Perceived stress and its associated factors among pregnant women attending antenatal clinic in a tertiary level hospital

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ABSTRACT

Background: Stress has been found widely prevalent among women during the time of pregnancy. Researches in different societies indicate a link between prenatal maternal stress and adverse obstetric, fetal, and neonatal outcome. Therefore, this study was carried out to assess perceived stress levels and associated factors with it among pregnant women.

Methods: A descriptive cross-sectional study was carried out from November 2022 to March 2023 among 264 pregnant women attending the Obstetrics/Gynaecology outpatient department of Nepal Medical College and Teaching Hospital. Pregnancy Stress Rating Scale (PSRS) was adopted to measure perceived stress levels among pregnant women. Data were collected through face-to-face interview techniques. Descriptive statistics and logistic regression analysis were used for data analysis.

Results: In this study, 11.4% (95% CI= 7.8% - 15.8%) of pregnant women had high levels of stress. Variables such as ethnicity, education of respondents and respondents' husbands, status of pregnancy (pregnancy intention), and gender preference were associated with high levels of perceived stress in bivariate analysis. While, only those respondents having male gender preference for the upcoming baby was associated with a high level of stress (AOR= 3.07; 95% CI = 1.26 –7.48) in multivariate analysis.

Conclusions: Approximately one out of nine pregnant women had a high level of stress in this study. Respondent's gender preference for male babies was associated with high levels of stress in multivariate analysis. Therefore, early recognition of antenatal stress and its management is crucial.

Keywords: Nepal, perceived stress, pregnancy, women

INTRODUCTION

A complex pattern of a reaction of human physiology in response to a strenuous circumstance is considered stress [1]. Pregnancy is a joyful moment for a woman; however, pregnant women go through a stressful time that requires remarkable emotional regulation [2]. Stress has been widely prevalent (5.5% to 78%) among pregnant women [3]. This journey of emotions experienced by a pregnant woman is associated with social and psychological factors in addition to hormonal changes occurring in a pregnant woman's body [4,5]. Physiological changes during pregnancy such as nausea and weight gain, unplanned pregnancies, acquired responsibilities with neonatal care, and the risk of complications during pregnancy and labour are some of the stressors that provoke to stress during pregnancy [4].

Antenatal stresses that the women experience have been correlated with preterm birth, low birth weight and infant mortality. Evidence suggests that women reported to have high levels of stress during pregnancy have 25-60% greater risk for preterm delivery when compared to the women with lower levels of stress, even after adjusting for the outcomes of other known potential factors [6].There is also an interrelationship between higher level of antenatal stress and occurrence of gestational hypertension and Pre-eclampsia. These occurrences are found to be significant factors contributing to preterm delivery [6].

The evidence from studies conducted in developing countries showed that stress was significantly associated with gravida, educational status, monthly family income, past history of spontaneous abortion, unplanned pregnancy, husband's formal employment status and

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male gender preference [7,8]. Even though perceived stress during pregnancy had adverse consequences, there is still a scarcity of data in the context of Nepal. So, this study was conducted to assess the prevalence of stress and its associated factors among pregnant women.

METHODS

This study adopted a descriptive cross-sectional design to identify the perceived stress level and its associated factors among pregnant women attending the Obstetrics/ Gynaecology Outpatient Department (OPD) of Nepal Medical College and Teaching Hospital (NMCTH). NMCTH is a tertiary-level hospital where a safe motherhood program under the government of Nepal had been launched. Purposive sampling technique was used to collect the data. Pregnant women with multiple pregnancies, known morbidities, and a history of known major psychiatric illnesses which might affect the stress status of women were excluded. The face-to-face interview technique was used for the collection of data. The sample size was estimated by using the formula for definite proportion $n= Z^2pq/d^2$ with the assumptions of 6% allowable error, and 95 % confidence interval. The estimated prevalence of perceived stress during pregnancy was taken as 34.2% from one of the studies conducted in the antenatal clinic of Patan Hospital, Nepal [9]. The total sample size was 264 adding a nonresponse rate of 10%. The data were collected from 13 November, 2022 to 27 March, 2023.

The tool was divided into two sections. The first section constituted socio-demographic and obstetric-related information whereas the second constituted of perceived pregnancy stress questionnaire. The self-constructed structured tool was used to collect data related to socio-demographic and obstetric-related information after reviewing related literature. Likewise, the Pregnancy Stress Rating Scale (PSRS) which is a valid and reliable tool was adopted to measure perceived stress levels among pregnant women [10].The PSRS was designed to measure stress unique to the pregnancy experience in Taiwan, including potentially stressful pregnancy-related events and anticipated events during the labor, delivery, and immediate postpartum periods. Some modifications in the tool were done to make it appropriate in the local context. Previously, this scale has been used in Nepali version in a study conducted in Biratnagar, Nepal and the same tool has been adopted in this study by taking permission from the author [11]. The Cronbach's alpha reliability coefficient of the PSRS tool is 0.879. The PSRS is scored by summing across all scale items with higher scores indicating higher perceived prenatal stress. The PSRS includes 32 items, with 5-point Likert scale which ranges from 0 (definitely no) to 4 (very severe). The total score ranges from 0-128 where score from 0-64 (≤50%) was classified as low score and score from 65-128 (>50%) as high stress in this study. The score classification has been adopted from the similar study conducted in Nepal [11]. By reviewing the related literature and consulting with subject experts, content validation of the tool was made. Along with this, pretesting was done before the data collection in 10% of the total sample size, i.e., among 26 pregnant mothers at the antenatal OPD of NMCTH to determine the comprehensibility of the tool. The respondents taking part in pretesting were not involved in the real study. The value of the Cronbach's alpha test of the tool was 0.88 in this study.

Epi Data 3.1 was used to enter data, which were then exported to IBM SPSS version 16. Descriptive statistics such as frequency, percentage, mean and standard deviation were used to find out socio-demographic, obstetric-related information and perceived stress level during pregnancy. Pearson's Chi-square test was used to assess the association between the level of stress and selected socio-demographic and obstetric-related information. Binary Logistics regression was used to quantify the strength of the association between levels of stress with selected socio-demographic and obstetric-related information. A p value less than 0.05 was considered statistically significant and the strength of statistical association was assessed through odd ratios with 95% confidence intervals.

RESULTS

A total of 264 pregnant women visiting obstetrics/ Gynaecology OPD of NMCTH were included in this study. Data were collected through face-to-face interview techniques.

Socio-demographic information

The mean age of respondents was 27.54 (SD = 4.28) years and ranged from 18 to 40 years. The data showed most of the respondents, i.e., 75.3% were of the age group ≤30 years. Likewise, 58.0% of respondents represent Janjati ethnicity, followed by Brahmin/Chhetri and then Dalit. Likewise, 38.2% of the respondents and 40.2% of the respondents' husbands had a completed secondary level of education. Similarly, more than half (65.5%) of the respondents stated their occupation as household work whereas 52.7% of the respondents belonged to single family [**Table 1**].

Obstetric information

More than half (54.9%) of the respondents were multigravida and about 17.4% had a history of spontaneous abortion. Likewise, 53.0% of the respondents were in the third trimester and 90.5% of the respondent's current pregnancy was planned. In the same way, 68.9% of the respondents stated that they had no preference for the gender of their upcoming baby while 20.5% of the respondents stated male gender preference for the expected baby. Similarly, among 118 respondents who had given birth previously, 59.3% of the respondent's mode of delivery of the previous childbirth was vaginal delivery with episiotomy [Table 2].

Prevalence of stress among pregnant women

Out of the total 264 respondents, 11.4% (95% CI: 7.8% - 15.8%) of the respondents had high levels of stress whereas 88.6% had low levels of stress.

Association between antenatal stress and socio-demographic factors

Table 3 showed the statistical association between perceived stress level and variables such as ethnicity, education of respondents, and education of respondents' husbands. However, the result does not show the statistical association between perceived stress level and other variables such as age, occupation, and type of family [**Table 3**].

Table 1: Socio-demographic characteristics of the respondents

Variables	Frequency n=264	Percentage (%)
Age (in years)		
≤30	199	75.3
≥31	65	24.7
Mean ± SD, (Range in years)	27.54 ± 4.28, (18 – 40)	
Ethnicity		
Brahmin/Chhetri	89	33.7
Janjati	153	58.0
Dalit	22	8.3
Educational level of respondents		
Cannot read and write	12	4.5
Primary	18	6.9
Secondary	101	38.2
Higher Secondary	80	30.3
Bachelors and above	53	20.1
Educational level of respondent's husband		
Cannot read and write	7	2.7
Primary	17	6.4
Secondary	106	40.2
Higher secondary	77	29.2
Bachelors and above	57	21.5
Occupation of respondents		
Household work	173	65.5
Service	36	13.6
Business	39	14.8
Daily wages	16	6.1
Type of Family		
Single	139	52.7
Joint	125	47.3

Association between antenatal stress and obstetric related factors

The respondent's obstetric-related factors such as pregnancy intention and gender preference for upcoming babies were associated with perceived stress levels in the analysis of the chi-square test. However, the result does not showed the statistical association between perceived stress level and other variables such as gravida, history of spontaneous abortion, mode of delivery of their previous birth, and gestational period [Table 4].

Table 2: Obstetric related information of the respondents

Variables	Feequency (n=264)	Percent (%)
Number of pregnancy (Gravida)		
Primigravida	119	45.1
Multigravida	145	54.9
History of spontaneous abortion		
Yes	46	17.4
No	218	82.6
Gestational period		
First trimester	20	7.6
Second trimester	104	39.4
Third trimester	140	53.0
Status of pregnancy (Pregnancy intention)		
Planned/wanted	239	90.5
Unplanned/unwanted	25	9.5
Gender preference for the expected baby		
Male	54	20.5
Female	28	10.6
Both/no preference	182	68.9
Mode of previous delivery (n=118)		
Vaginal delivery	13	11.0
Vaginal delivery with episiotomy	70	59.3
Caesarean section	35	29.7

Regression analysis

Binary logistic regression analysis was applied to measure the strength of the association of those variables that were significantly associated with the chi-square test where p value <0.05 level is considered significant. The result of the bivariate analysis showed respondents with dalit ethnicity (COR= 4.51, 95% CI: 1.51-13.42), respondents up to the secondary level of education (COR=2.63, 95% CI: 1.15-5.98), and respondents husband up to the secondary level of education (COR=2.67, 95% CI: 1.17 - 6.08), unplanned pregnancy (COR= 2.82, 95% CI: 1.03 – 7.76) and gender preference for male babies (COR= 4.12, 95% CI: 1.77 – 9.55) were found to be the factors influencing the perceived stress level. The variable such as ethnicity, respondent's education, respondent's husband education, pregnancy intention and gender preference that showed statistically significant at 95% CI in bivariate analysis were further adjusted for potential confounders through multivariate analysis. It is worth noting that, after adjusting for potential confounders, the only independent predictor of the perceived stress level was the respondent's preference for a male baby (AOR= 3.07; 95% CI = 1.26 –

Table 3: Socio-demographic factors associated with stress among pregnant women

Variables	Perceived stress		χ^2	p value
	High(n=30) n (%)	Low(n=234) n (%)		
Age				
≤30	25 (12.6)	174 (87.4)	1.15	0.28
>31	5 (7.7)	60 (92.3)		
Ethnicity				
Brahmin/Chhetri	10 (11.2)	79 (88.8)	15.53	<0.001*
Janajati	12 (7.8)	141 (92.2)		
Dalit	8 (36.4)	14 (63.6)		
Education of respondents				
Up to secondary level	21 (16.0)	110 (84.0)	5.62	0.018*
Above secondary level	9 (6.8)	124 (93.2)		
Education of husband				
Up to secondary level	21 (16.2)	109 (83.8)	5.83	0.016*
Above secondary level	9 (6.7)	125 (93.3)		
Occupation of respondents				
Household work	16 (9.2)	157 (90.8)	4.03	0.25
Service	5 (13.9)	31 (86.1)		
Business	5 (12.8)	34 (87.2)		
Daily wages	4 (25.0)	12 (75.0)		
Type of family				
Single	15 (10.8)	124 (89.2)	0.09	0.75
Joint	15 (12.0)	110 (88.0)		
*p value is significant at <0.05 level				

7.48) [Table 5]

DISCUSSION

In this study, the data revealed that 11.4% (95 % CI=7.8% - 15.8%) of the women had high levels of stress during the time of pregnancy. This finding is in line with a similar study conducted in Southeast Ethiopia where the prevalence of perceived stress was 11.6% [12]. Similarly, a lower finding has been observed in the study conducted by Deo et al. in Dharan, Nepal where 6% had moderate levels of stress [13]. The finding of this study is much lower than the study conducted in India (33.1%) [7], Ghana (28.6%) [8], and Saudi Arabia (33.4%) [14].The findings are also much less than the study conducted in Patan Hospital, Lalitpur, Nepal, and the study carried out in Biratnagar, Nepal where 34.2% [9] and 40.7% [11] respectively had perceived high levels of stress during pregnancy. The differences in prevalence among the various studies may be a result of the differences in the sample size, geographical area, and cultural practices as well as the difference in the assessment tools used. The other possible reason of relatively the low level of stress in the present study might be the fact that majority of our participants (90.5%) had planned pregnancy. Planned pregnancy is an important indicator of improving the health status of mothers and newborns whereas unplanned and forced pregnancy makes mothers fearful and anxious [15].

This study examined the statistical association between the prevalence of perceived stress among pregnant women with socio-demographic and obstetric-related variables. There were no statistical associations between perceived level of stress with socio-demographic and obstetric-related factors such as age, monthly family income, occupation, type of family, gravida, history of spontaneous abortion, gestational period, and mode of delivery. However, in this study, ethnicity, education of respondents, education of respondent's husband, pregnancy intention, and gender preference for an upcoming baby were found to be statistically significant with the perceived stress level.

The result of the bivariate analysis in this study revealed that there was a significant association between the perceived level of antenatal stress and ethnicity. The odds of developing perceived stress are 4.5 times higher among pregnant women who belong to Dalit ethnicity in comparison to Brahmin/Chhetri ethnicity (COR= 4.51, 95% CI: 1.51-13.42). This contradicts the study conducted in Nepal where no significant association was found [9].One of the ethnographic studies conducted in Nepal reported that Dalits were more likely to have less income, less social support, and greater exposure to stressful life events

Table 4: Obstetric related factors associated with stress among pregnant women

Variables	Perceived stress		χ2	(p value)
	High(n=30) n (%)	Low(n=234) n (%)		
Status of pregnancy (Pregnancy intention)				
Planned/wanted	24 (10.0)	215 (90.0)	4.37	0.03*
Unplanned/unwanted	6 (24.0)	19 (76.0)		
Gender preference				
Daughter	4 (14.3)	24 (85.7)	12.11	0.002*
Son	13 (24.1)	41 (75.9)		
No preference	13 (7.1)	169 (92.9)		
Number of Pregnancy				
Primigravida	11 (9.2)	108 (90.8)	0.96	0.32
Multigravida	19 (13.1)	126 (86.9)		
History of spontaneous abortion				
Yes	6 (13.0)	40 (87.0)	0.15	0.69
No	24 (11.0)	194 (89.0)		
Mode of delivery (n=118)				
Vaginal delivery	13 (15.7)	70 (84.3)	0.35	0.55
Caesarean section	4 (11.4)	31 (88.6)		
Gestational Period				
First trimester	2 (10.0)	18 (90.0)	0.18	0.91
Second trimester	11 (10.6)	93 (89.4)		
Third trimester	17 (12.1)	123 (87.9)		
*p value is significant at <0.05 level				

where all these potential mediators were associated significantly with depression and anxiety outcomes [16]. The significantly higher rates of perceived stress levels with Dalit ethnicity in this study might be more to its association with lower socioeconomic background which consequently can lead to stress rather than the direct effect of ethnicity.

In this study, women who had completed up to the secondary level of education were 2.6 times more likely to perceive a higher level of stress than those who had completed higher secondary and above level of education though there was no statistical significance in multivariate analysis (COR=2.63, 95% CI: 1.15-5.98). This result is consistent with the other studies conducted in Nepal [11] and India [7] where educational status was found statistically significant with antenatal stress ($p<0.05$). Likewise, the odds of developing perceived stress are also higher among the respondent's husband who had completed up to secondary level of education than those who had completed secondary and above level of education (COR=2.67, 95% CI: 1.17 - 6.08). In contrast, a study conducted by Woods et al. [3] and by Yiadom et al. [8] found no association between educational status and perceived level of stress. Evidence from different studies reported that literacy gives individuals a sense of improved self-esteem or self-efficacy, enhances their feelings of self-worth, diminishes feelings of shame, and in turn, reduces anxiety symptoms [17-18].

Unplanned pregnancy may increase a woman's exposure to psychosocial stressors, decrease social support provided to her by her partner, and decrease her overall life satisfaction [19]. In the study carried out, women with unplanned pregnancies admitted high levels of stress (COR= 2.82, 95% CI: 1.03 – 7.76) which supports the finding which has been shown earlier in other studies conducted in China [20], Southern India [21], and Ethiopia [12]. However, the findings of this study contradict the findings conducted in Biratnagar, Nepal [11].

Gender preference for male baby exists in several parts of the world specially in developing region such as South East Asia, Middle East and Africa [22]. The findings of the study showed willingness of having a male child is a strong predictor of a high level of perceived stress resulting in statistical significance even after removing potential confounders. The result showed respondents having male child preference were three times more likely to have a high level of stress than those who had no preference over the gender of their upcoming baby (AOR= 3.07; 95% CI = 1.26 – 7.48). Similar findings have been reported in a study where women who

Table 5: Association between selected variables with perceived stress among pregnant women by using binary logistic

Variables	COR (95 % CI)	p value	AOR (95% CI)	p value
Ethnicity				
Brahmin/Chhetri	1		1	
Janajati	0.67 (0.27-1.62)	0.37	0.56 (0.21-1.45)	0.23
Dalit	4.51 (1.51-13.42)**	0.007*	2.30(0.66 -7.98)	0.19
Education of respondents				
Up to secondary level	2.63 (1.15 – 5.98)**	0.02*	1.60 (0.47-5.45)	0.45
Above secondary level	1		1	
Education of husband				
Up to secondary level	2.67 (1.17-6.08)**	0.01*	1.68 (0.50 -5.68)	0.40
Above secondary level	1		1	
Status of pregnancy (Pregnancy intention)				
Planned/wanted	1		1	
Unplanned/unwanted	2.82 (1.03-7.76)**	0.04*	2.13 (0.70 -6.47)	0.18
Gender preference				
Daughter	2.16 (0.65-7.19)	0.20	2.38 (0.68 -8.28)	0.17
Son	4. 12(1.77-9.55)**	0.001*	3.07 (1.26 -7.48)**	0.01*
No preference	1		1	
*p-value is significant at <0.05 level, 1: reference group, **significant at 95% CI, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio.				

reported male gender preference was found to have higher stress scores [21-23].Gender preferences for male babies might not be merely the mother's willingness. Even when mothers do not have a gender preference, a sense of turmoil is induced in pregnancy due to societal and familial preferences for a male child resulting in maternal psychological distress.

This study was conducted in a tertiary level health facility; hence the findings of the study might not represent the stress of the pregnant women in the entire community. Also, only one study setting was included in this study which might limit the generalizability by influencing the result of the study.

CONCLUSION

Approximately one out of nine pregnant women had high level of stress in this study. Variables such as ethnicity, education of respondents and of the husbands, type of pregnancy intention, and gender preference were associated with the perceived stress level. However, after adjusting for potential confounders, respondents' willingness to have a male child was the only independent predictor of the higher perceived stress level. Hence, considering the adverse effects of stress on pregnancy outcomes, concerned authorities need to address programs that focus on early screening of stress and initiate appropriate modalities for the management of pregnancy-specific stress.

Authors Contributions:

PP (conceptual design, literature search, data collection, data analysis, data interpretation, drafting of the manuscript, reviewing of the manuscript, finalization of the manuscript, and corresponding to the journal editor) and BG (conceptual design, data collection, reviewing of the manuscript, and finalization of the manuscript). Note: PP and BG are abbreviated names of the authors.

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Data Availability: The data used to support the findings of this study are available from the corresponding author upon request.

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