



Available online at www.mchandaids.org

INTERNATIONAL JOURNAL of
MATERNAL and CHILD HEALTH and AIDS
ISSN 2161-864X (Online)
ISSN 2161-8674 (Print)
DOI: 10.21106/ijma.375

ORIGINAL ARTICLE | DEPRESSION & HIV

Depressive Symptoms Associated with Low Quality of Life Among Pregnant and Postpartum Women Living with HIV in Chiang Mai, Thailand

Linda Aурpibul, MD;¹ Fuanglada Tongprasert, MD;² Uraiwan Wichasilp, MD;³
Arunrat Tangmunkongvorakul, PhD¹

¹Research Institute for Health Sciences, Chiang Mai University, 110 Intavaroros Road, Sri Phum Subdistrict, Muang Chiang Mai District, Chiang Mai 50200, Thailand; ²Department of Obstetrics and Gynecology, Faculty of Medicine, Chiang Mai University, 110 Intavaroros Road, Sri Phum Subdistrict, Muang Chiang Mai District, Chiang Mai 50200, Thailand; ³Nakornping Hospital, 159 Chotana Road, Don Kaeo Subdistrict, Mae Rim District, Chiang Mai 50180, Thailand

Corresponding author email: lindaa@rihes.org

ABSTRACT

Background or Objectives: Women living with HIV (WLHIV) are at increased risk of depression. In pregnancy, depression could affect health and pregnancy outcomes, as well as child rearing. We assessed depressive symptoms and quality of life of WLHIV during the perinatal period.

Methods: This cross-sectional study was conducted at 15 hospitals in Chiang Mai, Thailand. The Patient Health Questionnaire-9 and the World Health Organization quality of life questionnaire (WHOQOL-BREF_THAI) were used to screen for depressive symptoms and to assess quality of life (QOL), respectively. Statistical analysis was performed by the SPSS. Descriptive statistics were reported. Factors associated with depressive symptoms were assessed by univariate and multivariate analyses. Linear regression analysis was performed to determine association between depressive symptom scores and QOL. Regression coefficient (β) and 95% confidence intervals (CI) were reported. P-values < 0.05 were considered statistically significant.

Results: One hundred WLHIV were enrolled and the mean age was 29.2 \pm 7.5 years. The overall prevalence of depressive symptoms was 30 (30%), 95% CI 21-39; specifically, 34 (34%) in pregnant and 27 (27%) in postpartum women. Overall, depressive symptoms were mild in 22 (22%), moderate in 7 (7%), and moderately severe in one (1%). Multivariate logistic regression analysis revealed that verbal abuse by partner ($\beta=4.751$ (95% CI=2.306-9.790), $p<0.001$) and lifetime alcohol use ($\beta=3.403$ (95% CI=1.427-8.115), $p=0.006$) were associated with depressive symptoms. The overall perception of own health and quality of life of WLHIV in all domains were lower than that of HIV-negative women. WLHIV with depressive symptoms had a significantly lower QOL than those without.

Conclusion and Global Health Implications: In this study, the prevalence of depressive symptoms in women living with HIV was similar to that in HIV-negative women. WLHIV with depressive symptoms had a significantly lower QOL than those without. Mental health screening in antenatal and postpartum clinic is warranted.

Key words: • Depression • Quality of life • Women • Pregnancy • Postpartum • HIV • Thailand

Copyright © 2020 Aурpibul et al. Published by Global Health and Education Projects, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in this journal, is properly cited.

I. Introduction

1.1. Background of the Study

Perinatal depression is one of the several mental health concerns in reproductive-age women globally. In developed countries, the prevalence of depression during pregnancy and the postpartum period ranged from 8-20%.¹ A systematic review of 23 studies in low- and middle-income countries among pregnant women documented that depression prevalence widely ranged from 1-30%.² A 2013 Malawian study conducted among pregnant women at an antenatal clinic reported that 21.1% had either major or minor depressive episodes.³ Socioeconomic factors such as parity, education, income, residential property, and interaction with partner were predictors of depression, as measured in a German study.⁴ The negative effect of depression on self-care and medical compliance of pregnant women has been documented.^{5,6}

When presented together, both HIV infection and being pregnant or postpartum could affect the mental health of reproductive women. Several studies documented high prevalence of perinatal depression in WLHIV during the early days of ART. A Zambian study published in 2002 found the presence of major depression in as many as 85% WLHIV, particularly in those who had just discovered their HIV status during pregnancy.⁷ Similarly, studies conducted in Thailand during 2004-2007 documented a high prevalence (>70%) of depression in WLHIV both during pregnancy and the postpartum period.^{8,9}

Currently, the World Health Organization (WHO) recommends ART initiation soon after confirmation of HIV diagnosis to prevent mother to child transmission; ART continuation after delivery is also mandatory.¹⁰ Thailand has followed these guidelines since 2014, while simultaneously recommending ART initiation for all HIV-infected individuals regardless of CD4 level.¹¹ When a diagnosis is made during pregnancy, women must come to terms with two life-changing pieces of information; the need for lifelong medication, as well as the physical and physiological changes during pregnancy might affect their mental health and quality of life. A Vietnamese study revealed an association between depressive symptoms and a

significant decrease in health-related quality of life in patients living with HIV on ART.¹² Those issues are more critical in pregnant and postpartum women living with HIV, as their mental health would not only affect their own quality of life, but also interfere the interpersonal relationship with their child.¹³ Understanding about their association would allow us to provide appropriate timely intervention.

1.2. Objectives of the Study

This cross-sectional study aimed to determine the prevalence of depressive symptoms among WLHIV during pregnancy up to one-year postpartum, and to assess their quality of life when compared to HIV-negative women.

1.3. Specific Aims and Hypothesis

We hypothesized a higher prevalence of depressive symptoms and lower quality of life would be seen in WLHIV, when compared to those without HIV. Also, demographic and socioeconomic factors would be associated with having depressive symptoms in the study population.

2. Methods

2.1. Study Variables

This cross-sectional study was conducted in 15 hospitals at Chiang Mai, Thailand from January to November 2017. Inclusion criteria for the target group were age \geq 15 years, HIV infection, and being pregnant or within 12 months postpartum. Those with mental or physical conditions affecting mood/quality of life were excluded. Potential participants were identified by health care providers at antenatal, postpartum, and well-baby clinics. They were approached during their regular visit for health care. Each potential participant was informed about the study, and invited to join the study in a consecutive sampling frame. Pregnant and 1-year postpartum HIV-negative women from each hospital were enrolled for comparison.

Socio-demographic data were collected by face-to-face interviews. Variables included ethnicity, parity, timing of knowing about HIV status, highest educational level, religion, household income, employment status, workplace, history of alcohol and tobacco use for participants and their partners.

Depressive symptoms were screened using the Patient Health Questionnaire-9 (PHQ-9). A PHQ-9 score ≥ 10 had a sensitivity of 88% and a specificity of 88% for major depression. Scores between 5-9, 10-14, 15-19, and 20-27 represented mild, moderate, moderately severe, and severe depressive symptoms, respectively.¹⁴ The Thai version of PHQ-9 was previously tested for reliability and validity and demonstrated satisfactory internal consistency (Cronbach's alpha = 0.79).¹⁵

Quality of life (QOL) was assessed using WHOQOL-BREF. Participants were asked to rate their QOL in the past two weeks with scores that ranged from 1-5. Higher scores indicated a better QOL.¹⁶ The tool was previously assessed for reliability and validity in Thai patients with HIV/AIDS; the Cronbach's alpha ranged from 0.61 to 0.81 across domains.¹⁷

2.2. Statistical Analysis

Statistical analysis was performed using the SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc; 2008. Participant characteristics were described using descriptive statistics, including number (percent), mean [standard deviation (SD)], and median [interquartile range (IQR)]. The two groups were compared using the Mann-Whitney U test, Fisher exact, Chi square, or one-way ANOVA as appropriate. Only variables significant at $p \leq 0.1$ in univariate analysis were included in subsequent multivariate analysis. Linear regression analysis determined association between depressive symptom scores and QOL. The study was approved by the Institutional Review Board at the Research Institute for Health Sciences, Chiang Mai University (Certificate approval number 16/2016). Literate participants gave written consent, while low and illiterate participants consented with a thumbprint with an impartial witness present.

3. Results

3.1. Sociodemographic Characteristics of the participants

One hundred WLHIV were enrolled. Mean age was 29.2 ± 7.5 years; 57 (57%) were between 25-40 years of age. Sixty-four percent were Thai, while

36 (36%) were migrant workers. Thirty-eight (38%) were pregnant while 62 (62%) were within 1-year postpartum. Thirty-nine (39%) were pregnant for the first time or had just delivered their first child. Fifty-three (53%) learned their HIV positive status during this pregnancy, 38 (38%) had prior knowledge, and 9 (9%) did not respond to this question.

One hundred HIV-negative women were enrolled as a control group; 78 (78%) were pregnant and 22 (22%) were within 1-year postpartum. They were younger (mean age 27.7 years), more educated, and had a higher household income than the WLHIV (Table 1).

3.2. Prevalence of Depressive Symptoms

There were 30 WLHIV (30%) with presence of depressive symptoms (PHQ-9 score ≥ 5), with (22) 22% mild, 7 (7%) moderate, and 1 (1%) moderately severe depressive symptoms. None had severe depressive symptoms. Meanwhile, 28 (28%) of HIV-negative women had depressive symptoms. Neither significant difference was seen between the mean depression scores (3.5 ± 3.6 vs. 3.4 ± 2.7 , respectively; $p = 0.691$), nor the prevalence of depressive symptoms (30% (95% CI 21-39) vs. 28% (95% CI 19-37), respectively; $p = 0.416$) when comparing WLHIV and HIV-negative women.

Looking exclusively at pregnant participants, there was no difference in mean depressive scores (3.6 ± 2.9 vs. 3.7 ± 2.8 , respectively; $p = 0.771$) or prevalence of depressive symptoms (13 (34%) vs. 26 (33%), respectively; $p = 1.000$) when compared between the groups of WLHIV and HIV-negative women. Thirty-four percent of WLHIV who recently learned their HIV-positive status had depressive symptoms compared to 21% of WLHIV with prior knowledge, though this was not statistically significant ($p = 0.179$). For the postpartum participants, a significant difference in mean depression scores was seen (3.5 ± 4.1 vs. 2.1 ± 1.6 , respectively; $p = 0.022$), but there was no significant difference in the prevalence of depressive symptoms (17 (27%) vs. 2 (9%), respectively; $p = 0.136$) (Table 2).

3.3. Factors Associated with Depressive Symptoms

In univariate logistic regression, presence of depressive symptoms was associated with familial

Table 1: Socio-demographic behavioral characteristics of the study participants (n=200)

Variables	Total	WLHIV	HIV-negative women	X ²	t	P-value
Number of participants	200	100	100			
Age (years), n (%)						
15-<25	71 (36)	36 (36)	35 (35)	4.825		0.085
25-40	121 (61)	57 (57)	64 (64)			
>40	8 (4)	7 (7)	1 (1)			
Mean (SD)	28.4 (6.8)	29.2 (7.5)	27.7 (6.0)		1.481	0.140
Nationality						
Thai	128 (64)	64 (64)	64 (64)	0.000		1.000
Migrant workers	72 (36)	36 (36)	36 (36)			
Status at the time of study						
Pregnant	116 (58)	38 (38)	78 (78)	32.841		< 0.001
Within 1 year postpartum	84 (42)	62 (62)	22 (22)			
Parity						
First	91 (46)	39 (39)	52 (52)	4.205		0.122
Second-third	94 (47)	51 (51)	43 (43)			
Forth or more	15 (8)	10 (10)	5 (5)			
Highest level of education, n (%)						
No schooling	62 (31)	34 (34)	28 (28)	12.185		0.035
Primary school	17 (12)	8 (12)	9 (13)			
Secondary/high school	69 (60)	41 (62)	28 (39)			
Vocational certificate/diploma	22 (16)	10 (15)	12 (17)			
Bachelor's degree or higher	30 (22)	7 (11)	23 (32)			
Monthly household income (Thai baht)						
< 5,000	7 (4)	5 (5)	2 (2)	8.333		0.016
5,000-20,000	142 (71)	78 (78)	64 (64)			
> 20,000	51 (26)	17 (17)	34 (34)			
Mean (SD)	19,098 (15,943)	16,949 (17,446)	2,1248 (17,446)		-1.920	0.056
Workplaces, N (%)						
Construction sites	14 (7)	4 (4)	10 (10)	1.087		0.297
Agricultural/ farming	23 (12)	13 (13)	10 (10)			
Industrial/factories	14 (7)	9 (9)	5 (5)			
Household work	21 (10)	12 (12)	9 (9)			
Office/store/company	96 (48)	47 (47)	49 (49)			
Government sector/state enterprises	16 (18)	5 (5)	11 (11)			
Unemployed	16 (18)	10 (10)	6 (6)			
Religion, N (%)						
Buddhist	182 (91)	94 (94)	88 (88)	2.864		0.413
Christian	15 (8)	5 (5)	10 (10)			
Muslim	1 (1)	0	1 (1)			
Other/No religion	2 (1)	1 (1)	1 (1)			

(Contd...)

Table 1: (Continued)

Variables	Total	WLHIV	HIV-negative women	X ²	t	P-value
Family violence, N (%)						
Verbal abuse	91 (46)	46 (46)	45 (45)	0.020		0.887
Physical abuse	10 (5)	9 (9)	1 (1)	6.737		0.009
Lifetime smoking, N (%)						
Self	4 (2)	3 (3)	1 (1)	1.020		0.621
Partner	82 (41)	47 (47)	35 (35)	2.976		0.084
Lifetime alcohol use, N (%)						
Self	36 (16)	14 (14)	18 (18)	0.595		0.440
Partner	137 (69)	68 (68)	69 (69)	0.023		0.879

Key: WLHIV Women Living with HIV, Data in mean (SD) or number (%), P-value by student t-test (t) for means, and chi-square (x²) or fisher exact as appropriate, The exchange rate as of December 2017, 32.65 Thai baht = 1 USD

Table 2: Prevalence and Severity of Depressive Symptom Scores in pregnant and 1-year postpartum WLHIV vs. HIV-negative women

PHQ-9	WLHIV		HIV-negative Women		Test statistic	p-value
	Number of participants	Values	Number of participants	Values		
Depression scores						
Total	100	3.5 (3.6)	100	3.4 (2.7)	t=0.398	0.691
Pregnancy	38	3.6 (2.9)	78	3.7 (2.8)	t=-0.291	0.771
1-year postpartum	62	3.5 (4.1)	22	2.1 (1.6)	t=2.334	0.022
Prevalence of depressive symptom ^a						
Total	100	30 (21-39)	100	28 (19-37)	X ² =2.696	0.416
Pregnancy	38	13	78	26	X ² =0.009	1.000
1-year postpartum	62	17	22	2	X ² =3.117	0.136
Severity of depressive symptoms						
Mild Depressive Symptoms (5-9)	22 (22%)		25 (44%)			
Moderate Depressive Symptoms (10-14)	7 (7%)		3 (3%)			
Moderately Severe Depressive Symptoms (15-19)	1 (1%)		0			
Severe Depressive Symptoms (20-27)	0		0			

Key: WLHIV women living with HIV; SD standard deviation; CI confident interval , Data in mean (SD), frequency (95% CI), or number (%); p-value by student t-test, Chi square as appropriate, ^aDefined as PHQ-9 core ≥ 5

verbal abuse, and lifetime alcohol use, while age, nationality, education, family income, physical abuse, self- or partner smoking, partner alcohol use, parity, and timing of HIV diagnosis were not associated with having depressive symptoms in this study population. The associations between verbal abuse in the family [$\beta = 3.537$ (95% CI = 1.308-9.562), $p = 0.013$] and lifetime alcohol use [$\beta = 10.863$ (95% CI = 2.620-45.031), $p = 0.001$] with presence of depressive symptoms in WLHIV during pregnancy

or within 1-year postpartum remained significant in multivariate analysis.

3.4. Quality of Life of WLHIV vs. HIV-negative women during Pregnancy and 1-Year after Delivery

When assessed by WHOQOL-BREF, the mean transformed domain scores (ranged from 0-100) of WLHIV were 44.21 ±11.08, 43.29 ±10.27, 36.64 ±14.64, and 39.04 ±11.61 in physical health,

psychological, social relationship, and environmental, respectively; all were lower than HIV-negative women, but not reached statistically significant difference. The overall perception on own health as rated by WLHIV were significantly lower than HIV-negative women (2.59 ± 0.99 vs. 2.92 ± 0.80 ; $p=0.010$); meanwhile, the overall perception of quality of life was not different.

3.5. Association Between Depressive Symptoms and Quality of Life

The overall perception of QOL as rated by WLHIV with depressive symptoms was significantly lower than by WLHIV without depressive symptoms (2.31 vs. 2.54 , respectively; $p = 0.039$), and the overall perception of own health was also significantly lower (2.50 vs. 2.82 , respectively; $p = 0.019$) in WLHIV with depressive symptoms when compared to those without. The simple linear regression analysis confirmed significant negative correlation between PHQ-9 scores and both overall perception on QOL ($\beta = -0.296$, $p = 0.030$) and on own health ($\beta = -0.214$, $p = 0.033$) (Table 3).

4. Discussion

We found that approximately one-third of WLHIV in this study had depressive symptoms, which was not significantly different from the HIV-negative comparison group. Our results were in line with a US study that found no difference in depression scores between women with and without HIV in both the prenatal and postpartum period¹⁸. A variation in prevalence of perinatal depression from different countries was documented. A study at an antenatal

clinic in Malawi found that 21.1% of pregnant women regardless of HIV status reported either major or minor depressive episodes.¹⁹ A rural South African study reported prenatal depression in 48.7% of HIV-infected participants, half of whom had unplanned pregnancies and were living in poverty.⁷

In this study, we found that women who were newly diagnosed with HIV during their latest pregnancy had more symptoms of depression, than women with a pre-pregnancy HIV-diagnosis. Discovering their HIV-positive status during pregnancy meant that the women had to immediately come to terms with their HIV status. Prior to ARTs, the prevalence of depression was as high as 85% as reported in a Zambian study published in 2002, particularly among those who had just discovered their HIV status during pregnancy.⁷ Studies conducted in Thailand between 2004 and 2007 reported a 78% prevalence of depressive symptoms in pregnant women and 74% in HIV-positive postpartum women.^{8,9} In our study the prevalence of depressive symptoms in pregnant and postpartum were 34% and 27%, respectively. Expanding the range of postpartum up to 1 year may explain the difference in rates. In the past, positive HIV diagnosis meant certain death, which may account for the high prevalence of depression in earlier studies. At that time, HIV-related stigma and discrimination was high and prognosis was poor.

We found that verbal abuse by their partner and lifetime alcohol use by the women were associated with the presence of depressive symptoms. As a cross-sectional study, it was not possible to determine the sequence of causal relationships.

Table 3: World health organization quality of Life (WHOQOL)-BREF Assessment in WLHIV vs. HIV-negative women

Quality of life profile	WLHIV	HIV-negative women	t	P-value
Overall perception on own health ^a	2.59 (0.99)	2.92 (0.80)	-2.599	0.010
Overall perception of quality of life ^a	2.44 (0.76)	2.51 (0.69)	-0.684	0.495
Domains ^b				
1) Physical Health	44.21 (11.08)	47.01 (9.99)	-1.876	0.883
2) Psychological	43.29 (10.27)	43.49 (10.62)	-0.135	0.872
3) Social relationships	36.64 (14.64)	40.44 (17.40)	-1.671	0.505
4) Environment	39.04 (11.61)	41.25 (10.72)	-1.395	0.584

Key: WLHIV women living with HIV, Data in mean (SD); p-value compared between WLHIV and women without HIV by student t-test; ^aRaw scores ranged from 1-5,

^bTransformed scores ranged from 0-100

However, a South African study reported that intimate partner violence was among the factors associated with depressive symptoms in pregnant women.¹⁹ It was similar to a Malawian study that documented major depressive episodes associated with lower social support and intimate partner violence.³ A German study reported that apart from education, income, and residential property status; partnership status and their interactions were predictive factors for depression scores in the perinatal period.⁴ A US study among pregnant HIV-infected minority women described positive partner support as a significant factor associated with lower levels depression.²⁰ Another US study reported that inadequate social support, history of depression, and childhood sexual abuse were better predictors of prenatal depressive symptoms than HIV status.²¹ An earlier Thai study found a negative association between emotional social support and depression.²² The Thai and US studies highlight the need to identify women at increased risk of depressive symptoms during prenatal care; this should be implemented countrywide, if possible. Interventions should include their partners, and focus on minimizing interpersonal conflict and promoting positive relationships.

The WHOQOL-BREF-THAI has been previously used in an earlier Thai study with HIV-positive participants (mean age 36 years; 44.2% female) in 2004.¹⁶ That study reported that domain scores discriminated between patients with high and low frequency/severity of HIV symptoms. In this study, we found that both pregnant and postpartum women with depressive symptoms had lower QOL scores when compared to those without. Similar to HIV symptoms, our study supported that mental health affects QOL as well. This finding supports an Indian study in non-pregnant HIV patients aged between 25-44 years; half were depressed and had significantly lower QOL than those who were not depressed.²³ This was particularly true for the environment and social relationships domains. This highlights the need to screen for mental health problems during prenatal care to identify those at increased risk, to whom appropriate intervention/treatment for depression would not only improve their QOL, but also affect infants under their care.

A South African study revealed a low likelihood of exclusive breastfeeding among mothers with high prenatal depression scores.²⁴ Persistent depression in mothers had a negative effect on infant nutritional status,²⁵ as well as it could affect mother-infant attachment resulting in delayed cognitive, linguistic skills, emotional and behavioral problems later in life.²⁶ In this study we did not follow infant health. Thus, the consequences of depression in postpartum women were not assessed.

4.1. Limitations

There were several limitations in this study. The cross-sectional design does not explain cause or effect. Language and cultural barriers among migrant workers were possible. Although most were proficient in Thai for daily living, it is possible that they may not have understood certain words used to describe their emotions and feelings. Since many participants were illiterate, the PHQ-9 was completed by face-to-face interviews with study staff rather than self-administered. These participants might hesitate to reveal their actual feelings and the frequency of negative emotions. We asked for lifetime alcohol use, smoking, and partner abuse, and this data did not include the specificity to determine their association with depressive symptoms or current QOL. Lastly, the study was conducted in a hospital setting, so participants may have given socially desirable responses.

4.2. Recommendation for further studies

Future studies should identify societal and resilience factors in WLHIV to better understand the dynamic of mental health in reproductive age women. Qualitative study might be an appropriate approach to further explore issues of mental health to follow-up on baseline data using standard questionnaires.

5. Conclusion and Global Health Implications

The prevalence of depressive symptoms in women living with HIV was similar to the prevalence in HIV-negative women in the same geographic area. Association with verbal abuse by partner and alcohol use was observed. WLHIV with depressive symptoms had a significantly lower QOL than those without.

We demonstrate presence of depressive symptoms among women in perinatal period. Thus, we support mental health screening in antenatal and postpartum clinic as a part of routine care so that women with abnormal screening could be intervened or referred for further evaluation as appropriate.

Compliance with Ethical Standards

Conflicts of Interest: The authors declare no conflict of interest. **Financial Disclosure:** All authors have no financial disclosure to declare. **Funding/Support:** This study was funded by Chiang Mai University. **Ethics Approval:** The study was approved by the Institutional Review Board at the Research Institute for Health Sciences, Chiang Mai University (Certificate approval number 16/2016). **Acknowledgements:** We thank our study team, the community hospital antenatal/HIV clinical staff, and our participants who contributed to this research.

Key Messages

- Perinatal depression remains a significant co-morbidity in WLHIV, thus, mental health screening during pregnancy and postnatal period should be encouraged.
- Presence of depressive symptoms associated with low perception of quality of life in WLHIV; detection, evaluation, and intervention should be done in a timely manner to minimize negative consequences.
- Identification of societal and resilience factors potentially affect mental health might be an important next step to improve quality of perinatal care, especially in WLHIV.

References

1. Robbins CL, Zapata LB, Farr SL et al. Core state preconception health indicators - pregnancy risk assessment monitoring system and behavioral risk factor surveillance system, 2009. *MMWR Surveill Summ.* 2014;63(3):1-62.
2. Jha S, Salve HR, Goswami K, Sagar R, Kant S. Burden of common mental disorders among pregnant women: A systematic review. *Asian J Psychiatr.* 2018;36:46-53.
3. Stewart RC, Umar E, Tomenson B, Creed F. A cross-sectional study of antenatal depression and associated factors in Malawi. *Arch Womens Ment Health.* 2014;17(2):145-154.
4. Hein A, Rauh C, Engel A, et al. Socioeconomic status and depression during and after pregnancy in the Franconian Maternal Health Evaluation Studies (FRAMES). *Arch Gynecol Obstet.* 2014;289(4):755-763.
5. Boonpongmanee C, Zauszniewski J, Morris D. Resourcefulness and self-care in pregnant women with HIV. *West J Nurs Res.* 2003;25(1):75-92.
6. Gordillo V, del Amo J, Soriano V, Gonzalez-Lahoz J. Sociodemographic and psychological variables influencing adherence to antiretroviral therapy. *AIDS.* 1999;13(13):1763-1769.
7. Kwalombota M. The effect of pregnancy in HIV-infected women. *AIDS Care.* 2002;14(3):431-433.
8. Ross R, Sawatphanit W, Zeller R. Depressive symptoms among HIV-positive pregnant women in Thailand. *J Nurs Scholarsh.* 2009;41(4):344-350.
9. Ross R, Sawatphanit W, Mizuno M, Takeo K. Depressive symptoms among HIV-positive postpartum women in Thailand. *Arch Psychiatr Nurs.* 2011;25(1):36-42.
10. Selvaraj V, Ross MW, Unnikrishnan B, Hegde S. Association of quality of life with major depressive disorder among people with HIV in South India. *AIDS Care.* 2013;25(2):169-172.
11. Department of disease control MoPH. Thailand National Guidelines on HIV/AIDS Treatment and Prevention. In: 2014.
12. Tran BX, Dang AK, Truong NT, et al. Depression and Quality of Life among Patients Living with HIV/AIDS in the Era of Universal Treatment Access in Vietnam. *Int J Environ Res Public Health.* 2018;15(12).
13. Bolghan-Abadi M. The Relationship between Parents' Child Rearing Styles and Their Children's Quality of Life and Mental Health. *Psychology.* 2011;2(3):230-234.
14. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606-613.
15. Lotrakul M, Sumrithe S, Saipanish R. Reliability and validity of the Thai version of the PHQ-9. *BMC Psychiatry.* 2008;8:46.
16. WHOQOL-BREF. Introduction, Administration, Scoring and Generic Version of the Assessment. Field Trial Version. In: 1996.
17. Sakthong P, Schommer JC, Gross CR, Sakulbumrungsil R, Prasithsirikul W. Psychometric

- properties of WHOQOL-BREF-THAI in patients with HIV/AIDS. *J Med Assoc Thai*. 2007;90(11):2449-2460.
18. Aaron E, Bonacquisti A, Geller PA, Polansky M. Perinatal Depression and Anxiety in Women with and without Human Immunodeficiency Virus Infection. *Womens Health Issues*. 2015;25(5):579-585.
 19. Peltzer K, Rodriguez VJ, Jones D. Prevalence of prenatal depression and associated factors among HIV-positive women in primary care in Mpumalanga province, South Africa. *SAHARA J*. 2016;13(1):60-67.
 20. Blaney NT, Fernandez MI, Ethier KA, et al. Psychosocial and behavioral correlates of depression among HIV-infected pregnant women. *AIDS Patient Care STDS*. 2004;18(7):405-415.
 21. Bonacquisti A, Geller PA, Aaron E. Rates and predictors of prenatal depression in women living with and without HIV. *AIDS Care*. 2014;26(1):100-106.
 22. Li L, Lee SJ, Thammawijaya P, Jiraphongsa C, Rotheram-Borus MJ. Stigma, social support, and depression among people living with HIV in Thailand. *AIDS Care*. 2009;21(8):1007-1013.
 23. Deshmukh NN, Borkar AM, Deshmukh JS. Depression and its associated factors among people living with HIV/AIDS: Can it affect their quality of life? *J Family Med Prim Care*. 2017;6(3):549-553.
 24. Tuthill EL, Pellowski JA, Young SL, Butler LM. Perinatal Depression Among HIV-Infected Women in KwaZulu-Natal South Africa: Prenatal Depression Predicts Lower Rates of Exclusive Breastfeeding. *AIDS Behav*. 2017;21(6):1691-1698.
 25. Kaaya S, Garcia ME, Li N, et al. Association of maternal depression and infant nutritional status among women living with HIV in Tanzania. *Matern Child Nutr*. 2016;12(3):603-613.
 26. Muzik M, Borovska S. Perinatal depression: implications for child mental health. *Ment Health Fam Med*. 2010;7(4):239-247.

**PUBLISH IN THE
INTERNATIONAL JOURNAL of
Maternal and Child Health and AIDS**



- Led By Researchers for Researchers
- Immediate, Free Online Access
- Authors Retain Copyright
- Compliance with Open-Access Mandates
- Rigorous, Helpful, Expeditious Peer-Reviews
- Highly Abstracted and Indexed
- Targeted Social Media, Email Marketing

www.mchandaids.org