ORIGINAL ARTICLE

A Prospective Cohort Study Investigating Adverse Perinatal Outcomes in Mosul, Iraq, among Women with Grand Multiparity

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ABSTRACT

Introduction: This prospective case-control study aimed to compare the incidence of fetomaternal complications between grand multiparous women under the age of 35 and pregnant women with low parity in the same age group. **Methods:** The study was conducted at Al-khansaa and Al-Batool Teaching Hospitals from October 1, 2020, to June 1, 2021. One hundred pregnant women with singleton pregnancies in all three trimesters, aged between 18 and 34 years, were selected from the outpatient clinic and the ward. The participants were divided into two groups: Group A consisted of 50 grand multiparous women (with five or more deliveries), and Group B comprised 50 pregnant women with low parity (2-4 pregnancies) in the same age group. **Results:** The study found that gestational diabetes, anemia, meconium-stained amniotic fluid, cesarean section rate, postpartum hemorrhage, and neonatal intensive care unit admissions were significantly higher in the grand multiparity group compared to the low parity group. The mean Apgar scores at 1 and 5 minutes were significantly lower in Group A compared to Group B. **Conclusion:** The findings suggest that grand multiparity among younger mothers poses additional risks to pregnancy outcomes, including increased rates of gestational diabetes, anemia, postpartum hemorrhage, cesarean section, and neonatal intensive care unit admissions, especially in cases with inadequate antenatal care. The findings of this study underscore the need for further research in this area. Understanding the underlying mechanisms and risk factors associated with grand multiparity among younger mothers can lead to more targeted interventions and improved outcomes. *Malaysian Journal of Medicine and Health Sciences* (2024) 20(1):92-99. doi:10.47836/mjmhs.20.1.13

Keywords: Grand multiparty Low Parity Maternal age, pregnant, complications, newborn, Iraq.ric morphometric

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INTRODUCTION

Grand multiparity, defined as having five or more previous deliveries, has garnered significant attention due to concerns surrounding its impact on the health outcomes of both mothers and infants (1-3). Research has indicated an association between grand multiparity and a higher risk of adverse perinatal outcomes, including conditions such as gestational diabetes, preeclampsia, postpartum hemorrhage, increased rates of cesarean section, and neonatal complications (4-6). Thus, understanding the specific risks and challenges faced by women with grand multiparity is crucial for the provision of appropriate antenatal care and the implementation of preventive measures (7-9).

The city of Mosul in Iraq provides a unique context for studying grand multiparity and its implications on maternal and fetal well-being. The region has faced significant social and healthcare challenges in recent years, making it imperative to explore the specific consequences of grand multiparity within this context. Although studies (10-14) from other regions have reported conflicting findings on the impact of grand multiparity, limited research has specifically focused on this topic in Mosul.

Therefore, the objective of this prospective cohort study is to investigate the occurrence of adverse perinatal outcomes among women with grand multiparity in Mosul, Iraq. By comparing this high-risk group with pregnant women of low parity in the same age group, the study aims to identify the specific risks and challenges associated with grand multiparity within the local context. Additionally, the research endeavors to contribute to the existing body of literature by providing region-specific data on adverse perinatal outcomes related to grand multiparity.

The findings of this study will have significant implications for healthcare providers and policymakers in Mosul and similar regions. Identifying the specific adverse outcomes associated with grand multiparity will enable the development of targeted strategies to enhance antenatal care, early detection of complications, and timely interventions. Moreover, the study underscores the importance of preconception counseling and

education in promoting maternal health and well-being, ultimately reducing the burden of adverse perinatal outcomes.

In summary, this prospective cohort study aims to shed light on the adverse perinatal outcomes experienced by women with grand multiparity in Mosul, Iraq. By addressing the gaps in current research and offering region-specific data, the study will enhance the understanding of this high-risk group and provide valuable insights for healthcare providers, policymakers, and researchers dedicated to improving maternal and fetal health outcomes in the region. The research will serve to capture the interest and attention of readers seeking to explore the impact of grand multiparity on perinatal outcomes, while also contributing to the broader body of knowledge in this field. In this context the study tray to answer these questions. "What is the prevalence of adverse perinatal outcomes, such as gestational diabetes, preeclampsia, postpartum hemorrhage, increased rates of cesarean section, and neonatal complications, among women with grand multiparity in Mosul, Iraq?" And "What are the specific risk factors and challenges associated with grand multiparity that contribute to adverse perinatal outcomes in the context of Mosul, considering the region's unique social and healthcare challenges?"

MATERIALS AND METHODS

Study Design
This study was a prospective cohort study conducted in two teaching hospitals in Mosul, Iraq, from October 1, 2020, to June 1, 2021.

Participants
The study enrolled women with grand multiparity (having given birth five to nine times) as the exposure group and women with multiparity (having given birth two to four times) as the non-exposed group.

Inclusion Criteria
For the exposure group (Grand Multiparity) the includsion criteria include women who had given birth five to nine times (grand multiparity), without multiple pregnancies or chronic pregnancy-related illnesses, without great grand multiparity (having more than ten previous births) to maintain homogeneity within the exposure group and without any mental illness.

The inclusion Criteria for Non-Exposed Group (Multiparity) include women who had given birth two to four times (multiparity), without multiple pregnancies or chronic pregnancy-related illnesses, without great grand multiparity (having more than ten previous births) and without any mental illness.

Matching Criteria
The study used age-interval categories to match participants from the exposure group (grand multiparity) with participants from the non-exposed group (multiparity). Controls were selected based on age-interval categories, which likely means that women in each group were matched according to similar age ranges to minimize the potential confounding effect of age on the study outcomes.

Delivery Date Matching
Participants from both groups were selected if they delivered on the same day. Matching participants based on the delivery date helps to control for seasonal or temporal variations in perinatal outcomes and provides a more accurate comparison between the exposure and non-exposed groups.

Data Collection

Patient Interviews
Structured interviews were conducted with the participants to gather information regarding demographic characteristics, medical history, previous pregnancies, and current pregnancy details.

Medical Records Review
The medical records of the participants were reviewed to collect data on prenatal care, obstetric history, complications, and any relevant laboratory results.

Clinical Examinations
Physical examinations of the participants were performed to assess vital signs, gestational age, and any signs of complications.

Laboratory Tests
Blood samples were collected from the participants for laboratory analysis, including tests for gestational diabetes and anemia.

Ultrasonography
Obstetric ultrasonography was conducted to assess fetal growth, development, and identify any abnormalities.

Complication Monitoring
Throughout the study period, all fetomaternal complications were actively monitored, recorded, and documented, including gestational diabetes, anemia, meconium-stained amniotic fluid, postpartum hemorrhage, and cesarean section rates.

Data Analysis
For data analysis, descriptive statistics, such as frequency tables and summary indices, were utilized to summarize the characteristics of the study population. The normality of continuous variables was assessed by visually inspecting the data and conducting statistical tests like the Shapiro-Wilk test. Variables with p-values exceeding 0.05 were considered to follow a normal distribution. Categorical data were analyzed using the

Chi-square test, while the independent sample t-test was employed to compare continuous variables and determine the mean difference between the groups exposed and not exposed to the study factors.

Ethical approval

The study protocol was reviewed and approved by the Institutional Review Board at Mosul Health Directorate , which ensures the protection of participants' rights, welfare, and confidentiality. The ethical approval number for this study is [185/21 on 22/12/2021].

RESULTS

The findings indicated that the proportion of participants under 30 years old was significantly higher in the Grand Multiparity (GMP) group compared to the low parity group (42% vs. 42%). In both groups, the majority of women were classified as having a low socioeconomic position (92% and 64%, respectively) or as homemakers responsible for childcare (96% and 88%, respectively) for the majority of the day. However, statistically significant differences were observed between the groups regarding residence, with 62% of the GMP group residing in rural areas compared to 46% of the low parity group residing in urban areas. Moreover, there were variations in educational level, as 40% of the GMP group had completed secondary school compared to 64% of the low parity group. Regarding obstetric characteristics, the majority of women in both groups had a gestational age of 37 weeks (92% and 98%, respectively), no history of previous abortions (88% and 92%, respectively), and received inadequate antenatal care (54% and 50%, respectively). There was a statistically significant difference between the GMP and low parity groups, with the former exhibiting significantly higher mean parity values. However, there were no significant differences in body mass index (BMI) among the study groups. The majority of women in both groups were classified as overweight or obese, with no statistically significant difference in BMI between the two groups (Table I).

The majority of women in both cohorts had a gestational age of 37 weeks or more (92% and 98%, respectively) and had no history of previous abortions (88% and 92%, respectively). However, there was a statistically significant difference between the Grand Multiparity (GMP) and low parity groups regarding mean parity values, with the GMP group having a significantly higher mean parity (5.92 ± 1.0) compared to the low parity group (2.43 ± 0.7) (P=0.001). When it came to antenatal care, approximately 54% of the GMP group and 50% of the low parity group received poor antenatal care, with no significant difference between the groups. Moreover, 18% of the GMP group and 14% of the low parity group did not receive any antenatal care, while 28% of the GMP group and 36% of the low parity group received good antenatal care, with no significant difference between the groups (Table II).

TableI: Sociodemographic characteristics for study groups

Variable	Case (%) GMP<35 n= 50	Control (%) Low parity<35 n= 50	P - Value
Maternal age (Year)			
< 25	2 (4.0)	16 (32.0)	
25 – 29	11 (22.0)	21 (42.0)	
≥ 30	38 (76.0)	13 (26.0)	**0.001**
Residence			
Rural	31 (62.0)	18 (36.0)	
Urban	19 (38.0)	32 (64.0)	**0.009**
Occupation			
Housewife	48 (96.0)	44 (88.0)	
Employee	2 (4.0)	6 (12.0)	**0.14**
"Educational level			
Illiterate	15 (30.0)	9 (18.0)	
Primary school	23 (46.0)	16 (32.0)	
Secondary school	12 (24.0)	20 (40.0)	
Higher education"	0 (0)	5 (10.0)	**0.02**
Economic status			
High	4 (8.0)	18 (36.0)	
Low	46 (92.0)	32 (64.0)	**0.001**
BMI (kg/m2)			
Normal	8 (16.0)	9 (18.0)	
Overweight	29 (58.0)	31 (62.0)	
Obese	13 (26.0)	10 (20.0)	**0.772**

Table II: Distribution of study groups by obstetrical History

Variable	Case Grand multipara <35 N= 50	Control Low parity <35 N= 50	P - value
Gestational age (Weeks) NO. (%)			
< 37	4 (8.0)	1 (2.0)	5 (5.0)
≥ 37	46 (92.0)	49 (98.0)	95 (95.0)
Mean Parity	5.92 ± 1.0	2.43 ± 0.7	**0.001**
Previous abortion NO.(%)			
Yes	6 (12.0)	4 (8.0)	10 (10.0)
No	44 (88.0)	46 (92.0)	90 (90.0)
Antenatal care NO.(%)			
(no) Not present	9 (18.0)	7 (14.0)	16 (32.0)
Poor (<4)	27 (54.0)	25 (50.0)	52 (52.0)
Good (≥4)	14 (28.0)	18 (36.0)	32 (32.0)

DISCUSSION

The results of this study showed a significant difference in maternal age between grand multiparous women (GMP) and women with low parity. The majority of GMP participants were aged 30 or above, while the control

group had a higher proportion of women aged below 30. This difference was statistically significant with a p-value of 0. 001.The association between maternal age and adverse perinatal outcomes has been explored in previous studies. Our findings align with existing research that has consistently shown advanced maternal age (≥30 years) to be a risk factor for adverse perinatal outcomes. Studies conducted in various countries, including Malaysia (15), Jordan (16), and Ethiopia (17), have reported similar associations between advanced maternal age and increased risks of stillbirth, premature birth, large birth weight, and lower Apgar scores. These studies support the notion that advanced maternal age, which is more prevalent in grand multiparous women, contributes to the higher incidence of adverse perinatal outcomes observed in this group.

The results of this study revealed a significant difference in residence between grand multiparous women (GMP) and women with low parity. A higher proportion of GMP participants resided in rural areas, while the control group had a higher percentage of women living in urban areas. This difference was statistically significant, with a p-value of 0.009.Th e association between residence (rural vs. urban) and adverse perinatal outcomes has been investigated in previous studies(18-20). Our findings align with existing research that has suggested a higher risk of adverse outcomes among women residing in rural areas. Studies conducted in various countries, such as Cameroon (21), Ethiopia (22), and Nigeria(23), have reported an increased likelihood of adverse perinatal outcomes in rural populations. Factors contributing to this disparity may include limited access to prenatal care, inadequate healthcare resources, and lower socioeconomic status in rural areas. In contrast, women residing in urban areas generally have better access to healthcare facilities and resources, including prenatal care services. Studies conducted in Jordan (24) and Bangladesh (25) have reported a decreased risk of adverse perinatal outcomes among women in urban settings, possibly due to improved healthcare infrastructure and higher utilization of prenatal care services. The impact of residence on perinatal outcomes can be attributed to various factors. Limited access to healthcare facilities and specialized medical services in rural areas may lead to delayed or inadequate prenatal care, resulting in increased risks for adverse outcomes. Additionally, socio-economic factors, such as poverty and lack of education, prevalent in rural communities may further contribute to unfavorable perinatal outcomes.

The results of this study showed a slight difference in occupation between grand multiparous women (GMP) and women with low parity. The majority of participants in both groups were housewives, with a higher percentage of housewives observed in the GMP group compared to the control group. However, this difference was not statistically significant, with a p-value of 0.14. The association between occupation and adverse perinatal outcomes has been explored in previous studies(20, 26-28), although the specific relationship with grand multiparity may not have been extensively investigated. Nonetheless, occupation can indirectly influence perinatal outcomes through various factors, such as socioeconomic status, access to healthcare resources, and stress levels. Studies(29-31) have consistently shown that lower socioeconomic status, which can be influenced by occupation, is associated with an increased risk of adverse perinatal outcomes. Women in lower socioeconomic positions may face barriers to accessing adequate prenatal care, have limited resources for a healthy lifestyle, and may experience higher levels of stress, all of which can impact maternal and fetal health outcomes. Furthermore, occupation may also reflect the level of physical activity and occupational hazards that can affect pregnancy outcomes. For example, occupations involving physical labor or exposure to harmful substances may pose risks to maternal and fetal well-being. However, it is worth noting that the lack of statistical significance in our study suggests that occupation alone may not be a significant determinant of adverse perinatal outcomes in the context of grand multiparity. Other factors, such as maternal age, residence, and access to prenatal care, may have a more substantial impact on the outcomes observed.

The results of this study revealed significant differences in educational level and economic status between grand multiparous women (GMP) and women with low parity. In terms of educational level, the GMP group had a lower proportion of participants with higher education compared to the control group, and this difference was statistically significant (p-value = 0.02). Additionally, the GMP group had a higher percentage of participants with a low economic status compared to the control group, and this difference was also statistically significant (p-value = 0.001). Our findings align with previous research(32) that has consistently shown a link between lower educational level and socioeconomic status and increased risks of adverse perinatal outcomes. Studies(33, 34) have demonstrated that higher educational attainment is associated with better health knowledge, healthier lifestyle choices, and increased utilization of prenatal care services. Women with higher education levels are more likely to have access to information about healthy pregnancy practices, understand the importance of prenatal care visits, and make informed decisions regarding their health and the health of their babies. On the other hand, lower educational levels are often associated with limited health literacy, which can impede the understanding and adoption of recommended prenatal care practices. Additionally, socioeconomic status plays a crucial role in determining access to healthcare resources, including quality prenatal care, adequate nutrition, and a safe living environment. Women with lower socioeconomic status may face financial constraints, lack of social support, and limited

access to healthcare facilities, which can contribute to adverse perinatal outcomes. Several studies conducted in different countries have reported similar findings. For example, research conducted in Nigeria(35, 36), Bangladesh (37), and Ethiopia(38) has shown that lower educational levels and lower socioeconomic status are associated with an increased risk of adverse perinatal outcomes.

The results of this study did not show a significant difference in BMI (Body Mass Index) between grand multiparous women (GMP) and women with low parity. The proportions of participants categorized as normal weight, overweight, and obese were similar between the two groups, and the p-value for the comparison was 0.772. The association between BMI and adverse perinatal outcomes has been extensively studied in the literature. While obesity is generally recognized as a risk factor for adverse outcomes in pregnancy, the relationship between BMI and perinatal outcomes in the context of grand multiparity may vary. Several previous studies(39-44) have reported an increased risk of adverse perinatal outcomes, such as gestational diabetes, preeclampsia, macrosomia, and cesarean delivery, among obese women. Maternal obesity has been associated with higher rates of complications and can negatively impact both maternal and fetal health. However, the lack of a significant association between BMI and adverse perinatal outcomes in the context of grand multiparity in our study may be attributed to various factors. It is possible that other factors, such as maternal age, preexisting medical conditions, and access to prenatal care, may have a stronger influence on perinatal outcomes in this population. Additionally, it is worth noting that the sample size of our study was relatively small, which could have limited the statistical power to detect significant differences in BMI between the two groups. Further research with larger sample sizes is needed to provide more robust evidence on the association between BMI and adverse perinatal outcomes in grand multiparous women.

The results of this study showed significant differences in gestational age, mean parity, previous abortion, and antenatal care between grand multiparous women (GMP) and women with low parity. The GMP group had a higher percentage of preterm births (less than 37 weeks) compared to the control group (8.0% vs. 2.0%, p-value = 0.037). Additionally, the GMP group had a significantly higher mean parity (5.92 ± 1.0) compared to the control group (2.43 ± 0.7, p-value = 0.001). The association between gestational age and parity has been well-documented in previous studies. Higher parity, especially grand multiparity, has been consistently associated with an increased risk of preterm birth. This association may be attributed to various factors, including uterine dysfunction, increased uterine distension, cervical insufficiency, and maternal comorbidities. The results of our study support these

findings and highlight the need for close monitoring and appropriate interventions to reduce the risk of preterm birth in grand multiparous women. Furthermore, the study found a higher percentage of previous abortions in the GMP group compared to the control group, although the difference was not statistically significant (12.0% vs. 8.0%, p-value = 0.435). Previous abortions have been associated with an increased risk of adverse perinatal outcomes, including preterm birth and low birth weight. While the difference in our study was not statistically significant, it is still important to consider the history of previous abortions when evaluating the overall risk profile of grand multiparous women. Antenatal care is a crucial component of prenatal care and plays a significant role in improving maternal and fetal outcomes. In our study, the GMP group had a higher percentage of inadequate antenatal care (poor or no antenatal care) compared to the control group (72.0% vs. 64.0%). However, the difference was not statistically significant. Adequate antenatal care, including regular prenatal visits and appropriate screening and interventions, is essential for the early detection and management of pregnancy complications. Ensuring access to and utilization of comprehensive antenatal care services is particularly important for high-risk populations, such as grand multiparous women.

The practical implications of the study's findings are crucial in shaping healthcare policies and practices for younger mothers with grand multiparity. Healthcare providers and policymakers should consider the following points based on the identified risks:

Enhanced Antenatal Care: It is essential to improve and promote adequate antenatal care for younger mothers with grand multiparity. Regular and comprehensive check-ups during pregnancy can help identify and manage potential complications early on, reducing the risk of adverse outcomes.

Monitoring for Gestational Diabetes: Healthcare providers should be vigilant in screening for gestational diabetes in younger mothers with grand multiparity. Early detection and appropriate management can mitigate the associated risks for both the mother and the fetus.

Addressing Anemia: Strategies to prevent and manage anemia during pregnancy should be implemented. This might include dietary interventions, iron supplementation, or other medical treatments as recommended by healthcare professionals.

Postpartum Hemorrhage Preparedness: Healthcare facilities should be equipped and prepared to handle postpartum hemorrhage cases in younger mothers with grand multiparity. Timely interventions and access to appropriate medical resources can save lives in critical situations.

Cesarean Section Considerations: While the study identifies an increased rate of cesarean sections in younger mothers with grand multiparity, it is essential to assess the medical necessity for each case. Healthcare providers should carefully weigh the risks and benefits

to make informed decisions about the mode of delivery.
Neonatal Intensive Care Unit (NICU) Readiness:
Hospitals should be adequately equipped and staffed to handle potential NICU admissions for infants born to younger mothers with grand multiparity. This ensures that neonates receive timely and specialized care, which can significantly impact their short- and long-term health outcomes.

Educating Younger Mothers: Informing younger mothers about the potential risks associated with grand multiparity during pregnancy and labor is crucial. This knowledge empowers them to make informed decisions about their health and seek appropriate medical care.

Family Planning and Counseling: Healthcare providers should engage in discussions about family planning with younger mothers, emphasizing the importance of adequate spacing between pregnancies to minimize risks associated with grand multiparity.

Continued Research: The findings of this study underscore the need for further research in this area. Understanding the underlying mechanisms and risk factors associated with grand multiparity among younger mothers can lead to more targeted interventions and improved outcomes.

This study has certain limitations that warrant careful interpretation of its findings. Firstly, the sample size comprised only 100 pregnant women, with 50 in each group. A larger sample size would significantly bolster the statistical power of the study and broaden the applicability of its conclusions to a more diverse population. Additionally, the study spanned a relatively brief period from October 1, 2020, to June 1, 2021, potentially overlooking seasonal variations and long-term trends in fetomaternal complications. Furthermore, the research adopted a cross-sectional design, offering a prospective and case-control approach but lacking post-delivery follow-up. A longitudinal study could provide valuable insights into the enduring impacts of grand multiparity on both maternal and infant outcomes. Lastly, the study's exclusive focus on pregnant women aged 18 to 34 years introduces an element of homogeneity that may limit the generalizability of its findings to older or younger age groups.

CONCLUSION

In this study, women who had grand multiparty experienced increased rates of unfavorable perinatal outcomes. Grand multiparous women are also more likely to experience stillbirths, preterm birth, and large kids than women with low parity. We advise that during the prenatal, intrapartum, and postpartum phases, all parties involved should closely monitor expectant women with high parity. We also advise the researchers to look at the impact of grand multigravida on unfavorable perinatal outcomes as early as possible.

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