

Research Article

Perceived Stress and Its Associated Factors among Pregnant Women in Rural Kancheepuram District, Tamil Nadu: A Cross-Sectional Study

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Abstract

Objective: To estimate the prevalence of perceived stress and identify its associated risk factors among rural pregnant women.

Methods: A community-based cross-sectional study was conducted among 250 antenatal mothers (gestation > 12 weeks) in rural Kancheepuram District, Tamil Nadu, over two years (January 2017 – December 2018). Data on demographic, obstetric, and lifestyle factors were collected using a semi-structured questionnaire. The Perceived Stress Scale (PSS) was used to assess stress levels.

Results: Among the 250 participants, the mean perceived stress score was 14.4 ± 4.01 . The prevalence of moderate stress was 51.2% (n=128), while 48.8% (n=122) reported low stress. Significant associations with higher stress were found for age (p=0.021), occupation (p=0.009), education (p=0.000), and lower socioeconomic status (p=0.003). Additionally, participants with thyroid disorders (p=0.022) and a history of infertility treatment (p=0.004) reported significantly higher stress levels. No significant association was found between stress and obstetric parameters such as gravida or parity.

Conclusion: This study found a high prevalence of moderate perceived stress among rural pregnant women. Key risk factors include lower socioeconomic status, occupation, and specific comorbidities. These findings underscore the need for routine psychosocial screening and early intervention, particularly for at-risk groups. Comprehensive support strategies must be integrated into antenatal care to promote maternal well-being and improve pregnancy outcomes.

Keywords: antenatal care, perceived stress, pregnancy, rural health, tamil nadu.

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INTRODUCTION

Pregnancy, while a period of profound joy, is accompanied by significant physiological and psychological changes. The complex interplay of hormonal fluctuations, physical discomfort, and anticipatory anxiety surrounding childbirth and motherhood contributes to a broad range of emotional experiences. This period of adjustment requires considerable adaptive capacity from expectant mothers. When the cumulative burden of these challenges exceeds a woman's ability to cope, stress may occur. Hans Selye classically

defined stress as "the body's nonspecific response to any demand."¹ Among pregnant women, this stress may be further compounded by additional vulnerabilities. Women with pregnancy-related complications, short interpregnancy intervals, and those who are employed may experience additional burdens, increasing their risk of elevated stress levels.²

Untreated antenatal stress poses a significant public health concern, as it is associated with adverse maternal and child outcomes. It has been linked to an increased risk of preterm birth, low birth weight, and long-term neurobehavioral and

cognitive deficits in children.³ Although a growing body of research has established an association between maternal stress and adverse pregnancy outcomes, a notable knowledge gap remains regarding the prevalence and determinants of perceived stress among pregnant women in rural settings. This gap is particularly important because rural populations often face a unique constellation of stressors, including lower socioeconomic status, inadequate infrastructure, geographic isolation, and limited access to quality healthcare services.⁴ Furthermore, cultural factors and the stigma surrounding mental health issues, particularly in developing countries such as India, may create substantial barriers to seeking psychological support and thereby exacerbate the psychological burden among pregnant women.⁵

Most existing studies have been conducted in urban or hospital-based settings, leaving the specific needs and challenges of pregnant women in rural communities relatively underexplored. Therefore, this study aims to address this knowledge gap by determining the prevalence of perceived stress and identifying the sociodemographic, obstetric, and psychosocial factors associated with perceived stress among pregnant women in rural areas of Kancheepuram District, Tamil Nadu. By elucidating these factors, this community-based cross-sectional study seeks to provide evidence to inform targeted and culturally sensitive interventions for this underserved population.

METHODS

A community-based cross-sectional study was conducted among pregnant women residing in the rural field practice area of the Rural Health and Training Centre (RHTC) in Poonjeri, affiliated with Chettinad Hospital and Research Institute, Kancheepuram District, Tamil Nadu. The study was conducted over a two-year period, from January 2017 to December 2018. The study included antenatal women in their second and third trimesters (gestational age >12 weeks) who resided in the villages served by the RHTC. Pregnant women who were critically ill or had pre-existing psychiatric conditions were excluded from the study.

Based on a previous study that reported a 66% prevalence of perceived stress among pregnant women,⁴ the sample size was calculated using the formula $N = 4pq/E^2$, where $p = 0.66$, $q = 0.34$,

and E (margin of error) = 6%. Assuming a 95% confidence level, the required sample size was calculated to be 250 participants.

A two-stage random sampling technique was employed. In the first stage, villages were selected. The RHTC covers 12 villages, comprising 3 villages in the Thiruporur block and 9 villages in the Thirukazhukundram block, with a combined population of 39,545 according to the household register. Using a lottery method, six villages were randomly selected: Karanai, Nallur, Kunnathur, Poonjeri, Paiyanoor, and Mamallapuram. In the second stage, participants were selected. According to data obtained from local health authorities and Integrated Child Development Services (ICDS) centres, there were 815 pregnant women with a gestational age >12 weeks residing in the six selected villages. Of these, 514 were registered and accessible for the study. Systematic random sampling was then applied, with every second eligible antenatal woman on the list being approached and invited to participate. This process was continued until the target sample size of 250 participants was achieved.

Data were collected using two instruments. A pretested and validated semi-structured questionnaire was used to collect information on sociodemographic characteristics (age, education, occupation, and socioeconomic status), obstetric history (gravida, parity, abortions, and live births), lifestyle factors, and medical comorbidities. The validated 10-item Perceived Stress Scale (PSS-10) was used to assess the level of perceived stress.⁶ Each item is scored on a 5-point Likert scale ranging from 0 (never) to 4 (very often). Total scores range from 0 to 40, with higher scores indicating greater perceived stress. Based on the standard scoring guidelines, scores of 0–13 were classified as low stress, 14–26 as moderate stress, and 27–40 as high stress.

After obtaining written informed consent from each participant, face-to-face interviews were conducted in the local language (Tamil) using the structured questionnaire. Confidentiality was maintained throughout the data collection process.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Institutional Ethical Committee of Chettinad Hospital and Research Institute prior to the commencement of the study (Reference No:

66/IHEC/9-16). Participation was voluntary, and all participants were informed of their right to withdraw from the study at any time without affecting the healthcare services they received.

STATISTICAL ANALYSIS

The data were checked for completeness and entered into Microsoft Excel. Periodic validation was performed to ensure data accuracy. The data were subsequently exported to and analysed using IBM SPSS Statistics version 23. Categorical variables were presented as frequencies and percentages. The association between perceived stress, categorized as low and moderate stress, and the independent variables was assessed using the Chi-square test for categorical variables and the independent-sample t-test for continuous variables. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 250 pregnant women participated in the study, yielding a 100% response rate. The mean age of the participants was 27.4 ± 5.2 years, with the largest proportion (40.0%) belonging to the 26–30-year age group. More than half of the participants were unemployed (56.4%), while 16.0% were engaged in unskilled labour. Regarding educational attainment, 40.8% were graduates, followed by 25.6% who had completed secondary education. Nearly half of the participants (49.6%) belonged to the lower-middle socioeconomic class, while 22.4% were from the lower socioeconomic class. The detailed sociodemographic characteristics of the study participants are presented in Table 1.

Table 1. Socio-demographic Profile of the Participants (N=250)

Variable	N	%
Age (Years)		
< 20	8	3.2
21-25	80	32.0
26-30	100	40.0
31-35	52	20.8
>35	10	4.0
Occupation		
Professional	4	1.6
semi-professional	9	3.6
clerk/shop owner	2	0.8
skilled	23	9.2
semi-skilled	31	12.4
unskilled	40	16.0
unemployed	141	56.4

Education		
Postgraduated	59	23.6
Graduated	102	40.8
Secondary	64	25.6
Higher secondary	17	6.8
Midle secondary	8	3.2
Socioeconomic status		
upper middle	11	4.4
middle	59	23.6
lower middle	124	49.6
lower	56	22.4

Regarding obstetric history, nearly half of the participants (48.0%) were primigravida, while 42.4% had a gravida score of 2. More than half of the participants (54.4%) were nulliparous. A history of previous abortion was reported by 17.6% of the women. The obstetric characteristics of the participants are summarized in Table 2.

Table 2. Obstetrics Score of the Participants (N=250)

Variable	N	%
Gravida		
1	120	48.0
2	106	42.4
3	21	8.4
4	3	1.2
Parity		
0	136	54.4
1	112	44.8
2	2	0.8
Abortions		
0	202	80.8
1	44	17.6
2	4	1.6
Live births		
0	139	55.6
1	111	44.4

Regarding medical comorbidities, the majority of participants (79.2%) reported no comorbid conditions. Among those with comorbidities, thyroid disorders were the most common (7.6%), followed by gestational diabetes mellitus (6.4%) and hypertension (5.6%). A small proportion of participants (1.2%) had a history of coronary artery disease.

The mean perceived stress score on the PSS-10 was 14.4 ± 4.01 (range, 3–33). Based on the standard PSS-10 categorization, 51.2% (n=128) of the participants experienced moderate stress, while 48.8% (n=122) reported low stress. No participant was classified as having high stress. Table 3 presents the associations between perceived stress and the sociodemographic and clinical factors.

Table 3. Factors Associated with Perceived Stress among Participants (N=250)

Variable	Low Stress (n=122) n(%)	Moderate stress (n=128) n (%)	P-value*
Age			
<20	6 (75.0)	2 (25.0)	0.021
21-25	42 (52.5)	38 (47.5)	
26-30	53 (53.0)	47 (47.0)	
31-35	20(38.5)	32 (61.5)	
>35	1 (10.0)	9 (90.0)	
Occupation			
Professional	0 (0.0)	4 (100.0)	0.009
Semi-professional	3 (33.3)	6 (66.7)	
Clerk/shop owner	0 (0.0)	2 (100)	
Skilled	9 (39.1)	14 (60.9)	
Semi-skilled	10 (32.3)	21 (67.7)	
Unskilled	17 (42.5)	23 (57.5)	
Unemployed	83 (58.9)	58 (41.1)	
Education			
Postgraduate	18 (30.5)	41 (69.5)	<0.001
Graduate	51 (50.0)	51 (50.0)	
Secondary	33 (51.6)	31 (48.4)	
Higher secondary	16 (94.1)	1 (5.9)	
Middle school	4 (50.0)	4 (50.0)	
Socioeconomic Status			
Upper middle	1 (9.1)	10 (90.9)	0.003
Middle	22 (37.3)	37 (62.7)	
Lower middle	65 (52.4)	59 (47.6)	
Lower	34 (60.7)	22 (89.5)	
Thyroid disorder			
Yes	2 (10.5)	17 (89.5)	0.022
No	120 (51.9)	111 (48.1)	
History of infertility treatment			
Yes	118 (54 (22.2) 0.9)	14 (77.8)	0.004
No		114 (49.1)	

*Chi-square test; statistically significant at p<0.05

Among the sociodemographic variables, age ($p=0.021$), occupation ($p=0.009$), education ($p<0.001$), and socioeconomic status ($p=0.003$) were significantly associated with perceived stress. Participants aged >35 years had the highest proportion of moderate stress (90.0%). Moderate stress was also more common among participants in professional and semi-professional occupations, although the proportions varied across occupational groups.

Regarding educational attainment, postgraduate participants had a higher proportion of moderate stress (69.5%), whereas those with higher secondary education had the lowest proportion (5.9%). Participants in the upper-middle socioeconomic class had the highest proportion of moderate stress (90.9%).

Regarding clinical factors, the presence of thyroid disorders ($p=0.022$) and a history of infertility treatment ($p=0.004$) were significantly associated with perceived stress. Among participants with thyroid disorders, 89.5% (17/19) experienced moderate stress, compared with 48.1% (111/231) among those without thyroid disorders. Similarly, 77.8% (14/18) of women with a history of infertility treatment reported moderate stress.

However, obstetric parameters, including gravida ($p=0.086$), parity ($p=0.234$), and history of previous abortion ($p=0.412$), were not significantly associated with perceived stress. Other comorbidities, including gestational diabetes mellitus ($p=0.182$) and hypertension ($p=0.315$), were also not significantly associated with stress levels.

DISCUSSION

This community-based study among rural pregnant women in Kancheepuram District found that 51.2% experienced moderate perceived stress, with a mean PSS-10 score of 14.4 ± 4.01 . This finding indicates that more than half of the pregnant women in this rural population experienced a considerable psychological burden during pregnancy. The findings suggest that antenatal stress is not limited to hospital-based populations but may also represent an important community health concern requiring appropriate attention.

The prevalence of moderate stress in our study (51.2%) was comparable to that reported in a South Indian hospital-based study, which found moderate stress in 57.7% of pregnant women.⁴ However, the mean PSS-10 score in our study (14.4) was slightly higher than the mean score of 13.5 ± 5.02 reported in that study. Despite differences in study settings, the comparable findings suggest that perceived stress during pregnancy may be prevalent across both community and hospital-based populations. In contrast, a community-based study from Western Ethiopia reported a substantially higher mean PSS score of 25.89 ± 6.70 .⁵ Differences in stress perception, socioeconomic conditions, cultural context, and access to healthcare may contribute to the variation between populations. The relatively lower stress levels observed in our study may also reflect differences in healthcare infrastructure and social support systems between the study settings.

Sociodemographic factors, including age, occupation, education, and socioeconomic status, were significantly associated with perceived stress. Women aged >35 years had the highest proportion of moderate stress (90%). This may be related to the increased physical and psychological demands associated with pregnancy at advanced maternal age, including concerns about pregnancy complications and fetal outcomes. Older mothers may also experience additional responsibilities related to childcare and family management, which could further contribute to psychological stress.

Participants with postgraduate education had a higher proportion of moderate stress (69.5%) than those with lower levels of educational attainment. Although this finding may appear unexpected, highly educated women may have greater awareness of potential pregnancy-related

complications and higher expectations regarding pregnancy and childbirth outcomes. They may also experience additional concerns related to balancing professional responsibilities, family expectations, and motherhood. However, these explanations remain speculative and should be interpreted cautiously.

Socioeconomic status was also significantly associated with perceived stress, with participants in the upper-middle socioeconomic class showing the highest proportion of moderate stress (90.9%). This finding should be interpreted cautiously, as socioeconomic status may influence stress through multiple pathways beyond financial resources. Women from relatively higher socioeconomic groups may experience greater expectations regarding healthcare, pregnancy outcomes, and family responsibilities. Conversely, women from lower socioeconomic backgrounds may have developed coping strategies through previous life experiences. Further studies are needed to explore the mechanisms underlying this association in rural populations.

Medical comorbidities, particularly thyroid disorders, were significantly associated with higher perceived stress. This association is clinically plausible because thyroid dysfunction during pregnancy may be accompanied by symptoms such as fatigue, mood disturbances, and anxiety, potentially increasing the psychological burden during pregnancy.⁶ Women with thyroid disorders may also require more frequent monitoring and medication adjustments and may have concerns regarding potential effects on fetal development, which could further contribute to stress. Similarly, a history of infertility treatment was significantly associated with moderate stress, with 77.8% of women with such a history reporting moderate stress. This finding is consistent with previous literature and may be related to heightened anxiety about miscarriage, fetal abnormalities, and adverse pregnancy outcomes among women who have undergone infertility treatment.⁷ The emotional and financial investment involved in achieving pregnancy through infertility treatment may further increase concerns about pregnancy loss and contribute to psychological stress during the antenatal period.

Resilience may also play a role in how pregnant women cope with psychological stress. Previous research has highlighted the importance of resilience in coping with stress during pregnancy, suggesting that individual coping capacity may influence perceived stress.⁸ This may partly

explain why the experience of stress varies among women exposed to similar sociodemographic, obstetric, or medical circumstances. Further research incorporating measures of resilience and coping strategies may provide a better understanding of these individual differences.

In contrast to some previous studies,⁹ our study found no significant association between obstetric characteristics, including gravida, parity, and history of abortion, and perceived stress. Previous research has identified associations between perceived stress and selected maternal and obstetric characteristics among pregnant women.⁹ The difference between these findings and those of our study may be partly explained by the relatively limited variation in obstetric characteristics within our study population, as nearly half of the participants were primigravida and 54.4% were nulliparous. Such limited variation may have reduced the ability to detect statistically significant associations. Alternatively, cultural expectations and social pressures surrounding pregnancy and childbirth may influence perceived stress independently of previous obstetric history in this population.

Occupation was also significantly associated with perceived stress. Although unemployed women constituted the largest occupational group, 58.9% of unemployed women reported low stress compared with 41.1% who reported moderate stress. This pattern should be interpreted cautiously and does not necessarily indicate that unemployment is protective against stress. Employed women, particularly those working in physically demanding occupations, may experience additional work-related and pregnancy-related burdens. Conversely, unemployed women may have greater access to family support and more time for household and community activities, which may help reduce stress. Further research is needed to clarify the relationship between employment status, working conditions, social support, resilience, and perceived stress among pregnant women in rural settings.

LIMITATIONS

This study was conducted in a single district, which may limit the generalizability of the findings to other populations and settings. Social support networks were not assessed, although social support may influence psychological symptoms during pregnancy.¹⁰ Additionally, the absence

of participants with high stress may reflect the characteristics of the study population or other contextual factors that were not assessed in this study. Despite these limitations, this study provides valuable community-based evidence on the burden of perceived stress among rural pregnant women, a population that remains underrepresented in maternal mental health research. The findings underscore the need to integrate routine psychosocial screening into antenatal care services, particularly for women with identifiable risk factors. Future research should employ longitudinal designs and qualitative approaches to explore the cultural, social, and contextual factors that shape experiences of stress among pregnant women in rural communities.

CONCLUSION

This community-based study found that 51.2% of rural pregnant women in Kancheepuram District experienced moderate perceived stress. Maternal age, occupation, educational status, socioeconomic status, thyroid disorders, and a history of infertility treatment were significantly associated with perceived stress, whereas obstetric characteristics, including gravida, parity, and history of abortion, were not significantly associated with stress levels. These findings highlight the importance of considering both psychosocial and clinical factors when assessing perceived stress during pregnancy. Routine screening using validated tools such as the PSS-10 may facilitate the early identification of women at increased risk of psychological stress during pregnancy. Targeted psychosocial support, particularly for women with medical comorbidities, a history of infertility treatment, or socioeconomic vulnerabilities, may help address their psychological needs and potentially improve maternal and child health outcomes.

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