Experimental
&
Clinical Article

Obstetrics; *Maternal Fetal Medicine and Perinatology*

Perinatal and Neonatal Outcomes of Grand Multiparous Refugee Women Under the Age of Thirty-Five: A Comparative Study

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ABSTRACT

OBJECTIVES: To compare maternal and neonatal outcomes between grand multiparous Syrian refugee women younger than 35 years and Türkiye citizens.

STUDY DESIGN: In this retrospective cohort study we screened electronic birth records according to predefined eligibility criteria. Of 313 potentially eligible women, 16 were excluded because their patient files could not be accessed, leaving 297 grand multiparous women aged 18–34 years (150 Türkiye citizens and 147 Syrian refugees) who delivered at Adiyaman University Faculty of Medicine Education and Research Hospital. Women aged <18 or ≥35 years, those with multiple pregnancies, and refugees with Türkiye citizenship were excluded. We compared groups and used multivariable logistic regression; adjusted models for neonatal intensive care unit (NICU) admission, cesarean delivery, and gestational diabetes mellitus (GDM) included maternal age, parity, and gestational age at delivery.

RESULTS: NICU admission was more frequent among Syrian refugee neonates (16.3% vs. 8.7%, p=0.046) and remained associated with refugee status after adjustment (adjusted odds ratio 2.42, 95% CI 1.11-5.26; p=0.026). Cesarean delivery, blood transfusion, 5-minute Apgar score <7, and diagnosed GDM did not differ significantly. Missing GDM data were substantially more frequent among Syrian refugees (57.1% vs. 4.7%).

CONCLUSION: Syrian refugee status was independently associated with higher NICU admission in this age-restricted grand-multiparous cohort, identifying neonatal intensive care requirement as the principal observed difference. This focused comparison highlights a clinically relevant neonatal disparity; non-significant differences in other outcomes do not establish equivalence or comparable healthcare access.

Keywords: Gestational diabetes mellitus; Grand multiparity; Neonatal intensive care unit; Perinatal outcomes; Syrian refugees

Gynecol Obstet Reprod 2026;32(2):84-89

Introduction

Effective healthcare during pregnancy, childbirth, and the postpartum period is essential for reducing preventable maternal mortality and morbidity (1). Population displacement caused by war and conflict can place substantial pressure on healthcare systems and may adversely affect maternal and neonatal care (2). Refugee pregnant women may face increased risks of adverse obstetric and perinatal outcomes, including preterm birth, low birth weight, cesarean delivery, postpartum hemorrhage, and anemia, in the context of barriers such as cost, unfamiliarity with the healthcare system, language difficulties, and discrimination (3,4).

Comparative studies of refugees and local populations have reported higher frequencies of adverse pregnancy and neonatal outcomes among refugees, including adolescent pregnancy, anemia, stillbirth, preterm premature rupture of membranes, and neonatal intensive care unit (NICU) admission (5,6). However, the effects of refugee status may be difficult to separate from those of adolescent pregnancy, advanced maternal age, and high parity. Adolescent pregnancy is asso-

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Submitted for Publication: 05.12.2025. Revised for Publication: 03.05.2026
Accepted for Publication: 26.08.2026 Online Published: 29.08.2026

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	DOI:10.21613/GORM.2026.1665

How to cite this article: *Kizilet H. Oztas S. Isikalan MM. Karacor T. Perinatal and Neonatal Outcomes of Grand Multiparous Refugee Women Under the Age of Thirty-Five: A Comparative Study. Gynecol Obstet Reprod Med. 2026;32(2):84-89*

ciated with increased risks of preterm birth, low birth weight, perinatal death, and maternal death (7). Grand multiparity has also been associated with postpartum anemia, postpartum hemorrhage, gestational hypertension, gestational diabetes mellitus (GDM), and preterm birth (8). Conversely, a study limited to grand multiparous women younger than 35 years reported antepartum complication rates comparable with those of other multiparous women (9).

The present study aimed to compare maternal and neonatal outcomes between grand multiparous Syrian refugee women younger than 35 years and Türkiye citizens who met the same age and grand-multiparity eligibility criteria. Restricting the study population to women aged 18–34 years was intended to reduce the influence of adolescent pregnancy and advanced maternal age, both of which are independently associated with adverse outcomes (10).

Material and Method

This retrospective cohort study was conducted at Adiyaman University Faculty of Medicine Education and Research Hospital. This study was conducted in accordance with the Declaration of Helsinki. The Adiyaman University Local Ethics Committee approved the study (Decision No: 2022/7-34; Date: 25 October 2022). As this was a retrospective study based on fully anonymized patient records and no identifiable personal data were accessed, the ethics committee waived the requirement for informed consent. Birth records and patient files were reviewed from January 2021 through December 2022.

Participants were classified as Group I (Türkiye citizens) or Group II (Syrian refugees). Electronic birth records were screened according to the predefined eligibility criteria, identifying 313 potentially eligible women (152 Türkiye citizens and 161 Syrian refugees). Patient files could not be accessed for 16 of these women (2 Türkiye citizens and 14 Syrian refugees), who were therefore excluded. The final cohort comprised 297 women: 150 Türkiye citizens and 147 Syrian refugees. Figure 1 summarizes the participant selection process.

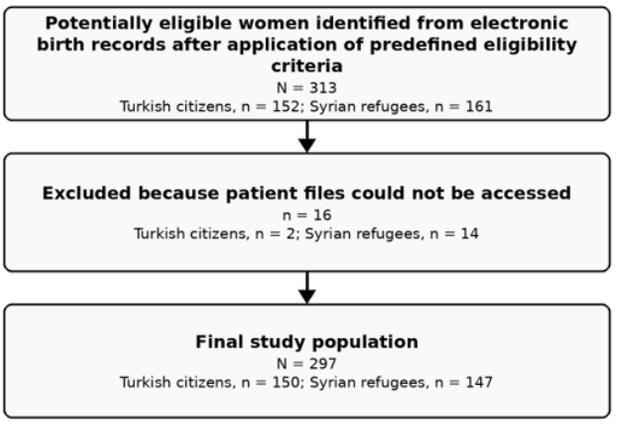

Figure 1: *STROBE flow diagram of participant selection.*

Grand multiparity was defined as five or more deliveries at 20 weeks of gestation or later (11). Women aged 18-34 years with singleton pregnancies who delivered at 20 weeks or later were eligible. Exclusion criteria were age <18 or ≥35 years, multiple pregnancy, and Türkiye citizenship among refugees.

Data extracted from electronic records and patient files included maternal age, gravidity, parity, number of abortions, gestational age at delivery, mode of delivery, third- or fourth-degree perineal laceration, prepartum and postpartum hemoglobin and hematocrit values, peripartum hysterectomy, length of hospital stay, blood transfusion, hypertensive disorders, and diabetes during pregnancy. Neonatal variables included congenital anomalies, 5-minute APGAR score, NICU admission, intrauterine fetal death (IUFD), and birth weight.

Pregestational and gestational diabetes mellitus were diagnosed according to American Diabetes Association criteria (12). Women without documented GDM information were treated as having missing data rather than as non-GDM cases. GDM information was unavailable for 7 of 150 (4.7%) Türkiye women and 84 of 147 (57.1%) Syrian refugee women; therefore, the unadjusted GDM comparison included 143 and 63 women with available data, respectively. Hypertensive disorders of pregnancy were diagnosed according to American College of Obstetricians and Gynecologists guidance (13). Anemia was defined as a hemoglobin concentration <11 g/dL (14).

Evaluation of Peripartum Hemorrhage: All participants had a complete blood count obtained within seven days before delivery and a postpartum complete blood count obtained approximately 24 hours after delivery. Consequently, the estimated blood loss volume (EBLV) analysis included all 297 women (150 Türkiye citizens and 147 Syrian refugees). Excessive blood loss was defined as EBLV ≥1000 mL (15). EBLV was calculated using the method described by Stafford et al. (16).

Statistical analysis

Data were analyzed using SPSS version 22.0. We assessed distributional normality with the Kolmogorov–Smirnov or Shapiro-Wilk test. Continuous variables were compared using Student's t-test or the Mann–Whitney U test, as appropriate. Categorical variables were compared using Pearson's chi-square test when expected cell counts were adequate and Fisher's exact test (two-sided) when any expected cell count was <5. Variables with zero events in both groups were described without hypothesis testing. A two-sided p-value <0.05 was considered statistically significant.

For the principal binary outcomes, we used multivariable logistic regression for NICU admission, cesarean delivery, and diagnosed GDM. Refugee status was the exposure of interest, with maternal age, parity, and gestational age at delivery included as covariates. We converted gestational age from

completed weeks and days to decimal weeks. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. We did not fit a conventional multivariable model for blood transfusion because only 11 transfusion events occurred, which was insufficient to build a stable model with the prespecified covariates. Analyses used available data, and participants with missing information required for a specific analysis were excluded from that analysis.

Results

Electronic birth records identified 313 potentially eligible women after application of the predefined eligibility criteria (152 Türkiye citizens and 161 Syrian refugees). Patient files could not be accessed for 16 women (2 Türkiye citizens and 14 Syrian refugees), who were excluded, leaving 297 women in the final cohort (150 Türkiye citizens and 147 Syrian refugees; Figure 1).

As shown in Table I, Türkiye women were older than Syrian refugee women (30.9±2.3 vs. 29.0±3.1 years, p<0.001). Parity was significantly higher among Türkiye women than among Syrian refugee women, although the median was 5 in both groups (range 5-10 vs. 5-9, respectively; p=0.003).

Maternal and obstetric outcomes are summarized in Table II. GDM information was available for 143/150 (95.3%) Türkiye women and 63/147 (42.9%) Syrian refugee women. Among women with available data, diagnosed GDM occurred in 19/143 (13.3%) Turkish women and 5/63 (7.9%) Syrian refugee women (p=0.270). Refugee status was not independently associated with diagnosed GDM after adjustment for maternal age, parity, and gestational age at delivery (aOR 0.64, 95% CI 0.19-2.17; p=0.477). Blood transfusion was required in 4/150 (2.7%) Türkiye women and 7/147 (4.8%) Syrian refugee women, with no statistically significant difference (p=0.339). Cesarean delivery also did not differ significantly between groups (14.7% vs. 19.0%, p=0.313), and refugee status was not independently associated with cesarean delivery in the adjusted model (aOR 1.69, 95% CI 0.85-3.37; p=0.137).

Table I: *Demographic characteristics of the study groups*

	Group I Türkiye citizens	**Group II Syrian refugees**	**p**
Age, years	30.9±2.3	29.0±3.1	<0.001*
Gravida	6 (5-11)	6 (5–9)	0.321
Parity	5 (5-10)	5 (5–9)	0.003*
Abortion	0 (0–3)	0 (0–7)	0.121
Gestational age at delivery, weeks	39.14 (27.8-42.8)	39.00 (26.43–42.57)	0.536

*Data are presented as mean ± standard deviation or median (min-max), as appropriate. Group I: Türkiye citizens; Group II: Syrian refugees. Continuous variables were compared using Student's t-test or the Mann-Whitney U test, as appropriate. *p<0.05*

Table II: *Maternal and obstetric outcomes*

	Group I Türkiye citizens	**Group II Syrian refugees**	**p**
Pregestational diabetes mellitus	5 (3.3)	1 (0.7)	0.214[a]
Gestational diabetes mellitus	19/143 (13.3)	5/63 (7.9)	0.270[b]
Gestational hypertension	3 (2.0)	5 (3.4)	0.498[a]
Preeclampsia	5 (3.3)	4 (2.7)	1.000[a]
Chronic hypertension	1 (0.7)	0 (0.0)	1.000[a]
Vaginal delivery	128 (85.3)	119 (81.0)	0.313[b]
Cesarean delivery	22 (14.7)	28 (19.0)	0.313[b]
Preterm birth <37 weeks	16 (10.7)	19 (12.9)	0.546[b]
Preterm birth <34 weeks	4 (2.7)	3 (2.0)	1.000[a]
Anemia	40 (26.7)	29 (19.7)	0.157[b]
Prepartum hemoglobin, g/dL	12.00 ± 1.54	11.85 ± 1.43	0.399[b]
Postpartum hemoglobin, g/dL	11.39 ± 1.62	11.03 ± 1.50	0.056[b]
Estimated blood loss volume, mL	274 (100–1489)	261 (100-3420)	0.590[b]
Estimated blood loss ≥1000 mL	6 (4.0)	4 (2.7)	0.750[a]
Blood transfusion	4 (2.7)	7 (4.8)	0.339[b]
Length of hospital stay, days	1 (1-3)	1 (1-4)	0.055[b]

Data are presented as n (%) unless otherwise indicated; hemoglobin values are mean ± standard deviation, and estimated blood loss volume and hospital stay are median (min–max). Group I: Türkiye citizens; Group II: Syrian refugees. a: Fisher's exact test (two-sided). b: Pearson's chi-square test. GDM percentages were calculated among women with available GDM data (143 Türkiye women and 63 Syrian refugee women). EBLV analyses included all participants. Outcomes with zero events in both groups are reported in the Results text.

No cases of eclampsia, maternal death, peripartum hysterectomy, disseminated intravascular coagulation, shock, acute renal failure, or third- or fourth-degree perineal laceration occurred in either group.

Neonatal outcomes are shown in Table III. NICU admission was more frequent among Syrian refugee neonates than Türkiye neonates (16.3% vs. 8.7%, p=0.046). After adjustment for maternal age, parity, and gestational age at delivery, Syrian refugee status remained associated with NICU admission (aOR 2.42, 95% CI 1.11-5.26; p=0.026). We excluded the single IUFD in the Syrian refugee group from the 5-minute Apgar analysis. Among all liveborn neonates, an Apgar score <7 occurred in 1/150 (0.7%) Türkiye and 2/146 (1.4%) Syrian refugee neonates (Fisher's exact test, p=0.619). Birth weight, congenital anomalies, and IUFD did not differ significantly between groups.

Discussion

This study compared maternal and neonatal outcomes between Türkiye citizens and Syrian refugees within a population restricted to grand multiparous women younger than 35 years. The principal finding was a higher NICU admission rate among Syrian refugee neonates; this association remained statistically significant after adjustment for maternal age, parity, and gestational age at delivery. In contrast, we found no statistically significant between-group differences for most other measured maternal and neonatal outcomes. Türkiye women were older and had higher parity than Syrian refugee women; the multivariable models accounted for these baseline differences. Because both groups consisted exclusively of grand multiparous women within the specified age range, these findings cannot be used to determine the independent effects of grand multiparity or maternal age.

Previous comparative studies have shown that Syrian refugee women tend to be younger at delivery and have higher rates of adolescent pregnancy than Türkiye women. A previous comparative study reported adolescent pregnancy rates of 19.4% among Syrian refugees and 5.6% among Türkiye women (5).

Evidence regarding the association of grand multiparity with postpartum hemorrhage (PPH) and blood transfusion is inconsistent. Some studies have reported an increased risk of PPH among grand multiparous women (18), potentially related to uterine atony (19). In contrast, other studies have not identified grand multiparity as an independent risk factor for blood transfusion (20). These outcomes are related but not interchangeable, because transfusion requirements may also be influenced by baseline hematologic status and clinical transfusion thresholds. In Türkiye, obstetric transfusion rates of approximately 2.5% have been reported, with uterine atony and chronic anemia among the leading indications (21). In the present study, EBLV ≥1000 mL occurred in 4.0% of Türkiye women and 2.7% of Syrian refugees, while blood transfusion was required in 2.7% and 4.8%, respectively. Neither between-group difference was statistically significant.

The relatively low median EBLV values in both groups should be interpreted in the context of the calculated blood-loss method used in this study rather than as direct measurements of blood loss.

The relationship between GDM and grand multiparity is also uncertain. Studies from eastern Türkiye have reported conflicting findings regarding GDM among grand multiparous women (8,22), and GDM prevalence varies substantially across populations (23). Turkay et al. reported no significant difference in GDM between Türkiye women and Syrian refugees (6). In our cohort, diagnosed GDM did not differ significantly between groups among women with available data, and refugee status was not independently associated with diagnosed GDM in the adjusted model. However, GDM information was unavailable much more frequently among Syrian refugees than among Türkiye women (57.1% vs. 4.7%). Differential ascertainment related to incomplete antenatal screening, follow-up, or documentation is therefore a major limitation, and the observed diagnosed-GDM rates should not be interpreted as estimates of the true population prevalence of metabolic disease.

NICU admission was more frequent among Syrian refugee neonates and remained associated with refugee status in the adjusted analysis. Previous studies have also reported less favorable neonatal outcomes among Syrian refugees (5,6). Nevertheless, residual confounding remains possible because antenatal visit frequency, socioeconomic circumstances, and other potentially relevant variables were not consistently

Table III: *Neonatal outcomes*

	Group I Türkiye citizens	**Group II Syrian refugees**	**p**
Birth weight, g	3300 (1090-4590)	3250 (810-4460)	0.302
NICU admission	13 (8.7)	24 (16.3)	0.046*
Intrauterine fetal death	0 (0.0)	1 (0.7)	0.495[a]
5-minute APGAR score <7	1/150 (0.7)	2/146 (1.4)	0.619[a]
Congenital anomalies	3 (2.0)	2 (1.4)	1.000[a]

*Birth weight is presented as median (min–max); categorical outcomes are presented as n (%). Group I: Türkiye citizens; Group II: Syrian refugees; NICU: neonatal intensive care unit. a: Fisher's exact test (two-sided). The 5-minute APGAR analysis included all liveborn neonates (150 Türkiye and 146 Syrian refugee neonates); the single IUFD was excluded. *: p<0.05*

available. The observed association therefore should not be interpreted as evidence of a causal effect of refugee status on NICU admission. After exclusion of the single IUFD, the frequency of a 5-minute Apgar score <7 did not differ significantly between groups.

Cesarean delivery rates in Türkiye remain high at the population level (24), and previous studies comparing Syrian refugees with Türkiye women have also examined differences in mode of delivery (6). In the present cohort, cesarean delivery occurred in 14.7% of Türkiye women and 19.0% of Syrian refugee women. The difference was not statistically significant, and refugee status was not independently associated with cesarean delivery after adjustment for maternal age, parity, and gestational age at delivery.

Syrian refugees in Türkiye are eligible to use primary, emergency, and higher-level healthcare services. Still, eligibility or hospital-based utilization should not be interpreted as evidence of equivalent access to care (25). Language, education, literacy, socioeconomic circumstances, and other barriers may affect healthcare utilization (5,17). Importantly, this study included only women who reached the study hospital and delivered there; women who did not access hospital-based maternity care are not represented. Accordingly, these data cannot establish comparable healthcare access between Syrian refugees and Türkiye citizens.

Strengths and Limitations: The principal strength of this study is its focus on a relatively homogeneous population of grand multiparous women within a restricted age range. Its limitations include the retrospective, single-center design; possible incomplete documentation; substantial differential missingness in GDM information; and the absence of reliable data on antenatal visit frequency, interpregnancy interval, nutritional status, socioeconomic conditions, and psychosocial factors. In addition, the hospital-based design introduces selection bias because women who did not reach the study hospital are structurally absent from the cohort. Most outcomes were uncommon, limiting precision for some comparisons, and the study was not designed as an equivalence or non-inferiority study. The findings therefore cannot be generalized to all Syrian refugees in Türkiye.

Conclusion

In this age-restricted grand-multiparous cohort, Syrian refugee status was independently associated with higher odds of NICU admission after adjustment for maternal age, parity, and gestational age at delivery. Most other measured maternal and neonatal outcomes did not differ significantly between groups, while substantial differential missingness in GDM data limits interpretation of that outcome. The persistence of the NICU association after adjustment identifies neonatal intensive care utilization as the principal observed disparity and warrants further investigation of clinical, antenatal, and social factors that may contribute to neonatal care needs in refugee populations. These findings do not establish causality or equivalence and cannot be used to infer comparable access to healthcare.

Declarations

Acknowledgment: None. This manuscript was not derived from a thesis and has not been presented at a congress or symposium.

Ethics approval and consent to participate: This study was conducted in accordance with the Declaration of Helsinki. The Adiyaman University Local Ethics Committee granted ethical approval (Decision No: 2022/7-34; Date: 25 October 2022). As this was a retrospective study based on fully anonymized patient records and no identifiable personal data were accessed, the ethics committee waived the requirement for informed consent.

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

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

Authors' contributions: HK: Conceptualization, Methodology, Formal analysis, Project administration, Writing - original draft, and Writing-review & editing. SO: Data curation, Formal analysis, Investigation, Writing - original draft, and Writing - review & editing. MMI: Conceptualization, Methodology, Formal analysis, and Writing – review & editing. TK: Formal analysis and Writing - review & editing. All authors read and approved the final manuscript.

Conflict of interest: The authors declare no competing interests.

Declaration regarding the use of generative AI and AI-assisted technologies in the writing process: During revision of this manuscript, the authors used ChatGPT (OpenAI) solely to improve language, readability, organization, and internal textual consistency. The tool was not used to generate or analyze study data, perform the reported statistical analyses, or draw scientific conclusions. The authors reviewed and edited all AI-assisted content and take full responsibility for the final manuscript.

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