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Evaluation of obstetric and neonatal outcomes and cesarean section rates of Syrian and Turkish adolescent pregnant women according to the Robson ten group classification system

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ABSTRACT

Aim: Our research has two purposes. To begin with, we sought to determine whether there were any differences in maternal and newborn outcomes between Syrian adolescent and adult pregnant women living in Turkey after the Syrian civil war and Turkish adolescent and adult pregnant women. Second, we wanted to examine and compare the rates of cesarean section (CS) and spontaneous vaginal delivery (SVD) in adolescent and adult pregnant women using the Robson ten group classification system (RTGCS).

Material and Method: Our study investigated data from a retrospective cross-sectional study of 1823 Turkish and Syrian pregnant women who gave birth between September 2020 and August 2021 in a tertiary reference hospital in Turkey's Mediterranean area. Our study enrolled 838 pregnant adolescent girls between the ages of 13 and 19 and 985 pregnant adult women between the ages of 20 and 47.

Results: The probability of adolescent pregnancy is 3.081 times greater among Syrian refugees than among Turkish natives ($p<0.001$, OR: 3.081, 95% CI: 2.544–3.731). Primary school graduates face a 2.757-fold greater risk of adolescent pregnancy than secondary school graduates ($p<0.001$, OR: 2.757, 95% CI: 2.15–3.536). Syrian nationality is 1.51 times more likely to be associated with late preterm birth in adolescent pregnancies than throughout the term gestational week ($p=0.033$, OR: 1.51 95% CI: 1.035–2.203). The probability of Syrian nationality in late preterm pregnancies is 1.51 times higher in adolescent women compared to term pregnancies. Ethnicity does not significantly affect the delivery week in adult pregnant women or the total ($p>0.050$). Among pregnant adolescents, newborns with a low birth weight (LBW) are 2.041 times more likely to be Syrian nationals than infants with ≥ 2500 g. Regardless of the gestational week, infants with LBW are 2.33 times more likely to be Syrian nationals than infants ≥ 2500 g.

Conclusion: Adolescent pregnancy is particularly prevalent among young females with poor levels of education and Syrian adolescent girls. Pregnant adolescent women face a greater risk of obstetric and neonatal problems than pregnant adult women of reproductive age. A country-based assessment of the RTGCS will aid in the development of effective strategies for achieving The World Health Organization (WHO)-recommended CS rates by identifying the factors that contribute to the rise in CS rates.

Keywords: Adolescent pregnancy, pregnancy outcomes, refugees, cesarean section, Robson classification

INTRODUCTION

Twenty-one million girls become pregnant in developing countries each year (1). Twelve million of these pregnancies between the ages of 15 and 19 result in birth (1). Around 17 thousand of these pregnant girls are expected to die because of complications associated with parturiency or childbirth problems (2). Pregnancies in adolescents can result in cephalopelvic disproportion (CPD), low birth weight, maternal anemia, preterm birth, acute fetal distress (AFD), perinatal fetal loss, pregnancy-induced hypertension (PIH), eclampsia, postpartum hemorrhage, and emergency cesarean delivery among other complications (3).

Robson's classification (4). RTGCS is a well-known and reliable method for determining CS rates (4). This classification system is supported by the WHO as a global standard for monitoring, assessing, and comparing CS

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rates at all levels (5). CS rates are an essential indicator of a country's access to and quality of maternal health services (5). According to a 1985 WHO report, mother and infant fatalities fell in a country with a CS incidence of 10-15% (6). In Turkey, CS rates included 45% to 53% of all live births (7). The reason for this difference in CS rates depends on several factors. Some of these include financial incentives, high compensation that midwives and physicians must pay due to malpractice law, and differences in professional training (7). The WHO advises using the RTGCS as the worldwide standard for comparing and evaluating CS rates in hospital settings (8). The RTGCS allows for a more reliable comparison and analysis of CS rates across hospitals, cities, regions, and countries (9) (**Table 1**).

Table 1. Robson ten group delivery classification system (RTGCS) (5)

	Robson classification groups description
Group 1	Nulliparous, singleton pregnancy, cephalic presentation, gestation period of ≥37 weeks (spontaneous labor).
Group 2	Nulliparous, singleton pregnancy, cephalic presentation, gestation period of ≥37 weeks (induced or CS before labor).
Group 3	Multiparous (without a preexisting uterine wound), singleton pregnancy, cephalic presentation, and gestation of ≥37 weeks (spontaneous labor).
Group 4	Multiparous (without a preexisting uterine wound), singleton pregnancy, cephalic presentation, and gestation of ≥37 weeks (induced or CS before labor).
Group 5	Multiparous, singleton pregnancy, prior CS, cephalic presentation, gestation of ≥37 weeks.
Group 6	Consists of nulliparous women with a single breech presentation.
Group 7	Consists of multiparous women with a single breech presentation (including women with previous CS).
Group 8	All pregnant women, including those who have had several pregnancies (including women with previous CS).
Group 9	All pregnant women with a singleton, transverse, or oblique lying (including women with previous CS).
Group 10	Includes all pregnant women with a singleton pregnancy, cephalic presentation, and a gestational age of <37 weeks (including women with previous CS).

We aim to examine the obstetric and neonatal outcomes of pregnant adult Turkish and Syrian refugee women and Turkish and Syrian adolescents. The results for which we sought answers in our study are 1) What are the differences between obstetric and neonatal outcomes among pregnant adolescents in Turkey and Syrian refugee adolescent pregnant women? 2) What distinctions exist between adolescent and adult pregnant women regarding obstetric and neonatal outcomes? 3) Are there differences in obstetric and neonatal outcomes between Syrian refugee pregnant women and Turkish-citizen pregnant women? In line with the results of our research, we will interpret the solutions considering the literature. In this way, our research aims to help policymakers, ministries, and non-governmental groups decide how to avoid obstetric and neonatal complications for pregnant adolescents and foreign nationals.

MATERIAL AND METHOD

The study was approved by the Health Sciences University Adana City Training and Research Hospital Clinical Researches Ethics Committee (Dated: 26.08.2020, Decision No: 1046). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki which is one of the largest regional hospitals in Turkey's southern region. Additionally, this study was approved by the Scientific Research Platform of the Turkish Ministry of Health, General Directorate of Health Services (2021-07-08T21_48_13). All patients hospitalized in our clinic consent to the use of patient data, procedures to be performed, and complications that may occur during hospitalization, provided that their data remains confidential. All medical documents of our patients can be retrieved from the central electronic data processing system archives with a unique login password defined for each doctor.

As shown in **Figure 1**, we identified 1923 patients as potentially eligible for the study.

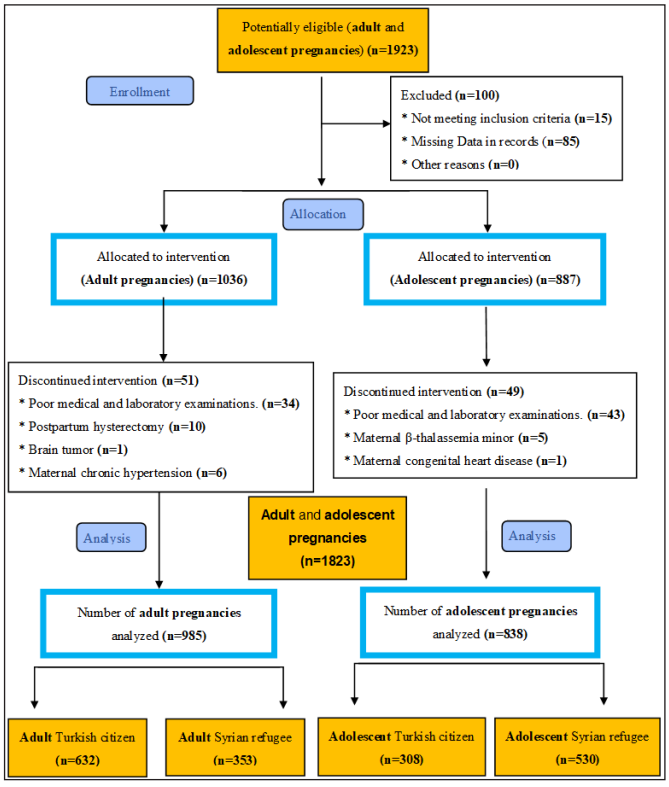

Figure 1. Flow diagram of participants

Pregnancies less than 24 weeks, pregnant women with known chronic systemic diseases (oncologic, cardiovascular, autoimmune, endocrinologic), and patients with missing laboratory and clinical information on the epicrisis form were excluded from the study. The gestational weeks of the pregnant women who took part in the study were based on their last menstrual dates and the crown-rump length values measured during the

first trimester ultrasounds (10). Our study looked at the APGAR score in the 5th minute because the APGAR score in the 1st minute could not accurately predict the newborn's prognosis. Numerous studies have connected a low APGAR score at the fifth minute to an increased risk of neonatal mortality and a broad spectrum of mental disorders (11, 12). When we looked at CS rates, group size, and contribution to CS in RTGCS (4), we tried to figure out the rise in CS rates among Syrian refugees and Turkish citizens.

Statistical Method

The data were analyzed using IBM SPSS V23. For this purpose, Pearson chi-square and Yates' correction for continuity tests were used to analyzing categorical data by nationality in adolescent and adult pregnancies. The Kolmogorov-Smirnov test was used to determine the normal distribution of quantitative data, and the Mann-Whitney U test was used to assess group comparisons. The risk variables for adolescent pregnancy were identified using logistic regression analysis. For quantitative data, the mean±standard deviation and median (minimum-maximum) were used, whereas the frequency (percent) was used for categorical data. The level of significance was set at $p<0.05$.

Power analysis: A minimum sample size of 300 in each group is necessary to detect a significant difference using this test (600 in total), considering type 1 error (alfa) of 0.05, power (1-beta) of 0.95, the effect size of 0.295, and two-sided alternative hypothesis (H1) (3). The study was completed on 838 individuals (distribution by nationality in adolescent pregnancies), and the power of the test was obtained at 98.4%.

RESULTS

The age distribution of mothers differs according to nationality in both adolescent and adult pregnant women ($p>0.05$). When analyzed according to education level, the rate of Syrian pregnant women with primary and secondary education is lower than Turkish pregnant women ($p<0.001$). Pregnancy rates in adolescent pregnant women differ according to nationality ($p<0.001$). The single pregnancy rate is higher among Turkish citizens. For Syrians, 2nd, 3rd, fourth, and eighth pregnancy rates are high. The number of pregnancies in the adult pregnant group is also related to nationality ($p<0.001$). While the first and second pregnancy rates in Turks are high, the third and fourth to eighth pregnancy rates are lower (**Table 2**)

RTGCS varies significantly between nationalities of pregnant adolescents ($p<0.001$). Syrian adolescents in Robson groups 2, 5, and 6 have a lower prevalence among Syrian adolescents, whereas Robson groups 3 and 10 have a higher prevalence. In the adult group of pregnant women, there was also a significant relationship between RTGCS and nationality ($p<0.001$). Robson's first and second groups were lower in Syrian adult pregnant women, while the third and fourth groups were higher (**Table 3**).

Birth types differ according to the adolescent pregnant group ($p<0.001$). While SVD was higher in Syrians, cesarean section rates were higher in Turks. There is no difference between the initial SVD rates. Similarly, birth types differ according to the adult pregnant group ($p<0.001$). While the rate of vaginal delivery is higher in Syrians, the cesarean section rate is higher in Turks. There

Table 2. Comparison of the number of pregnancies by nationality and educational level among adolescent and adult pregnant women

	Adolescent Pregnancies (13–19 years) (n, %)			Adult Pregnancies (20–47 years) (n, %)		
	Turkish citizen	Syrian refugee	p	Turkish citizen	Syrian refugee	p
Maternal age						
≤15	3 (1)	14 (2.6)		---	---	0.842[a]
16–19	305 (99)	516 (97.4)	0.163[b]	---	---	
20–34	---	---		533 (84.3)	296 (83.9)	
≥35	---	---		99 (15.7)	57 (16.1)	
Level of education						<0.001[a]
Illiterate	12 (3.9)[a]	104 (19.6)[b]		9 (1.4)[a]	85 (24.1)[b]	
Primary education	244 (79.2)[a]	368 (69.4)[b]	<0.001[a]	320 (50.6)[a]	241 (68.3)[b]	
Secondary education	52 (16.9)[a]	58 (10.9)[b]		251 (39.7)[a]	27 (7.6)[b]	
High education	---	---		52 (8.2)[a]	0 (0)[b]	
Number of pregnancies						
1	250 (81.2)[a]	370 (69.8)[b]		157 (24.8)[a]	51 (14.4)[b]	<0.001[a]
2	56 (18.2)[a]	131 (24.7)[b]	<0.001[a]	225 (35.6)[a]	113 (32)[a]	
3	2 (0.6)[a]	27 (5.1)[b]		107 (16.9)[a]	72 (20.4)[a]	
4–8	0 (0)[a]	2 (0.4)[a]		143 (22.6)[a]	117 (33.1)[b]	

[a]Pearson Chi-square test; bYates correction, cMann-Whitney U test; dIndependent-Samples T test; F: Fisher's Exact test; a-b: There is no difference between the ratios of columns with the same letter in each row; notation: mean±standard deviation, median (minimum—maximum) frequency (percent).

is no difference between the initial SVD rates. We found a statistically significant difference between the distribution of cesarean section indications according to nationality within the adult group (p=0.027). The abnormal fetal lie and presentation indication rate were higher in Syrian adult pregnant women. The median values of maternal hemoglobin and hematocrit differ according to nationality (p<0.001). In adolescent pregnancy, the median for Turks was higher than the median for Syrians. Likewise, among pregnant women, the median of Turkish women was higher than that of Syrians. The length of hospital stays for adolescent pregnancies varies according to nationality (p=0.009). The average length of hospital stays is higher in Turks. There is a difference in hospitalization durations according to nationality in pregnant adult women (p=0.001). Two days is the average hospital stay for pregnant women in two nationalities. However, the difference is due to the rank average. While the average rank for Turks is 513.28, the average rank for Syrians is 456.70 (**Table 4**).

Table 3. Comparison of RTGCS by nationality between adolescent and adult pregnant women

	Adolescent Pregnancies (13–19 years) (n, %)			Adult Pregnancies (20–47 years) (n, %)		
	Turkish citizen	Syrian refugee	p	Turkish citizen	Syrian refugee	p
Robson classification						
Group 1	111 (36)[a]	174 (32.8)[a]		67 (10.6)[a]	23 (6.5)[b]	
Group 2	79 (25.6)[a]	54 (10.2)[b]		55 (8.7)[a]	14 (4)[b]	
Group 3	21 (6.8)[a]	65 (12.3)[b]		135 (21.4)[a]	124 (35.1)[b]	
Group 4	10 (3.2)[a]	31 (5.8)[a]		36 (5.7)[a]	48 (13.6)[b]	
Group 5	11 (3.6)[a]	6 (1.1)[b]		190 (30.1)[a]	59 (16.7)[b]	
Group 6	4 (1.3)[a]	1 (0.2)[b]	<0.001[a]	6 (0.9)[a]	2 (0.6)[a]	<0.001[a]
Group 7	0 (0)[a]	5 (0.9)[a]		14 (2.2)[a]	14 (4)[a]	
Group 8	2 (0.6)[a]	9 (1.7)[a]		7 (1.1)[a]	2 (0.6)[a]	
Group 9	–––	–––		0 (0)[a]	2 (0.6)[a]	
Group 10	70 (22.7)[a]	185 (34.9)[b]		122 (19.3)[a]	65 (18.4)[a]	

[a]Pearson Chi-square test; bYates correction, cMann-Whitney U test; dIndependent-Samples T test; F: Fisher's Exact test; a-b: There is no difference between the ratios of columns with the same letter in each row; notation: mean±standard deviation, median (minimum – maximum) frequency (percent)

Table 4. Comparison of birth types, cesarean section indications, maternal anemia, and length of stays in hospital by nationality between adolescent and adult pregnant women

	Adolescent Pregnancies (13–19 years) (n, %)			Adult Pregnancies (20–47 years) (n, %)		
	Turkish citizen	Syrian refugee	p	Turkish citizen	Syrian refugee	p
Type of Delivery						
Cesarean Delivery	107 (34.7)[a]	115 (21.7)[b]	<0.001[a]	368 (58.2)[a]	138 (39.1)[b]	<0.001[a]
First vaginal birth	171 (55.5)[a]	300 (56.6)[a]		88 (13.9)[a]	36 (10.2)[a]	
Vaginal Birth	30 (9.7)[a]	115 (21.7)[b]		176 (27.8)[a]	179 (50.7)[b]	
Caesarean section indications						
Abnormal Fetal Lie and Presentation	12 (11.2)	3 (2.6)	0.170[a]	15 (4.1)[a]	17 (12.3)[b]	0.027[a]
Acute Fetal Distress (AFD)	35 (32.7)	40 (34.8)		47 (12.8)[a]	13 (9.4)[a]	
Cephalopelvic disproportion (CPD)	17 (15.9)	24 (20.9)		30 (8.2)[a]	7 (5.1)[a]	
Fetal Macrosomia	8 (7.5)	7 (6.1)		12 (3.3)[a]	4 (2.9)[a]	
Intrauterine Growth Restriction	2 (1.9)	2 (1.7)		5 (1.4)[a]	0 (0)[a]	
Multiple pregnancies (twin pregnancy)	2 (1.9)	9 (7.8)		6 (1.6)[a]	2 (1.4)[a]	
Placenta previa	---	---		8 (2.2)[a]	0 (0)[a]	
Placental Abruption	3 (2.8)	4 (3.5)		2 (0.5)[a]	1 (0.7)[a]	
Preeclampsia	8 (7.5)	6 (5.2)		16 (4.3)[a]	4 (2.9)[a]	
Previous Caesarean Section	20 (18.7)	20 (17.4)		227 (61.7)[a]	90 (65.2)[a]	
Length of stay in hospital / day	1.7±0.8	1.6±0.8	0.009[a]	1.9±0.7	1.8±0.8	0.001[a]
	2.0 (1.0-5.0)	1.0 (1.0-5.0)		2.0 (1.0-6.0)	2.0 (1.0-6.0)	
Maternal hemoglobin (g/dL)	11.2±1.2	10.4±1.0	<0.001[c]	11.7±1.3	10.9±1.1	<0.001[c]
	11.4 (6.8-13.3)	10.3 (6.5-12.8)		11.7 (6.6-15.5)	10.9 (6.8-14.1)	
Maternal hematocrit (%)	33.1±3.1	31.1±2.6	<0.001[c]	34.1±3.4	32.5±2.9	<0.001[d]
	33.6 (22.1-39.8)	31.1 (20.4-40.2)		34.2 (20.6-42.9)	32.9 (22.4-40.1)	

[a]Pearson Chi-square test; bYates correction, cMann-Whitney U test; dIndependent-Samples T test; F: Fisher's Exact test; a-b: There is no difference between the ratios of columns with the same letter in each row; notation: mean±standard deviation, median (minimum – maximum) frequency (percent)

In addition, there is a significant difference in newborn weight distribution according to nationality in adolescent pregnancies (p=0.001). Similarly, there is a significant difference between the median newborn heights of pregnant adolescents according to nationalities (p<0.001) (**Table 5**).

Nationality influences adolescent pregnancies (p<0.001). The probability of adolescent pregnancy is 3.081 times greater among Syrian refugees than among Turkish natives. When educational attainment is considered, the risk of adolescent pregnancy is 2.757 times greater among primary school graduates than among secondary school graduates (p<0.001). The incidence of adolescent pregnancy is 3.119 times greater among illiterate students than among secondary school graduates (p<0.001) (**Table 6**).

The probability of Syrian nationality in late preterm pregnancies is 1.51 times higher in adolescent women compared to term pregnancies. There is no statistically significant effect of the week of delivery in adult pregnancies or total (p>0.050) (**Table 7**).

Among pregnant adolescents, those with LBW are 2,041 times more likely to be of Syrian nationality than normal ones. There was no significant effect on newborn birth weight in pregnant adult women (p>0.050). Regardless of age group, LBW people are 2.33 times more likely to be Syrian citizens than normal ones (**Table 8**).

Table 5. Comparison of neonatal outcomes by nationality between adolescent and adult pregnant women

	Adolescent Pregnancies (13–19 years) (n, %)			Adult Pregnancies (20–47 years) (n, %)		
	Turkish citizen	Syrian refugee	p	Turkish citizen	Syrian refugee	p
Gestational week						
>41 weeks	2 (0.6)	2 (0.4)		3 (0.5)	0 (0)	
37–41 weeks	252 (81.8)	404 (76.2)		523 (82.8)	300 (85)	
32–36 weeks	46 (14.9)	111 (20.9)	0.217a	94 (14.9)	46 (13)	0.177a
28–31 weeks	7 (2.3)	9 (1.7)		9 (1.4)	2 (0.6)	
<28 weeks	1 (0.3)	4 (0.8)		3 (0.5)	5 (1.4)	
APGAR Score (5. minute)						
4–6	43 (14)	83 (15.7)		25 (4)	15 (4.2)	0.956b
≥7	265 (86)	447 (84.3)	0.507a	607 (96)	338 (95.8)	
Newborn weight (gram)						
≥2500 (g)	246 (79.9)a	355 (67)b		588 (93)	330 (93.5)	
LBW 1500 – 2499 (g)	55 (17.9)a	162 (30.6)b	0.001a	38 (6)	16 (4.5)	0.331a
VLBW 1000 – 1499 (g)	6 (1.9)a	9 (1.7)a		3 (0.5)	2 (0.6)	
ELBW <1000 (g)	1 (0.3)a	4 (0.8)a		3 (0.5)	5 (1.4)	
Newborn height (cm)	49.0±3.0	47.9±3.0	<0.001c	50.0±2.2	50.0±2.6	0.667c
	50.0 (36.0 – 54.0)	48.0 (33.0 – 54.0)		50.0 (35.0 – 53.0)	50.0 (34.0 – 55.0)	

[a]Pearson Chi-square test; bYates correction, cMann-Whitney U test; dIndependent-Samples T test; F: Fisher's Exact test; a-b: There is no difference between the ratios of columns with the same letter in each row; notation: mean±standard deviation, median (minimum – maximum) frequency (percent)

Table 6. Examination of risk factors influencing pregnancy in adolescents

	Adolescent Pregnancies (13-19 years) (n, %)	Adult Pregnancies (20-47 years) (n, %)	Total	OR (%95 CI)	p
Nationality					
Turkish citizen	308 (36.8)	632 (64.2)	940 (51.6)	Reference	
Syrian refugee	530 (63.2)	353 (35.8)	883 (48.4)	3.081 (2.544 – 3.731)	<0.001
Level of education					
Illiterate	116 (13.8)	94 (9.5)	210 (11.5)	3.119 (2.197 – 4.427)	<0.001
Primary education	612 (73)	561 (57)	1173 (64.3)	2.757 (2.15 – 3.536)	<0.001
Secondary education	110 (13.1)	278 (28.2)	388 (21.3)	Reference	
High education	0 (0)	52 (5.3)	52 (2.9)	---	

*Adolescent pregnancies are not included in the analysis because they are not graduates of higher education. OR (95%CI): Odds Ratio (95% Confidence Interval)

Table 7. The impact of gestational week on nationality

Pregnancies	Birth (weeks)	Nationality		Total	OR (%95 CI)	p
		Syrian refugee	Turkish citizen			
Adolescent	Term	406 (76.6)	254 (82.5)	660 (78.8)	Reference	
	Late preterm	111 (20.9)	46 (14.9)	157 (18.7)	1.51 (1.035 – 2.203)	0.033
	Very Preterm	9 (1.7)	7 (2.3)	16 (1.9)	0.804 (0.296 – 2.187)	0.67
	Extremely Preterm	4 (0.8)	1 (0.3)	5 (0.6)	2.502 (0.278 – 22.515)	0.413
Adult	Term	300 (85)	526 (83.2)	826 (83.9)	Reference	
	Late preterm	46 (13)	94 (14.9)	140 (14.2)	0.858 (0.587 – 1.255)	0.43
	Very Preterm	2 (0.6)	9 (1.4)	11 (1.1)	0.39 (0.084 – 1.815)	0.23
	Extremely Preterm	5 (1.4)	3 (0.5)	8 (0.8)	2.922 (0.693 – 12.314)	0.144
Total	Term	706 (80)	780 (83)	1486 (81.5)	Reference	
	Late preterm	157 (17.8)	140 (14.9)	297 (16.3)	1.239 (0.965 – 1.59)	0.092
	Very Preterm	11 (1.2)	16 (1.7)	27 (1.5)	0.76 (0.35 – 1.648)	0.486
	Extremely Preterm	9 (1)	4 (0.4)	13 (0.7)	2.486 (0.762 – 8.108)	0.131

*Adolescent pregnancies are not included in the analysis because they are not graduates of higher education. OR (95%CI): Odds Ratio (95% Confidence Interval)

Table 8. The impact of newborn weight on nationality.

Pregnancies	Newborn weight (gram)	Nationality		Total	OR (%95 CI)	p
		Syrian refugee	Turkish citizen			
Adolescent	≥2500 (g)	355 (67)	246 (79.9)	601 (71.7)	Reference	
	LBW 1500 – 2499 (g)	162 (30.6)	55 (17.9)	217 (25.9)	2.041 (1.444 – 2.886)	<0.001
	VLBW 1000 – 1499 (g)	9 (1.7)	6 (1.9)	15 (1.8)	1.039 (0.365 – 2.958)	0.942
	ELBW <1000 (g)	4 (0.8)	1 (0.3)	5 (0.6)	2.772 (0.308 – 24.949)	0.363
Adult	≥2500 (g)	330 (93.5)	588 (93)	918 (93.2)	Reference	
	LBW 1500 – 2499 (g)	16 (4.5)	38 (6)	54 (5.5)	0.75 (0.412 – 1.366)	0.347
	VLBW 1000 – 1499 (g)	2 (0.6)	3 (0.5)	5 (0.5)	1.188 (0.197 – 7.145)	0.851
	ELBW <1000 (g)	5 (1.4)	3 (0.5)	8 (0.8)	2.97 (0.705 – 12.505)	0.138
Total	≥2500 (g)	685 (77.6)	834 (88.7)	1519 (83.3)	Reference	
	LBW 1500 – 2499 (g)	178 (20.2)	93 (9.9)	271 (14.9)	2.33 (1.778 – 3.054)	<0.001
	VLBW 1000 – 1499 (g)	11 (1.2)	9 (1)	20 (1.1)	1.488 (0.613 – 3.612)	0.38
	ELBW <1000 (g)	9 (1)	4 (0.4)	13 (0.7)	2.739 (0.84 – 8.934)	0.095

*Adolescent pregnancies are not included in the analysis because they are not graduates of higher education. OR (95%CI): Odds Ratio (95% Confidence Interval).

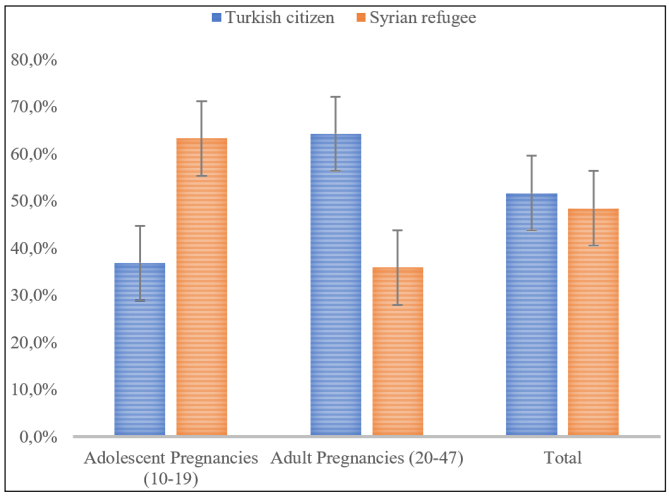

Figure 2. Percentage distribution of nationalities.

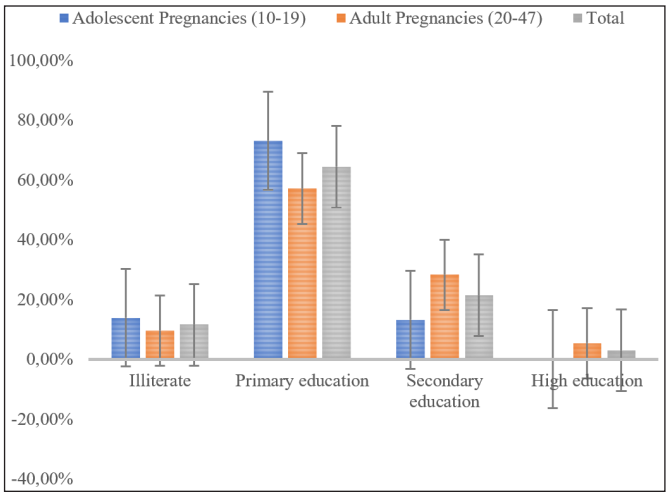

Figure 3. Percentage distribution of education level.

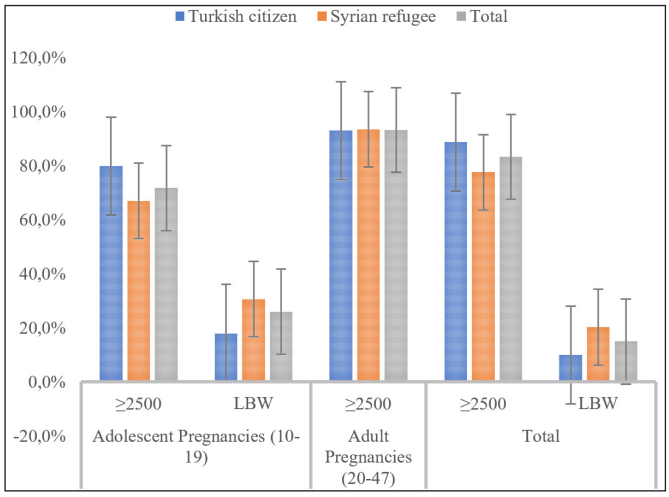

Figure 4. Percentage distribution of birth weight by nationality.

DISCUSSION

This study aimed to compare the clinical features and obstetric and neonatal outcomes of Turkish and Syrian adult and adolescent pregnant women. Also, we used the RTGCS to compare and analyze the birth characteristics of Turkish and Syrian pregnant adolescents and adults. According to the results of our study, adolescent pregnancy is exceptionally high among low-education young females and Syrian adolescent girls. Pregnant adolescent women are more likely than pregnant adult women of reproductive age to experience obstetric and neonatal complications. Robson Group 10 is more common in Syrian adolescent pregnant women than in Turkish pregnant women. This means that Syrian adolescent pregnant women have a higher rate of preterm births than Turkish adolescent pregnant women.

Our study shows that the risk of adolescent pregnancy is three times higher in Syrian refugees than in Turkish citizens ($p<0.001$). While the average fertility rate is 2.3 in Turkey, the regional fertility rate reaches the highest value at 3.2 in Eastern Anatolia. The total fertility rate among Syrian refugees has been 5.3, and 93% of births occur in health facilities (13). This shows that countries hosting numerous Syrian refugees, especially Turkey, need to make severe social, economic, political, and security plans and take comprehensive measures (13). Vural et al. (14) showed in their study that pregnant Syrian refugee women are younger and have a shorter gestation period. They also underlined those Syrian refugees have a higher risk of adolescent pregnancy. Similar studies in the literature support our findings (15,16). According to Turkay et al. (3), the pregnancy rate among young Syrian refugees was 10.8%, and the pregnancy rate of the Turkish adolescent population was 2.4%. In our study, while this rate is 63.2% for Syrians, it is 36.8% for Turks. This difference is due to the different regional distribution of Syrian refugees.

When our study is analyzed by education level, primary school graduates have a 2.7 times higher risk of adolescent pregnancy than secondary school graduates ($p<0.001$). Fertility increases as the education level falls, and illiterate women have two more children than women who have achieved a high school diploma or above (17). According to certain studies, education level may even affect preterm birth rates (18,19). It is even stated that the high CS rates in Turkey may be affected by education and literacy levels (20).

When we compared teenage and adult pregnancies by nationality in our study, we determined Syrian refugees had a greater rate of pregnancies and thus a higher rate of live births than Turkish residents. While the single pregnancy rate in the adolescent pregnant group is high in Turks, the rate of two or more pregnancies is higher in Syrians. In the adult population, Turkish women have a greater rate of first and second pregnancies, while Syrian women have a higher rate of three or more pregnancies. While we found no difference between the number of pregnancies among Syrian adolescents and Turkish adolescent pregnancies in Turkay et al. (3), we found a significant difference between the 1st, second, and third pregnancies. This difference is due to the different regional distribution and socio-cultural levels of Syrian refugees. In a similar study, Sayili et al. (21) found that Syrian refugees had a considerably greater parity than Turkish citizens ($p=0.010$) and a significantly shorter first gestational age ($p=0.034$).

In our present study, according to RTGCS (5), the high rate of Robson Group 10 among Syrian adolescent pregnant women shows that Syrian adolescent pregnant women give birth more prematurely than Turkish adolescent pregnant women. In the study by Vural et al. (14), the causes of premature births, which are more common in Syrian pregnant women, were associated with inadequate antenatal care, unemployment, malnutrition, inadequate iron supplementation, and low socioeconomic and cultural levels. In Robson Group 1, the proportion of Turkish adult pregnant women is higher than that of Syrian adult pregnant women. This could be because Turkish pregnant women become pregnant at a older age (15,16). This is probably the fear of childbirth, low sociocultural level, the pressure of malpractice laws on physicians, and especially Turkish women's negative expectations about SVD (22).

In our study, when we compared adolescent and adult pregnant women according to their nationalities, Robson Group 5 rates in RTGCS were higher in favor of Turkish pregnant women. Due to the increasing contribution of Robson Group 5 to overall cesarean rates, more women will need to have repeat cesarean sections in the future (23). Tontus et al. (24) observed that each CS delivery

in Robson groups 1-4 results in the addition of new cesarean candidates to Robson group 5, which already has the highest cesarean rate in subsequent pregnancies. As a result of Group 5's increased contribution to overall CS rates (23), more women will require a repeat CS as CS rates rise. Lefevre (25) asserts that various factors influence an obstetrician's attitude toward cesarean delivery. These factors include CSs being more profitable than SVDs due to financial incentives, the fear of malpractice, and physicians' desire to spend more time socializing.

When teenage and adult pregnancies were compared according to their national origins, we determined that Syrian pregnant women had a greater rate of SVD. According to Birge et al. (26), the rate of CS in adolescent pregnancies in Turkey is 36.7 percent, and 20.1 percent in Syrian adolescent pregnancies. In their study (26), they reported that CS rates were considerably higher ($p<0.001$) in Turkish adolescent pregnancies. In their study, Karacam et al. (27) discussed the rise in CS rates in Turks. More women are having CS surgery, an increase in CS surgeries, fear of vaginal birth by expectant mothers, IVF pregnancies, and more pregnant women over the age of 35. Turkay et al. (3), reported no difference in cesarean delivery rates between Syrian adolescent pregnant women and Turkish adolescent pregnant women. On the contrary, our study found a substantial difference in the proportion of CS of teenage Syrian refugees (21.7%) compared to Turkish adolescents (34.7%). Another result of our study is that while there is no difference between the first SVD rates of Syrian and Turkish adolescent pregnant women, subsequent vaginal delivery rates are higher than Syrian adolescent women (21.7% vs. 9.7%). It is seen that adolescent women are adversely affected not only by their first pregnancy and first birth but also by subsequent pregnancies and births. Therefore, adolescent pregnancies are also a risk factor for subsequent pregnancies and births of young mothers (28).

In this current study, we saw that the indications for cesarean section among adolescent pregnant women are not different between Turks and Syrians. When the adult pregnancy group was examined, we found that only the abnormal fetal lie and presentation rates were higher in favor of Syrian pregnant women.

According to our study, pregnant adults had a greater rate of previous CS than adolescent pregnant women, regardless of their nationality. Consistent with the literature, although there is no statistically significant difference between Turkish and Syrian pregnant women, the most common reason for CS indications is previous CS (14,29). Considering this data, if we want to decrease the CS rates in line with the WHO recommendations (9), we must first decrease the primary CS rates.

In our study, when adolescent and adult pregnancies were analyzed by nationality, the length of hospital stays was remarkably higher in favor of Turkish pregnant women in both groups. Vural et al.'s (14) study showed that Turkish pregnant women have a more extended hospitalization period than Syrian pregnant women. In our country, by WHO standards (30), we require women and newborns to stay in the hospital for at least 24 hours following SVD and at least 48 hours following cesarean delivery in the absence of postpartum problems. Because of the high rate of CS among pregnant Turkish women, we believe that this difference is reflected in the length of hospital stays.

Anemia adjusted for altitude and smoking was defined by the WHO (31) as values less than 11 mg/dL in pregnant women. In our study, when adolescent and adult pregnancies were compared according to their nationalities, the hemoglobin ratios of Syrian refugee pregnant women were lower. In their meta-analysis study, Karacam et al. (27) reported lower hemoglobin values in adolescent pregnancies ($p<0.001$). Contrary to our study, in Genc et al. (32), Hb and Htc values in adolescent pregnant women and adult pregnant women were within the WHO-recommended ranges, and they observed no significant difference. We can attribute the high rate of anemia in adolescent pregnancies to their low education level and low socioeconomic status. Adolescent pregnant women may not be aware of the necessity of regular prenatal follow-ups, oral iron supplementation, and laboratory tests to prevent anemia (14).

In our study, we found a proportionate difference in gestational weeks between teenage and adult pregnant women regardless of their nationality. While the delivery of adult pregnancies ended at the 37th and 41st gestational weeks, the delivery of adolescent pregnancies took place at the 32nd and 36th gestational weeks. We found that the probability of Syrian nationality in late preterm delivery in adolescent pregnancies is 1.51 times higher than at the term gestational week. In the study by Genc et al. In the study by Genc et al. (32), pregnant women aged 16 years and younger had a shorter gestational week. They noted in the same study that the pervasiveness of premature delivery was substantially higher in teenage pregnant women than in adult pregnant women ($p=0.0001$). In the study of Vural et al. (14), the prevalence of preterm birth was higher among Syrian refugee women, and they associated it with low sociocultural level, inadequate pre-pregnancy care, malnutrition, and post-traumatic stress disorder. In the study by Turkay et al. (3), as with our study, no difference in preterm birth rates was observed between Syrian and Turkish teenagers. In Karacam et al.'s meta-analysis study (27), they stated that preterm birth rates are 2.12 times more common in adolescent

pregnancies, and gestational weeks are shorter than adult pregnancies (p<0.001). According to Korencan et al. (33), preterm birth rates are higher in adolescent pregnant women than in adult pregnant women. The possible cause of premature birth in adolescent pregnant women is related to increased prostaglandin secretion due to insufficient uterine cervical blood flow. Other factors influencing the frequency of preterm birth in adolescent pregnancies include a small uterine volume and a short uterine cervical length of less than 25 mm (33).

When we compared the 5th minute APGAR scores of newborns born to teenage and adult pregnant women based on their nationality, we discovered that Turkish newborns had APGAR scores of 7 and above. We determined that neonates of pregnant adults, regardless of their nationality, had higher 5th minute APGAR ratings than newborns of teenage pregnant women. In the study published by Vural et al. (14), the APGAR score in infants of Syrian refugees was found to be below 7, like our study. As in Turkay et al.'s (3) study, there was no difference in our study's APGAR score rates between Syrian and Turkish adolescents. As a result, we should not forget that babies born to Syrian refugees and pregnant teenagers may need the right equipment and medical attention after birth for possible resuscitation.

In our study, newborns who were born with an LBW were twice as likely to be Syrian nationals as those born with a normal birth weight (p<0.001). However, we identified that Syrian teenage pregnant women's newborns have a lower birth weight than Turkish teenage pregnant women's newborns. Similarly, when we compared the neonates of Turkish and Syrian pregnant women, we determined that Syrian newborns had a lower birth weight than Turkish newborns, regardless of their age. When the weights of neonates born to teenage and adult pregnant women were compared, we revealed that all infants born to teenage pregnant women were underweight, except for newborns weighing less than 1000 g. We identified no difference in preterm birth rates between a Syrian refugee and Turkish pregnant women regardless of age, but a significant difference in favor of Syrian pregnant women between 1500 g and <2500 g in LBW newborns. In our study, newborns born with a LBW were twice as likely to be Syrian nationals as those born with an average birth weight (p<0.001). Regardless of age, newborns with LBW were 2.3 times more likely to be Syrian nationals (p<0.001). Genc et al. (32) showed that infants of adolescent pregnant women gave birth to lower fetal weights and had a higher risk of LBW than infants of adult pregnant women. According to Moraes et al. (34), he attributes this to the fact that adolescent girls at the age of growth and development must share the nutrients they need with their babies. Although the risk of late preterm delivery (34th–36th gestational weeks) is significant in Syrian pregnant women, the average birth weight of the babies is over 2500 g, according to Vural et al. (14). This is because LBW is caused by preterm birth, IUGR, or both (35). The term LBW means <2500 g absolute weight regardless of gestational week. LBW is an important indicator of maternal health, malnutrition, access to health care, and low socioeconomic status (36). Infants born with LBW are twenty times more likely to die than those born with more than 2500 g (37). Economic studies in low-income countries have shown that cutting down on the LBW burden will save a lot of money for the healthcare system (35).

Strengths and Limitations

Among the study's strengths was the high-quality index of publications against which we compared our results. Our study includes a significant number of patients evaluating Syrian and Turkish adolescent pregnant women. Numerous limitations apply to our investigation. In the information note it published (38), WHO drew attention to maternal mortality rates due to adolescent pregnancies. However, in our study, we realized that we needed to conduct a separate study with the anesthesia and reanimation clinic of our hospital to get sufficient data and evidence about maternal mortality due to adolescent pregnancies. Additionally, the limited sample size of our adolescent pregnant group of young girls aged 10–15 years may introduce bias into the results.

CONCLUSION

As a consequence of our study, the maternal age of pregnant Syrians is younger, and the risk of adolescent pregnancy is threefold that of Turkish nationals. According to education level, the risk of adolescent pregnancy in primary school graduates is approximately three times higher than that of secondary school graduates. According to the RTGCS, Syrian refugees and adolescent pregnancies have higher rates of preterm birth. Among adolescent pregnant women, the probability of late–preterm pregnant women being Syrian nationals is one and a half times higher than that of term pregnant women. Among adolescents who have given birth, infants with LBW are almost twice as likely to be Syrian nationals. Syrian pregnant women give birth to approximately two and a half times more LBW babies than Turkish pregnant women.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Health Sciences University Adana City Training and Researches Hospital Clinical Research Ethics Committee (Date: 26.08.2020, Decision No: 1046).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer reviewed.

Conflict of Interest Statement: The author has no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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