


# One-Third of Perinatal Women Living with HIV Had Perinatal Depression in Gondar Town Health Facilities, Northwest Ethiopia

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**Background:** Depression is the most common co-morbidity among perinatal women living with HIV. It affects client's adherence to care and treatment, which results in increased viral load; further exposing women to opportunistic infections that reduce quality-of-life. A cumulative effect of these may increase mother-to-child transmission of HIV.

**Methods:** An institution-based cross-sectional study was conducted among perinatal women living with HIV in Gondar town health facilities, Northwest Ethiopia from October 1–30, 2018. A single population proportion formula was used to calculate the sample size. The sample was stratified and proportionally allocated to each health facility. Participants were chosen from each stratum independently using a simple random sampling technique. A total of 422 study participants were selected. The World Health Organization (WHO) 20-item self-reported questionnaire (SRQ-20) was used to measure perinatal depression among women living with HIV. Perceived stigma was measured using HIV stigma scale. Women were interviewed at the PMTCT clinic during follow-up care, and clinical variables were extracted from client chart. Bi-variable and multivariable logistic regression models were used to identify factors associated with perinatal depression. Variables having an odds ratio with 95% confidence interval and a *P*-value less than 0.05 were taken as significant variables associated with perinatal depression.

**Results:** The prevalence of perinatal depression among women living with HIV was found to be 38.4% (95% CI=34.1–43.1%). Fair and poor ART drug adherence (AOR=5.44; 95% CI= 2.81–10.56%), the presence of comorbid illness (AOR=3.24; 95% CI: 1.83–5.75), being on second line ART (AOR=2.97; 95% CI=1.08–8.17), perceived stigma (AOR=3.61; 95% CI=2.11–6.17), and suicidal ideation (AOR=3.89; 95% CI=1.28–11.81) were factors associated with perinatal depression.

**Conclusion:** The prevalence of perinatal depression among women living with HIV was found to be high. Adherence counseling needs to be strengthened; preventing first line treatment failure has to be encouraged; greater emphasis has to be given for those women on second line ART. Early identification and management of co-morbidity has to be considered. HIV positive perinatal women need counseling to reduce HIV-related perceived stigma.

**Keywords:** perinatal women, HIV/AIDS, depression, Ethiopia

## Introduction

Depression is a common mental disorder characterized by depressed mood, loss of interest or pleasure, decreased energy, feeling of guilt or low self-worth, disturbed sleep or appetite, and poor concentration.<sup>1</sup> It is estimated to be the second disease

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burden on the globe by 2020.<sup>2</sup> However, it is a neglected mental health disorder among people living with HIV in sub-Saharan Africa.<sup>3</sup> Perinatal depression is a kind of depression that occurs during the perinatal period (pregnancy up to 1 year of postpartum).<sup>4</sup> In low and middle income countries, the prevalence of perinatal depression is estimated to be 15–25%.<sup>5</sup> Depression is the most common illness among pregnant women living with HIV.<sup>6</sup> It is associated with significant adverse public health consequences.<sup>7</sup> This might have a negative effect on their adherence to care and treatment which subsequently contribute to rapid viral multiplication and mutation that results in treatment failure.<sup>8</sup> The high viral load due to treatment failure causes increased vertical transmission of HIV.<sup>9,10</sup> According to reports by the WHO, UNICEF, and UNAIDS on HIV/AIDS, every year about 1.49 million infants born from women living with HIV.<sup>11</sup> Depression during pregnancy is a public health concern because it is associated with poor fetal and delivery outcomes, risky behaviors, and poor uptake of antenatal care.<sup>12</sup> Perinatal depression can introduce threats to maternal and child health during pregnancy and the postnatal period.<sup>13</sup> In particular in low and middle income countries where the threat of maternal morbidity and mortality is unacceptably high. Adverse consequences of maternal depression for women living with HIV and their children may include low uptake and poor adherence to interventions in preventing mother-to-child transmission of HIV.<sup>14</sup> Maternal depression also affects child health, including risks of perinatal HIV transmission, poor physical health, impaired cognitive, behavioral, and psychomotor development and slow socio-economic development.<sup>15,16</sup> Women from developing countries are usually exposed to risk factors to develop perinatal depression; such as poor socioeconomic status and unintended pregnancy.<sup>17</sup> A study conducted in Ethiopia indicated that the prevalence of depression among women who do not have Ante Natal Care (ANC) follow-up was 31.5%.<sup>18</sup> The antenatal care clinic is place where women receive healthcare during pregnancy.<sup>19</sup> Depression in women living with HIV might be higher than women who do not have HIV infection. Having HIV and depression together is a double burden for the pregnant women. However, there is still no sufficient data which describes its magnitude and associated factors. Therefore, the aim of this study was to assess the prevalence of perinatal depression and associated factors among women living with HIV in Gondar town health facilities, North West Ethiopia.

## Materials and Methods

### Study Design and Setting

An institution-based cross-sectional study was conducted in Gondar town health facilities. The university hospital and five health facilities that were providing PMTCT care were involved in the study. Those women living with HIV who visit the selected health facilities in their regular follow-up of PMTCT service were interviewed during data collection period. Women who were seriously ill and unable to communicate and transferred out were excluded from the study.

### Sample Size and Sampling Procedures

The sample size was calculated using a single population proportion formula with the assumption of proportion of perinatal depression (50%) and 5% margin of error. The final sample size was found to be 384. By adding a 10% non-response rate the total sample size became 422. The sample was stratified and allocated proportionally to each health facilities. Simple random sampling was used to collect data in six health facilities independently.

### Data Collection Tools and Procedures

Data was collected using the Amharic version of the interviewer administered questionnaire from October 1–30, 2018. The questionnaire was first prepared in English but later it was translated into Amharic by a language expert, and then it was translated back to English by another language expert to check its consistency. Two trained psychiatric nurses participated in the data collection process. The WHO 20 items self-reporting questionnaire (SRQ-20) was used to measure perinatal depression. This tool is superior to the Edinburgh postnatal depression scale (EPDS) across all domains in evaluating perinatal depression in a low income setting.<sup>20</sup> Perinatal depression was considered using a cut-off point of 6 and above.<sup>20</sup> The Oslo-3 social support scale which has a score of 3–14 was used to determine social support characteristics. The Oslo-3 social support scale with a score of 3–8 was poor, 9–11 moderate, and 12–14 strong social support.<sup>21</sup> Perceived stigma was measured using the HIV stigma scale, and participants who scored above the mean were considered to have perceived stigma.<sup>22</sup> Suicidal ideation was assessed using the Composite International Diagnostic Interview (CIDI).<sup>23</sup> Suicidal ideation was recorded if the respondent responded yes to the question: have you ever seriously thought about committing suicide? And a suicidal attempt was recorded if

the respondents said yes to the question: have you ever attempted suicide? Drug adherence was assessed using a self-reporting questionnaire. History of alcohol use was assessed by asking “have you ever used any alcohol since the beginning of your pregnancy?” The Amharic version of the semi-structured pre-tested and interviewer administered questionnaire was used to collect data on the socio-demographic characteristics of participants. Secondary data was obtained from the patient chart for clinical information (recent CD4 count, recent viral load, ART regimen, and other variables).

## Data Processing and Analysis

The collected data was manually checked for its completeness before entering into EPI INFO version 7. Then data was exported to SPSS version 20 for analysis. Primarily, a binary logistic regression model was used; variables with a  $P$ -value  $\leq 0.2$  from this model were fitted into the multi-variable logistic regression model in order to avoid confounding factors. Finally, an adjusted odds ratio with 95% CI was calculated; variables with a  $P$ -value less than 0.05 were considered to be significant factors associated with perinatal depression.

## Result

A total of 414 eligible clients were included in the study with a response rate of 98.1%. The mean age of the respondents was 30.1 (SD= $\pm 4.65$ ) years. The majority of women were aged 26–33 years. About 75% of women were married; nearly one-third (133, 32.1%) of the women had completed secondary school. The majority of the respondents (374, 90.3%) were urban dwellers (Table 1)

About three quarters of the study participants had had two-to-four pregnancies including the current one. About 99% of the participant’s children were tested for HIV/AIDS; 20.5% of them were positive for the HIV test. One hundred and twenty-six (30.44%) participants had a history of child death, while 22.5% had a history of abortion. Around 16% of the respondents had a history of alcohol use during their current pregnancy. About 8% of the study participants had suicidal ideation in the 12 months prior to data collection (Table 2).

Close to one-third of the respondents had comorbid illness; such as hypertension, diabetes mellitus, and tuberculosis. The majority of the participants were on the first line ART regimen and 56% of them were on TDF/3TC/EFV. About 81.6% of respondents had good ART

adherence (taken  $>95\%$  of drugs prescribed). About 60% of the study participants knew that their partners were HIV positive. One fourth of the participants had partners with unknown HIV status; 15% of participants had partners with negative HIV test results. Among the study participants, 6.5% of them were reactive for the syphilis test. The majority (88.6%) of women living with HIV disclosed their HIV status, of which about three quarters (74%) had also disclosed it to their partner. Close to half of the respondents (47.3%) had perceived stigma. Fifty-six (13.5%) of the respondents had a CD4 count less than 200 cell/mm<sup>3</sup> and 262 (63.3%) of respondents had started ART before pregnancy. None of respondents had strong social support (Table 3).

This study showed that 38.4% (95% CI 34.2–43.1%) of perinatal women living with HIV were found to have depression. The ART drug adherence, having comorbid illness, being on second line ART, perceived stigma, and suicidal ideation were significant and independent factors associated with perinatal depression. Women with fair and poor ART drug adherence were 5-times more likely to have perinatal depression (AOR=5.44; 95 % CI=2.81–10.56). Women with comorbid illness had 3-times more odds of depression than those with no comorbidity (AOR=3.24; 95% CI=1.83–5.75) and those women on second line ART were 3-times more depressed compared to those who were on first line ART (AOR=2.97; 95% CI=1.08–8.19). In addition, those women with perceived HIV stigma were 3.6-times more likely to have perinatal depression (AOR=3.61; 95% CI=2.11–6.17) and those women with suicidal ideation were nearly 4-times more likely to have depression than their counterparts (AOR=3.89; 95% CI=1.28–11.81) (Supplementary Table S1)

## Discussion

The prevalence of perinatal depression among women living with HIV was found to be 38.4% (95% CI=34.1–43.1%). This finding is almost in-line with the study conducted in Uganda (39%).<sup>24</sup> This might be due to socio-economic similarity between the two countries. However, it is higher than the findings in Cape Town, South Africa (11%).<sup>25</sup> This variation might be due to differences in sociodemographic characteristics and tools used to measure depression. For instance, in the study conducted in Cape Town, depression was assessed using the Edinburgh postnatal depression scale (EPDS). The finding of this study was also higher than a systematic review conducted in Ethiopia (25.8%)<sup>26</sup> and other low and middle income

**Table I** Sociodemographic Characteristics of HIV Positive Perinatal Women in Gondar Town Health Institutions, Northwest Ethiopia, 2018 (n=414)

Variables	Category	Frequency	Depression		Percent
			Yes	No	
The outcome variable	Perinatal Women living with HIV	414	159 (38.4%)	255 (61.6%)	
Age	18–21	10	4	6	2.4
	22–25	56	26	30	13.5
	26–29	129	45	84	31.2
	30–33	118	39	79	28.5
	34–37	73	29	44	17.6
	38–41	28	16	12	6.8
Marital status	Married	300	89	211	72.5
	Single	18	13	5	4.3
	Divorced or widowed	41	25	16	9.9
	Separated	55	32	23	13.3
Residence	Rural	40	19	21	9.7
	Urban	374	236	138	90.3
Level of education	Unable to read and write	72	34	38	17.4
	Able to read and write only	15	6	9	3.6
	Primary school	94	41	53	22.7
	Secondary school	133	45	88	32.1
	Diploma and above	100	30	70	24.2
Living status	Alone	94	59	35	22.7
	With family	19	11	8	4.6
	With husband	301	89	212	72.7
Occupation	No occupation	7	5	2	1.7
	Government employee	92	29	68	23.4
	Housewife	210	71	139	50.7
	Daily labor	59	41	18	14.3
	Merchant	41	13	28	9.9
Husband occupation	Government employed	122	39	115	40.6
	Farmer	32	14	18	10.6
	Daily labor	47	34	33	15.6
	Merchant	52	21	41	17.3
	Other*	48	17	31	15.9
Income	0–585	64	38	26	15.5
	586–1,650	82	44	38	19.8
	1,651–3,145	122	39	83	29.5
	3,146–5,195	68	22	46	16.4
	5,196–7,758	48	11	37	11.6
	7,759–10,833	26	4	22	6.3
	>10,833	4	1	3	1

Notes: \*Driver, unemployed/no occupation.

countries (18.9%).<sup>27</sup> This may be due to the fact that this single study was compared with a systematic review with pooled prevalence from different studies. In addition, a systematic review conducted in Ethiopia was among

perinatal women in general, and ours is specific to perinatal women living with HIV. On the other hand, this study is lower than studies done in South Africa (48.7%) and Chicago, IL (44%).<sup>28,29</sup> This discrepancy might be due to

**Table 2** Behavioral and Other Characteristics Among HIV Positive Perinatal Women in Gondar Town Health Institutions, Northwest Ethiopia, 2018 (n=414)

Variables	Category	Frequency	Depression		Percent
			Yes	No	
Outcome variable	Perinatal women living with HIV	414	159 (38.4%)	255 (61.6%)	
Alcohol use	Yes No	68 (16.4%) 346 (83.6%)	22 (32.4%) 137 (39.6%)	46 (67.6%) 209 (60.4%)	16.4 83.6
Chewing khat	Yes No	5 (1.2%) 409 (98.8%)	2 (20%) 157 (38.4%)	3 (60%) 252 (61.6%)	1.2 98.8
Thought of committing suicide	Yes No	34 (8.2%) 360 (92.8%)	28 (82.4%) 131 (36.4%)	6 (17.6%) 249 (63.6%)	8.2 91.8
Suicide attempt	Yes No	4 (1%) 410 (99%)	3 (75%) 156 (38%)	1 (25%) 254 (62%)	1 99
Child death	Yes No	126 (30.4%) 288 (69.6%)	73 (57.9%) 106 (36.8%)	53 (42.1%) 182 (63.2%)	30.44 69.56
Future plan to be pregnant	Yes No	100 (24.2%) 314 (75.8%)	59 (59%) 100 (31.8%)	41 (41%) 214 (68.2%)	24.15 75.85

the variation in sample size; differences in lifestyle of the study participants and tools used to assess perinatal depression. A relatively small size (244) was used in Chicago, and depression was measured by the Center for Epidemiological Studies scale (CES-DS), while EPDS was used in South Africa.

In the current study, clinical and behavioral characteristics were associated with perinatal depression. Respondents who had fair and poor adherence to their ART drug were 5-times more odds of perinatal depression than those who had good drug adherence (AOR=5.44; 2.81–10.56). This was supported by the study done in Botswana,<sup>14</sup> South Africa,<sup>28</sup> and Los Angeles.<sup>30</sup> This might be due to the fact that depressed patients experience loss of interest, reduced concentration, feelings of worthlessness, and disrupt self-management activities which may increase poor drug adherence. Patients with poor drug adherence may have repeated attacks of opportunistic infections, which might in turn lead them to develop depression.<sup>31</sup> This shows that more emphasis has to be given in adherence counseling before treatment failure with the aim of slowing to switching to second line ART. In addition, the presence of comorbid illness was significantly associated with perinatal depression. Those women with comorbid illness had 3-times more odds of depression than those with no comorbidity (AOR=3.24; 95% CI=1.83–5.75). This is supported by systematic electronic

literature review<sup>32</sup> and another systematic review conducted in 2007.<sup>33</sup> The possible explanation might be due to the fact that those HIV positive women with comorbid illness are exposed to pill burden, drug side-effects, and expenses more to buy opportunistic infection (OI) treatments. In addition, due to the illness, they might have psychological, physical, and social problems (such as stress, social discrimination, unemployment) which might cause depression.<sup>34</sup> The findings of this study revealed that being on the second line ART regimen was a significant factor associated with perinatal depression. Those women living with HIV who were on the second line ART had 3-times more odds of depression than those who were on the first line ART (AOR=2.97; 95% CI=1.08–8.19). This is supported by a study done in Bahir Dar.<sup>35</sup> This might be due to the fact that patients who are on second line ART needs to take more than two pills per day, and second line drugs have more frequent and severe side-effects, which makes the women depressed.<sup>36</sup> In addition, patients on second line therapy may worry about their future if they fail to be treated by second line ART drugs.<sup>37</sup>

In another study, perceived stigma was another significant factor associated with depression. Those women living with HIV having perceived stigma were 3.6-times more likely to have perinatal depression (AOR=3.61; 95% CI=2.11–6.17). This is in line with the findings of the studies conducted in Addis Ababa,<sup>38,39</sup> Tigray,<sup>40</sup> and

**Table 3** Clinical Characteristics Among HIV Positive Perinatal Women in Gondar Town Health Institutions, Northwest Ethiopia, 2018 (n=414)

Variables	Category	Frequency	Depression		Percentage
			Yes	No	
History of mental illness	Yes	5	4	1	1.2
	No	409	155	254	98.8
Family History of mental illness	Yes	5	3	2	1.2
	No	409	156	253	98.8
CD4	<200	56	27	29	13.5
	≥200	358	132	226	86.5
Viral load	Not detected	213	62	151	51.4
	<1,000 copies/mL	195	95	100	47.1
	>1,000 copies/mL	6	2	4	1.4
Syphilis test result	Reactive	27	17	10	6.5
	Non-reactive	387	142	245	93.5
Hemoglobin level	<12 mg/dL	169	74	104	40.8
	>12 gm/dL	245	85	151	59.2
Adherence	Good	341	106	235	82.4
	Fair & poor	73	53	20	17.6
Mid-upper arm circumference (MUAC)	<21 cm	330	125	205	79.7
	>21 cm	84	34	50	20.3
Regimen of ART	1st line	383	138	245	92.5
	2nd line	31	21	10	7.5
WHO stage	Stage I	382	143	239	92.3
	Stage II	32	16	16	7.7
Co-morbid illness*	Yes	130	81	49	31.4
	No	284	78	206	68.6
Partner HIV status	Positive	246	63	183	59.4
	Negative	63	27	36	15.2
	Unknown	105	69	36	25.4
Timing of ART initiation	Before pregnancy	262	90	172	63.3
	During pregnancy	144	68	76	34.8
	Labor & delivery	1	0	1	0.2
	Post-partum	7	1	6	1.7
Disclosure status	Yes	367	121	346	88.6
	No	47	9	38	11.4
Perceived Stigma	Yes	255	159	96	47.3
	No	159	37	122	52.7
Social support	Poor	313	123	190	75.6
	Moderate	101	36	65	24.4

Notes: \*Diabetes, Hypertension, Tuberculosis.

Nkangala, South Africa.<sup>41</sup> A possible reason might be due to the fact that those HIV positive women who had perceived stigma may not have healthy social

interactions with the community; they may feel isolated from the society where they live; they may not share their feeling with friends and families; and they may try to keep



their feelings secret. A combination of these may lead to feelings of loneliness and helplessness that finally increase the risk of depression.<sup>42</sup>

The finding of this study also showed that suicidal ideation was another factor associated with perinatal depression. Those women having suicidal ideation were at nearly 4-times more odds of depression than their counterparts (AOR=3.89; 95% CI=1.28–11.81). This is supported by the findings of a study conducted in Cape Town and Nepal.<sup>25,43</sup>

This might be due to the fact that women with depression are more prone to have suicidal ideation,<sup>44</sup> low coping mechanisms, and emotional stability. The struggle in choosing either self-killing or living might contribute to frequent psychological stress that finally leads to depression, and the reverse might be true.<sup>45,46</sup>

## Conclusion

The findings of this study indicated that the prevalence of perinatal depression among women living with HIV was found to be high. ART drug adherence, having a comorbid illness, being on second line ART, perceived stigma, and suicidal ideation were significant and independent factors associated with perinatal depression in women living with HIV. Strengthening adherence counseling has to be emphasized, especially for those women on second line ART. Preventing first line ART treatment failure has to be encouraged. Early identification and management of comorbid illness needs special consideration. HIV positive perinatal women have to be counseled to reduce HIV-related perceived stigma. Further study needs to be considered using a large sample size and solid study design.

## Strength of the Study

We tried to address multiple variables that were hypothesized to be associated with perinatal depression.

## Limitation of the Study

Some variables that may have significant associations were not included (such as having previous obstetric complications and partner violence). We used a cross-sectional study design which does not allow us to conclude the cause and effect relationship. The other limitation we assume is, it would have been good if we used wealth index in assessing participants' income. The absence of a separate analysis of depression in antenatal and postnatal women was another limitation.

## Abbreviations

AIDS, acquired immune deficiency syndrome; ANC, antenatal care; ART, anti-retroviral therapy; CES-DS, center for epidemiological studies depression scale; EPDS, Edinburgh postnatal depression scale; HIV, human immune deficiency virus; MUAC, mid upper arm circumference; OI, opportunistic infection; PD, perinatal depression; PMTCT, prevention of mother-to-child transmission; SRQ-20, self-reporting questionnaire-20; UNAIDS, United Nations Program on HIV and AIDS; UNICEF, United Nations International Children's Emergency Fund; WHO, World Health Organization.

## Data Sharing Statement

The datasets used and/or analyzed in this study are available from the corresponding author on reasonable request.

## Ethical Approval and Consent

The ethical clearance was obtained from the College of Medicine and Health Sciences, University of Gondar. Verbal informed consent was approved by the College of Medicine and Health Science, University of Gondar, and the study was conducted in accordance with the Declaration of Helsinki. Informed verbal consent was obtained from the study participants before the beginning of the interview. The confidentiality of patient-related data was maintained by avoiding possible identifiers such as; name of the patient and medical record number. Participants identified with depressive symptoms during the data collection and those who had recent suicidal ideations were linked to the University of Gondar hospital psychiatric clinic for better evaluation and management.

## Consent for Publication

Not applicable.

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## Author Contributions

All authors made substantial contributions to the conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed on the journal to which the article will be submitted; gave final approval of the

version to be published; and agreed to be accountable for all aspects of the work.

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## Disclosure

The authors declare that they have no competing interests.

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