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Maternal and Fetal Outcome in Grandmultipara - An Observational Study

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Abstract

Introduction: Maternal and perinatal morbidity and mortality are significant health challenges in developing countries, particularly India, where over 99% of maternal deaths occur. Among various risk factors, grand multiparity, defined by the World Health Organization (WHO) as having five or more previous viable pregnancies beyond 24 weeks, markedly increases the risk of complications during pregnancy, labor, and the postpartum period.

Objective: This study aims to analyze maternal and fetal outcomes in grand multiparous pregnancies and to highlight the associated risks and complications.

Methods: A descriptive observational prospective study was conducted at the Department of Obstetrics and Gynecology, SMS Medical College, Jaipur, from December 2022 for one year. The study included 210 grand multipara women with live pregnancies over 28 weeks of gestation, meeting specific inclusion and exclusion criteria. Comprehensive examinations and investigations were performed, and data on socio-demographic characteristics, pregnancy complications, delivery methods, and fetal outcomes were collected.

Results: The mean age of participants was 33.78 ± 3.03 years, with a predominance of women. Complications were prevalent, with anemia (60%) being the most common. Postpartum complications occurred in 11.4% of cases, with uterine atony as the predominant cause of postpartum hemorrhage. Among newborns, 69.5% scored greater than 7 on the APGAR scale at 1 minute, while 90.4% scored above 7 at 5 minutes. Notably, 9.52% of newborns required NICU admission, primarily due to prematurity.

Conclusion: Grand multiparity is associated with significant obstetric risks, hence Comprehensive antenatal care and regular monitoring are crucial for improving maternal and fetal outcomes in affected populations.

Keywords: Grand multiparity, maternal morbidity, perinatal outcomes.

Introduction

Maternal and perinatal morbidity and mortality are critical health challenges in developing nations,

particularly India, where over 99% of maternal deaths occur, as reported by the World Health Organization (WHO).[1] Among various risk factors, grand multiparity, defined by the WHO as having five or more previous viable pregnancies beyond 24 weeks, significantly increases complications during pregnancy, labor, and the postpartum period. The prevalence of grand multiparity varies widely, from 10% to 30% in developing countries—often correlated with cultural norms supporting large families—compared to just 3-4% in developed nations.[2]

The term "grand multipara" was first introduced by Beth el Solomons in 1934 to describe women with five or more children, challenging the assumption that multiparity guarantees easier childbirth. Solomons highlighted the escalating maternal mortality rates with increased parity, especially beyond the fifth pregnancy.[3] The International Federation of Gynecology and Obstetrics (1993) further defined multiparity as delivering two to four infants, with grand multiparity extending to the fifth to ninth. Studies indicate that while the risks are lower in the second to fourth pregnancies, they significantly rise with the fifth pregnancy and beyond.[4]

Factors contributing to grand multiparity include a strong desire for additional children, unplanned pregnancies, and low contraceptive use. Moreover, it reflects broader societal issues like low literacy and poverty, leading to increased health risks such as maternal anemia, antepartum hemorrhage, and hypertensive disorders.[5] Perinatal complications like low birth weight and congenital malformations are also more prevalent.

Grand multiparity is associated with various pregnancy-related complications, including fetal malpresentation, dysfunctional labor, and a higher likelihood of cesarean sections. Women with grand multiparity often experience higher rates of uterine rupture, postpartum hemorrhage, and retained placenta, significantly impacting maternal mortality rates. Additionally, twin pregnancies are more common, leading to elevated perinatal mortality due to factors like preterm labor and congenital malformations.[6]

Despite these challenges, some studies suggest that grand multiparous women in developed countries do not necessarily face higher obstetric complications due to advanced healthcare systems.[7] To improve maternal and fetal outcomes in developing countries, initiatives such as health education, enhanced antenatal care, and promoting family planning methods are essential. This study aims to analyze maternal and fetal outcomes in grand multiparous pregnancies, addressing the need for targeted strategies to mitigate associated risks.

Material and Method

This descriptive observational prospective study was conducted at the Department of Obstetrics and Gynecology, SMS Medical College, Jaipur, starting in December 2022 and continuing for one year or until the desired sample size was reached, with an additional two months for data analysis. The study universe included all pregnant women admitted to the labor room, focusing specifically on grand multipara women with live pregnancies over 28 weeks of gestation. Ethical approval was obtained from the institutional review board and ethical committee. The sample size was determined to be 210 grand multipara women, calculated at 80% study power and an alpha error of 0.05, as referenced in the seed article.[8]

Inclusion Criteria

Grand multipara women with live pregnancies exceeding 28 weeks of gestation, who were willing to participate and provide informed, written consent, and who were not involved in any other study.

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Exclusion Criteria

Women with chronic medical disorders such as diabetes mellitus, chronic hypertension, liver disease, renal diseases, and autoimmune diseases, as well as those who were critically or mentally ill and unable to communicate.

Methodology

Approval was obtained from the Institutional Research Review Board and Ethical Committee before the study began. Eligible women were recruited based on inclusion and exclusion criteria, with informed consent obtained. Comprehensive examinations and necessary investigations, including CBC, blood sugar, and renal and liver function tests, were conducted. Socio-demographic data were recorded, along with pregnancy complications such as GDM, IUGR, and IUFD. Women were closely monitored during labor for induction needs, labor duration, and delivery mode. Antepartum and intrapartum complications were documented, along with fetal outcomes, including weight and APGAR scores. Postpartum complications such as PPH and UTIs were noted, followed by data compilation and statistical analysis.

Data Compilation and Statistical Analysis: All data were collected and entered into an MS Excel sheet for statistical analysis. Continuous variables were analyzed using the unpaired t-test, one-way ANOVA, and Pearson correlation coefficient. Nominal and categorical variables were assessed using Fisher's Exact Test or the Chi-square test. A p-value of <0.05 was considered significant. MedCalc version 16.4 software was utilized for all statistical calculations.

Results and Observations

In our study, 33 (15.71%) women were aged 26-30 years, 104 (49.52%) were 31-35 years, and 73 (34.76%) were over 35, with a mean age of 33.78 ± 3.03 years. The majority were Muslim (125, 59.52%), followed by Hindus (79, 37.61%). Most participants were from rural areas (145, 69.05%) and the lower class (100, 47.61%). Educationally, 99 (47.14%) were illiterate, while 58 (27.62%) had primary education, 52 (24.76%) secondary education, and 1 (0.48%) higher education. Gravidity showed that 93 (44.29%) were G5, 94 (44.76%) G6, and 23 (10.95%) G7 or more. Regarding inter-pregnancy duration, 9 (4.29%) had ≤12 months, 31 (14.76%) had 13-24 months, 80 (38.10%) had 25-36 months, 76 (36.19%) had 37-48 months, and 14 (6.67%) exceeded 48 months.

Table 1: Antenatal Complication in grand multipara

Antenatal Complication		Total	
		No. of Women	Percentage
No Complication		34	16.19
Anemia		126	60
Malpresentation		10	4.76
APH	Placenta Previa	7	3.3
	Abruptio Placentae	5	2.38
IUGR		10	4.7
Preeclampsia		5	2.38
Eclampsia		6	2.85
Gestational DM		7	3.33

Out of the total participants, 34 (16.19%) had no complications. The most common issues were anemia (126, 60%), malpresentation (10, 4.76%), placenta previa (7, 3.3%), abruptio placentae (5, 2.38%), IUGR (10, 4.7%), preeclampsia (5, 2.38%), eclampsia (6, 2.85%), and GDM (7, 3.33%). Regarding presentations, 200 (95.23%) were cephalic, 5 (2.38%) breech, 2 (0.95%) transverse, and 3 (1.42%) oblique. Delivery methods included normal (147), assisted breech (5), instrumental (2), and LSCS (56).

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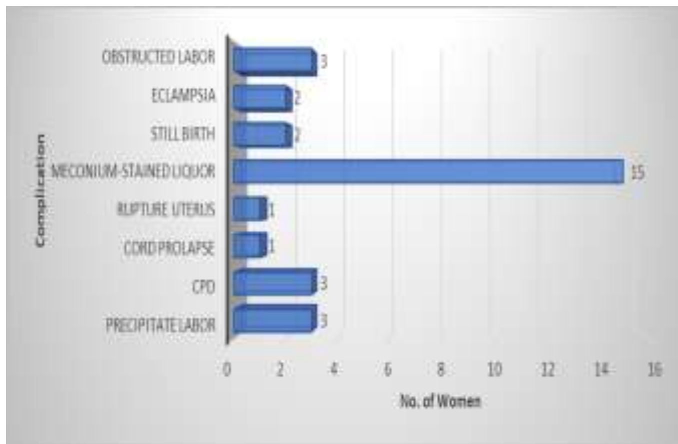
Graph 1: Intra-partum Complication in grand multipara.



The most common complication was meconium-stained liquor, affecting 15 (7.1%) women. Precipitate labor, cephalopelvic disproportion (CPD), and obstructed labor each occurred in 3 (1.43%) women. Stillbirth and eclampsia were observed in 2 (0.95%) women each, while cord prolapse and uterine rupture were the least frequent complications, affecting 1 (0.47%) woman each.

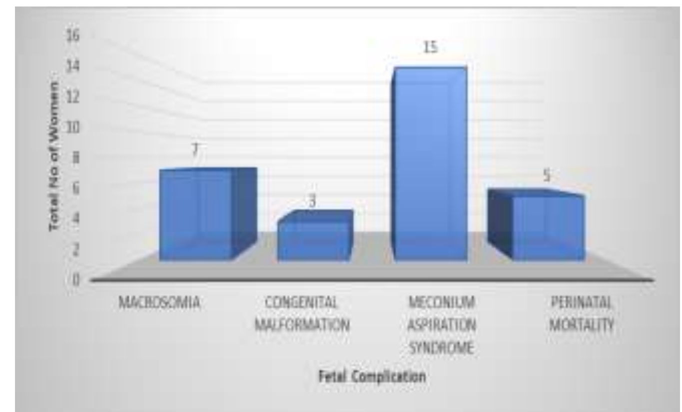
Table 2: Post Partum Complication in grand multipara

Post-Partum Complication		Total	
		No. of Women	Percentage
PPH		24	11.4
Inversion of Uterus		2	0.95
Postpartum Eclampsia		6	2.8
Pulmonary Embolism		1	1.56
Puerperal Pyrexia	UTI	2	0.95
	Breast Engorgement	2	0.95
Puerperal sepsis		11	5.2
Subinvolution of uterus		12	6.7

The most common complication was postpartum hemorrhage (PPH), affecting 24 (11.4%) women. Subinvolution of the uterus was reported in 12 (6.7%) and puerperal sepsis in 11 (5.2%) women. Postpartum eclampsia occurred in 6 (2.8%) women. Less common complications included pulmonary embolism, inversion of the uterus, urinary tract infection (UTI), and breast engorgement, affecting 1 (1.56%) and 2 (0.95%) women, respectively.

Uterine atony was the predominant cause of PPH, affecting 18 (75%) women, followed by cervical tears in 3 (12.5%) and vaginal tears in 2 (8.33%). Uterine rupture was the least frequent, observed in 1 (4.1%) woman. One patient (0.47%) expired due to pulmonary embolism after undergoing LSCS for obstructed labor. Of the women, 37 (17.6%) experienced pre-term births, while 173 (82.38%) did not. The majority of babies weighed between 2.1 and 3 kg (102, 48.57%), followed by 1 to 2 kg (42, 20%), 3.1 to 4 kg (59, 28%), and the least common weight range was 4.1 to 5 kg, affecting 7 (3.3%) women.

Graph 2: Fetal Complications in grand multipara



The most common complication was meconium aspiration syndrome, affecting 15 (7.14%) women. Macrosomia was reported in 7 (3.33%) women, and perinatal mortality occurred in 5 (2.38%). Congenital malformations were the least frequent, observed in 3 (1.42%) women. Regarding APGAR scores, 146 (69.5%) newborns scored greater than 7 at 1 minute, while 64 (30.4%) scored less than 7. By 5 minutes, 190 (90.4%) had scores greater than 7, and only 20 (9.5%)

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scored less than 7. A total of 20 (9.52%) newborns were admitted to the NICU, while 190 (90.47%) were not.

Table 3: Causes of NICU admission in Baby of Grand multipara

The most common cause of admissions was prematurity, accounting for 7 (35%) cases. Low birth weight contributed to 5 (25%) admissions, while Acute Respiratory Distress Syndrome (ARDS) was observed in 4 (20%) newborns. Hypoglycemia and neonatal sepsis affected 2 (10%) newborns each, and congenital heart disease was noted in 1 (5%) newborn.

Causes of NICU Admission	Total No	Percentage %
Prematurity	7	35
Low birth weight	5	25
ARDS	4	20
Hypoglycemia	2	10
Neonatal sepsis	1	5
Congenital heart disease	1	5

Discussion

Grand multiparity is increasingly recognized as a significant risk factor for pregnant women, associated with elevated maternal and fetal morbidity and mortality. This condition results in a higher incidence of obstetric and medical complications. In Western obstetric practice, the prevalence of grand multiparity has declined due to the widespread adoption of family planning methods.[9]

Antenatal Complication

In our study, 34 (16.19%) women had no complications, while 126 (60%) had anemia, and other complications included malpresentation (10; 4.76%), placenta previa (7; 3.3%), abruptio placentae (5; 2.38%), intrauterine growth restriction (10; 4.7%), preeclampsia (5; 2.38%), eclampsia (6; 2.85%), and gestational diabetes (7; 3.33%). Hadiya et al.[10] reported that 57.83% of cases had no complications, with 25.4% experiencing anemia and 4.86% developing eclampsia or preeclampsia. Mgaya AH et al.[11] noted that anemia persists due to socioeconomic factors, high parity, and poor diet, while hypertensive disorders are more common with age-related vascular changes.

Intra-Partum Complication

Meconium-stained liquor was the most common complication, affecting 5 (7.1%) women. Precipitate labor, cephalopelvic disproportion (CPD), and obstructed labor occurred in 3 (1.43%) women each. Stillbirth and eclampsia were reported in 2 (0.95%) women each, while cord prolapse and uterine rupture affected 1 (0.47%) woman each. Baghotia P et al. [12] noted a 4.71% stillbirth rate and 9.42% meconium-stained liquor among 552 cases. Roy R et al.[13] reported uterine rupture in 2 women (1.8%), requiring laparotomy.

Post Partum Complication

Postpartum complications included postpartum hemorrhage (PPH) in 24 (11.4%) women, subinvolution of the uterus in 12 (6.7%), puerperal sepsis in 11 (5.2%), and postpartum eclampsia in 6 (2.8%). Less common complications were pulmonary embolism, uterine inversion, urinary tract infection (UTI), and breast engorgement, affecting 1 (1.56%) and 2 (0.95%) women, respectively. Thekrallah F et al.[14] reported PPH in 1.9% of grand multipara, while Singh S P et al.[15] found it in 14% of cases, along with retained placenta in 5%, uterine inversion in 3%, and third-degree perianal tear in 1%. Uterine rupture occurred in 2% of cases.

Fetal Complications

The most common complication was meconium aspiration syndrome, affecting 15 (7.14%) women. Other complications included macrosomia in 7 (3.33%), perinatal mortality in 5 (2.38%), and congenital malformations in 3 (1.42%). Baghotia P et al.[12] reported 2.89% macrosomia, while Roy R et al.[13] found 7%,

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associated with birth trauma and shoulder dystocia. Yasmeen L et al. noted 12% macrosomia and 6% low birth weight (LBW).

Nicu Admission

A total of 20 (9.52%) newborns were admitted to the NICU, with the most common cause being prematurity (7 cases, 35%). Low birth weight accounted for 5 admissions (25%), and Acute Respiratory Distress Syndrome (ARDS) was observed in 4 (20%). Hypoglycemia, neonatal sepsis, and congenital heart disease affected 2 (10%) and 1 (5%) newborns, respectively. Baghotia P et al.[12] reported a NICU admission rate of 6.52%. Thekrallah F et al.[14] noted no significant differences in neonatal APGAR scores, but unadjusted analysis revealed a higher prevalence of low birth weight and NICU admissions among neonates of grand multiparous women, linked to increased preterm deliveries.

Conclusion

Grand multiparity, defined as having five or more pregnancies, poses significant obstetric risks, especially in developing countries. Factors like illiteracy, socio-economic status, and religious influences limit access to healthcare, increasing maternal and fetal mortality and morbidity. Addressing these challenges requires proactive measures, including health education on the risks of multiple pregnancies and promotion of family planning. Improving socio-economic conditions can enhance healthcare access and reduce grand multiparity rates. For those affected, high-quality antenatal care and regular monitoring are vital to mitigate risks and improve outcomes, particularly in populations with high unbooked deliveries.

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