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ORIGINAL ARTICLE

Frequency of Preterm Delivery and Low Birth Weight in Patients with Gestational Hypertension

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ABSTRACT

Objective: To determine the frequency of preterm delivery and low birth weight in patients with gestational hypertension.
Study Design: Descriptive cross-sectional study
Place and Duration of Study: Department of Obstetrics & Gynaecology, Bolan Medical Complex Hospital PGMI, Quetta from 1st April 2023 to 30th September 2023.
Methodology: One hundred and five women suffering from gestational hypertension were enrolled. The outcomes of the pregnancy were assessed in terms of neonatal preterm birth, low birth weight presence. Frequency of preterm delivery and low birth weight was assessed and interpreted. The data regarding anthropometric measurements of the mother and child were carefully recorded. In addition to this, the frequency of maternal stress and its association with hypertension was also recorded.
Results: The average maternal age was 26.8±6.1 years for the overall group, 26.1±6.3 years for the non-recurrent preeclampsia group, and 27.5±5.9 years for the recurrent preeclampsia group. The two groups had no significant difference in parity at index pregnancy (p=0.462). The mean body mass index at index pregnancy was 27.15±6.45 kg/m² in the overall group, 25.1±5.6 kg/m² in the non-recurrent preeclampsia group, and 29.2±7.3 kg/m² in the recurrent preeclampsia group. The majority of women had severe preeclampsia (58.09%), with a slightly higher percentage of recurrent preeclampsia cases (64%) compared to non-recurrent cases (52.72%). The average weight change was 12.1±15.2% for the overall cohort. The overall average weight change was 12.9±14.3%.
Conclusion: The significance of maternal body mass index in predicting the outcomes of gestational hypertension, particularly recurrent preeclampsia, with preterm delivery and low birth weight.
Keywords: Low birth weight, Pre-eclampsia, Gestational age, Pre-term delivery

INTRODUCTION

Low birth weight (LBW) is a major global public health concern, playing a crucial role in the survival rates of vulnerable newborns. Studies have proved that LBW is linked to a variety of negative health outcomes in infants, including growth issues, higher risks of morbidity and mortality, and long-term chronic conditions.[1,2] Global data showed an estimated 20 million LBW babies are born each year. The global prevalence of LBW is reported to be approximately 15.5%, and Asia is the most targeted region of the world accounting for about 75% of these cases. Newborns with LBW delivered at full term typically show inadequate growth for their gestational age, while those born prematurely may have either normal or inadequate growth. High blood pressure in pregnant women is often associated with these adverse outcomes.[3-5]

Gestational hypertension and pre-eclampsia are the most common hypertensive disorders that occur during pregnancy, typically after 20 weeks of gestation, and can present with or without proteinuria. The relationship between these conditions and poor fetal growth has been the subject of varying studies. Some research suggests that women experiencing gestational hypertension or pre-eclampsia are at a higher risk of having infants who are small for gestational age (SGA) or LBW. Several studies indicate that pre-eclampsia may pose a greater risk than gestational hypertension in this regard.[6,7] A study by Chinese examined the impact of different hypertensive disorders during pregnancy on fetal growth in southern China. The study found that both pre-eclampsia and gestational hypertension was associated with an increased risk of SGA, after adjusting for potential confounding factors.[8] The variations in study outcomes may be influenced by factors such as differences in the clinical presentation of these conditions, definitions of LBW and SGA, and the consideration of confounding variables.[9]

The purpose of this study was to assess the impact of gestational hypertension and pre-eclampsia on the risk of LBW and pre-term delivery. Furthermore, this study also evaluates whether the timing of the onset of hypertensive disorders affects the likelihood of these adverse outcomes.

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MATERIALS AND METHODS

This descriptive cross-sectional study was conducted at Department of Obstetrics & Gynaecology, Bolan Medical Complex Hospital PGMI Quetta from 1st April 2023 to 30th September 2023. A total of 105 women suffering from gestational hypertension were included. A written informed consent was taken from each pregnant woman before the initiation of the study. The sample size was calculated using the WHO calculator for a single proportion with a 95% confidence of Interval, 8% margin of error and taking frequency of low birth weight in women with gestational hypertension as 22.4%. The age of the pregnant hypertensive women selected for the research was between 20-45 years. Those pregnant women who were suffering additionally with a cardiovascular ailment, gestational diabetes mellitus or having twin/multiple pregnancy and or having chronic renal disease, and connective tissue disorders were excluded from the study. The outcomes of the pregnancy were assessed in terms of neonatal preterm birth, low birth weight (LBW) presence. A well-structured questionnaire was designed for documenting the variables. The frequency of preterm delivery and low birth weight was assessed and interpreted. The data regarding anthropometric measurements of the mother and child were carefully recorded. In addition to this the frequency of maternal stress and its association with hypertension was also recorded. The data was analyzed using SPSS version 26.0. A Chi-square test was applied for analyzing the frequency of preterm and LBW in hypertensive pregnant women, p value <0.05 was considered as significant.

RESULTS

The average maternal age was 26.1±6.3 years for the non-recurrent preeclampsia group and 27.5±5.9 years for the recurrent preeclampsia group. 18 (17.1%) women in the overall group experienced pregnancy-associated stress, with 9 (16.3%) in the

non-recurrent preeclampsia group and 11 (22%) in the recurrent preeclampsia group. The two groups had no significant difference in parity at index pregnancy (p=0.462). 64 (60.9%) women in the overall group had 1 child, and 41 (39.0%) had more than 1 child. In the non-recurrent preeclampsia group, 37 (67.3%) had 1 child, and 18 (32.7%) had more than 1 child. In the recurrent preeclampsia group, 27 (54%) had 1 child, and 23 (46%) had more than 1 child. The mean BMI at index pregnancy was 27.15±6.45 kg/m² in the overall group, 25.1±5.6 kg/m² in the non-recurrent preeclampsia group, and 29.2±7.3 kg/m² in the recurrent preeclampsia group. The mean BMI at subsequent pregnancy was 29.15±8.15 kg/m² in the overall group, 27.8±4.8 kg/m² in the non-recurrent preeclampsia group, and 30.5 ± 6.7 kg/m² in the recurrent preeclampsia group. There was a statistically significant difference between the groups, with a p-value of 0.021 (Table 1).

The majority of women had severe preeclampsia (58.09%), with a slightly higher percentage of recurrent preeclampsia cases (64%) compared to non-recurrent cases (52.72%). However, this difference was not statistically significant (P=0.273). Preterm birth occurred in 64.76% of the overall cohort, with 60% in the non-recurrent group and 70% in the recurrent group. Low birth weight was found in 64.76% of the cohort, with 67.27% in the non-recurrent group and 62% in the recurrent group (Table 2).

The average weight change was 12.1±15.2% for the overall cohort. In the non-recurrent preeclampsia group, the mean weight change was 14.6±18.6%, while in the recurrent preeclampsia group, it was 9.6±11.8%. The overall average weight change was 12.9±14.3%. For non-recurrent preeclampsia, it was 8.7±10.8%, and for recurrent preeclampsia, it was 8.4±17.8%. he overall mean weight change was -1.85±11.1%. In the non-recurrent group, the mean weight change was 2.1±11.2%, while in the recurrent group, it was -5.8±11.1% (Table 3).

In the group of women who had recurrent preeclampsia, there was 40% reported incidence of new interpregnancy chronic hypertension. In the non-recurrent preeclampsia group, <10% of women developed chronic hypertension after the first pregnancy, but before a potential second pregnancy (Fig 1).

Table 1: Comparison of maternal characteristics between non-recurrent and recurrent preeclampsia at index and subsequent pregnancies

Category	Preeclampsia at Index Pregnancy			P value
	Overall (N=105)	Non-recurrent Preeclampsia (N=55)	Recurrent Preeclampsia (N=50)	
Maternal age	26.8±6.1	26.1±6.3	27.5±5.9	0.472
Pregnancy-associated stress	18 (17.15)	9 (16.3)	11 (22)	0.701
Parity (at index)				
0	73 (69.52%)	41 (74.54%)	32 (64%)	0.462
1	19 (18.09%)	7 (12.7%)	12 (24%)	
>1	13 (12.38%)	7 (12.7%)	6 (12%)	
Parity (at subsequent)				
1	64 (60.9%)	37 (67.27%)	27 (54%)	0.283
>1	41 (39.1%)	18 (32.725)	23(46%)	
BMI, kg/m^2, index	27.15±6.45	25.1±5.6	29. 2±7.3	0.002
BMI, kg/m^2, subsequent	29.15±8.15	27.8±4.8	30.5±6.7	0.021

Table 2: Pregnancy chronic disease, pregnancy complications at index, subsequent pregnancies, and interpregnancy changes

Category	Preeclampsia at Index Pregnancy			P value
	Overall (N=105)	Non-recurrent Preeclampsia (N=55)	Recurrent Preeclampsia (N=50)	
Preeclampsia severity				
Mild	44 (41.9%)	26 (47.27%)	18 (36%)	0.273
Severe	61 (58.1%)	29 (52.72%)	32 (64%)	
Preeclampsia severity				
Preterm birth (<37 weeks)	68 (64.76)	33 (60)	35 (70%)	0.385
Low birth weight (<2500 grams	68 (64.76)	37 (67.27%)	31 (62%)	0.581

Table 3: Obesity status, interpregnancy interval, and weight change in women with non-recurrent and recurrent preeclampsia

Obesity status (mean weight change)	Preeclampsia at Index Pregnancy			P value
	Overall (N=105)	Non-recurrent Preeclampsia (N=55)	Recurrent Preeclampsia (N=50)	
Normal, BMI <25	12.1±15.2	14.6±18.6	9.6±11.8	0.521
Overweight, BMI 25–29.9	12.9±14.3	8.7±10.8	8.4±17.8	0.953
Obese, BMI >30	-1.85±11.1	2.1±11.2	−5.8±11.1	0.192
Interpregnancy interval	3.45±1.3	3.8±2.1	3.1±0.5	1.091

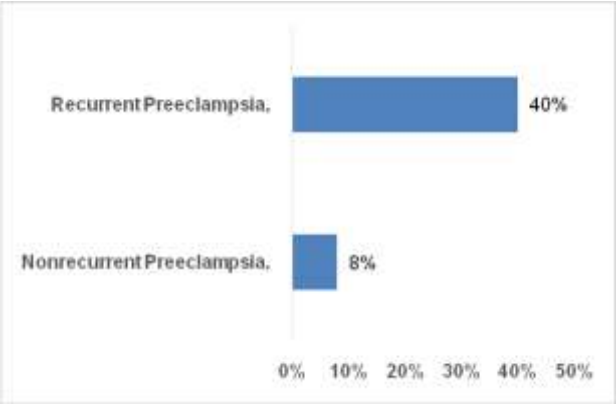

Fig. 1: New inter-pregnancy chronic hypertension

DISCUSSION

The frequency of preterm delivery and low birth weight in patients with gestational hypertension is a critical factor in understanding the outcomes of this pregnancy complication. Gestational hypertension, a condition marked by high blood pressure during pregnancy without the presence of proteinuria, can significantly impact both maternal and fetal health.[10,11] The study indicates no significant difference in maternal age between women with non-recurrent and recurrent preeclampsia (p=0.472). Although maternal age is often considered an important factor influencing pregnancy outcomes such as preterm delivery and low birth weight, our findings suggest that age alone may not be a strong determinant in this cohort.[12,13]

Pregnancy-associated stress was reported in 17.1% of the overall cohort, with no significant difference between non-recurrent (16.3%) and recurrent (22%) preeclampsia groups (p=0.701). Although stress is an important contributor to adverse pregnancy

outcomes, such as preterm birth, this finding suggests that the presence of gestational hypertension itself might be a more substantial risk factor for these outcomes than pregnancy-associated stress. Studies have shown that while stress can exacerbate complications, hypertension-related pathophysiological mechanisms, such as impaired placental blood flow, may more directly influence birth outcomes.[14,15]

A significant difference was observed in BMI at both index and subsequent pregnancies between the non-recurrent and recurrent preeclampsia groups. Women with recurrent preeclampsia had higher BMIs at both time points (index: 29.2±7.3 kg/m², subsequent: 30.5±6.7 kg/m²) compared to those with non-recurrent preeclampsia (index: 25.1±5.6 kg/m², subsequent: 27.8±4.8 kg/m²). This aligns with the well-established association between obesity and an increased risk of preeclampsia, as well as poorer pregnancy outcomes such as preterm birth and low birth weight. High BMI is thought to contribute to the pathophysiology of gestational hypertension through mechanisms like insulin resistance, endothelial dysfunction, and chronic inflammation, which may impair placental function, leading to adverse fetal outcomes.[16]

In light of the above findings, the role of maternal factors like BMI in gestational hypertension is particularly pertinent. As indicated, higher BMI in recurrent preeclampsia is significantly associated with worse maternal and fetal outcomes. These women may be more prone to complications like preterm delivery due to impaired placental perfusion and an increased likelihood of placental insufficiency, which is a well-known risk factor for preterm birth and low birth weight.[17,18] Furthermore, while stress and parity do not show significant differences in this cohort, other factors such as the severity of hypertension, the timing of diagnosis, and the presence of comorbidities (e.g. diabetes) are likely to be important contributors to adverse outcomes like preterm delivery and low birth weight.[19]

CONCLUSION

The significance of maternal body mass index in predicting the outcomes of gestational hypertension, particularly recurrent preeclampsia, with preterm delivery and low birth weight while other factors like maternal age, pregnancy-associated stress, and parity did not show significant associations, the higher body mass index observed in women with recurrent preeclampsia suggests a need for more focused clinical management in this group.

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