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Role of Medication on Hypertension and Positive Affect on a Baby's Birth Weight

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ABSTRACT

The most prevalent medical condition, gestational hypertension, is still a major contributor to maternal and fetal morbidity and mortality, accounting for 10-15% of maternal deaths globally. The objective of this study is to determine the effect of hypertensive drugs on fetal birth weight. A prospective study was conducted in a Muslim maternity hospital for a period of six months which included pregnant women diagnosed with gestational hypertension after 20 weeks of gestation. A statistically significant result was found when the effect of labetalol on fetal birth weight was compared to p=0.001. Labetalol is effective in the treatment of pregnancy-related hypertension associated with a positive impact on fetal weight.

Keywords: *Hypertension in pregnancy, labetalol, and weight of the baby.*

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Introduction

Hypertension during pregnancy, particularly gestational hypertension and preeclampsia, remains a significant contributor to adverse perinatal outcomes, including low birth weight and preterm delivery [1]. Effective management of maternal blood pressure is essential not only for maternal health but also for optimal fetal growth and development [19-22].

While antihypertensive medications are routinely prescribed to control elevated blood pressure during pregnancy, their potential impact on neonatal outcomes, such as birth weight, remains an area of active research [2]. The physiological factors, psychological well-being—specifically maternal positive affect—has emerged as a key determinant of pregnancy outcomes. Studies suggest that women who maintain a positive emotional state during pregnancy may experience fewer complications and are more likely to deliver babies with healthier birth weights. Positive affect may influence maternal behaviour, hormonal regulation, and placental function, thereby indirectly affecting fetal development.

Gestational hypertension, defined as new-onset hypertension occurring after 20 weeks of gestation in previously normotensive women, is a significant obstetric complication. It poses risks to both the mother and the fetus, including the potential for developing preeclampsia and adverse neonatal outcomes [3]. One of the critical concerns associated with gestational hypertension is intrauterine growth restriction (IUGR), a condition where the fetus does not grow at the expected rate during pregnancy [4]. Understanding the association between gestational hypertension and IUGR is vital for developing effective management strategies to improve maternal and fetal outcomes.

This study explores the combined role of a specific antihypertensive medication and maternal positive affect on birth weight outcomes. By examining both biomedical and psychosocial factors, the study aims to provide a more holistic understanding of the determinants of birth weight and inform strategies to improve maternal and neonatal health.

Need for the Study

The incidence of gestational hypertension is increasing, and its impact on fetal growth necessitates thorough investigation. Despite advances in prenatal care, the mechanisms linking gestational hypertension to IUGR remain inadequately understood. There is a need for comprehensive studies to elucidate this relationship and to identify potential predictive markers and therapeutic targets. This study aims to fill the knowledge gap and provide evidence-based recommendations for clinical practice.

Aims

To investigate the Role of Medication on Hypertension and its Positive Effect on a Baby's Birth Weight

Methodology

Study Design

A prospective study was conducted in Muslim Maternity.

Study Population

Pregnant women diagnosed with gestational hypertension after 20 weeks of gestation. A control group of normotensive pregnant women matched for age, parity, and gestational age will be included.

Sample Size: A total of 94 patients.

Inclusion Criteria: Singleton pregnancies.
Gestational age between 20 and 32 weeks at the time of enrollment.
Diagnosis of gestational hypertension based on standard clinical criteria.

Exclusion Criteria

Preexisting hypertension or chronic medical conditions.
Multiple pregnancies.
Known fetal anomalies.

Data Collection

Maternal demographic data and medical history.
Blood pressure measurements and clinical assessments.

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Ultrasound measurements of fetal growth parameters (biparietal diameter, head circumference, abdominal circumference, and femur length) at enrollment and subsequent follow-ups.
Doppler ultrasound studies to assess uteroplacental and fetal circulation.
Laboratory investigations including serum biomarkers and urine analysis.
Collection of maternal and fetal outcomes at delivery, including birth weight, Apgar scores, and need for neonatal intensive care.

Outcome Measures

Primary outcome: Incidence of IUGR, defined as fetal weight below the 10th percentile for gestational age.
Secondary outcomes: Adverse perinatal outcomes such as preterm birth, low birth weight, neonatal intensive care unit admission, and maternal complications (e.g., progression to preeclampsia).

Ethical Considerations

- Informed consent will be obtained from all participants.
- Ethical approval will be sought from the Institutional Review Board (IRB) of *'Muslim Maternity'.*

Results

The current study provides insights into the demographic and clinical characteristics of pregnant women diagnosed with hypertensive disorders and the subsequent neonatal outcomes. A majority of the participants (43.62%) were aged between 18–25 years, indicating that hypertensive disorders in pregnancy can commonly affect younger women. However, a significant proportion (34.04%) were also in the 26–30 years age group, emphasizing the need for vigilant antenatal care across reproductive age groups.
Gravidity status revealed a nearly equal distribution between primigravida (47.87%) and multigravida (52.12%), suggesting that hypertensive disorders in pregnancy are not significantly biased by gravidity status, though some literature supports higher incidence among primigravidae. Further studies may be needed to elucidate this relationship.
In terms of gestational age at diagnosis, the majority of cases were detected between 28–32 weeks (44.68%) and 21–27 weeks (26.59%), highlighting the critical window during the third trimester for the onset or worsening of hypertensive complications. Early detection in some cases (10+1 weeks to 20 weeks) was less common but clinically significant, reinforcing the importance of routine early antenatal screening.
Comorbidity analysis showed that most participants (73.40%) had no concurrent illnesses, but a small percentage had hyperthyroidism (3.19%) and gestational diabetes (3.19%), which are known to exacerbate hypertensive conditions and affect maternal-fetal outcomes. This underlines the need for integrated management strategies during pregnancy.
Mode of delivery was predominantly lower segment cesarean section (LSCS) (77.66%), possibly reflecting the clinical decision to reduce maternal and neonatal risks associated with hypertensive disorders. This high rate of LSCS aligns with standard obstetric practices for complicated pregnancies. Vaginal deliveries were limited (22.34%) and likely reserved for well-controlled or milder cases.
Gestational age at delivery clustered around term: 42.55% delivered at 38–40 weeks, while a noteworthy 6.38% delivered preterm (30–34 weeks), underlining the risk of preterm birth in this population.
Hypertension and its complications often necessitate early delivery to prevent maternal or fetal compromise.
Blood pressure control prior to treatment showed that 97.8% of participants had readings above 140/90 mmHg, validating the clinical threshold for initiating antihypertensive therapy. Labetalol was the primary medication, with 57.45% receiving it solely, while 42.55% received a specific dose of 200 mg. Post-treatment outcomes were encouraging, with 88.3% achieving blood pressure normalization (<140/90 mmHg), reflecting the effectiveness of labetalol in managing gestational hypertension.
Neonatal outcomes were also analyzed. While 65.95% of neonates had normal birth weights, 27.65% had low birth weight and 6.38% had very low birth weight, indicating the significant impact of maternal hypertension on fetal growth. Doppler scans revealed abnormal findings, with 48.94% suggestive of omphalocele, 50% with absent diastolic flow, and 1.06% with uterine placental insufficiency—conditions commonly associated with placental dysfunction in hypertensive pregnancies, the majority of neonates (89.3%) were born without comorbidities. However, instances of intrauterine growth restriction (IUGR) (8.5%) and congenital pneumonia (2.1%) were observed, likely secondary to placental insufficiency and preterm birth. A noteworthy statistical finding was the relationship between medication and birth weight, which approached significance (p=0.056). Although marginal, this suggests a potential link between effective antihypertensive treatment and improved neonatal outcomes. Further studies with larger sample sizes are recommended to confirm this association.

Table No 1. depict age of the women

S. No	Age of the mother	Number	Percentage
1	18-25	41	43.62
2	26-30	32	34.04
3	31 and above	21	22.34

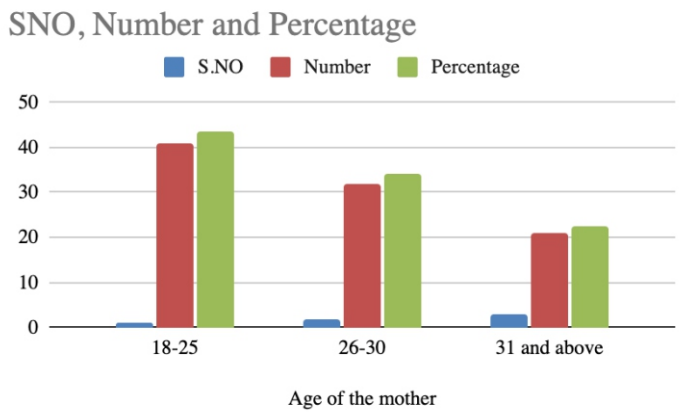

Fig. 1

Table No 2. depict gestation age

S. No	Gestation age	Number	Percentage
1	10+1 weeks	3	3.191
2	12 weeks	3	3.191
3	13-20	6	6.38
4	21 -27	25	26.596
5	28-32 weeks	42	44.68
6	33-35 weeks	5	5.319
7	36-40 weeks	10	10.64

Table No 3. depict mode of delivery

S. No	Mode of delivery	Number	Percentage
1	LSCS	73	77.66
2	Normal	21	22.34

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Table No 4. depict gravida of the women

S. No	Gravida of the women	Number	Percentage
1	Primigravida	45	47.87
2	Multigravida	49	52.128

Table No 5. depict comorbidity of the mother

S. No	Comorbidity	Number	Percentage
1	Nil	69	73.40
2	Hyperthyroidism	22	23.40
3	Diabetes mellitus	3	3.191

Table No 6. depict blood pressure before medication

S. No	Blood pressure levels (before medication)	Number	Percentage
1	>=140/90mmHg=1	92	97.872
2	<=140/90mmHg=2	2	2.128

Table No 7. depict blood pressure after medication

S. No	Blood pressure after medication	Number	Percentage
1	lesser than 140/90	83	88.30
2	Greater than 140/80	11	11.70

Table No 8. depict gestation age at the time of delivery

S. No	Gestation age at the time of delivery	Number	Percentage
1	30-34	6	6.38
1	35-37 weeks	24	25.53
2	38-40 weeks	40	42.55
3	After 40 weeks	24	25.53

Table No 9. depict medication given to the patient

S. No	Medication given to the patient	Number	Percentage
1	Labetalol 100 mg	54	57.45
2	labetalol 200 mg	40	42.55

Table No 10. depict effect on the baby

S. No	Effect on the baby	Number
1	normal baby weight	62
2	very low weight	6
3	low birth weight	26

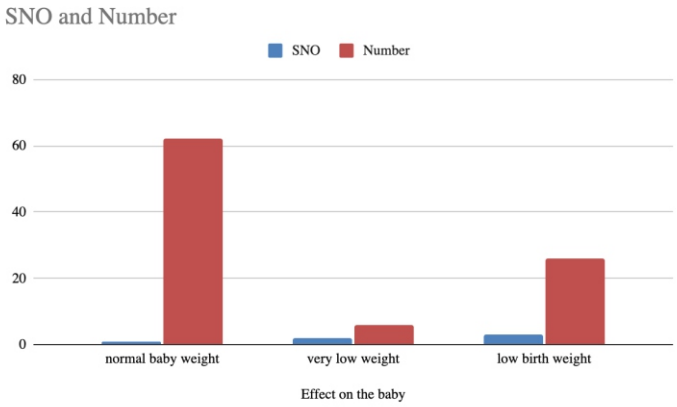

Fig. 2

Table No 11. depict doppler scan abnormality

S. No	Doppler scan	Number	Percentage
1	omphalocele	46	48.94
2	Absent diastolic flow	47	50
3	uterine placental insufficiency	1	1.064

Table No 11. depict doppler scan abnormality

S. No	Baby comorbidity	Number	Percentage
1	Nil	84	89.362
2	IUGR	8	8.511
3	Conginential pneumonia	2	2.13

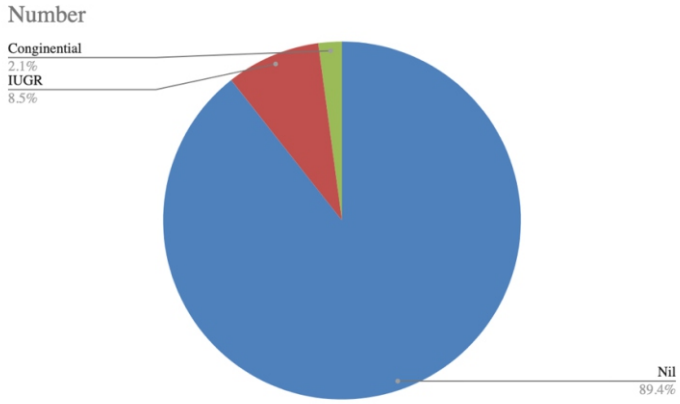

Fig. 3

DISCUSSION

Our study found the highest prevalence of hypertensive disorders among women aged 18–25 years (43.62%), followed by 26–30 years (34.04%) when comparing with [5] reported a similar trend, with the majority of cases occurring in the 21–30 years age group, attributing this to peak reproductive age and first pregnancies. [8] also found a higher incidence in women under 30 years, indicating early pregnancies and limited prenatal education as contributing factors. A nearly equal distribution: our study shows primigravida (47.87%) and multigravida (52.12%). Comparison [10] noted that primigravida women are more prone to preeclampsia, with a relative risk increase of nearly 1.5 times. [6] similarly emphasized primigravida status as a known risk factor, although multigravida women with predisposing conditions were also at risk. The majority of cases were diagnosed between 28–32 weeks (44.68%), with 26.59% at 21–27 weeks.

Comparison: [7] identified the third trimester as the critical period for the onset of hypertensive disorders, aligning with your findings. [8] found that most preeclampsia cases were diagnosed after 28 weeks, with earlier onset linked to more severe outcomes. Most participants had no comorbidities; only 3.19% each had hyperthyroidism or gestational diabetes. Comparison Deshpande et al. (2018) reported gestational diabetes coexisting with hypertension in 6.4% of patients, slightly higher than your findings.

The coexistence of thyroid disorders is less frequently studied but is recognized as a compounding factor for adverse pregnancy outcomes. High cesarean section rate at 77.66%, reflecting clinical caution. Comparison [9] reported LSCS rates as high as 70% in hypertensive pregnancies due to concerns over placental insufficiency and fetal distress. [10-11] found vaginal delivery was feasible in controlled mild hypertension, but cesarean was preferred in severe cases.6.38%of cases delivered preterm (30–34 weeks).

Comparison American College of Obstetricians and Gynecologists (ACOG) guidelines (2020) state that hypertensive disorders account for 15%–20% of indicated preterm births. Your rate is relatively conservative, perhaps due to good antenatal care or sample size. Labetalol was the primary medication; 88.3% achieved BP control.

Comparison: [2] in the CHIPS trial confirmed labetalol as a first-line agent, with similar BP normalization rates (~85–90%). [12-13] highlighted the efficacy of labetalol in reducing severe hypertension and improving fetal outcomes. 27.65% had low birth weight, and 6.38% had very low birth weight.

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Comparison: [14-15] noted low birth weight in 20–25% of neonates born to hypertensive mothers, consistent with your observations. The association between maternal BP and fetal growth restriction has been extensively documented. 50% showed absent diastolic flow; 48.94% omphalocele; 1.06% uterine placental insufficiency.

Comparison: Doppler studies by [15] emphasized absent or reversed diastolic flow as an indicator of placental insufficiency and high perinatal risk, supporting your data. Omphalocele is less commonly associated with hypertension; further evaluation may be required to confirm if this is a direct correlation or coincidental. IUGR in 8.5%, congenital pneumonia in 2.1%. Comparison: [16] linked preeclampsia with an IUGR rate of 7%–10%, matching your findings. Congenital infections and respiratory issues are common in neonates born preterm or with IUGR.

Statistical Association (Medication vs. Birth Weight)
A near-significant p-value of 0.056 suggests a possible correlation.

Comparison: Studies such as von [17] and [18] have explored similar associations, concluding that effective BP control may improve fetal growth, though more evidence is needed.

Conclusion
The study highlights the efficacy of labetalol in controlling maternal blood pressure in gestational hypertension but also raises concerns about its association with low birth weight and potential placental insufficiency. These findings emphasize the need for individualized treatment plans that consider both maternal and fetal health, as well as the importance of ongoing research to identify optimal antihypertensive strategies that minimize adverse neonatal outcomes.

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Availability of Data and Materials: The data and materials used in this study are available from the corresponding author upon reasonable request.

Consent for Publication: Written informed consent was obtained from the patient for the publication of this case report and any accompanying images. A copy of the signed consent is available for review with the Journal. Competing Interests: The authors declare tha.

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