

Risk factors and prevalence of antenatal psychiatric symptoms: A cross-sectional study in an underprivileged urban setting

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Abstract:

Introduction: Antenatal psychiatric symptoms (APS) adversely affect maternal-foetal outcomes, and underprivileged urban communities are challenged with availability and accessibility to mental health services.

Objectives: To assess the prevalence and associated risk factors of APS in a hospital in an urban underprivileged setting.

Methods: This cross-sectional study was conducted at a government maternity hospital among 253 antenatal women using consecutive sampling. Women with gestation <24 weeks were screened for APS using Patient Health Questionnaire-9, Generalised Anxiety Disorder-7 and World Health Organisation's Alcohol, Smoking, and Substance Involvement Screening Test. Descriptive statistics and multivariable logistic regression analysis were performed.

Results: Prevalence of APS was 13.4%, with prevalence of depression 10.3%, anxiety 8.7%, alcohol use 0.8% and tobacco use 0.4%. Past history of self-harm attempts and spouse being a daily wage labourer were associated with APS. There is an absence of traditional risk factors like unplanned pregnancy, spousal alcoholism, intimate partner violence, problems with spouse, pressure to have a male child and poor social support.

Conclusion: APS is prevalent in urban, underprivileged backgrounds. Mental health screening during pregnancy is vital, especially for those with a history of self-harm.

Keywords: Antenatal psychiatric symptoms, Urban underprivileged setting, Prevalence, Risk factors, Maternal mental health

Introduction:

Antenatal Psychiatric symptoms (APS), including depression, anxiety, and substance use, affects 21.8% of pregnant women in India.^[1] This leads to adverse outcomes, including pre-eclampsia, prematurity, low birth weight, failure to thrive, and increased infant mortality.^[2] APS is associated with reduced antenatal care, impaired nutrition and reduced care of self.^[3]

Further, APS is associated with increased cortisol and reduced placental blood flow, leading to pre-eclampsia.^[4]

All these factors can lead to adverse outcomes for the baby.^[2] Known risk factors for APS include unplanned pregnancy, spousal alcoholism, intimate partner violence, problems with spouse, a history of psychiatric illness, poor social support, and pressure to have a male child.^[1]

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Health care challenges reported by antenatal women in India include financial constraints, low literacy levels and poor healthcare access.^[5] Conversely burden on healthcare due to APS include complications in children, including increased infection, hospitalization and incomplete immunisation.^[6] Further, the National Mental Health Program does not focus on peripartum mental health and Maternal and Child Health programs have only recently introduced screening for APS in the antenatal care (ANC) card.^[7] Stigma associated with mental health issues precludes the self-reporting of APS at ANC visits. Therefore, screening for perinatal mental health problems remains neglected, particularly for underprivileged populations who have poor availability and accessibility to mental health services.^[8] Prevalence and risk factors of APS are understudied in underprivileged urban settings, and maternal mental health research in India has focused more on prevalence in hospital settings.^[9] We aimed to determine the prevalence and factors associated with APS among women availing antenatal care at a government maternity hospital in an urban underprivileged area of Bengaluru.

Methods:

Study Setting and Design

This cross-sectional study was conducted at a government maternity hospital in Bangalore, serving an urban underprivileged population. This hospital refers women with severe and uncontrolled co-morbidities like gestational diabetes and hypertension to a tertiary centre. This study was a part of a larger longitudinal study, which recruited women at gestational age of <24 weeks and followed the cohort up to 6 months post partum. Following Institutional Ethics Committee (IEC 51/2022) approval, women were recruited from ANC after providing written informed consent. This study was conducted according to the Declaration of Helsinki 2013.

Study population and sampling

The sample population included pregnant women attending the ANC. Based on a 15.6% mental disorder prevalence during pregnancy^[10] 5% precision, 80% power and 95% confidence interval (CI), with a 25%

inflation for study drop-outs, the final sample size was calculated as 253. Participants were recruited via consecutive sampling between September 2022 and April 2023. Inclusion criteria were participants who were Kannada-speaking, aged ≥ 18 years, with a gestational age < 24 weeks. Women with a history of severe mental illness (e.g., psychotic or bipolar disorders) or serious medical illness that will preclude a meaningful interview were excluded.

Study Tools

1. PHQ-9, a validated 9-item tool that was used to screen for depressive symptoms over the preceding 2 weeks, in antenatal women in Kannada.^[11,12] Each scored from 0 ("not at all") to 3 ("nearly every day"), with a total score of 0-27. The PHQ-9 is classified as no/minimal (0-4), mild (5-9), moderate (10-19), and severe (20-27).
2. GAD-7 is a 7-item questionnaire used for screening anxiety symptoms in the past 2 weeks in antenatal women, validated in Kannada with a total score ranging from 0-21.^[12,13] GAD-7 is classified into no/minimal (0-4), mild (5-9), moderate (10-14) and severe (≥ 15).
3. Substance use was screened via the World Health Organisation's Alcohol, Smoking, and Substance Involvement Screening Test (WHO ASSIST) for use in antenatal women. It has a sensitivity of 79.7% and a specificity of 82.8%.^[14] This was translated into Kannada and back-translated into English. WHO ASSIST for alcohol is classified into mild (1-10), moderate (11-26) and severe (27+). WHO ASSIST tobacco is classified into mild (1-3), moderate (4-26) and severe (27+).
4. Social support was measured via the Social Support Questionnaire (SSQ) which is a 12-item scale comprising six instrumental and six emotional support items. Participants responded using a 4-point Likert scale from 1 (definitely not enough) to 4 (definitely enough), ranging from scores 12-48.^[15] Total mean scores of all items were used. Higher scores indicate good social support.
5. A structured questionnaire was used to collect sociodemographic (age, education, husband's

occupation, spousal alcoholism), obstetric (past abortions, planning of pregnancy) and psychosocial variables (e.g., intimate partner violence, gender preference of baby, history of self-harm). All the screening tools and the questionnaire were interviewer-administered. The psycho social variables, including history of self-harm before pregnancy, were elicited as a binary question (yes/no) by the interviewer.

The identity of the participants was anonymized using alphanumeric codes. Presence of APS was defined by the scores of ≥ 5 on the PHQ-9 or GAD-7 or ≥ 1 on the WHO ASSIST. Participants screening positive for APS or reporting suicidal ideation (PHQ-9 item 9) at the time of the study were referred to a psychiatrist.

Statistical Analysis

Data was analyzed using STATA software (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC). Categorical data, including sociodemographic, obstetric & psycho social variables, were reported as frequencies and percentages. Continuous data, including social support, were expressed as mean (SD). Socio-demographic, obstetric and psycho-social factors associated with APS were identified via univariate analysis. Significant variables ($p < 0.05$) entered a multivariable regression model to determine adjusted odds ratios (AOR) with 95% CI.

Results:

To achieve the sample size of 253, we had to consecutively screen a total of 320 women, 29 of whom declined to participate, and 38 did not meet the eligibility criteria. Of the 253 participants, the sociodemographic, obstetric, and psychosocial characteristics of the sample are detailed below.

The mean age was 24.7 years (SD = 4.2), with 207 women (81.8%) aged 20–30 and 20 (7.9%) under 19. Most were housewives (205, 81.0%), Hindu (138, 54.5%), and had completed higher secondary education (165, 65.2%). Regarding living arrangements, 92 women (36.4%) lived in joint families and 42 (16.6%) in extended families. Most (186, 73.5%) reported a monthly income of 6,768–20,273, with 231 (91.3%) being financially dependent on spouses. All spouses

were employed, with 144 (56.9%) in business or salaried employment and the rest as daily wage labourers (109, 43.1%).

Obstetrically, 113 women (44.7%) were primigravida, and 40 (15.8%) had third or higher pregnancy. Previous abortions were reported by 49 (19.4%), and 99 (39.1%) said that their current pregnancy was unplanned. Most (194, 76.7%) had no gender preference. Medical complications were rare: 3 (1.2%) had gestational diabetes and 5 (2.0%) had pregnancy-induced hypertension.

Psycho-socially, 10 women (4%) each reported intimate partner violence and marital discord, while 8 (3.2%) cited hostile in-laws. Spousal alcoholism was reported by 13 (5.1%). The overall social support score for our sample population was high, with a mean of 35.6 and standard deviation of 4.8. Sixteen women (6.3%) had a history of attempted self-harm before pregnancy. However, none reported suicidal ideas at the time of the study.

APS was identified in 34 women (13.4%). Depression was found in 26 (10.3%), with mild severity in 15 (5.9%) and moderate in 11 (4.3%); none had severe symptoms. Anxiety symptoms were present in 22 (8.7%), with mild severity in 10 (4%), moderate in 5 (2%), and severe in 7 (2.8%). Substance use was minimal, with 2 (0.8%) reporting alcohol use and 1 (0.4%) tobacco use; both had mild severity; no other substances were reported.

There was no history of known psychiatric illness before pregnancy. Factors associated with APS during pregnancy are presented in Table 1. In univariate analysis, family income and social support scores were associated with APS; however lost significance after adjustment, as shown in Table 1. None of the other sociodemographic, obstetric, or psychosocial factors was associated with APS in the univariate analysis. In multivariable regression analysis, as shown in Table 1, women whose husbands were daily wage labourers were four times more likely to have more psychiatric symptoms than those in other professions, such as business or salaried employment (AOR 4.46; 95% CI: 1.64-12.12; $P=0.003$). Women with a history of

Table 1: Risk factors associated with Antenatal Psychiatric symptoms (APS) in an urban underprivileged setting

Factors	Overall (n=253)	APS		Crude odds ratio (95% C.I)	P-value	Adjusted odds ratio (95% C.I)	P-value
		Present (n=34)	Absent (n=219)				
Age bracket							
(≤19)	20 (7.9%)	3 (8.8%)	17 (7.8%)	Ref			
(20-30)	207 (81.8%)	25 (73.5%)	182 (83.1%)	0.78 (0.21,2.85)	0.705		
(>30)	26 (10.3%)	6 (17.6%)	20 (9.1%)	1.7 (0.37,7.85)	0.496		
Education							
Upto 5th	45 (17.8%)	6 (17.6%)	39 (17.8%)	Ref			
Upto 12th	165 (65.2%)	24 (70.6%)	141 (64.4%)	1.11 (0.42,2.9)	0.837		
Graduate & above	43 (17.0%)	4 (11.8%)	39 (17.8%)	0.67 (0.17,2.55)	0.553		
Employment							
Housewife	205 (81.0%)	24 (70.6%)	181 (82.6%)	Ref			
Laborer	11 (4.3%)	3 (8.8%)	8 (3.7%)	2.83 (0.7,11.39)	0.144		
Business/service	37 (14.6%)	7 (20.6%)	30 (13.7%)	1.76 (0.7,4.44)	0.232		
Religion							
Hindu	138 (54.5%)	18 (52.9%)	120 (54.8%)	Ref			
Muslim	74 (29.2%)	7 (20.6%)	67 (30.6%)	0.7 (0.28,1.75)	0.442		
Christian	41 (16.2%)	9 (26.5%)	32 (14.6%)	1.88 (0.77,4.57)	0.166		
Family income							
<6767	4 (1.6%)	2 (5.9%)	2 (0.9%)	17 (1.02,283.01)	0.048	10.61 (0.33,338.31)	0.181
6768-20273	185 (73.1%)	23 (67.6%)	162 (74.0%)	2.41 (0.31,19)	0.403	2.1 (0.26,17.14)	0.49
20273-33792	46 (18.2%)	8 (23.5%)	38 (17.4%)	3.58 (0.41,30.91)	0.246	2.59 (0.29,23.07)	0.394
>33793	18 (7.1%)	1 (2.9%)	17 (7.8%)	RefRef			
Husband employment							
Farmer/laborer	109 (43.1%)	7 (20.6%)	102 (46.6%)	3.36 (1.10,8.05)	0.006	4.46 (1.64,12.12)	0.003*
Business/service	144 (56.9%)	27 (79.4%)	117 (53.4%)	RefRef			
Number of living children							
None	121 (47.8%)	13 (38.2%)	108 (49.3%)	Ref			
One	100 (39.5%)	16 (47.1%)	84 (38.4%)	1.58 (0.72,3.47)	0.252		
≥2	32 (12.6%)	5 (14.7%)	27 (12.3%)	1.54 (0.5,4.69)	0.449		
Number of abortions							
None	203 (80.2%)	26 (76.5%)	177 (80.8%)	Ref			
One	37 (14.6%)	6 (17.6%)	31 (14.2%)	1.32 (0.5,3.46)	0.576		
≥2	13 (5.1%)	2 (5.9%)	11 (5.0%)	1.24 (0.26,5.9)	0.789		
Pregnancy							
Planned	154 (60.9%)	16 (47.1%)	138 (63.0%)	Ref			
Not planned	99 (39.1%)	18 (52.9%)	81 (37.0%)	1.92 (0.93,3.96)	0.08		
Intimate partner violence							
Yes	10 (4.0%)	3 (8.8%)	7 (3.2%)	2.93 (0.72,11.93)	0.133		
No	243 (96.0%)	31 (91.2%)	212 (96.8%)	Ref			
Hostile in-laws							
Yes	8 (3.2%)	3 (8.8%)	5 (2.3%)	4.14 (0.94,18.2)	0.06		
No	245 (96.8%)	31 (91.2%)	214 (97.7%)	Ref			
Marital discord							
Yes	10 (4.0%)	3 (8.8%)	7 (3.2%)	2.93 (0.72,11.93)	0.133		
No	243 (96.0%)	31 (91.2%)	212 (96.8%)	Ref			
Alcoholism in husband							
Yes	13 (5.1%)	3 (8.8%)	10 (4.6%)	2.02 (0.53,7.76)	0.304		
No	240 (94.9%)	31 (91.2%)	209 (95.4%)	Ref			
Social support	35.6 ± 4.8	33.9 ± 5.8	35.8 ± 4.5	0.93 (0.87,1)	0.036	0.96 (0.88,1.03)	0.262
Self-harm before pregnancy							
Yes	16 (6.3%)	9 (26.5%)	7 (3.2%)	10.9 (3.74,31.82)	<0.001	9.51 (2.84,31.88)	<0.001*
No	237 (93.7%)	25 (73.5%)	212 (96.8%)	Ref			

*P value < 0.05; Ref: Reference variable;

attempted self-harm before pregnancy had 10 times greater chance of APS compared to those with no history of self-harm. (AOR 9.51; 95% CI: 2.84-31.88; $P < 0.01$). None of the other independent covariates remained significant in the regression model.

Discussion:

Our study found that 13.4% of pregnant women had APS. This prevalence was similar to that found among rural women near Bangalore (15.3%)^[16] but was lower compared to other Indian research.^[17] In our study, antenatal depression was 10%. However, this is lower than antenatal depression (33%) elicited in the urban antenatal clinic during first trimester in Bengaluru.^[18] This may be due to protective factors such as higher education levels, strong social support, and stable family structures and low rates of high-risk pregnancies in our study. The prevalence of anxiety was 8.7% in our study. Another study with a similar population had 55% anxiety in antenatal women less than 24 weeks gestation without pregnancy complications in a public sector hospital in Bengaluru.^[19] But in the latter study anxiety was associated with poor social support, unlike our cohort.

The negligible rates of alcohol (0.8%) and tobacco use (0.4%) were found in this cohort. National Family Health Survey-5 reports a maternal prevalence of alcohol $< 1\%$ and tobacco of 2.48% in Karnataka. Our study cannot be generalized to the state statistics. However, negligible rates of alcohol and tobacco use may be due to perceived social stigma, social desirability bias and underreporting.^[20,21] Similarly, low reports of marital discord, intimate partner violence & gender preference of baby may indicate participant hesitation to disclose personal views and social desirability bias. Targeted intervention on perceived stigma may address underreporting of these variables.

The reported 6.3% prevalence of pre-pregnancy self-harm attempts in this study aligns with findings from a tertiary centre in Bangalore, where 7% of antenatal mothers reported suicidal ideation or attempts.^[22] Notably, in our study, women with a history of self-harm attempts were ten times more likely to screen positive for

APS compared to those without such a history. So a history of self-harm is a strong “marker” for current perinatal mental health struggles. However, these findings should be interpreted with caution as this study was not powered to elicit risk factors in this population.

In our study, women had good social support. In this urban Bengaluru cohort, the presence of family during ANC visits likely contributes to high perceived social support. This finding contrasts with a systematic review indicating increased risks of women with APS in those who lacked robust support systems.^[23] This could be due to half of our study subjects staying with an extended family/joint family. There could be a possible informal community support system, which requires further research.

Participants whose spouses were employed as daily wage labourers had higher likelihood of APS than those whose spouses had stable jobs like business or service, indicating the stressor of uncertain earnings that is experienced by daily wage earners. This alignment is with a cross-sectional study from Indonesia.^[24] Spousal occupation may serve as a proxy marker for socioeconomic status, where greater financial stability acts as protective factor against APS. Aside from the husband’s occupation and previous history of self-harm, did not demonstrate a statistically significant association with any specific obstetric factors.” This could be due to low rates of high-risk pregnancy, which were referred to higher centres. The timing of screening less than 24 weeks precluded us from assessing obstetric risk factors. Several factors established in literature, including the number of living children, planned pregnancy or socio-demographic variables, failed to reach significance here, possibly because the sample size was powered for prevalence rather than for odds ratio of risk factors. Furthermore, sensitive issues like spousal alcoholism, problems with spouse or in-laws, gender preference of the baby, and intimate partner violence are better captured through qualitative interviews where a good rapport can be established. Reports from participants on spousal alcoholism were low. Husbands were not available during the ANC, and first-hand information about spousal alcoholism could not be obtained.

No specific risk factor could be ascertained in this study. High prevalence of APS and lack of risk factors point to the need for screening of all women for APS. Routine integration of maternal mental health screening can be integrated into ANC with special focus on women with a history of self-harm attempt. Recommendations can be made for capacity building for healthcare professionals to use ANC as an opportunity for screening for APS. We will need guidelines for referral pathways for the management of APS.

Study strengths include validated local-language tools and screening for a wide range of APS. Limitations include the cross-sectional design and social desirability bias in the context of psycho-social factors and substance use. The sample size was calculated on the basis of the prevalence of APS and as such may have been inadequate for multivariate analysis.

Directions for further research: A qualitative study may better elicit aspects of intimate partner violence and the gender preference of the baby.

Conclusion:

This study found a 13.4% prevalence of APS. This was associated with a pre-pregnancy history of self-harm attempts and spousal occupation of daily wage labour. However, the limited risk factors in the urban underprivileged setting suggest mental health screening is required in all pregnant women, especially those with a history of self-harm attempts. These findings underscore the necessity of integrating mental health screening into routine antenatal care.

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