# Status of Perceived Stress and Associated Factors Among Pregnant Women During Coronavirus Pandemic in Antenatal Care at Gondar Town, Northwest, Ethiopia: A Cross-Sectional Study

**Agerie Mengistie Zeleke[1]* and Gashaw Melkie Bayeh[2]**

[1]*Department of Midwifery, College of Health Science, Teda Health Science College, Gondar, Ethiopia*
[2]*Department of Environmental Health, School of Public Health, Teda Health Science College, Gondar, Ethiopia*

***Corresponding Author:*** Agerie Mengistie Zeleke, Department of Midwifery, College of Health Science, Teda Health Science College, Gondar, Ethiopia.

## Abstract

**Background**: Stress during pregnancy has serious adverse effects on both the mother and newborn. Pregnancy is an emotional, physical, and stressful event in a woman's life that needs a huge psychological adjustment. However, this problem doesn't get adequate attention during antenatal care in Ethiopia. Thus, this study is aimed to assess the status of perceived stress and associated factors among pregnant women during antenatal care at Gondar town governmental health institutions, northwest, Ethiopia.

**Methods**: A cross-sectional study was employed among 425 pregnant mothers from October 25 to December 30, 2020. A systematic random sampling was used to select participants. The status of perceived stress of participants is assessed by 11 perceived stress scales (PSS 11). Data were collected using a structured pretested questionnaire. Data were entered into Epi-Data version 4.6 and exported to SPSS version 20 software for further analysis. Bivariate and multivariable logistic regressions were used to identify factors associated with the status of perceived stress during pregnancy.

**Findings:** The prevalence of perceived stress during pregnancy was 27.1% (95% CI; 68.6- 77.2)). Antenatal care follow-up <16 weeks of 42 gestation (AOR: 4.35, 95% CI; (2.66-7.12)), not having family emotional support (AOR: 2.38, 95% CI; (1.38-4.10)), recent history of family member death (AOR: 2.06, 95% CI; (1.17-3.60)) and fear of exposure to coronavirus (AOR: 1.93, 95% CI; (1.22-3.32)) were factors that increased perceived stress during pregnancy.

**Conclusions**: The prevalence of perceived stress during pregnancy was high in the study area. Therefore, The ministry of health should have to promote facility based screening of pregnant mothers to determine whether they had perceived stress due to coronavirus during antenatal care or not. Assessing the level of perceived stress and provision of emotional support for pregnant women is very crucial. Pregnant women who had a positive screening test should be linked to a psychiatrist for re-evaluation and management.

***Keywords****: Antenatal Care; Ethiopia; Gondar City; Perceived Stress*

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## Abbreviations

ANC: Antenatal Care; COVID: Corona Virus Infection Disease; IRB: Institutional Research Ethics Review Board; PSS: Perceived Stress Scale; WHO: World Health Organization

## Introduction

Perceived stress during pregnancy is defined as the imbalance a pregnant woman feels when she cannot cope with her demands [1]. These stressful events in a woman's life need enormous psychological and behavioral adjustment [2] and necessary screening and appropriate support during antenatal follow-up by healthcare providers [3,4]. Physiological enlargement of the endocrine gland occurs during pregnancy which produces hormonal responses to both the hypothalamic- pituitary adrenal (HPA) axis and the sympathetic nervous system[5]. The hormonal changes during pregnancy predisposes to an increased psychological disorders[6, 7] such as stress, depression, anxiety, and obsessive-compulsive disorders[8, 9]. Moreover, pregnant women encounter mixed feelings of imbalance between the desire for external support from healthcare providers due to fear of coronavirus infection and the health care demands of pregnancy period[10]. The effects of psychological stress on pregnancy were preterm birth, low birth weight, neonatal asphyxia, premature rupture of membrane (PROM), and maternal-fetal compromise[11, 12]. It may also cause delays in mental and physical development, vision and hearing impairments[13, 14].

Only few was reported about the prevalence and associated factors perceived stress of pregnant women's particularly in the period of corona virus pandemic. For instance, the prevalence of perceived stress during pregnancy was reported to from 5.5% to 35%[15]. Other studies from Democratic Republic of the Congo, Nigeria, and Ghana revealed that the prevalence of perceived stress during pregnancy was 57.1%, 46.7%, and 28.6%, respectively [4, 16, 17]. The contributing factors to an increased perceived stress during pregnancy were age, marital status, educational status, occupation, religion, fear of obstetric related complications, and poor family support, past history of depression, domestic violence, and poor interpersonal skills of healthcare providers[8, 18-23]. However, the most important factor was fear of acquiring corona virus infection because of compromised quality of healthcare services [24-27]. This national pandemic coronavirus may be spread during provide a care inadequate preventive measures [28, 29].

Although there is ample research that links stress and pregnancy, there is still a paucity of evidence on perceived stress and its contributing factors among pregnant mothers after occurrence of corona virus pandemic in the Amhara region, particularly in the study area. Understanding the status of perceived stress during antenatal care is important for institutions to create strategies and guidelines for treating and alleviating the problem and its adverse maternal and neonatal outcomes. Therefore, our study is aimed to assess the prevalence of perceived stress and its associated factors among pregnant women during antenatal care in Gondar town, Ethiopia.

## Materials and Methods

### Study setting

This study was conducted in public health facilities in Gondar town, Amhara Regional State, Northwest Ethiopia. The town is located in the Central Gondar Zone, Amhara Regional State and is at 748 km northwest of Addis Ababa, the capital of Ethiopia. According to the Ethiopian central statistics agency, the projected total population of Gondar town in the year 2021 is 378,000 [30]. The annual population growth rate and total fertility rate of the region were -2.2 and 4.2 respectively. The town has eight public health centers one public teaching comprehensive specialized referral hospital, and two private hospitals providing health services to the population.

### Study design and period

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An institutional quantitative research method was conducted from October 25 to December 30, 2020.

## Participants

All pregnant women who attended antenatal care (ANC) follow-up services were the source population while all pregnant women who attended antenatal care (ANC) follow-up service during the study period were study population. All pregnant women attended ANC follow-up in public health facilities and have been living in Gondar town for at least six month were included the study. All pregnant women attended ANC follow-up who had a history of psychiatric illnesses current pregnancy complications, intellectual disability were excluded from the study.

## Sample size determinations

The sample size(n) was determined by using a single population proportion formula by considering the following statistical assumptions: A previous study in the Bale zone, southeast Ethiopia, using the same study setting and perceived stress measurement tool as this study, found that the prevalence of perceived stress in pregnant women was 21.4% [9]. The powers of 80% and a level of confidence of 95% were applied to determine the difference between groups, adding a non-response rate of 10%, d = 5% margin of error and a 1.5 design effect. After multiplying by the design effect of 1.5, it gave 425 samples.

## Sampling procedures

In Gondar town, there are eight public health centers and one public comprehensive specialized referral hospital. Of these, Gondar comprehensive specialized referral hospital, Gondar Poly, Maraki, Azezo and Teda health centers were selected by simple random sampling technique. The allocation of the sample to each health facility was made proportionally based on the average number of pregnant women who had attended ANC follow-up services in the month proceeding the data collection period. Study participants were selected systematically from the ANC follow-up room. The first participant was selected by lottery method from their order of discharge registrations. To determine the interval of participants at the exit of the ANC follow-up in selected health facility, $K^{th}$ value was used. As reported, the annual number of ANC participants recorded at Gondar town public health facilities were 5,450.

## Data collection tools

Data collected using a structured and pre-tested questionnaire were employed. Data were collected through face-to-face interviews which developed from different related literatures[8, 11, 16]. The questionnaire was prepared first in English and then translated into Amharic (a local language) to ensure consistency. Five midwives data collectors and two supervisors were recruited for the study.

## Study variables and measurements

The outcome variable was the prevalence of pregnant women's perceived stress while socio-demographic variables (age, religion marital status, educational status of mother and partner, mother's occupational status, husband's occupation, family income), personal behaviors smoking, and alcohol drinking), obstetrics variables (pregnancy intention, parity, gestational age, and initiation of ANC follow-up); and serious life events (recent death of close relatives, physical/psychological trauma from death of the relative family members, suicidal idea/suicidal attempts, intimate partner violence, and fear of exposure to COVID 19 infection during ANC were independent variables.

The status of perceived stress level was measured using a perceived stress scale (PSS). The PSS was originally developed by Cohen., *et al.* in 1983 [31]. The PSS used in this study was customized to an 11-item version (PSS-11) from the original 14-item version (PSS-14) 14 measure for all general populations [32]. Since 11-item version (PSS-11) was more appropriate and easy-to-administer self-assessment

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tools for measuring perceived stress in pregnant women [2]. It has 11-item, evaluated by a 5-point Likert-type scale ranging from 0 (never) to 4 (very often), representing how often participants had perceived stress symptoms within the past month. The sum of all the 11 items was calculated for the PSS-11 score [33]. The perceived stress scale is scored by summing across all scale (PSS 11) items. Assessment total scores ranged from 0 to 44 with higher scores of ≥ 27.1% indicating pregnant women perceived stress symptoms [33].

### Quality control of the data

To assure the quality of the data, training was given to the data collectors and supervisors about the collection tools, data collection techniques, and ethical issues during the selection of the study participants and collection of the data. Pre-test of the questionnaires was conducted on 10% of the sample size, on 42 participants, in at health facility where the study was not undertaken. The pre-test was part of the training and its findings were discussed during the training day and all the concerns were clarified. Every day after data collection, filled questionnaires were reviewed by supervisors and the principal investigators to ensure the completeness of the questionnaires' data. Appropriate modifications such as wording, changing terms, rephrasing for better understanding, discarding the incomplete, and adding some information for clarity were made on the questionnaires accordingly. Data collections were closely monitored by investigators and supervisors. Moreover, quality of the collected data were assured by using statistical parameters. A Hosmer and Leme show goodness of fit test was conducted to test the model's fitness, and the model was adequate (p = 0.405). Multicollinearity was checked by using VIF and it was < 5. The study concluded that the PSS-11 had excellent goodness-of-fit, good reliability and high validity for assessing the stress perception level within cultural context of northwest part of the Ethiopia.

### Data processing and analysis

Data completeness and consistencies were checked by Epi-Data version 4.6. It was used for data entry and the data were exported to SPSS version 20 software. Logistic regression analysis was applied to identify the association between perceived stress and independent variables. Each variable that has a p-value less than 0.25 was added to the final model to control the confounders. A significant association was declared at p < 0.05. The results were presented in text and tables with an adjusted odds ratio (AOR) and the corresponding 95% confidence interval.

### Results

### Socio-demographic characteristics

A total of 421 pregnant participants, participated in this study, giving a response rate of 99.05%. The mean (mean ± SD) age of the participants was 32.8 ± (1.17) years. Among the total participants, 208 (49.6%) of the participants were orthodox Christians and 255 (60.6%) of the participants were married. Of the total participants, 148 (35.2%) had diplomas and above education, while 160 (38.0%) of participants' partners had no formal the educational background. Regarding occupational status, 170 (40.7%) were housewives and family income of 290 (68.9%) participants was earned monthly at 2500 EBR. Nearly two-thirds of the partners, 120 (28.5%), were employees in occupational status. About 229 (50.8%) of the husbands had attended secondary school and above. Besides, the majority of the respondents' husbands 173 (38.4%), were government employees (Table 1).

### Obstetric characteristics

Of the total pregnant participants involved in this study, 267 (63.4%) of them were multigravida. About 380 (90.3%) of the participants got intentionally pregnant, and 377 (89.5%) of the pregnancies were planned and supported. More than half of the participants,

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| Variables | Category | Frequency | Percent (%) |
|---|---|---|---|
| **Maternal Age** | ≤24 | 110 | 26.1 |
| | 25-34 | 238 | 56.5 |
| | ≥35 | 73 | 17.3 |
| **Marital status** | Single | 78 | 18.5 |
| | Married | 255 | 60.6 |
| | Divorced | 72 | 17.1 |
| | Windowed | 16 | 3.8 |
| **Religion** | Orthodox | 209 | 49.6 |
| | Muslim | 96 | 22.3 |
| | Catholic | 60 | 14.3 |
| | Protestant | 56 | 13.8 |
| **Mother's education** | No formal education | 66 | 15.7 |
| | Primary school | 114 | 27.1 |
| | Secondary school | 91 | 21.6 |
| | Diploma and above | 150 | 35.6 |
| **Mother's occupation** | Unemployed or student | 216 | 51.3 |
| | Private employee | 114 | 27.1 |
| | Governmental employee | 91 | 21.6 |
| **Partner's education** | No formal education | 160 | 38.0 |
| | Primary school | 95 | 22.6 |
| | Secondary school | 63 | 15.0 |
| | Diploma and above | 103 | 24.5 |
| **Partner's occupation** | Unemployed or driver | 211 | 50.1 |
| | Private employee | 90 | 21.4 |
| | Governmental employee | 120 | 28.5 |
| **Family income** | ≤1500 | 65 | 15.4 |
| | 1501-2500 | 66 | 15.7 |
| | ≥2501 | 290 | 68.9 |

*Table 1: Socio-demographic characteristics of pregnant women during antenatal care in Gondar town at public health facility, northwest, Ethiopia, 2020, (n = 421).*

276 (65.6%), were antenatal care attendees before 16 weeks of gestation age, and about 201 (47.7%) of the current gestational age of participants were in second triministers during interviews. During the current pregnancy or previous pregnancy, 237 (56.3%) of the study subjects reported that they didn't face any type of obstetric complications (Table 2).

### Maternal behavioral and support characteristics

Three hundred and twenty-two (76.5%) of the participants had family emotional support, and at the same time, 314 (74.6%) of the

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| Obstetric Characteristics | Category | Frequency | Percent |
|---|---|---|---|
| Gravidity | Primigravida | 154 | 36.6 |
| | Multigravida | 267 | 63.4 |
| Status of pregnancy | Planned | 377 | 89.3 |
| | Unplanned | 44 | 10.5 |
| Pregnancy intention | Yes | 380 | 90.3 |
| | No | 41 | 9.7 |
| Time of starting of ANC | <16 weeks | 145 | 34.4 |
| | ≥16 weeks | 276 | 65.6 |
| Current gestational age | First triministers | 115 | 27.3 |
| | Second triministers | 201 | 47.7 |
| | Third triministers | 105 | 24.9 |
| Intimate partner violence during pregnancy | Yes | 182 | 43.2 |
| | No | 239 | 56.8 |

***Table 2:*** *Obstetric Characteristics of pregnant women during antenatal care unit of Gondar town at public health facility, northwest, Ethiopia, 2020, (n = 421).*

participants said their husbands/partners helped them and emotionally supported them during their current pregnancies. About 316 (75.1%) of the participants reported that their husbands/partners helped with financial support without conflicts. On the other hand, in terms of serious life events during pregnancy, 339 (80.5%) of the participants had no recent death of close relatives, according to the study.

Among the total of the study participants, 326 (75.1%) had no physical or psychological stressful events from their family, and 339 (80.5%) had suicidal ideas or suicidal attempts. Almost half of the participants (182 (43.2%)) reported being abused by an intimate partner while pregnant. The majority 380 (90.3%)) of the participants were never smokers, and 341 (81.1%) were never drinkers. Finally, among the total study participants, 276 (65.6%) had fear of being to be exposed to the national coronavirus (Table 3).

| Maternal behavioral and support Characteristic | Category | Frequency | Percent |
|---|---|---|---|
| Family emotional support | Yes | 322 | 23.5 |
| | No | 99 | 76.5 |
| Husband emotional support | Yes | 107 | 25.4 |
| | No | 314 | 74.6 |
| Partner helps by financial support | Yes | 105 | 24.9 |
| | No | 316 | 75.1 |
| Death of close relatives | Yes | 82 | 19.5 |
| | No | 339 | 80.5 |
| Physical /psychological trauma from their family | Yes | 105 | 24.9 |
| | No | 316 | 75.1 |

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| | | | |
|---|---|---|---|
| Suicidal idea  or suicidal attempt | Yes | 82 | 19.5 |
| | No | 339 | 80.5 |
| Intimate partner violence during pregnancy | Yes | 182 | 43.2 |
| | No | 239 | 56.8 |
| Feared of national pandemic cornea virus | Yes | 145 | 34.4 |
| | No | 276 | 65.6 |
| Mother drink alcohol | Yes | 80 | 19.9 |
| | No | 341 | 81.1 |
| Mother smoking | Yes | 41 | 9.7 |
| | No | 380 | 90.3 |

*Table 3: Maternal support distribution among pregnant women during antenatal care in Gondar town at public health facility, northwest, Ethiopia, 2020, (n = 421).*

**Prevalence and factors associated with perceived stress during pregnancy**

Overall, the prevalence of perceived stress was 27.1%; 95% CI (68.6%-77.2%).

The association between perceived stress and its associated factors among the pregnant participants was analyzed using binary logistic regression. All factors which have a p-value of < 0.25 in bivariate analysis were considered in the multivariable logistic regression model.

Hence, marital status, husband's educational status, participants, occupation, ANC follow-up < 16 weeks, gestational age, family emotional support during pregnancy, intimate partner violence during pregnancy, presence of recent death of close relatives of participants, and fear of exposure to the corona virus were included in the multivariable analysis. After adjusting for confounding effects using multiple logistic regression analysis, ANC follow-up < 16 weeks, family emotional support, the presence of recently deceased close relatives, and fear of the coronavirus found to be were significant associated factors.

The odds of having perceived stress among the pregnant participants who started ANC before 16 weeks of gestational age were 4.35 times higher than those mothers who have ANC < 16 weeks of gestational age (AOR: 4.35; 95% CI; (2.660 - 7.122)). Participants who did not receive emotional support from their families during pregnancy reported 2.38 times more stress than their counterparts (AOR: 2.38, 95% CI; (1.384 - 4.095)).

The likelihood of having perceived stress was about 1.93 times higher for mothers who had feared exposure to a national coronavirus pandemic (AOR: 1.93, 95% CI; (1.215 - 3.317) as compared to those participants who had not feared exposure to the national pandemic coronavirus. Finally, the odds of developing perceived stress was higher among participants who had a recent death of close relatives (AOR: 2.06, 95% CI; (1.173 - 3.601)) ( Table 4).

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| Types of variable | Perceived stress | | COR (95%CI) | AOR (95% CI) | P - value |
|---|---|---|---|---|---|
| | Yes | No | | | |
| **Marital status** | | | | | |
| Single | 25 | 53 | 0.79 (0.257 - 2.405) | 1.7 (0478 - 6.124) | 0.43 |
| Married | 54 | 201 | 0.45 (0.156 - 1.287) | 0.97 (0.292 - 3.237) | 0.93 |
| Divorced | 29 | 43 | 1.12 (0.368 - 3.482) | 2.8 (0.778 - 10.255) | 0.12 |
| Windowed | 6 | 10 | Rf | Rf | Rf |
| **Maternal occupational status** | | | | | |
| Unemployed or student | 53 | 163 | 0.70 (0.406 - 1.192) | 0.87 (0.465 - 1.619) | 0.73 |
| Private employee | 32 | 82 | 0.83 (0.457 - 1.522) | 0.56 (0.557 - 2.227) | 0.73 |
| Governmental employee | 29 | 62 | Rf | Rf | Rf |
| **Husband educational status** | | | | | |
| No formal education | 43 | 117 | 1.21 (0.681 - 2.150) | 0.86 (0.446 - 1.644) | 0.66 |
| Primary school | 31 | 64 | 1.59 (0.852 - 2.982) | 1.46 (0.721 - 2.956) | 0.34 |
| Secondary school | 16 | 47 | 1.12 (0.541 - 2.321) | 0.89 (0.395 - 2.016) | 0.65 |
| Diploma and above | 24 | 79 | Rf | Rf | Rf |
| **Husband occupational status** | | | | | |
| Unemployed or driver | 55 | 156 | 0.76 (0.465 - 1.245) | 0.86 (0.487 - 1.515) | 0.85 |
| Private employee | 21 | 69 | 0.66 (0.353.1.223) | 0.75 (0.466 - 1.537) | 0.60 |
| Governmental employee | 38 | 82 | Rf | Rf | Rf |
| **ANC starting in week** | | | | | |
| ≥16 weeks | 229 | 47 | Rf | Rf | Rf |
| <16 weeks | 78 | 67 | 4.19 (2.661 - 6.583) | 4.35 (2.660 - 7.122)* * | 0.000 |
| **Gestational age** | | | | | |
| First triministers | 51 | 64 | 2.30 (1.300 - 4.078) | 1.58 (0.750 - 3.340) | 0.30 |
| Second triministers | 36 | 165 | 0.63 (0.358 - 1.111) | 1.10 (0.532 - 2.076) | 0.96 |
| Third triministers | 27 | 78 | Rf | Rf | Rf |
| **Family emotional support** | | | | | |
| Yes | 247 | 75 | Rf | Rf | Rf |
| No | 60 | 39 | 2.14 (1.326 - 3.455) | 2.38 (1.384 - 4.095) * | 0.002 |
| **Death of close relatives** | | | | | |
| Yes | 237 | 96 | 1.58 (0.359 - 1.122) | 2.06 (1.173 - 3.601) * | 0.012 |
| No | 70 | 18 | Rf | Rf | Rf |
| **Fear of corona virus** | | | | | |
| Yes | 119 | 26 | 2,14 (1.307 - 3.511) | 1.93 (1.215 - 3.317) * | 0.018 |
| No | 188 | 88 | Rf | Rf | Rf |
| **Intimate partner violence** | | | | | |
| Yes | 180 | 55 | 1.32 (0.858 - 2.035) | 1.25 (0.770 - 2.024) | 0.54 |
| No | 127 | 59 | Rf | Rf | |

***Table 4:** Bivariate and multivariable logistic regressions analysis of factors associated with perceived prenatal stress among pregnant women who attended ANC in Gondar town, public health facility, northwest, Ethiopia, 2020 (n=421)*
*Note*shows significant at p< < 0.05**, Statically significant at p<0.000, Hosmer and Lemeshow, the goodness of fit test P 0.287, Rf =Reference.*

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## Discussion

The overall status of perceived stress among pregnant women during antenatal care at public health facility in Gondar town was 27.1% (95% CI; (68.6%, 77.2%)). This study's finding was also higher than the studies conducted in different countries; in Iran, 12.4% [34], in the United States of America 6% [32], and Canada 17.2% [35], and in urban Thailand 23.6% [2], Tehran, Iran 25.5% [36]. There were differences in terms of socio-cultural, geographical area, economic status, educational level, and life standard across the countries. This inconsistency can also be due to the fact that, in Ethiopia, the communities have good emotional support during pregnancy, and this may decrease stress among pregnant women. The other difference could be explained by the difference in study period, and fear of the coronavirus, which could increase the impact of pregnancy stress on these study participants when compared to the participants of previous studies done before the coronavirus is happen [32,35].

In contrast, the findings of this study were lower than those of previous studies done in Saudi Arabia (33.4%) [34], Ghana (50%) [15], the Democratic Republic of the Congo (57.1%) [4], and Nepal (34%) [37]. These discrepancies can be explained as a difference in socio-cultural status, study period, and lack of community support resulting in a increase prevalence of perceived stress. For example, evidence from Iran study showed that pregnant women with favorable social support had significantly less stress than those with unfavorable social support [38].

In the current study, than having antenatal care < 16 weeks of gestational age was more likely to cause perceived stress than those having antenatal care after 16 weeks of gestational age. This finding is in contrast with previous studies employed in China and Nepal, which stated that late initiation of antenatal care was significantly associated with a higher level of perceived stress [12, 37]. This finding is contrary to the study employed in China, which states that late initiation of antenatal care is significantly associated with pregnancy-related perceived stress [12]. Because women in the early period of pregnancy face different hormonal and physiological changes, these changes may expose them to stress. Another possible explanation is a disparity in socio-cultural and living standards status which makes it difficult for mothers to cope with pregnancy and raised stress with limited resources.

In this study, it is found that pregnant women who had no family emotional support during pregnancy had perceived stress compared with pregnant women who had family emotional support. This finding is in line with the studies carried out in Ghana [16] and in the Bale zone of Ethiopia [9]. This consistency may be due to not having social support during pregnancy which may lead the mother to be isolated and may result in perceived stress. This consistency might also be supported by women in the community who feel a dilemma or worry about suicidal attempts during pregnancy. There is also strong evidence from a prior study from Iran that pregnant women with favorable social support had significantly less stress than those with unfavorable social support [39]. Additionally, lack of social support during pregnancy may lead the mother to be isolated and stressed.

According to the finding of this study, a pregnant woman who feared exposure to the coronavirus pandemic during her current pregnancy experienced more perceived stress compared with pregnant women who did not have fear. This association is supported by different previous studies. To have known that a mother had COVID-19 had a greater impact on mental and physical health than not knowing whether or not one had corona infections [24,40,41]. Currently, people especially pregnant women are stressed and overloaded with information about the worldwide coronavirus since it has still not been proven to affect mother-to-child transition and adverse birth outcomes. On the other hand, one possible explanation could be fear of exposure to a national coronavirus pandemic, and pregnant women might fear compromised health care services that lead to stress. This finding is also supported by a comparative study [42].

Finally, the odds of developing perceived stress were 2.06 times more likely among participants who had history of at recent death of close relatives when compared with who had no history of at recent death of close relatives (AOR = 2.06; CI (1.173 - 3.601)). This associa-

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tion was in line with different studies [37,43]. The possible reasons might be due to the traumatic memories of the death of their family and the psychological impact on mental health. In that view, in the Ethiopian culture, the death of a family member had a strong effect on emotional status [9,11].

## Limitations of the Study

This study was institution-based; hence its findings may not reflect the stress of all the pregnant women in the community. Social desirability bias could also be a concern. The cross-sectional study could not help the researchers establish a cause-effect relationship.

## The Strength of the Study

Many variables were addressed and assessed; it was also possible to conduct a face-to-face interview with maximum precaution rather than a simple email, online or telephone survey to evaluate the real perceptions.

## Conclusions

The prevalence of perceived stress during pregnancy was high in study area. Antenatal care follow-up < 16 weeks of 42 gestation, participants who haven't family emotional support, recent family death participants' family members and fear of exposure to coronavirus were significantly associated with perceived stress during the pregnancy. Therefore, ministry of health to incorporate screening the status of pregnancy perceived stress into basic antenatal care guidelines to screen for psychosocial stress during pregnancy are very important. Assessing the level of perceived stress and provision of emotional support for pregnant women is also very crucial. Pregnant women who had a positive screening test were link to a psychiatrist for re-evaluation and proper management.

## Acknowledgments

## Declaration

### Ethical approval and consent to participate

The ethical approval was obtained from the Ethical Committee of the Amhara Public Health Institution (APHI) because our institution did not have the authority to give ethical approval. Permission letter was obtained from both the North Gondar zonal health department's office and office of each health facility. After explaining the objectives of the study in detail, informed written consent was obtained from all the study participants. The respondents were also informed that they have the full right to withdraw or refuse at any time from the process. Confidentiality of information given by each respondent was kept properly and anonymity was explained clearly for the participants. Pregnant women diagnosed with psychiatric disorders were counseled and linked to psychiatrist for re-evaluation and proper managements.

## Funding Statement

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## Availability of Data and Materials

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

## Authors' Contributions

AM- was involved in the conception and design of the research project proposal, collect, analyzes, interpret the data and results and preparation and critical review of the manuscript. Another author (GM) was involved in reviewing the research project proposal and interpretation of results as well as preparing and critical review of the manuscript.

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