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Research Article

Pregnancy outcome in pregnant mothers with depressive symptoms

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Abstract: A number of studies have suggested an association between maternal depression and adverse obstetric outcome. This study was conducted to describe the obstetric outcome of mothers with depressive symptoms and the factors associated with maternal depression. A hospital based prospective cohort study was conducted in professorial obstetrics unit, North Colombo teaching hospital, Ragama, Sri Lanka. Eligible mothers between 28 to 34 weeks were recruited for the study. Presence of depression was assessed by validated Sinhala translation of Edinburgh Postnatal Depression Scale. (EPDS) Depressed and non depressed cohorts were followed up till delivery and the outcomes were compared. Six hundred and seventy mothers were screened and 14.9% (n=100) found to be having depressive symptoms. Significantly higher proportion of depressed cohort had a history of preterm delivery than non depressed cohort (18.00%, 95%CI 11.7-26.7 Vs 3.86% 95%CI 2.0-7.44). Significantly higher proportion of depressed cohort had antenatal anaemia than non depressed (22% 95 CI 15-31.1 vs 11.1 % CI 7.5-16.1). After analyzing the variance of all the confounding factors, the birth weight was found to be low for mothers with depressive symptoms. There was a statistical significant difference in the birth weight of term babies between two groups ($p<0.05$).There was no significant difference in Mode Of Delivery (MOD)and the requirement for Neonatal Intensive Care Unit (N) admission of neonates between two groups. Depressive symptoms during pregnancy are associated with reduction of birth weight. But other obstetric outcomes such as Mode of Delivery (MOD) and requirement for NICU admission remain unaffected. Statistically significant Reduction in Birth Weight (BW) is seen only in term babies who were clinically normal. Presence of depressive symptoms in mothers do not lead to significant short term adverse outcomes in the mother and baby in the absence of severe symptoms. Further follow up studies are needed to assess the long term effects.
Keywords: maternal depression, anaemia, Neonatal Intensive Care

INTRODUCTION

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her day to day y responsibilities[1]. Depression is not gender specific but women experience major depression twice as often as men[2].This increased incidence occurs mainly during the reproductive years and is universal and unrelated to culture, race or class [2]. When a person has a depressive disorder it interferes with daily life, normal functioning and causes pain to both the person with disorder and those who care about him or her. Depression affects 121 million people worldwide and is a leading cause of disability. At its worst, depression can lead to suicide, a tragic fatality associated with the loss of about 850 000 lives every year. Over the past decade, the Confidential Enquiries into Maternal Deaths in the United Kingdom have highlighted that suicide in pregnancy and during the first postnatal year remains a leading cause of maternal death[3]. It has been found that genetic factors can interact with environmental factors to influence the vulnerability to major depression in subtle ways[4].Although the exact causes of depression are unknown, there are several risk factors that can trigger or increase the risk of depression. In addition, trauma, loss of a loved one, a difficult relationship, or any stressful situation may trigger a depressive episode. Subsequent depressive episodes may occur with or without an obvious trigger[5].

The severity, frequency and duration of symptoms will vary depending on the individual and his or her particular illness. Persistent sadness, anxious or "empty" feelings, Feelings of hopelessness and/or pessimism ,Feelings of guilt, worthlessness and/or helplessness, irritability, restlessness ,loss of interest in activities or hobbies once pleasurable, including sex

,Fatigue and decreased energy ,difficulty concentrating ,insomnia, early-morning wakefulness, or excessive sleeping overeating, or appetite loss, thoughts of suicide, suicide attempt, persistent aches or pains, headaches, and cramps or digestive problems that do not ease even with treatment are the common symptoms of depression[5]. Biological, life cycle, hormonal and psychosocial factors unique to women may be linked to women's higher depression rate. Many women face the additional stresses of work and home responsibilities, caring for children and aging parents, abuse, poverty, and relationship strains[5]. Reproductive events have been suggested to be involved in the onset and course of depression and anxiety and postpartum depression is probably the widely studied area[6]. Women with a history of major depression are at high risk of recurrent depression during pregnancy, especially if antidepressant therapy has been discontinued. For one-third of women, however, this can be their first episode of major depression. Lack of psychosocial support, difficulty in coping with changes in body image, hyperemesis gravidarum, relationship problems, unplanned or unwanted pregnancy are other risk factors for antenatal depression[7]. Psychiatric disorder is more common in the first and third trimesters than in the second. In the first trimester unwanted pregnancies are associated with anxiety and depression. In the third trimester there may be fears about impending delivery, or doubts about the normality of the fetus[8].

Little attention has been paid and inadequate information is available regarding the negative impact of depression in pregnant women. Bronwyn *et al.;* showed that the significant predictors for antenatal depression are Low self esteem, antenatal anxiety, negative cognitive style, low social support, major life events, low income and history of abuse. Antenatal depression was the strongest predictor of post natal depression which eventually leads to parenting stress[9]. Maternal depression is not necessarily linked to child birth. It is generally recognized that 10% to 15% of the women suffer from depression during pregnancy[7]. However, depressive symptoms occur in as many as 30% to 38% of pregnant women[10]. Golbasi *et al.;* used the Turkish version of Edinburgh postpartum depression scale (EPDS) to estimate the prevalence of depression in prenatal women. In his study 258 eligible pregnant women were screened using cut off as 13 and the estimated prevalence was 27.5%. In a Sri Lankan community based study done in the district of Puttalam, Rowell *et al.;*[12] found that the prevalence of depression among antenatal mothers is 25.6% .In many South Asian countries antepartum and postpartum depression are reaching epidemic proportions warranting early detection and intervention[11]. There are no clinical tests for depression, so detailed interviews and questionnaires are usually used to make a diagnosis. There are many different questionnaires used to measure depression. However, two classifications of mental illness are most widely used: Diagnostic and Statistical Manual of Mental Disorders and International Classification of Diseases. Depression, even the most severe cases, is a highly treatable disorder. As with many illnesses, the earlier that treatment can begin, the more effective it is and the greater the likelihood that recurrence can be prevented. The most common treatment modalities are medication and psychotherapy[5].

Treatment of depressed pregnant women requires skilled management by a psychiatrist, working collaboratively with the woman and her obstetric team. Medication should be used with caution and only after careful analysis of the associated risks and benefits. If untreated, there is a significant increase in risk of subsequent postnatal depression. Whether treated or not depression in pregnancy creates several challenges. Maternal depression can itself adversely affect the developing fetus. A number of studies have suggested an association between maternal depression and factors that predispose to poor neonatal outcome. These include preterm birth, low birth weight, smaller head circumference and low Apgar scores[13]. Consequences of antenatal and postnatal depression are far reaching and not only the mother but also her infant and their relationships are also affected. Depression in pregnancy may diminish one's capacity for self care, including inadequate nutrition and lead to poor antenatal clinic attendance compromising women's physical and mental health and may affect development of the fetus. Increases in serum cortisol and catecholamine levels, typically observed in women with depression, and may possibly induce adverse changes in placental function by altering uterine blood flow and inducing uterine irritability[14-15]. Dysregulation of the hypothalamo–pituitary–adrenal axis, which is associated with depression, may also have a direct effect on fetal development. Animal studies suggest that stress during pregnancy is associated with neuronal death and abnormal development of neural structures in the fetal brain, as well as sustained dysfunction of the hypothalamo–pituitary–adrenal axis in the offspring[7] .On the other hand ,a number of Scandinavian studies have reported that maternal psychological distress does not seem to influence fetal growth[16]. In a longitudinal study Evans et al found that there is little evidence of an independent association between depressive symptoms in pregnancy and birth weight[17]. But there is increasing evidence that the mother's mood during pregnancy is important[18-19].

Maternal Anxiety has been shown to impair uterine contractility and this may increase the risk of operative delivery[20]. There is strong correlation between anxiety and depressive effect and it is possible that antepartum depression increases the risk of

operative delivery through this effect[21]. Therefore early detection of depression in pregnancy is vital because depression not only can adversely affect the obstetric outcome and neonatal heath but if untreated can persist. In an American study Miguel *et al.;* found that prenatal depression was associated with adverse perinatal outcomes, including premature delivery and slower fetal growth rates. Prenatal maternal cortisol levels appear to play a role in mediating these outcomes[22].

Although depression is well researched in women in general, depression in pregnancy needs further studies. This study is aimed at describing the obstetric outcome of pregnant women with antenatal depression in Sri Lanka. The objectives were to detect mothers with depressive symptoms using the validated translation of EPDS, to describe factors associated with antenatal depression and to describe adverse pregnancy outcome associated with antenatal depression

METHODOLOGY

A hospital based prospective Cohort study was conducted among the pregnant women following antenatal clinics in North Colombo Teaching Hospital, Ragama, Sri Lanka from1st of February, 2009 to 30th of May 2009. All eligible mothers between the POA of 28 completed weeks to 34 completed weeks who follow the antenatal clinics were recruited in the study and followed up prospectively till delivery. All eligible mothers were recruited consecutively till the required number was achieved. Mothers who have not had a proper dating scan before 20 weeks of gestation, mothers with known fetal anomalies and mothers with any known psychiatric illnesses were also excluded.

Presence of depressive symptoms was assessed using the EPDS[23]. Although developed as a screening tool for depression following childbirth, this scale has been validated during pregnancy as well as outside the postpartum period[23,24]. The EPDS is a widely used 10-item self-rating questionnaire on which women rate their feelings over the previous 7 days, giving a score ranging from 0 to 30[22,25] . The EPDS has been used in many studies of depression in childbearing women, most typically in the first year postpartum period. Sinhalese translation of EPDS which has been validated by Rowell *et al.;*[26] to use as a reliable tool to detect antenatal depression (sensitivity 90.7% and specificity 86.9%) and postnatal depression (sensitivity 89.9% and specificity 78.9%).This scale was used as a tool to detect the mothers with depressive symptoms in our study. Self administered questionnaire (EPDS) was given to eligible mothers between POA of 28 completed and 34 completed weeks. Cut out mark for antenatal depression was 9 as found by Rowell *et al.;*[12] in a sample of Sri Lankan population. Mothers who were found to have depressive symptoms according to EPDS scale were followed up longitudinally till the delivery to see the obstetric outcome. Following child birth, details of obstetric outcome were obtained from participants' medical notes and of those who delivered in other hospitals were obtained via telephone. Mothers who were not found to be depressed (those who score less than 9) were in the control group. According to sample size calculation for one mother with depression, two consecutive mothers without depression were recruited as controls. Antenatal risk factors and obstetric outcome in the depressed group as well as in the non depressed group were recorded in a data sheet. The data sheets were filled before the patients were discharged. The data sheet included four components. Component 'a' included demographic data of the mother including the age, parity, level of education, occupation, husband's occupation, and the monthly income of the family. Component 'b' included the details of past obstetric history i.e. mode of delivery, history of preterm delivery and low birth weight ,number of miscarriages, death in utero and neonatal death and details of past chronic medical history .

Babies born before 37 weeks were considered as preterm[27] and babies born with a birth weight of less than 2500 g were considered as LBW[28]**.** Details of the current pregnancy including BMI at booking visit and antenatal complications which are found to affect the birth weight (threatened miscarriage, antepartum hemorrhage, anemia, heart disease in pregnancy, hypertensive disorders and gestational diabetes) were included in component 'c'. Threatened miscarriage was defined as passage of vaginal bleeding with or without pain, a closed cervix on examination and evidence of fetal cardiac activity[29] .Antepartum hemorrhage was defined as bleeding from the genital tract after the 28th week of pregnancy and before the end of the second stage of labour. Moderate anaemia (Hb 7 to 9.9 g/dl) and severe anaemia (Hb less than 7 g/dl)[31] were considered as anaemia in our study population. Pregnant women who were in the category of mild anemia[31] which has no established influence on the fetal outcome were not included among them, A mother who was found to be having increased blood pressure with or without protienuria and required medical treatment or hospital admission was considered as suffering from pregnancy induced hypertension. Mothers with gestational diabetes were the mothers who had elevated blood sugar values beyond 20 weeks of gestation requiring lifestyle modification or pharmacological intervention. Mode of delivery, birth weight, Apgar score at 5 minutes, and history of NICU admission were included in component'd'. Theses Outcome measures were compared between the two groups.

Sample size was 97 depressed mothers 194 non depressed mothers to determine the association of

Low birth weight considered as the main outcome for significant level of 95% and power of 80% for 15% LBW among non depressed.

Data analysis for the prevalence study was described in percentages and ratios. Factors associated with antenatal depression were analyzed using student T -test and Chi square tests. Adverse pregnancy outcome associated with antenatal depression was analyzed by using multivariate logistic regression; Ethical approval for the study was taken from the ethical review committee, Faculty of Medicine, Ragama.

RESULTS

Six hundred and seventy mothers were screened and 14.9% (n=100) found to be having depressive symptoms according to EPDS scale. The mean age of mothers with depressive symptoms (according to EPDS scale) was 26.9 (SD=9.8) years and the mean age of mothers without depressive symptoms was 27.3 (SD=4.9) and there was no statistically significant between the two groups.

Table 1 - Age and parity distribution of the study population according to EPDS scale.

		Age category (n, %)			
		<19	20-35	>35	Total(n,%)
primi	Depressed	20 (32)	38 (61)	4(7)	62 (100)
	Non depressed	15 (24)	34 (56)	12 (20)	61 (100)
multipara	Depressed	0	22 (58)	16 (42)	38 (100)
	Non depressed	0	114 (78)	32 (22)	146 (100)

Out of the total mothers in the primi para group, 62 were found to be depressed. Out of that 20 (32%) were in the teenage group and 4 (7%) were in the advance maternal age group. In the multipara group, 38 were found to be depressed. Out of that no one were in the teenage category and 16 (42%) were in the advanced maternal age group (Table .1)

Table 2 - Educational status of mothers with depressive symptoms (n=100) and without depressive symptoms (n=207).

	depressive symptoms n (%)	No depressive symptoms n (%)
Less than ordinary level	2 (2)	30 (14.5)
Ordinary level	15 (15)	117 (56.5)
Up to Advanced level	77 (77)	54 (26)
Degree	6 (6)	6 (2.9)
Total	100 (100)	207 (100)

$\chi^2 = 79.75$, $p < 0.05$

In the depressed group only 2 (2%) were having educational level below ordinary level. However there were 30 (14.5%) in the non depressive group were below ordinary level. There were 77 (77%) in the depressive group with up to Advanced level education, while there were only 54 (26%) in the non depressive group.(Table 2)

Table 3 - The social class according to the Kuppuswamy Socio-economic class scale of the mothers with depressive symptoms (n=100) and without symptoms (n=207).

	depressive symptoms n (%)	No depressive symptoms n (%)
Upper class	0 (0)	1 (0.5)
Upper middle class	2 (2)	11 (5.3)
Lower middle class	2 (2)	4 (1.9)
Upper lower	88 (88)	174 (84)
Lower	8 (8)	17 (8.2)
Total	100 (100)	207 (100)

With Fishers Exact test, $p > 0.05$

In both depressive and non depressive groups highest numbers were in the upper lower group, 88 (88%) and 174 (84%) respectively. However, there was no statistical significance between the two groups with regard to socio economic classes (Table.3). The Mean (SD) income of families of mothers with depressive symptoms was Rs 16,494.00 (SD=643.00) and the mean income of families' mothers without depression was Rs

15,747.00 (SD=556.00).There was no statistically significant difference between two groups.

Table 4 - The adverse events occurred in previous pregnancies and depression

	Mothers with depression				Mothers without depression			
Event	n	%	CI		n	%	CI	
Miscarriage								
1 miscarriage	12	12.00%	7.00%	19.81%	28	13.53%	9.53%	18.86%
2 or more	1	1.00%	0.18%	5.45%	2	0.97%	0.27%	3.45%
Past LBW	8	8.00%	4.11%	15.00%	2	0.97%	0.27%	3.45%
Preterm labour	**18**	**18.00%**	**11.70%**	**26.67%**	**8**	**3.86%**	**1.97%**	**7.44%**
Death in utero	1	1.00%	0.18%	5.45%	1	0.48%	0.09%	2.69%
Neonatal death	3	3.00%	1.03%	8.45%	1	0.48%	0.09%	2.69%
Total	100				207			

Preterm labor showed a statistically significant association with mothers with depressive symptoms.($p<0.05$)(table .4)

Mean (SD) BMI of mothers with depressive symptoms at booking visit was 20.7 (SD =1.8) and that of mothers without depressive symptoms was 21.2 (SD= 2.3). There was no statistically significant difference. Considering Past medical illness, 28% (95% CI 20.1-37.5) of mothers with depressive symptoms and 18.35% (95% CI 13.7-24.2) of mothers without depressive symptoms gave a past history of a major medical illness and it showed a statistically significant association between having depressive symptoms and a history of a major medical illness ($p<0.05$).

Table 5 - Antenatal complications of mothers with depressive symptoms (n=100) and without depressive symptoms (n=207).

	Mothers with depression				Mothers without depression			
Antenatal complications	n	%	CI		n	%	CI	
Threatened miscarriage	14	14.00%	8.53%	22.14%	17	8.21%	5.19%	12.76%
Antepartum hemorrhage	2	2.00%	0.55%	7.00%	7	3.38%	1.65%	6.81%
Anaemia	**22**	**22.00%**	**15.00%**	**31.07%**	**23**	**11.11%**	**7.52%**	**16.12%**
Gestational diabetes	10	10.00%	5.52%	17.44%	15	7.25%	4.44%	11.61%
Hypertensive disorders	11	11.00%	6.25%	18.63%	23	11.11%	7.52%	16.12%
Total	100				207			

Presence of anemia had a statically significant difference between two groups ($p<0.05$).(Table .5).

There was no statistical difference observed in each group with regard to mode of delivery. (Table 6)

Table 6 -The mode of delivery of mothers with depressive symptoms(n=100) and mothers without depressive symptoms (n=207).

	Mothers with depression				Mothers without depression			
	n	%	CI		n	%	CI	
VD	58	58.00%	48.21%	67.20%	132	63.77%	57.02%	70.01%
Operative vaginal delivery	13	13.00%	7.76%	20.98%	22	10.63%	7.12%	15.57%
EL LSCS	13	13.00%	7.76%	20.98%	21	10.14%	6.73%	15.01%
EM LSCS	16	16.00%	10.10%	24.42%	32	15.46%	11.17%	21.01%
	100				207			

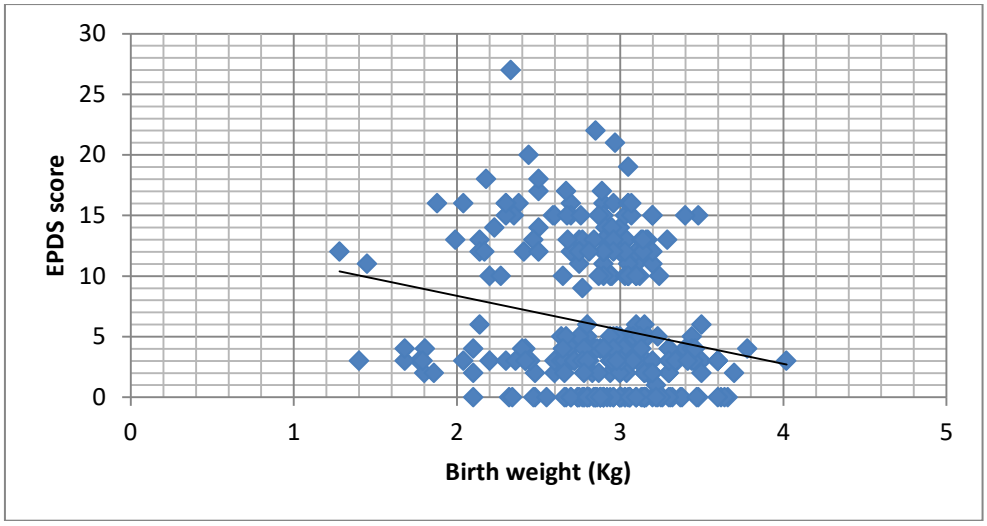

Fig-1 : The birth weight changes of all the cases and controls with the EPDS score is shown in the Scatter plot graph

There was a negative correlation (-0.202) between birth weight and EPDS Score. It was found to be statistically significant (p=0.001).(figure 1)

There was a negative correlation -0.162 in mothers with depression, between their EPDS score and Birth weight. However there was no statically significant correlation noted (p=0.11).(Figure 2)

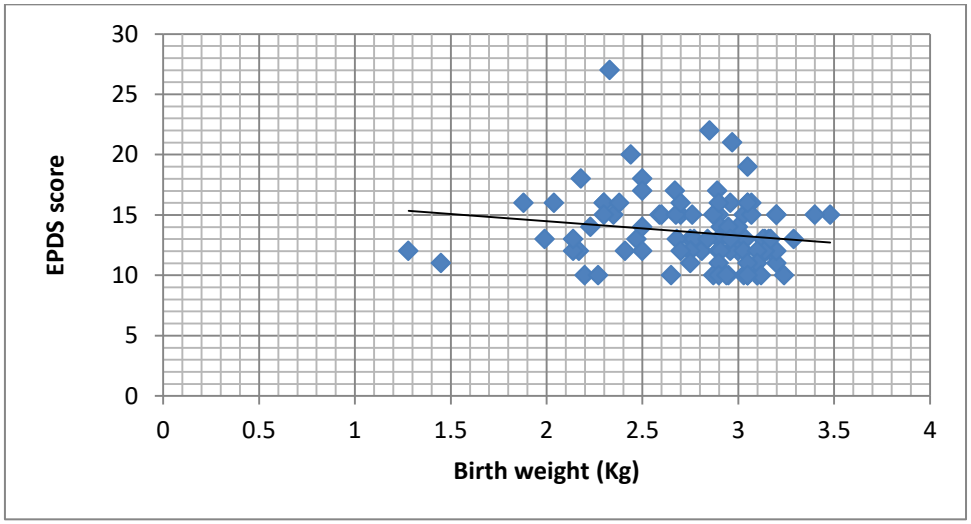

Fig-2: The birth weight and the EPDS score of mothers with depression is shown in the scatter plot graph.

Table-7 :The results of multivariate regression analysis results of the birth weight in relation to the two categories EPDS equal or more than 9 and less than 9. Other confounding factors are also shown in the table.

Variable	SE	t	Significance
Age(<20 and >35 yr)	0.092	-0.897	0.371
Adverse events in the past (Threatened miscarriage, Preterm delivery, LBW,NND,IUD)	0.057	0.966	0.335
BMI (<19)	0.284	-0.845	0.399
History of chronic medical illness	0.041	-0.3	0.759
Antenatal complications in current pregnancy			
Threatened miscarriage	0.078	1.594	0.112
APH	0.135	-1.236	0.218
Anemia	0.066	-0.81	0.419
GDM	0.084	3.671	0
PIH	0.074	-2.548	0.011
EPDS >=9 or less	0.051	-3.451	0.001

Multivariate regression analysis was done to find the statistical significance of BW between the two groups (Mothers with depression and mothers without depression).The potential confounding factors were maternal age, BMI at booking visit, past history LBW, History of chronic medical diseases, antenatal complications such as anaemia, antepartum haemorrhage, threatened miscarriage, hypertensive disorders and gestational diabetes. After analyzing the variance of all the confounding factors, the birth weight was found to be low for mothers with depressive symptoms. The difference was statistically significant ($p<0.009$).

Table 8 - Birth weight differences in preterm and term babies among depressed and non depressed mothers.

	Non depressed		depressed		significance
34-37 wks	Mean(SD)Kg	n	Mean(SD)Kg	n	
	2.3(0.41)	11	2.03(0.43)	4	p>0.05
>37 wks	**2.98(0.37)**	**195**	**2.83(0.33)**	**94**	**p<0.05**

There was a statistical significant difference in the birth weight of term babies between two groups ($p<.05$).(Table 8).

There was no statistically significant difference between the two groups ($p=0.65$).(Table 9)

Table 9 - Association of antenatal depressive symptoms with NICU admission of the neonates.

	Depression	
	No	**Yes**
	n (%)	n (%)
No n (%)	150 (72)	70 (70)
Yes n (%)	57 (28)	30 (30)
Total	207 (100)	100 (100)

$\chi^2 = 0.202$, $p = 0.653$

DISCUSSION

This prospective cohort study was conducted in the North Colombo teaching hospital, Ragama which is in the district of Gampaha. This is one of the densely populated districts in Sri Lanka and the North Colombo Teaching Hospital is the biggest hospital which caters to the public in this region. Thus the setting was ideal to undertake a study of this nature. To achieve a required number of 100 mothers with depressive symptoms and 207 mothers without depression, (a ratio of 1:2) 670 eligible pregnant women were screened. Among them 15 % was found to be having depressive symptoms.

Rowell *et al.;*[12] used the validated Sinhala version of EPDS to screen 1095 mothers in the district of Puttalam and found that the prevalence of depression among mothers was 25.6% when the EPDS cut off was 9. Therefore we used the validated EPDS with the same cut off value of 9 to detect the mothers with antenatal depression. We used the same tool in mothers between 28 weeks and 34 weeks as we were able to screen as many eligible women as possible and follow up. The proportion of mothers with depressive symptoms in our study was 15% which warrants careful evaluation and follow up by the health care providers. The actual prevalence in the community could not be calculated as ours was a hospital based study.

The mean age of mothers with depressive symptoms according to EPDS scale was 26.9 (9.8 SD) years and mean age of mothers without depressive symptoms was 27.3 (SD=4.9).There was no statistically significant difference observed between the group of mothers. Marcus *et al.;* [33] found that young age is a risk factor for maternal depression while Golbansi *et al.;* [11] reported a significant positive mild to moderate correlation between the EPDS score and maternal age. But we did not find a correlation between age and depressive symptoms.

In our sample 77% of depressed mothers were educated up to advanced level where as only 26 % of the women were educated up to advanced level in the non depressed group. Although the finding is statistically significant, it may not have a clinical significance. The causal effect of education on depression is ambiguous in the literature. Zuckerman *et al* [**Error! Bookmark not defined.**] found mothers' education has no significant association with maternal depression.

It is an established fact that the depression is significantly associated with many social, economic and family factors. It has been found that poor social support and negative life events are associated with depressive symptoms and poor health behaviours in

these women. All these factors lead to poor neonatal outcome [**Error! Bookmark not defined.**]. But in our study, 88% of mothers of depressed cohort and 84% of mothers of non depressed cohort were from upper lower class. There was no statistical significance observed between the two groups with regard to SEC. This may be the reflection of the social issues and health behaviours which are common to this social class. Mothers from the upper middle class and upper class constitute a small proportion in either group of our study population as most of them tend to use the private sector. Another limitation was that assessment of socio economic classes in a hospital based study is mostly unreliable.

Mothers in the depressed group were found to have a significant history of preterm delivery in previous pregnancies. This finding may reflect the fact that the risk factors for preterm labor including the maternal age (teenage), parity, socioeconomic deprivation, unemployment and low level of education were also linked with depressive symptoms. Digo *et al.*;[22] found that depressed women had a 13 % greater incidence of premature delivery than non depressed women and concluded that the maternal cortisol levels appear to play a role. In our study the mothers with the history of preterm delivery may be having persistent depressive symptoms or they may have the risk factors persistently as many studies have found that significantly increased depression prevalence or mean depression scores in mothers of preterm infants at some point in the first postpartum year[34,35]. This finding is an important public health issue and needs further evaluation at community level. Also during subsequent pregnancies they should be assessed in terms of mental well being in order to reduce further preterm deliveries if the association between depressive symptoms and preterm delivery is established.

Although the history of miscarriage and pregnancy termination are associated with maternal depression[36], in our study we were unable to find a significant difference between the two groups.

Mothers with chronic medical illnesses were found to have significantly greater association with maternal depression than the non depressed group. This may be due the negative self esteem and anxiety due to medical disease and treatment. Thus proper prenatal counselling, risk assessment and closer antenatal follow up may benefit the mothers with chronic medical illnesses.

Antenatal complications may also lead to stress, anxiety and low self esteem during pregnancy. Along with poor social support, antenatal complications and subsequent hospital admission may lead to maternal depression. In our study population, incidence of anaemia in pregnancy was significantly higher in depressed group than non depressed group. Presence of anaemia may have a link with the other risk factors such as chronic medical diseases, poor socio economic background or anaemia could have produced depressive symptoms which is difficult to be differentiated from clinical depression[37].

The number of antenatal complications was few in our study population preventing us from drawing any conclusions. This limitation may have led to the non significant differences of other antenatal complications such as incidence of threatened miscarriage, antepartum haemorrhage, and heart disease in pregnancy, gestational diabetes and hypertensive disorders.

In our study group mode of delivery did not show significant differences between the two groups although studies show that maternal depression is associated with increased risk of operative deliveries[21].

After adjusting for potential confounding factors by multivariate regression analysis, it was found that the BW of babies born to mothers with depressive symptoms was low. Although the difference was significant, the correlation of BW with the EPDS score of depressed mothers did not show a statistically significant difference. Therefore severity of depressive symptoms could not be correlated with the EPDS score of depressed mothers in our study. The birth weight of preterm babies born to mothers in two groups did not have a significant difference although there was statistically significant difference in BW of term babies noted between two groups. And the rate of NICU admission of the neonate between two groups did not show a significant difference. In our study although the BW was significantly low in mothers with depressive symptoms, requirement of NICU admission has not changed significantly. This may be because the significant BW difference observed among term babies who were clinically normal. It has been shown in previous studies that the requirement for NICU admission is high among babies born to mothers with depression, However long term outcome of babies born to mothers with depressive symptoms needs to be confirmed by further follow up studies.

The other limitations are that our study was dependant only on EPDS to assess the maternal depressive symptoms. Although it is a reliable screening tool it is not a diagnostic tool. And the mothers were assessed only once between 28 to 34 weeks of POA. Depressive symptoms can fluctuate among them depending on various provoking factors. These factors could have caused a selection bias in our population. This selection bias could have been

eliminated if another validated tool or the same tool had been used at a different time.

Since the rate postnatal depression among the mothers with antenatal depression was high we referred the mothers with moderate to severe depressive symptoms to psychiatric assessment and follow up. This group constituted only 20 % of the mothers with EPDS score >9.Thus out of the 15 % women who were found to have scored more than 9 in the EPDS ,only a small proportion is having significant depressive symptoms who may require treatment.

CONCLUSION

A depressive symptom during pregnancy is associated with reduction of birth weight. But other obstetric outcomes such as mode of delivery and requirement for neonatal intensive care unit admission remain unaffected in our study. Therefore we conclude that reduction in the birth weight due to depression may not be pathological. Although depression is associated with other risk factors such as socio economic issues, medical and obstetric complications which affect the woman's' quality of life, presence of mild to moderate depressive symptoms may not require close feto-maternal surveillance and mothers who score >9 in EPDS cannot be considered as high risk category in the absence of severe depressive symptoms. This needs further research in order to implement prenatal and antenatal screening methods to detect depressive symptoms. Also further follow up studies are needed to see the long term outcomes.

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