Obstetrics and Gynaecology Section

Risk Factors for Stress During Antenatal Period Among Pregnant Women in Tertiary Care Hospital of Southern India

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ABSTRACT

Background: The well-being of an infant may be affected when the mother is subjected to psychosocial stress during her pregnancy. Mothers exposed to stressful conditions were more prone for preterm birth than those without any stress. In this study perceived stress has been used as an indicator of levels of stress. There are very few studies published from developing countries on the levels of perceived stress and its causes in pregnant women.

Materials and Methods: This study employed a cross-sectional assessment of pregnant women attending the outpatient services of a tertiary care hospital for regular antenatal check-up. Women not known to have any risk factors at 28 weeks to 34 weeks of pregnancy who agreed to participate in the study were interviewed to assess the perceived stress score.

Results: Among the total patients 57.7% were primigravida and the mean score on perceived stress scale was 13.5±5.02. The majority of the group (102; 65.4%) scored higher than the mean value of total score on the perceived stress scale. Unplanned pregnancy and husband's employment status were associated with high levels of perceived stress in multivariate analysis in this set of women.

Conclusion: Individual as well as pregnancy related factors can contribute to perceived stress in pregnant women. With the established relationship between maternal mental health, pregnancy outcome and infant growth, the assessment and management of stress early in the pregnancy is crucial.

INTRODUCTION

The concept of "battered foetus" was described by Pugh as the disastrous consequence of physical violence to the pregnant abdomen [1]. Psychosocial status has also been hypothesized to impact pregnancy outcome directly through alterations in physiologic state, or indirectly through its impact on the health behaviour in the mother, or through interactions between these two mechanisms [2]. The wellbeing of the foetus may be affected when the mother is subjected to psychosocial stress during her pregnancy. There is accumulating evidence for severe psychological stress during pregnancy and adverse effect on fetal development which is probably mediated through the excessive production of stress hormones in the mother. These stress hormones cross the placenta inhibiting foetal growth and causing preterm delivery [3-11]. Corticotrophin releasing hormone activity within placenta, foetal membranes, decidua and umbilical cord may cause paracrine and autocrine interactions within the placenta, foetal membranes and decidua resulting in the maturation of foetal hypothalamo-pituitary-adrenal axis [12]. There exists a complex relationship between foetal wellbeing and the physical and emotional factors operating in the mother during pregnancy [13].

Maternal psychosocial processes in pregnancy are important and warrant the same degree of consideration and study like obstetric causes, because of the overall magnitude of their independent effect on prematurity related outcomes [14]. Adverse life events and life hassles experienced by women pre-conceptionally, during antenatal period or postpartum period can have impact on multiple areas like environmental, psychological and biological and can contribute to adverse obstetric outcomes [15]. Apart from affects on low risk pregnancies, the impacts of maternal stress on the birth weight of the baby in women with high-risk pregnancies have also been recorded [16]. Follow up studies have recorded the impact of maternal prenatal anxiety and stress on the infant's health complaints during the first year of life [17]. In low income countries maternal competence in child care is likely to have more of an impact on the child's physical well-being and survival especially in the first year of life [18].

Many psycho-social risk factors contribute to distress in pregnancy. Significant factors among them were past history of depression, domestic violence, stressful life events and poor social support [19,20]. Poor marital adjustment is also known to predict higher degree of hassles during pregnancy [21]. Socio-economic and cultural factors, such as male gender preference for the baby, lower income, adjustment problems with the spouse's family and parents and experiencing adverse life events in the previous year were found to be risk factors for postpartum depression from this region [22].

Stress is perceived when there is an imbalance between demands of life and the adaptive capacity of an individual [23]. Appraisal of an event as stressful by an individual can lead to series of stress response mechanisms in different domains like psychological, physiological and behavioural. Maternal psychosocial distress measured as perceived stress, with high salivary cortisol levels and the resultant high incidence of maternal depression and anxiety have been documented [24]. Tapping the stress and its impact on the individual in disease has been done using different approaches. In psychological tradition of assessment, stress is measured as perceived stress and the focus is on individual's subjective evaluation of their abilities to cope with demands of specific events and their affective responses to that event. Perceived stress is a measure of degree to which situations in one's life are perceived as stressful [25,26].

Regular antenatal visits include assessment of obstetric parameters and questions regarding specific past history and treatment for mental illness. A detailed psychological assessment through referral to a psychiatric facility is carried out for those women with a history of treatment for mental illness, those with history of postpartum psychiatric disorders and those who presented with depressive anxiety symptoms during their antenatal visits. Women who perceived

stress but were not symptomatic are not given an opportunity to address their stress during regular antenatal check-up. The aim of this study is to investigate the perceived stress in pregnant women attending antenatal clinics with no known risk factors for obstetric complications and to determine socio-demographic and pregnancy related factors associated with stress.

MATERIALS AND METHODS

This cross-sectional study was conducted from 2010 to 2012 in the outpatient clinics of a large tertiary care centre. This study received ethical approval of Institutional Review Board (IRB number 6972). As the prevalence rate of antenatal stress from reports in developing countries was 15% [19], to obtain 6% absolute precision the sample size calculated was 142.

During the period of study the average number of new women attending the outpatient department was 134. Consecutive women between 28 weeks and 34 weeks of their pregnancy were screened for any possible obstetric risk factor. Any women with high risk factor or history of a major mental illness like schizophrenia or bipolar affective disorder were also excluded from the study. Women who could converse in the local language and who consented to participate in the study were selected for the study. These women were interviewed after their routine antenatal check-up.

Psychosocial factors related to three following areas were carried out including retrospective examination of the past history of the patient using a specially designed proforma. (i) Patient's socio-demographic details, background, husband's employment; (ii) Details related to family like family income, whether they lived in a joint or nuclear family; (iii) Specific pregnancy related issues. Clinical details were noted from case notes.

Stress perceived by pregnant women was assessed using Perceived stress scale - a 10 item version [17]. This scale comprised of 10 items with choices on a 5-point agreement scale which has been widely used. The original 14 item perceived stress scale was shortened to a 10 item version using factor analysis from the data collected from a large sample of population in United States [27]. Perceived stress scale is an instrument used to measure perception of stress. The questions are designed to tap the degree and frequency of stressful thoughts during previous one month. These questions are of general nature and can be applied to any subgroup of population [25]. As this was not a diagnostic instrument there was no score cut offs and authors used comparisons within the sample. Perceived stress scale is reviewed as a questionnaire with good psychometric properties [28].

STATISTICAL ANALYSIS

Descriptive statistics were used to describe continuous variables and number and percentages for categorical variables. Mean value of the total scores of perceived stress scale was used to divide the group of pregnant women into those with high levels and low levels of stress. Pearson's Chi-square test was used to assess the association between level of stress and psychosocial, pregnancy and family related factors. Stepwise Binary Logistics regression was used to quantify the strength of association between levels of stress with risk factors after adjusting for other variables. Hosmer and Leme show's statistics was used to assess the Goodness of the Model fit.

RESULTS

Out of all the identified 156 pregnant women, the majority of the group was homemakers (136; 87.2%) and had a college education (97; 62.2%). More than half of the group (90; 57.7%) was primigravida. Only very few (16; 10.2%) were formally employed. A very small proportion of the group, 1.9% of them had a past history of psychiatric illness and family history of psychiatric illness [Table/Fig-1].

Characteristics	N (%)
Maternal Characteristics	
Age (Mean ±SD)	25.01±3.35
Education Uneducated Primary and secondary level education College level education	1(0.6) 58(37.2) 97(62.2)
Marital status(currently married)	156(100)
Occupation House wife/not employed outside the home Employment on a daily wages basis Employed in private & govt. sector	136(87.2) 4(2.6) 16(10.2)
BMI* (Mean ±SD)	23.46±4.47
Parity Primigravida Multigravida	90(57.7) 66(42.3)
Presence of past history of psychiatric illness	3(1.9)
Presence of family history of psychiatric illness	3(1.9)
Details of Pregnancy	
Treatment for conception	5(3.2)
Vaginal bleeding during this pregnancy	16(10.3)
Thought about abortion during this pregnancy	5 (3.2)
Drugs used for abortion during this pregnancy	1(0.6)
Current pregnancy planned	75(48.1)
Past history of spontaneous abortion	30(19.2)
Details of family	
Nuclear family	62(39.7)
Family income per month (INR) (Mean ±SD)	12,971.90±11,289.83
Husband's employment Unemployed& employed on a daily wages basis Private & public employee Demand for dowry	19(12.2) 137(87.8) 8 (5.1)
Physical abuse during antenatal period	4(2.6)
Poor family support	9(5.8)
Total Scores on PSS** (Mean ±SD)	13.50±5.02

[Table/Fig-1]: Socio-demographic characteristics and details related to pregnancy of antenatal women with low risk for obstetric complications attending tertiary care hospital in South India and their total score on Perceived stress scale.
*Body mass index
**Perceived stress scale

102 women (65.4%) scored higher than the mean value of total score (13.5 ± 5.02) on perceived stress scale. The larger proportions of women (84; 60.3%) were living in joint families. A small proportion of the women (13; 8.3 %) admitted to having a male gender preference for the baby and (16; 10.3%) of them admitted to their in-laws having a male gender preference for the expected baby. Reports of poor support by their families were made by few women (9; 5.8%) and physical abuse during pregnancy by very few (4; 2.6%).

[Table/Fig-2] documents odds ratios and confidence intervals of various socio-demographic, family factors and pregnancy related characteristics of perceived stress in pregnant women. Higher educational level of pregnant women, unplanned pregnancy, husband's formal employment status and in laws having expressed male gender preference were associated with higher level of stress in pregnant women in univariate analysis. Employment of husband (OR 0.24; 0.07-0.81; p = 0.022), unplanned pregnancy (OR 8.4; 3.62-19.57; p= < 0.001) were associated with stress in multivariate analysis using stepwise logistic regression. A trend of association (non-significant) between male gender preference of in-laws (OR 0.32; 0.10-1.01; p=0.052), past history of spontaneous abortion (OR 2.8; 0.99-8.00; p=0.053), and maternal stress have been noticed.

Specific pregnancy related factors like treatment for conception, bleeding during first trimester, thoughts about and drugs taken for abortion during pregnancy were not significantly associated with higher levels of stress.

DISCUSSION

Stress and its impact on maternal mental health as well as pregnancy outcome have been established. Stress can influence maternal mental health during pregnancy and postpartum period and or can influence the pregnancy outcome. Perception of stress can alter the pathogenesis of a physical disease through its influence on the mood state [29]. Evidence from South Asia

Characteristics	Mean PSS Score** 13.5 n=54	Mean PSS Score** >13.5 n=102	Univariate Statistics Odds ratio (95% CI)	p value	Multivariate Statistics Adjusted Odds ratio (95% CI)	p value
Maternal Characteristics						
Age					0.66(0.03-14.11)	
<20	5(41.7)	7(58.3)	0.18(0.02 to 1.88)	0.150	0.29(0.02-4.15)	0.796
21-30	48(35.6)	87(64.4)	0.23(0.03 to 1.87)	0.168		0.364
>30	1(11.1)	8(88.9)	1	-		
Education					0.35(0.11-1.09)	
≤ 5 years	17(60.7)	11(39.3)	0.263(0.11-0.615)	0.002		0.071
> 5 years	37(28.9)	91(71.1)	1			
Patient's employment					1.95(0.28-13.2)	0.494
House wife	49(36.0)	87(64.0)	0.592(0.18-1.94)	0.385		
Daily wages	1(25.0)	3(75.0)	1.00(0.08-12.56)	1.000		
Private/ Govt Employee	4(25.0)	12(75.0)	1	-		
BMI*					3.88(0.36-40.9)	0.258
<25	40(37.7)	66(62.3)	0.825(0.26 -2.59)	0.742	3.08(0.23-41.1)	0.395
25-30	9(25.7)	26(74.3)	1.44(0.39-5.38)	0.583		
>30	5(33.3)	10(66.7)	1	-		
Parity					1.27(0.49-3.31)	0.618
Primi	30(33.3)	60(66.7)	1.143(0.59-2.23)	0.694		
Multi	24(36.4)	42(63.6)	1	-		
Maternal age at first pregnancy					1.76(0.51-6.06)	0.365
<=25	38(56.7)	29(43.3)	1.526(0.51-4.55)	0.448		
>25	12(66.7)	6(33.3)	1	-		

Characteristics	Mean PSS Score** <13.5 n=54	Mean PSS Score** >13.5 n=102	Univariate Statistics Odds ratio (95% CI)	p value	Multivariate Statistics Adjusted Odds ratio (95% CI)	p value
Pregnancy Related Factors						
Treatment for conception						
Yes	1(20.0)	4(80.0)				
No	53(35.1)	98(64.9)	2.163(0.23-19.8)	0.495	9.25(0.76-112.4)	0.081
Bleeding during 1st trimester						
Yes	9(56.2)	7(43.8)				
No	45(32.1)	95(67.9)	0.368(0.12-1.05)	0.062	0.48(0.14-1.65)	0.250
Thought of aborting the pregnancy						
Yes	3(60.0)	2(40.0)	0.340(0.			
No(R)	51(33.8)	100(66.2)	55-2.10)	0.246	0.12(0.01-1.10)	0.062
Planned pregnancy						
No	13(16.0)	68(84.0)	6.3(2.98-13.31)		8.4(3.62-19.57)	
Yes (R)	41(54.7)	34(45.3)		<0.01		<0.001
Previous history of spontaneous abortion						
Yes	8(26.7)	22(73.3)				
No(R)	46(36.5)	80(63.5)	1.58(0.65-3.83)	0.311	2.81(0.99-8.00)	0.052
Patients gender preference						
Yes	7(53.8)	6(46.2)				
No(R)	47(32.9)	96(67.1)	0.420(0.13-1.31)	0.137	1.04(0.29-3.70)	0.952
Hospital admission during pregnancy						
Yes	4(66.7)	2(33.3)				
No(R)	50(33.3)	100(66.7)	0.250(0.44-1.412)	0.116	0.190(0.03-1.96)	0.190

Characteristic	Mean PSS Score** <13.5 n=54	Mean PSS Score** >13.5 n=102	Univariate Statistics Odds ratio (95% CI)	p value	Multivariate Statistics Adjusted Odds ratio (95% CI)	p value
Family Factors						
Husband's employment						
Unemployed & Daily wages	13(68.4)	6(31.6)	0.20(0.07-0.55)	0.002	0.24(0.07-0.81)	0.022
Private/ Govt job (R)	41(29.9)	96(70.1)				
Husband's work pattern						
All the days in a week	42(32.1)	89(67.9)	0.71(0.27-1.86)	0.484	0.99(0.31-3.12)	0.987
<50% />50% in a week (R)	8(40.0)	12(60.0)	1			
Type of family						
Nuclear	22(35.5)	40(64.5)	0.938(0.48-1.83)	0.853	0.83(0.39-1.75)	0.633
Joint family(R)	32(34.0)	62(66.0)	1			
Demand for dowry						
Yes	3(37.5)	5(62.5)	0.876(0.20-3.81)	0.860	0.92(0.12-6.85)	0.940
No(R)	51(34.5)	97(65.5)				
Physical abuse						
Yes	1(25.0)	3(75.0)	1.606(0.16-15.82)	0.685	2.09(0.11-37.9)	0.616
No(R)	53(34.9)	99(65.1)				
Poor family support						
Yes	4(44.4)	5(55.6)	0.644(0.16-2.50)	0.526	1.05(0.19-5.66)	0.946
No(R)	50(34.0)	97(66.0)				
In law's male gender preference for baby						
Yes	10(62.5)	6(37.5)	0.275(0.09-0.80)	0.018	0.32(0.10-1.01)	0.052
No (R)	44(31.4)	96(68.6)				
Family history of psychiatric illness						
Yes	2(66.7)	1(33.3)	0.257(0.23-2.90)	0.272	0.25(0.01-4.25)	0.341
No	52(34.0)	101(66.0)				
Available health facility						
< 5 km	43(32.1)	91(67.9)	0.473(0.19-1.17)	0.107	0.45(0.17-1.22)	0.121
> 5 km	11(50.0)	11(50.0)				

[Table/Fig-2]: Sociodemographic, pregnancy and family related factors and stress in pregnant women *Body mass index
**Perceived stress scale

has shown that a common and potentially treatable mental health problem, postnatal depression in mothers, is one of the causes for the failure to thrive in infants [18]. Postnatal depression in the developing world and this region has been shown to be associated with risk factors like low income, the birth of a daughter when a son was desired, relationship difficulties with the mother-in-law and parents, a lack of physical help and adverse life events during pregnancy [22]. These findings have been replicated and other factors associated with post-partum depression were age of the mother being less than 20; or more than 30 years, schooling of less than five years, thoughts of aborting current pregnancy, unhappy marriage, physical abuse during current pregnancy and after childbirth, husband's use of alcohol, girl child delivered in the absence of living boys and a preference for a boy, low birth weight, and a family history of depression [30]. Psychosocial stress has also been shown to be associated with preterm labour [31]. Gestational age at presentation was negatively correlated with stressful life events and with psychosocial score in women with preterm labour and psychotherapeutic intervention has been shown to be effective in prolonging pregnancy in women with early cervical change [32]. Stress and its impact on maternal mental health as well as pregnancy outcome have been established.

Studies on stress in pregnant women have shown that one in ten pregnant women report high levels of stress and about 40% report their lives as moderately stressful. Women who experience high levels of stress are more likely to be from low socioeconomic status, less than 20 years of age, single, have less than grade 11 educations and have no social support [33].

Majority of pregnant women in this group perceived stress above the mean for the group. Women with unplanned pregnancy admitted high levels of stress and this finding has been shown earlier in another study by Lau Y [34]. Use of structured questions in the checklist and tailor made stress management programmes have been recommended to handle stress during pregnancy.

Our study showed that there are culture specific factors which could contribute to significant stress in pregnancy. Gender preference for the baby, a male child over a female, has been reported as a risk factor for postpartum depression in many studies from the developing world and this region [24,25]. This study has replicated this finding though there was no statistical significance in multivariate analysis. A past history of spontaneous abortion was also found to be associated with higher levels of stress in this study group. The relationship between previous pregnancy loss and depression, anxiety and posttraumatic stress disorder in subsequent pregnancy has been reported earlier [35,36].

STRENGTH OF THE STUDY

1. This study selected samples from pregnant women who are attending antenatal clinic 7-8 times during pregnancy and delivered in the same institution.
2. Sample of women with no identified high risk factors for obstetric complications are selected as they have less anxiety about pregnancy complication.

LIMITATIONS OF THE STUDY

1. Sample of pregnant women in this study are from an outpatient department of a tertiary care hospital, hence findings may not reflect all areas of concern or stress for women in the community.
2. This study selected the patient's crossectionally and retro-spective examinations retrieve answers by recalling of the past which may be inaccurate.

CONCLUSION

Women perceive stress in pregnancy. Factors associated with stress can be related to past obstetric history, planning of pregnancy,

socio-demographic factors or cultural issues specific to the region. With the established relationship between stress and maternal mental health, which in turn can affect pregnancy outcome and infant growth, detection and management of stress as early as possible becomes a requirement during antenatal visits. This can facilitate functioning of the family unit and the critical parent-infant relationship with a potential for positive impact on the health of the future generation.

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