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CLINICAL ARTICLE

Adolescent pregnancy in Upper Egypt

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ABSTRACT

Objective: To determine the reasons for adolescent pregnancy in Upper Egypt and to evaluate maternal, fetal, and neonatal outcomes. *Methods:* All primigravidae under 30 years of age who attended the labor/delivery ward at Sohag University Hospital, Sohag, Egypt, between December 31, 2005, and December 31, 2009, were invited to participate. Participants were allocated to the study group (up to 19 years of age at first pregnancy) or the control group (20–30 years of age at first pregnancy). Maternal, obstetric, fetal, and neonatal complications were compared between the groups, and adolescent participants completed a questionnaire to identify the reasons for pregnancy. *Results:* In total, 58.2% had married seeking motherhood. Rates of ectopic pregnancy, pre-eclampsia, eclampsia, premature rupture of membranes, preterm labor, and cesarean were significantly higher among adolescents younger than 15 years of age; the risk then decreased steadily with age and became comparable to the control group after 16 years of age. *Conclusion:* Adolescent pregnancy increases the risk of ectopic pregnancy, pre-eclampsia, eclampsia, premature rupture of membranes, preterm labor, and cesarean among mothers up to 16 years of age. After 16 years of age, pregnancy is not associated with increased risk of obstetric or neonatal complications.

1. Introduction

Adolescence is a critical period, during which a person is no longer a child but is not yet a fully mature adult. Adolescent pregnancy has been reported to have deleterious reproductive implications for women, in addition to placing a burden on the community. The most frequently reported complications are increased risk of preterm labor [1–3], intrauterine growth retardation [4], cesarean delivery [5], and low birth weight [6]. However, the effect of confounders such as smoking and alcohol intake could not be ruled out in many previous studies [1–6].

The reasons for teenage pregnancy may be multifactorial and have a self-behavioral, traditional, social, cultural, or religious foundation. Poverty, low socioeconomic status [7–10], limited education [11], and early sexual activity [12,13] are the main factors perpetuating the problem of adolescent pregnancy. Other factors such as risk-taking behavior [14,15] and lack of information about contraception [9] have also been proposed.

Egypt has a high birth rate, which is nearly constant at 2.7%, and the rate of adolescent pregnancy ranges from 4.1% in urban societies to 11.3% in rural areas [16]. The vast majority of studies of adolescent pregnancy have been conducted in Western, Asian, or other African countries, and data regarding this problem in Upper Egypt are relatively scarce. The aim of the present study was to determine the reasons for and the obstetric implications of adolescent pregnancy in Upper Egypt.

2. Materials and methods

The present cross-sectional study was conducted between December 31, 2005, and December 31, 2009, at the Department of Obstetrics and Gynecology at Sohag University Hospital, Sohag, Egypt. The study hospital is in Sohag Governorate, which is in the central part of Upper Egypt, and provides medical care to mainly patients of low socioeconomic status from Sohag and other governorates of Upper Egypt.

During the study period, all primigravidae under 30 years of age at first pregnancy who attended the labor/delivery ward at Sohag University Hospital were invited to participate. Participants were allocated to the study group (up to 19 years of age at first pregnancy [n = 2153]) or the control group (20–30 years of age at first pregnancy [n = 3162]). To determine more clearly the influence of age on pregnancy outcome, the study group was further subdivided: younger than 15 years of age (n = 40); 15 to less than 16 years of age (n = 171); 16 to less than 17 years of age (n = 323); 17 to less than 18 years of age (n = 711); and 18 to less than 19 years of age (n = 908). Exclusion criteria were refusal to participate in the study, unreliable menstrual dating, multiple pregnancies, and pre-existing illness. The institutional ethics committee provided approval, and informed consent was obtained from all participants.

The adequacy of prenatal care was evaluated according to WHO guidelines [17], which recommend 4 prenatal visits—the first of which should be conducted during the first trimester, with extra visits

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recommended in high-risk pregnancies. After general, obstetric, and pelvic examinations, blood samples were taken for complete blood counting and determination of blood glucose levels. Other investigations (urine analysis, kidney function test, liver function test, and coagulation profile) were carried out according to the medical and obstetric needs of women.

Ultrasonography was conducted to evaluate gestational age, fetal condition, amniotic fluid, and placenta. Labor was monitored via partograph [18] and external cardiotocography. After delivery, 1- and 5-minute Apgar scores were evaluated and the newborns were carefully examined by a neonatologist.

Before discharge from hospital, adolescent participants were asked to complete a questionnaire to identify the reasons for their pregnancy. There were 4 questions. The first asked whether adolescent mothers considered themselves young at the time of their first pregnancy; the second asked for reasons for their adolescent pregnancy, with the participants choosing 1 of the proposed reasons (i.e. tradition, seeking motherhood, seeking better life, forced by somebody, imitating friends, or advice by mother or friends); the third asked whether the participants had received information about the risks of adolescent pregnancy; and the fourth asked whether they believed that adolescent pregnancy was risky.

At the end of the study period, the following data were collected: medical (anemia, diabetes mellitus, or hypertension); obstetric (preterm labor, pre-eclampsia, premature rupture of membranes, or postpartum hemorrhage); fetal (intrauterine growth restriction or intrauterine fetal death) or neonatal (low Apgar score or low birth weight) complications; route of delivery; and indications for cesarean. The *t* test was used for statistical analysis, and $P<0.05$ was considered to be statistically significant. The adjusted odds ratio and 95% confidence interval for each complication in the study group were calculated, with the control group used as the reference.

3. Results

During the study period, 30 441 women were admitted to the labor/delivery ward at Sohag University Hospital; 2287 (7.5%) were 19 years of age or younger at first pregnancy and 21 276 (69.9%) were 20–30 years of age. In total, 2153 adolescents and 3162 adults fulfilled the inclusion criteria and were assigned to the study and control groups, respectively. The main reasons for exclusion in the study group were unreliable menstrual dating (38.8%), refusal to participate (29.2%), unreliable maternal age (15.4%), anemia (10.4%), and multiple pregnancy (4.5%). In the control group, the main reasons for exclusion were refusal to participate (53.7%), unreliable menstrual dating (25.3%), anemia (12.5%), and unreliable maternal age (7.9%).

Most participants were from rural areas and of low socioeconomic status (Table 1). The majority of women in both groups had completed non-university education, but significantly more participants in the study group than in the control group had stopped their education at primary- and preparatory-school level (20.4% vs 7.2% [$P=0.02$] and 14.1% vs 5.9% [$P=0.04$], respectively). Only 1.2% of the study group had attended university, compared with 22.8% of the control group who were either university students or had finished their university education ($P<0.001$).

In total, 94.3% of the study group did not consider themselves young at the time of pregnancy (data not shown). The reasons for adolescent pregnancy were: seeking motherhood (58.2%); tradition (22.1%); imitating friends (8.3%); and maternal advice (7.1%). The remaining 4.3% did not provide an opinion. Although 22.4% of the study group had received information about the risks of adolescent pregnancy, none of them believed that such pregnancy was risky.

The rates of abortion, anemia, intrauterine growth restriction, intrauterine fetal death, low Apgar score, low birth weight, and postpartum hemorrhage were comparable between the groups ($P>0.05$) (Table 2). There was a significantly increased risk of ectopic pregnancy, preterm labor, pre-eclampsia, eclampsia, premature rupture of membranes, and cesarean delivery in the study group ($P<0.05$), whereas there was a significantly increased risk of gestational diabetes and prolonged pregnancy in the control group ($P<0.05$).

The most frequent indications for cesarean delivery in the study group were cephalopelvic disproportion (25.8% vs 8.8% in the control group), dysfunctional labor (24.5% vs 11.1% in the control group), and pre-eclampsia (19.2% vs 29.3% in the control group) (data not shown). In the control group, the most frequent indications for cesarean were pre-eclampsia (29.3%), prolonged pregnancy (13.7% vs 1.5% in the study group), and premature rupture of membranes (12.4% vs 15.8% in the study group) (data not shown).

The risks of ectopic pregnancy, pre-eclampsia, eclampsia, preterm labor, premature rupture of membranes, and cesarean delivery were markedly higher among mothers younger than 15 years of age (Fig. 1). Thereafter, the risks decreased progressively, reaching approximately the adult rate at 16 years of age.

Table 1
Sociodemographic characteristics.[a]

	Study group (n = 2153)	Control group (n = 3162)	*P* value
Age at marriage, y	17.8 ± 0.9	21.4 ± 1.2	0.03
Age at first pregnancy, y	18.3 ± 1.3	24.6 ± 3.1	0.02
Age of husband, y	32.3 ± 4.1	35.1 ± 2.8	0.93
Residence			
Rural	1679 (77.9)	2276 (71.9)	0.16
Urban	474 (22.1)	886 (28.1)	0.22
Socioeconomic status			
Low	1795 (83.4)	2704 (85.5)	0.89
Moderate	329 (15.3)	389 (12.3)	0.23
High	29 (1.3)	69 (2.2)	0.41
Education level			
Illiterate	19 (0.9)	89 (2.8)	0.05
Primary school	433 (20.4)	221 (7.2)	0.02
Preparatory school	301 (14.1)	189 (5.9)	0.04
Secondary school	36 (1.7)	76 (2.4)	0.07
Non-university education	1341 (62.2)	1866 (59.0)	0.76
University education	23 (1.2)	721 (22.8)	<0.001
Adequate prenatal care	2045 (94.9)	2782 (87.9)	0.11

[a] Values are given as mean ± SD or number (percentage) unless otherwise indicated.

Table 2
Obstetric, fetal, and neonatal outcomes.[a]

	Study group (n = 2153)	Control group (n = 3162)	Odds ratio (95% confidence interval)	*P* value
Abortion	258 (11.9)	367 (11.6)	0.91 (0.82–1.23)	0.34
Ectopic pregnancy	51 (2.4)	29 (0.9)	1.33 (1.28–1.44)	0.02
Preterm labor	285 (13.2)	179 (5.6)	1.96 (1.76–1.99)	0.02
Prolonged pregnancy	23 (1.1)	301 (9.5)	0.54 (0.49–0.78)	0.01
PROM	451 (20.9)	411 (12.9)	2.11 (1.92–2.62)	0.01
Pre-eclampsia	336 (15.6)	291 (9.2)	1.83 (1.69–1.77)	0.04
Eclampsia	89 (4.1)	56 (1.8)	1.78 (1.45–1.86)	0.04
IUGR	251 (11.6)	299 (9.4)	1.2 (1.12–1.21)	0.13
IUFD	41 (1.9)	94 (2.9)	0.93 (0.90–1.01)	0.27
Anemia	566 (26.2)	981 (31)	0.88 (0.92–1.13)	0.36
Gestational diabetes	11 (0.5)	146 (4.6)	1.12 (0.96–1.21)	0.04
CPD	451 (20.9)	186 (5.8)	2.13 (2.21–2.45	0.001
Dysfunctional labor	380 (17.6)	266 (8.4)	1.98 (1.83–2.11)	0.01
Cesarean delivery	990 (45.9)	732 (23.1)	2.34 (2.13–2.67)	0.001
Low Apgar score	114 (5.2)	265 (8.4)	0.77 (0.83–0.96)	0.21
Low birth weight	101 (4.7)	133 (4.2)	1.06 (1.23–1.32)	0.94
PPH	61 (2.8)	156 (4.9)	1.54 (1.57–1.83)	0.17

Abbreviations: CPD, cephalopelvic disproportion; IUFD, intrauterine fetal death; IUGR, intrauterine growth restriction; PPH, postpartum hemorrhage; PROM, premature rupture of membranes.

[a] Values are given as number (percentage) unless otherwise indicated.

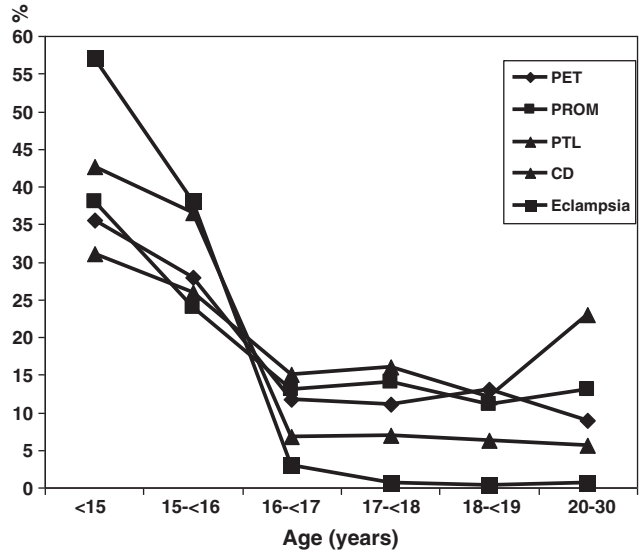

Fig. 1. Risk of obstetric complications correlated with age of adolescent mothers. Abbreviations: CD, cesarean delivery; PET, pre-eclampsia; PROM, premature rupture of membranes; PTL, preterm labor.

4. Discussion

Adolescent pregnancy is often associated with poor reproductive outcome (especially preterm delivery) [1,2], intrauterine growth restriction [3], and increased risk of neonatal mortality [15], although some studies have not demonstrated these adverse effects—particularly following adequate prenatal care [19,20].

Extramarital pregnancy is religiously prohibited, and considered to be "illegal pregnancy" and an unforgivable sin in Egyptian society. Although this belief is held throughout the country, it is more apparent in Upper Egypt, where religious beliefs and traditions are stronger.

Most studies reporting that adolescent pregnancy is risky included heterogeneous groups of participants, of different ethnic origins, who may have been socially deprived and could have smoked, drunk alcohol, or taken drugs, and in many cases the pregnancy was unintentional [21]. By contrast, the present study groups contained a homogeneous population from Upper Egypt—of the same ethnic origin and with comparable socioeconomic statuses. Moreover, smoking, alcohol intake, and drug abuse—which may increase the risk of adverse pregnancy outcome—were not practiced by the participants. Additionally, the pregnancies in the present study were intentional and occurred during the course of official marriage. Accordingly, the majority of participants were assumed to have been supported socially and by their families. This was evidenced by the high rate of adolescents with adequate prenatal care (94.9%), which was even higher than among adults (87.9%).

Consistent with previous findings [4,5], the present study showed that adolescent pregnancy was associated with significantly higher risks of ectopic pregnancy, pre-eclampsia, eclampsia, preterm labor, premature rupture of membranes, and cesarean delivery. However, unlike many studies dealing with the issue of adolescent pregnancy—in which the 7-year period of adolescence was considered to be a single period of time, even though biologic, physiologic, and even anatomic maturation of the human pelvis and reproductive organs may vary from one year to the next during this period [22,23]—in the present study, women were investigated according to their individual age.

The risks of these obstetric complications were highest among mothers younger than 15 years of age. Thereafter, the risks decreased progressively, reaching approximately the adult rate at 16 years of age. This is consistent with the results from a previous study aimed at defining early adolescent childbearing [23], in which the authors concluded that the rate of poor birth outcome (very low birth weight and very preterm delivery) stabilized at 16 years.

The increased risk of preterm labor and premature rupture of membranes has been attributed to biologic immaturity of the uterus or to shortness of the cervix, with subsequent increased risk of ascending infection [20]. Psychologic instability of young mothers, which has been reported to increase the risk of preterm labor [24], may be an additional factor. However, the present study indicated that psychosocial factors may not have been the cause of the increased risk of preterm labor and premature rupture of membranes. First, pregnancy occurred during the course of official marriage—which may have provided a supportive family environment—in all cases. Second, pregnancy was planned in 94.0% of cases, indicating a stable psychologic milieu. These findings provide indirect support that biologic immaturity of the uterus and cervix was the cause of the increased risk.

The most frequent indications for cesarean delivery in the study group were cephalopelvic disproportion and dysfunctional labor, compared with pre-eclampsia, prolonged pregnancy, and premature rupture of membranes in the control group. Biologic immaturity of the pelvis and of the uterine and cervical musculature has been postulated as a reason for these complications among adolescents [22], although it has also been disputed by some investigators [23]; however, the significantly higher rates of cephalopelvic disproportion, dysfunctional labor, and preterm labor among participants younger than 16 years of age support this theory. The higher rate of ectopic pregnancy among adolescents is an interesting finding, and may have been due to physiologic, functional, or anatomic immaturity of the fallopian tubes—although this remains to be determined.

There were limitations to the present study. The fact that counseling of the participants occurred postpartum was not ideal, and the high rate of refusal to participate may have been a consequence of this. Another limitation was the restriction—owing to financial constraints—of routine investigations to single blood samples for evaluating glucose levels and performing blood counts. Moreover, the lack of information regarding the long-term effects of adolescent pregnancy on the mother and the infant was another shortcoming. It should also be emphasized that the present results may not be consistent with those from societies with different traditions, cultures, socioeconomic levels, lifestyles, and beliefs.

It should be stressed that the study findings are not arguments in favor of early marriage. Although pregnancy after the age of 16 was not associated with increased risks of maternal or fetal complication in the present study, this was only from a medical point of view. It is clear that adolescent pregnancy may impair the educational level, career, and even psychologic condition of the mother.

Conflict of interest

The authors have no conflicts of interest.

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