Original Research Article

Perinatal risk assessment of women for psychological problems

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ARTICLE INFO

ABSTRACT

Introduction: Pregnancy is the most beautiful and memorable time in a woman's life. During pregnancy and even after the birth of a child, women are at an increased risk of experiencing psychological problems.
Aim: Screening of antenatal women for risk of psychological illness and following them postnatal period for risk of Post Partum Depression.
Materials and Methods: The study has cohort design.150 Antenatal women were screened during their antenatal visit between 24 weeks up till 36weeks of pregnancy by semi structured questionnaire to screen high risk women. These women were followed during Post Natal period between 4-8th day and then 4-8 weeks of postnatal period by Edinburgh Post Natal Depression Scale (EDPS) for assessment of Postnatal Depression.
Result: 31% ANC women were screened as high risk 20% had high EDPS scores at 4-8 days and 8.6% at 4-8weeks. By logistic regression antenatal risk factors were statistically analyzed .1) Higher education level there is lesser risk 2) residence from rural area had 3.9 times higher risk. 3) who had supportive mother had 1.3 times lesser risk 4) supportive partner reduced risk by 4.4 times. 5) supportive family reduced risk by1.7 times 6) Previous history of depression of more than 2wks had 5.4 times higher risk 7) history of mental health problem in past had 1.5 times higher risk 8) Antenatal women having psychological illness has 4.29 times higher risk of delivering a neonate with birth weight <2.5kg.
Conclusion: Focus also on ante partum psychological risks. It is suggested to integrate mental health to maternal health care services and train health care givers for screening.

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1. Introduction

Pregnancy is the most beautiful and memorable time in a woman's life. It is accompanied with a lot of physical, social and psychological changes in a woman. During pregnancy and even after the birth of a child, women are at an increased risk of experiencing psychological problems. This duration is also a time when different types of mental health conditions that a woman may have previously experienced in the past can return or worsen.[1] Anxiety, Mood Swings, and depression are among the common psychiatric problems that occur during pregnancy and in the year after childbirth. A pregnant woman's emotions can affect her health that

is her nutritional metabolic, psychological, hormonal and social conditions and can have a direct effect on fetal outcome and the pregnancy. A woman who has previously been suffering from psychiatric illness often does not have the will or the strength to adequately care for herself or her in-utero developing baby.[2,3]

Studies suggest during antenatal period, psychiatric symptoms not only affect woman's health and her wellbeing but may also affect the neonate's intra and extra uterine development There is emerging evidence in role of epi - genetics, as mediator highlighting the importance of long-term adaptation and programming through epigenetic mechanisms in response to environmental factors.[4] Perinatal depression is defined as depression occurring in a woman while she is pregnant or within 12 months of delivery.[5]

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The reported prevalence of postpartum depression in India ranges between 15.3% and 23.0% with an incidence of 11.0%. Around 14% of mothers continue to have symptoms of depression till up to 6 months after delivery. Economic and interpersonal relationship issues, partner violence, alcohol use by spouse and gender of the newborn child are among the major determinants of postpartum depression.[6]

2. Aim

Screening of antenatal women for risk of psychological problems during antenatal period and follow up of those women during postnatal period for risk assessment of Post Partum Depression.

3. Objectives

1. To screen antenatal women for risk of psychological problems during pregnancy between 24 to 36 weeks of pregnancy.
2. To follow these antenatal women further for screening risk of development of Postnatal Depression.

4. Materials and Methods

Our study has a prospective longitudinal cohort design. Before initiating study permission was obtained from Institutional Ethics Committee. The study was carried out from November 2016 till Aug 2018. Initially 170 antenatal participants were recruited but 20 patients were excluded as they were lost to follow up. 150 Antenatal women were screened during their antenatal visit between 24 weeks up till 36weeks of pregnancy by semi structured questionnaire to screen high risk women. These women were then followed during Post Natal period between 4-8[th]day of postnatal period Edinburgh Post Natal Depression Scale(EDPS) was administered for risk assessment of Postnatal Depression. They were further followed between 4 to 8 weeks postnatal period using the EDPS.

A risk assessment questionnaire was utilized in local language after pre validation (crohn back alpha = 0.724) and was found to be reliable. The risk factors identified and included were socio demographic factors, education, place of residence, mother support while growing up, partner support, family Support, physical abuse, emotional abuse, History of mental illness, episode of depression lasting for more than 2 weeks, stress or loss in last 1 year.

EPDS is a commonly used 10-item self-reporting instrument, EPDS is a internationally validated questionnaires for detecting depression.[6] We used the translated version of questionnaire.

All the antenatal women visiting the antenatal OPD of department of Obstetrics & Gynecology of People's College of Medical Sciences & Research Centre, Bhopal were explained the importance of screening of psychological problems. Those who agreed to participate were included

after taking written informed consent. Those screened as high risk were referred to psychiatry consultation and counselor if required.

4.1. Exclusion criteria

Antenatal women having any of the psychiatric diseases and taking treatment for the disorder were excluded from the study.

5. Result

150 women were included in the study who were screened as per the study protocol during once antenatal period and postnatal period twice.

Of all the 150 Antenatal women 47 women were screened as high risk (31 %) women. Rest 104 women (69%) were low risk for psychological diseases. (Figure 1)
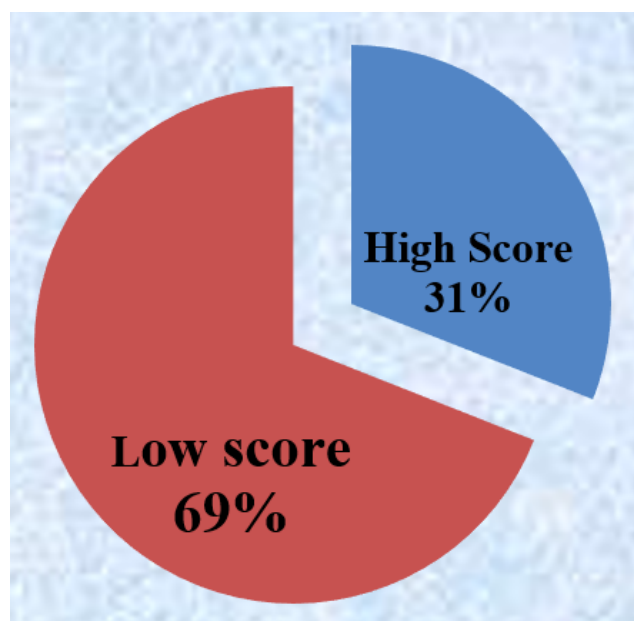
Fig. 1: Proportion of women screened High Risk during Antenatal visits

20% had high EDPS scores (4-8 days) and 8.6% high risk at 4-8weeks. 23 women of 150 antenatal women were screened high risk by all the interventions during antenatal and postnatal period. The proportion of women screened positive were 15.3% (Figure 2)

Different Socio-Demographic profile of these identified high risk women were analyzed. (Table 1)

5.1. Age

Most of the antenatal participants in the study were of age group 23 to 28 years (46.7%) in both high risk and low risk group.15 % were in high risk and 31% were in low risk
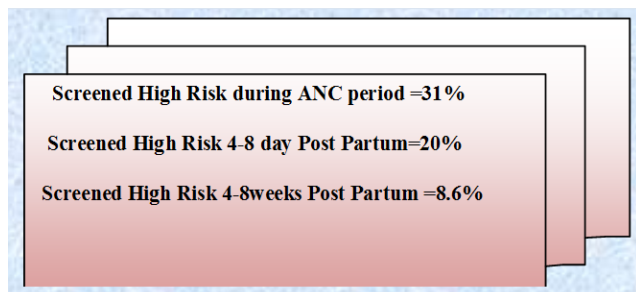
Fig. 2: Proportion of screened High Risk for psychological illness at different point of time

group Association between the age and high risk were found to be statistically non-significant. (X^2 value-0.37, p value-0.82)

5.2. Education

Maximum number of participants had education between 6th and 10th Standard in both the groups. Association between low education and high risk was found to be statistically significant. (X^2 value-10.24, p value-0.037) (Figure 3)

5.3. Parity

81.3% of cases were multigravida and rest were primigravidas. No statistical significant difference in risk was found between parity and risk difference between low and high risk groups (X^2 value-2.12, p value-0.12).

5.4. Locality of residence (Urban /Rural)

In, 47 women who were high risk 60% (28/47) of the women were from rural background. The difference was found to be statistically significant (x^2 4.6, P value -0.03). Residential location of participants was found to be statistical significant between the high and low risk groups. The rural antenatal women are found to be more at risk of psychological disorders.

5.5. Mother's emotional support

Upon asking the participants about the mother emotional support while they were growing up. 29.8% women reported excellent support and 59.6% had good support in high risk group. 44.7% women had excellent support and50.5% had good support in Low risk group. The difference was statistically not significant. (x^2 6.22, p value 0.18).

5.6. Partner emotional support

12.8% women reported excellent support and 42.6% reported good support in high risk group, 12.6% reported excellent support and60.2% good support in low risk group. The difference was not statistically significant. ($x^2$6.42, p value 0.17)

5.7. Family support

None reported excellent support, in high risk group 6.4% had good support and 42.6% had somewhat support. 8.7% had good support, 31.1% had somewhat support in low risk group. The difference was not statistically significant. (x^2 2.76, p value 0.430)

History of Past Psychological Events or Psychiatric Illness :- (Table 2)

5.8. History of depression for >2 weeks

In high risk group 55.8% had positive history, 44.2% gave positive history in low risk group .18.4% in high risk group have negative history and 81.6% had negative history in low risk group. The difference was statistically significant (X^2 22.08,p value 0.001).

5.9. History of mental health problem

50.0% participants had positive history in both high and low risk group, 31.1% had negative history in the high risk group, 68.9% reported negative history. The difference was statistically not significant. (X^2 0.32,p value 0.57)

5.10. Stress or losses in last 12 months

In high risk group 77.4% reported that they had stress where as in low risk group 22.6% reported stress. In the high risk group 19.3% gave negative history and in low risk group 80.7% conveyed no such stress or loss event in last 12 months. The difference was statistically significant. (X^2 38.6, p value 0.001)

5.11. History of emotional abuse

In the high risk group 72.7% gave positive history and 27.3% in low risk group reported. 28.1% reported negative history in high risk group, 71.9% gave negative history in low risk group. The difference was statistically significant. (X^2 9.45 ,p value 0.004)

5.12. Sexually/physically abused

6.3% reported positive in high risk group where as 100% reported negative history in low risk group. The difference was statistically significant. ($X^2$7.13, p value 0 .03)
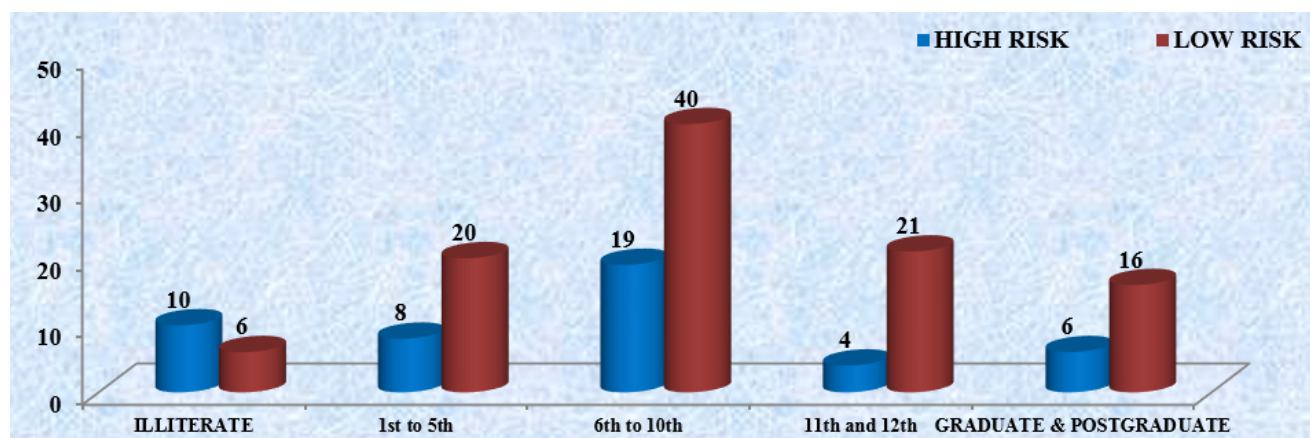
Fig. 3: Education status of screened ANC women in high and low category

Table 1: Socio-demographic variables of antenatal women screened

Socio Variables	-Demographic	High Risk	Low Risk	Total	X2 value	P Value
Age Group	<22yrs	11 7.3%	29 19.3%	40 26.7%		
	23-28yrs	23 15.3%	47 31.3%	70 46.7%	0.37	0.82
	>28yrs	13	27	40		Not Significant
		8.7%	18.0%	26.7%		
Education	Illiterate	10 6.7%	6 4.0%	16 10.7%		
	1st - 5th class	8 5.3%	20 13.3%	28 18.7%	10.24	0.037*
	6th - 10th class	19 12.7%	40 26.7%	59 39.3%		Significant
	11th -12th	4 2.7%	21 14.0%	25 16.7%		
	Graduate & Postgraduate	6 4.0%	16 10.7%	22 14.7%		
Parity	Primi	12 8.0%	16 10.7%	28 18.7%	2.12	0.12
	Multi	35	87	122		Not Significant
		23.3%	58.0%	81.3%		
Residential Locality	Rural	28	79	107		
		26.2%	73.8%	100%	4.6	.03 (Significant)
	Urban	19 44.2%	24 55.8%	43 100%		
	Total	47 31.3%	103 68.7%	150 100.0%		

5.13. Mode of delivery

94.1% of women in high risk group delivered by cesarean section where as 5.9% participants delivered by cesarean section in low risk group. Results were found to be statistically significant. (X^2 -35.12.,P value- 0.001)

5.14. Neonatal weight at birth

In high risk group 47.5 % women had neonates less than 2.5 kg birth weight. In low risk group 52.5% women had their neonate less than 2.5 kg. In high risk group 21.2% women had their neonate weight between 2.5 kg and 3 kg where as in low risk group it was 78.8%. In high risk group no baby had weight more than 3 kg. Results were found to be statistically significant. (X^2 -13.34, P value- 0.001)

5.15. IUFD

10.6% of women had IUFD in the high risk group where as there were no IUFD in the low risk group. Results were found to be statistically significant (X^2 -.11.33,P value- 0.003).

5.16. EPDS administered at 4 to 8 days of Post Natal Period

20% (30) had high scores of more than 10 rest 80% (120) had low risk scores.

5.17. EPDS administered at 4 to 8 weeks of Post Natal Period

8.6% (13) women had high scores 91.3% had low risk scores.

There is changes in scores after pregnancy which reveal that risk of depression reduces by 54 % at 4-8 days after pregnancy. Similarly, at 4-8wks interval risk of depression is further decreased by 57.6% as compared to antenatal time. These differences are significant as suggested by p values. (p<0.05) (Table 3)

Mode of delivery and EDPS scores

5.18. EDPS (4-8 days)

Women who underwent cesarean delivery 76.5% had high EDPS scores where as only 23.5% women with cesarean delivered had low EDPS score. 12.8% of women who delivered vaginal route had high scores and 87.2% women who delivered by vaginal route had low risk scores. Mode of delivery was found to be in positive correlation with risk of postnatal depression that as found to be statistically significant.(X2 – 38.21,p value -.001)

On follow up at 4-8 weeks 29.4% women delivered by cesarean were found to have high Edinburgh post natal depression score where as 70.6% women were now having low scores.

6.0% of women who delivered by vaginal route had high EDPS scores and 94.0% of women who delivered by vaginal route had low EDPS scores. Mode of delivery was found to statistical significant for postnatal depression at 4 -8 weeks.(x2 10.42, p value 0.008)

5.19. Association between antenatal risk factors and risk of post-depression 4-8 days after delivery

30.8%of the Cases with history of depression, stress for more than 2 weeks during pregnancy was found to be in positively associated with high risk for postnatal depression at 4 to 8 days which was statistically significant. (x2 5.8, p value 0.02)

38.7% of cases with stress, losses and changes in last 12 months during or before pregnancy were found to have high EDPS which was statistically significant. (x2 8.5, p value 0.006.

45.5% of Cases who were emotionally abused while growing up were found to have high EDPS which was statistically significant and were prone to have postnatal depression at 4 to 8 days post delivery. (x2 4.8,p value 0.044)

5.20. Association between antenatal risk factors and risk of post-depression 4-8 weeks of after delivery

Cases with history of depression, stress for more than 2 weeks during pregnancy were found to be positively associated with high risk for postnatal depression at 4 to 8 weeks. The results were statistically significant. (X2 value- 7.5, p value- 0.01)

Cases with history of previous mental health problems were more likely to have postnatal depression at 4 to 8weeks after delivery. The results were statistically significant. (X^2 value-4.37, p value- 0.03)

Cases with stress, losses and changes in last 12 months during or before pregnancy were found to statistically significant. (X^2 value-9.6.5, p value- 0.006).

Cases who were emotionally abused while growing up were found to be statistically significant and prone to have postnatal depression at 4 to 8 weeks post delivery. (X^2 value-11.5, p value- 0.008)

By logistic regression risk factors during antenatal period were statistically analyzed the following were found to have associations (Table 4)

1. As the education level is increasing there is lesser risk for antenatal psychological problems
2. Antenatal women residing at Rural area had 3.9 times higher risk of antenatal psychological problems.
3. Previous LSCS had 1.2 times high risk of having psychological problems during pregnancy
4. Participants who had supportive mother had 1.3 times lesser risk of having psychological problems during pregnancy

Table 2: Association between risk factors and psychological illness in antenatal women

Risk Factors	High Risk		Low Risk	Total	X2 Value	P Value
Period of depression for >2 weeks	No	18	80	98		
		18.4%	81.6%	100.0%		
	Yes	29	23	52	22.08	0.001
		55.8%	44.2%	100.0%		Highly Significant
History of mental health problem	No	46	102	148		
		31.1%	68.9%	100.0%		
	Yes	1	1	2	0.32	0.57 (Not significant)
		50.0%	50.0%	100.0%		
Stress or losses in last 12 months	No	23	96	119		
		19.3%	80.7%	100.0%		
	Yes	24	7	31	38.6	0.001 (Highly Significant)
		77.4%	22.6%	100.0%		
Emotionally abused	No	39	100	139		
		28.1%	71.9%	100.0%		
	Yes	8	3	11	9.45	0.004 (Highly Significant)
		72.7%	27.3%	100.0%		
Sexually/ physically abused	No	44	103	146		
		30%	70%	100%		
	Yes	3	0	3	7.13	0.03 Significant
		100 %	0%	100%		

Table 3: Changes in risk of depressionafter pregnancy at follow up at 4-8 days and 4-8 weeks (differences betweenmean antenatal and mean postnatal at 4-8 days, 4-8 Weeks)

Variable		Mean	N	Std. Deviation	T Value	P Value
Pair 1	ANC Risk	20.24	150	6.940	21.09	<0.001*(HS)
	EPDS(4-8 Days)	9.13	150	2.113		
Pair 2	ANC Risk	20.24	150	6.940	21.08	<0.001*(HS)
	EPDS(4-8 Wks)	8.57	150	1.382		
Pair 3	EPDS(4-8 Days)	9.13	150	2.113	4.97	<0.001*(HS)
	EPDS(4-8 Wks)	8.57	150	1.382		

5. Participants with Partner support had 4.4 times lesser risk of having psychological problems during pregnancy

6. Participants with Family support had 1.7 times lesser risk of having psychological problems during pregnancy

7. Participants with Previous history of depression of more than 2 wks had 5.4 times higher risk of having psychological problems during pregnancy

8. Participants with History of mental health problem in past had 1.5 times higher risk

9. Stresses and losses at previous 12 months 0.6 times higher risk

10. Antenatal women having psychological illness has 4.29 times higher risk of delivering a neonate with birth weight <2.5kg.

Binary Logistic Regression for high risk factors EDPS 4-8 days (Table 5)

1. Women from Rural background had 2.9 times higher risk of high risk scores by EPDS

2. Previous Cesarean section had 1.8 times higher risk of high risk scores by EPDS

3. Supportive mother had 4.9 times lesser risk of higher scores by EPDS

4. Partner support had 1.05 times lesser risk of higher scores by EPDS

5. Family support had 2.3 times lesser risk of higher scores by EPDS

6. Previous depression of more than 2wks had 1.9 times higher risk of high EPDS

7. Neonatal weight between 2.5-3 kg had 1.58 times lesser risk of higher EPDS than weight less than 2.5

Table 4: Binary logistic regression showing risk factors during antenatal period

Dependent Variables	B	S.E.	Sig.	Exp(B)/Risk	95% C.I. for EXP(B)	
					Lower	Upper
Gravida(1)	.019	.739	.979	1.020	.239	4.342
Education			.023			
IIITERATE	2.131	.999	.033	8.420	1.188	59.665
1-5	2.240	.923	.015	9.395	1.539	57.350
6-10	3.823	1.172	.001	45.748	4.600	454.923
>11TH	3.241	1.313	.014	25.565	1.950	335.187
Residential area	-1.364	.587	.020	3.9	.081	.808
Previous LSCS	-.250	1.117	.823	1.2	.087	6.956
Supportive Mother	.310	2.588	.905	1.363	.009	217.393
Partner support	-1.490	.942	.114	4.4	.036	1.427
Family support	.583	.569	.306	1.791	.587	5.464
Depression >2weeks	-1.693	.585	.004	5.4	.058	.579
H/O mental problem	.444	3.034	.884	1.559	.004	596.390
Stress losses in last 12 months	-2.756	.739	.000	.064	.015	.270
Emotional abuse	-2.837	1.031	.006	.059	.008	.442
Sexual abuse	-20.148	19489.241	.999	.000	.000	.
Neonatal weight <2.5	1.457	1.027	.156	4.294	.573	32.162
Constant	.108	5.670	.985	1.114		

kg.

All the risk factors showed reduction at 4-8 weeks (Table 6)

6. Discussion

Ravi Prakash Upadhyay et al in 2017 have reported a systematic review and meta analysis on post partum depression in India.[7] The estimated overall pooled prevalence was highest in the southern region of the country 26%; followed by eastern 23%; south-western 23%; 27 and western regions 21%. The northern region of India had the lowest prevalence 15%

The pooled prevalence was higher, for studies conducted in hospital settings 23%; than in community settings 17%. In urban versus rural areas 24% versus 17%. Prevalence was 20% and 21% when studies with mean maternal age of ≤ 25 years and > 25 years were pooled respectively A total of 32 studies reported risk factors for postpartum depression. The risk factors most commonly reported were financial difficulties (in 19 out of 21 studies that included this variable), domestic violence (6/8 studies), past history of psychiatric illness in the mother (8/11 studies), marital conflict (10/14 studies), lack of support from the husband (7/11 studies) and birth of a female baby (16/25 studies). Other commonly reported risk factors were lack of support from the family network (8/14 studies), recent stressful life event (6/11 studies), family history of psychiatric illness (7/13 studies), sick baby or death of the baby (6/13 studies) and substance abuse by the husband (4/9 studies). Preterm or low birth weight baby, high parity, low maternal education, current medical illness, complication in current pregnancy and unwanted or unplanned pregnancy

and previous female child, were some of the other reported risk factors.

Bilal UR Rehman et al reported a study from a tertiary hospital of Srinagar.[7] They reported in their study" the prevalence of depressive disorder as 26%. They also reported that "depression significantly increased with advancing pregnancy and advancing age, Socio-economic status, Women with bad relationship with in laws. The association between parity and depressive disorder was statistically insignificant"

Sujit D. Rathod et alreported "a study on Characteristics of perinatal depression in rural central, India.[8] Which was conducted at Sehore District, Madhya Pradesh between 2013 and 2017. They identified 224 perinatal women from the Community Study and 130 perinatal women from the Facility Study, of whom 8.8% and 18.5% screened positive for depression, respectively. They emphasized that perinatal depression, must be utilized by policy-makers to prioritize mental health services for mothers along with maternal and child health services."

B. Sheeba reported a nested cohort study.[9] The proportion of screened positive for prenatal depression was 35.7%. They reported that domestic violence was found to impose a five times higher and highly significant risk of developing prenatal depression among the respondents. Pregnancy related anxiety and a recent history of distressing events were also found to be a positive predictors of prenatal depression.

Veena A. Satyanarayana et al the review of literature on mental health during pregnancy and in the postpartum period and its influence on birth outcomes and child behavior.[10] Their review suggested that the prevalence of

Table 5: Binary logistic regressionshowing risk factors for high EPDS (4-8 days)

Risk Factors	B	S.E.	Sig.	Exp(B)/	95% C.I. for EXP(B)	
					Lower	Upper
Gravida	-.289	.654	.659	.749	.208	2.702
Residential area	-1.033	.521	.047	2.9	.128	.987
Previous LSCS	-.624	.926	.501	1.8	.087	3.292
Depression for>2 weeks	-.654	.536	.223	1.9	.182	1.487
H/o mental health problem	-1.860	1.666	.264	.156	.006	4.077
Stress or losses in last 12 months	-1.129	.613	.066	.310	.097	1.075
Emotional abuse	-1.900	.777	.014	.150	.033	.686
Sexual abuse	.385	1.424	.787	0.680	.090	23.924
Neonatal wt.	-.462	2.343	.844	1.58	.006	62.255
Mother support	-1.601	1.749	.360	4.9	.007	6.211
Partner support	-.051	1.013	.960	1.05	.131	6.918
Family support	.854	.511	.094	2.349	.863	6.391
Constant	3.651	4.828	.449	38.516		

Table 6: Binary logistic regressionshowing risk factors for high EPDS (4-8 weeks)

Risk Factors	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
Gravida	-1.294	1.149	.260	.274	.029	2.606
Area	-1.206	.836	.149	.299	.058	1.541
Previous LSCS	-1.744	1.356	.198	.175	.012	2.492
Depression for>2 weeks	-1.312	.819	.109	.269	.054	1.341
H/o mental health problem	-2.317	2.191	.290	.099	.001	7.223
Stress or losses in last 12 months	-1.903	.870	.029	.149	.027	.820
Emotional abuse	-2.894	.999	.004	.055	.008	.392
Sexual abuse	.021	1.620	.989	1.022	.043	24.425
Neonatal weight	.167	1.468	.909	1.182	.067	20.990
Partner support	-1.525	1.274	.231	.218	.018	2.643
Family support	.945	.829	.254	2.573	.506	13.066
Constant	7.909	7.598	.298	2722.419		

antenatal depression and/or anxiety ranges from 8% to 30%. They reported in the review that "studies have also suggested a positive association between antenatal distress and birth outcomes and antenatal/postnatal distress on Maternal Fetal Attachment, temperament and cognitive–emotional and behavioral problems in the child. The impact of maternal mental health is also known to have lasting implications on child/adolescent behavior."

Shashi Rai et al reported The prevalence of depression, anxiety, and stress was found to be 25.5%, 63%, and 23%, respectively.[11] They Pregnant females have increased biological vulnerability due to the hormonal maladjustment, psychological vulnerability due to apprehension for new life of motherhood, and social vulnerability due to the added demands of family support and care during this critical phase of her life

Avita Rose Johnson and colleagues reported 12 (5.8%) screened positive for antepartum mental morbidities, of which depression was the most common. 3.8% of all women screened positive for depression, with 15.4% showed depressive symptoms.[12] They reported " Overall, 82 (39.4%) had the presence of one or more psychological symptoms, including fatigue, irritability, anxiety, and problems with sleep and concentration. Factors associated with the presence of antepartum mental illness included relationships with their spouse is poor, unsatisfactory relationship with siblings or in-laws, and the desire to have a male child."

our study results mother had 1.3 times lesser risk, partner support had 4.4 times lesser risk, family support had 1.7 times lesser risk of having psychological problems during pregnancy.

Ashlesha Bagadia evidences of literature review suggest to integrate mental health with maternal health care.[13] There is sufficient evidence to show that postpartum depression is a strong predictor of parenting stress, negatively impacting mother-infant bonding and leading to cognitive, emotional and behavioral problems in children. Antenatal mental health problems are also associated with poor nutrition, inadequate weight gain and irregular antenatal appointments. Children of mothers who have depression or anxiety are more susceptible to attention deficit hyperactivity disorder (ADHD), conduct disorders and emotional problems.

Vikram Patel found that maternal psychological morbidity was independently associated with low birth weight (odds ratio 1.44,95% CI 1.00- 2.07).[14] They concluded that maternal psychological morbidity has an adverse impact on foetal growth. Our study also suggest similar adverse results on neonatal birth weight.

Samantha Meltzer-Brody explained the pathogenesis of perinatal depression[15] "female reproductive steroid hormones -estrogen and progesterone in addition to reproductive function exhibits potent neuro-regulatory effects on a range of non reproductive behaviors including mood and cognition."

"In a *normal* HPA axis, the delivery of CRH from the paraventricular nucleus of the hypothalamus triggers the stimulation of adrenocorticotropic hormone (ACTH) from the anterior pituitary and, consequently, cortisol from the adrenal cortex. This hormonal system is regulated by negative feedback mediated by cortisol receptors in the anterior pituitary, hypothalamus, and hippocampus, as well as ACTH receptors in the anterior pituitary and CRH autoreceptors in the hypothalamus."

"In *depressed patients* A hallmark feature that characterizes the HPA axis in depression is the altered response to stress and inability to maintain regulation: indeed, hyperactivity of the HPA axis is one of the most robust biological findings in major depression."

"In the first few weeks postpartum, euthymic women demonstrate an HPA axis that remains refractory to external CRH challenge. In contrast, women with PPD have been shown to experience an ongoing blunting of ACTH response to corticotrophin-releasing hormone (CRH) at 6 to 12 weeks postpartum compared with non depressed women, interpreted as reflecting an ongoing hypo reactive HPA axis"

"There are specific sites where a methyl group can attach to DNA via cytosine through an enzymatic reaction called methylation. At a most basic functional level, methylation results in the silencing of the gene, and the bond formed between the DNA cytosine and the methyl group is strong, causing a stable but potentially reversible change in gene expression. However, DNA methylation patterns can remain throughout the life of the cell and may be passed along for multiple generations potentially causing the organism's genes to behave differently, and providing an explanation for how early life experiences can have a long lasting effect on the brainand influence behavior and health in later life."

Lei Cao-Lei[4] reported" The NR3C1gene, coding for the glucocorticoid receptor (GR), is the prime candidate gene for epigenetic influence on outcomes as it plays a key regulator role in HPA axis functioning. Results showed that increased maternal depressed mood in the third trimester was associated with increased methylation of the NGFI-Abinding site in NR3C1 in the infants, which then predicted increases in their HPA stress reactivity."

Millennium Development Goal 5 of WHO focus on improve maternal mental health.[16] The World Health Organization (WHO) and United Nations Population Fund (UNFPA)had jointly initiated a program to integrate mental health needs into existing maternal and child health policies, plans and activities.

Balaji Bharadwaj reported that The NIMHANS, Bangalore, has started a mother-baby Unit and a postdoctoral training course in perinatal psychiatry and women's mental health.[17]

Rahul Shidhaye et al[18] operationalized World Health Organization (WHO) Mental Health Gap Action Plan (mhGAP) guidelines[19] by integrating Mental Health Care Plan with primary health care for Sehore district during the period August 2011 to March 2014. Suggested mental healthcare plan (MHCP) a robust policy context for designing and implementing a district-level MHCP that will help rejuvenated DMHP. They also include interventions for maternal depression as it is the second leading cause of disease burden in women worldwide.

7. Conclusion

The integration of mental health care to maternal health care is indispensible need of today. The importance of antenatal depression has been largely underestimated with the focus of research maintained on postnatal depression. Health care providers working in reproductive and child health should be trained to recognize signs and symptoms suggestive of a psychological problem and to provide counseling to the women about physical changes and stress and as well as provide effective psychological support and interventions if required. High risk suspected cases should be immediately referred to the psychiatrist and proper follow-ups should be done. Special free OPD's comprising female doctors can be run to address women's psychological issues. Partner & Family members should be educated of risk factors and long term consequences on child's health. They should be encouraged to provide support, care and healthy environment to the antenatal women. In our institute we have a special OPD at psychiatry department for mental health of women by the name "*VYAMM*" which is a small positive step towards a big goal.

8. Source of funding

None.

9. Conflict of interest

None.

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