RESEARCH ARTICLE

CYPRUS
JOURNAL OF MEDICAL SCIENCES

DOI: 10.4274/cjms.2024.2024-77
Cyprus J Med Sci 2025;10(1):33-37

The Impact of Grand Multiparity on Perinatal and Neonatal Results in Females Over 35 Years of Age

Ufuk Atlıhan[1], Onur Yavuz[2], Hüseyin Aytuğ Avşar[3], Can Ata[4], Selçuk Erkılınç[5], Tevfik Berk Bildacı[6]

[1]Clinic of Obstetrics and Gynecology, Private Karataş Hospital, İzmir, Türkiye
[2]Department of Obstetrics and Gynecology, Dokuz Eylül University Faculty of Medicine, İzmir, Türkiye
[3]Clinic of Obstetrics and Gynecology, İzmir Tınaztepe University, Private Galen Hospital, İzmir, Türkiye
[4]Clinic of Obstetrics and Gynecology, Buca Seyfi Demirsoy Training and Research Hospital, İzmir, Türkiye
[5]Department of Oncology, İzmir Democracy University Faculty of Medicine, İzmir, Türkiye
[6]Department of Obstetrics and Gynecology, İzmir Democracy University Faculty of Medicine, İzmir, Türkiye

Abstract

BACKGROUND/AIMS: The purpose of this current research was to evaluate the perinatal and neonatal outcomes among >35-year-old grand multiparous, multiparous, and primiparous pregnant females.

MATERIALS AND METHODS: In this study, a total of 156 patients who underwent pregnancy follow-up and gave birth in the obstetrics clinic between January 2018 and January 2024 were included. The participants were divided into 3 groups based on primiparous (single birth), multiparous (2-4 births), and grand multiparous (5 or more births). The age, parity, type of birth, presence of perineal tears, blood transfusion history, presence of gestational hypertension, and gestational diabetes during pregnancy were scanned retrospectively from the hospital database of the females analyzed in the research.

RESULTS: The mean body mass index of grand multiparous pregnant females was 27.4±3.1 kg/m^2, which was considerably larger than that of the other groups (p=0.032). The gravida number of grand multiparous pregnant females was 6 (5.7) and the parity number was 6 (5.5), which were found to be higher than in the other groups (p=0.012, p=0.008, respectively). The rate of perineal laceration was considerably higher in the primiparous pregnant group than in the other groups (p=0.021). When compared with regard to pregnancy and birth-complications, estimated blood loss volume and >1000 cc bleeding rates were shown to be considerably larger in primiparous-pregnancies than in other pregnancies (p=0.012, p=0.046, respectively). Neonatal intensive care unit need was observed tobe significantly greater in the primiparous pregnant groups than in the other groups (p=0.024).

CONCLUSION: In this current research we showed that grand multiparity (GM) has complication rates similar to other groups and is not a risk factor alone. Advanced maternal age may also be associated with difficulties associated with GM. Pregnancy monitoring and birth should be performed more frequently and carefully to reduce risks in this patient group.

Keywords: Advanced maternal age, multiparity, neonatal, perinatal

To cite this article: Atlıhan U, Yavuz O, Avşar HA, Ata C, Erkılınç S, Bildacı TB. The impact of grand multiparity on perinatal and neonatal results in females over 35 years of age. Cyprus J Med Sci. 2025;10(1):33-37

ORCID IDs of the authors: U.A. 0000-0002-2109-1373; O.Y. 0000-0003-3716-2145; H.A.A. 0000-0003-0636-3104; C.A. 0000-0002-0841-0480; S.E. 0000-0002-6512-9070; T.B.B. 0000-0002-6432-6777.

Corresponding author: Ufuk Atlıhan
E-mail: cfl.ufuk@gmail.com
ORCID ID: orcid.org/0000-0002-2109-1373

Received: 13.08.2024
Accepted: 30.10.2024
Publication Date: 14.03.2025

INTRODUCTION

Grand multiparity (GM) is generally referred to the pregnant females having a parity of five or more.[1] Some previous studies showed that higher perinatal-mortality, postpartum-hemorrhage (PPH), cesarean section (C/S) rates, placenta-previa, antepartum-hemorrhage, diabetes mellitus, and iron deficiency-anemia, are all considerably higher in GM patients.[2-4] According to some research, there is no difference in the antepartum complication rate between grand multiparous-pregnancies and ordinary multiparous pregnancies.[5,6] Complications associated with GM are less common because GM is not common in developed countries due to socioeconomic and sociocultural factors. GM and its accompanying complications have become a problem and can cause maternal and newborn death and morbidity, especially in developing and underdeveloped countries.[7-10] Gestational diabetes mellitus (GDM), gestational hypertension (GHT), premature birth, and postpartum hemorrhage are among the most common pregnancy complications of grand multiparous females.[7-10] Studies have reported that the prevalence of these complications increases with maternal age.[11] In another study that considered maternal age as a separate risk factor in this respect, socioeconomic status and conditions that trigger cardiovascular disease were not excluded.[12] Advanced maternal age was independently linked with many GM problems.[13] The purpose of this current investigation was to compare perinatal and neonatal outcomes between grand multiparous pregnant women aged 35 years and over and multiparous and primiparous pregnant women.

MATERIALS AND METHODS

The present research was constructed in a retrospective-observational design following the principles of the Declaration of Helsinki. Informed consent documents were obtained from each patient for the current investigation. This research was initiated after receiving ethics committee approval from Buca Seyfi Demirsoy Training and Research Hospital's Ethics Committee (approval number: 2024/292, date: 29.05.2024). A total of 156 pregnant women, whose pregnancy follow-up was performed in the Buca Seyfi Demirsoy Training and Research Hospital, Clinic of Gynecology and Obstetrics and who gave birth in our clinic, from January 2018 to January 2024, were included in the current research. Depending on their parity, the subjects were split into 3 groups: grand multiparous (5 or more births), multiparous (2-4 births), and primiparous (single births). Fifty-two patients in each of the primiparous, multiparous, and grand multiparous groups were analyzed in the research. Females aged >35 years and having a history of singleton pregnancy were included in the study. No perinatal or neonatal risks were detected in the previous pregnancies of the women included in this study. Those <35 years of age, females who had not given birth for >24 weeks, females with multiple-pregnancies, females with consanguineous marriages, females with coagulation disorders, and females whose information was incomplete were not included in the research. The age of the females in the research, gravida, body mass index (BMI) at the time of pregnancy, parity, number of abortions, smoking status, gestational age, type of birth, presence of perineal tear, prenatal and postpartum-hemoglobin and hematocrit scores, postpartum hysterectomy background, hospital stay, blood transfusion background, presence of GHT, and GDM were scanned retrospectively from the hospital database and patient files. Regular cigarette use was defined as 10 cigarettes per day.[14] Fetal congenital anomaly, 1st and 5th minutes Apgar scores, neonatal intensive care unit (NICU) history, birth weight data, and intrauterine fetal death history were evaluated. GDM was constructed according to the criteria established by the American Diabetes Association.[15] GDM is confirmed if one or more of these plasma glucose levels meet or exceeds the specified thresholds.: Fasting: 92 x mg/dL (5.1 x mmol/L), 1h: 180 x mg/dL (10.0 x mmol/L), 2h: 153 x mg/dL (8.5 mmol/L). A 75 g oral glucose tolerance tests (OGTT) test is conducted at 24-28 weeks in pregnant women who have never had diabetes before, and plasma glucose levels are evaluated during the first and second hours of fasting. After a minimum of eight hours of fasting overnight, the OGTT should be performed in the morning. Based on the most recent recommendations from the American-College of Obstetricians and Gynecologists bulletin,[15] GHT was diagnosed.[16] Proteinuria and hypertension together are diagnostic criteria for preeclampsia. After the 20th week of pregnancy, in females with formerly normal-blood pressure, GHT was defined as a systolic-blood pressure of no less than 140 mmHg or a diastolic-blood pressure of no less than 90 mmHg tested four hours apart or more. A systolic-blood pressure of 160 mmHg or greater or a diastolic-blood pressure of 110 mmHg or greater is considered severe hypertension. For the diagnosis of preeclampsia, females with hypertension must also exhibit proteinuria, which is defined as the presence of a minimum of 300 mg of protein in a 24-hour urine collection. Patients who satisfied the requirements for hypertension associated with preeclampsia but did not exhibit proteinuria or any severe additional complications were diagnosed with GHT.[16] Hemoglobin values <11 g/dL were used to diagnose anemia.[17] Delphicriterion was used to diagnose fetal growth restriction.[18] A fetus's death at >24 weeks' gestation was referred to as fetal mortality. Estimated blood loss volume, postpartum-hemoglobin score, and presence of blood transfusion were evaluated in the evaluation of peripartum-hemorrhage. The expected blood loss of >1000 mL was considered excessive. Control hemoglobin levels were measured in all females approximately 12 hours after birth. The estimated volume of blood loss was measured by utilizing the pregnant females's height, weight, and prenatal and postpartum hematocrit values.[19] Blood transfusion indications were determined in terms of vital signs, estimated blood loss volume, and postpartum hemoglobin value <8 g/dL.[19]

Statistical Analysis

Statistical analysis was performed using SPSS 26.0 (IBM-Inc-Chicago-IL-USA). The distribution normality was measured with the Kolmogrov-Smirnov test and Shapiro-Milk test, ANOVA, or Wallis test on the basis of whether the data demonstrated normal-distribution. The Fisher's exact and chi-square tests were employedin the categorical-data analysis. The quantitative-data of the patients were presented as mean ± standard deviation (minimum-maximum). The results were evaluated at a 95% confidence interval. The p-value, <0.05, was regarded as statistically significant. The post-hoc power analysis was performed using the G*Power 3.1 tool (Erdfelder-Faul-Buchner-Düsseldorf-Germany). A total of 144 was determined to be the required sample size.

RESULTS

The average age of the participants for this present research was found to be 38.1±2.5 and the average BMI was 26.2±3.8 kg/m^2. The average BMI of the grandimultiparous patients was; 27.4±3.1 kg/m^2, which was significantly higher than the BMI mean of the primiparous and multiparous patient groups (p=0.032). The mean gravida of the grand multiparous patients was 6 (5.7), and the parity mean was found to be 6 (5.5), which was significantly higher than the mean gravida and parity of the primiparous and multiparous patients (p=0.012, p=0.008; respectively) (Table 1).

The high rate of C/S in multiparous and grand multiparous pregnant females was attributed to the increase in the rate of previous C/S indications. In the primiparous group, one patient had cleft lip and palate, and one patient had umbilical hernia. In the multiparous group, one patient had cleft lip and palate, and one patient had syndactyly. In the grand multiparous group, one patient had trisomy 21. Two patients underwent hysterectomy due to uterine atony after vaginal birth. The rate of perineal laceration was significantly greater in the primiparous group than in the grand multiparous patients (p=0.015). ΔHb level was significantly greater in the primiparous group than in the other groups (p=0.016). When analyzed by comparing the pregnancy and birth complications, primiparous pregnancies had an estimated blood loss volume that was substantially larger than pregnancies that were multiparous (p=0.012). The >1000 cc bleeding rate was significantly greater in the primiparous patient group than in the grand multiparous patients (p=0.046) (Table 2).

The need for NICU was significantly greater in primiparous patients than in grand multiparous patients (p=0.024). Among primiparous patients, 8 (72.7%) patients requiring NICU had a history of vaginal birth. No significant differences were observed across the groups on the basis of Apgar (1st minute) and (5th minute) scores, birth weights, or fetal mortality rates (Table 3).

DISCUSSION

There were no notable differences observed in grand multiparous-pregnant females on the basis of perinatal and neonatal risks compared with other groups in the present study. The presence of perineal laceration estimated blood loss volume and NICU need were significantly higher in primiparous pregnant women. The mean BMI of grand multiparous pregnant women was significantly higher than that of the other groups. Many previous studies have evaluated the effects of GM in pregnancy. However, GM was not evaluated as an

Table 1. Intergroup comparison of demographic data

	Primiparous (n=52) Mean ± SD	Multiparous (n=52) Mean ± SD	Grand multiparous (n=52) Mean ± SD	p
Age (year)	38.0±2.5	38.1±2.6	38.2±2.4	0.860
BMI (kg/m²)	24.4±2.7	25.2±2.6	27.4±3.1	0.032
Smoking	12 (23%)	10 (19.2%)	13 (25%)	0.780
Gravida	1 (1.3)	3 (3.7)	6 (5.7)	0.012
Parity	-	3 (2.6)	6 (5.5)	0.008
Abortion	0 (0.2)	0 (0.1)	0 (0.2)	0.560
Gestational week	38.9±1.5	38.7±1.8	38.8±1.7	0.790

Values are expressed as frequency or percentage. Values are expressed as mean ± standard deviation. Pearson's chi-square test was used. Fisher's exact test was used. BMI: Body mass index, SD: Standard deviation.

Table 2. Intergroup comparison of perinatal outcomes

	Primiparous (n=52) Mean ± SD	Multiparous (n=52) Mean ± SD	Grand multiparous (n=52) Mean ± SD	p
GHT	3 (5.7%)	4 (7.6%)	5 (9.6%)	0.380
Preeclampsia	3 (5.7%)	3 (5.7%)	4 (7.6%)	0.690
GDM	3 (5.7%)	6 (11.5%)	4 (7.6%)	0.160
Vaginal birth	40 (76.9%)	35 (67.3%)	37 (71.1%)	0.480
C/S	12 (23.1%)	17 (32.7%)	15 (28.9%)	
Premature birth	4 (7.6%)	6 (11.5%)	7 (13.4%)	0.410
Perineal laceration	5 (12.5%)	2 (5.7%)	1 (2.7%)	0.021
Anemia	12 (23%)	10 (19.2%)	13 (25%)	0.720
Preoperative-Hb	12.2±1.5	12±1.7	11.9±1.9	0.780
Postoperative-Hb	10.9±1.8	11.3±1.8	11.1±1.7	0.140
ΔHb (preop-postop)	1.3±0.8	0.8±0.6	0.9±0.7	0.016
Estimated volume of blood loss	472 (240-725)	265 (90-520)	350 (125-620)	0.012
>1000 cc bleeding	8 (15.3%)	4 (7.6%)	2 (3.8%)	0.046
Blood transfusion	5 (9.6%)	4 (7.6%)	4 (7.6%)	0.880
Hospital stays	1.4±0.5	1.3±0.7	1.3±0.6	0.710
Hysterectomy	0 (0.0)	1 (1.9)	1 (1.9)	0.560
Congenital anomaly	2 (3.8%)	2 (3.8%)	1 (1.9%)	0.840

Values are expressed as frequency or percentage. Values are expressed as mean ± standard deviation. Pearson's chi-square test was used. Fisher's exact test was used. GDM: Gestational diabetes mellitus, GHT: Gestational hypertension, C/S: Cesarean section, Hb: Hemoglobin, SD: Standard deviation.

Table 3. Intergroup comparison of neonatal outcomes

	Primiparous, (n=52) Mean ± SD	Multiparous, (n=52) Mean ± SD	Grand multiparous, (n=52) Mean ± SD	p
Apgar (1st minute)	8.1±0.9	8.2±0.7	8.1±0.8	0.850
Apgar (5th minute)	8.8±1.15	8.7±1.1	8.7±1.2	0.770
Birth weight (gr)	3100±520	3130±440	3180±500	0.660
NICU	11 (21.1%)	6 (11.5%)	6 (11.5%)	0.024
Fetal death	1 (1.9%)	0 (0.0)	1 (1.9%)	0.560

Values are expressed as frequency or percentage. Values are expressed as mean ± standard deviation. Pearson's chi-square test was used. Fisher's exact test was used. NICU: Neonatal intensive care unit, SD: Standard deviation.

independent risk factor in these studies but was evaluated together with many risks, including age, socioeconomic-status, and smoking status.[20-22] Only women aged >35 years were included in the present study in all groups because the majority of issues observed in grand multiparous pregnancies might be linked to older mothers. Since all patients were >35 years old, we believe that age differences between the groups had little bearing on pregnancy problems, even if a substantial difference in gravida and parity was seen between them. It is particularly important to evaluate the increased risks of GM and prenatal and postnatal complications, independent of age, smoking, socioeconomic status, and ethnic background. Previous studies have reported that the prevalence of complications considered to be linked with GM, (e.g., placenta-previa, preeclampsia, and PPH) increases as maternal age increases.[11,12] It is difficult to distinguish whether the complications in these patients are associated with advanced age or GM because grand multiparous females are likely to be older.[12,23] In previous research, Alsammani et al.[21] reported that many complications were reduced in young grands multiparous females compared with older grand-multiparous patients, and many complications increased when compared with primiparous and multiparous patients who were of the same age. To make this distinction, a preliminary study was conducted on women >35 years of age in the current investigation, and the risks associated with the age factor that might occur between the groups were eliminated. Thus, a suitable environment is provided to evaluate only the risks associated with parity. Studies have reported that a low socioeconomic status is linked to more births.[5,24] Many previous studies investigating the relationship between GM and pregnancy outcomes have reported a lack of prenatal care.[25,26] The socioeconomic status and prenatal care parameters of the patients could not be evaluated in this study due to insufficient data. In the literature, several studies have reported that low birth weight newborns are more likely to have a history of GM.[5,21] There were no noticeable differences in the rates of low birth weight infants between the groups in the present study. Previous studies have shown that the prevalence of hypertensive pregnancy disorders as a pregnancy complication is elevated in grand multiparous patients compared with other patients.[27] No increased risk of GHT and preeclampsia was detected in grand multiparous patients compared with the other groups in the present study. It has been reported in the literature that postpartum bleeding is a common complication in grand multiparous patients.[28,29] It is generally believed that an increase in the number of births causes uterine atony, leading to postpartum hemorrhage.[30] Unlike the literature data, the estimated blood-loss volume in primiparous pregnancies was substantially larger than that in multiparous pregnancies in the current research when evaluated in terms of pregnancy and delivery problems. The bleeding rate of >1000 cc was significantly greater in the primiparous group than in the grand multiparous group. The reason for this was considered to be a significantly higher rate of perineal laceration in primiparous pregnant females in the present investigation and the bleeding caused by this. Previous studies in the literature have shown that the postpartum hemogram values of grand multiparous patients are lower.[27,29] Regarding postoperative hemoglobin levels, no statistically significant differences were observed between the groups in this study. Studies in the literature have reported that the Apgar score is lower in grand multiparous females.[3,21] Al-Shaikh et al.[31] conducted a study on grand multiparous patients and reported that they had similar perinatal and neonatal-risks when compared to other groups after adjusting for age. No significant differences were detected in this present investigation between the 1st and 5th-minute Apgar scores between the groups. However, the requirement for NICU was significantly higher in the primiparous patient group. It is considered that this might have occurred because of fetal distress secondary to prolonged labor in primiparous patients. Because of the age group selected in this study, eliminating the effect of age risk, which is known to be a significant risk factor for perinatal and neonatal outcomes, and focusing only on parity might be regarded as this current study's strength.

Study Limitations

The most important limitation of this study was that the data collected were restricted to what could be found in the records of patients because it was a retrospective study. Another limitation was that no data were available on factors that affect pregnancy outcomes, such as socioeconomic status and pre-pregnancy care.

CONCLUSION

Our study showed that GM pregnancy is not an independent risk factor; rather, perinatal and neonatal complication rates are comparable to those of nulliparous and multiparous pregnancies. We believe that poor prenatal care, low socioeconomic status, and advanced age may be linked to a number of GM-related complications. Pregnancy monitoring and birth should be performed more frequently and carefully to reduce the risks in these patients.

MAIN POINTS

- Grand multiparity is not an independent risk factor, and perinatal and neonatal complications are similar to nulliparous and multiparous pregnancies.
- We believe that a number of Grand-multiparity complications may be related to low socioeconomic-status and advanced age.

- To reduce risks in grand multiparous patients, pregnancy follow-up should be performed more frequently and carefully.

ETHICS

Ethics Committee Approval: This research was initiated after receiving Buca Seyfi Demirsoy Training and Research Hospital's Ethics Committee approval (approval number: 2024/292, date: 29.05.2024).

Informed Consent: Informed consent documents were obtained from each patient for the current investigation.

FOOTNOTES

Authorship Contributions

Surgical and Medical Practices: U.A., S.E., Concept: O.Y., C.A., T.B.B., Design: U.A., H.A.A., Data Collection and/or Processing: U.A., S.E., Analysis and/or Interpretation: U.A., O.Y., Literature Search: C.A., T.B.B., Writing: U.A., O.Y., S.E.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study had received no financial support.

REFERENCES

1. Abu-Heija AT, Chalabi HE. Great grand multiparity: is it a risk? J Obstet Gynaecol. 1998; 18(2): 136-8.
2. Al JF. Grandmultiparity: a potential risk factor for adverse pregnancy outcomes. J Reprod Med. 2012; 57(1-2): 53-7.
3. Mgaya AH, Massawe SN, Kidanto HL, Mgaya HN. Grand multiparity: is it still a risk in pregnancy? BMC Pregnancy Childbirth. 2013; 13: 241.
4. Guedalia J, Lipschuetz M, Walfisch A, Cohen SM, Sheiner E, Samson AO, et al. Partogram of grandmultiparous parturients: a multicenter cohort study. J Clin Med. 2023; 12(2): 592.
5. Mor-Yosef S, Seidman DS, Samueloff A, Schenker JG. The effects of the socioeconomic status on the perinatal outcome of grand multipara. Eur J Obstet Gynecol Reprod Biol. 1990; 36(1-2): 117-23.
6. Ozkan ZS, Atılgan R, Goktolga G, Sımsek M, Sapmaz E. Impact of grandmultiparity on perinatal outcomes in eastern region of Turkey. J Matern Fetal Neonatal Med. 2013; 26(13): 1325-7.
7. Akwuruoha E, Kamanu C, Onwere S, Chigbu B, Aluka C, Umezuruike. Grandmultiparity and pregnancy outcome in Aba, Nigeria: a case control study. Arch Gynecol Obstet. 2011; 283: 167172.
8. Nordin NM, Fen CK, Isa S, Symonds EM. Is grandmultiparity a significant risk factor in this new millennium? Malays J Med Sci. 2006; 13(2): 52-60.
9. Kandasamy T, Cherniak R, Shah R, Yudin MH, Spitzer R. Obstetric risks and outcomes of refugee women at a single centre in Toronto. J Obstet Gynaecol Can. 2014; 36(4): 296-302.
10. Avsar HA, Atlıhan U, Ata C, Erkılınc S. Intrahepatic cholestasis of pregnancy and its association with preeclampsia and gestational diabetes: a retrospective analysis. Arch Gynecol Obstet. 2024; 310(1): 221-7.
11. Geidam AD, Audu BM, Oummate Z. Pregnancy outcome among grand multiparous women at the University of Maiduguri Teaching Hospital: a case control study. J Obstet Gynaecol. 2011; 31(5): 404-8.
12. Roman H, Robillard PY, Verspyck E, Hulsey TC, Marpeau L, Barau G. Obstetric and neonatal outcomes in grand multiparity. Obstet Gynecol. 2004; 103(6): 1294-9.
13. Chan BC, Lao TT. Effect of parity and advanced maternal age on obstetric outcome. Int J Gynaecol Obstet. 2008; 102(3): 237-41.
14. Atlıhan U, Yavuz O, Avşar HA, Ata C, Erkılınç S, Bildacı TB. Vitamin D evaluation in adenomyosis: a retrospective cross-sectional study. Turk J Obstet Gynecol. 2024; 21(2): 98-103.
15. American Diabetes Association. 2. Classification and diagnosis of diabetes: standards of medical care in diabetes-2020. Diabetes Care. 2020; 43(Suppl 1): S14-31.
16. ACOG Practice Bulletin No. 202: Gestational hypertension and preeclampsia. Obstet Gynecol. 2019; 133(1): 1.
17. Pavord S, Daru J, Prasannan N, Robinson S, Stanworth S, Girling J, et al. UK guidelines on the management of iron deficiency in pregnancy. Br J Haematol. 2020; 188(6): 819-30.
18. Gordijn SJ, Beune IM, Thilaganathan B, Papageorghiou A, Baschat AA, Baker PN, et al. Consensus definition of fetal growth restriction: a Delphi procedure. Ultrasound Obstet Gynecol. 2016; 48(3): 333-9.
19. Stafford I, Dildy GA, Clark SL, Belfort MA. Visually estimated and calculated blood loss in vaginal and cesarean delivery. Am J Obstet Gynecol. 2008; 199(5): 519.
20. Alkwai H, Khan F, Alshammari R, Batool A, Sogeir E, Alenazi F, et al. The association between grand multiparity and adverse neonatal outcomes: a retrospective cohort study from Ha'il, Saudi Arabia. Children. 2023; 10(9):1541.
21. Alsammani MA, Jafer AM, Khieri SA, Ali AO, Shaaeldin MA. Effect of grand multiparity on pregnancy outcomes in women under 35 years of age: a comparative study. Med Arch. 2019; 73(2): 92-6.
22. Kabir Z, Clancy L. Smoking ban and pregnancy complications: new evidence. J Womens Health (Larchmt). 2012; 21(6): 616-8.
23. Simonsen SM, Lyon JL, Alder SC, Varner MW. Effect of grand multiparity on intrapartum and newborn complications in young women. Obstet Gynecol. 2005; 106(3): 454-60.
24. Ikeako LC, Nwajiaku L. Grandmultiparity: experience at Awka, Nigeria. Niger J Clin Pract. 2010; 13(3): 301-5.
25. Dasa TT, Okunlola MA, Dessie Y. Effect of grand multiparity on the adverse birth outcome: a hospital-based prospective cohort study in Sidama region, Ethiopia. Int J Womens Health. 2022; 14: 363-72.
26. Muniro Z, Tarimo CS, Mahande MJ, Maro E, Mchome B. Grand multiparity as a predictor of adverse pregnancy outcome among women who delivered at a tertiary hospital in Northern Tanzania. BMC Pregnancy Childbirth. 2019; 19(1): 222.
27. Rayamajhi R, Thapa M, Pande S. The challenge of grandmultiparity in obstetric practice. Kathmandu Univ Med J (KUMJ). 2006; 4(1): 70-4.
28. Yasmeen S, Danielsen B, Moshesh M, Gilbert WM. Is grandmultiparity an independent risk factor for adverse perinatal outcomes? J Matern Fetal Neonatal Med. 2005; 17(4): 277-80.
29. Alsammani MA, Ahmed SR. Grandmultiparity: risk factors and outcome in a tertiary hospital: a comparative study. Med Arch. 2015; 69: 38-41.
30. Agrawal S, Agarwal A, Das V. Impact of grandmultiparity on obstetric outcome in low resource setting. J Obstet Gynaecol Res. 2011; 37(8): 1015-9.
31. Al-Shaikh GK, Ibrahim GH, Fayed AA, Al-Mandeel H. Grand multiparity and the possible risk of adverse maternal and neonatal outcomes: a dilemma to be deciphered. BMC Pregnancy Childbirth. 2017; 17(1): 310.