

# The prevalence and determinants of pregnancy-related anxiety amongst pregnant women at less than 24 weeks of pregnancy in Bangalore, Southern India

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**Background:** A pregnant woman undergoes physiological as well as psychological changes during this phase of life during which anxiety is a commonly faced mental condition. There is sufficient evidence on the association of pregnancy specific anxiety with adverse pregnancy outcomes. Studies on anxiety during pregnancy from low and middle income countries are limited.

**Methods:** This study included 380 pregnant women, having a confirmed pregnancy of less than 24 weeks without any obstetric complication, who were availing of antenatal care at a public sector hospital in Bangalore city. Pregnancy-related thoughts (PRT) scale was used to screen for anxiety. Details pertaining to sociodemographic data, obstetric history, psychosocial factors including social support, marital discord, domestic violence, consanguinity, history of catastrophic events, history of mental illness, current presence of depression and anxiety was obtained by means of electronic data capture using an Android-based App.

**Results:** Out of 380 pregnant women, 195 (55.7%) were found to have pregnancy-related anxiety. Lower socioeconomic status, low social support and depression emerged as significant determinants of anxiety.

**Conclusion:** The prevalence of anxiety was fairly high in the study population and is therefore an important public health concern. Pregnancy-related anxiety must be identified early during routine antenatal care to prevent any untoward pregnancy outcomes.

**Keywords:** anxiety, pregnancy, prevalence, determinants, India

## Introduction

Pregnancy is a time of joy and hopeful expectation although it could also be fraught with worries and anxiety about the physiological and emotional changes that take place during this time. While depression and anxiety are commonly occurring mental conditions during pregnancy, there is emerging evidence that presence of anxiety may be much more common than that of depression.<sup>1</sup> Pregnancy anxiety is defined as a negative emotional state that is associated with worries about “the health and well-being of one’s baby, the impending childbirth, of hospital and health-care experience (including one’s own health and survival in pregnancy) during birth and parenting or maternal role.”<sup>2</sup> It is considered to be distinct from the general indices of anxiety and depression in the non-pregnant state.<sup>3</sup> In low- and middle-income countries, more importance

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is given towards addressing obstetric complications and reducing the maternal mortality; while a woman's emotional and mental health receives less attention than is due.<sup>4</sup> Symptoms suggestive of a disturbed mental health such as poor sleep and tiredness are likely to be ignored and attributed to a normal physiological condition associated with pregnancy.

There is ample evidence that anxiety and similar mental conditions during pregnancy could increase the risk of adverse pregnancy outcomes and offspring neurodevelopment.<sup>5,6</sup> The adverse outcomes include low birth weight, prolonged labour, preterm delivery and a higher incidence of caesarean section.<sup>7-10</sup> When compared with general anxiety, pregnancy-related anxiety appears to be a stronger determinant for poor obstetric consequences.<sup>4</sup>

According to a systematic review, the prevalence of anxiety during pregnancy ranges from 1% to 26% in low- and middle-income countries (LMICs).<sup>11</sup> However, published literature on anxiety during pregnancy seems to be limited. In a systematic review of common mental health morbidities during the antenatal period, it was found that evidence from LMICs' contributed to only 8% of included literature.<sup>12</sup> The aim of this study was to determine the prevalence of anxiety and its determinants among pregnant women availing of antenatal care at a public sector hospital in Bangalore.

## Material and methods

### Study area, participants and recruitment

The study participants included pregnant women who were seeking care at Jaya Nagar General Hospital, which is a sub-district hospital in Bangalore. This study was nested within an ongoing cohort study, the study protocol of which has been published earlier.<sup>13</sup> The study participants were included according to the eligibility criteria of the study protocol. Pregnant women above the age of 18 years with a confirmed pregnancy of less than or equal to 6 months ( $\leq 24$  weeks) were included. Those diagnosed with obstetric complications and a recent intake of steroidal medication were excluded. The study analyzed the data of 350 eligible pregnant women who had completed baseline visit of the study during the period from August 2017 until July 2018.

### Ethical issues

After an explanation about the nature and purpose of the study, the eligible pregnant women who agreed to participate were asked to give a signed consent. Privacy was ensured during data collection and all identifiers were

removed to ensure data confidentiality. The Institutional Ethics Committee of the Indian Institute of Public Health, Bangalore campus (IIPHBB/TRCIEC/118/2017) gave approval for the study.

### Data elements

A custom designed Android-based App Cascade version 2.0.0 developed by Athenaeum Technologies Private Limited was used for electronic data capture. Data included sociodemographic variables, obstetric history, psychosocial factors such as social support, marital discord, domestic violence, consanguinity, history of catastrophic events, history of mental illness, recent anxiety and depression.

### Measurement of dependent variables

The Pregnancy-related thoughts (PRT) scale which was originally developed by Rini et al<sup>14</sup> in 1999 was used to screen for the presence of anxiety. The scale is composed of ten questions, the initial five questions have been derived from a prenatal stress scale by Wadhwa et al<sup>15</sup> in 1993, the remaining five items were added by Rini et al. Each item is scored on a 4-point scale with cut-off scores of 28 and 24 for nulliparous and multiparous women. The internal consistency (Cronbach's alpha) of PRT was seen to be 0.79. The scale, originally in English language, was translated into the local language 'Kannada' and then back translated. The scale was pilot tested in a sample of 100 women and found to be reliable with a Cronbach's alpha of 0.80.

### Measurement of possible determinants

Modified Kuppaswamy socioeconomic scale was used to measure the socioeconomic status.<sup>16</sup> The Revised Dyadic Adjustment Scale was used to explore marital relationship; it estimates seven domains of relationship between the partners within three categories: decision making, values and affection.<sup>17</sup> Social support was gauged by using the Multidimensional Scale of Perceived Social Support Scale (MSPSS).<sup>18</sup> The scale includes 12 questions and scoring is done on a 7-point Likert rating scale ranging from "very strongly disagree" to "very strongly agree." History of spouse physical and sexual violence was elicited by means of the Modified Conflict Tactics scale.<sup>19</sup> The participants were screened for depression using the 10-item Edinburgh Postnatal Depression Scale (EPDS).<sup>20</sup> The scale comprises of 10 short questions, those scoring above 12 or 13 are likely to be suffering from depression.

## Statistical analysis

Data were retrieved from the data server, cleaned and analyzed using SPSS version 22 (IBM Corporation, Armonk, NY, USA). The presence of anxiety using the PRT scale was indicated by a score of more than or equal to 28 for nulliparous women and more than or equal to 24 for multiparous women. The independent variables were categorized to analyze the association between each independent and outcome variable using a univariate analysis to calculate the Crude Odd's Ratio with 95% Confidence Interval. Those variables that were found to be associated at a *P* level <0.2 in the univariate analysis were entered into a multivariate logistic regression model to calculate the Adjusted Odd's Ratio and to eliminate the effects of confounding. A *P*-value of less than 0.05 for an association in the multivariable analysis was considered to be significant.

## Results

### Sociodemographic characteristics of the study participants

Almost two-thirds (70%) of the study participants were above the age of 20 years and 72.3% belonged to the Muslim faith. Over one third of them had completed high school (38.6%) while the spouses of 33.9% had completed pre-university college or diploma level education. The majority (92%) were homemakers and the husbands of 51.8% were semiskilled workers. Over half (57.4%) of them belonged to upper-lower socioeconomic status. The details are presented in Table 1.

The mean gestational age of the respondents was 17.6 ±4.1 weeks. As many as 309 respondents were between 13 and 24 weeks (88.3%) while the remaining 11.7% were less than 12 weeks of gestation.

### Prevalence of anxiety

Out of 350 pregnant women, 195 (55.7%) were found to have pregnancy-related anxiety. The mean score obtained from the PRT scale according to the gestational age and parity is shown in Table 2. The group-wise mean score difference was not significant.

### Association of anxiety with sociodemographic characteristics

As shown in Table 3, the Odd's of anxiety was more than twice as higher among women belonging to the lower middle class [AOR 2.804(1.296–6.068, *P*=0.009)].

**Table 1** Sociodemographic profile of study participants (N=350)

Sociodemographic characteristics	Frequency (n = 350)	Percentage (%)
<b>Age group</b>		
≤ 20 years	105	30
>20 years	245	70
<b>Religion</b>		
Hinduism	91	26.0
Christianity	06	1.7
Islam	253	72.3
<b>Educational qualification of the respondents</b>		
Illiterate	11	3.1
Primary school	09	2.9
Middle school	105	30.0
High school	135	38.6
PUC or diploma	65	18.6
Graduate	25	7.1
<b>Educational qualification of the husbands</b>		
Illiterate	36	12.9
Primary school	20	7.1
Middle school	71	25.4
High school	95	33.9
PUC or diploma	36	12.9
Graduate	22	7.8
Postgraduate		
<b>Occupation of the respondents</b>		
Unskilled worker	15	4.3
Semi-skilled worker	12	3.4
Clerical or Farmer	01	0.3
Housewife	322	92.0
<b>Occupation of the husbands</b>		
Unemployed	01	0.4
Unskilled worker	96	34.3
Semi-skilled worker	145	51.8
Skilled worker	35	12.5
Clerical or Farmer	01	0.4
Semi professional	02	0.7
<b>Socioeconomic Status</b>		
Upper middle class	43	12.3
Lower middle class	106	30.3
Upper Lower class	201	57.4

### Association of anxiety with obstetric history

There was no significant association between anxiety and obstetric variables as seen in Table 4.

**Table 2** Mean PRA score according to gestational age and gravidity

	Primigravida	Multigravida
Gestational age ≤12 weeks	22.07±8.39	19.6±12.4
Gestational age >12 weeks to ≤24 weeks	25.27±8.96	23.7±9.3

## Association between anxiety and psychosocial factors

The Odds of anxiety was significantly higher among women with low social support on univariate as well as multivariate analysis (COR 1.733 [0.945–3.178], AOR 1.683 [0.925–3.064]) (Table 5). The association of anxiety with marital discord was statistically significant ( $P=0.051$ ) although its strength was low (AOR 0.639 [0.402–1.008]). Similarly, association with spousal violence was weak (AOR, 0.258 [0.072–0.919]), although significant,  $P=0.037$ . Anxiety and depression appeared to be strongly and significantly associated (COR =1.928 [1.163–3.196],  $P=0.011$ , AOR, 1.965 [1.193–3.235],  $P=0.008$ ).

## Discussion

In this study, more than half of the pregnant women (55.7%) were suffering from pregnancy-related anxiety during early-to-mid pregnancies as determined by using the PRT scale. The reported prevalence rates using differing scales from other countries seem to be much lower- 23.6% in Saudi Arabia using the State Anxiety scale,<sup>21</sup> 26.8% in Brazil using the Hospital Anxiety Subscale,<sup>22</sup> 23% in South Africa using the Mini-International Neuropsychiatric Interview diagnostic interview and 25% in Tanzania using the Pregnancy-related anxiety questionnaire.<sup>23,24</sup>

Among Indian studies, Madhavaprabhakaran et al<sup>25</sup> with the help of the Pregnancy Specific Anxiety Scale (PSAS), found that all women during the first trimester had some degree of pregnancy specific anxiety, which was mostly the moderate form in 89.4% of the women. A lower prevalence rate of 28.4% throughout all the trimesters was seen among pregnant women in Bhubaneswar for which the Hospital Depression and Anxiety Scale was used for measurement.<sup>26</sup> This disparity in the prevalence rates could be attributed to differences in the psychometric properties of measuring scales that were used; and also to the sociodemographic and sociocultural heterogeneity and diversity of the study population. Societal norms and values can also alter the perceptions of what may be considered to be “stressful” or

“dangerous” hence accounting for this variation in the prevalence across different study settings.<sup>27</sup>

Among the sociodemographic factors, we could not demonstrate any relevant association of pregnancy-related anxiety with age, respondent’s education and occupation; and husband’s education. Madhavaprabhakaran et al<sup>25</sup> reported that younger women were at a higher risk for pregnancy-related anxiety. In regard to the relationship of anxiety with a woman’s education, different studies report conflictive findings. While Lau and Yin<sup>28</sup> (2011) contended that well educated women could handle stress in a better way during pregnancy;<sup>28</sup> other authors claim that the stress levels could be much higher in this group.<sup>29,30</sup>

The burden of anxiety was seemingly higher among women who belonged to lower socioeconomic classes; which is in concurrence with other study results.<sup>31–34</sup> However, Kingston et al<sup>35</sup> (2012) and Renae Stancil et al<sup>36</sup> (2000), found lower levels of stress in lower income group women.

We could not find any important linkage between anxiety and obstetric history, although many studies show higher levels of anxiety among primiparous women.<sup>37,38</sup> Also, an unplanned pregnancy or a history of medical complaint did not appear to predispose to prenatal anxiety. This is contrary to the study findings on anxiety in pregnant women from the Netherlands wherein multiparity, a history of depression, episodes of severe nausea and extreme fatigue were strongly related with anxiety.<sup>39</sup> Alqahtani et al<sup>21</sup> in their research, also identified unplanned pregnancy and history of abortion to be significant predictors of anxiety.<sup>21</sup> Likewise, van Heyningen et al<sup>23</sup> confirmed that multigravidity, previous pregnancy loss and unplanned pregnancy could be significant predictors of antenatal anxiety.

Among the psychosocial factors, low social support emerged as a significant predictor of anxiety. The association of anxiety with marital discord was weak whereas none was seen with a recent history of catastrophic events. While spousal violence is a known stressor,<sup>40,41</sup> paradoxically, in the present study the prevalence of anxiety was seemingly lower in respondents who were victims; this may be ascribed to a respondent bias in the form of non-reporting, most likely due to fear apprehension or an associated social stigma. Most cases of spousal violence go under-reported, the reported cases present the “tip of the iceberg.”<sup>42</sup> Increased perceived social and partner support appear to decrease the risk for antenatal anxiety as

**Table 3** Association between sociodemographic characteristics and anxiety among the pregnant women (N=350)

Socio demographic characteristics	Non-anxious (155)	Anxious (195)	Crude Odd's Ratio (95% CI)	P-value	Adjusted Odd's Ratio (95% CI)	P-value
<b>Age group</b> ≤20 years (101) >20 years (245)	49 (46.7%) 106 (43.3%)	56 (53.3%) 139 (56.7%)	1 1.246 (0.749–2.073)	0.396		
<b>Educational qualification of the respondents</b> < High school (225) >High school (125)	97 (43.1%) 58 (46.4%)	128 (56.9%) 67 (53.6%)	0.861 (0.523–1.416) 1	0.555		
<b>Educational Qualification of the husbands</b> <High school (173) >High school (177)	73 (42.2%) 82 (46.3%)	100 (57.8%) 95 (53.7%)	1.220 (0.705-2.110) 1	0.477		
<b>Occupation of the respondents</b> Working (28) Housewife (322)	11(39.3%) 144 (44.7%)	17 (60.7%) 178 (55.3%)	0.960 (0.388-2.377) 1	0.929		
<b>Occupation of the husbands</b> Skilled workers (109) Semi/unskilled workers (241)	36 (33%) 119 (49.4%)	73 (67%) 122 (50.6%)	1 0.528(0.305-0.912)	0.665	0.545 (0.320-0.930)	0.988
<b>Socioeconomic Status</b> Upper middle class (43) Lower middle class (106) Upper Lower class (201)	27 (62.8%) 43 (40.6%) 85 (42.3%)	16 (37.2%) 63 (59.4%) 116 (57.7%)	1 0.586 (0.341-1.009) 1.733 (0.945-3.178)	0.054 0.075	2.804(1.296-6.068) 1.963 (0.934-4.116)	0.009 0.075

**Table 4** Association of obstetric history with anxiety among the pregnant women (N=350)

Obstetric and Medical History	Non- anxious mothers (n=155)	Anxious mothers (n=195)	Crude OR (95% CI)	P value
<b>Gravida</b> Primigravida (143) Multigravida (207)	65 (45.5%) 90 (43.5%)	78 (54.5%) 117 (56.5%)	1 0.918 (0.358-2.353)	0.918
<b>Parity</b> Primipara (155) Multipara (195)	72 (46.5%) 83 (42.6%)	83 (53.5%) 112 (57.4%)	1 1.718 (0.501-2.743)	0.715
<b>Abortion</b> Yes (82) No (268)	38 (46.3%) 117 (43.7%)	44 (53.7%) 151 (56.3%)	0.904 (0.475-1.721) 1	0.758
<b>Pregnancy Unplanned</b> Yes (148) No (202)	64 (43.2%) 91 (45%)	84 (56.8%) 111 (55%)	1.068 (0.607-1.702) 1	0.783
<b>History of medical complications</b> Yes (26) No (324)	12 (46.2%) 143 (44.1%)	14 (53.8%) 181 (55.9%)	0.865 (0.328-0.284) 1	0.771



**Table 5** Association between psychosocial factors and anxiety among the pregnant mothers (N=350)

Social Support & Spouse physical and Sexual violence	Non-Anxious (155)	Anxious (195)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P-value
<b>Social Support</b>						
High Support (1 to 2.9) (172)	73 (42.4%)	99 (57.6%)	0.586 (0.941-1.009)	1	0.567 (0.335-0.960)	
Moderate Support (3 to 5) (98)	58 (59.2%)	40 (40.8%)	1.733 (0.945-3.178)	0.054	1.683 (0.925-3.064)	0.035
Low Support (5.1 to 7) (80)	24 (30%)	56 (70%)		0.075		0.088
<b>Marital Discord</b>						
No (159)	63 (39.6%)	96 (60.4%)	0.613 (0.382-0.983)	1		
Yes (191)	92 (48.2%)	99 (51.8%)		0.042	0.639 (0.402-1.008)	0.051
<b>Spouse Physical and Sexual Violence</b>						
Yes (13)	9 (69.2%)	4 (30.8%)	0.247 (0.749-4.107)	0.035	0.258 (0.072-0.919)	0.037
No (337)	146 (43.3%)	191 (56.7%)		1		
<b>Depression</b>						
Depressed (123)	43 (35%)	80 (65%)	1.928	0.011	1.965	0.008
Non-depressed (227)	112 (49.3%)	115 (50.7%)	(1.163-3.196)	1	(1.193-3.235)	
<b>Consanguinity</b>						
Not a relative (240)	103 (42.9%)	(57.1%) 137		1		
Relative (110)	52 (47.3%)	58 (52.7%)	0.783 (0.475-1.292)	0.339		
<b>Past H/O catastrophic events</b>						
Absent (265)	118 (44.5%)	147 (55.5%)		1		
Present (85)	37 (43.5%)	48 (56.5%)	1.060 (0.616-1.822)	0.834		

observed in other study settings.<sup>43</sup> The prevalence of anxiety was significantly higher among women who were depressed in the present study. The co-morbid existence of depression and anxiety is frequently encountered, although the mechanism behind this and timing of which appears first is yet to be ascertained.<sup>24,36,44</sup>

## Study limitations

This study was conducted in an urban public sector hospital setting where antenatal care is mostly availed by pregnant women belonging to the lower- and middle-income groups in a community. Hence, the findings from this study may not be applicable for pregnant women belonging to higher socioeconomic group as a result of variations in psychosocial factors and standard of living. The chance of selection bias is higher in a single hospital-based cohort. The PRT scale, though not validated for use in the Indian population, was field tested for feasibility and reliability in a small sample of participants. As a part of the cohort study protocol, women with high risk

pregnancies and those with a history of recent intake of steroidal medication were excluded which could impede the generalizability of the study result. The counterintuitive finding of lower rates of spousal violence in the anxiety group could be attributed to respondent bias due to under-reporting of cases.

## Conclusion

The prevalence of anxiety was fairly high in the study population and was strongly associated with lower socioeconomic status, low social support and depression. It is important that pregnancy-related anxiety be identified and addressed during routine antenatal care to prevent associated adverse pregnancy outcomes. Future research should be focused upon widespread community-based studies to estimate prevalence of anxiety in a general population of pregnant women as much of the estimates in the current literature are derived from hospital-based studies. There is also a need to explore the neuroendocrinal factors and

physiologic pathways that could possibly be associated with antenatal anxiety.

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## Disclosure

The authors report no conflicts of interest in this work.

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