Low husband involvement in maternal and child health services and intimate partner violence increases the odds of postpartum depression in northwest Ethiopia: A community-based study

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Abstract

Background
Depression is the most common mental health problem that affects women during pregnancy and after child-birth. Postpartum depression, in particular, has both short and long-term effects on the lives of mothers and children. Women’s health is a current global concern, but postpartum depression is a neglected issue in the maternal continuum of care and is rarely addressed. Therefore, this study aimed to assess postpartum depression and associated factors in Gondar city, northwest Ethiopia.

Methods
A community-based cross-sectional study was conducted from August 1st to 30th, 2021 in Gondar city. A cluster sampling technique was employed to select 794 postpartum women. Data were entered by EPI DATA version 4.6 and exported to SPSS version 25 for further analysis. The multivariable logistic regression analysis was carried out to identify factors associated with postpartum depression. The adjusted odds ratio with its 95% confidence interval at a p-value of ≤ 0.05 was used to declare the level of significance.

Results
A total of 794 women were included in the analysis, giving a response rate of 98.5%. The prevalence of postpartum depression was 17.25% (95% CI: 14.5, 20.2). Younger maternal
Postpartum depression and associated factors

Introduction

Depression is the most common psychiatric condition that occurs during pregnancy and the postpartum period [1]. Postpartum Depression (PPD) is defined as depressive symptoms such as reduced mood, loss of enjoyment, diminished energy and activity, functional impairment, low self-esteem, and suicidal thoughts or acts that occur within the first year after childbirth [2–4]. The transition to motherhood is considered to be a difficult and emotional transition with significant changes in psychological, social and physiological aspects, and increased susceptibility to mental illnesses including PPD [5]. It is a major public health concern because it affects mothers and newborns, as well as family members and the society at large [6]. In the same way, intimate partner violence (IPV) is a global public health problem within an intimate relationship that causes physical, psychological, or sexual harm [7]. It can cause extensive mental health consequences including depression among victims [8,9]. In Ethiopia, the prevalence of IPV among pregnant women was 28.74% [10] and in central Ethiopia, it was 31.4% postpartum IPV [11].

Around 10%-20% of mothers suffer from depressive symptoms after childbirth worldwide [12]. In sub-Saharan Africa the magnitude of postpartum depression is 18.6% [13]. A meta-analysis study conducted in Ethiopia also showed that 21.5% of women develop postpartum depression [14].

Empirical evidence has found that postpartum depression is linked to impaired mother-infant bonding, child abuse, child neglect, maternal substance abuse, and self-harm [15,16]. In addition, maternal depression has also been linked to poor weight gain, impaired cognitive and motor development in infants, and early discontinuation of breastfeeding because of reduced breast milk production [15,17]. Moreover, maternal depression affects the nutrition of the women that could lead to some morbid conditions like anemia, malnutrition, and hypertension [1,12]. The family can be affected through neglect of family duties and financial strain due to the treatment costs for PPD and low productivity at work [12]. This maternal depression can also lead to suicide, which is a leading cause of death in the first postnatal year, accounting for around 22% of maternal deaths. About 10% of maternal suicide, in particular, is resulted from postpartum mental health problems [18].
Endless crying of babies, painful and cracked nipples, painful delivery wounds, inadequate breast milk, family demands, sleepless nights, and constant fatigue have been associated with postpartum depression [19]. Even though PPD has no single cause, some of the factors are being a first-time mother, history of previous depression [20], domestic violence [21,22], history of substance use, poor social support [22,23], and unplanned pregnancy [20,21].

The 2015 World Health Organization recommendation on measures to promote maternal and child health outcomes during pregnancy, childbirth and the postpartum period include effective implementation of male involvement in the maternal continuum of care [24]. This is because low husband/partner involvement in Maternal, Neonatal, and Child Health (MNCH) care services during pregnancy and the postpartum period is a leading cause of poor maternal health, including PPD [25].

However, the PPD screening tool (i.e. Patient health questionnaire-9) is not incorporated into modern postnatal care guidelines in Ethiopia. This study can help reduce maternal PPD and influencing factors and provide information on strategies targeting on maternal and child health. Therefore, this community based cross-sectional study assessed postnatal depression and associated factors among women who gave birth in the last one year in Gondar City, Northwest Ethiopia.

**Method and materials**

**Study design and period**

A community-based cross-sectional study was conducted in Gondar city from August 1st to August 30th, 2021.

**Study area**

Gondar city is found in Amhara national regional state, Central Gondar Zone. It is located 166 km from Bahir Dar (the capital city of Amhara regional state) and 750 km Northwest of Addis Ababa (the capital city of Ethiopia). According to the population projection of Ethiopia, the estimated total population of the city was 432,191, of whom, 224,508 are females. From this, about 133,477 (30.88%) of females are in the reproductive age (women aged from 15–49 years old) (unpublished data by Amhara regional state, 2021). There are 1 governmental comprehensive specialized referral hospital, 8 governmental health centers, 22 health posts, 1 private primary hospital, and 1 general hospital serving the town.

**Study population and eligibility criteria**

The study population included all women who gave birth in the last year (from August 2020 to August 2021) and who resided in the city for at least 6 months in the selected kebeles during the data collection period.

**Sample size determination and sampling procedure**

The sample size was determined by using the single population proportion formula by considering the following assumptions: the proportion of postpartum depression 33.82%, which was done in southwest Ethiopia [26], level of confidence 95%, and margin of error 5%. Therefore, the sample size \( n = \frac{(Z_{a/2})^2 \cdot p \cdot (1-p)}{d^2} = \frac{(1.96)^2 \cdot 0.3382 \cdot (1-0.3382)}{(0.05)^2} = 344 \). After considering a design effect of 2 and a non-response rate of 10%, the total sample size was 757. Gondar city has 22 kebeles (the smallest administrative unit) and six kebeles (25% of the total kebeles) were randomly selected by a lottery method. All eligible women in the selected clusters were interviewed. Finally, due to the nature of cluster sampling, 806 women were included in our study.
Variables of the study
Postpartum depression was the outcome variable whereas maternal age, religion, marital status, mother’s educational status, women’s occupation, average monthly income, mother’s educational status, husband educational status, husband occupation, parity, having ANC visit, place of delivery, mode of delivery, PNC visit, planned pregnancy, intimate partner violence (IPV), decision-making power, social support, and husband/partner involvement in MNCH, family history of mental health problem, known psychiatric illness, having information about mental health during pregnancy, having medical illness and experienced a death of family or friends were independent variable of the study.

Operational definitions and measurements
Postpartum depression: Women who were interviewed and scored ten and above by using patient health questionnaire-9 (PHQ-9) were considered as depressed [27].

Social support: The Oslo Social Support Scale (OSS-3) scores ranged from 3–14 with a score of 3–8, poor support; 9–11, moderate support; and 12–14, strong support [28].

Household decision-making power: A total of eight questions were prepared to assess the household decision-making power of the women. A score of 2 were given for women who decided independently, 1 for women who decided with their husband, and 0 for decisions made by the husband alone or other person. The minimum and the maximum scores were 0 and 16, respectively. Thus, based on the summative score of variables designed to assess household decision-making power women, who answered above the mean value (8.98) were considered to have higher decision-making power [29].

Husband/partner involved in MNCH services: It was composed of nine questions for this study. For each question, the response was given a score of 0 and 1. The total score was 9, with a minimum of 0 and a maximum of 9. Hence, husband involvement with a score above the mean (6.08) was considered as involved [25].

Intimate partner violence: Intimate partner is considered as a current spouse, co-habited, current boyfriends, former partner, or spouse. Women were considered to have experienced intimate partner violence, if they said “Yes” to any one of the ranges of sexual, psychological, and physical or any combination of the three coercive acts regardless of the legal status of the relationship with current/former intimate partner, it was considered as IPV [30].

Having medical illness: It was defined as a women who presented with at least one of the following medically diagnosed illness: hypertension, diabetes, asthma, cardiac and renal disease [31].

Data collection tool and quality assurance
The data collection tool was developed by reviewing the literature [8,21–23,26,32–36] and was collected using a structured questionnaire through face-to-face interviews. The questionnaire was prepared in the English version and translated to the local language (Amharic) and back to English to keep uniformity. The questionnaire contains socio-demographic characteristics, obstetric, medical, and maternal health services-related characteristics, social support, husband/partner involvement in MNCH, decision-making power, and intimate partner violence-related questions, and questions assessing PPD. Six BSc and two MSc midwives were recruited for data collection and supervision, respectively. To assure the quality of the data, one day training was given for data collectors and supervisors about the interview technique and supervising the data process. Moreover, pretest was done on 5% of the determined sample size in the Maksegnit district to look for the understandability and appropriateness of the study tool. The completeness of the questionnaire was checked by the supervisors daily.
Data management and analysis
Data were checked, coded, and entered into EPI Data version 4.6 and exported to SPSS version 25 for further analysis. Descriptive statistics like frequency, mean, and proportion were used to present participants’ characteristics. Binary logistic regression was fitted to identify eligible factors and variables having a p-value of ≤ 0.2 were included in the multivariable logistic regression analysis. In the multivariable logistic regression analysis, a p-value of ≤ 0.05 with a 95% CI for the adjusted odds ratio was used to claim the level of significance.

Ethical considerations
Ethical clearance was obtained from the University of Gondar Institutional Review Board (IRB) (Reference number: V/P/RCS/05/2710/2021). A formal letter of administrative approval was obtained from the selected clusters (kebeles) of Gondar city. Written informed consent was taken from each study participants after a clear explanation of the aim of the study.

Result
Socio demographic characteristics of respondents
A total of 806 women were included in the study making a response rate of 98.5%. Among the total study participants, the mean age of the respondents was 29.7 years old (±SD 4.83) and 550 (69.3%) of the respondents were in the age group of 25–34 years. Most (81.6%) of the study participants were Orthodox Christian. Regarding marital status, 718 (90.4%) of study participants were married. More than one quarter, 229 (28.8%) of study participants had completed secondary education. Regarding occupation, 357 (45%) women were housewives, and 457 (66.15%) of their husbands were government employees (Table 1).

Obstetrics, medical related, and maternal health service characteristics
Among the total respondents, more than half (56.2%) of women had a parity of two to four. The majority, 773 (97.4%) of study participants had at least one ANC visit whereas 418 (52.6%) of the participants had at least one PNC visit. Six hundred seventy eight (85.4%) and seven hundred thirty seven (92.8%) of the pregnancies were planned and supported by husband/family, respectively. Regarding social support, 228 (28.7%) of the respondents had poor social support. More than half, 416 (52.4%) of women’s got their husband/partner’s support during maternal, neonatal, and child health care services, and nearly two-thirds, 494 (62.2%) of women had a higher decision making power (Table 2).

Prevalence of postpartum depression and associated factors
The prevalence of postpartum depression among women who gave birth in the last one year was 17.25% (95% CI: 14.5, 20.2). In the binary logistic regression analysis: maternal age, women’s educational status, family monthly income, intimate partner violence, women’s decision-making power, type of pregnancy, husband/partner involvement in MNCH service, social support, place of delivery, and pregnancy supported by family/partner were found to be a p-value of <0.2 and entered into multivariable analysis. However, maternal age, family monthly income, women’s decision-making power, husband/partner involvement in MNCH care service, type of pregnancy, and IPV were significantly associated with postpartum depression in the multivariable analysis.

Women whose age was ≤ 24 years were 2.72 times more likely to develop postpartum depression compared with women whose age was ≥ 35 years (AOR = 2.72, 95% CI: 1.23, 5.85). Women whose average monthly income ≤ 1000 Ethiopian Birr (ETB) were 2.71 times more
likely to experience postpartum depression than those women who earned > 2000 ETB (AOR = 2.71, 95% CI: 1.24, 5.91). This study revealed that women who had lower decision-making power were 2.04 times more likely to have had depression during the postpartum period compared with those women who had higher decision-making power (AOR = 2.04, 95% CI: 1.31, 3.18).

Table 1. Socio-demographic characteristics of women who gave birth in the last one year in Gondar city, North-west Ethiopia, 2021 (n = 794).

| Variables                          | Frequency | Percentage (%) |
|------------------------------------|-----------|----------------|
| Age                                |           |                |
| ≤24                                | 98        | 12.3           |
| 25–34                              | 550       | 69.3           |
| ≥35                                | 146       | 18.4           |
| Religion                           |           |                |
| Orthodox Christian                 | 648       | 81.6           |
| Muslim                             | 105       | 13.2           |
| Protestant                         | 32        | 4.0            |
| Othersa                            | 9         | 1.1            |
| Current marital status             |           |                |
| Married                            | 718       | 90.4           |
| Unmarried                          | 76        | 9.6            |
| Women’s education status           |           |                |
| No formal education                | 96        | 12.1           |
| Primary education                  | 128       | 16.1           |
| Secondary education                | 229       | 28.8           |
| Diploma and above                  | 341       | 42.9           |
| Women’s occupation                 |           |                |
| Housewives                         | 357       | 45             |
| Daily laborer                      | 14        | 1.8            |
| Self-employee                      | 97        | 12.2           |
| Merchant                           | 97        | 12.2           |
| Government employee                | 215       | 27.1           |
| Husband educational status (n = 718)|         |                |
| No formal education                | 40        | 5.57           |
| Primary education                  | 54        | 7.52           |
| Secondary education                | 149       | 20.75          |
| Diploma and above                  | 457       | 66.15          |
| Husband occupation (n = 718)       |           |                |
| Daily labor                        | 45        | 6.27           |
| Self-employee                      | 161       | 22.42          |
| Government employee                | 333       | 46.37          |
| Merchant                           | 151       | 21.03          |
| Othersb                            | 28        | 3.89           |
| Average family monthly income      |           |                |
| ≤1000 ETB                          | 49        | 6.2            |
| 1001–2000 ETB                      | 53        | 6.7            |
| ≥2001 ETB                          | 692       | 87.2           |

ETB: Ethiopian Birr, a: Jewish and Adventist, b: Student and Farmer.

https://doi.org/10.1371/journal.pone.0276809.t001
Table 2. Obstetrics, medical related and maternal health service characteristics of women who gave birth in the last one year in Gondar city, northwestern Ethiopia, 2021 (n = 794).

| Variables                              | Frequency | Percentage (%) |
|----------------------------------------|-----------|----------------|
| Parity                                 |           |                |
| 1                                      | 318       | 40.1           |
| 2–4                                    | 446       | 56.2           |
| ≥5                                     | 30        | 3.8            |
| ANC visit                              |           |                |
| Yes                                    | 773       | 97.4           |
| No                                     | 21        | 2.6            |
| Number of ANC visit (n = 773)          |           |                |
| <4                                     | 274       | 35.4           |
| 4 and above                            | 499       | 64.6           |
| Place of delivery                      |           |                |
| Home                                   | 24        | 3              |
| Health facility                        | 770       | 97             |
| Mode of delivery                       |           |                |
| SVD                                    | 471       | 59.3           |
| Cesarean section                       | 297       | 37.4           |
| Instrumental delivery                  | 26        | 3.3            |
| PNC visit                              |           |                |
| Yes                                    | 418       | 52.6           |
| No                                     | 376       | 47.4           |
| Type of pregnancy                      |           |                |
| Planned                                | 678       | 85.4           |
| Unplanned                              | 116       | 14.6           |
| Was the pregnancy supported            |           |                |
| Yes                                    | 737       | 92.8           |
| No                                     | 57        | 7.2            |
| Women’s decision making power          |           |                |
| Higher                                 | 494       | 62.2           |
| Lower                                  | 300       | 37.8           |
| Husband/partner involvement in MNCH    |           |                |
| Involved                               | 416       | 52.4           |
| Not involved                           | 378       | 47.6           |
| Social support                         |           |                |
| Poor                                   | 228       | 28.7           |
| Moderate                               | 351       | 44.2           |
| Strong                                 | 215       | 27.1           |
| Intimate partner violence              |           |                |
| Yes                                    | 388       | 48.9           |
| No                                     | 406       | 51.1           |
| Family history of mental health problem|           |                |
| Yes                                    | 83        | 10.5           |
| No                                     | 711       | 89.5           |
| Known psychiatric illness              |           |                |
| Yes                                    | 19        | 2.4            |
| No                                     | 775       | 97.6           |
| Having information about mental health during pregnancy | | |
| Yes                                    | 365       | 46             |

(Continued)
Women whose husband/partner were not actively involved in MNCH service were 2.34 times more likely to experience postpartum depression compared with those women whose husbands/partners were actively involved in MNCH care services (AOR = 2.34, 95% CI: 1.44, 3.81). The current study revealed that type of pregnancy has been strongly associated with postpartum depression. The odds of experiencing postpartum depression among respondents who had unplanned pregnancies were 3 times higher as compared to those women who had planned pregnancies (AOR = 3.16 95% CI: 1.77, 5.62). The study also found that there was a significant association between IPV and postpartum depression. Thus, the odds of having PPD among women who experienced IPV were about 3 times higher compared with their counterparts (AOR = 3.13; 95% CI: 1.96, 4.99) (Table 3).

Discussion

This community-based cross-sectional study assessed postpartum depression and associated factors among women who gave birth in the last one year (from August 2020 to August 2021) in Gondar city, northwest Ethiopia, 2021. Thus, it was found that the prevalence of postpartum depression was 17.25% (95% CI: 14.5, 20.2), which is comparable with studies conducted in Debre Berhan, Ethiopia-15.6% [37] and Eastern Ethiopia-16.3% [38]. However, the finding of this study was higher than studies conducted in Hiwot Fana Specialized Hospital, Ethiopia-13.11% [39], Eritrea-7.4% [40], Kenya-13.0% [34], and South Africa-8.8% [41]. The possible reason for this discrepancy could be due to study setting and socio-cultural differences. All the above-mentioned studies were institution-based cross-sectional studies where women who came for MNCH care services will get health education about the physiologic and psychologic changes during the postpartum period. In addition, IPV has been linked with mental health problems, particularly postpartum depression [42]. For instance, nearly half (48.9%) of the study participants in the current study have experienced IPV, while only 3.7% of women in South Africa experienced IPV. Moreover, the possible discrepancy might be the effect of the COVID-19 pandemic and the internal conflict in the country, which may increase the prevalence of PPD in this study [43].

On the other hand, the result of this study was lower compared with other studies conducted somewhere else in Ethiopia including Gondar town-25% [44], Awi Zone-23.7% [45], Bench Maji Zone-22.4% [23], and Southwest Ethiopia-33.8% [26]. The result of this study is also lower as compared to a study conducted in Cameron-23.4% [35]. This variation might be due to the differences in the tool we used to measure the outcome variable, time of data collection, and characteristics of the study participants. The study conducted in Awi Zone, Ethiopia used Edinburgh Postnatal Depression Scale (EPDS) with a cutoff point of 8 to declare
Table 3. Bivariant and multivariable logistic regression analysis of associated factors of postpartum depression among women who gave birth in the last 1 year in Gondar city, northwest Ethiopia, 2021 (n = 794).

| Variables                                    | Postpartum depression |   |   |
|----------------------------------------------|-----------------------|---|---|
|                                              | COR (95%CI)           |   | AOR (95% CI) |
|                                              | Yes       | No |       |
|                                              | COR (95%CI)           |   | AOR (95% CI) |
| Material age                                 | COR (95%CI)           |   | AOR (95% CI) |
| ≤ 24                                        | 3.09 (1.63, 5.88)     |   | 2.72 (1.23, 5.85)* |
| 25–34                                       | 1.26 (0.74, 2.14)     |   | 1.35 (0.73, 2.51) |
| ≥ 35                                        | 1.1 |
| Women’s education status                     | COR (95%CI)           |   | AOR (95% CI) |
| No formal education                          | 3.97 (2.28, 6.93)     |   | 1.16 (0.57, 2.39) |
| Primary education                            | 1.43 (0.78, 2.63)     |   | 0.49 (0.24, 1.02) |
| Secondary education                          | 2.69 (1.69, 4.29)     |   | 1.21 (0.71, 2.08) |
| Diploma and above                            | 1 |
| Family monthly income                        | COR (95%CI)           |   | AOR (95% CI) |
| ≤ 1000 ETB                                  | 4.24 (2.32, 7.75)     |   | 2.71 (1.24, 5.91)* |
| 1001–2000 ETB                               | 1.66 (0.84, 3.25)     |   | 0.92 (0.42, 2.02) |
| ≥ 2001 ETB                                  | 1 |
| Place of delivery                            | COR (95%CI)           |   | AOR (95% CI) |
| Home                                        | 3.01 (1.29, 7.03)     |   | 2.36 (0.89, 6.29) |
| Health facility                              | 1 |
| Social support                               | COR (95%CI)           |   | AOR (95% CI) |
| Poor                                        | 2.97 (1.79, 4.93)     |   | 1.53 (0.84, 2.77) |
| Moderate                                    | 1.20 (0.72, 2.02)     |   | 1.11 (0.62, 1.98) |
| Strong                                      | 1 |
| Women’s decision-making power                | COR (95%CI)           |   | AOR (95% CI) |
| Higher                                      | 2.41 (1.66, 3.49)     |   | 2.04 (1.31, 3.18)* |
| Lower                                       | 1 |
| Husband/partner involvement in MNCH care services | COR (95%CI)           |   | AOR (95% CI) |
| Involved                                    | 2.87 (1.94, 4.25)     |   | 2.34 (1.44, 3.81)** |
| Not involved                                | 1 |
| Type pregnancy                               | COR (95%CI)           |   | AOR (95% CI) |
| Planned                                     | 5.40 (3.51, 8.31)     |   | 3.16 (1.77, 5.62)** |
| Unplanned                                   | 1 |
| Was the recent pregnancy supported           | COR (95%CI)           |   | AOR (95% CI) |
| Yes                                         | 4.41 (2.71, 6.31)     |   | 3.13 (1.96, 4.99)** |
| No                                          | 1 |
| Intimate partner violence                    | COR (95%CI)           |   | AOR (95% CI) |
| Yes                                         | 2.62 (1.46, 2.71)     |   | 0.53 (0.23, 1.19) |
| No                                          | 1 |
| NB                                          | * Significant (P-value ≤ 0.05) |
| ** P-value <0.001.                           |                 |
| MNCH: Maternal, Neonatal, and Child Health, AOR: Adjusted Odd Ratio, COR: Crude Odd Ratio, CI: Confidence Interval. |

https://doi.org/10.1371/journal.pone.0276809.t003
postpartum depression. In this study, however, the PHQ-9 depression scale with a cutoff point of 10 was used. Moreover, the study participants in Gondar town and Cameron were women who gave birth in the last 6 weeks and women whose children aged 4 to 6 weeks, respectively. As a result, the prevalence of PPD might be increased because postpartum depression is most common in the first 6 weeks after childbirth [23]. On the other hand, the study in Bench Maji Zone, Ethiopia showed that 42.1% of the study participants were under the age of 23 years. However, only 11.2% of the participants were under the age of 24 in this study. It has been evidenced that being younger age is highly correlated with postpartum depression [32,46]. The lower prevalence of PPD in the current study might also be related to the low incidence of unplanned pregnancy. Unplanned and unsupported pregnancies have been associated with PPD as evidenced by scholars [22,23,47,48]. Hence, 30% of the pregnancy in the Southwest Ethiopia study was unplanned whereas only 14.6% of the pregnancies were unplanned in our study.

It has been found that being younger age increases the odds of developing PPD. Accordingly, the odds of having postpartum depression was 2.72 times higher among women aged ≤ 24 years compared with those women aged ≥ 35 years old. This finding was supported by the study conducted in Southwest Ethiopia [23], Sudan [33], Kenya [49], and Armenia [32]. The possible explanation might be due to the fact that younger women are expected to be exposed to emotional distress as they experience childbirth for the first time. Besides, the additional burden of caring for infants and preparation to be a mother will be often challenging and will lead to unpleasant health outcomes [50]. In this regard, the need to screen younger women for mental health problems and endorsing screening tools starting from the prenatal period will be crucial.

The study also affirmed that the family monthly income of the respondents was one of the variables positively associated with PPD. Respondents who had an average monthly income ≤ 1000 ETB were 2.7 times more likely to report PPD than participants who had an average monthly income of >2000 ETB. This finding was supported by studies conducted in Kenya [34] and Cameron [35]. This might be due to women with low socioeconomic status may face difficulties to fulfill their needs and newborns during the postpartum period. Low socioeconomic status has been connected with a high rate of different mental health problems [51,52].

This study also revealed that women who had lower decision-making power were 2.04 times more likely to have had depression during the postpartum period compared with those women who had higher decision-making power. This result is consistent with studies done in Bahir Dar, Ethiopia [21], and China [36]. The possible reason for this could be those women who didn't have power and control over resources, restriction to access maternal and reproductive health services, and unable to decide independently for their health could negatively affect their overall wellbeing. This could also be justifies as about 45% of the participants in this study were housewives, in which being unemployed has been associated with mental health problems so far [53]. This is because employed women are expected to have higher levels of household decision-making power as compared with their counterparts. Unemployed women are usually economically dependent on their husband/partner, particularly in developing countries and exclude women from different opportunities [54].

In this study, husband/partner involvement in MNCH service was significantly associated with PPD. Accordingly, women whose husbands/partners were not actively involved in MNCH care service were 2.34 times more likely to experience postpartum depression compared with those women whose husbands/partners were involved in MNCH care service. This could be explained by having husband/partner involvement in MNCH care services may build a higher sense of support for the women. The other possible justification could be that men are
influential in health care decision-making, which leads to a woman’s experiencing mental health problems. Evidence support that husband/partner involvement in MNCH services is found to be crucial for the reduction of adverse health outcomes [55]. However, only 52.4% of husbands/partners have been involved in MNCH care service in the current study.

The current study revealed that the type of pregnancy has been strongly associated with PPD. Thus, the odds of experiencing PPD among respondents who had unplanned pregnancy was 3 times more compared with those women who had planned pregnancy. This result is supported by studies conducted in Ethiopia such as Bahir Dar [21], Nekemte town [22], Bench Maji zone, [23], and southwest Ethiopia [26], in Kenya [49], in Nepal [56], and in Pennsylvania [57]. This could be due to the fact that pregnancy itself needs physiological, psychological, and financial preparation. Empirical evidence showed that unplanned pregnancy is associated with PPD [47,48].

This study also declared that there was a significant association between IPV and PPD. Hence, the odds of having PPD among women who experienced IPV were 3 times higher compared with their counterparts. Similar findings were reported from previous studies done in Ethiopia [14,21,22], Nigeria [58], Bangladesh [8], and Canada [59]. The explanation for this might be IPV has a major effect on women’s physical and psychological health and this may lead to postpartum depression [9]. This indicates that screening for IPV in antenatal and postnatal care could help to identify and treat women at risk of depression.

We authors strongly believe that the present study is very important in providing evidences about the prevalence and its associated factors of PPD. Based on this evidence, policymakers should think about the burden of PPD, which is left undiagnosed and untreated due to the lack of an integrated depression screening tool with prenatal and postnatal care and low PNC service utilization. Lastly, the authors would like to acknowledge the limitation of this study. Due to the cross-sectional nature of the study, it couldn’t be possible to infer cause-effect between the outcome and explanatory variables. Our study did not assess the effect of the COVID-19 pandemic and internal conflict-related issue. The use of interviewer-administer questions can lead to social desirability bias. This might cause to underestimate of the prevalence of PPD. Moreover, since we include women who gave birth in the last year recall bias might be expected.

**Conclusion**

In this study, PPD was comparable with previous studies. However, given the community health context, it is an important public health issue. Being younger, lack of husband involvement in MNCH care services, lack of decision-making power in the household, experiencing IPV, unplanned pregnancy, and lower household monthly income were increase the odds of experiencing PPD. It is important to integrate routine screening and management tools for PPD with prenatal and PNC service guidelines for screening, timely transfer, and early treatment of those women who are at risk of postpartum depression, so as to improve maternal and child wellbeing in general. Therefore, the government and non-governmental organizations should focus on this public health problem because PPD has a potential adverse effect on parenting practices and children’s physical and emotional development [34,60]. It is also crucial to advocate the need for the husband’s/partner involvement in MNCH services and ensure women’s decision-making power in the household. Moreover, community-based sexual and reproductive health education would be better to reduce risk factors for postpartum depression.

Healthcare providers who work directly with pregnant and postpartum women have a better opportunity to identify the risks, signs, and symptoms of PPD and refer patients for
treatment. They also focus on preconception care for the prevention of unplanned pregnancy and provide psychotherapy for IPV victims for the prevention of PPD. The healthcare provider prefers to give counseling about the impact of husband/partner involvement in maternal and child health.

For future researchers, we recommend an advanced study design that would strongly infer the casual link between exposure to varying forms of independent factors and the development of PPD. In addition, we recommend a qualitative research to explore PPD in depth.

Supporting information

S1 File. English version of the questionnaire.
(DOCX)

S2 File. SPSS dataset.
(SAV)

Acknowledgments

We would like to thank the University of Gondar for providing study ethical clearance to conduct this study. Our gratitude also goes to all data collectors and study participants. We are glad to Gondar city kebeles for writing permission letter.

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**References**

1. Parsons CE, Young KS, Rochat TJ, Kringelbach ML, Stein A. Postnatal depression and its effects on child development: a review of evidence from low-and middle-income countries. British medical bulletin. 2012; 101(1):57–79. [https://doi.org/10.1093/bmb/ldr047](https://doi.org/10.1093/bmb/ldr047) PMID: 22130907
2. Turkcapar AF, Kadioğlu N, Aslan E, Tunc S, Zayifoğlu M, Mollamahmutoğlu L. Sociodemographic and clinical features of postpartum depression among Turkish women: a prospective study. BMC Pregnancy & Childbirth. 2015; 15(1):1–8. https://doi.org/10.1186/s12884-015-0532-1 PMID: 25935726

3. Lund C, Town C. Maternal depression. Health And Education Advice & Resource Team. 2016:1–7.

4. Guo N, Bindt C, Te Bonle M, Appiah-Poku J, Hinz R, Barthel D, et al. Association of antepartum and postpartum depression in Ghanaian and Ivorian women with febrile illness in their offspring: a prospective birth cohort study. American journal of epidemiology. 2013; 178(9):1394–402. https://doi.org/10.1093/aje/kwt142 PMID: 23931153

5. Chowdhary N, Sikander S, Atif N, Singh N, Ahmad I, Fuhr DC, et al. The content and delivery of psychological interventions for perinatal depression by non-specialist health workers in low and middle income countries: a systematic review. Best practice & research Clinical obstetrics & gynaecology. 2014; 28(1):113–33. https://doi.org/10.1016/j.bpobgyn.2013.08.013 PMID: 24054170

6. Connelly CD, Hazen AL, Baker-Ericzen MJ, Landsverk J, Horwitz SM. Is screening for depression in the perinatal period enough? The co-occurrence of depression, substance abuse, and intimate partner violence in culturally diverse pregnant women. Journal of Women’s Health. 2013; 22(10):844–52. https://doi.org/10.1089/jwh.2012.4121 PMID: 23931153

7. WHO. Understanding and addressing violence against women: 2012 [Available from: https://apps.who.int/iris/bitstream/handle/10665/77432/WHO_RHR_12.36_eng.pdf.

8. Azad R, Fahmi R, Shrestha S, Joshi H, Hasan M, Khan ANS, et al. Prevalence and risk factors of postpartum depression within one year after birth in urban slums of Dhaka, Bangladesh. PloS one. 2019; 14(5):e0215735. https://doi.org/10.1371/journal.pone.0215735 PMID: 31048832

9. Ziaei S, Frith AL, Ekström E-C, Naved RT. Experiencing lifetime domestic violence: associations with mental health and stress among pregnant women in rural Bangladesh: the MINIMat Randomized Trial. PLoS one. 2016; 11(12):e0168103. https://doi.org/10.1371/journal.pone.0168103 PMID: 27992478

10. Liyew AM, Alem AZ, Ayalew HG. Magnitude and factors associated with intimate partner violence against pregnant women in Ethiopia: a multilevel analysis of 2016 Ethiopian demographic and health survey. BMC public health. 2022; 22(1):1–10.

11. Dirirsa DE, Desta AA, Geleta TA, Gemmechu MM, Melase GT, Abebe ST. Intimate partner violence in the postpartum period and its associated factors among women attending a postnatal clinic in Central Ethiopia. SAGE Open Medicine. 2022; 10:20503121221100136. https://doi.org/10.1177/20503121221100136 PMID: 35646358

12. Azale T, Fekadu A, Hanlon C. Treatment gap and help-seeking for postpartum depression in a rural African setting. BMC psychiatry. 2016; 16(1):1–10.

13. Woldeyohannes D, Tekalegn Y, Sahiledengle B, Ermias D, Ejajo T, Mwanri L. Effect of postpartum depression on exclusive breast-feeding practices in sub-Saharan Africa countries: a systematic review and meta-analysis. BMC Pregnancy and Childbirth. 2021; 21(1):1–10.

14. Desta M, Memiah P, Kassie B, Ketema DB, Amha H, Getaneh T, et al. Postpartum depression and its association with intimate partner violence and inadequate social support in Ethiopia: a systematic review and meta-analysis. Journal of affective disorders. 2021; 279:737–48. https://doi.org/10.1016/j.jad.2020.11.053 PMID: 33234282

15. Eastwood J, Ogbo FA, Hendry A, Noble J, Page A, Group EYR. The impact of antenatal depression on perinatal outcomes in Australian women. PLoS One. 2017; 12(1):e0169907. https://doi.org/10.1371/journal.pone.0169907 PMID: 28095461

16. Desmarais SL, Pritchard A, Lowder EM, Janssen PA. Intimate partner abuse before and during pregnancy as risk factors for postpartum mental health problems. BMC pregnancy and childbirth. 2014; 14(1):1–12.

17. Perfetti J, Clark R, Fillmore C-M. Postpartum depression: identification, screening, and treatment. WMJ-MADISON-. 2004; 103:56–63.

18. Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk JJ. Saving lives, improving mothers’ care-lessons learned to inform future maternity care from the UK and Ireland Confidential Enquiries into maternal deaths and morbidity 2009–2012: National Perinatal Epidemiology Unit, University of Oxford; 2014.

19. Warren CE, Abuja T, Kanya L, Obare F, Njuki R, Temmerman M, et al. A cross sectional comparison of postnatal care quality in facilities participating in a maternal health voucher program versus non-voucher facilities in Kenya. BMC pregnancy and childbirth. 2015; 15(1):1–14.

20. Biratu A, Haile D. Prevalence of antenatal depression and associated factors among pregnant women in Addis Ababa, Ethiopia: a cross-sectional study. Reproductive health. 2015; 12(1):1–8.
21. Abebe A, Tesfaw G, Mulat H, Hibdye G. Postpartum depression and associated factors among mothers in Bahir Dar Town, Northwest Ethiopia. Annals of general psychiatry. 2019; 18(1):1–8. https://doi.org/10.1186/s12991-019-0244-4 PMID: 31523264

22. Abadiga M Magnitude and associated factors of postpartum depression among women in Nekemte town, East Wollega zone, west Ethiopia, 2019: A community-based study. PloS one. 2019; 14(11): e0224792. https://doi.org/10.1371/journal.pone.0224792 PMID: 31721808

23. Toru T, Chemir F, Anand S. Magnitude of postpartum depression and associated factors among women in Mizan Aman town, Bench Maji zone, Southwest Ethiopia. BMC pregnancy and childbirth. 2018; 18(1):1–7.

24. Davis J, Luchters S, Holmes W. Men and maternal and newborn health: benefits, harms, challenges and potential strategies for engaging men. Melbourne, Australia: Compass: Women’s and Children’s Health Knowledge Hub. 2012.

25. Yargawa J, Leonardi-Bee J. Male involvement and maternal health outcomes: systematic review and meta-analysis. J Epidemiol Community Health. 2015; 69(6):604–12. https://doi.org/10.1136/jech-2014-204784 PMID: 25700533

26. Kerie S, Menberu M, Niguse W. Prevalence and associated factors of postpartum depression in Southwest, Ethiopia, 2017: a cross-sectional study. BMC research notes. 2018; 2018(11):1–7.

27. Gelaye B, Williams MA, Lemma S, Deyessa N, Bahretibe Y, Shibre T, et al. Validity of the patient health questionnaire-9 for depression screening and diagnosis in East Africa. Psychiatry research. 2013; 210(2):653–61. https://doi.org/10.1016/j.psychres.2013.07.015 PMID: 23972787

28. Abiola T, Udofia O, Zakari M. Psychometric properties of the 3-item oslo social support scale among clinical students of Bayero University Kano, Nigeria. Malaysian Journal of Psychiatry. 2013; 22(2):32–41.

29. Kebede AA, Cherkos EA, Taye EB, Eriku GA, Chanie WF. Married women’s decision-making autonomy in the household and maternal and neonatal healthcare utilization and associated factors in Debretabor, northwest Ethiopia. PloS one. 2021; 16(9):e0255021. https://doi.org/10.1371/journal.pone.0255021 PMID: 34570781

30. Stockl H, March L, Pallitto C, Garcia-Moreno C. Intimate partner violence among adolescents and young women: prevalence and associated factors in nine countries: a cross-sectional study. BMC public health. 2014; 14(1):1–14. https://doi.org/10.1186/1471-2458-14-751 PMID: 25059423

31. Bante A, Mersha A, Zerdo Z, Wassihun B, Yeheyis T. Comorbid anxiety and depression: Prevalence and associated factors among pregnant women in Arba Minch zuria district, Gamo zone, southern Ethiopia. PloS one. 2021; 16(3):e0248331. https://doi.org/10.1371/journal.pone.0248331 PMID: 33690693

32. Petroysan D, Armenian HK, Arzoumanian K. Interaction of maternal age and mode of delivery in the development of postpartum depression in Yerevan, Armenia. Journal of affective disorders. 2011; 135(1–3):77–81. https://doi.org/10.1016/j.jad.2011.06.061 PMID: 21835474

33. Khalifa DS, Glavin K, Bjertness E, Lien L. Determinants of postnatal depression in Sudanese women at 3 months postpartum: a cross-sectional study. BMJ open. 2016; 6(3):e009443. https://doi.org/10.1136/bmjopen-2015-009443 PMID: 26966055

34. Madeghe BA, Kimani VN, Vander Stoep A, Nicodimos S, Kumar M. Postpartum depression and infant feeding practices in a low income urban settlement in Nairobi-Kenya. BMC research notes. 2016; 9(1):1–9.

35. Adams ND, Fourman P, Olen JPK, Dothit JS, Mekoni ENU, Mboudou E. Prevalence and risk factors of postpartum depression in Yaounde, Cameroon. Open Journal of Obstetrics and Gynecology. 2015; 5(11):608.

36. Chien L-Y, Tai C-J, Yeh M-C. Domestic decision-making power, social support, and postpartum depression symptoms among immigrant and native women in Taiwan. Nursing research. 2012; 61(2):103–10. https://doi.org/10.1097/NUR.0b013e31824482b6 PMID: 22307142

37. Wubetu AD, Engidaw NA, Gizachew KD. Prevalence of postpartum depression and associated factors among postnatal care attendees in Debre Berhan, Ethiopia. BMC pregnancy and childbirth. 2020; 20(1):1–8. https://doi.org/10.1186/s12884-020-02873-4 PMID: 32228500

38. Ashenafi W, Mengiste B, Egata G, Berhane Y. The role of intimate partner violence victimization during pregnancy on maternal postpartum depression in Eastern Ethiopia. SAGE open medicine. 2021; 9:2050312121989493. https://doi.org/10.1177/2050312121989493 PMID: 33552514

39. Shewangzawa A, Tadesse B, Ashani T, Misgana T, Shewasidat S. Prevalence of postpartum depression and associated factors among postnatal women attending at Hiwot Fana specialized University Hospital. Harar, East Ethiopia. 2018.
40. Gebregziabher NK, Netsereab TB, Fessaha YG, Alaza FA, Ghebrehiwet NK, Siyum AH. Prevalence and associated factors of postpartum depression among postpartum mothers in central region, Eritrea: a health facility based survey. BMC public health. 2020; 20(1):1–10.

41. Govender D, Naidoo S, Taylor M. Antenatal and postpartum depression: prevalence and associated risk factors among adolescents’ in KwaZulu-Natal, South Africa. Depression research and treatment. 2020; 2020. https://doi.org/10.1155/2020/5364521 PMID: 32411457

42. Nur N. The effect of intimate partner violence on mental health status among women of reproductive ages: A population-based study in a middle Anatolian city. Journal of interpersonal violence. 2012; 27(16):3236–51. https://doi.org/10.1177/0886260512441255 PMID: 22550141

43. Bo H-X, Yang Y, Chen J, Zhang M, Li Y, Zhang D-Y, et al. Prevalence of depressive symptoms among pregnant and postpartum women in China during the COVID-19 pandemic. Psychosomatic Medicine. 2021; 83(4):345–50. https://doi.org/10.1097/PSY.0000000000000904 PMID: 33337594

44. Asaye MM, Muche HA, Zelealem ED. Prevalence and predictors of postpartum depression: Northwest Ethiopia. Psychiatry Journal. 2020; 2020.

45. Shitu S, Geda B, Dheresa M. Postpartum depression and associated factors among mothers who gave birth in the last twelve months in Ankesha district, Awi zone, North West Ethiopia. BMC pregnancy and childbirth. 2019; 19(1):1–9.

46. Liu S, Yan Y, Gao X, Xiang S, Sha T, Zeng G, et al. Risk factors for postpartum depression among Chinese women: path model analysis. BMC pregnancy and childbirth. 2017; 17(1):1–7.

47. Salsabilla DA, Prasetya H, Murti B. The Effect of Unplanned Pregnancy on Postpartum Depression: A Meta-Analysis. Journal of Maternal and Child Health. 2017; 83(4):345–50. https://doi.org/10.1186/s12884-020-03301-3 PMID: 33087076

48. Centers for Disease C. Prevention. Prevalence of self-reported postpartum depressive symptoms—17 states, 2004–2005. MMWR Morbidity and mortality weekly report. 2008; 57(14):361–6. PMID: 18401329

49. Mahfouz E, Mohammad E, Alkilany S, Rahman TA. Impact of household food insecurity on maternal mental health in Egypt. Eastern Mediterranean Health Journal. 2021;27(4). https://doi.org/10.26719/2021.27.4.344 PMID: 33955530

50. Abimana MC, Karangwa E, Hakizimana I, Kirk CM, Beck K, Miller AC, et al. Assessing factors associated with poor maternal mental health among mothers of children born small and sick at 24–47 months in rural Rwanda. BMC pregnancy and childbirth. 2020; 20(1):1–12. https://doi.org/10.1186/s12884-020-03301-3 PMID: 33087076

51. Osamor PE, Grady C. Women’s autonomy in health care decision-making in developing countries: a synthesis of the literature. International journal of women’s health. 2016; 8:191. https://doi.org/10.2147/IJWH.S105483 PMID: 27354830

52. Balabanova ES. Women’s economic dependency: Nature, causes, and consequences. Sociological research. 2007; 46(2):5–21.

53. Adeyemo EO, Oluwole EO, Kanma-Okafor OJ, Izuka OM, Odeyemi KA. Prevalence and predictors of postpartum depression among postnatal women in Lagos, Nigeria. African health sciences. 2020; 20(4):345–51. https://doi.org/10.4314/ahs.v20i4.53 PMID: 34394261

54. Beydoun HA, Al-Sahab B, Beydoun MA, Tamim H. Intimate partner violence as a risk factor for postpartum depression among Canadian women in the Maternity Experience Survey. Annals of epidemiology. 2010; 20(8):575–83. https://doi.org/10.1016/j.annepidem.2010.05.011 PMID: 20693336

55. Grace SL, Evidard A, Steward DE. The effect of postpartum depression on child cognitive development and behavior: a review and critical analysis of the literature. Archives of women’s mental health. 2003; 6(4):263–74. https://doi.org/10.1007/s00737-003-0024-6 PMID: 14628179