

Effect of grand multiparity on maternal, obstetric, fetal and neonatal results

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Abstract. – OBJECTIVE: The aim of the study was to compare the incidence of antenatal and intrapartum complications and perinatal outcomes between grand multiparous women of the same age and socioeconomic status and nulliparous and multiparous women.

PATIENTS AND METHODS: A prospective case-control study was conducted at the Tertiary Center Gynecology and Obstetrics Clinic of the Eastern Anatolia Region between January 1, 2021, and January 1, 2023. It was compared with 149 grand multiparous, 724 multipara, and 258 nulliparous singleton pregnancies. The data were entered separately by two people and then compared. The delivery period, gestation period, maternal obstetric, and fetal and neonatal outcomes of the groups were compared.

RESULTS: The frequency of postpartum hemorrhage, antepartum and postpartum anemia was significantly higher in grand multiparity patients than in other groups. Gestational hypertension, Gestational DM and Abortus imminent, and the frequency of preterm birth increases with parity. The frequency of hyperemesis gravidarum and preeclampsia was significantly higher in nulliparous pregnant women than in others. There was no difference between the groups in terms of premature rupture of membranes and post-term pregnancy. Among the neonatal outcomes, only the frequency of low birth weight was significantly higher in grand multiparous patients.

CONCLUSIONS: The frequency of postpartum anemia, postpartum bleeding, gestational hypertension, gestational diabetes, and preterm pregnancy is higher in grand multiparity patients than in multiparous and nulliparous patients. Due to the increased risks with grand multiparity, pregnancy follow-up, and follow-up should be done within the risk factors of these patients in regions where grand multiparity is intense, and family planning practices should be increased.

Key Words:

Grand multiparity, Postpartum hemorrhage, Neonatal outcomes, Risk, Maternal complications.

Introduction

Grand multiparity is defined as the parity being greater than or equal to the previous five births. Grand multiparity has been accepted as a factor that increases adverse outcomes for both fetus and mother, especially diabetes mellitus, antepartum hemorrhage, malpresentation, cesarean section rate, postpartum hemorrhage, iron deficiency anemia, and high perinatal mortality^{1,2}. Complications related to grand multiparity may be seen less frequently in developed countries since grand multiparity is not common due to socioeconomic and sociocultural factors. Especially in developing and underdeveloped countries, grand multiparity and its accompanying complications have become a problem and may cause maternal and neonatal mortality and morbidity. Gestational diabetes, gestational hypertension, preterm labor, and postpartum hemorrhage can be counted among the most common pregnancy complications of grand multiparas^{3,4}. While some of the studies reported that the prevalence of antepartum complications in grand multiparous patients was not different from other patients, other studies^{4,5} drew attention to the relationship between grand multiparity and associated it with low socioeconomic conditions.

Malpresentation, placenta previa, postpartum hemorrhage, and preeclampsia are also reported in the literature, associated with grand multiparity, which shows that its prevalence increases with maternal age⁶. Another study⁷ was conducted considering maternal age as a separate risk factor, but socioeconomic status and conditions that trigger cardiovascular disease were not excluded in these patients. Overall, there has been no clear classification of increased risks in grand multiparity, and few studies have evaluated it

independently. There are additional factors in these studies as well. The fact that the groups are similar in terms of ethnicity, socioeconomic status and age, which are factors that may affect the study results, makes our study meaningful.

Patients and Methods

This prospective case-control study was conducted at the tertiary Gynecology and Obstetrics Clinic in Van between January 1, 2021 and January 1, 2023. 149 grand multiparous, 724 multiparous and 258 nulliparous women who gave birth simultaneously were included in the study. Only patients of the same ethnic origin, between the ages of 24 and 34, who had normal birth were included in the study. Patients with a history of chronic diseases such as hypertension and diabetes, patients over 35 years of age, and patients with anomalies that could affect fetal outcomes were not included in the study. The groups' birth, pregnancy, maternal obstetric, and fetal and neonatal outcomes were compared. Similar patients were also evaluated for smoking due to increased pregnancy complications due to smoking⁸. Patients of different ethnic groups were excluded from the study for a more homogeneous study environment. Data were entered and compared separately by two people.

Statistical Analysis

Statistical analysis was done with a licensed SPSS 22.0 program (SPSS Corp., Armonk, NY, USA). ANOVA test was used to compare more than three normally distributed groups. Tukey's

HSD post-hoc test was used to determine the differences between the groups. Paired sample *t*-test was used to compare dependent groups. Fisher's Exact test was used to compare categorical variables. The statistical significance level was determined as $p < 0.05$.

Results

A total of 1,131 people were included in the study, of which 258 (22.8%) were primiparous, 724 (64.0%) were multiparous, and 149 (13.2%) were grand multiparous. The mean age of the pregnant women was 28.95 ± 4.94 .

The distribution of parity groups according to maternal characteristics is presented in Table I.

There was no difference between the groups in terms of mean age, socioeconomic status, and smoking, which is a risk factor for many diseases. There is a difference between the groups in terms of gravida. The number of gravidae is the highest in grand multiparas. There is a significant difference between the groups according to the antepartum and postpartum hemoglobin values and the difference between them. Antepartum and postpartum hemoglobin values decreased from the primiparous group to the grand multiparous group ($p < 0.05$).

There was a significant difference between the groups according to gestational diabetes, gestational hypertension and abortion imminence. The frequency of gestational diabetes, gestational hypertension and preterm birth threat increased from the nulliparous group to the grand multiparous group ($p < 0.05$).

Table II. Distribution of primiparous, multiparous and grand multiparous women according to neonatal outcomes.

	Primipar n: 258	Multipar n: 724	Grandmultipar n: 149	<i>p</i>
Fetal weight	3071.63 ± 481.95 ^a	3149.12 ± 636.18 ^a	2834.40 ± 366.89 ^b	0.001**
APGAR 1 min	7.28 ± 0.58	7.73 ± 0.57	7.62 ± 0.63	0.410*
APGAR 5 min	9.01 ± 0.35	9.04 ± 0.34	9.06 ± 0.46	0.621*
Neonatal intensive care unit (NICU) n (%)				
No	246 (95.3)	695 (95.9)	142 (95.3)	0.348*
Yes	12 (4.1)	29 (4.1)	7 (4.7)	
Small for gestational age n (%)				0.001*
No	244 (94.6)	657 (90.7)	131 (87.9)	
Yes	14 (5.4)	67 (9.3)	18 (12.1)	
Macrosomia n (%)				0.109
No	245 (95.3)	688 (95.0)	142 (95.3)	
Yes	13 (4.7)	36 (5.0)	7(4.7)	

SD; Standard deviation. *Fisher exact test **ANOVA test, Values in bold represent statistically significant results. Column percentages are given. ^{a,b}shows the differences between the groups.

There is a significant difference between the groups according to preeclampsia. The frequency of preeclampsia in the nulliparous group was significantly higher than in the other groups ($p < 0.05$).

There is a significant difference between the groups according to abortion imminent. The incidence of abortion imminent increased from the primiparous group to the grand multiparous group ($p < 0.05$).

There is a significant difference between the groups according to hyperemesis gravidarum. The frequency of hyperemesis gravidarum in the nulliparous group was significantly higher than in the other groups ($p < 0.05$).

There was no significant difference in the comparison of groups according to premature rupture of membranes and post-term pregnancy ($p > 0.05$).

The distribution of groups according to neonatal characteristics is presented in Table II. There was a difference between groups according to birth weight. As the parity number of the groups increased, the birth weights decreased. There was a difference between groups according to low birth weight. Grand multiparas are more likely to have a low-birth-weight baby. There was no significant difference between the groups according to NICU (need for newborn intensive care), Macrosomia, and APGAR scores.

Table I. Distribution of groups according to maternal characteristics.

	Nullipar n: 258	Multipar n: 724	Grandmultipar n: 149	p
Age (mean \pm SD)	28.45 \pm 4.08	29.34 \pm 4.22	29.08 \pm 4.24	0.45
Cigarette smoking				
No	22 (8.7)	637 (87.9)	131 (87.9)	0.212*
Yes	29 (11.3)	87 (12.1)	18 (12.1)	
Socioeconomic status				
Low	53 (20.5)	153 (21.1)	31 (20.8)	0.345*
Medium	179 (69.4)	502 (69.4)	102 (68.5)	
High	26 (10.1)	69 (9.5)	16 (10.7)	
Gravida (mean \pm SD)	1.05 \pm 0.21 ^a	3.12 \pm 1.01 ^b	6.00 \pm 1.21 ^c	0.001**
Antepartum hemoglobin (mean \pm SD)	13.08 \pm 1.57 ^a	12.73 \pm 1.18 ^b	12.28 \pm 1.16 ^c	0.001**
Postpartum hemoglobin (mean \pm SD)	12.02 \pm 1.57 ^a	11.41 \pm 1.13 ^b	9.68 \pm 1.23 ^c	0.001**
Difference of antepartum and postpartum hemoglobin (mean \pm SD)	1.06 \pm 0.64 ^a	1.32 \pm 0.63 ^b	2.60 \pm 0.90 ^c	0.001**
Gestational diabetes n (%)				
No	252 (97.7)	689 (95.0)	133 (89.3)	0.01*
Yes	6 (2.3)	35 (5.0)	16 (10.7)	
Gestational hypertension n (%)				
No	249 (96.5)	686 (94.8)	128 (92)	0.01*
Yes	9 (3.5)	38 (5.2)	21 (8.0)	
Premature rupture of membranes (PROM) n (%)				
No	248 (97.6)	703 (97.2)	145 (97.4)	0.09*
Yes	10 (2.4)	21 (2.8)	4 (2.6)	
Premature birth threat n (%)				
No	241 (93.4)	665 (91.9)	134 (89.9)	0.01*
Yes	17 (6.6)	59 (8.1)	15 (10.1)	
Postterm pregnancy n (%)				
No	246 (95.3)	690 (95.3)	142 (95.3)	0.65
Yes	12 (4.7)	34 (4.7)	7 (4.7)	
Preeclampsia n (%)				
No	237 (91.8)	696 (96.1)	143 (95.9)	0.04*
Yes	21 (8.2) ^a	28 (3.9) ^b	6 (4.1) ^b	
Abortion imminens n (%)				
No	246 (95.3)	682 (94.1)	131 (87.9)	0.01*
Yes	12 (4.7)	42 (5.9)	18 (12.1)	
Hyperemesis gravidarum n (%)				
No	239 (92.6)	695 (95.9)	143 (95.9)	0.03*
Yes	19 (7.4) ^a	29 (4.1) ^b	6 (4.1) ^b	

SD; Standard deviation. *Fisher exact test **ANOVA test. Values in bold represent statistically significant results. Column percentages are given. ^{a,b,c}shows the differences between the groups.

Discussion

Many studies⁸⁻¹⁰ have been conducted on grandmultiparity in the literature. However, in these studies, grand multiparity was not evaluated as an independent risk factor but was evaluated together with many risks such as age, socioeconomic level, and smoking. Van Regional Training and Research Hospital is one of the tertiary health centers with the highest fertility rate. Patients with similar socioeconomic status in the Van province region, where the rate of grand multiparity at an early age is high, and pregnant women who applied to our hospital were included in the study. In particular, increased risks due to grand multiparity and prenatal and postnatal complications were evaluated independently of age, smoking, socioeconomic and ethnic background.

Studies show that the prevalence of complications related to grand multiparity, such as malpresentation, placenta previa, postpartum hemorrhage and preeclampsia, increase with maternal age⁶⁻⁸. The increase in complications due to maternal age prevented us from understanding whether grand multiparity or age affected the risk of this complication, and it could not be evaluated as an independent risk factor. Most studies have suggested that grand multiparas are more likely to be older, which may be the cause of increased morbidity and mortality. This factor is difficult to eliminate in clinical practice. Because women who have given birth to multiple births are older, it is difficult to distinguish whether the complications in these patients are related to advanced age or grand multiparity^{6,7,11}.

In another study, it was shown that young grand multiparity only decreased the risk for many complications compared to older grand multiparous patients but increased many complications compared to primiparous and multiparous patients⁹. Differently, in our study, since the groups were similar in terms of age, risk factors were evaluated only according to parity.

Studies have shown that low socioeconomic conditions are associated with greater polygamy^{5,12}. Most studies investigating the association between grand multiparity, and pregnancy outcomes report a lack of prenatal care. This situation causes low birth weight babies to be observed more frequently in grand multiparous women^{5,8,9}. However, in these studies, it is not fully understood whether socioeconomic level or grand multiparity causes low birth weight. We

evaluated the complications in grand multipara and other patients independently of other known risk factors, thanks to the inclusion of patients with generally similar sociocultural and socioeconomic status in our region. In our study, we concluded that grand multiparity is a risk factor for low-birth-weight babies regardless of age and socioeconomic status. However, we did not look at the status of receiving antenatal care in our study. New studies should be conducted to evaluate patients with the same antenatal care.

Researchers show that the prevalence of hypertensive pregnancy disorders, one of the complications of pregnancy, is higher in grand multiparous patients than in grand multiparous patients¹³. In this study, unlike the previous study^{8,9}, nulliparous, multiparous and grand multiparous patients with the same age and socioeconomic status were evaluated. While the frequency of gestational hypertension increased with parity, preeclampsia was evaluated as low. According to a systematic review conducted in England¹⁴ and a study conducted in Italy¹⁵ regarding Doppler ultrasound, Doppler ultrasound is one of the most important parameters used to evaluate fetal health and neonatal outcomes in high-risk pregnancies such as hypertensive disorders of pregnancy. However, we did not use Doppler ultrasound in our study.

Postpartum bleeding is also reported in the literature as a prevalent complication in grand multiparous women^{16,17}. Studies have reported that grand multiparity is the predominant risk factor for postpartum haemorrhage^{13,17}. Similarly, in our study, grand multiparity was found to be an independent risk factor for postpartum hemorrhage. At the same time, antepartum and postpartum hemogram values were found to be lower.

In a study on neonatal outcomes with grand multiparity in patients of similar age groups, it was found that grand multiparous women had twice the probability of malpresentation and three times more meconium-stained fluid and a high prevalence of placenta previa compared to women whose birth resulted in abortion¹⁸. APGAR score was observed to be lower in grand multiparity and grand multiparity was considered an independent risk factor for low birth weight¹⁸. In our study, there was no difference between APGAR scores. The frequency of low-birth-weight babies was found to be higher. Grand multiparity was considered an independent risk factor for low birth weight.

Conclusions

Studies in developed countries report better obstetric outcomes associated with grand multiparity. Most of the negative outcomes associated with grand multiparity are reported as advanced age, less antenatal care, and low socioeconomic status. In our study, we examined patients who were similar in terms of age, smoking and socioeconomic status. When age, smoking and socioeconomic differences were eliminated, we found that grand multiparity alone is like a risk factor for postpartum bleeding, gestational hypertension, and gestational diabetes. In this study, we did not study whether pregnant women were given antenatal care, and since we received the patients from the same center, the results may have been similar. Therefore, a more detailed study should be conducted on this subject. Due to the increased risks seen in grand multiparous patients, pregnancy follow-up and delivery should be done more frequently and more carefully. These pregnant women should be followed up more closely, and family planning studies should be done more closely.

Conflict of Interest

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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Informed Consent

The authors declare that the patients included in the study signed informed consent forms to use their medical information in the studies.

Authors' Contribution

Concept: Y.B., K.U., İ.Ç.; Design: Y.B., K.U., İ.Ç.; Supervision: Y.B., K.U., İ.Ç.; Funding: Y.B., K.U., İ.Ç.; Materials: Y.B., K.U., İ.Ç.; Data: Y.B., K.U., İ.Ç.; Analysis: Y.B., K.U., İ.Ç.; Literature search: Y.B., K.U., İ.Ç.; Writing: Y.B., K.U., İ.Ç.; Critical revision: Y.B., K.U., İ.Ç.

Data Availability

The data used and analyzed during this research are available from the corresponding author upon reasonable request.

Ethical Approval

Ethics committee approval released by the Van Training and Research Hospital with the decision dated 04.01.2023 and numbered 2023-01-04.

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