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**Original Research**

# Prevalence of Postpartum Depression and Associated Factors Among Mothers Attending Maternal and Child Health Care of Public Health Centers at Dire Dawa City Administration, Dire Dawa, Eastern Ethiopia

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## Abstract

**Background:** Mothers with postpartum depression experience feelings of extreme sadness, anxiety, and exhaustion that make it difficult for them to complete daily activities for themselves or for their infant. Children of depressed mothers are more likely to have delayed psychological, cognitive, neurological, and motor development. Postpartum depression is a major public health problem having a great effect on the mothers and their child in a critical period of child development. However, it has received little attention. The objective of this study was to assess the prevalence and associated factors of postpartum depression among mothers attending maternal and child health care at public health centers of Dire Dawa, Eastern Ethiopia, in 2020.
**Methods:** An institution-based cross-sectional study design was employed for women attending the maternal and child health care clinics of the governmental health centers in the Dire Dawa city administration. The Edinburgh Postnatal Depression Scale (EPDS) with a cutoff score ≥ 13 was employed on 641 study subjects to define postpartum depression by using the systematic random sampling method. Data was analyzed by descriptive statistics, and for association of factors, logistic regression was used.
**Results:** Among the total participants, 151 mothers (23.6%) reported a history of abortion, with the majority (99.3%) having fewer than three abortions, and only one reporting more than three. In this study, 170 respondents (26.5%) were found to have postpartum depression. Factors significantly associated with postpartum depression included a history of abortion (AOR = 1.95; 95% CI: 1.01, 4.18), lack of autonomy in domestic decision-making (AOR = 2.03; 95% CI: 1.12, 2.83), and experiencing intimate partner violence (AOR = 2.71; 95% CI: 1.36, 5.39).
**Conclusion:** This study found out that the prevalence of postpartum depression was high. Having a previous history of abortion, lack of autonomy in the domestic decision-making, and intimate partner violence were factors significantly associated with postpartum depression. Therefore, clinicians working in maternal and child health are better off giving special focus to mothers who have these factors.

**Keywords:** Postpartum Depression, Prevalence, Risk Factor

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## 1. Introduction

Mental disorders during and after pregnancy are increasingly recognized for their burden in low- and middle-income countries for both the disability among the affected women and the associated impact on their children [1]. Mental health problems in mothers can lead to increased maternal mortality and morbidity. Postpartum depression (PPD) describes a various group of depressive symptoms and syndromes that take place during the first year following birth [2].

Postpartum Depression (PPD) is a challenging condition and a major public health problem because of its great effect on the mother and her child in a critical period of child development [3]. APA specifies PPD as the onset of symptoms of MDE within 4 weeks postpartum [4], and the World Health Organization (WHO) International Classification of Disease (ICD-10) specifies the postpartum onset within 6 weeks after birth [5], but many authors considered the onset to occur any time during the first postpartum year, with incidence decreasing dramatically after 3 months of birth [6-8]. Postpartum depression is one of the common complications of the postpartum period and a major public health issue. It adversely affects the mother, her child, and the family [9].

Postpartum depression (PPD) is prevalent in low- and high-income countries and is associated with negative personal, family, and child developmental outcomes [10]. Depression is the most frequently occurring psychiatric condition among women of childbearing age [11]. It is the leading cause of disease burden in women in both high- and low-income countries. MDD is the 4th leading cause of burden among all diseases and the 2nd leading cause of disability in the world and is expected to be the leading cause of disability by 2020. During pregnancy and the postnatal period, mothers are vulnerable to mental illnesses like depression [12].

Postpartum depression is the most frequently occurring psychiatric condition among women of childbearing age, with 8% being affected at any given time [10]. Every year 10% to 20% of new mothers are affected with this problem [2]. Prevalence studies have documented the rates of postnatal depression (PND) across many low- and middle-income countries as significantly higher than high-income countries. In Ethiopia the prevalence of postpartum depression in a study conducted in Addis Ababa shows 23.3% [2], but there are low rates of facility-based postpartum checkups in the Amhara region [1].

Although motherhood brings happiness and personal fulfillment, a significant number of recently delivered women cannot attain these positive states because of the depression that

causes emotional distress to some women [13]. Postpartum depression results in maternal suffering and diminished functioning and is associated with increased risks of marital conflict and impaired infant care. Children of depressed mothers are more likely to have impaired emotional, social, and cognitive development [7] and developmental delays [14], which has the potential to affect later health and development [11].

Global research on maternal mental illness has shown strong evidence linking maternal ill health with compromised child outcomes [15]. Having those potentially serious consequences of postpartum depression, it is unfortunate that the rates of diagnosis and treatment of this serious problem are low primarily because of lack of recognition [16].

Postpartum depression is one of the major public health problems left undiagnosed and untreated; the short- and long-term sequelae of postpartum depression have devastating consequences, not only for the women experiencing it but also for the children and family. However, once risk factors are acknowledged early and screening and assessment are performed, potential months of suffering could be decreased. Moreover, early detection is an effective strategy for decreasing the potential harmful impact on the infant and improves the mother-child relationship.

Despite the fact that the primary health care system in the town is strengthened, postpartum women receive very limited mental health services. And there was no documented data on existing prevalence and associated factors of PPD in public health centers in the Dire Dawa city administration. Even though there is overwhelming evidence that many factors are strongly associated with PPD, there are factors that previous Ethiopian studies didn't consider and that were reconsidered in this study. Thus, the current study assessed the prevalence of postpartum depression and associated factors among mothers attending maternal and child health care clinics of public health centers of the Dire Dawa city administration, Eastern Ethiopia.

## 2. Methods and Materials

### 2.1. Study Area and Period

The study was conducted in the Dire Dawa City Administration. Dire Dawa city is located 515 kilometers away from the capital city of Ethiopia, Addis Ababa. According to the 2007 Ethiopian census projection for 2015/16, the current total population of the Dire Dawa administration is 396,423 (58% residing in urban areas,42% reside in rural areas). It has 9 urban Kebeles (the smallest unit of Ethiopia) and 38 rural Kebeles and 100% geographic access with

primary health care. In terms of distribution of health facilities by type in the administration, there are two governmental and 4 private hospitals, 15 health centers, 5 higher clinics, 12 medium clinics, & 31 health posts (governmental). Currently the city administration has 2 governmental hospitals, 8 urban and 8 rural health centers, and 34 health posts. Among the two governmental hospitals, Dilchora Referral Hospital is the largest hospital, which serves the people of both urban and rural communities [17]. The study was conducted from May to June 2020 in public health facilities of Dire Dawa, Ethiopia.

### 2.2. Study Design

Institution based cross-sectional study design was employed.

### 2.3. Eligibility Criteria

In this study, mothers who gave birth within 6 months were included and those women who were under 18 years of age, gave birth 2 weeks prior to data collection period, and those mothers who were seriously ill and coming for treatment were excluded.

### 2.4. Sample Size Determination

The required sample size was determined by using a single population proportion formula using the prevalence study of postpartum depression in Addis Ababa, Ethiopia in 2016 which was 23.3% with the following assumptions:

N = the number of participants to be interviewed;

(Z α/2)2 = standardized normal distribution value for the 95% CI, =1.96

P = Proportion of prevalence of postpartum depression P= 23.3%

d = margin of error taken as 3%,

The sample size calculation using the above formula was:

$$n = \frac{(Z_{1-\alpha/2})^2 P(1-P)}{d^2} = \frac{(1.96)^2(0.23)\,(1-0.23)}{(0.03)^2} = 582$$

**Sample size for specific objective 2:**

Calculated for the second specific objective by using Epi Info Sample

| Calculated sample size using 95% CI 1:1 Ratio 80% power | | | | | | |
|---|---|---|---|---|---|---|
| | Exposure | Disease status Depression Yes | No | Odds Ratio | % in un exposed | Sample Size |
| 1 | School attend | 100 | 402 | 0.407 | 19.9 | 374 |
| | Yes | 44 | 72 | | | |
| | No | | | | | |
| 2 | Marital Status | 90 | 436 | 0.145 | 17.1 | 166 |
| | Yes | 54 | 38 | | | |
| | No | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | Planned pregnancy | 51 | 388 | 0.14 | 13.14 | 212 |
| | Yes | 93 | 86 | | | |
| | No | | | | | |
| 4 | Happy in marriage | 77 | 428 | 0.12 | 15.34 | 170 |
| | Yes | 67 | 46 | | | |
| | No | | | | | |
| 5 | Presence of family support | 102 | 428 | 0.26 | 19.24 | 218 |
| | during labor | 42 | 46 | | | |
| | Yes | | | | | |
| | No | | | | | |
| 6 | Fetal sex | | | | | |
| | Desired | 36 | 171 | 0.59 | 17.39 | 477 |
| | Un desired | 108 | 303 | | | |

By comparing the two sample sizes, the sample size calculated for the first specific objective (582) and for the second specific objective is 477. Then the largest sample size was taken and 10% non-response rate was added. The final sample was 641.

### 2.5. Sampling Procedure

Participants of this study were selected from 8 public health centers of the Dire Dawa city administration. The numbers of women included in the study from each health center were determined by using proportional allocation on the basis of previous six-month data from the respective health center. Systematic random sampling was used to select women as the total frame size (N) = 1324 and sample size (n) = 641 to determine the number of sampling intervals k by dividing N by n, N/n = 1324/641 = 2. The first woman was selected by the lottery method, and then every 2 women were selected for the study.

Formula: $\mathrm{n} = \frac{(\text{Each health centers average sample size x total sample size (641)})}{\text{Total population of the 8 health centers}}$

1. Goro health center, $n = \frac{(150*641)}{1324}$ = 73 participants
2. Gende Kore health center, $n = \frac{(157*641)}{1324}$ = 76 participants
3. Addis Ketema health center, $n = \frac{(160*641)}{1324}$ = 77 participants
4. Dire Dawa health center, $n = \frac{(175*641)}{1324}$ = 85 participants
5. Legehare health center, $n = \frac{(165*641)}{1324}$ = 80 participants
6. Dechatu health center, $n = \frac{(165*641)}{1324}$ = 80 participants
7. Gende Gerada health center, $n = \frac{(170*641)}{1324}$ =82 participants
8. Melka Jebdu health center, $n = \frac{(182*641)}{1324}$ =88 participants

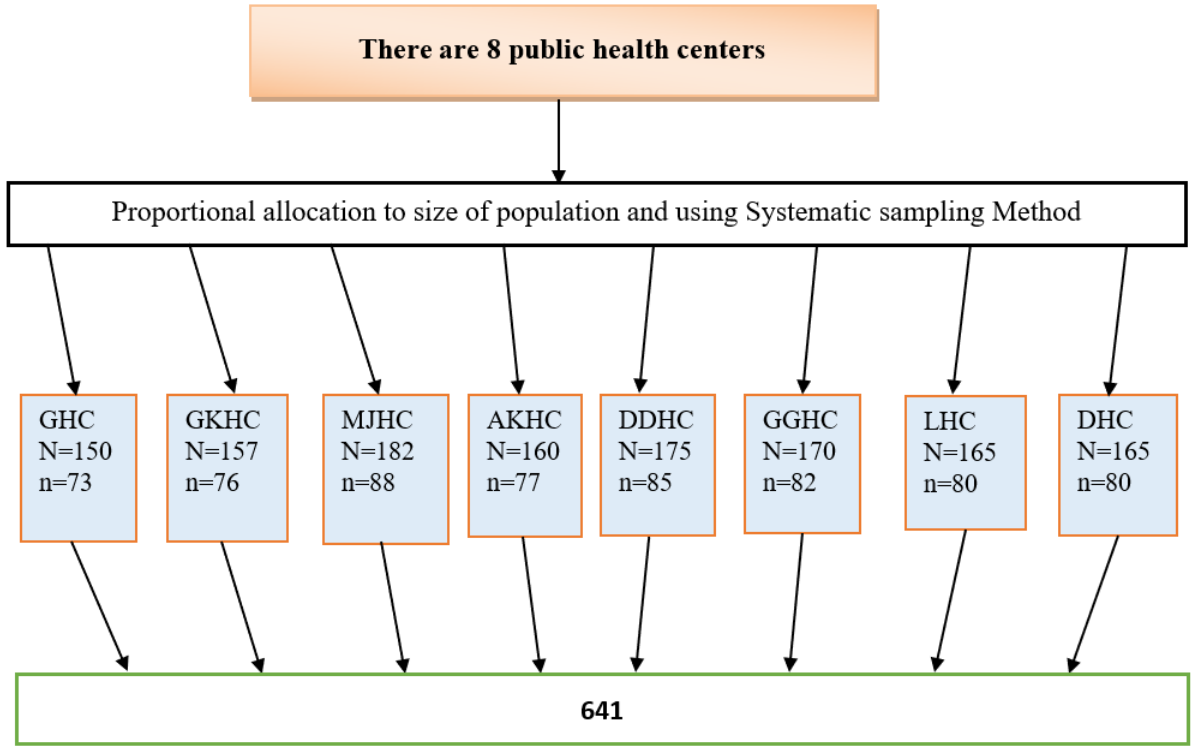


**Figure 1:** Schematic presentation of the sampling procedure for the assessment of postpartum depression and associated factors among mothers attending MCH clinics of the public HCs, Dire Dawa, Eastern Ethiopia, 2019.

## 2.6. Variables

### Dependent variable

- Postpartum depression

### Independent variables

- **Demographic variables:** Age, marital status, educational status, income, working status.
- **Psychosocial factors:** Social support, intimate partner violence, women's autonomous decision making
- **Obstetric factors:** Unplanned pregnancy, parity, mode of delivery, hospitalizing a baby, new born sex
- **Clinical factors:** History of depression and family history of psychiatric problems, history of chronic illness.

## 2.7. Operational Definition

**Postpartum Partum Depression:** Individuals who scored ≥ 13 on Edinburgh postnatal depression scale (EPDS) were considered to have postpartum depression [18].

**Social Support:** On Oslo 3-item social support scale individuals who scored (3-8) poor social support, (9-11) intermediate and good social support (12-14) were considered [19].

**Intimate Partner Violence:** Using the abuse assessment screening scale women who had one affirmative respond for any of abuse assessment question were considered to have intimate partner violence [20].

**Decision-Making Autonomy:** women who respond self-decision or jointly with her husband to household decisions making and decision-making regarding children were considered to have autonomy.

### 2.8. Data Collection Tools and Techniques

#### 2.8.1. Data Collection Tool

The Edinburgh Postnatal Depression Scale (EPDS) was used. It is a screening test consisting of 10 inventory questions that investigate feelings occurring within the previous 7 days, each question having four possible answers rated from 0 to 3, giving a total score of 30. A cutoff score of ≥ 13 was used to screen postpartum depression. In Ethiopia, the Amharic version of the EPDS has been validated as a screening tool to detect postnatal depression in Addis Ababa and found to have a sensitivity of 78.9% and a specificity of 75.3% [21].

Abuse assessment screening was used to screen intimate partner violence. Scores were summed together, and one "yes" response was considered as presence of abuse. Women's autonomy screening has three components: freedom of movement, decision-making regarding children, and decision-making regarding household tasks. The first part is a yes/no question that assesses whether husband permission was required to go out of the house compound, to the local market, or to go to the health center. Decision-making regarding children and household tasks has three possible answers: the decision was made by the woman alone, jointly with her husband, or by the husband. A decision made alone or jointly with her husband was recorded, and a value of (=1) was assigned. And the decision made by the husband alone (=0) was assigned. Then scores were summed together, and having one response left for the husband's decision was considered as absence of autonomy. Social support has 3-items classified individual scores as poor social support (3-8), intermediate (9-11) and good social support (12-14) [19].

#### 2.8.2. Data Collection Procedure

The participants were chosen from mothers visiting MCH clinics of 8 public health centers at the Dire Dawa city administration using the systematic random sampling method. Those mothers who fulfill the inclusion criteria were informed about the aims and nature of this study, and oral consent was taken before answering the questions. Data were collected with an

interviewer-administered questionnaire from mothers who came for postnatal and vaccination services.

### 2.9. Data Quality Control

Data quality was ensured by giving two days of training for 16 data collectors and 4 supervisors by investigators before the data collection date on the details of the questionnaire and purpose of the study and ensuring confidentiality of the respondents. The investigators closely supervised the data collection process for data completeness and consistency. A pre-test was done on 5% of the samples in Sabian Primary Hospital before the actual data collection date on clients, and the result was not included in the main study.

### 2.10. Data Processing and Analysis

First the data was checked for completeness and consistency and then entered into EPIDATA software version 3.1 and exported to the Statistical Package for Social Sciences (SPSS) version 23 for statistical analysis. Descriptive analysis was done using mean, standard deviation, and frequency tables and graphs for presenting the data. Logistic regression analyses were done to assess factors associated with PPD. Multivariate logistic regression was used to identify the independent predictor of PPD. The finding was determined using crude and adjusted OR with a 95% confidence interval in the bivariate and multivariate analysis. A variable with a P-value less than 0.05 will be considered as statistically significant.

## 3. Results

### 3.1. Socio Demographic Characteristics of Respondents

A total of 641 respondents were included in this study, and all of the participants answered the questionnaires completely, making the response rate 100%. Among all the respondents, 579 (90.3%) of the women are urban residents, and the remaining 62 (9.7%) are rural residents. The mean age of the respondents was 28.48 years with SD (±5.88) and ranges from 18 to 51. Regarding the respondent's religion, among the respondents, there was a high number of Muslims, 367 (57.3%), and 171 (26.7%) were Orthodox Christians. The majority, 617 (96.3%), of the respondents are married. Among 581 (90.6%) of the respondents who attended school, 176 (30.3%) completed primary and 179 (30.8%) completed secondary school. Among the last children coming for vaccination, 327 (51%) were males, and 429 of the women got the sex of the child as they intended to be male or female (Table 1).

**Table 1:** Socio demographic characteristics of women on postpartum at public health centers in Dire Dawa city administration, Dire Dawa, Eastern Ethiopia,2019/20(N=641).

| No | Variables | | Frequency | Percent (%) |
|---|---|---|---|---|
| 1 | Address | Urban | 579 | 90.3 |
| | | Rural | 62 | 9.7 |
| 2 | Age in years | < 20 | 62 | 9.7 |
| | | 20-29 | 320 | 49.9 |
| | | 30-39 | 231 | 36 |
| | | >40 | 28 | 4.4 |
| 3 | Religion | Orthodox | 171 | 26.7 |
| | | Catholic | 43 | 6.7 |
| | | Protestant | 58 | 9 |
| | | Muslim | 367 | 57.3 |
| | | Others | 2 | 0.3 |
| 4 | Cultural rituals | Yes | 176 | 27.5 |
| | | No | 465 | 72.5 |
| 5 | Marital status | Married | 617 | 96.3 |
| | | Others | 24 | 3.7 |
| 6 | Attended school | Yes | 581 | 90.6 |
| | | No | 60 | 9.4 |
| 7 | Highest level of education | Primary school | 176 | 30.3 |
| | | Secondary school | 179 | 30.8 |
| | | Technical /vocational | 19 | 3.3 |
| | | Diploma | 113 | 19.4 |
| | | First degree and above | 94 | 16.2 |
| 8 | Occupational status | Student | 51 | 8 |
| | | Paid worker | 250 | 39 |
| | | Unpaid employee | 29 | 4.5 |
| | | House wife | 237 | 37 |
| | | Merchant | 57 | 8.9 |
| | | Farmer | 14 | 2.2 |
| | | Others | 3 | 0.5 |
| 9 | Paid worker | Civil servant | 167 | 66.9 |
| | | Non civil servant | 38 | 15.1 |
| | | NGO employee | 14 | 5.6 |
| | | Daily laborer | 31 | 12.4 |
| 10 | Husband occupation | Merchant | 223 | 35.1 |
| | | Civil servant | 176 | 27.7 |
| | | Non civil servant | 122 | 19.2 |
| | | Daily laborer | 85 | 13.4 |
| | | Others | 30 | 4.7 |
| 11 | Works at the postpartum period | Yes | 367 | 57.3 |
| | | No | 274 | 42.7 |
| 12 | Average monthly income | 446-1200 | 21 | 3.3 |
| | | 1201-2500 | 97 | 15.1 |
| | | 2501-3500 | 150 | 23.4 |
| | | >3501 | 263 | 41 |
| | | I Don't know | 110 | 17.2 |
| 13 | Income is enough to lead your life | Yes | 215 | 33.5 |
| | | No | 426 | 66.5 |

Religion: Others *: Wakefeta, no religion; Marital status: Others*: Single, divorced, separated, cohabiting; Cultural rituals*: Female circumcision, genital mutilation, hitting mother during delivery, gun firing during labour

### 3.2. Obstetric Related Factors of Respondents

Of all the respondents, 463 (72.2%) of mothers had three or fewer pregnancies, and 27 (4.2%) of the women had greater than 7 children. Among the total number of mothers, 151 (23.6%) of them have a history of abortion, and 150 (99.3%) of the mothers have less than 3 abortions, and only one woman has more than 3 abortions. Among the mothers, 82 (12.8%) of them faced different medical illnesses during their last pregnancy (Table 2).

**Table 2:** Obstetrics factors of mothers attending maternal and child health clinics of public health centers Dire Dawa, Ethiopia, 2019/20 (N=641).

| N | Variables | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Number of pregnancies | 1-3 | 463 | 72.2 |
| | | 4-6 | 151 | 23.6 |
| | | ≥7 | 27 | 4.2 |
| 2 | Number of living children | ≤2 | 366 | 57.1 |
| | | 3-5 | 247 | 38.5 |
| | | ≥6 | 28 | 4.4 |
| 3 | Ever had abortion | Yes | 151 | 23.6 |
| | | No | 490 | 76.4 |
| 4 | Number of abortions | ≤3 | 150 | 99.3 |
| | | >3 | 1 | 0.7 |
| 5 | Experience death of baby | Yes | 62 | 9.7 |
| | | No | 579 | 90.3 |
| 6 | Hospitalization of children | Yes | 222 | 34.6 |
| | | No | 419 | 65.4 |
| 7 | Mode of delivery of last baby | Vaginally | 388 | 60.5 |
| | | C/S | 182 | 28.4 |
| | | Instrumental delivery | 71 | 11.1 |
| 8 | Pregnancy planned | Yes | 517 | 80.7 |
| | | No | 124 | 19.3 |
| 9 | Sex of last baby | Male | 327 | 51 |
| | | Female | 314 | 49 |
| 10 | Desired sex of baby | Desired | 429 | 69.9 |
| | | Undesired | 102 | 15.9 |
| | | I don’t mind | 110 | 17.2 |
| 11 | Illness during last pregnancy | Yes | 82 | 12.8 |
| | | No | 559 | 87.2 |
| 12 | Negative event during pregnancy | Yes | 177 | 27.6 |
| | | No | 464 | 72.4 |
| 13 | Type of negative event | Death of relatives | 37 | 20.9 |
| | | Accident | 91 | 51.4 |
| | | Separation from their husband | 21 | 11.9 |
| | | Divorce | 20 | 11.3 |
| | | Others | 8 | 4.5 |

### 3.3. Clinical Related Factors of Postpartum Depression

Among all the participants, 145 (22.7%) had relatives who suffered from mental illness, and 89 (13.9%) had a previous history of depression (Table 3).

**Table 3:** Clinical related factors of mothers attending maternal and child health clinics of public health centers Dire Dawa, Ethiopia, 2019/20(N=641).

| No | Variables | | Frequency | Percent (%) |
|---|---|---|---|---|
| 1 | Family history of mental illness | Yes, near family member | 60 | 9.4 |
| | | Yes, distant family member | 85 | 13.3 |
| | | None | 496 | 77.4 |
| 2 | Previous history of depression | Yes | 89 | 13.9 |
| | | No | 552 | 86.1 |

### 3.4. Psychological Factors of Postpartum Depression

By using the Oslo 3-item social support scale, the majority, 282 (44%), of the respondents reported that they have three to five people closer to them that they can count on during great personal problems. In addition, 246 (38.4%) of the respondents receive some interest and concern from other people. Moreover, 265 (41.3%) participants reported that it is possible to get practical help from neighbors. The overall social support scale among the respondents was categorized as poor social support, intermediate social support, and strong social support, which have values of 7.2%, 70.4%, and 22.5%, respectively. Among all the participants, 209 (32.6%) have intimate partner violence, and the vast majority, 432 (67.4%), have no intimate partner violence. Among the respondents, 535 (83.5%) of them are ordered by their husband to go away from their compound, and 543 (84.7%) of the respondents have decisions made by their husband alone regarding their children. Regarding the overall decision-making of respondents, 506 (78.9%) of the respondents are autonomous, and the remaining 135 (21.1%) of them are not autonomous in decision-making, and their daily decisions are dominated and decided by their husband (Table 4).

**Table 4:** Psychological factors of mothers attending maternal and child health clinics of public health centers Dire Dawa, Ethiopia, 2019/20(N=641).

| No. | Variables | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Social support | Poor social support | 46 | 7.2 |
| | | Intermediate social support | 451 | 70.4 |
| | | Strong social support | 144 | 22.5 |
| 2 | Intimate partner violence | Yes | 209 | 32.6 |
| | | No | 432 | 67.4 |
| 3 | Freedom of movement | Yes (husband) | 535 | 83.5 |
| | | No (wife). | 106 | 16.5 |
| 4 | Decision making regarding children | Wife and husband | 98 | 15.3 |
| | | Husband alone | 543 | 84.7 |
| 5 | House hold tasks and decisions | Husband alone | 162 | 25.3 |
| | | Wife and husband | 479 | 74.7 |
| 6 | Autonomous decision making | Has autonomous | 506 | 78.9 |
| | | No autonomous | 135 | 21.1 |

### 3.5. Prevalence of Postpartum Depression

This study revealed that the prevalence of postpartum depression among postpartum mothers in Dire Dawa public health facilities was 170 (26.5%) with a CI of 23.1-29.8 (Figure 3).

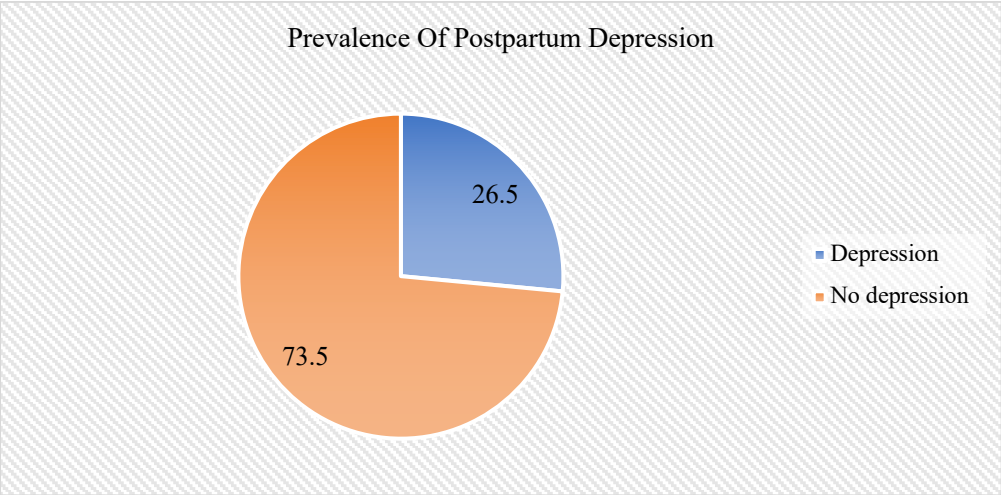


**Figure 3:** The prevalence of postpartum depression among mothers attending maternal and child health care clinics of public health facilities in Dire Dawa city administration, Dire Dawa, Eastern Ethiopia, 2020.

### 3.6. Factors Associated with Postpartum Depression

Binary logistic regression analysis was used for both bivariate and multivariate analysis. A variable with p values below 0.25 in the bivariate analysis was considered as a candidate variable for multivariate logistic regression. In the bivariate analysis, being aged, having intimate partner violence, absence of women's autonomy in decision-making, having cultural rituals, unplanned pregnancy, hospitalizing a baby, working in the postpartum period, having a large number of living children, sex of the last baby, having a history of abortion, previous history of depression, and family history of mental illness were variables that fulfilled the minimum requirement p-value < 0.25.

Variables with a p-value less than 0.05 in the multivariate logistic regression model were considered significantly associated with postpartum depression. These included intimate partner violence, lack of women's autonomy in decision-making, history of depression, and presence of cultural rituals. The strength of association was measured using adjusted odds ratios (AOR) with 95% confidence intervals (CI). Mothers with a previous history of abortion were 1.95 times more likely to experience postpartum depression compared to those without such a history (AOR = 1.95; 95% CI: 1.01, 4.18). Similarly, women who lacked autonomy in domestic decision-making were twice as likely to develop postpartum depression compared to those who were autonomous (AOR = 2.03; 95% CI: 1.12, 2.83).

Experiencing intimate partner violence was also a strong predictor; affected women were 2.71 times more likely to have postpartum depression than those who did not report such experiences (AOR = 2.71; 95% CI: 1.36, 5.39). Notably, the presence of cultural rituals was found to have a protective effect against postpartum depression (Table 5).

**Table 5:** Factors associated with postpartum depression among mothers attending maternal and child health care clinics of the public health centers (Bivariate and multivariate analysis) at Dire Dawa, Ethiopia, 2019/20(N=641)

| Explanatory variable | Postpartum Depression | | COR (95% C.I) | AOD (95% C.I) |
|---|---|---|---|---|
| | No Depression | Depression | | |
| Age | | | | |
| <20 years | 48 | 14 | 1 | 1 |
| 20-29 years | 242 | 78 | 1.105(0.578, 2.112) | 0.348(0.070, 1.742) |
| 30-39 years | 166 | 65 | 1.343(0.693, 2.6) | 0.551 (0.100, 3.046) |
| >40 years | 15 | 13 | 2.971(1.147, 7.697) | 2.25(6.196, 25.988) |
| Cultural rituals | | | | |
| Yes | 149 | 27 | 1.769(1.236, 2.532) | 0.288(0.128, 0.649) |
| No | 322 | 143 | 1 | 1 |
| Paid worker | | | | |
| NGO employee | 115 | 53 | 1 | 1 |
| Non civil servant | 33 | 5 | 2.115(1.014, 4.413) | 0.397(0.131, 1.208) |
| Civil servant | 13 | 1 | 6.6(1.433, 30.397) | 0.350(0.041, 2.987) |
| Daily laborer | 19 | 12 | 0.45(0.196, 1.035) | 0.772(0.283, 2.104) |
| Works at the postpartum period | | | | |
| Yes | 259 | 108 | 1.426(0.994, 2.046) | 2.774(0.277, 27.820) |
| No | 212 | 62 | 1 | 1 |
| Monthly income | | | | |
| ≥ 3500 | 199 | 64 | 1 | 1 |
| 1201-2500 | 66 | 31 | 1.46(0.876, 2.435) | 1.631(0.641, 4.150) |
| 2501-3500 | 111 | 39 | 1.092(0.689, 1.732) | 0.873(0.383, 1.994) |
| Less than 1200 | 15 | 6 | 1.244(0.463, 3.346) | 1.720(0.211, 14.007) |
| I Don't know | 80 | 30 | 1.166(0.703, 1.933) | 1.212(0.338, 4.344) |
| Number of living children | | | | |
| ≤ 2 | 279 | 87 | 1 | 1 |
| 3 to 5 | 172 | 75 | 1.398(0.973, 2.010 | 1.789(0.84, 3.812) |
| ≥ 6 | 20 | 8 | 1.283(0.546, 3.015) | 1.343(0.056, 32.362) |
| Ever had abortion | | | | |
| Yes | 104 | 47 | 1.348(0.903, 2.013) | 1.951(1.01, 4.179)** |
| No | 367 | 123 | 1 | 1 |
| Hospitalization of children | | | | |
| Yes | 149 | 73 | 1.626(1.134, 2.322) | 0.895(0.447, 1.793) |
| No | 322 | 97 | 1 | 1 |
| Pregnancy planned | | | | |
| Yes | 387 | 130 | 1 | 1 |
| No | 84 | 40 | 1.418(0.926, 2.170) | 0.650(0.273, 1.545) |
| Sex of last baby | | | | |
| Male | 231 | 96 | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| Female | 240 | 74 | 0.742(0.521, 1.056) | 0.806(0.418, 1.555) |
| Family history of mental illness | | | | |
| Close families | 36 | 24 | 2.112(1.211, 3.683) | 1.625(0.554, 4.766) |
| Distant families | 58 | 27 | 1.475(0.894, 2.434) | 1.586(0.663, 3.794) |
| None | 377 | 119 | 1 | 1 |
| History of depression | | | | |
| Yes | 58 | 31 | 1.588(0.986, 2.558) | 1.797(0.657, 4.919) |
| No | 413 | 139 | 1 | 1 |
| Autonomous decision making | | | | |
| Has autonomous | 102 | 33 | 1 | 1 |
| No autonomy | 369 | 137 | 1.148(0.74, 1.78) | 2.03 (1.12, 2.831) |
| Social support | | | | |
| Poor support | 30 | 16 | 2.421(1.154, 5.076) | 0.836(0.155, 4.501) |
| Intermediate support | 323 | 128 | 1.799(1.123, 2.882) | 1.979(0.873, 4.489) |
| Strong support | 118 | 26 | 1 | 1 |
| Intimate partner violence | | | | |
| Yes | 129 | 80 | 2.357(1.639, 3.388) | 2.705(1.358, 5.387)** |
| No | 342 | 90 | 1 | 1 |

**p value is significant at P<0.05 1 = reference

## 4. Discussion

This study was a first attempt to ascertain the prevalence of postpartum depression and associated factors among postpartum women in the Dire Dawa city administration. The current study revealed that the prevalence of postpartum depression was 26.5% (95% CI: 23.1, 29.8). Having intimate partner violence, absence of women's autonomous decision-making, and previous history of abortion were significantly associated with postpartum depression. Regarding prevalence, the current study finding was in line with other studies carried out in Addis Ababa, Ethiopia, in which the prevalence estimate was reported to be 23.3% [2].

However, the current finding was higher than studies carried out in Northern Ethiopia and other African countries (Southeastern Nigeria, Nairobi, Kenya, Sudan, and Egypt) and in Delhi, India; Australia; Toronto, Canada; Turkey; Pakistan; and the UAE, in which the prevalence estimates were reported to be 19%, 22.9%, 13%, 9.2%, 17.9%, 6%, 15%, 11%, 21%, 17%, and 10%, respectively [3, 15, 16, 22, 23].

The explanation for this discrepancy could be linked to the difference in cut points used, the difference in the duration of the postpartum period used, the difference in screening tools, and the different study designs in each study area. For instance, a study carried out in Delhi, India, took the postpartum period from one day to three weeks after delivery. In addition, they used EPDS with a cutoff of ≥ 10. A study from São Paulo's Western region was a cohort study,

which is different from the current study. The Sudanese study used EPDS with a cutoff point ≥12 and a 3-month postpartum period. Similarly, a Kenyan study took place during a 6–14 weeks postpartum period. Consequently, a study done in Northern Ethiopia used a different screening tool, PHQ-9. On the other hand, the finding of this study was lower than studies done in South Africa and Beijing, China, in which the prevalence estimates were reported to be 50.3% and 30%, respectively. The variation from the present study might be due to the usage of different screening tools.

Disparity from the South African study could be a study design difference. They used a population-based cohort study, and the study population was women during pregnancy and the postpartum period [13]. A study from China used the Center for Epidemiologic Studies Depression Scale (CES-D) to measure participants' depression symptoms and to detect people at risk of experiencing a depressive disorder in mothers 1–3 years postpartum [24].

Regarding associated factors, the finding of this study indicates that postpartum depression was 2.7 times higher among respondents who experienced intimate partner violence than those who were not exposed to intimate partner violence [AOR = 2.705, 95% CI: 1.358, 5.387]. Similar results were observed from studies carried out in Delhi, India [25]; Southwestern Ethiopia [26]; China [24]; South Africa [27]; and Bangladesh [28]. Possible explanations for the association may be that violence could lead to psychological trauma, especially if the action is in front of other people, their neighbors, friends, and relatives; psychological trauma leads to negative beliefs about self and others, which in turn leads to depression.

Another significant association found in this study was between postpartum depression and women's autonomy in decision-making. In which postpartum depression was almost 2 times higher among respondents who were not autonomous in domestic decision-making than those who were autonomous [AOR = 2.03, 95% CI: 1.01, 4.179]. Despite the variability and broadness of the concept of autonomy in this study, women's empowerment typically refers to freedom of movement, decision-making regarding children, and decision-making in household tasks. Hence, from the respondents found to be depressed, 21.1% have no autonomy in either freedom of movement, decision-making regarding children, or decision-making in the household tasks. This finding is supported by studies from Nepal and Bangladesh [29, 30].

The possible explanation for this could be that if a woman has limited rights and control over resources, restrictions in her mobility, and a lack of personal power in the intra-household

ability to make and execute independent decisions on her own concern or about children, this inequality could be a psychological trait that negatively affects her cognition so that this psychological cause could lead to depression.

Another significant association found in this study was between a history of previous abortion and postpartum depression. Individuals having a previous history of abortion were 1.95 times more likely to develop postpartum depression than those who had not had an abortion previously [AOR = 1.95, 95% CI: 1.01, 4.179]. This finding is in line with studies carried out in Southwestern Ethiopia [31] and Pakistan [9]. The possible explanation for the association might be that carrying an unwanted pregnancy that leads to abortion to term could be a kind of psychological torture for women. Unintended pregnancy or forced continuation of unwanted pregnancy increases health risks for women, so to escape from this suffering, they prefer to abort the baby. Women not planned for pregnancy could have a negative emotional reaction, and it may increase a woman's exposure to psychosocial stressors, and this could decrease support provided to her by the partner, which increases her risk of having postpartum depression.

**Limitation of the study**

This is a cross-sectional study and hence it is not possible to reach conclusions regarding causal links between postpartum depression and its associated factors.

## 5. Conclusion

This study found a high prevalence of postpartum depression (PPD), with significant associations observed with lack of autonomy in household decision-making, intimate partner violence, and a history of abortion. Routine screening for PPD among postpartum mothers attending MCH services at public health centers is recommended. Clinicians should also assess stressful life events and domestic abuse, given their strong correlation with PPD. Furthermore, educating families and communities on the importance of women's decision-making autonomy, and raising awareness about the risks of unplanned pregnancy through health bureau initiatives, are crucial strategies to reduce the burden of postpartum depression.

## Abbreviations

APA - American Psychological Association; EPDS – Edinburgh Postnatal Depression Scale; ICD – International Classification of Disease; MCH – Maternal and Child Health; MDE –

Major Depressive Episode; Postpartum Depression (PPD); Statistical Package for Social Sciences; WHO: World Health Organization.

## Authors Contributions

All authors involved in various aspects of the project, including conceptualization, fund acquisition, validation, design, data curation, resource management, project administration, methodology, data analysis, report writing, and manuscript review and approval. Additionally, all authors contributed to drafting the manuscript, revising it, and preparing the final version for submission.

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## Competing Interests

The authors state that they have no competing interests.

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## Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki ethical principles for medical research. Ethical clearance was first obtained from the Institutional Review Board (IRB) of Dire Dawa University. Permission and support letters were then secured from the Dire Dawa Administration Health Bureau and submitted to the respective health facilities where the study was carried out. Written informed consent was voluntarily obtained from participants, their parents, or legally authorized representatives. Data were collected anonymously, with confidentiality strictly maintained throughout the study period.

## Consent for Publication

Not applicable.

## Data Availability Statement

Data will be available upon request from the corresponding author.

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