



Editorial

Pregnancy in adolescence: It is time to get ready for generations Z and Alpha



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1. Introduction

Pregnancy in adolescents is a significant public health challenge. The adolescent birth rate has fallen due to improvements in public health. However, teenage pregnancy is still a major issue in many parts of the world, both developed and developing countries. Pregnancy in adolescence has broad health, economic and social consequences. Nevertheless, different communities vary in terms of both predictors and outcomes of teenage pregnancy. However, in general, those communities with lower levels of education or unsustainable economic status tend to have higher rates of teenage pregnancy.¹

Adolescent pregnancy is a pregnancy in a female at or below 19. Teenage pregnancy, by definition, occurs between 13 and 19. However, these are used interchangeably. However, the *MeSH Heading* “pregnancy in adolescence” is more favored.

Annually, 21 million girls between the ages of 15 and 19 in developing regions become pregnant, and about 12 million deliver.² Statistics on births for females between 10 and 14 are only sometimes reported.³ The universal adolescent birth rate, which was 64.5 births per 1,000 females in 2000, has decreased to 42.5 births per 1,000 females in 2021. Nevertheless, the rate of change was uneven around the world. Some areas like South Asia experienced steeper decreases, while areas like the regions of South America and the Caribbean, and Sub-Saharan Africa, while geographically not connected, observed slower decrease rates. Despite the decline in all regions, Sub-Saharan Africa, South America, and the Caribbean regions still have the highest rates at 101 and 53.2 births per thousand women.⁴ Despite the decrease in the global adolescent birth rate, the current number of teenage births remains high. In 2021, Sub-Saharan Africa had the most births to 15–19-year-olds (6,114,000), while Central Asia had far fewer (68,000). In the same year, the corresponding figure for girls aged between 10 and 14 was 332,000 in Sub-Saharan Africa and 22,000 in Southeast Asia.⁴

Adolescent fatherhood rates are not collected or reported

unfortunately.⁵ Furthermore, progress in reducing teenage first births has been slower, which consequently increases inequity. On the other side, child marriage and child sexual abuse increase girls' risk of pregnancy, often unplanned and undesired. Sometimes, barriers to access and utilization of contraceptive methods prevent girls below twenty from avoiding unwanted pregnancies. However, thanks to decades of successful campaigns and initiatives, there is awareness of providing quality maternal care for pregnant and parenting teenage girls. World Health Organization has extensively prioritized advocating for attention to adolescent pregnancy, providing evidence for action, developing policy and appropriate programs and tools, increasing capacity, and assisting countries to address teenage pregnancy accordingly.¹

2. Outcomes of pregnancy in adolescence

Although for some abortion is an option; however, the majority of pregnant adolescent women decide to keep the pregnancy.⁶ On the other side, if deliver, life for an adolescent mother and her baby can be burdensome. Compared to other adolescents, adolescent mothers are more likely to abandon school due to childcare. In addition, with lower education, an adolescent mother may not be acquainted with the necessary skills for work, and thus sustaining a secured source of income might be challenging.⁷

The government, society, or their families might need to support the financial needs of adolescent mothers with children. The above factors may lead teenage mothers more likely to struggle financially. Adolescent pregnancy is a double challenge for teenagers because it adds another layer of complexity to a physically and emotionally demanding time. Due to economic, personal, and societal issues such as financial pressure and social stigma of adolescent mothers and linking it to promiscuity, or no partner, family, and community support, a teenage mother might also struggle with serious mental health issues such as stress and anxiety, depression, panic attacks, or suicidal thoughts. In addition, loneliness,

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guilt, despair, lower self-esteem, poor nutrition, delayed access to prenatal care, loss of interest in pursuing education, limited career opportunities, and lack of a support system are among the everyday struggles of an adolescent mother.^{7,8}

2.1. Misdiagnosis of Pregnancy

It is essential that pregnancy diagnosis in an adolescent not be missed because many adolescents seek care primarily at pediatric or family physician offices. Furthermore, early detection and early referral of pregnant adolescents help reduce maternal and perinatal risks.⁹

Some adolescent pregnancies may present with vague symptoms. However, others may present with more classic symptoms such as the absence of period, nausea, vomiting, increase in weight, breast tenderness, fatigue, abdominal pain, urinary symptoms, lightheadedness, or general malaise.¹⁰ It is noteworthy that an adolescent girl's menstrual cycle is often irregular and can make it burdensome to assess menstruation. Many teenagers underestimate the risks of pregnancy, even following unprotected intercourse with a male partner. As a matter of fact, many teenagers delay receiving perinatal care, as denial of pregnancy symptoms plays a major role here.¹⁰

Teenage mothers are more likely to receive late or no prenatal care. In 2003, 9.1% of teens aged 15–16 and 15.8% of those aged between 10 and 14 had either no prenatal care or had received it only in the last trimester of pregnancy. In the adolescent population, it is generally advisable to frequently assess the possibility of a pregnancy.¹¹

2.2. Perinatal and neonatal outcomes

Most adolescent pregnancies are unplanned pregnancies. Adolescent pregnancies have been associated with several adverse perinatal outcomes, especially miscarriages, anemia, preeclampsia, premature rupture of membranes, preterm birth, low birth weight neonates, stillbirth, and intrapartum deaths.^{12–14} The following are some of the perinatal and neonatal outcomes.

2.2.1. Anemia in teenage pregnancy

According to the WHO, anemia is decreased oxygen-carrying capacity of hemoglobin in the red blood cells. During pregnancy, mild anemia is defined as Hemoglobin levels between 11 and 10 g/dl, while moderate anemia is between 7 and 9.99 g/dl, and severe anemia as Hemoglobin levels below 7 g/dl.^{15,16} Because the need for iron is more significant during specific periods of fetal rapid growth, pregnant adolescents tend to be more iron deficient. This can lead to anemia, which can harm both fetuses and adolescent mothers physically and cognitively.¹⁷

About 9 to 16 percent of female adolescents suffer from Iron deficiency in the United States, which makes it the most common nutritional deficiency in this age group. Iron deficiency is the primary cause of anemia outside of pregnancy in about 3 percent of females between 12 and 21 years old.¹⁸ According to Young et al.'s study, 29% of expectant adolescent mothers at-birth and 19% of the same group had iron deficiency anemia.¹⁹

2.2.2. Preeclampsia in teenage pregnancy

Preeclampsia is a hypertensive disorder in pregnancy characterized by increasing hypertension and proteinuria. Preeclampsia may adversely impact multiple organs and has sudden-onset severe negative consequences for both mother and fetus. It occurs more often in young mothers, especially primigravids.^{20,21} It is postulated that as expectant teenage mothers are more likely to have underdeveloped uteruses and irregular menstrual cycles, preeclampsia is more common in adolescent pregnancy. These conditions may affect decidualization, spiral artery remodeling, and deep placentation.²⁰

The delivery of the baby is the only effective treatment for preeclampsia. In cases of adolescent pregnancies with preeclampsia before 37 weeks of gestation, fetal prematurity can be a severe problem.

Therefore, multi-disciplinary systems of care are needed to avoid complications of preeclampsia in adolescent pregnancy.²²

2.2.3. Premature rupture of membranes

If the gestational membranes rupture before 37 weeks of pregnancy, it is called premature rupture of membrane.²³ According to the results of a study, teenage girls are more likely to develop premature rupture of membranes and premature rupture of membranes.²⁴

Diagnosis of a ruptured membrane is through direct visual inspection, detection of leaking amniotic fluid, the nitrazine test, crystallography, and ultrasonography. Premature rupture of membranes can be treated with maternal antibiotics, corticosteroids dosed according to the gestational age, magnesium sulfate, tocolytic drugs, and appropriate time and route of delivery.²⁵

2.2.4. Sexually transmitted diseases

HIV, Hepatitis B, HPV, HSV, chlamydia, gonorrhea, trichomoniasis, and syphilis infections are among the sexually transmitted diseases that may be seen among adolescent expectant mothers and sexually active teenagers. In addition, vertical transmission of some STDs can cause fetal injury.^{26,27} In case of insufficient sex education, adolescents are significantly more susceptible to sexually transmitted diseases. Other factors facilitating the spread of diseases include drugs, promiscuity, socioeconomic inequality, and lack of family support among adolescents.²⁷

2.2.5. Preterm birth

A major study by the World Health Organization revealed that the rate of preterm birth rose significantly for teenage pregnancies, from 11.2 percent of females under age 15 to 7.7 percent for girls aged 18–19. Interestingly, the rate of preterm birth was reported to be 7 percent in females aged 20–24.²⁸ The number of preterm deliveries in females younger than 14 years old was 21.3 percent in the United States in 2000–2002. However, the corresponding figure for females aged 20–39 was between 9.2 and 10.7%. Rates of very preterm births (earlier than 32 weeks) were about two times higher in females below 14 years compared to those over 18.²⁹

Some risk factors for preterm births in adolescents include shorter length of the cervix, increased incidence of the urinary tract and lower genital infections, and developing uterus.^{30–32} Another study revealed that women who became pregnant within two years after their menarche were at an increased risk of preterm birth and having small for gestational age babies.³³ A similar study found that the risk of preterm labor for those pregnant within the first two years of their menarche was 21.2 percent, while for adult expectant mothers, only 12.6 percent. The risk of preterm delivery was 12.8 percent and 6.3 percent in these groups of women, respectively.³⁴

2.2.6. Small for gestational age and low birth weight

Low birth weight (less than 2500 g) has also been associated with adolescent pregnancy.^{33,35} Many researchers have estimated the risk of low birth weight babies for pregnancies in adolescence as high as 1.5 to 2 times higher than adult females.^{28,29} For instance, one study revealed that the incidence of low birth weight for mothers less than 14 years was 12.6 percent, while the overall incidence was 6.1 percent.²⁹

Numerous studies have been conducted to suggest potential causes for why teenage mothers may be more likely to give birth to low birth weight babies.³⁶ Short birth intervals, which increase the risk of growth restriction and preterm delivery, were observed in adolescent mothers with multiple conceptions.^{36,37} In their review study, Stevens-Simon et al. highlighted the factors of maternal growth during adolescence that may have a detrimental impact on placentation and fetal growth restriction.³²

2.2.7. Neonatal outcomes

The highest infant mortality rate (15.4 per 1,000 live births) is found in pregnancies related to women who are 10–14 years old. Nevertheless,

compared to girls aged 10–14 years (13.0 per 1,000), women aged 45 to 54 have higher perinatal mortality rates (16.2 per 1,000). Perinatal mortality is defined as late fetal and early neonatal deaths.²⁹

In comparison to all other age groups, girls between 10 and 14 years had the most significant rates of early neonatal (8.9 per 1,000), late neonatal (1.5 per 1,000), and post-neonatal (5.0 per 1,000) deaths, defined as 7 days, 7–27 days, and 28 days–1 year after birth, respectively.²⁹ Girls between 10 and 14 experience newborn deaths at a rate of twice as high (8.9 per 1,000) compared to girls between 15 and 19 years old (4.1 per 1,000). Low birth weight is the primary cause of neonatal mortality among those aged 15 to 19 (22% of all cases of neonatal mortality).²⁹

2.3. Mode of delivery

Numerous studies have assessed how maternal age affects the mode of delivery. While the results vary, adolescents tend to have greater rates of spontaneous vaginal birth and lower rates of cesarean and operative vaginal deliveries overall.³⁸

The highest disparities were observed in the youngest adolescents, with an aOR of 0.26 for patients younger than 16 years, according to Katz Eriksen, who also noted that adolescents were much less likely than adults to undergo cesarean delivery for failure to progress.³⁹

2.4. Postpartum hemorrhage

Adolescent females are reported to have greater rates of postpartum hemorrhage, despite the lower rates and risk factors for cesarean deliveries.³⁸ Compared to adults, Kawakita et al.'s Consortium for Safe Labor retrospective cohort research reported an aOR of 1.46 in females under 16. The same research reported no difference for those aged 16 to 20.⁴⁰ On the other side, the Maternal Newborn Health Registry study by Althabe and the WHO multi-country study by Ganchimeg et al. did not find any differences in postpartum hemorrhage, either overall or in severe hemorrhage. The Maternal Newborn Health Registry study by Althabe's Global Network found no statistically significant differences in overall or severe postpartum hemorrhages.^{28,41}

2.5. Maternal mortality

Nove et al.'s 2014 investigation was the largest recent study to assess maternal mortality among teenage women. The risk of mortality among teenagers was discovered to be slightly higher than in females between 20 and 24 years old (maternal mortality ratio for adolescents: 260 maternal deaths per 100,000 live births [uncertainty: 100–410], maternal mortality ratio for females between 20 and 24 years old: 190 maternal deaths per 100,000 live births [uncertainty 120–260]).

According to this study, after analysis of national registries and data from 144 countries, both groups showed lower maternal mortality compared to females above 30.⁴²

2.6. Postnatal care

2.6.1. Breastfeeding

WHO advises mothers to breastfeed their infants for at least the first six months of life due to the infant's health, developmental, and psychosocial advantages, based on evidence collected from various studies. Adolescent women, however, tend to stop exclusively breastfeeding earlier than older mothers. This needs more consideration, as mothers also get advantages from breastfeeding. Cost-effectively, it may lead to longer intervals between pregnancies and promote mother-infant bonding.⁴³

Sipsma et al. investigated 225 females between 14 and 21 years old in a cohort study from early pregnancy up to 6 months after delivery. According to this study, adolescents who started breastfeeding tend to have planned for it, to have partners who supported their decision, and to have

experienced complications during labor and delivery. This study also revealed that most adolescent mothers discontinued breastfeeding before six months, with an average breastfeeding period of fewer than six weeks.⁴⁴

Adolescent mothers (aged at or below 19 years) were found to breastfeed less than older mothers (aged >20 years) in Ohio, according to a retrospective population-based cohort research study.⁴⁵

The most significant predictors of failure to initiate breastfeeding were social support and socioeconomic stability parameters. In addition, lower rates were linked to being single and having governmental insurance as the primary insurance. Nevertheless, teenage mothers who gave birth prematurely had even lower breastfeeding initiation rates. However, premature babies may benefit most from breastfeeding. Interventions that aim to start breastfeeding should focus on the adolescent mother as well as her support network. Future initiatives ought to evaluate the intricate relationships between adolescents and their care and support networks.⁴⁵

2.6.2. Depression

Every woman receiving postpartum care should receive a routine depression assessment. Given that adolescent mothers are substantially more likely than adult postpartum women to experience postpartum depression, it is crucial in the care of adolescent mothers. The mother's postpartum depression has an impact on her developing child as well. For example, Huang et al. observed that higher levels of maternal depression are associated with larger developmental delays in babies at 18 months of age. In addition, adolescent mothers had less social support and more parenting stress, both associated with a higher risk of depression at postpartum.⁴⁶

2.6.3. Rapid repeat pregnancy in adolescence

Preterm deliveries, newborns with low birth weights, and small for their gestational age babies may be reduced by allowing spacing and enough time between pregnancies.⁴⁷

Rapid repeat births, defined as pregnancies within two years of prior pregnancy, may present even more enormous obstacles to adolescent women than women past adolescence. Moreover, it becomes more challenging to continue education, find an appropriate job, and secure income for a teenager with more than one baby.⁴⁷ A rapid repeat pregnancy occurs in almost 35% of recently pregnant teenagers; about 65% of them were unplanned.⁴⁸

According to one study, adolescent mothers should receive individualized non-coercive counseling on contraceptive methods and birth spacing. This study suggests that counseling should start in the prenatal stage and provide adequate contraceptive methods to adolescents immediately after delivery or termination of pregnancy and before leaving the hospital.⁴⁸

2.6.4. Adolescent trauma

Considering the Underlying personal, family, and Socioeconomic status of the adolescent, Fasula et al. discovered that adolescent mothers are more likely to have a teen parent or no parent, live in a dysfunctional family environment, have issues such as substance abuse, have experienced childhood trauma, or have become pregnant due to sexual abuse.⁴⁹ The care providers need to understand the background in these cases and, in order to prevent a rapid repeat pregnancy in adolescence, involve multi-disciplinary care networks.

2.7. Long-term outcomes

Pregnancy in adolescence may lead to negative socioeconomic outcomes and health inequities to both that a mother and her child will experience throughout their lives.⁵⁰ Adolescent mothers are at a greater risk of having less educational achievement, fewer job options, inadequate social support, lower mental health, and higher rates of illicit drug abuse as compared to women who become pregnant during

adulthood.^{51–53}

A substantial number of studies demonstrate a link between adolescent parenthood and higher levels of maternal anxiety and depression. Moreover, these elements may have a negative effect on both mother and the baby, as they might unfavorably affect a parent's parenting skills and influence the behavior of their offspring.^{53–55}

3. Economic challenges for mother, baby, and society

Economic difficulties may both be a predictor and also an outcome in adolescent pregnancies. According to a study, pregnancies among adolescents are more likely to be a consequence of struggling economic circumstances and also may have negative effects on both the babies and their teenage parents.⁵⁶

Moreover, parenting during adolescence frequently causes barriers to both educational and employment chances.^{42,56} Tragically, pregnancy in adolescence reinforces the cycle of poverty and has a substantial negative influence on maternal and infant health and rates of mortality.¹

To a greater extent, Adolescent births may have a major impact on the economy on a national level and public health. For example, 12 billion dollars were saved in the United States due to the decline in adolescent birthrate between 1994 and 2010.⁵⁷

3.1. Health and mental health

As discussed earlier, adolescent mothers experience a number of negative health effects, including a higher risk of death, in addition to economic inequality.^{1,42} Studies have linked pregnancy among adolescents to a number of long-term conditions, including anemia, smoking, illicit drug abuse, including marijuana, insufficient weight gain, and STDs.^{5,57}

Pregnancy in teenagers may happen due to sexual abuse or repeated rape incidents. Substance abuse is also more common among teenage mothers compared to other teenagers. Smoking, which might be related to underlying depression, is also among the behavioral patterns of some adolescent mothers. Unfortunately, some teenagers may experience physical abuse. Depression and partner-related issues are also more prevalent among teenage mothers compared to other teenagers, as a recent systematic review reveals.⁵⁸

3.2. Negative parenting

Adolescent mothers not only have more difficulty practicing successful parenting behaviors, but Smith, Chiappone, & Wilson also discovered that many of these mothers had unfavorable parenting habits.⁵⁹

It is well established that unfavorable parenting styles are associated with increased rates of childhood trauma and unfavorable academic outcomes for babies. An increasing body of research also shows that teenagers with bad relationships with their parents tend to engage in risky behaviors, such as sexual intercourse, and are consequently more likely to become teen parents themselves.⁶⁰

When engaging with a teen parent, parent education and dyadic work are crucial since negative parenting practices can both anticipate and result from teen parenting.⁵⁷

4. Prevention models for pregnancy in adolescence

To develop national and state policy, it is critical to assess the impact of evidence-based initiatives for preventing pregnancies among adolescents. To address the issue of teenage pregnancy, many strategies have been created over several decades. However, these three approaches—clinic-based interventions, school-based interventions, and school-linked interventions (i.e., community programs)—are the most successful teen programs that utilize evidence-based methodologies.

Interactive appointments, individualized counseling, state-of-the-art

educational programs, respect for confidentiality and privacy, available contraceptives, free or low-cost providers, referrals, and active follow-ups are all characteristics that these programs need to aim for.⁶¹

From another perspective, various strategies are employed in evidence-based initiatives. Some centers only encourage sexual abstinence while avoiding talking about contraception. On the other hand, comprehensive initiatives prioritize educating adolescents about safe and high-risk sexual interactions, contraceptive methods, and healthy relationships. Finally, multi-component programs focus on sexual abstinence as one strategy, while at the same time, they deliver information on contraceptive methods.⁶¹

Regardless of the various approaches, it is always advised to enhance the educational programs' content, quality, and sustainability in order to facilitate communication with the audience of “teen pregnancy.” Health Policymakers also need to actively involve Generation Z and Alpha in the process of policy-making, including initiatives, programs, and clinical services. In order to maintain proper communication with the forthcoming generations, technology needs to be utilized thoughtfully to increase health literacy, devalue false beliefs and misconceptions, and advocate for the most up-to-date health content. In addition, it is crucial to bear in mind that facilitating access to clinical services through telehealth services and similar delivery alternatives provides access to more remote areas and is a part of everyday life in urban atmospheres. Finally, recognizing and addressing structural racism, xenophobia, exclusivity, and incorporating health equity and inclusivity is the cornerstone of every program and initiative.

Conflict of interest

None.

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