

Twin pregnancy: adolescents versus adults

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Abstract

Objective: Various nations, and this could create a new era of very young mothers which apply an additional pressure on obstetrical and neonatal health system. In cases of twin pregnancy, the burden would be maximized. The aim was to highlight the differences of obstetrical and neonatal outcomes of twin adolescent pregnancy compared to adults.

Material and Methods: Data were collected prospectively over five years from a tertiary obstetric and neonatal center. Two categories of twin pregnancies were formed from adolescents as the case group and adults as controls.

Results: The adolescent group included 59 women and adults numbered 782. The adolescents had significantly higher rates of very preterm delivery, defined as gestational age [(GA) $28 \leq 32$ weeks] [odds ratio (95% confidence interval) 2.64 (1.26-3.92)], $p < 0.05$, and significantly lower mean GA than adults (36.6 ± 4.1 versus 37.8 ± 2.6 , weeks respectively). Babies delivered to adolescents had significantly lower mean birth weight (1936.5 ± 0.604 g), birth height (43.4 ± 4.3 cm), and occipitofrontal circumference (OFC) (30.8 ± 3.3 cm). Moreover, there was a significantly higher frequency of neonates with APGAR score < 7 at the fifth minute [31 (52.54)], low birth weight [53 (89.83)], and neonatal intensive care unit (NICU) admission [38 (64.41)].

Conclusion: Twin adolescent pregnancy had significantly elevated metrics for obstetric and neonatal complications, which were especially notable for very preterm delivery, low neonatal birth weight and short birth length, and reduced OFC, APGAR score < 7 at the fifth minute, and NICU admission rate. [J Turk Ger Gynecol Assoc. 2025; 26(3): 174-9]

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Introduction

Pregnancy between the ages of 10-19 years is considered adolescent pregnancy, while any age older than that is defined as adult pregnancy (1).

Although adolescent pregnancy is not common, it has shown an increasing trend worldwide although the rates vary widely from country to country, and have been reported to range from 0.1% to over 20%. The incidence tends to be higher in developing countries compared to developed countries, however (2,3).

The rate of twin adolescent pregnancy is much lower at about 1.5% globally. Assisted reproductive technologies (ART) have significantly increased this rate (up to 32.1%), but ART is more easily accessible in the developed parts of the world (4,5). However, the present study only examined spontaneous twin pregnancies and thus focused on natural twinning rates.

In most of the developing countries in the Middle East and North Africa, the rates of adolescent pregnancy are among the highest in the world due to many factors. These include the social



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belief of early marriage, and background cultural acceptance of pregnancy at a very young age. These beliefs extend beyond pregnancy through all age groups and involve the use of certain drugs and remedies to support the health of adolescent pregnant women and her neonate based on traditional beliefs. As a result, the rate of twinning in adolescents may be as high as 16 per 1,000 births (6-9).

In general, twin pregnancy carries risks to the mother and her babies and more risks are associated with adolescents as these women are not biologically and mentally mature enough to face the burden of this health-related event. Many complications may arise, such as preterm delivery, gestational hypertension (GH), gestational diabetes (GDM), higher cesarean section (CS) rates, and low birth weight (LBW) with higher chances of the newborn baby needing neonatal intensive care unit (NICU) admission. Similarly, advanced maternal is also associated with more complications with higher rates of maternal and neonatal morbidities (10-12).

The limited published data about adolescent twin pregnancy and the expected load on the health system dealing with twinning pregnancy at different maternal ages (2,6) are the major stimuli for this study. The aims are to examine and report obstetrical and neonatal outcomes of twin pregnancy in adolescents compared to twin pregnancies in adults.

Material and Methods

Twin pregnant women who visited obstetrics and gynecology department at a tertiary medical center over five years, from November 2019 to October 2024 were prospectively included. Data were obtained from the attending obstetrical and neonatal units' records under the supervision of the researchers.

Exclusion criteria were: previously diagnosed chronic maternal disease, including hematological, cardiovascular, immunological, endocrinological, and oncological abnormalities; fetal retardation-associated pregnancies; pregnancies resulting from in vitro fertilization (to decrease bias in results when comparing twin pregnancy outcomes in adolescents versus (vs) adults); premature delivery before 28 weeks gestation; VLBW below 1,000 g; congenital and/or chromosomal neonatal defects; and missing and incomplete data. Two groups were formed; the study group included adolescent twin pregnant women and the control group included adult twin pregnant women aged (20-34) years.

Definitions

The adolescent pregnant women were defined as women aged (10-19) years, while pregnant women aged ≥ 20 years were defined as adult (13,14).

Preterm pregnancy was defined as gestational age (GA) birth below 37 completed weeks, and late preterm pregnancy was defined as GA between 32-37 weeks. If GA was 28 to <32 weeks, this was categorized as a very preterm pregnancy, while an extremely preterm pregnancy was one when birth occurred with GA <28 weeks (15,16).

Premature rupture of membranes (PROM) as defined as rupture occurring before 37 weeks GA (17).

LBW, and VLBW neonates were defined when birth weight was <2.5 kg, and <1.5 kg, respectively (18,19).

The definition of GH follows the guidelines set by the American College of Obstetricians and Gynecologists. This is characterized by a systolic blood pressure of ≥ 140 mm Hg or a diastolic blood pressure of ≥ 90 mm Hg on two separate readings taken at least 4 hours apart after 20 weeks of pregnancy in a woman with previously normal blood pressure (20,21). Women with GH were managed according to the hospital's guideline with labetalol and/or methyldopa.

Maternal anemia was defined as a hemoglobin level less than 11 g/dL measured at birth (14,22).

GDM was diagnosed after 20 weeks of pregnancy following the criteria established by the International Association of Diabetes in Pregnancy Study Groups. Diagnosis involved a fasting plasma glucose level exceeding 91.8 mg/dL, or elevated postprandial levels during a 75 g oral glucose tolerance test, with thresholds of over 180 mg/dL at one hour and over 153 mg/dL at two hours (11,22). Women with GDM were managed according to the hospital's guideline and started with diet and healthy lifestyle, and if that failed, metformin was tried before the use of insulin which was considered the last treatment option.

Body mass index was calculated using the standard formula: body weight (kg)/ height (m^2) (23).

Stillbirth was defined as a baby that died after 28 weeks of GA, but before or during delivery (24).

The attending obstetrician and neonatologist completed all the needed measurements according to standard hospital guidelines, under observation of the authors.

This study was approved by the Al-Kindy College of Medicine University of Baghdad (approval number: 89, date: 23.09.2019).

Statistical analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 25.0 (IBM Corporation, Armonk, New York, USA), with a significance threshold set at $p < 0.05$ for all tests. The normality of the data was assessed using the Kolmogorov-Smirnov test. Parametric data were analyzed with Student's t-test, and results are presented as mean $\pm$ standard deviation. For non-parametric data, the Mann-Whitney U test was applied, with results reported as

median (minimum, maximum). Categorical variables were assessed using the chi-square test, and odds ratios with 95% confidence intervals were calculated.

Results

The study group of adolescent twinning pregnancies included 59 women, and the control group of adult twinning pregnancies included 782 women.

Table 1 shows the general sociodemographic characteristics. Evidently, median age (years) differed significantly between the adolescent and adult groups and multiparity was more frequent in adults. Both groups have comparable rates of CS, and the adolescent group included a larger percentage of primary CS. Mean stillbirth values were higher in adolescents without being significant. Mean GA at birth was significantly lower in the adolescent group in comparison with the adult group (36.6 ± 4.1 and 37.8 ± 2.6 , respectively), with approximately one week difference.

In terms of maternal outcomes (Table 2), very preterm delivery has been significantly more common in adolescents than adults [31 (52.54) and 232 (29.67), respectively]. Conversely, late preterm delivery, extremely preterm delivery, and GDM

were more common in the adult group, but not significantly so. In addition, preterm delivery, PROM, GD, GH, and maternal anemia were more common in adolescents.

In terms of neonatal outcomes (Table 3), mean birth weight (g), birth length (cm), and occipitofrontal circumference (OFC; in cm) were significantly less in babies born to adolescents compared to those born to adults (1936.5 ± 0.604 vs. 2181.7 ± 0.522 , 43.4 ± 4.3 vs. 44.6 ± 4.1 , and 30.8 ± 3.3 vs. 31.9 ± 3.8 , respectively). Proportion of neonates with APGAR score <7 at the fifth minute, LBW, and NICU admission were significant larger in the adolescent group than the adult group [31 (52.54) vs. 367 (46.93), 53 (89.83) vs. 527 (67.39), and 38 (64.41) vs. 1.76 (1.1-3.2), respectively]. However, although the APGAR score <7 at the first minute and VLBW were more frequent in the adolescent group than in adults, these variables failed to reach statistical significance [31 (52.54) vs. 367 (46.93), and 8 (13.56) vs. 81 (10.36), in corresponding order].

Discussion

Although twin pregnancy at any age is a major health concern, adolescent population may fare worse. In the present study, median ages of adolescent and adult pregnant women was

Table 1. General demographic characteristics of adolescent versus adult twin pregnancies

Parameter	Adolescent group (n=59)	Adult group (n=782)	p-value
Age (years): median (min, max)	18 (12-19)	28 (20-34)	<0.05
Parity: n (%)			<0.05
Nulliparous	57 (96.61)	556 (71.10)	
Multiparous	2 (3.39)	226 (28.90)	
Body mass index: mean $\pm$ SD	24.6 ± 1.7	25.9 ± 3.2	0.09
Residence: n (%)			0.24
Urban	46 (77.97)	568 (72.64)	
Rural	13 (22.3)	214 (27.36)	
Mode of delivery: n (%)		36.6 ± 4.1 and 37.8 ± 2.6	
Vaginal	3 (5.08)	28 (3.58)	
Cesarean section: n (%)	56 (94.92)	754 (96.42)	
Primary: n (%)	54 (96.43)	567 (75.20)	<0.05
Repeated: n (%)	2 (3.57)	187 (24.80)	
Gestational age at delivery: mean $\pm$ SD	36.6 ± 4.1	37.8 ± 2.6	0.36
Chorion type, n (%)			0.27
Mono-chorionic	23 (38.98)	386 (49.36)	
Di-chorionic	36 (61.02)	396 (50.64)	
Neonatal sex: n (%)			0.89
Male	66 (55.93)	822 (52.56)	
Female	52 (44.07)	742 (47.44)	
Stillbirth: mean $\pm$ SD	$4 (6.78)$	$46 (5.88)$	0.74
Gestational age (GA): mean $\pm$ SD weeks	36.6 ± 4.1	37.8 ± 2.6	<0.05

SD: Standard deviation, Min: Minimum, Max: Maximum

Table 2. Obstetrical complication by different maternal age groups

Complication: n (%)	Adolescent group (n=59)	Adult group (n=782)	OR 95% CI	p-value
Preterm delivery	51 (86.44)	605 (77.37)	1.78 (0.89-3.51)	0.28
Late preterm delivery	19 (32.20)	358 (45.78)	0.83 (0.61-1.73)	0.07
Very preterm delivery	31 (52.54)	232 (29.67)	2.64 (1.26-3.92)	<0.05
Extremely preterm delivery	1 (1.67)	15 (1.92)	0.68 (0.44-2.53)	0.43
Premature rupture of membranes (PROM)	16 (27.12)	176 (22.51)	1.2 (0.39-5.37)	0.31
Gestational hypertension (GH)	5 (8.47)	51 (6.52)	1.1 (0.35-3.46)	0.72
Anemia	52 (88.14)	670 (85.68)	1.57 (0.73-4.29)	0.69
Gestational diabetes (GD)	2 (3.39)	31 (3.96)	0.82 (0.24-3.13)	0.54

OR: Odds ratio, CI: Confidence interval

Table 3. Neonatal complication by different maternal age groups

Complication	Adolescent group (n=59)	Adult group (n=782)	OR 95% CI	p-value
Birth weight (g) (mean $\pm$ SD)	1936.5 $\pm$ 0.604	2181.7 $\pm$ 0.522		<0.05
Birth height (cm) (mean $\pm$ SD)	43.4 $\pm$ 4.3	44.6 $\pm$ 4.1		<0.05
Occipitofrontal circumference (cm) (mean $\pm$ SD)	30.8 $\pm$ 3.3	31.9 $\pm$ 3.8		<0.05
APGAR score <7 at 1 st minute: n (%)	31 (52.54)	367 (46.93)	1.38 (0.94-2.25)	0.14
APGAR score <7 at 5 th minute: n (%)	15 (25.42)	126 (16.11)	1.47 (1.08-2.39)	<0.05
Low birth weight: n (%)	53 (89.83)	527 (67.39)	2.98 (1.64-5.13)	<0.05
Very low birth weight: n (%)	8 (13.56)	81 (10.36)	1.57 (0.61-2.72)	0.29
Neonatal intensive care unit admission	38 (64.41)	428 (54.73)	1.76 (1.1-3.2)	<0.05

OR: Odds ratio, CI: Confidence interval, SD: Standard deviation

around 18 and 28 years, respectively. This is in line with other local and international figures (3,6,25). Parity in adults was much higher than in adolescents, unsurprisingly, as with age progression the number of deliveries is likely to increase (2,26). Operative delivery by CS had similar rates in both groups, possibly because of obstetrician's choice for twin pregnancies (25,27). Primary CS was predominant in adolescents while adults had predominantly repeated CS. This is obvious as adolescent pregnancy is a risk factor by itself and with elevated parity numbers the possibility of repeated operative delivery and CS increases (2,27,28).

There was a one-week difference in GA at birth between adolescents and adults. However, it has been shown that GA at birth is shortened in both adolescent pregnancies and twin pregnancies (29,30).

Although preterm delivery was more frequent in the adolescent group, very preterm delivery was the only definition of prematurity to exhibit a significant difference. Conflicting previous reports have shown various results. One much earlier study found no difference in preterm rates between adolescents and adults, while a more recent paper revealed a higher occurrence of very advanced preterm labor with less

than 28 weeks in twin adolescent pregnancy. However, a third paper reported higher preterm deliveries of less than 33 weeks in twin adolescent pregnancy (31-33). These contradictory results could be related to the number and ethnic background of involved samples, and the criteria used for defining different categories of preterm delivery.

Obstetric complications including PROM are more common in both adolescent pregnancies and twin pregnancies, which is in parallel with our results (2,26,27).

GH was more common in our adolescent pregnancy cohort. Again, published evidence is contradictory about this. Some reports found no differences in GH in different age groups, while others observed a higher incidence in adolescents (12,29,31,32). The multifactorial etiology of GH may explain these contrary results.

Anemia is a common feature of adolescents in general, especially nutritional anemia due to iron deficiency since they have elevated iron requirements because their physical development is not yet finished. Besides, pregnancy is a known cause of iron deficiency. Accordingly, anemia is more common in all age groups during pregnancy but slightly more so in adolescents (14,34).

As individuals grow older the sensitivity of pancreatic beta cells decreases. Pregnancy also increases demand on the maternal beta-cell function. Given this, adult pregnant women have a higher chance to develop GDM than adolescents, and that is what we found in our sample (11,21).

With respect to neonatal complications, we found that neonatal weight, length, and OFC measurements were significantly less in babies born to adolescents. This is in line with the published evidence. Furthermore, adolescents may focus on their body shape, even during pregnancy, using various approaches like fasting, lowering amount and type of daily food and calories, and even vomiting. Besides, adolescent physical development may not be complete, especially in younger adolescents, and this could lead to conflicting needs for nutrient absorption and utilization between the developing body of the adolescent and their fetuses. Given these factors, and the one week difference in GA at birth, the findings concerning neonatal anthropometry in the two groups in our study may be unsurprising (2,6,35,36). In the present study, being adolescent when pregnant was significantly associated with reduced rates of APGAR score <7 at 5th minute, LBW, and NICU admission were found. Many earlier investigations had the same opinion showing poor neonatal parameters and outcomes (2,6,25,37,38).

Study limitations

Strengths of this work include prospective data collection over five years and being conducted at the largest tertiary medical facility in Iraq.

Yet, some limitations should be acknowledged, including the single-center nature of the study, the relatively small number of women with twin pregnancies, especially adolescents, leading to limited statistical power to detect differences in rare outcomes, such as GDM and GH, and lack of nutritional data for the pregnant women. Finally, the sociodemographic characteristics of the Iraqi population mean that the findings may not be generalizable. Thus more studies with expanded international diversity are suggested.

Conclusion

This study investigated outcomes of twin pregnancies in adolescents and adult women where adolescent pregnancy was considered a high-risk medical concern. It was found that adolescent twin pregnancy was associated with increased complications and morbidities, both for the mother and the twins. Of note, there was a heightened vulnerability of very preterm delivery, APGAR score <7 at the fifth minute, LBW, and NICU admission in the adolescent group. Furthermore, neonatal birth weight, birth length, and OFC were all significantly lower in twins born to adolescents.

Ethic

Ethics Committee Approval: *This study was approved by the Al-Kindy College of Medicine University of Baghdad (approval number: 89, date: 23.09.2019).*

Informed Consent: *Helsinki declaration guidelines were applied, and an instructed consent was gathered from all participants.*

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Footnotes

Author Contributions: *Surgical and Medical Practices: S.K.J., R.D., A.O.O., H.A.M, R.A., Concept: S.K.J., R.D., R.A., Design: S.K.J., R.D., A.O.O., H.A.M, Data Collection or Processing: S.K.J., R.D., A.O.O., Analysis or Interpretation: S.K.J., R.D., H.A.M, Literature Search: R.D., A.O.O., H.A.M, R.A., Writing: S.K.J., R.D., A.O.O., H.A.M, R.A.*

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