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Comparison of Delivery Results of Adolescent-Age Pregnant Women and Older Pregnant Women With Those In Normal Age Range

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ABSTRACT

The negative results of adolescent (10-19 years) and advanced-age pregnancies (AMA) (>40 years) were compared with the results of the pregnancies considered to be within normal reproductive period (20-40 years) in our study. The complications and poor outcomes that might occur during and after pregnancies in these special periods were also uncovered in this respect.

The data of the patients were scanned retrospectively through the automation system, and the patients were divided into 3 groups according to their ages at birth; adolescent (10-19 years), normal (20-40 years old), and AMA (>40 years). A total of 100 patients were evaluated in the adolescent age group, 99 patients in the normal age group, and 76 patients in the AMA group.

Statistically significant differences were detected between the groups in terms of age, weight, and BMI ($p<0.05$). Statistically significant differences were found between the groups in terms of active phase duration ($p<0.05$), which was the highest in women in the AMA group (268.5min). There were statistically significant relations in terms of pregnancy follow-up status ($p<0.05$); and the rate of non-follow-up was the highest in the adolescent group (32.0%). C/S ratio was the highest in the AMA group (73.7%), the normal delivery rate was the highest in the adolescent group (83.0%). Also, there were statistically significant relations between cesarean section indications ($p<0.05$).Although fetal distress was the indication for cesarean section in the majority of women in the normal and adolescent group (39.1%-56.3%), the reason for cesarean section was found to be maternal anxiety (patient demand) in the majority (25.0%) of women in the AMA group.

Early and late pregnancies should be considered as a special group and follow-up should be planned accordingly. Decreased pregnancy follow-up status in adolescence and increased cesarean section rates in advance-age pregnancies may increase complications.

Keywords: adolescent pregnancy, advanced age pregnancy, cesarean section

Introduction

Parental age, especially maternal age, is among the important aspect for maternal and fetal follow-up in the antenatal period and the development of the infant following the birth. It was reported in the literature that the complication rates increase in gestational ages at both extreme points of the reproductive period (1).

WHO reported the pregnancy and birth complications in pregnant women in the adolescent age group (10-19 years) as one of the leading causes of mortality in the world (2). Adolescent pregnancy is an indicator of social disadvantage, and is accepted as a cause of emotional and physical health problems (3). In a study in which many countries participated, increased risks were detected for many complications such as anemia, preterm birth, low birth-weight, eclampsia, and endometritis in adolescent pregnancies (2).

Although there is no absolute consensus regarding the Advanced Maternal Age (AMA) in the literature, the general opinion is considered to be over 40 years old. There has been a recent increase in the frequency of Advanced Maternal

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Age pregnancies, especially with more frequent use of assisted reproductive techniques. Participation in business life with increased education levels and assisted reproductive techniques are among the reasons for this (4, 5). Although the cause of advanced gestational age varies depending on the career chosen and assisted reproductive techniques, worse obstetric and neonatal outcomes are reported when compared to mothers at younger ages (5). It is argued that the reasons for these are increased risk of chromosomal anomaly (6), maternal diabetes and preeclampsia (7), preterm birth, low birth weight, perinatal death, and increased cesarean delivery rates (8, 9).

In the present study, the negative outcomes in adolescent (10-19 years) and advanced age pregnancies (>40 years) were compared with the results seen in normal reproductive period (20-40 years). The purpose was to increase our experience in complications and poor outcomes, which may occur during and after pregnancy.

Material and Method

After receiving the approval of the ethics committee, patients who were admitted at the tertiary center between February 2015 and February 2021 were scanned retrospectively with the automation system. The gestational ages were calculated according to the starting date of the Latest Menstrual Period (LMP), and were then confirmed with ultrasound examination in the first and second trimesters.

The patients were divided into 3 groups according to age at birth, adolescent (10-19 years old), normal (20-40 years old), AMA (>40 years old). A total of 100 patients in the adolescent age group, 99 patients in the normal age group, and 76 patients in the AMA group were evaluated. Analyzed variables; age, weight, height, Body Mass Index (BMI), LMP, Thyroid-stimulating hormone (TSH), hemoglobin (Hb), presence of additional disease, parity, mode of delivery, indication for cesarean section, presence of perinatal complications, active phase duration, presence of birth complications, the gender and weight of the infant, and 1st and 5th-minute APGAR results were evaluated in all 3 groups.

Preeclampsia is defined as the type of hypertension accompanied by proteinuria in the urine test after the 20th week of pregnancy by measuring the systolic blood pressure as 140 mmHg and above and diastolic blood pressure as 90 mmHg and above every 6 hours. It is defined as the presence of protein in ≥1 concentration or the presence of 1+ proteinuria with urinary dipstick (10). Intrauterine Growth Retardation (IUGR) was defined as the sonographic finding of fetal weight below the tenth percentile of the expected weight for gestational age (by using the Hadlock Formula) and fetal and postnatal confirmation attributed to increased pulsatility index of the umbilical artery with more than two standard deviations. Small for Gestational Age (SGA) and Large for Gestational Age (LGA) were defined as neonatal weights below the 10th percentile and above the 90th percentile for gestational age, respectively in the present study. Preterm birth was defined as the birth before 37 completed weeks of gestation (11). Gestational Diabetes Mellitus (GDM) diagnosis was made by screening with 50 g Oral Glucose Tolerance Test (OGTT) at 24-28 weeks of pregnancy and with 100 g OGTT test in patients with 1st-hour postprandial blood glucose 140 mg/dL and above. GDM diagnosis was made in those who fasted for at least 8 hours during the night in a 100-gr OGTT test, with any two of the following; fasting blood glucose levels 95 mg/dL, 1st hour 180 mg/dL, 2nd hour 155 mg/dL, and 3rd hour 140 mg/dL (12). All fetuses that had anus or abnormal presentation were delivered with cesarean section. Perinatal death was defined as fetal death at or above 20 weeks of gestation and earlier than 28 days (13).

Statistical Analysis: The values of kurtosis and skewness obtained from the measurements are between +3 and -3, which is considered sufficient for a normal distribution (14,15,16). According to the test results, age, active phase duration, LMD, TSH, APGAR score measurements do not show normal distribution, height, weight, BMI, hemoglobin measurements show normal distribution. One-way ANOVA and Tukey test were used for normally distributed measurements, and Kruskal Wallis, Mann Whitney, Wilcoxon tests were used for non-normally distributed measurements. The statistical significance limit was accepted as $P<0.05$. SPSS 24.0 program was used for data analysis.

Results

Statistically significant differences were detected between the groups in terms of age, weight, and BMI values ($p<0.05$). In the advanced maternal age group, the mean weight was 71.64 kg and BMI was 26.24kg/m^2, which was the highest. According to the intra-group comparison results,

Table 1: Comparison of the Body Measurements of the Pregnant Women According to the Groups

	Normal (20-40 years of age)		Adolescent (10-19 years of age)		AMA (>40 years of age)		X2/F	P
	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD		
AgeKW (year)	24-38	26.11±1.5	14-18	16.93±0.9	40-46	41.36±1.49	244.789	0.001*
HeightF(cm)	149-180	164.98±5.48	149-180	164.86±5.58	149-180	165.34±6.08	0.163	0.850
WeightF(kg)	50-90	67.27±10.16	48-110	65.82±11.66	50-110	71.64±12	6.078	0.003*
BMIF(kg/m2)	18.14-33.2	24.7±3.47	17.63-36.75	24.21±4.03	18.14-37.46	26.24±4.35	6.037	0.003*

BMI: Body Mass Index.

*$p<0.05$ significant difference, $p>0.05$ no significant difference; Kruskal Wallis (X^2), ANOVA (F)

significant differences were detected in terms of weight and BMI values between women in the AMA group and normal age, and adolescent women ($p<0.05$) (Table 1).

A statistically significant relation was detected between the pregnant women in different age groups and additional disease status ($p<0.05$) (Table 2). The rate of the comorbidities was highest in the AMA group (77.6%). No statistically significant relations were detected between the comorbidity subtypes and the groups ($p>0.05$). There were statistically significant relations between the groups regarding the delivery types ($p<0.05$). Although the C/S ratio was the highest in the AMA group (73.7%), the normal delivery rate was the highest in the adolescent group (83.0%). Also, there were statistically significant relations between cesarean section indications ($p<0.05$). Although fetal distress was found to be was the cause in the majority of women in the normal and adolescent group (39.1%-56.3%), it was maternal anxiety (patient demand) in the majority of women (25.0%) in the AMA group.

No statistically significant relations were detected between the groups, perinatal complication status (Table 2) and types ($p>0.05$). There were statistically significant relations in terms of pregnancy follow-up status ($p<0.05$); and the rate of non-follow-up was the highest in the adolescent group (32.0%).

There were no statistically significant relations between the gender of the same group pregnancies ($p>0.05$) (Table 3).

No statistically significant differences were detected between the groups in terms of the birth weight of the infants ($p>0.05$), but a statistically significant difference was detected in terms of APGAR measurement at 1 min ($p<0.05$) (Table 4) . The 1st-minute APGAR score was the highest in women in the adolescent group (p: 0.003). According to intra-group comparisons, a significant difference was detected between women in the adolescent group and women in the AMA group ($p<0.017$); and there were no statistically significant differences in the comparisons made in terms of APGAR measurements at the 5th minute ($p>0.05$).

Statistically significant differences were detected between the groups in terms of active phase duration ($p<0.05$), which was the highest in women in the AMA group (268.5min). According to the intra-group comparisons, a significant difference was detected between the pregnant women in the 20-40 age group and the women in the AMA and adolescent group in terms of active phase duration ($p<0.05$). No statistically significant differences were detected between the groups in terms of LMP, Hemoglobin, and TSH values ($p<0.05$) (Table 5).

Discussion

In the present study, the adolescent-age, normal-age, and advanced-age pregnancy outcomes were evaluated. Although the BMI, presence of additional disease, severe preeclampsia frequency, and active phase durations were found to be significantly higher in advanced-age pregnancies in the examinations, the rate of non-follow-up was higher in adolescent pregnancies during pregnancy. Although cesarean section indication was found to be at the highest rate in advanced-age pregnancies, the reason for this was found to be fetal distress in normal-aged and adolescent pregnancies. No significant differences were detected between the birth weights of the infants. The highest 1st minute APGAR score was found in adolescent pregnancies, and the lowest was in advanced-age pregnancies.

In a study that evaluated the results of adolescent pregnant women (15-19 years), the rate of preterm birth and SGA was found to be higher when compared to pregnancies in the ages 20 and over. Patients from many different income countries such as Asia, Africa, and America were included in this study. Many other studies were related to poor perinatal outcomes in adolescents such as

Table 2: The Relation between the Demographic Data and Pregnancy Characteristics of the Women and the Group

n (%)		Normal (20-40 years of age)	Adolescent (10-19 years of age)	AMA (>40 years of age)	X2	P
Comorbidity status	No	86 (86.9)	93 (93)	59 (77.6)	8.697	0.013*
	Yes	13 (13.1)	7 (7)	17 (22.4)		
Comorbidity	Anemia	0 (0)	0 (0)	1 (5.9)	18.710	0.724
	Arrhythmia	0 (0)	0 (0)	1 (5.9)		
	Asthma	1 (7.7)	1 (14.3)	0 (0)		
	Crohn's Disease	0 (0)	0 (0)	1 (5.9)		
	Diabetes Mellitus	2 (15.4)	0 (0)	3 (17.6)		
	Epilepsy	0 (0)	1 (14.3)	1 (5.9)		
	FMF	0 (0)	2 (28.6)	1 (5.9)		
	GDM	2 (15.4)	0 (0)	2 (11.8)		
	Goiter	5 (38.5)	3 (42.9)	2 (11.8)		
	Hypertension	1 (7.7)	0 (0)	2 (11.8)		
	Migraine	1 (7.7)	0 (0)	2 (11.8)		
	Thalassemia	1 (7.7)	0 (0)	1 (5.9)		
Parity	Multigravida	35 (35.4)	9 (9)	0 (0)	52.689	0.001*
	Primigravida	64 (64.6)	91 (91)	76 (100)		
Birth type	Normal birth	76 (76.8)	83 (83)	20 (26.3)	71.950	0.001*
	Caesarian birth	23 (23.2)	16 (16)	56 (73.7)		
CS indication	Vacuum	0 (0)	1 (1)	0 (0)	39.191	0.019*
	Foot presentation	1 (4.3)	0 (0)	0 (0)		
	CPD	3 (13)	2 (12.5)	8 (14.3)		
	Placental abruption	0 (0)	0 (0)	2 (3.6)		
	Previous cesarean	1 (4.3)	1 (6.3)	0 (0)		
	Fetal distress	9 (39.1)	9 (56.3)	12 (21.4)		
	Fetal macrosomia	0 (0)	0 (0)	3 (5.4)		
	Twin pregnancy	1 (4.3)	0 (0)	2 (3.6)		
	Non-progressive labor	4 (17.4)	0 (0)	1 (1.8)		
	Cord prolapse	0 (0)	0 (0)	1 (1.8)		
	Breech presentation	2 (8.7)	3 (18.8)	6 (10.7)		
	Placenta Previa	0 (0)	0 (0)	1 (1.8)		
	Severe preeclampsia	1 (4.3)	0 (0)	2 (3.6)		
	Transvers presentation	1 (4.3)	0 (0)	3 (5.4)		
	Prolonged MR	0 (0)	1 (6.3)	0 (0)		
	Face presentation	0 (0)	0 (0)	1 (1.8)		
Perinatal complication status	No	87 (87.9)	86 (86)	60 (78.9)	2.728	0.256
	Yes	12 (12.1)	14 (14)	16 (21.1)		
Perinatal complication	Disrupted Doppler	1 (8.3)	1 (7.1)	2 (12.5)	14.176	0.767
	Multiple pregnancy	1 (8.3)	0 (0)	2 (12.5)		
	Placental abruption	1 (8.3)	1 (7.1)	2 (12.5)		
	IUGR	3 (25)	3 (21.4)	1 (6.3)		

	Oligohydramnios	2 (16.7)	4 (28.6)	4 (25)		
	Polyhydramnios	0 (0)	0 (0)	4 (25)		
	Preeclampsia	1 (8.3)	1 (7.1)	0 (0)		
	Preterm labor	1 (8.3)	1 (7.1)	1 (6.3)		
	SGA	1 (8.3)	1 (7.1)	1 (6.3)		
Pregnancy Followed-up	Followed-up	99 (100)	68 (68)	76 (100)	72.415	0.001*
	not followed-up	0 (0)	32 (32)	0 (0)		
Birth complication status	No	89 (89.9)	84 (84)	58 (76.3)	5.873	0.052
	Yes	10 (10.1)	16 (16)	18 (23.7)		
	Atonia	1 (10)	3 (18.8)	1 (5.6)		
	Eclampsia	0 (0)	0 (0)	1 (5.6)		
	Ex fetus	0 (0)	0 (0)	1 (5.6)		
	Surmaturity	1 (10)	1 (6.3)	0 (0)		
	Hysterectomy	1 (10)	0 (0)	0 (0)		
Birth complication	Shoulder dystocia	1 (10)	1 (6.3)	0 (0)	14.633	0.514
	Transfusion	2 (20)	1 (6.3)	4 (22.2)		
	Complicated episiotomy	0 (0)	1 (6.3)	0 (0)		
	Neonatal Intensive Care need	4 (40)	9 (56.3)	11 (61.1)		

GDM: Gestational Diabetes Mellitus, FMF: Familial Mediterranean Fever, CPD: Cephalopelvic Disproportion, MR: Membrane Rupture, IUGR: Intrauterine Growth Retardation , SGA: Small for Gestational Age.
*p<0.05 significant relation, p>0.05 no significant relation; Chi-Square

Table 3: Examination of Pregnancy in Different Age Groups according to the Gender of the Baby

n (%)		Normal (20-40 years of age)	Adolescent (10-19 years of age)	AMA (>40 years of age)	X2	P
Gender of the baby	Male	38 (38.4)	47 (47)	33 (43.4)	1.51	0.46
	Female	61 (61.6)	53 (53)	43 (56.6)	9	8

*p<0.05 significant relation, p>0.05 no significant relation; Chi-Square

low birth weight, premature birth, and increased perinatal mortality (17, 18). Although these risks are higher in young adolescents (10-15 years), they decrease as the age of adolescents increases (18-19 years) (19). Since the adolescent-age pregnant women were predominantly over the age of 16 in our study, we believe that negative outcomes were less.

Antenatal follow-ups are important in terms of determining the well-being of the fetus, especially chromosomal anomalies and accompanying comorbidities. Low education and socioeconomic levels, family pressure and difficulty in expressing wishes can be listed among the reasons for accessing adequate antenatal care in adolescent pregnancies especially in developing societies (19). It was found in our study that the rate of antenatal follow-up of adolescent pregnant women was low. In the future, we are planning to conduct a survey study regarding the reasons for this.

Advanced age pregnancies are common especially in developed countries because of the career goals of women, and because of the lack or inadequate implementation of family planning methods in underdeveloped and developing societies and the increase in the use of assisted reproductive techniques. Perinatal and maternal morbidity and mortality rates may increase in advanced age pregnancies (20). Similar to our study, in a previous study that was conducted with 5063 cases, no associations were detected between advanced maternal age and adverse pregnancy outcomes (21). However, in the study of Londero et al. conducted in 2019, it was reported that the results of GDM, preeclampsia, and IUGR were more common in advanced maternal age. Although the exact cause of this is not known clearly, they attribute it to vascular causes. However, the higher incidence of comorbidities in older ages must also be considered as a reason. No significant differences were detected in our

Table 4: Comparison of Birth Weights and 1st and 5th-Minute APGAR Scores of the Infants according to Groups

	Normal (20-40 years of age)		Adolescent (10-19 years of age)		AMA (>40 years of age)		X2/F	p
	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD		
Birth weight of infant (gr) (F)	1935-4330	3107.88±379.86	1180-4100	3108.25±499.78	1530-5190	3141.05±626.98	0.119	0.888
1st Min APGAR score (X2)	3-8	7.38±1.02	3-9	7.58±1.42	3-8	7.08±1.26	11.918	0.003*
5th Min APGAR Score (X2)	5-10	9.39±1.02	5-10	9.37±1.11	4-10	9.08±1.28	4.865	0.088

*p<0.05 Significant difference, p>0.05 no significant difference; ANOVA (F), Kruskal Wallis (X^2)

Table 5: The comparison of pregnancy according to Active Phase Duration, Week of Gestation according to Latest Menstrual Date (LMD), Hemoglobin, and TSH Measurements in Different Age Groups

	Normal (20-40 years of age)		Adolescent (10-19 years of age)		AMA (>40 years of age)		X2/F	p
	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD		
Active phase durationKW (min)	30-720	194.11±119.34	60-420	231.07±68.88	120-390	268.5±71.84	19.293	0.001*
LMPF (week)	32-41	37.4±1.58	28-41	37.41±2	29-41	37.54±2.34	1.444	0.486
HemoglobinF (gr/dl)	8-15.3	11.67±1.53	8.5-15	11.75±1.52	8-16	11.57±1.91	0.265	0.767
TSHF (mU/L)	0.1-8	1.86±1.4	0.1-6.5	1.72±1.24	0.1-6.5	2.01±1.27	2.854	0.240

LMP: Date of the Latest Menstrual Period, TSH: Thyroid-stimulating hormone.
*p<0.05 significant difference, p>0.05 no significant difference; Kruskal Wallis (X^2), ANOVA (F)

study between the groups in terms of comorbidities (13).

Increasing cesarean section rates has become an important issue all over the world, especially in our country. Although there are studies reporting that the rates of cesarean section and interventional delivery increased in adolescent pregnancies, there are also some other studies arguing the opposite (19). Studies, which report that the rates of cesarean and interventional delivery increased, attribute this to the lack of cooperation in the second stage of labor and the underdevelopment of the pelvic floor. Decreased vaginal and interventional delivery along with increased cesarean delivery are noteworthy in advanced age pregnancies (22). The main reason for this is increased maternal stress and the perception of the baby, especially in primiparous pregnant women. Although the percentage of normal births in adolescent pregnant women was the highest among the groups in our study, statistically significant increases were detected in the cesarean section percentage in the AMA group. We believe that normal birth rates can be increased, especially in patients who are over the age of 40 with first pregnancies by providing more detailed birth process information, psychological support, and by encouraging normal birth. However, the fact that the active phase durations were higher in advanced age group pregnant women at significant levels in our study is a finding that may increase cesarean rates.

In a study that was conducted by Kıncı et al., it was reported that the hemoglobin values were lower at significant levels and the frequency of anemia increased in pregnant women aged 19 years and younger (23). However, no significant differences were detected in hemoglobin values between the groups in the present study of ours. It is considered that this may be because of the small number of patients in our study and the iron prophylaxis in pregnancy follow-ups. Although other compared parameters such as TSH values and infant birth weights were similar between the groups, the 1st -min Apgar Score was found to be higher in the adolescent group. While the 1st Minute Apgar Score provides information about the respiratory function of the newborn, the 5th Minute Apgar Score shows the factors that may affect the future life of the newborn and may cause sequelae. Indeed, in a study of 172 cases by Fields et al., they found umbilical arterial blood pH values within normal ranges in 56% of newborns with a 1st Minute Apgar Score below 7 (24). In general, the Apgar 5th Minute Score is considered more prognostic for infants. The higher normal birth rate in the adolescent group suggests that lung functions may have become more mature. For this reason, the 1st Minute Apgar Score may have been found to be higher in the adolescent group.

The gestational ages are pulled towards both extreme ends in our present day depending on different socioeconomic and education levels. Early and late pregnancies must be evaluated as a special group, and the follow-ups must be planned in this respect. It must be kept in mind that adolescent and advanced-age pregnancies may have negative outcomes. Especially in advanced age pregnancies, increased cesarean section rates and decreased pregnancy follow-up status in adolescence may end up in increased complication rates. In both cases, detailed information on prenatal care and birth process must be provided in pregnant information schools, and it must be encouraged for both normal delivery and regular control.

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