

## ORIGINAL PAPER

# IDENTIFYING DEPRESSION AMONG THE HUMAN IMMUNODEFICIENCY VIRUS (HIV) PATIENTS IN UNIVERSITY MALAYA MEDICAL CENTRE, KUALA LUMPUR, MALAYSIA

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### Abstract

**Objective:** The aim of this study was to identify depression among HIV-infected patients attending Infectious Disease Clinic in University Malaya Medical Centre (UMMC). **Methods:** This is a cross sectional study on HIV-infected patients attending Infectious Disease Clinic, UMMC. Those who fulfilled inclusion criteria were recruited and interviewed. Socio-demographic characteristics and clinical conditions such as mode of transmission, year of diagnosis, CD4+ counts, drug treatment and clinical stage were collected. The patients were then subjected to self-administered questionnaires, Patient Health Questionnaire, (PHQ-9) and Hospital Anxiety & Depression Scale (HADS). **Results:** 89 patients were recruited. Scores from PHQ9 showed 32% of depression rate while scores from HADS showed 19% of depression rate among the respondents. Non-self financial supporter, non-alcoholic drinkers and females were more likely to be depressed ( $P < 0.05$ ). All clinical characteristics showed no statistical differences. **Conclusion:** The depression rate was lower compared to those from the studies in western countries. The risk factors for depression were different from those found in other studies as well. *ASEAN Journal of Psychiatry, Vol. 10(2): July – Dec 2009: XX XX*

**Keywords:** Depression, HIV, AIDS, Malaysia, screening tools.

### Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus that attacks human's immune system, disabling the body's defense system

against infections. HIV can be transmitted through unprotected sexual intercourse, vertical transmission and exchange of infected blood such as sharing infected needles among drug addicts, blood

transfusion and organ transplant. Vertical transmission means mother to child transmission during pregnancy, birth delivery or breast feeding. HIV infection cannot be cured but its progression can be slowed down with antiviral therapy [1].

Acquired Immune Deficiency Syndrome (AIDS) is the condition whereby HIV has destroyed a person's immune system, such that it is unable to defend the body from opportunistic diseases. Most of the time, HIV infected patients do not die of AIDS but opportunistic diseases such as Kaposi's Sarcoma, Pneumocystis Carinii Pneumonia (PCP) and Tuberculosis.

Despite the promising developments in the world in recent years, the global AIDS epidemic continues to grow. In Malaysia until June 2007, a cumulative total of 78,784 HIV infected individuals have been reported to the Ministry of Health, Malaysia (inclusive of AIDS) of which 13,121 were notified as AIDS cases and 9,586 have died [1].

Increased evidence shows that HIV patients are found to have suffered from psychiatric disorders concurrently.[2,3] Studies indicated a wide range of depression rates in HIV-infected patients, which varies from 4% to 58%.[2,4,5,6,7,8,9,10] However, most of the HIV-related depressed patients were often underdiagnosed and hence, undertreated.[2,11] The relationship between HIV infection and depression are generally complex and difficult to assess.[2,11] This may be due to the fact that signs and symptoms of depression listed in Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV) criteria are similar to signs and symptoms of HIV infection itself. For example, weight loss, insomnia, fatigue and anorexia are associated with either depression or HIV infection.[12]

Under diagnosis of depression in HIV infections is the main issue of concern. Depression can significantly interfere with a patient's daily routine and adherence to therapy. Identifying depression among HIV patients using screening tools is important as it saves time and reduces the cost of treatment.

The aims of the study are to identify depression in HIV-infected patients attending Infectious Disease Clinic, UMMC, by using two screening tools and look into factors that may be contributing to it.

## **Methods**

The samples were collected from the Infectious Disease Clinic, UMMC. UMMC is a teaching and referral hospital in Malaysia. It is located on the border of Kuala Lumpur and Petaling Jaya. Its catchment area is the population of Petaling Jaya which at the last count stands at 450,000. They are mainly of Chinese descent, urbanized and are in the middle income bracket.

This was a cross sectional study on HIV related patients attending Infectious Disease Clinic, UMMC from 7<sup>th</sup> December 2008 to 7<sup>th</sup> March 2008. Ethical approval was obtained from Medical Ethical Committee, UMMC. The patients were screened by the researchers. Those who fulfilled the criteria were recruited. Patients included in the study were 18 years old and above, diagnosed with HIV infection and consented. The subjects were interviewed by their physician. The clinical data such as modes of transmission, year of diagnosis, CD4+ count, drug treatment and clinical stages of the disease were collected. They were then asked to fill in a sociodemographic questionnaire and answer two self administered screening tools

(Patient Health Questionnaire, PHQ-9 and Hospital Anxiety & Depression Scale, HADS).

Data collected was analyzed using the Statistical Program for Social Sciences (SPSS) version 15.0 for Windows XP. The independent variables are age, gender, ethnicity, social history, economic status, marital status and CD4+ lymphocyte count while the dependent variables are the scores of both the depression scales. Descriptive analysis was used to analyze the principal socio-demographic characteristics. The relationship between depression scores and age, duration of illness and CD 4+ lymphocyte count was calculated by the Student's t-test with 95% confidence interval. The relationships between depression scores and gender, ethnicity, marital status, social history, economic status, clinical status of HIV infection, mode of transmission and treatment use was calculated by using the chi-square with 95% confidence interval. A p value of <0.05 was considered statistically significant. Cronbach's alpha test was used in testing the internal consistency of scores for both depression scales.

## **Results**

### *Socio-demographic characteristics*

A total of 89 participants were recruited in the study. Participants ranged in age from 22 to 81 (mean=39.3, SD=9.9) years. Mostly

were Chinese (76%), single (45%) and lived with family or friends (83%). Majority had completed secondary school (71%). Although 75% were employed, 65% reported monthly income of RM 3000 or less. 67% of the participants were financially self-supported (table 1); 36% of the participants were smokers and more than half of them were non-alcohol drinkers. Those who drink alcohol were mostly occasional drinkers and only 10% reported experiencing withdrawal symptoms. There was only 1% of the participants who used recreational drugs (table 1).

### *Clinical Characteristic*

Most of the respondents had duration of HIV infection between 2 to 5 years. Nearly half were classified as AIDS. The commonest mode of transmission was through heterosexual contact and only 2% were intravenous users; 11% of the respondents were not on medication. The antiretroviral use in Malaysia was HAART, with 73% taking Efavirenz-based regime. Most of the respondents were not taking any concurrent supplements. Those who took concurrent supplements, such as vitamin C, multivitamins, vitamin E, fish oils and others were 31%. 39% of respondents had CD4+ cell counts within 200-499 cells/ $\mu$ L (table 2).

**Table 1:** Socio-demographic characteristics of the samples.

<i>Demographic characteristic (N=89)</i>	<i>Mean (SD)</i>
Age (years)	39.3 (9.9)
Gender	<i>n (%)</i>
Male	70 (79%)
Female	19 (21%)
Ethnicity	
Malay	10 (11%)
Chinese	68 (76%)
Indian	7 (8%)
Others	4 (5%)
Marital Status	
Single	40 (45%)
Married	33 (37%)
Cohabited	2 (2%)
Divorced	8 (9%)
Widowed	6 (7%)
Living companion	
Living alone	15 (17%)
Living with others	74 (83%)
Education	
Secondary and lower	63 (71%)
Higher than secondary	26 (29%)
Employment status	
Yes	67 (75%)
No	22 (25%)
Monthly household income	
Below RM1000	24 (27%)
RM1001 - RM3000	41 (46%)
RM3001 – RM5000	17 (19%)
Above RM5000	7 (8%)
Financial supporter	
Self	60 (67%)
Non-self	29 (33%)
<b><i>Social characteristic (N=89)</i></b>	<b><i>n (%)</i></b>
Smoking	
No	57 (64%)
Yes	32 (36%)
Pack year history of smoker (n=32)	
0-20 pack years	26 (81%)
Above 20 pack years	6 (19%)
Alcohol drinking	
No	60 (67%)
Yes	29 (33%)
Frequency of alcohol drinking (n=29)	
Everyday	0 (0%)
Occasional	29 (100%)
Withdrawal symptoms (n=29)	
No	26 (90%)
Yes	3 (10%)
Recreational drug use	
No	88 (99%)
Yes	1 (1%)

**Table 2:** Clinical characteristic of the samples.

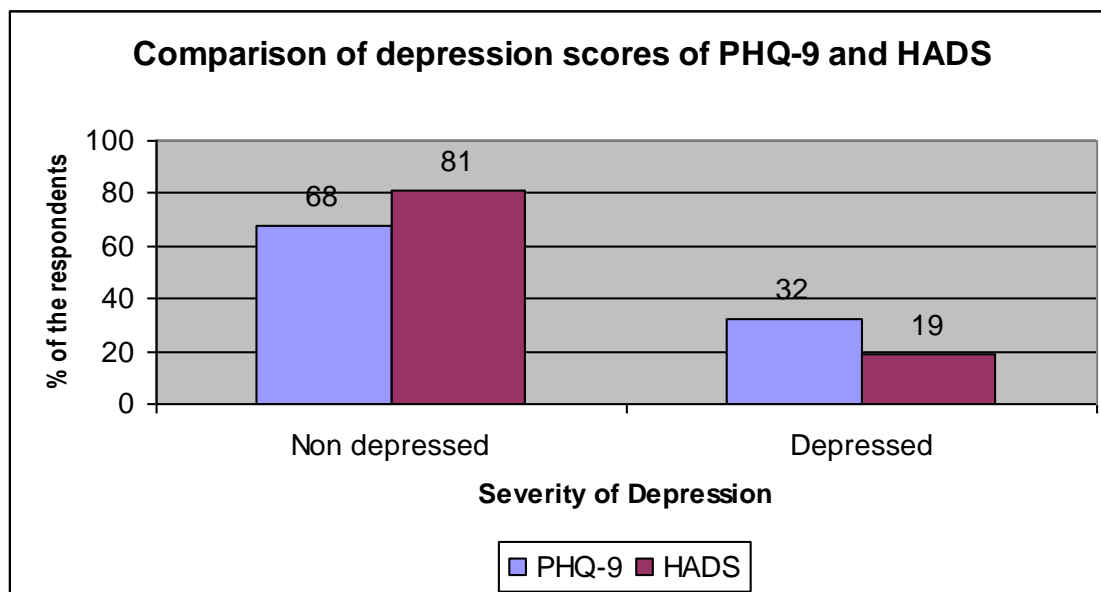
<i>Clinical characteristic (N=89)</i>	<i>N (%)</i>
Duration of illness (ie. HIV infection)	
< 1 year	14 (16%)
2-5 years	54 (61%)
> 5 years	21 (23%)
Clinical stages of HIV infection	
Asymptomatic infection	34 (38%)
Symptomatic infection	16 (18%)
AIDS	39 (44%)
Mode of transmission	
Heterosexual	66 (74%)
Homosexual	13 (15%)
Intravenous drug user (IDU)	2 (2%)
Blood transfusion	1 (1%)
No information	7 (8%)
Antiretroviral use	
No	10 (11%)
Yes	79 (89%)
Efavirenz use (n=79)	
Yes	58 (73%)
No	21 (27%)
On first line regime (n=79)	
Yes	66 (84%)
No	13 (16%)
Supplement taking	
Yes	28 (31%)
No	61 (69%)
CD4+ count (cells/ $\mu$ L)	
500-1500 (normal)	25 (28%)
200-499 (below normal)	35 (39%)
0-199 (increased risk of opportunistic infection)	29 (33%)

### ***Depression Scores of Participants***

Depression scores from PHQ-9 showed 32% of depression rate (*following criteria used by Spitzer et al 1999*)[13], meanwhile, depression scores from HADS demonstrated

a much lower rate i.e. 19% (*following criteria used by Zigmond & Snaith 1983*)[14]. This study showed that PHQ-9 and HADS had good reliability with Cronbach's alpha of 0.873 and 0.697 respectively (figure 1).

**Figure 1:** Comparison of depression scores of PHQ-9 and HADS.



**Relationship between depression scores from PHQ-9 and socio-demographic and clinical characteristics**

When PHQ-9 was used as the screening tool, it shows that females, financially dependent on others and non-alcoholic

drinkers were more likely to be depressed ( $P < 0.05$ ). There were no differences between the two groups on other socio-demographic factors. All the clinical factors did not have significant effect when the depression scores were assessed via PHQ-9 (table 3).

**Table 3.** Relationship between socio-demographic and clinical characteristics with depression score (PHQ-9)

Socio-demographic characteristic	PHQ-9 (N=89)		P value
	Depressed (n=28)	Non-depressed (n=61)	
<i>Continuous variables, Mean (SD)</i>			
Age (years)	37.1 (9.5)	40.3 (10.0)	0.150
<i>Categorical variables, N (%)</i>			
Gender			
Male	18 (25.7%)	52 (74.3%)	0.025*
Female	10 (52.6%)	9 (47.4%)	
Marital Status			
Not married	16 (38.1%)	26 (61.9%)	0.203
Married	12 (25.5%)	35 (74.5%)	
Living companion			
Living alone	4 (26.7%)	11 (73.3%)	0.661
Living with others	24 (32.4%)	50 (67.6%)	
Educational level			
Secondary or lower	19 (30.2%)	44 (69.8%)	0.681
Higher than secondary	9 (34.6%)	17 (65.4%)	

Employment status			
Yes	19 (28.4%)	48 (71.6%)	0.271
No	9 (40.9%)	13 (59.1%)	
Financial Supporter			
Self	13 (21.7%)	47 (78.3%)	0.004*
Non-self	15 (51.7%)	14 (48.3%)	
Smoking			
Yes	9 (28.1%)	23 (71.9%)	0.612
No	19 (33.3%)	38 (66.7%)	
Alcohol drinking			
Yes	5 (17.2%)	24 (82.8%)	0.045*
No	23 (38.3%)	37 (61.7%)	
Recreational drug use			
Yes	0 (0%)	1 (100.0%)	1.000
No	28 (31.8%)	60 (68.2%)	
<b>Clinical characteristic</b>			
<i>Continuous variables, Mean [SD]</i>			
Duration of illness (years)	4.5 [4.0]	3.3 [2.8]	0.110
CD4+ count (cells/ $\mu$ L)	326.1 [224.0]	358.4 [261.2]	0.573
<i>Categorical variables, N (%)</i>			
Clinical stages of HIV infection			
Asymptomatic infection	11 (32.4%)	23 (67.6%)	0.989
Symptomatic infection	5 (31.3%)	11 (68.8%)	
AIDS	12 (30.8%)	27 (69.2%)	
Mode of transmission			
Heterosexual	21 (31.8%)	45 (68.2%)	1.000
Homosexual	4 (30.8%)	9 (69.2%)	
Others	3 (30.0%)	7 (70.0%)	
Antiretroviral use			
No	6 (60.0%)	4 (40.0%)	0.066
Yes	22 (27.8%)	57 (72.2%)	
Efavirenz use (n=58)			
Yes	15 (25.9%)	43 (74.1%)	0.513
No	7 (33.3%)	14 (66.7%)	
On first line regime (n=66)			
Yes	17 (25.8%)	49 (74.2%)	0.499
No	8 (61.5%)	5 (38.5%)	
Supplement taking			
Yes	7 (25.0%)	21 (75.0%)	0.374
No	21 (34.4%)	40 (65.6%)	

(\*)  $p$  value < 0.05

### ***Relationship between depression scores from HADS and socio-demographic and clinical characteristic***

When the depression scores were assessed with HADS, those who were financially dependent on others and non-alcoholic

drinkers were more likely to be depressed ( $P < 0.05$ ). There were no differences between the two groups on other socio-demographic factors. All the clinical characteristics show no significant effect on depression score when assessed with HADS (table 4).

**Table 4.** Relationship between socio-demographic and clinical characteristic with depression score (HADS)

<b>Socio-demographic characteristic</b>	<b>HADS ( (N=89)</b>		<b>P value</b>
	<b>Depressed (n=17)</b>	<b>Non-depressed (n=72)</b>	
<i>Continuous variables, Mean (SD)</i>			
Age (years)	39.2 (9.3)	39.3 (10.1)	0.991
<i>Categorical variables, N (%)</i>			
Gender			
Male	12 (17.1%)	58 (82.9%)	0.510
Female	5 (26.3%)	14 (73.7%)	
Marital Status			
Not married	10 (23.8%)	32 (76.2%)	0.285
Married	7 (14.9%)	40 (85.1%)	
Living companion			
Living alone	4 (26.7%)	11 (73.3%)	0.474
Living with others	13 (17.6%)	61 (82.4%)	
Educational level			
Secondary or lower	12 (19.0%)	51 (81.0%)	1.000
Higher than secondary	5 (19.2%)	21 (80.8%)	
Employment status			
Yes	11 (16.4%)	56 (83.6%)	0.348
No	6 (27.3%)	16 (72.7%)	
Financial Supporter			
Self	8 (13.3%)	52 (86.7%)	0.046*
Non-self	9 (31.0%)	20 (69.0%)	
Smoking			
Yes	5 (15.6%)	27 (84.4%)	0.532
No	12 (21.1%)	45 (78.9%)	
Alcohol drinking			
Yes	2 (6.9%)	27 (93.1%)	0.042*
No	15 (25.0%)	45 (75.0%)	
Recreational drug use			
Yes	0 (0%)	1 (100.0%)	1.000
No	17 (19.3%)	71 (80.7%)	
<b>Clinical characteristic</b>			
<i>Continuous variables, Mean [SD]</i>			
Duration of illness (years)	5.1 [4.2]	3.4 [3.0]	0.686
CD4+ count (cells/ $\mu$ L)	261.4 [216.8]	368.8 [253.4]	0.105
<i>Categorical variables, N (%)</i>			
Clinical stages of HIV infection			
Asymptomatic infection	9 (26.5%)	25 (73.5%)	0.369
Symptomatic infection	2 (12.5%)	14 (87.5%)	
AIDS	6 (15.4%)	33 (84.6%)	
Mode of transmission			
Heterosexual	14 (21.2%)	52 (78.8%)	0.697
Homosexual	1 (7.7%)	12 (92.3%)	
Others	2 (20.0%)	8 (80.0%)	
Antiretroviral use			
No	3 (30.0%)	7 (70.0%)	0.395
Yes	14 (17.7%)	65 (82.3%)	
Efavirenz use (n=58)			

Yes	11 (19.0%)	47 (81.0%)	0.749
No	3 (14.3%)	18 (85.7%)	
On first line regime (n=66)			
Yes	12 (18.2%)	54 (81.8%)	1.000
No	2 (15.4%)	11 (84.6%)	
Supplement taking			
Yes	3 (10.7%)	25 (89.3%)	0.173
No	14 (23.0%)	47 (77.0%)	

(\*)*P* value < 0.05

## Discussion

UMMC is a teaching and referral hospital in Malaysia. UMMC is a semi-government hospital which requires patient to pay more for medical treatment compared to government hospital. Therefore, only patients and patients who can afford it and patients with complicated co-morbidities would seek treatment from UMMC. The frequency description of ethnicity was different from the HIV/AIDS statistics in Malaysia [15] (Table 8). This a unique sample where more Chinese participants were recruited in this study. This might be due to more Chinese patients staying near UMMC and they could afford to seek treatment from UMMC. Male HIV-infected patients were more than female and mostly were in their late 30s coinciding with Malaysian HIV/AIDS statistics. Majority of this group of participants had finished secondary school, and most of them were employed with monthly income of more

than RM1000. Hence, most of the respondents were financially supported by their own salary. From this study, we might say that this group of subjects was capable to seek treatment from UMMC. Majority of the samples were infected with HIV infection through heterosexual intercourse. Only 1% of the respondents reported recreational drug use and only 2% of the respondents reported as intravenous drug users.

In this study, most of the participants had HIV infection for 2 years and above, with majority of AIDS and symptomatic infection. Either it was due to poor control of the disease or they were newly diagnosed cases. Generally, this group of participants were not healthy because 72% of them showed low CD4+ count (<500 cells/ $\mu$ L). From the literature, when CD4+ count is low, progression of HIV infection to AIDS is faster [16].

**Table 8.** Total number of HIV cases reported in Malaysia (From 1986 until June 2007)

	<i>Classification</i>	<i>Number (n=78,784)</i>	<i>Percentage (%)</i>
Sex / Gender	Male	72,311	92
	Female	6,473	8
Age groups	<30 years old	29,269	37
	30-39 years old	33,823	43
	>39 years old	15,692	20
Ethnic groups	Malay	56,859	72
	Chinese	11,562	15
	Indian	6,396	8
	Others	3,967	5
Transmission based on risk factor	IDU	56,902	72
	Heterosexual	12,396	16
	Homosexual	1,406	2
	Others	8,080	10

(Modified from Resource Centre, Malaysian AIDS Council and AIDS/STI Unit, Ministry of Health Malaysia (2007) HIV/AIDS statistic in Malaysia)

Depression rate reported from the 89 HIV-infected patients was 32% by using PHQ-9 depression scale and 19% by using HADS scale. The difference in depression rate using two different scales on the same subject might be due to different sensitivity and specificity. A few studies reported PHQ-9 and HADS scales have similar sensitivity but PHQ-9 has higher specificity. Furthermore, the design of PHQ-9 scale was more user-friendly compared to HADS scale [17,18 - 20]. Although different depression rate was determined using two different scales, both of them still supported literature showing high depression rate among HIV patients [4,21-23].

In this study, non-self financial supporters were more likely to be depressed. It might be due to them feeling that they are a burden to others especially their family members. This result was unusual compared with previous studies. Investigating who was the financial supporter is important. If those non-self financial supporters were more

likely to be depressed, more attention should be paid on them. It was interesting to find that non-alcoholic drinkers were more likely to be depressed. The result is similar to Mistrá & Williams (2005) study which suggested the correlation between depressive symptoms and alcohol drinker is low [24]. This result reflects that there might be some protective effect of alcohol on HIV related depression. Hence, further research can be carried on the relationship between drinker and depression. Another factor that showed statistically significant differences in depressed and non-depressed groups was gender. This factor only applied to result from the PHQ-9 scores. It is similar to the result from Chen et al. (2006) [25] which used the same tool.

In general, all clinical factors showed no significant effect on depression regardless of the type of screening questionnaire used. This finding supported the results from other studies. CD4+ count is the common laboratory test used to test against the

relationship with depression. Results from various studies showed contradicting findings [18,22,23,26]. This study did not show significant relationship between CD4+ count and depressive symptoms.

### **Limitation**

This is a cross sectional study with a small sample size. Convenient sampling was adopted in this study and it was not representative of the general HIV population in Malaysia.

### **Conclusion**

Depression is common among the HIV-infected patients in UMMC. The prevalence varies depending on the type of self-rated questionnaire used. The factors that showed close relationship with depression are financial supporter and alcohol consumption. Gender only showed statistically significant differences using PHQ-9 scores. However, the result from this study cannot be generalized to the Malaysian HIV population due to the small sample size and unique group of respondents.

It is suggested that self-rated questionnaires are useful in identifying depression in HIV patients. Source of financial support and substance use need additional attention in the aim of reducing depression in HIV patients.

### **References**

- 1 Malaysian AIDS Council 2008, Retrieved September 21, 2007, from <http://www.mac.org.my>
- 2 Basu, S, Chwastiak, LA & Bruce, RD, Clinical Management of Depression

and Anxiety in HIV-Infected Adults, AIDS, Lippincott Williams & Wilkins, 2005;19(18):2057-67

3. Ciesla, JA & Roberts, JE, Meta-Analysis of the Relationship Between HIV Infection and Risk for Depressive disorders, American Journal of Psychiatry, 2001;158(5):725-730

4. Brown, GR, Rundell, JR, McManis, SE, Kendall, SN, Zachary, R & Temoshok, L, Prevalence of psychiatric disorders in early stages of HIV infection, Psychosomatic Medicine, 1992;54:(588-601)

5. Levine, AB, Aaron, E & Laquinte, J, Prevalence of depression in HIV-infected pregnant women, American Journal of Obstetrics and Gynecology, 2003;189(6): supp.1, p.S97

6. McDaniel, J, Fowlie, E, Summerville, MB, Farber, EW & Cohen-Cole, SA, An Assessment of rates of psychiatric morbidity and functioning in HIV disease, General Hospital Psychiatry, 1995;17:346-352

7. Morrison, MF, Petitto, JM, Ten Have, T, Gettes, DR, Chiappini, MS, Weber, AL, Brinker-Spence, P, Bauer, RM, Douglas, SD & Evans, DL, Depressive and Anxiety Disorders in Women With HIV Infection, American Journal of Psychiatry, 2002;159(5):789-796

8. Petrushkin, H, Broadman, J & Ovuga, E, Psychiatric disorders in HIV-positive individuals in urban Uganda, Psychiatric Bulletin, 2005;29:455-458

9. Robinson, RG & Yales, WR, Psychiatric treatment of the medically ill, Informa Health Care, 1999:187-195

10. Yun, LWH, Maravi, MBC, Kobayashi, JS, Barton, PL & Davidson, AJ, Antidepressant Treatment Improves Adherence to Antiretroviral Therapy Among Depressed HIV-Infected Patients, *Journal of Acquired Immune Deficiency Syndrome*, 2005;38(4):432-437
11. Fulk, LJ, Kane, BE, Philips, KD, Bopp, CM & Hand, GA, Depression in HIV-infected patients Allopathic, complementary, and alternative treatments, *Journal of Psychosomatic Research*, 2004;57(4):339-351
12. Olley, BO, Seedat, S & Stein, DJ, Persistence of psychiatric disorders in a cohort of HIV/AIDS patients in South Africa: A 6-month follow-up study, *Journal of Psychosomatic Research*, 2006;61(4):479-484
13. Spitzer, RL, Williams, JBW, Kroenke, K and colleagues, Validation and Utility of a Self-report Version of PRIME-MD: The PHQ Primary Care Study, *The Journal of American Medical Association*, 1999;282(18):1737-44
14. Zigmond, AS & Snaith, PR, The Hospital Anxiety and Depression Scale, *Acta Psychiatrica Scandinavica*, 1983;67:361-370
15. Resource Center, Malaysian AIDS Council & AIDS/STI Unit, Ministry of Health Malaysia 2007, Total Number of HIV/AIDS Cases and related deaths reported in Malaysia (from 1986 until June 2007), HIV/AIDS Statistic in Malaysia, retrieved March 28, 2008, from: [http://www.mac.org.my/article\\_07.htm](http://www.mac.org.my/article_07.htm)
16. Leserman, J, Jackson, ED, Petito, JM, Golden, RN, Silva, SG, Perkins, DO, Cai, J, Folds, JD & Evans, DL, Progression to AIDS: The Effects of Stress, Depressive Symptoms, and Social Support, *Psychosomatic Medicine*, 1999;61(3):397-406
17. Cheng, C & Cheng, M. To validate the Chinese version of the 2Q and PHQ-9 questionnaires in Hong Kong Chinese patients, *The Hong Kong Practitioner*, 2007,vol.29: 381-390
18. Kendrick & Lester, A quick guide to a depression assessment tools, *Pulse*, 8th Jun 2006:29-36.
19. Mykletun, A, Stordal, E & Dahl, AA, Hospital Anxiety and Depression (HAD) scale: factor structure, item analyses and internal consistency in a large population, *British Journal of Psychiatry*, 2001;179:540-544
20. Olsson, I, Mykletun, A & Dahl, AA, The hospital anxiety and depression rating scale: A cross-sectional study of psychometrics and case finding abilities in general practice, *BioMed Central Psychiatry*, 2005;5(46):1-10
21. Antelman, G, Kaaya, S, Wei, R, Mbwambo, J, Msamanga, GI, Fawzi, WW & Fawzi, MCS, Depressive Symptoms Increase Risk of HIV Disease: Progression and Mortality Among women in Tanzania, *Journal of Acquired Immune Deficiency Syndromes*, 2007;44(4):470-477
22. Asch, SM, Kilbourne, AM, Gifford, AL, Burnam, MA, Turner, B, Shapiro, MF, Bozzette, SA & for the HCSUS Consortium, Underdiagnosis of Depression in HIV, *Journal of Internal Medicine*, 2003;18:450-460
23. Burack, JH, Barrett, DC, Stall, RD, Chesney, MA, Ekstrand, ML & Coates, TJ,

Depressive Symptoms and CD4+ Lymphocyte Decline Among HIV-Infected Men, *The Journal of the American Medical Association*, 1993;270(21):2568-73

24. Misra, A & Williams, HM, Alcohol and depression, [netdoctor.co.uk](http://netdoctor.co.uk), 6<sup>th</sup> January, 2005.

25. Chen, TM, Huang, FY, Chang, C & Chung, H 2006, Using the PHQ-9 for

Depression Screening and Treatment Monitoring for Chinese Americans in Primary Care, *Psychiatric Services*, 2005;57(7):976-981

26. Moore, J, Schuman, P, Schoenbaum, E, Boland, B, Solomon, L & Smith, D, Severe adverse life events and depressive symptoms among women with, or at risk for, HIV infection in four cities in the United States of America, *AIDS*, 1999;13(17):2459-68

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