



Research paper

Comparison of the course of labour in adolescent mothers (aged ≤ 17 years) and young women (aged 18–19 years)

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ABSTRACT

Introduction: Adolescent motherhood is associated with a high risk of health problems due to the unfinished process of biological development of the body.

Aim: To compare the course of labour among adolescent mothers (aged up to 17 years) and young women (aged 18–19 years).

Material and methods: The study was performed on the basis of a retrospective analysis of medical records from 2010 to 2018 in one of the clinical hospitals in Poland. The analysis included the births given by 133 adolescent mothers and 169 young women.

Results and discussion: There was a downward trend in the percentage of births given by adolescent mothers and young women over a 9-year period. The placenta of adolescent women was lighter, by 25 g on average ($P = 0.011$), and had a smaller size ($P = 0.038$) than the placenta of young women. In adolescent women, pregnancy-related complications were significantly more often associated with pregnancy-induced hypertension ($P = 0.037$), and in young women with gestational diabetes ($P = 0.003$). The rupture of membranes was observed significantly more often at the first stage of labour among mothers aged 18–19 years than in mothers aged up to 17 years ($P = 0.043$).

Conclusions: A decrease in the number of births given by adolescent mothers and young women over 9 years was demonstrated. Among adolescent mothers a pregnancy-related complication was pregnancy-induced hypertension. The placenta of adolescent mothers was significantly lighter and smaller than of young women. The rupture of membranes (in the first stage of labour) concerned more often women aged 18–19 years.

1. INTRODUCTION

Adolescent maternity refers to women who gave birth before the age of 18 before reaching legal maturity.¹ The subject of pregnant adolescents concerns about 2.5% of all pregnancies. Compared to 1990 as many as 8.0% of teenagers became mothers. In the long-term perspective (1980–2017) there was a decrease in the number of adolescent births in Poland.² We should seek the causes of teenage pregnancies in the phenomenon of early puberty, lack of socialization and sex education, both in schools and at home, changes in morals, the consequence of which is early sexual initiation, risky health behavior and an unfavorable socio-economic situation.³ According to the World Health Organization, about 16 million teenage girls give birth every year around the world. Over 90% of these births take place in low- and middle-income countries. In most countries in Western Europe the percentage of pregnant adolescents tend to decrease year by year.^{4,5} Adolescent pregnancy remains a major challenge in both developed and developing countries.⁶ Teenage pregnancies are usually unplanned and very often unwanted. They are considered to be high risk pregnancies by the medical community due to the numerous complications that result from the fact that they seek medical care too late or lack proper obstetric care. From the biological point of view, the consequences of pregnancy in adolescence are high prevalence of pregnancy-induced hypertension, anemia, gestational diabetes, labour complications, which determine the increase in maternal mortality. Pregnancy during adolescence is associated with higher rates of low birth weight (LBW), premature births, respiratory diseases and birth injuries as well as more frequent neonatal complications and infant mortality.^{7,8} Adolescent mothers breastfeed their babies only for about 5 weeks.⁹ Stillbirth is significantly more common in the group of girls aged 16–17. Adolescent mothers (aged up to 15 years) significantly more often experience preeclampsia, eclampsia, anemia, postpartum endometritis and systemic infection than adult mothers. Caesarean section concerns significantly more often young mothers up to 15 years of age than adults. Postpartum hemorrhage is much more frequent in adolescents aged between 16 and 17.¹⁰ Studies carried out by Shveiky et al. report that young adolescents and adolescents had significantly higher rates of labial and periurethral lacerations compared to individuals aged 22–34 years.¹¹ The authors showed that severe preeclampsia accounted for 6.0% of all live births (excluding multiple pregnancies and other forms of hypertension), 13.5% of which were adolescents.¹² Teenage motherhood is a complex phenomenon that can be viewed from a social, legal, medical and psychological perspective.

2. AIM

To compare the course of labour among adolescent mothers (aged up to 17 years) and young women (aged 18–19 years).

3. MATERIAL AND METHODS

A retrospective and comparative study of the medical documentation of the course of birth was carried out among adolescent mothers (aged up to 17 years) and young women (aged 18–19 years) who gave birth in a clinical hospital in Bydgoszcz from 2010 to 2018 (Poland). The hospital provides level III perinatal care and covers high-risk pregnancies. Due to the retrospective design of the study, the Bioethics Committee approved the review of patients' medical records without their approval. All the data used in the study remained confidential. Sociodemographic and clinical variables were collected on the basis of birth books. Birth books from 2010 to 2014 were kept only in a paper form, from 2014 to 2018 they were kept in electronic form. The birth records lacked some data concerning the course of labour. The average age of adolescent mothers was 16.5 years, minimum 13, maximum 17. The average age of young women was 18.5, minimum 18, maximum 19 years. Delivery among adolescent mothers took place at 37.5 weeks of pregnancy on average, minimum 23, maximum 42, and in young women at 38.5 weeks of pregnancy, minimum 26, maximum 42. LBW was defined as up to 2499 g. The average birth weight of newborns was 2230 g, minimum 580 g, maximum 4830 g. Preterm delivery was defined as delivery before 37 weeks of pregnancy. Statistical analysis was performed in R statistical package v. 3.5.2. The results with a significance level less than 0.05 were considered significant.

4. RESULTS

In total, 17 413 women gave birth in a clinical hospital from 2010 to 2018, which gives an average of 1934 births per year. There is a downward trend in the percentage of births in adolescent mothers and young women. Detailed data has been presented in Table 1 and in Figure 1. Both adolescent mothers and young women most often gave birth on due date. The preterm delivery rate was 34.1% ($n = 45$) for adolescent mothers and 24.3% ($n = 41$) for young women. There were no significant differences in the compared groups with

Table 1. The incidence of deliveries among adolescents (aged up to 17 years) and young women (aged 18–19 years) in 2010–2018, n (%).

Year	Total	Adolescent mothers	Young women
2010	52(100)	20(38.5)	32(61.5)
2011	48(100)	22(45.8)	26(54.2)
2012	27(100)	12(44.4)	15(55.6)
2013	42(100)	21(50.0)	21(50.0)
2014	20(100)	13(65.0)	7(35.0)
2015	45(100)	16(35.6)	29(64.4)
2016	33(100)	9(27.3)	24(72.7)
2017	20(100)	11(55.0)	9(45.0)
2018	15(100)	9(60.0)	6(40.0)
Annual average	34(100)	15(44.0)	19(56.0)

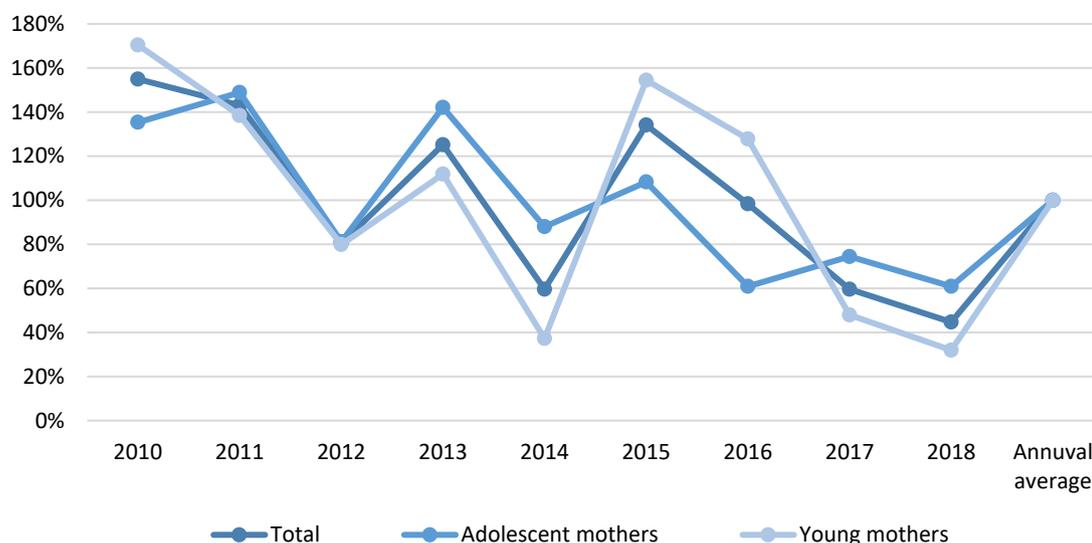


Figure 1. The incidence of deliveries among adolescents (aged up to 17 years) and young women (aged 18–19 years) in 2010–2018.

regard to the occurrence of preterm delivery ($P = 0.081$). Both groups of the studied teenagers most often gave birth naturally. Caesarean sections concerned 29.0%–32.0% of those giving birth, depending on the group, and the surgical delivery occurred sporadically. Both groups of the women did not differ significantly in terms of the frequency of the occurrence of the analyzed types of delivery ($P = 0.204$). The comparison of fertility in the studied groups was presented in Table 2. There was no significant difference in the

Table 2. Comparison of fertility in terms of age.

Fertility	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
Primipara	123(92.5)	140(82.8)	0.021
Multipara	10(7.5)	29(17.2)	
Total	133(100.0)	169(100.0)	

Table 3. Comparison of the duration of labour in terms of age of the study sample.

Duration of labour	Adolescent mothers	Young women	<i>P</i>
The first stage of labour, minutes	245.0 (172.5–310.0)	237.5 (150.0–337.5)	0.797
The second stage of labour, minutes	20.0 (10.0–35.0)	15.0 (10.0–35.0)	0.229
The third stage of labour, minutes	5.0 (5.0–10.0)	5.0 (5.0–10.0)	0.978

Comments: The data presented as median (Q1–Q3).

Table 4. Comparison of the birth weight of newborns in terms of the age of the studied sample.

Birth weight of newborns, g	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
Below 2499	30(24.0)	31(19.6)	0.164
2500–3999	90(72.0)	112(70.9)	
4000 and more	5(4.0)	15(9.5)	
Total	125(100.0)	158(100.0)	

duration of the first, second and third stage of labour (Table 3). The frequency of episiotomy and the frequency of individual degrees of perineal tear did not differ significantly between the groups of women ($P > 0.05$). No significant difference of the birth weight of newborns in the studied groups of mothers was confirmed ($P = 0.164$) (Table 4). No significant difference in the anthropometric measurements of newborns between the groups was confirmed ($P > 0.05$). The comparison of indications for cesarean section was presented in Table 5. The moment of outflow of amniotic fluid was compared in the studied groups in Table 6. Placental delivery mechanism did not differ significantly between the groups of women ($P > 0.05$). Almost all patients (97% for both groups) delivered placenta by the Schultzze mechanism. The weight and size of placenta was compared in the studied groups in Table 7. The incidence of comorbidities with pregnancy in the studied groups was compared in Table 8. Table 9 and Figure 2 present the comparison of the assessment of newborns according to the Apgar score (in 2014–2018).

Table 5. Comparison of the incidence of individual indications for cesarean section in terms of age of the study sample.

Indications for cesarean section	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
Threatening fetal asphyxia	12(27.9)	9(18.4)	0.402
Disproportion / narrow pelvis / contracted pelvis	5(11.6)	9(18.4)	0.544
Breech position	4(9.3)	8(16.3)	0.368
Preeclampsia / threatening eclampsia / eclampsia	3(7.0)	7(14.3)	0.327

Comments: Calculations for the women giving birth by cesarean section ($n = 43$ for adolescent mothers $n = 49$ for young women).

Table 6. Comparison of outflow of amniotic fluid in terms of age.

Moment of outflow of amniotic fluid	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
Artificial rupture of membranes in the first stage	5(10.9)	4(6.5)	0.043
Artificial rupture of membranes in the second stage	0(0.0)	1(1.6)	
Rupture of membranes in the first stage	9(19.6)	28(45.2)	
Rupture of membranes in the second stage	14(30.4)	14(22.6)	
PROM	18(39.1)	15(24.2)	
Total	46(100.0)	62(100.0)	

Table 7. Comparison of weight and size of placenta in terms of age.

Size of placenta	Adolescent mothers	Young women	<i>P</i>
Weight of placenta, g	595.0 (510.0–640.0)	620.0 (550.0–650.0)	0.038
Weight of the first placenta, cm	16.0 (13.0 – 18.0)	17.0 (15.0 – 20.0)	0.006
Weight of the second placenta, cm	17.0 (15.0 – 20.0)	19.0 (17.0 – 21.0)	0.011

Comments: The data presented as median (Q1–Q3).

5. DISCUSSION

The medical aspect of teenage motherhood is mainly associated with the lack of preparation of the young body for the reproductive functions, as well as with insufficient pregnancy monitoring. According to the literature, teenage pregnancy is associated with the risk of various obstetric complications.^{11–13} Our own material demonstrated that in 2014 and 2017–2018, adolescent mothers gave birth to more children than mothers

Table 8. Comparison of the incidence of comorbidities with pregnancy in terms of age of the study sample.

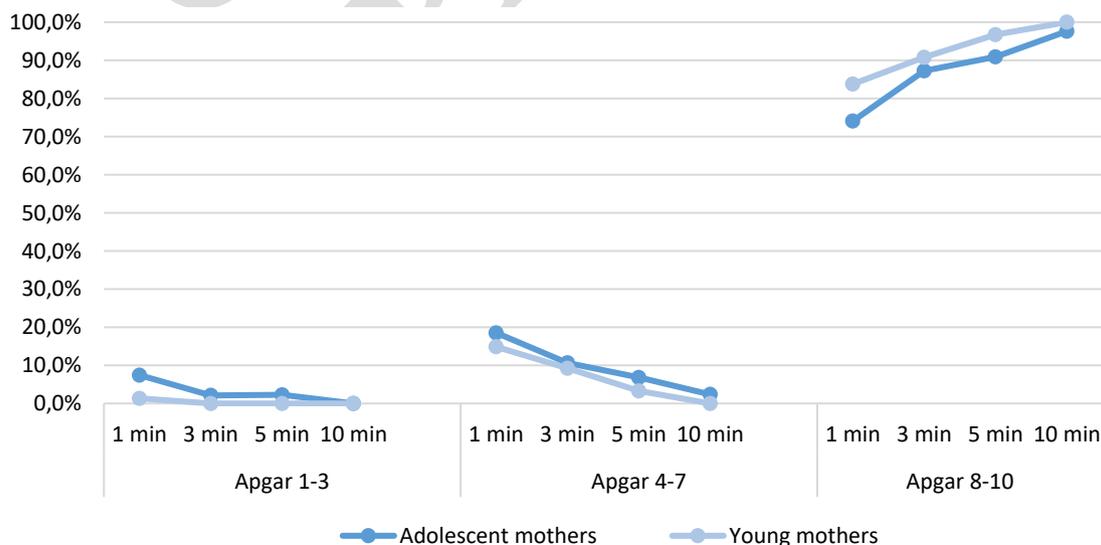
Comorbidities	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
GDMG1 or GDMG2	3(1.8)	19(11.2)	0.003
Preeclampsia	2(1.2)	4(2.4)	0.698
Pregnancy hypertension	4(2.4)	0()	0.037
Fetal hypotrophy	3(1.8)	1(0.6)	0.324
Oligohydramnios	1(0.6)	1(0.6)	>0.999
Hypothyroidism	4(2.4)	6(3.6)	>0.999

Comments: Calculations for all women (*n* = 133 for adolescent mothers and *n* = 169 for young women).

Table 9. Comparison of the APGAR score assessment at the first minute of newborns' lives in terms of age of the studied sample in 2014–2018.

APGAR 1 minute	Adolescent mothers <i>n</i> (%)	Young women <i>n</i> (%)	<i>P</i>
0–3	4(7.4)	1(1.4)	0.190
4–7	10(18.5)	11(14.9)	
8–10	40(74.1)	62(83.8)	
Total	54(100.0)	74(100.0)	

at the age of 18–19 (approx. 60% vs. approx. 40%). In 2013, the same number of births was recorded among both adolescent mothers and young women (*n* = 21). On average, 1934 deliveries took place in the clinical hospital per year (within 9 years). Our study shows that pregnancies among teenage mothers (aged up to 17 and 18–19 years) constituted 1.7% over a 9-year period. There was a downward trend of pregnancies in the study groups. Complications related to pregnancy and childbirth are the main cause of death of 15–19

**Figure 2. Comparison of the assessment of newborns at the 1st, 3rd, 5th and 10th minute of life on the APGAR score (*n* = 54 for adolescent mothers and *n* = 74 for young women) in 2014–2018.**

year-old girls in the world.¹⁴ Szyszko-Perłowska et al. analyzed the births given by mothers aged 14–18 in 2008–2009 in Poland. The vast majority of deliveries did not entail any complications (80%). The most common complication of labor was haemorrhage (13%), with average blood loss of 286 mL. Haemorrhages were also the most common pathology occurring during puerperium (5.7%).¹³ Our results indicate that umbilical cord wrapped around the neck (12% among adolescent mothers and 11% among young women) and abnormal position of fetus (8.0% vs. 6.0%) occurred most often during labour. In 1 case a young mother underwent a uterus amputation. Forceps delivery was performed among 3 teenagers (aged 18–19 years) and there was 1 vacuum-assisted delivery. Mohamed et al. reports that the incidence of vacuum extraction and Caesarean section during labor was lower in the adolescent group in comparison with the group of adult women.¹⁵ Our own material demonstrated that gestational diabetes was significantly more common among women at the age of 18–19, and pregnancy-induced hypertension was more common among mothers aged up to 17 years. There was no difference in the prevalence of preeclampsia among the compared groups. In the research carried out by Kawakita et al., young adult women were more likely to have gestational diabetes (aged 20.0–24.9 years) than other age groups (aged up to 15.9 years and 16.0–24.9 years).¹⁶ The rapidly increasing diabetes morbidity and advancement of its complications have become significant health and social problems. However, a significant issue that remains to be addressed is preventing diabetes.¹⁷ In Poland there is a rule of universal screening for hyperglycaemia during pregnancy. The results of our study reveal that the study sample usually gave birth naturally (adolescent mothers 67.7% vs. young women 68.6%). There was no difference in the frequency of Caesarean sections between the groups. Labour usually took place on due date. There were no significant differences in the compared groups with regard to the incidence of preterm delivery. There was no difference in the frequency of Caesarean sections between the groups. Another report also indicates that adolescent and teenage mothers more often gave birth naturally than adult women.¹⁶ La-Orpipat and Suwarath report that preterm delivery was more common in adolescents than in women aged 20–29 years. Both teenagers (aged 16–19 years) and adolescents (aged up to 15 years) usually gave birth naturally.¹⁸ Our own material showed that the frequency of episiotomy during labour, as well as and the incidence of perineal tears did not differ between the groups of women. Episiotomy was made in 30% of girls aged up to 17 years and in 28% of women aged 18–19 years. 23% of the women in both groups had no perineal injuries. If the perineal tear occurred, it was usually a first-degree tear. Second and third-degree tears occurred in few patients from both groups. There was no need for an episiotomy in 35% of the teenagers in the study carried out by Szyszko-Perłowska et al.¹³ Severe perineal injury during delivery in the group of older teenagers (aged 16–19.9 years) in comparison with the girls aged up to 15.9 years was demonstrated by Kawakita et al. The authors report that pregnancy arterial hypertension was the most common indication for

Caesarean section in teenagers.¹⁶ Preeclampsia / threatening eclampsia was an indication for Caesarean section in 14.3% of the young women in our own material, but the difference was not statistically significant. Shorter first and second stage of labour was observed in adolescent mothers.¹⁶ Sánchez-Ávila et al report the risk of high-grade tears was higher in adolescent deliveries in contrast to the births in adult women. A total of 179 cases of patients with third- and fourth-degree tears were identified, for a general prevalence of 2.0% during the study year. Adolescents accounted for 60 cases (33.5%), for a prevalence of 2.5% of tears in this age group, higher than the prevalence of adult women (1.8%).¹⁹ The results of our study indicate that the most common indication for caesarean section in adolescent mothers was fetal asphyxia (28.0%). On the other hand, in teenage women (aged 18–19 years), threatening fetal asphyxia was as frequent as fetopelvic disproportion, narrow pelvis (18% of cases for both indications). The duration of individual stages of labour did not differ between the study groups. The first stage of labour lasted on average 237.5–245.0 minutes depending on the group, the second stage lasted only 15–20 minutes, and the third stage lasted 5 minutes in each group. Torvie et al. report a prolonged labour in girls who gave birth at the age of 10–14. These mothers prematurely delivered newborns with low and very low birth weight in comparison with adult mothers (aged 20–24 years), but significantly less often by caesarean section.²⁰ Girls aged less than 15 years more often gave birth under 28, 32 and 37 weeks of pregnancy with a diagnosis of intrauterine growth restriction (IUGR).²¹ Other reports also indicate that mother's young age (aged 10–14 years) may be a risk predictor of preterm delivery and low birth weight of newborns.^{22–23} The infant mortality rate (15.4 per 7315 females aged 10–14 years delivered a live birth in 2002 of U.S. Hispanic origin) was two to three times higher than for infants of mothers aged 20–44.²² The results of our own material indicate that the sample of teenagers gave birth on due date (38 weeks of gestation on average). The vast majority of newborns had a normal body weight ranging from 2500 g to 4000 g in the studied groups. 24% of mothers aged up to 17 and about 20% of young mothers (aged 18–19 years) delivered babies with low birth weight (up to 2499 g). Another Polish study reports that the average body weight of newborns delivered by teenage mothers was 3148 ± 1.130 g.¹³ A Turkish study reports that the median duration of pregnancy was lower in adolescents (aged less than 15 years, 15–19 years) than in the control group (aged 25–30 years). Adolescent pregnancies were associated with higher rates of threatened abortion and pre-eclampsia. Gestational diabetes mellitus was less common, whereas the risk for Caesarean section was higher, in adolescents. In addition, women aged less than 15 years were at higher risk for preterm delivery.²³ Analyzing the Apgar score at the 1st minute of life of newborns, we demonstrated that 74% of children of adolescent mothers and 84% of children of young mothers received 8 to 10 points. However, the differences between the groups were not statistically significant. In the study carried out by Szyszko-Perłowska et al., no newborn received 10 points on the Apgar scale.¹³ In the

study carried out by Karatasali et al. the Apgar scores at the 5th minute of life were lower for the babies of adolescents, and the requirement of newborn intensive care was higher for the infants of mothers aged less than 15 years.²⁴ There was no statistically significant difference in the rate of low Apgar score at 1st and 5th minutes after birth and neonatal intensive care unit (ICU) admission between babies born from adolescent and adult women in the study by Kass et al.²⁵ We did not confirm the difference between the groups in body length and head circumference of newborns. The median of body length of the children was 54 cm and the median of head circumference of the children was 34 cm in both groups. The young age of mothers did not influence the anthropometric measurements of newborns in the study by Stewart et al.²⁶ Our study confirms that the placenta of adolescent mothers had significantly lower weight and measurements than the placenta of young mothers. The median of placental weight in adolescent mothers was 595 g, and in young women 620 g. The size of placenta for both groups was 16 cm and 17 cm in the first dimension, and 17 cm and 19 cm in the second dimension, respectively. The literature on the subject quotes that the largest placenta is 20–25 cm, 2–3 cm thick, and it weighs approximately 500 g. Despite the fact that the placenta of adolescent mothers was lighter than the placenta of young women, it was within the normal range. In the studied groups, the placenta was delivered most often by the Schultze mechanism, which occurs in about 80% of deliveries. Szyszko-Perłowska et al. report that incomplete placenta was found in 9% of the women, and postnatal abnormalities occurred in almost 30% of adolescents.¹³ Pregnancy in adolescents is classified as a high risk pregnancy by medical environments. Attention should also be paid to the unfavorable socio-economic conditions and consequences of early motherhood, such as delays in continuing education and starting working as well as living in poverty. The psychological effects are also significant, which results from more frequent acts of sexual violence and harassment against young women. According to the available literature, even the best sex education system (which we still do not have in Poland) and easy access to modern contraception do not ensure a decrease in the percentage of pregnancy among adolescents and engaging in risky sexual behaviours. The limitation of our study was the fact that the course of labour of teenage mothers was analyzed only in one clinical hospital in Poland, so caution is needed when interpreting the results. A lot of health facilities from Poland should be included in the project in order to draw clear conclusions. It is necessary to understand teenage mothers' needs so as to provide high-quality comprehensive perinatal care services in Poland. The goal can be achieved by conducting further research in this direction to provide new insights for policymakers and healthcare workers. It should result in responding to the challenges of teenage mothers, including ensuring universal access to sexual and reproductive care services, such as family planning, information and education, and the integration of reproductive health.

6. CONCLUSIONS

- (1) Teenage deliveries (up to 17 years and 18–19 years) constituted 1.7% in the clinical hospital from 2010 to 2018. There was a downward trend in deliveries among the compared groups.
- (2) Adolescent mothers and young women most often gave birth naturally on due date to newborns with a normal body weight and in a good condition according to the Apgar score.
- (3) Pregnancy-induced hypertension and lower placental weight and measurements were observed more frequently among adolescent mothers than among young women.
- (4) Gestational diabetes and outflow of amniotic fluid at the first stage of labour more often affected young women than adolescent mothers.

Conflict of interest

None declared.

Funding

None declared.

Ethics

In order to conduct the study, ethical approval was obtained from the Bioethics Committee 828/2018 at CM NCU in Torun, Poland.

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