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## Adverse perinatal outcome in teenage pregnancies: an analysis of a 5-year period in Southeastern Hungary

Adrienn Karai<sup>a</sup>, Zita Gyurkovits<sup>b</sup>, Tibor András Nyári<sup>c</sup>, Tamás Sári<sup>b</sup>, Gábor Németh<sup>b</sup>  and Hajnalka Orvos<sup>b</sup>

<sup>a</sup>Department of Pediatrics, University of Szeged, Szeged, Hungary; <sup>b</sup>Department of Obstetrics and Gynecology, University of Szeged, Szeged, Hungary; <sup>c</sup>Department of Medical Physics and Informatics, University of Szeged, Szeged, Hungary

### ABSTRACT

**Objective:** To determine the risks of adverse perinatal outcomes of teenage mothers.

**Material and methods:** A retrospective analysis was performed on teenage mothers (under 20 years of age) who delivered in the period of 2010–2014 at the Department of Obstetrics and Gynecology, University of Szeged (study group). All mothers who delivered in Hungary during the same period were studied as a control group. The following parameters were analyzed: demographic data of the mothers, maternal complications, perinatal outcome and congenital malformations of the newborns. The binominal test, Student's *t*-test and Poisson's regression were applied using STATA 9.0 (StataCorp, College Station, TX, USA) statistical software ( $p < .05$  was considered to be statistically significant).

**Results:** During this 5-year period, 12,845 births were recorded at the Department, of these 274 (2.1%) were teenage pregnancies with 275 newborns. The offsprings of teenage mothers had significantly lower mean birth weight ( $3110.2 \pm 564.03$  g versus 3247 g), higher rate of congenital malformations (8.0 versus 5.0%) and higher admission to neonatal intensive care unit (12.4 versus 8.0%) than the infants in the control group.

**Conclusions:** Younger maternal age was significantly associated with lower mean birth weight, higher risk of congenital malformations, and increased admission rate to neonatal intensive care unit.

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Teenage pregnancy;  
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### Introduction

The population including the total number of deliveries has been decreased in the last decades in Hungary. Despite of this tendency, the incidence of adolescent pregnancies has increased [1].



Teenage pregnancy and its effect on perinatal outcome has been brought into focus by a lot of studies. Many of them reported higher rate of low birth weight [2–10], prematurity [2–8,10–12], intrauterine growth retardation (IUGR) [1,7,8], congenital malformations [3,13–16], neonatal intensive care admission [4,17] and perinatal mortality [4,6,7] among teenage pregnancies. Marital status, low educational level, poverty, and lack of prenatal care are also risk factors of poor perinatal outcome among these young mothers [3,18,19]. On the other hand, there are some studies in the literature, which assert the contrary that young maternal age does not mean higher risks of adverse perinatal outcome [20].

The aim of this study was to determine if teenage pregnancy is associated with adverse perinatal

outcome with particular regard to congenital malformations.

### Materials and methods

A retrospective analysis was done on teenage mothers (under 20 years of age) with more than 24 complete weeks of gestation, who delivered between 1 January 2010 and 31 December 2014 at the Department of Obstetrics and Gynecology, University of Szeged (study group). The following parameters were analyzed: demographic data of the mothers, maternal complications, neonatal data including congenital malformations. Gestational age was established by the last menstrual period, first-trimester ultrasonography or the examination of newborn. Preterm delivery was considered before 37 complete gestational weeks, intrauterine growth retardation (IUGR) means birth weight below the 10th percentile for gestational age according to sex. Prenatal care was adequate when the first visit was registered below 16 weeks of

**CONTACT** Adrienn Karai  [adrienn.karai@gmail.com](mailto:adrienn.karai@gmail.com)  Department of Pediatrics, University of Szeged, Korányi Fásor 14-15, Szeged, Hungary

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gestation or at least four check-ups were done during pregnancy. We compared the data of teenage mothers with the data of all mothers who delivered in Hungary (Hungarian Central Statistical Office) during the study period (control group). Our department is a regional healthcare center, which means that high-risk pregnancies are transferred from the Southeastern part of Hungary to here.

The binomial test was applied to compare proportions of the anomalies observed in Szeged to the Hungarian rates. Furthermore, Student's *t*-test was applied to compare the average birth weight between the two groups. The trends in incidence of adolescent deliveries were investigated using Poisson's regression.

All statistical analyses were carried out using STATA (StataCorp, College Station, TX, USA) 9.0 statistical software,  $p < .05$  was considered to be statistically significant.

## Results

During the 5-year study period, 12,845 births were recorded at the Department. The total number of teenage pregnancies was 274 (2.1%). Out of these, 273 were singleton gestations and one was twin pregnancy. In Hungary, the total number of births was 448,852, out of these 27,777 (6.18%) were teenage pregnancies.

Table 1 shows the main characteristics of the teenage mothers. Most of them (41.0%) were 19 years old and only one was under 14 years. Among adolescents the rate of marriage is 11.7%, but the number of single mothers and number of mothers who had a partner in life was nearly the same. A total of 66 mothers (24.0%) reported smoking during pregnancy, 94.5% of them attended prenatal care regularly, but seven mothers (2.5%) never attended. 90 mothers (32.8%) had history of previous gestation(s) and 14.2% of the mothers had at least one previous delivery.

The rate of maternal complications during pregnancy is demonstrated in Table 2. Gestational diabetes was significantly lower among adolescent mothers than in the control group. Preeclampsia was common in teenagers, but there was no significant difference.

Table 2 also summarizes the data of the perinatal outcome in the control and in the study group. The rate of premature deliveries was worse in the study group (10.2%) than the national rate (8.9%), but it was not significant. Frequency of spontaneous vaginal delivery and caesarean section were similar in the two groups (66.5 versus 65.2 and 33.5 versus 34.8%). IUGR occurred a little bit more often in the teenage group. Significant difference was found in mean birth weight,

**Table 1.** Characteristics of teenage mothers (274 mothers).

	<i>n</i>	%
Maternal age		
<14 years	1	0.4
14 years	6	2.4
15 years	6	2.4
16 years	28	11.0
17 years	47	16.9
18 years	72	25.9
19 years	114	41.0
Marital status		
Single	119	43.4
Partner in life	123	44.9
Married	32	11.7
Smoking during pregnancy		
Yes	66	24.0
No	208	76.0
Attending prenatal care		
Regularly	259	94.5
Irregularly	8	3.0
Never	7	2.5
Number of previous gestations		
0	184	67.2
1	65	23.7
2 or more	25	9.1
Number of previous deliveries		
0	235	85.8
1	32	11.7
2 or more	7	2.5

**Table 2.** Maternal complications during pregnancy (274 mothers) and perinatal outcome of newborns (2010–2014, 275 newborns).

	Teenagers	Control <sup>b</sup>	<i>p</i>
Maternal complications			
Gestational diabetes	5 1.8%	6.3%	<.001*
Preeclampsia	21 7.6%	6.0%	.250
Threatened preterm delivery	22 8.0%	8.0%	1.000
Perinatal outcome of newborns			
Premature	28 10.2%	8.86%	.450
Mode of delivery			
Vaginal delivery	183 66.5%	65.2%	
Caesarean section	92 33.5%	34.8%	.660
Mean birth weight (g)	3110.2 ± 564.03	3247	<.001*
IUGR	26 9.4%	8.0%	.370
Congenital malformation	22 8.0%	5.0%	.036*
Apgar score at 5 min <7	4 1.5%	data not available	
Umbilical cord blood pH <7.2 <sup>a</sup>	51 18.5%	data not available	
Newborn transferred to NICU	34 12.4%	8.0%	.014*

<sup>a</sup>Measurement was not performed in all cases (14).

<sup>b</sup>National data.

\*Significance at  $p < .05$ .

in rate of congenital malformation, and in admission to Neonatal Intensive Care Unit (NICU).

Table 3 shows the types of congenital malformations registered in the study group. 22 babies from the 275 newborns of adolescent mothers had congenital malformations (8.0%), three of them had multiple malformations.

## Discussion

Over the last decades, remarkable changes have been noticed in family life and in sexual activity before

**Table 3.** The incidence of various fetal malformations.

Defects	Incidence	
Neural tube defects/hydrocephalus	2	0.8%
Heart defects	2	0.8%
Single umbilical artery	1	0.4%
Abdominal wall defect (gastroschisis)	1	0.4%
Urogenital defects	7	2.8%
Musculoskeletal defects	10	4.0%
Tracheostenosis	1	0.4%
Supernumerary nipple	1	0.4%

marriage. Sexual provocation has increased through the media and contraceptives are easier available than before. All these factors have led to the increased number of adolescent pregnancies throughout the world [21].

In the study by Orvos et al. in 1999 [1], most of the teenage mothers were single and almost one fifth of adolescent mothers have never attended prenatal care (data were collected immediately after the political structure change). In our study, changes have been noticed in the proportion of single mothers and of those who had a partner in life. Having a husband or a partner during pregnancy could mean appreciable support to the mother, and it can explain the high rate of attending prenatal care.

Several previous studies have already shown association between teenage pregnancy and adverse perinatal outcome. Mahavarkar et al. [2], Loto et al. [4], Gilbert et al. [6] described low birth weight among the babies of teenagers, but we found difference only in the mean birth weight, which was lower than in control. It contrasts with the findings of Dewan et al., who found no significant differences between the mean birth weight and the proportion of low birth weight babies between teenagers and adults [22]. We could not prove higher rate of prematurity and IUGR like Amini [7] and Fraser [8]. The study of Sandal et al. demonstrated that the rate of NICU admission was higher in adolescent mothers [17], our observations confirmed their statement. We have noticed significant risk of congenital malformations similarly to Eckmann-Sholz [13], Csermely [14], and Reefhuis [15] et al.

Csermely et al. examined the risk of congenital anomalies in young pregnant women in Hungary: according to their results, a higher risk of gastroschisis, congenital heart defects, particularly left-sided obstructive defects, undescended testis and clubfoot was found in the youngest age group (19 years or less) [14]. Hollier et al. reported also a high risk of gastroschisis and polydactyly [23]. In the study by Eckmann-Scholz gastroschisis and fetal heart defects were the most frequent malformations [13]. Chen et al. found no increased risk for circulatory/respiratory

or urogenital anomalies, but reported higher risk for congenital anomalies in central nervous, gastrointestinal and musculoskeletal systems [16]. Our study agrees with Hollier (polydactyly), Csermely (undescended testis) and Chen (musculoskeletal defects), but gastroschisis was noticed only in one case.

During the analysis of maternal complications, gestational diabetes was significantly lower among adolescent mothers. The prevalence of gestational diabetes has been increasing with maternal age [24], thus, our results were not unexpected. Preeclampsia is more specific in younger age and in nulliparous women, our findings are similar: preeclampsia was common in teenagers, but there was no significant difference.

To identify the causes of congenital anomalies, prematurity, low birth weight and other adverse perinatal outcome is a really complex task. Lam suggests that young mothers who smoke cigarettes or marijuana or are malnourished have a high risk of having an infant with gastroschisis [25]. Reefhuis claims that lifestyle factors seem to be the most likely explanation for the increased risk of congenital abnormalities: inadequate prenatal care, smoking, drinking alcohol, taking drugs, and malnutrition (lack of using folic acid and multivitamins) [15]. In Hungary, Paulik et al. had similar results: the regular use of folic acid was important to prevent neural tube defects [26]. Smoking is a well-known risk factor of low birth weight and prematurity, Dewan reported that the mean birth weight of babies of smoking mothers was significantly lower than for non-smoking mothers and risk of low birth weight was significantly increased in teenagers who smoked [22]. Gortzak-Uzan confirmed that nutritional status, insufficient folate intake, lack of prenatal care are risk factors in teenage pregnancies [3].

The limitations of our study are its retrospective nature and the small sample size in the examined groups despite of being a regional center. No data were available about level of education, income of the mothers, folate or vitamin intake, diet habits, if mothers smoked before pregnancy, and there was no detailed medical follow-up of the transferred neonates, because NICU is located in another department.

In conclusion, we can summarize that in our study group younger maternal age was significantly associated with lower mean birth weight, higher risk of congenital malformations and increased admission rate to neonatal intensive care unit. The possible causes need further investigation, but our findings confirm the relevancy of screening congenital malformations in younger mothers and the necessity of NICU. Teenage mothers should be informed about the potential

complications during an adequate prenatal care program and recommended to deliver in a regional center to avoid adverse perinatal outcome.

### Disclosure statement

The authors report no conflicts of interest.

### ORCID

Gábor Németh  <http://orcid.org/0000-0003-1829-3457>

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