV (PLWH) in Suphanburi Province, Thailand. *J Assoc Nurses AIDS Care* 2012; 23: 63-72.

Kohli RM, Sane S, Kumar K, Paranjape RS, Mehendale SM. Assessment of quality of life among HIV-infected person in Pune, India. *Qual Life Res* 2005; 14: 1641-7.

Mahatnirunkul S, Tuntipivatanaskul W, Pumpisanchai W. Comparison of the WHOQOL-100 and the WHOQOL-BREF (26 items). *J Ment Health Thai* 1998; 5: 4-15.

Marcellin F, Préau M, Ravaux I, Dellamonica P, Spire B, Carrieri MP. Self-reported fatigue and depressive symptoms as main indicators of the quality of life (QOL) of patients living with HIV and hepatitis C: implications for clinical management and future research. *HIV Clin Trials* 2007; 8: 320-7.

Murphy DA, Moscicki AB, Vermund SH, Muenz LR. Psychological distress among HIV+ adolescents in the REACH study: effects of life stress, social support, and coping. *J Adolesc Health* 2000; 27: 391-8.

Murri R, Fantoni M, Del Borgo C, *et al*. Determinants of health-related quality of life in HIV-infected patients. *AIDS Care* 2003; 21 (suppl): 19-27.

Pereira M, Canavarro MC. Gender and age differences in quality of life and the impact of psychopathological symptoms among HIV-infected patients. *AIDS Behav* 2011; 15: 1857-69.

Phungrassami T, Katikarn R, Watanaarepornchai S, Sangtawan D. Quality of life assessment in radiotherapy patients by WHOQOL-BREF-THAI: a feasibility study. *J Med Assoc Thai* 2004; 87: 1459-65.

Rao D, Hahn EA, Cella D, Hernandez L. The health related quality of life outcomes of English and Spanish speaking persons living with HIV/AIDS from the continental United States and Puerto Rico. *AIDS Patient Care STDS* 2007; 21: 339-46.

Ruiz Perez I, Rodriguez Bano J, Lopez Ruz MA, *et al*. Health-related quality of life of patients with HIV: impact of sociodemographic, clinical and psychosocial factor. *Qual Life Res* 2005; 14: 1301-10.

Swindells S, Mohr J, Justis JC, *et al*. Quality of life in patients with human immunodeficiency virus infection: impact of social support, coping style and hopelessness. *Int J STD AIDS* 1999; 10: 383-91.

World Health Organization (WHO). Data on the size of the HIV/AIDS epidemic: number of deaths due to AIDS by country: Global Health Observatory Data Repository. Geneva: WHO, 2011. [Cited 2011 Jul 10]. Available from: URL: http://apps.who.int/gho/data/node.main.620?lang=en

Zinkernagel C, Taffe P, Rickenbach M, *et al*. Importance of mental health assessment in HIV-infected outpatients. *J Acquir Immune Defic Syndr* 2001; 28: 240-9.