Outcome of Adolescent Pregnancy: A Retrospective Cohort Study

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ABSTRACT

Objective: The aim of this study is to review the sociodemographic characteristics, maternal, natal and postnatal outcomes of adolescent pregnancy.

Subjects and method: The records of all adolescent pregnancies (aged 13–19 years) delivered at Sisli Hamidiye Etfal Research and Training Hospital, Istanbul, Turkey, over a period of two years were reviewed. Structured survey was conducted with adolescent mothers over the phone.

Results: The incidence of adolescent pregnancy was 7.06%; 91.1% of the cases were reported to be married. Consanguineous marriage was found to be 27.6%. Maternal anaemia was detected in 43.1% of cases. Premature birth rate was 6.3%. The rate of Caesarean section was 31.8%. Adolescent mothers were categorized into two groups: 17 years and below and above 17 years. The maternal, natal and postnatal outcomes were not statistically different between the two groups.

Conclusions: Health policies should be revised and improved to take the necessary steps for providing adequate health services for adolescents and for improving prenatal, natal and postnatal care of pregnant adolescents.

Keywords: Adolescent pregnancy, maternal complication, neonatal complication, obstetric outcome, sociodemographic factors

INTRODUCTION

Adolescence is defined as the transitional stage between childhood and adulthood that is marked by biological, psychological and social changes occurring between the ages of 10 and 19 years, according to the World Health Organization [WHO] (1). Early sexual encounter, early marriage, teenage pregnancy, unintended pregnancy and sexually transmitted diseases are the main health issues affecting adolescents. Adolescent pregnancy is a significant social, economic and healthcare problem worldwide (2).

Data from the WHO reveal that 16 million adolescents give birth each year; 95% of these births occur in low- or middle-income countries (2). In these countries, complications during pregnancy and childbirth are considered as the most important causes of death among girls aged 15–19 years. Maternal complications, maternal anaemia, premature birth and low birthweight are associated with prenatal mortality and increased rate of infant death (3–5).

There are also studies which suggest that outcome of adolescent pregnancies might be good and pregnant adolescents should not be considered as a risky group where prenatal care is sufficient (6).

Teenage pregnancy is considered as one of the major risk factors for maternal and infant mortality. According to the Turkey Demographic and Health Survey (TDHS) in 2008, the adolescent pregnancy rate was 6% (7). While women within the age range of 15–19 years constitute 2.5% of married women in the 15–49-year age group, 5.9% of pregnancy associated deaths are in this age group. The pregnancy associated death rate in the 20–24-year age group is 15.7 in 100 000 live births. This rate increases to 18.7 in the 15–19-year age group (7).

Data from the WHO reveal that newborn deaths are 50% higher among infants born to adolescent mothers than among those born to mothers of 20–29 years (8). According to TDHS in 2008, the newborn death rate was 17 deaths per 1000 live births, while it was 33 deaths per 1000 live births in infants born to adolescent mothers (7).

In this study, we aim to review the sociodemographic characteristics, maternal, natal, and postnatal outcomes of adolescent pregnancy and compare these data with those reported in TDHS and the literature.

SUBJECTS AND METHOD

This is a hospital-based retrospective cohort study from the Sisli Hamidiye Etfal Training and Research Hospital located

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in Istanbul at a neighborhood in which low-income families and immigrants from all over Turkey reside.

A total of 6535 pregnant women were admitted and delivered in the Obstetrics and Gynaecology Service in Sisli Etfal Training and Research Hospital between January 2011 and December 2012; 462 babies were born to adolescent mothers. Demographic characteristics, maternal age, gravidity, parity, status of education, maternal, natal and postnatal data were collected from medical records. Adolescent mothers were categorized into two groups: 17 years and below and above 17 years. Structured questionnaires were administered to willing adolescent mothers *via* phone call. Of 462 cases, phone numbers of 150 cases were out of use; 312 cases were called. Phone numbers of 15 cases belonged to someone else. Of the 297 adolescent mothers contacted, 272 agreed to participate in the present study. Ethical approval was obtained from the ethics committee of the institution and verbal consent was also obtained from the participants over the phone. Definitions of terms are given in Table 1.

NCSS (Number Cruncher Statistical System) 2007 and PASS (Power Analysis and Sample Size) 2009 statistical software (Utah, USA) applications were used for statistical analyses. Fisher-Freeman-Halton test, Pearson Chi-squared test, Fisher's exact tests and Yates continuity correction tests were used to compare the qualitative data along with descriptive statistical methods (mean, standard deviation, frequency, ratio, minimum, maximum) for analysis of the study results. Student's *t*-test was used to compare the mean differences. Results were analysed in 95% confidence interval and significance rate was defined as $p < 0.05$ and $p < 0.01$.

RESULTS

A total of 6535 births took place between January 2011 and December 2012 in our hospital; 462 were adolescent pregnancies, giving an adolescent pregnancy rate of 7.06%. Distribution of sociodemographic characteristics of adolescent pregnancies is presented in Table 2.

Table 2:   Sociodemographic characteristics of adolescent mothers

		Min–Max	Mean ± SD
Maternal age (years)		13–19	17.92 ± 1.12
Paternal age (years)		17–39	25.32 ± 3.59
Age of grandmothers at first birth (years)		14–40	24.58 ± 7.49
Total income (USD)		240–1925	513.76 ± 239.76
		n	**%**
Maternal age	≤ 17	134	29
	> 17	328	71.0
Grandmother's	≤ 19	91	33.4
age (n = 272)	> 19	181	66.6
Marriage (n = 272)		248	91.1
Consanguinity between partners (n = 462)		128	27.6
Nuclear families (n = 272)		139	51.1
Mother's work status (n = 462)		11	2.3
Educational status (n = 272)			
	Illiterate	33	12.1
	Elementary school	94	34.5
	Middle-, high school	144	53.1
	University	1	0.3
Health insurance (n = 462)			
	Yes	222	48.1
	No	110	23.8
	Green card holder	130	28.1
Level of income	≤ 385.12 USD	100	36.6
(n = 272)	> 385.12 USD	172	63.4

Mean age was 17.92 ± 1.12 years. When the distribution by age was analysed, it was found that 29% of the cases were ≤ 17 years old, while 71% of the cases were >17 years old. Mean age of fathers was 25.32 ± 3.59 years, which is approximately seven years older than the mean age of mothers. One-third of the grandmothers had also been adolescent mothers. Nearly 92% of the cases were reported to be married. Consanguineous marriage was found to be 27.6%. Family structure was mostly in the form of nuclear family (51.1%). Only 2.3% of adolescent mothers were reported to be working. When the educational status was

Table 1:   Definition of terms

Terms	Definition
Adolescent pregnancy	Maternal age between 13 and 19 years old at the time of birth
Low birthweight	Birthweight of a neonate below 2500 grams
Prematurity	Neonates whose gestational age is below 37 weeks
SGA	Small for gestational age; birthweight of a neonate below 10th percentile for gestational age
LGA	Large for gestational age; birthweight of a neonate in the 90th percentile for gestational age
IUGR	Intrauterine growth restriction; fetus below 10th percentile of mean weight for gestation
Low Apgar score	An Apgar score of < 7 at five minutes
Maternal anaemia	Haemoglobin <11 g/dL
Status of education	Mothers were divided into groups as: illiterate, graduates of five-year primary school, graduates of 6+ year education (elementary and high-school) following primary school, and university graduates

investigated, it was found that 12.1% of adolescents were illiterate, while only 53.1% completed elementary and high school education. Almost 24% of the cases had no health insurance.

Mean monthly income was 513.76 ± 239.76 USD and 36.6% lived on minimum wage or lower (minimum wage: 385.12 USD monthly).

The obstetric characteristics of all adolescent mothers as well as those who were 17 years and above and below 17 years are presented in Table 3. Of the 272 cases contacted *via*

of adolescent mothers were not different in the two groups. The neonatal outcomes are presented in Table 4.

Premature birth rate was 6.3%, rate of babies with low birthweight was 10%, rate of SGA babies was 2.4% and IUGR rate was 0.6%. Low Apgar score was reported only in 23 babies. One-third of mothers (31.8%) had undergone Caesarean section. Congenital anomalies were reported in 2.8% of cases. Out of 462 babies, 26 were transferred to the neonatal intensive care unit. The most common cause was transient tachypnoea of newborn (TTN; 46.2%), followed by

Table 3:   Obstetric outcomes of adolescent pregnancies

		≤ 17 y/o		> 17 y/o			13–19 y/o	
		n	%	n	%	*p*	n	%
Birth control (n = 272)		48	56.7	118	62	[a]0.748	166	60.9
Sexual education (n = 272)		0		0			0	
Intended pregnancy (n = 272)		76	96.6	184	95.3	[b]1.000	260	95.6
Smoking during pregnancy (n = 272)		13	16.2	29	15.2	[a]0.978	42	15.4
Gravidity	1						399	86.4
(n = 462)	2						58	12.6
	3						4	0.9
	5						1	0.2
Antenatal follow up (n = 272)		70	88.8	181	93.6	[a]0.234	251	92.2
Pregnancy complications	Pre-eclampsia	3	75	5	50		8	57.1
	Eclampsia	0	0	2	20		2	14.3
	Gestational DM	0	0	1	10		1	7.1
	EMR	1	25	0	0		1	7.1
	Placental abruption	0	0	2	20		2	14.3
	Total	4	3	10	3	[b]1.000		
Maternal anaemia (Hb < 11 g/dL)		63	47	136	41.5	[c]0.274	199	43.1
		Mean ± SD	Median	Mean ± SD	Median	*p*		
Weight gain (kg)		13.67 ± 5.91	13	13.80 ± 5.88	13.0	[d]0.879		
Maternal Hb levels (g/dL)		11.25 ± 1.50	11.25	11.34 ± 1.51	11.40	[d]0.434		

[a]Yates continuity correction test; [b]Fisher's exact test; [c]Pearson Chi-squared; [d]Mann Whitney U test
DM: diabetes mellitus; EMR: early membrane rupture; Hb: haemoglobin

telephone, 60.9% stated that they used birth control, while 100% stated that they never had any sexual education. Almost all (95.6%) of the pregnancies were considered as intended pregnancies. The smoking rate during pregnancy was 15.4%. While 86.4% of the pregnancies were nulliparous, 12.6% gave birth to a second baby, 0.9% to a third baby and one case to a fifth baby.

Over 90% of adolescents had antenatal follow-up. Maternal complications were reported in 3% of the cases. Complication rates were as follows: 57.1% pre-eclampsia, 14.3% eclampsia, 14.3% placental abruption, 7.1% early membrane rupture (EMR) and 7.1% gestational diabetes. Maternal anaemia was detected in 43.1% of cases. Weight gain during pregnancy varied between 2 and 35 kg, while mean weight gain was 13.76 kg. The obstetric characteristics

prematurity (30.8%). When we compared the indications for NICU transfer between the two groups, in adolescent mothers of 17 years and below, the most common indication for NICU transfer was prematurity, whereas the most common indication for NICU transfer in adolescent mothers of above 17 years was TTN. The neonatal outcomes were not significantly different between the two groups. The most common Caesarean section indication was found to be fetal distress syndrome (30.6%), followed by cephalopelvic disproportion [CPD] (13.6%) and prolonged labour [12.2%] (Table 5). Three multiple pregnancies were delivered *via* Caesarean section. Two stillbirths were reported. The most common indications for Caesarean section were similar in the two groups.

Table 4:   Neonatal outcomes

		≤ 17 y/o		> 17 y/o			13–19 y/o	
		n	%	n	%	p	n	%
Premature delivery		9	6.7	20	6.1	[a]0.970	29	6.3
LBW		14	10.4	32	9.8	[a]0.957	46	10.0
Gender	Male						231	50.0
Low Apgar score		8	7.5	15	5.4	[a]0.589	23	5.0
Delivery	C/S	40	29.9	107	32.6	[b]0.562	147	31.8
method	NSD	94	70.1	221	67.4		315	68.2
	SGA	1	0.7	10	3.0	[c]0.478	11	2.4
	LGA	11	8.2	22	6.7		33	7.1
	IUGR	1	0.7	2	0.6		3	0.6
	AGA	121	90.3	294	89.6		415	89.8
Congenital anomaly		2	1.5	11	3.4	[d]0.364	13	2.8
NICU transfer		10	7.5	16	4.9	[a]0.383	26	5.6
NICU	RDS	1	10.0	0	0.0		1	3.8
	TTN	1	10.0	11	68.8		12	46.2
	Meconium aspiration	1	10.0	1	6.3		2	7.7
	Polycythaemia	1	10.0	0	0.0		1	3.8
	Asphyxia	1	10.0	1	6.3		2	7.7
	Prematurity	5	50.0	3	18.8		8	30.8

[a]Yates continuity correction test; [b]Pearson Chi-squared; [c]Fisher-Freeman-Halton test; [d]Fisher's exact test; *$p < 0.05$

LBW: low birthweight; C/S: Caesarean section; NSD: normal spontaneous delivery; SGA: small for gestational age; LGA: large for gestational age; IUGR: intrauterine growth restriction; AGA: appropriate for gestational age; NICU: neonatal intensive care unit; RDS: respiratory distress syndrome; TTN: transient tachypnoea of newborn

Table 5:   Indications for Caesarean section

	≤ 17 y/o		> 17 y/o		13–19 y/o	
	n	%	n	%	n	%
CPD	5	12.5	15	14.0	20	13.6
EMR	1	2.5	3	2.8	4	2.7
Maternal epilepsy	1	2.5	2	1.9	3	2.0
Fetal distress	17	42.5	28	26.2	45	30.6
Twin pregnancy	0	0.0	3	2.8	3	2.0
Prolonged labour	6	15.0	12	11.2	18	12.2
Macrosomia	1	2.5	2	1.9	3	2.0
In-utero ex	0	0.0	2	1.9	2	1.4
IUGR	0	0.0	1	0.9	1	0.7
Breech presentation	3	7.5	11	10.3	14	9.5
Repeat Caesarean section	0	0.0	12	11.2	12	8.2
Oligohydramnios	1	2.5	6	5.6	7	4.8
Stillbirth	1	2.5	1	0.9	2	1.4
Abnormal placentation	0	0.0	2	1.9	2	1.4
Preeclampsia	2	5.0	6	5.6	8	5.4
Postmaturity	0	0.0	1	0.9	1	0.7
Vaginal condyloma	1	2.5	0	0.0	1	0.7
Vaginal septum	1	2.5	0	0.0	1	0.7

CPD: cephalopelvic disproportion; EMR: early membrane rupture; IUGR: intrauterine growth restriction

DISCUSSION

Maternal, natal and postnatal outcomes of adolescent pregnancies were investigated in the present study. According to the medical records, 7.06% of all births that took place in our hospital between 2011 and 2012 were adolescent pregnancies. The WHO declared adolescent pregnancy rate as 11%, while this rate was reported to be between 8 and 12% in Turkey (9). Adolescent pregnancy increases rapidly with age. The rate among 15-year old adolescents is below 1% but increases to 13% among 19-year old women. Seventy-one per cent of adolescent pregnancies in the present study were in the 18–19-year age group.

Main risk factors of adolescent pregnancy are low socio-economic status, low educational status and being single (10). In developed countries, it was observed that pregnant adolescents are not married but in developing countries like Turkey, girls are encouraged by their parents to get married and have children at young ages due to socio-economic conditions (11). In the present study, 91.1% of adolescent mothers were married; 95.6% of adolescent mothers reported that the pregnancy was intended, while 60.9% reported that they used birth control. In the literature, studies conducted in Turkey showed that the marriage rate was high. In a study conducted by Yildirim *et al*, it was

stated that 84% of adolescent mothers were married, 76% had intended pregnancies and 60.9% used birth control (12). Data provided by the Turkish Statistical Institute (TSI) for 2012 revealed that 90% of adolescent mothers were officially married in Turkey (13). Although legal marriage age for both women and men is 17 years, early marriages are substantially common in Turkey.

Mean age of partners was 25.3 years and the mean age between partners was seven years. In the study conducted by Taylor *et al,* it was detected that partners were adults in 26.7% of adolescent pregnancies and that the mean age difference was 8.8 years (14). Similarly, according to the data of TSI, 43.1% of partners of adolescent mothers were in the age group of 25–29 years, while the age difference was 5–9 years between 52.6% of the partners and mothers (13). Men have higher first marriage ages for reasons such as higher social acceptance of men's continued education trends compared to women, obligatory military service, and the process they have to go through to own a business.

When levels of income and welfare were compared, adolescent pregnancy was observed in 2% of women in households with the highest welfare level, while this rate increased to 8–11% in women living in households with low welfare level. Women with the highest level of welfare give birth to their first children three years later than women with the lowest level of welfare (7). In the present study, socio-economic levels of pregnant adolescents were found to be significantly low. Mean total income was 513.76 ± 239.76 USD and 36.6% lived on minimum wage or lower.

It is highly possible that mothers of pregnant adolescents were also pregnant adolescents (15). In the present study, one out of three mothers of pregnant adolescents also had adolescent pregnancies. With the increase in educational level of girls, rate of adolescent pregnancy has decreased. Early motherhood makes it harder for women to benefit from educational and economic opportunities (16, 17). There is an inverse proportion between educational level and adolescent pregnancy. Adolescent pregnancy is more common among women with low educational levels compared to women with high educational levels. While 7% of uneducated women begin to give birth in adolescence, this rate decreases to 4% in women with at least high school education (7). Young girls, especially the ones with insufficient education, are prone to be forced to get married and engage in sexual relationship at an early age. According to 2008 TDHS, 20.9% of adolescents in the 15–19-year age group were uneducated, while 18.5% were elementary school graduates (7). In the present study, the educational level of adolescents was higher than Turkey's average; 12% of pregnant adolescents were illiterate and 34.5% were elementary school graduates. The majority (97.7%) of pregnant adolescents were not employed and almost 24% did not have any health insurance. However, average employment ratio in Turkey was 9.8% in this age group and 87% had no health insurance (7). In a study on socio-economic status of pregnant adolescents by

Keskinoglu *et al*, 945 pregnant adolescents were investigated and it was observed that 99.7% of adolescents were not employed and 59.8% had no health insurance (18).

In TDHS 2008 data (7), 12.7% of pregnancies in mothers under 20 years of age and 10.5% of pregnancies in mothers between 20 and 34 years had low birthweight history; while in the present study, this rate was 10%. This rate was below Turkey's average due to high antenatal follow-up rates. Contrary to previous studies, low birth rate was not higher in younger adolescents. Residing in larger cities and an easy access to general hospitals explains why antenatal follow-up rates were high. Sufficient antenatal follow-up allows the diagnosis and treatment of health issues of both mother and baby earlier and in a short period of time.

Limited number of clinics for adolescents and exclusion from the educational system causes inadequate sexual education and support from experts about sexual health and development (2). Another striking result of the present study was that none of the pregnant adolescents had sexual education. Interestingly enough, 92% of pregnant adolescents stated that they had regular antenatal follow-ups during pregnancy. Despite regular antenatal follow-ups, anaemia was observed in 43.1% of mothers. The incidence of anaemia was significantly high in both groups of adolescent mothers. Major causes of anaemia in these cases are possibly nutritional deficiency, ignorance about pregnancy and low income. In certain studies, anaemia incidence in adolescent pregnancies was found higher than adult pregnancies (19–21). Recommended weight gain for pregnant adolescents is 5–18 kilograms according to the Institute of Medicine report in 2009, which varies according to the body mass index before pregnancy (22). In the present study, mean weight gain during pregnancy was 13.76 ± 5.87 kilograms (range: 2–35 kg).

Although adolescent pregnancy is considered as a risk in terms of maternal and neonatal complications, studies on the subject vary in results. Along with studies suggesting that first labour of an adolescent pregnancy is riskier, there are also studies suggesting that a second adolescent pregnancy carries more risks (23–25). Irregular antenatal follow-up and smoking during pregnancy are the major reasons for risky adolescent pregnancies (26). The most significant reasons for variation between study results are different methods used in the study and ignoring the most important risk factor which is smoking. In the present study, 86.4% of adolescent pregnancies were nulliparous and smoking rate was 15.4%, despite a good antenatal follow-up. The smoking rate was similar in both groups of adolescents. We can speculate that smoking habit starts at an early age and continues to be high.

Caesarean section rates in adolescent pregnancies are reported at a high frequency in developing countries, compared to developed countries (27, 28). In the present study, however, 30% of pregnant adolescents went through Caesarean section. The most common Caesarean section indication was fetal distress (30%), followed by CPD

(13.6%) and obstructed labour (12.2%). In a cohort study conducted in Canada, a developed country, a comparison between adult and adolescent pregnancies revealed that Caesarean section rate in adult pregnancies was 26.2% while it was 16.5% in adolescent pregnancies. In that study, the most common Caesarean section indication was prolonged labour (50%) in both adult and adolescent pregnancies followed by fetal distress [36%] (28).

One of the fundamentals of the United Nations Convention on the Rights of the Child is that children have the right to choose when or with whom they will get married, when and how many children they are going to have and to decide when and how they are going to live their sexuality. However, roles cast upon women by society and social expectations deprive them of opportunities, such as education and employment, that may raise their status in society. This results in early marriages which function as a predisposing factor for early pregnancy.

In the report published by WHO in 2012, in order to prevent adolescent pregnancy, reducing marriage before the age of 18 years is recommended, and to reduce pregnancy before the age of 20 years of age, necessary background and education are recommended for the public awareness (2).

The major causes of intramarital pregnancy in adolescence are observed to be lack of education and unemployment, while that of extramarital pregnancy includes ignorance and unfamiliarity with the risks. In this regard, schooling more girls, eight years of compulsory education and letting women have more roles in work life will increase the status of women in the society and help protect young people from early marriages and therefore from early pregnancies and complications. In order to cover the lack of knowledge about safe sex, sexuality education in schools should be improved and educational campaigns and education *via* mass media should also be organized for unschooled adolescents. Young people should be able to access healthcare services easily and benefit from such services without being judged.

There are also some limiting factors to this study. Missing medical records are among these factors since only 64% of all cases could be contacted *via* telephone and only 58.9% agreed to participate in the study. Also, most of the adolescents contacted *via* telephone did not want to respond to the questions and the answers of those who responded to the questions cannot be proven.

CONCLUSION
In this study, adolescent pregnancy rate, maternal, obstetric and natal results were lower than Turkey's average. Family support and regular prenatal follow-up can be considered as probable reasons. Furthermore, it was observed that pregnant adolescents live in socio-economically difficult conditions; they have low income and low educational level; they experience nutrition problems and maternal anaemia rate was high among them. The maternal, obstetric and natal outcomes were similar in adolescents of 17 years and below compared to those above 17 years. For a healthier society, adolescent pregnancies should be prevented. Health policies should be revised and improved to take the necessary steps for providing adequate health services for adolescents and for improving prenatal, natal and postnatal care of pregnant adolescents.

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