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# Pregnancy Outcome among Teenagers in Burgas Region

**Antonio Dushepeev[1,2], Zlatko Kirovakov[1,3], Stefani Markova[1], Emil Kovachev[2]**
[1]University Multi-Profile Hospital for Active Treatment - Burgas, Bulgaria
[2]Department of Obstetrics and Gynecology, Medical University – Varna, Bulgaria
[3]Department of Health Care, Faculty for Public Health and Health Care, Prof. d-r Asen Zlatarov University – Burgas, Bulgaria

**Corresponding author:** Antonio Dushepeev, Maternity Ward – UMHAT – Burgas, 73 Stefan Stambolov BLVD, Burgas 8000

**Abstract**

**Objective**

The study aims to investigate the pregnancy outcomes among teenagers in Burgas region, Bulgaria, to order to outline the factors that influence the occurrence of teenage pregnancies, number of births attributed to teenage mothers, related concomitant diseases, duration of the birth periods and mechanism of birth in adolescent.

**Methodology**

The study focuses on adolescent patients between the ages of 10 and 18 who presented for childbirth in the time period between 2016 and 2022 in the Mulpi-profile University Hospital for Active Treatment - Burgas, Bulgaria. The focus of the questionnaire was demographic features, birth rate, comorbidities, birth mechanisms, infant anthropometric features and the operative interventions. The data that was collected and analyzed using Excel and IBM's Statistical Package for Social Sciences (SPSS) to provide the demographic and inferential statistics related to the topic of research.

**Findings**

A significant difference was found between the performed episiotomies ($p = 0.00001$) in adolescent patients (10-18) 61.77% compared to patients in the age group 20-24, where the percentage is 30.83%. The difference between the number of perineoraphys is also statistically significant ($p < 0.0072$), in adolescent patients (10-18) 10.58% and in patients in the age group 20-24, where the percentage of performed perineoraphys is 4.17%. A significant difference is also found in the number of Obstetrical forceps application ($p=0.0654$), in the group of adolescent patients (10-18) it was performed in 2.73% and in the patients in the age group 20-24 years the percentage is 0.84%. The findings show that anemia is a primary comorbidity factor for adverse pregnancy outcomes for teenagers and the control group.

**Conclusion**

Adolescent pregnancy is a social and medical problem. Regional and national policies need to be developed for the early identification of pregnant women in the discussed age group, which would significantly reduce complications during pregnancy. The significant adverse outcomes that are directly linked to teenage pregnancies include higher rates of anemia, operative interventions and infant anthropometric anomalies as well as increased fetal complications such as fetal growth restriction and miscarriage.

**Keywords:** adolescent pregnancy, pregnancy outcome, anemia, preeclampsia, perineoraphy, episiotomy, cesarean section.

## Introduction

Teenage pregnancy in Bulgaria has become an intense social topic of interest for academic researchers in the country largely as a result of the related adverse outcomes. Globally, teenage and adolescent pregnancy has been considered as a universal societal problem that affects different countries at different degrees which has led to adoption of different policies such as contraceptive measures and legalization of abortion to address the problem [1], [2]. On a global scale, teenage pregnancy is still rampant

with up to 19 percent of women in developing countries getting pregnant below 19 years of age with 11 percent of the total global births involving teenage women [1]. The existing Bulgarian statistics on teenage pregnancy highlight a deepening demographic crisis in terms of numbers of birth attributed to teenage and adolescent mothers, related comorbidities, mechanism of birth, duration of birth periods, and anthropometric details of the newborns. In the past decades, Bulgaria has experienced significant societal transformations which has led to an increased interest in the impact of demographic features including age and are related to pregnancy outcomes [2]. Existing academic literature on teenage pregnancy in Bulgaria have often highlighted the role of having Roma origin as a factor for high rate of adolescent fertility and abortion rates in Bulgaria and the wider European Union (EU) region. It is reported that there is an increasing trend in teenage pregnancy among the Roma population with a higher adolescent live birth rate as compared to those of non-Roma origins which indicates a direct correlation between having a Roma origin and adolescent live births [3], [4]. Considering the significance of the teenage pregnancy on society, it is important to understand the related outcomes for formulation of effective policies to address the problem.

From a medical perspective, teenage pregnancy is directly associated with higher risk of complications with existing evidence indicating that teenage maternal related mortality is twice as likely to occur as compared to that of adult women. The teenage maternal complications include higher rates of anemia, operative interventions and infant anthropometric anomalies [5], [6]. Further evidence indicates increased fetal complications such as fetal restriction growth, miscarriage and even fetal death with the largest proportion of teenage pregnancies being directly associated with instrumental deliveries [7]. On the same note, teenage pregnancy has been characterized with long-term well-being problems such as increased rates of maternal postpartum depression, infant emotional syndrome, maternal malnutrition, inadequate prenatal care, and toxic maternal habits [8], [9]. As a result, it is necessary to understand the significance of perinatal care for pregnant teenagers and the significance of effective policies for prevention of pregnancy, especially among the most vulnerable populations in Bulgaria. However, there is limited existing literature on teenage pregnancy outcomes in Bulgaria which has created a significant research gap on the topic, especially in relation to the causative demographic factors and related comorbidities. To this end, the present research study aims to investigate the pregnancy outcomes among teenagers in Burgas region, Bulgaria, to understand the factors that influence the occurrence of teenage pregnancies, number of births attributed to teenage mothers, related concomitant diseases, and the anthropometrical details of the newborns. Further, the study outlines the related operative interventions during birth and the need for elective and emergency cesarean delivery.

## Methodology

The present research study investigates the teenage pregnancy outcomes in the Burgas region in Bulgaria in relation to demographic features, the total numbers of birth, the related comorbidities, mechanisms of birth, anthropometric features of infants, the operative interventions, and the related indications for caesarean section delivery. To achieve the set research objectives, the study adopted a quantitative methodological framework involving statistical data related to the study variables. First, in relation to the population of interest, the study is focused on adolescent patients between the ages of 10 and 18 who presented for childbirth in the time period between 2016 and 2022 in the Mulpi-profile University Hospital for Active Treatment - Burgas, Bulgaria. The recruitment of the participants was based on their admission for childbirth at the hospital during the period of the analysis and were offered the option of providing the data related to the study variables using a questionnaire. The study control group were adult mothers above the age of 19 years. The focus of the questionnaire was demographic features, birth rate, comorbidities, birth mechanisms, infant anthropometric features and the operative interventions. To meet the ethical requirements of scientific research, the participants were provided with an informed consent documentation to ensure anonymity and respect of their rights. The data that was collected analyzed using Excel and IBM's Statistical Package for Social Sciences (SPSS) to provide the demographic and inferential statistics related to the topic of research.

## Results

A total of 1,024 adolescent patients between the ages of 10 and 18 who presented for childbirth in the time period between 2016 and 2022 took part in the research study. The largest proportion of participants were aged 17 years (42.5%) of the total studied population followed by those who were aged 16 (34.5%), and the smallest share is 13-year-olds - 0.8%. All the study participants were aged above 12 years. According to the results, the mean age of the participants in 2016 was 16.109 (S.D= 0.9242), M= 16.1523 (S.D= 0.91) in 2017, M=16.1345 (S.D=0.9203) in 2018, and M= 16.1835 (S.D=0.9512) in 2019. The participant mean age for 2020/2021 and 2022 were M=16.0329 (S.D=0.9242) and M= 16.1329 (S.D=0.9042) respectively. The demographic statistics for the age of the participants is shown in Table 1 below;

**Table 1:** Average of Participants distributed across the period of the research.

| Year | 2016 | 2017 | 2018 | 2019 | 2020/21 | 2022 |
|---|---|---|---|---|---|---|
| Average age (mean ± SD) | 16.1094 SD± 0.9242 | 16.1523 SD± 0.91 | 16.1345 SD± 0.9203 | 16.1835 SD± 0.9512 | 16.0329 SD±0.924 | 16.1329 SD± 0.9042 |

The result indicates an overall tendency for a decrease in the birth rate as an absolute value of the number of births with the birth rate in 2016 being 9.1‰ while in 2022 it was 8.8‰. In terms of births attributed to teenage and adolescent mothers, the results show a mixed trend with only 7.47 percent of the total births in 2016 being by teenage mothers with the number increasing to 10.43 percent and 10.08 percent for the subsequent two years of 2017 and 2018 respectively. However, in 2019, the number of teenage pregnancies in Burgas region reduced to 6.02 percent which highlights significant policy changes related to combating the direct effects of the pregnancies. The total number of births attributed to teenage pregnancies between 2016 and 2022 in the Burgas region is shown in Figure 1 below.

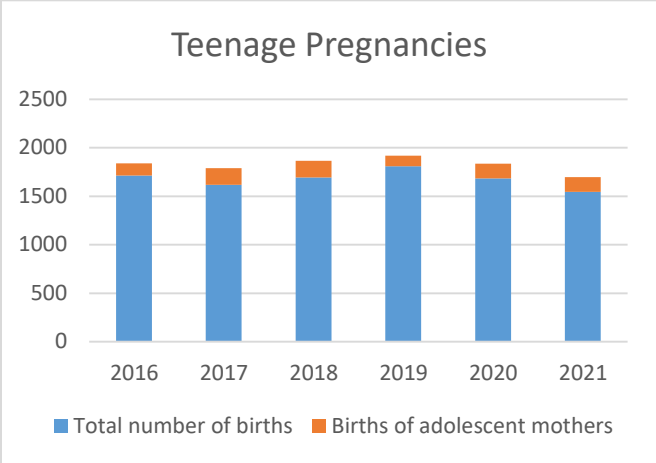


**Figure 1:** Total number of births during the studied years and number of births to adolescent mothers.

In terms of concomitant diseases, the findings show that anemia is a primary comorbidity factor for adverse pregnancy outcomes for teenagers and also in the control group. For the teenage participants, anemia accounted for up to 45.11 percent of the total accompanying conditions that were directly associated with adverse pregnancy outcomes and accounted for 38.33 percent of the total accompanying conditions for the control group. The other notable accompanying conditions associated with teenage pregnancy among the participants included obesity and preeclampsia which accounted for 13.24 percent and 11.04 percent of the total births. Other related comorbidity conditions that were identified included varicose veins of the vulva, syphilis, condyloma acuminate, epilepsy, and thalassemia minor. The distribution of adolescent female patients reporting comorbidities is shown in Figure 2.

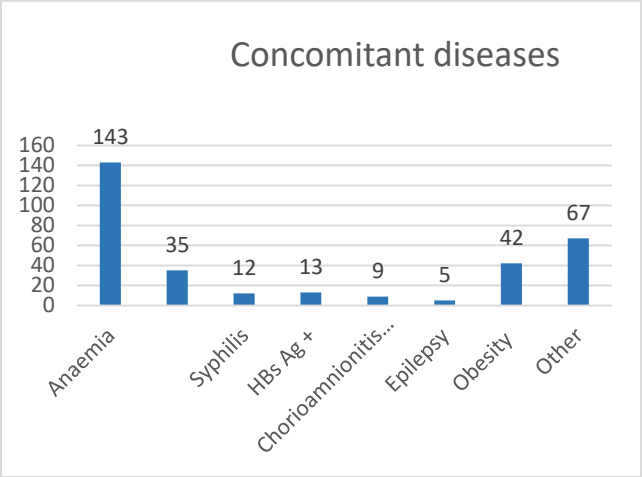


**Figure 2:** Distribution of comorbidities in adolescent female and control group.

Data present in Fig. 2, is confirmed, as the leading concomitant disease among adolescent patients is anemia. It is significant to consider obesity as an emerging problem in development and, above all, the prevalence of preeclampsia. The presence of HBsAg (+), syphilis and associated chorioamnionitis is also evident, Anemia 143 (13.96%), Obesity 42 (4.04%), HBsAg (+) 13 (1.25%), Syphilis 12(1.15%).

In terms of mechanism of birth, the results indicate that the participants aged between 13 years and 15 years reported the highest levels of vaginal delivery as compared to those between 16 years and above. According to the results, 83.7 percent of the participants aged between 13 years and 15 years reported vaginal births while only 16.26 percent underwent caesarean delivery. The results further show that 75.39 percent of the participants aged between 16 years and 18 years reported vaginal births while 24.61 percent underwent caesarean delivery. For the control group, the results indicated 78.33 percent of the participants reported vaginal births while 24.61 percent underwent caesarean delivery. The findings of the mechanism of birth for the experimental and control groups are indicated in Figure 3.

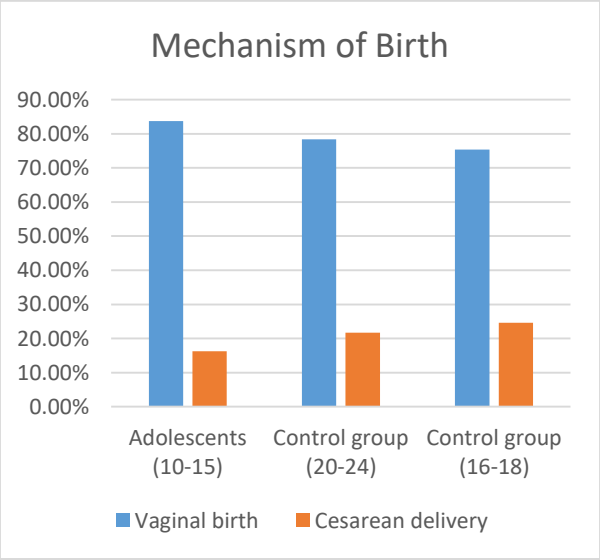


**Figure 3:** Mechanism of Birth of Experimental and Control Groups.

In relation to duration of birth, the results indicate a significant difference between the duration of the 1st period in the adolescent patients (M= 6.1 SD = 1.67) and the control group (M= 5.37 SD =1.48), p = 0.0082, and a significant difference between the duration of the second period in the adolescent patients (M= 20.14 SD =7.64) and the control group (M= 15.95 SD = 6.61), p < 0.0001. However, there was no statistically significant difference found in the duration of the 3rd period in the adolescent patients (M= 6.94 SD =3.63) and the control group (M= 7.26 SD = 5.14), p = 0.0082. The results of the duration of birth are indicated in Table 2.

**Table 2:** Duration of the birth 1st, 2nd, 3rd period of birth in Adolescents and Control group.

| Period | Duration of the birth periods in Adolescent (mean ± SD) | Duration of the births period in Control group (mean ± SD) | P-value |
|---|---|---|---|
| **I st** | (M= 6.1 SD = 1.67) | (M= 5.37 SD =1.48) | **p = 0 .0082** |
| **II nd** | (M= 20.14 SD =7.64) | (M= 15.95 SD = 6.61) | **p < 0.0001** |
| **III rd** | (M= 6.94 SD =3.63) | (M= 7.26 SD = 5.14) | p = 0.2526 |

The results of the operative interventions during vaginal delivery are shown in Table 3 and Table 4.

**Table 3:** Operative interventions among Adolescent (Per vias naturales)

| Operative interventions | Adolescents (10-15) n=200 | Adolescents (16-18) n=678 | P value |
|---|---|---|---|
| Episiotomy | **66.5%** | **60.38%** | p = 0.5200 |
| Vaginoperineorrhaphy | **7.5%** | **11.48%** | **p = 0.0372** |
| Labiorrhaphy | **2.5%** | **2.5%** | p = 0.8556 |
| Trachellorrhaphy | **5.5%** | **4.71%** | p = 0.3249 |
| IRUC | **4.0%** | **4.41%** | p = 0.4400 |
| Appl. Forceps | **2.5%** | **2.79%** | p = 0.6540 |

A significant difference was found between the number of Vaginoperineorrhphy performed (p= 0.0372) in adolescent patients in the age group 10-15 years (7.5%) and in adolescent patients in the

age group 16-18 years, where the percentage was 11.48%.

**Table 4:** Operative interventions between adolescent and control group (Per vias naturales)

| Operative interventions | Adolescents (10-18) N=879 | Control group (20-24) N=95 | P value |
|---|---|---|---|
| Episiotomy | **61.77%** | **30.83%** | **p < 0.00001** |
| Vaginoperineorrhaphy | **10.58 %** | **4.17%** | **p = 0.0072** |
| Labiorrhphy | **2.5%** | **0.83%** | p = 0.1556 |
| Trachellorrhaphy | **4.89%** | **2.5%** | p = 0.3298 |
| IRUC | **432%** | **3.33%** | p = 0.4400 |
| Appl. Forceps | **2.73%** | **0.84%** | **p = 0.0654** |

A significant difference was found between the episiotomies performed (p < 0 .00001) in adolescent patients (10-18) 61.77% and in patients in the age group 20-24, where the percentage was 30.83%. The difference between the number of vaginoperineorrhaphy (p = 0 .0072), in adolescent patients (10-15) 10.58% and in patients in the age group 20-24, where the percentage of performed vaginoperineorrhaphy was 4.17%.

A significant difference was also found in the number of Appl. forceps (p=0.0654), in the group of adolescent patients (10-15) it was performed in 2.73% and in patients in the age group 20-24 the percentage is 0.84%.

Figure 4 show the absolute values of patients who underwent Caesarean delivery in the study group and the control group. Caesarean delivery in adolescents peaks to 5,40% from all Caesarean deliveries in 2018 and 2021. Only 3,80% of all Caesarean deliveries were performed on adolescents.

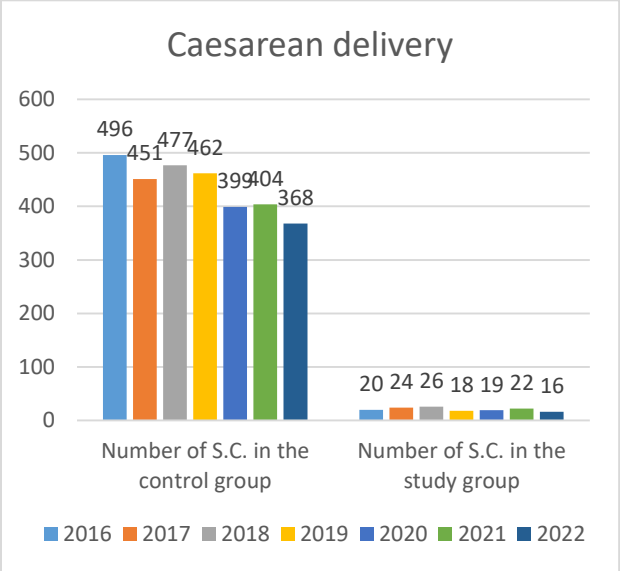


**Figure 4:** Number of caesarean deliveries in the study and control groups.

Citing data from studies on the ratio of elective to emergency Caesarean sections conducted in the United Kingdom and Southeast European countries, we observe the following results: Nearly half of Caesarean sections in the United Kingdom are performed electively, whereas in Southeast Europe, planned Caesarean deliveries account for 20.9% of all births, compared to 15.2% for emergency Caesarean sections. In both studies, the percentage of Caesarean sections hovers around 30% [10], [11]. From our results, it becomes evident that the situation with elective versus emergency Caesarean sections among adolescent pregnancies is exactly the opposite. The percentage of elective Caesarean sections varies significantly, from 20% in 2016 to 37.5% in 2017. For the remaining years, elective Caesarean sections accounted for 23.07% in 2018, 33.33% in 2019, 31.58% in 2020, 22.72% in 2021, and 31.25% in 2022. The summarized data is presented in Figure 5.

The results indicate a higher level of emergency operative delivery among adolescents of age between 10 years and 15 years with up to 80.08 percent of the participants undergoing the delivery method. On the other hand, for the control group, only 33 percent of the participants reported to have undergone emergency operative delivery. In terms of indications for caesarean section, the results indicate that the largest proportion of the participants reported fetal asphyxia as the reason for the delivery. Other notable indications for caesarean section delivery included breech presentation, pre-eclampsia,

pelvifetal disproportion, and previous cesarean delivery.

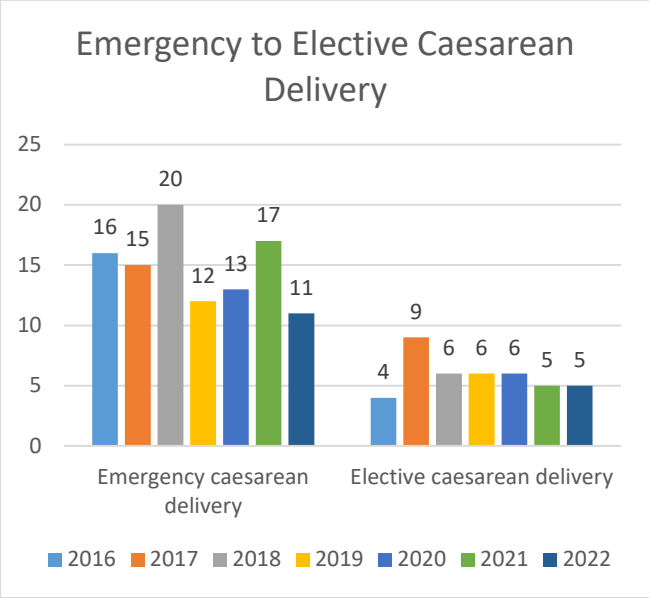


**Figure 5:** Number of emergency and elective caesarean deliveries in adolescents.

Regarding the indications for Caesarean section, the data identify the most common causes as acute intrapartum fetal asphyxia, cephalopelvic disproportion, breech presentation, and preeclampsia. Figure 6 shows the frequency of different indications for Caesarean section. Note that some of the women had more than one indication for surgery.

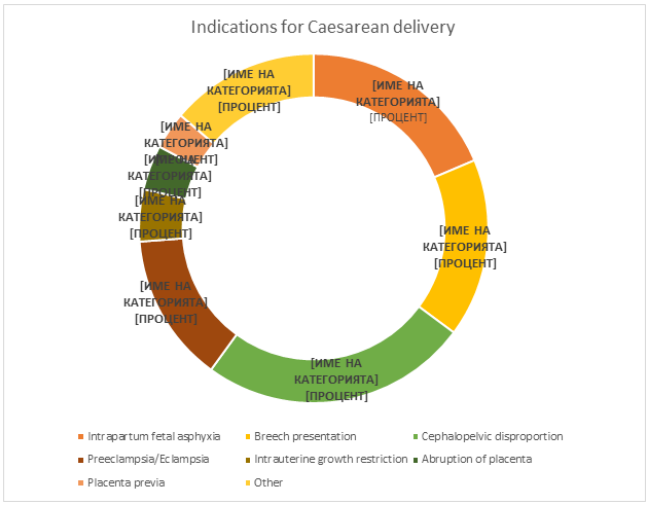


**Figure 6:** Indications for Caesarean delivery. Note that some of the women had more than one indication for surgery.

When examining the leading indications for Cesarean delivery separately for elective and emergency interventions, the following differences are observed. The most common indications for Cesarean section in planned interventions are breech presentation of the fetus, a previous Cesarean section, and preeclampsia, followed by intrauterine growth restriction of the fetus and cephalopelvic disproportion. In emergency surgical deliveries, the leading cause is cephalopelvic disproportion, followed by intrapartum fetal asphyxia and breech presentation.

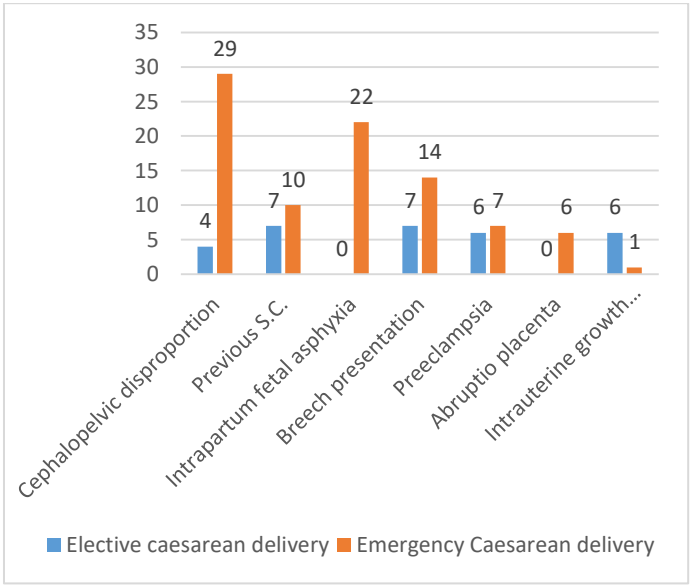


**Figure 7:** Indications for elective and emergency Caesarean delivery.

## Discussion

The research findings highlight the significance of understanding the causative factors and effect of teenage pregnancy outcomes in the Burgas region, Bulgaria. According to the findings, there is a decrease in the overall birth rates among the participants which is confirmed by existing literature which have highlighted drastic societal transformations related to demographic factors associated with pregnancies [12], [13], [14]. Based on the findings, there are significant adverse outcomes that are directly linked to teenage pregnancies including higher rates of anemia and operative interventions [15], [16]. The results further indicate that the largest proportion of teenage pregnancies are directly associated with instrumental and operative deliveries including episiotomy, vaginorrhaphy, labiorrhapy and perineorrhaphy [17]. The results indicate significant differences in the mode of birth delivery between teenagers and the participants who were above the teenage years, as further supported by existing literature which have

highlighted adverse delivery processes associated with teenage pregnancies [18], [19]. It has been shown that teenage pregnancy is characterized with long-term well-being problems such as increased rates of maternal postpartum depression, infant emotional syndrome, maternal malnutrition, inadequate prenatal care, and toxic maternal habits [20], [21]. The results clearly highlight the adverse outcomes associated with teenage pregnancies in Bulgaria which requires changes in policies for addressing the issue.

The comorbidity factors that are related to teenage pregnancies are linked to the pre-natal care outcomes and directly affects the physiological pregnancy processes. The results indicate that anemia is a primary comorbidity factor for adverse pregnancy outcomes for both teenagers and other pregnant women [21]. The findings are supported by existing research which directly correlate anemic conditions with adverse pregnancy outcomes such as fetal growth restriction, miscarriage and even fetal death. It is further noted that other accompanying conditions associated with teenage pregnancy included obesity, pre-eclampsia, varicose veins of vulva, syphilis, condyloma acuminate, epilepsy, and thalassemia minor [22]. Further, the results indicate an increased number of elective and caesarean birth delivery operations for teenage pregnancies as compared to the control group which highlights the adverse outcomes that are directly associated with teenage pregnancies in the Bulgaria. Based on the research results and the existing literature, there is a significant difference in the periods between subsequent pregnancies in adolescents and adults, which is directly linked to the effects of early age pregnancies [23]. Also, it is reported that most teenage pregnancies are likely to undergo episiotomic operative interventions which highlight the complication related to the pregnancies.

## Conclusions

Adolescent pregnancy is a social and medical problem. Regional and national policies need to be developed for the early identification of pregnant women in the discussed age group, which would significantly reduce complications during pregnancy. In Bulgaria, there is a deepening demographic crisis in relation to teenage pregnancy specifically in terms of numbers of birth attributed to teenage and adolescent mothers, related comorbidities, mechanism of birth, duration of birth periods, and anthropometric details of the newborns. The findings indicate significant adverse outcomes that are directly linked to teenage pregnancies including higher rates of anemia and operative interventions. Also, it is reported that there are significant differences in the mode of birth delivery between teenagers and the participants who were above the teenage years, and that teenage pregnancy can also lead to long-term well-being challenges such as increased rates of maternal postpartum depression, infant emotional syndrome, maternal malnutrition, inadequate prenatal care, and toxic maternal habits.

## References:


1. M. De La Calle et al., “Younger age in adolescent pregnancies is associated with higher risk of adverse outcomes,” IJERPH, vol. 18, no. 16, p. 8514, Aug. 2021, doi: 10.3390/ijerph18168514.
2. M. Cense and R. Ruard Ganzevoort, “The storyscapes of teenage pregnancy. On morality, embodiment, and narrative agency,” Journal of Youth Studies, vol. 22, no. 4, pp. 568–583, Apr. 2019, doi: 10.1080/13676261.2018.1526373.
3. K. Part et al., “Teenage pregnancies in the European Union in the context of legislation and youth sexual and reproductive health services,” Acta Obstet Gynecol Scand, vol. 92, no. 12, pp. 1395–1406, Dec. 2013, doi: 10.1111/aogs.12253.
4. A. Ursache et al., “Epidemiology of Adverse Outcomes in Teenage Pregnancy—A Northeastern Romanian Tertiary Referral Center,” IJERPH, vol. 20, no. 2, p. 1226, Jan. 2023, doi: 10.3390/ijerph20021226.
5. A. K. K. Bennetsen et al., “Factors associated with teenage pregnancy in the Scandinavian countries,” Scand J Public Health, vol. 52, no. 5, pp. 616–623, Jul. 2024, doi: 10.1177/14034948231172819.
6. S. Amjad et al., “Social determinants of health and adverse maternal and birth outcomes in adolescent pregnancies: A systematic review and meta-analysis,” Paediatric Perinatal Epid, vol. 33, no. 1, pp. 88–99, Jan. 2019, doi: 10.1111/ppe.12529.
7. S. P. W. Wong, J. Twynstra, J. A. Gilliland, J. L. Cook, and J. A. Seabrook,

"Risk Factors and Birth Outcomes Associated with Teenage Pregnancy: A Canadian Sample," Journal of Pediatric and Adolescent Gynecology, vol. 33, no. 2, pp. 153–159, Apr. 2020, doi: 10.1016/j.jpag.2019.10.006.

8. E. Hristova-Atanasova, G. Iskrov, R. Raycheva, V. Mandova, and R. Stefanov, "Preconception-Health-Related Attitudes of Bulgarian Women of Reproductive Age," Healthcare, vol. 11, no. 7, p. 989, Mar. 2023, doi: 10.3390/healthcare11070989.
9. J. Diabelková, K. Rimárová, E. Dorko, P. Urdzík, A. Houžvičková, and Ľ. Argalášová, "Adolescent Pregnancy Outcomes and Risk Factors," IJERPH, vol. 20, no. 5, p. 4113, Feb. 2023, doi: 10.3390/ijerph20054113.
10. Chrissie Yu (2025). "Caesarean Rates Statistics UK and Global." Retrieved from Chrissie Yu.
11. Amyx M, Philibert M, Farr A, Donati S, Smárason AK, Tica V, Velebil P, Alexander S, Durox M, Elorriaga MF, Heller G, Kyprianou T, Mierzejewska E, Verdenik I, Zīle-Velika I, Zeitlin J; Euro-Peristat Research Group. Trends in caesarean section rates in Europe from 2015 to 2019 using Robson's Ten Group Classification System: A Euro-Peristat study. BJOG. 2024 Mar;131(4):444-454. doi: 10.1111/1471-0528.17670. Epub 2023 Oct 1. PMID: 37779035.
12. M. Kamburova, S. Georgieva, D. Tsanova, and E. Stoyanova, "Roma origin as a factor for high level of adolescent fertility and abortion rate in European Union," European Journal of Public Health, vol. 29, no. Supplement_4, p. ckz186.660, Nov. 2019, doi: 10.1093/eurpub/ckz186.660.
13. M. E. Dillon and A. L. Cherry, "An International Perspective on Adolescent Pregnancy," in International Handbook of Adolescent Pregnancy, A. L. Cherry and M. E. Dillon, Eds., Boston, MA: Springer US, 2014, pp. 1–38. doi: 10.1007/978-1-4899-8026-7_1.
14. S. Youseflu et al., "What Are the Maternal and Neonatal Outcomes of Adolescent Pregnancy in Women Referring to Ayatollah Mousavi Hospital in Zanjan? A Comparative Cross-sectional Study," PCNM, vol. 9, no. 3, pp. 27–34, Nov. 2019, doi: 10.52547/pcnm.9.3.27.
15. H. Thavarajah, C. Flatley, and S. Kumar, "The relationship between the five minute Apgar score, mode of birth and neonatal outcomes," The Journal of Maternal-Fetal & Neonatal Medicine, vol. 31, no. 10, pp. 1335–1341, May 2018, doi: 10.1080/14767058.2017.1315666.
16. M. Rexhepi, F. Besimi, N. Rufati, A. Alili, S. Bajrami, and H. Ismaili, "Hospital-Based Study of Maternal, Perinatal and Neonatal Outcomes in Adolescent Pregnancy Compared to Adult Women Pregnancy," Open Access Maced J Med Sci, vol. 7, no. 5, pp. 760–766, Mar. 2019, doi: 10.3889/oamjms.2019.210.
17. V. Karataşlı, A. G. Kanmaz, A. H. İnan, A. Budak, and E. Beyan, "Maternal and neonatal outcomes of adolescent pregnancy," Journal of Gynecology Obstetrics and Human Reproduction, vol. 48, no. 5, pp. 347–350, May 2019, doi: 10.1016/j.jogoh.2019.02.011.
18. C. L. Harrison et al., "Weight management across preconception, pregnancy, and postpartum: A systematic review and quality appraisal of international clinical practice guidelines," Obesity Reviews, vol. 22, no. 10, p. e13310, Oct. 2021, doi: 10.1111/obr.13310.
19. R. Bayrami, A. Didarloo, and A. Asadinejad, "Predictors of preconception care behaviour among women of reproductive age using a behaviour-change model," Proceedings of Singapore Healthcare, vol. 30, no. 2, pp. 125–130, Jun. 2021, doi: 10.1177/2010105820958727.
20. S. Lim, B. Hill, H. J. Teede, L. J. Moran, and S. O'Reilly, "An evaluation of the impact of lifestyle interventions on body weight in postpartum women: A systematic review and meta-analysis," Obesity Reviews, vol. 21, no. 4, p. e12990, Apr. 2020, doi: 10.1111/obr.12990.
21. N. N. Khan, J. A. Boyle, A. Y. Lang, and C. L. Harrison, "Preconception Health Attitudes and Behaviours of Women: A Qualitative Investigation," Nutrients, vol. 11, no. 7, p. 1490, Jun. 2019, doi: 10.3390/nu11071490.

22. E. Koytcheva and D. Philipov, “Bulgaria: Ethnic differentials in rapidly declining fertility,” DemRes, vol. 19, pp. 361–402, Jul. 2008, doi: 10.4054/DemRes.2008.19.13.
23. R. Dimitrova, A. Chasiotis, M. Bender, and F. Van De Vijver, “Collective identity and wellbeing of Roma minority adolescents in Bulgaria,” Int J Psychol, vol. 48, no. 4, pp. 502–513, Aug. 2013, doi: 10.1080/00207594.2012.682064.