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Original Article

Epidemiology of Adolescent Pregnancy: Health Impacts and Interventions

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ABSTRACT

Background: Adolescent pregnancy remains a public health concern with consequences for adolescent mothers and their infants. This review aimed to identify the factors associated with adolescent pregnancy, its health impacts, and the interventions available for its prevention and for the support of pregnant adolescents.

Methods: This systematic literature review was reported according to the PRISMA guidelines. PubMed, ScienceDirect, Google Scholar, SINTA, Garuda, and ResearchGate were searched for English- and Indonesian-language studies published between 2016 and 2025. Study quality was appraised using the Joanna Briggs Institute checklists, and the findings were synthesized narratively.

Results: Thirty-six studies from 17 countries and several multicountry analyses were included. Early marriage, early sexual initiation, poverty, low educational attainment, limited reproductive health knowledge, low contraceptive use, peer influence, sexual violence, and limited parent–adolescent communication were associated with adolescent pregnancy; marriage before the age of 15 years showed the strongest association (AOR = 30.1). Adolescent pregnancy was associated with inadequate prenatal care, preterm delivery, low birth weight, higher child mortality, child undernutrition, school dropout, family rejection, domestic violence, and psychological distress. Reproductive health education and community-based interventions improved adolescents' knowledge, and midwife-led psychoeducation reduced anxiety, stress, and depression among pregnant adolescents; however, none of the included intervention studies measured pregnancy occurrence as an outcome.

Conclusions: Adolescent pregnancy results from interconnected individual, family, social, and structural factors and adversely affects maternal, neonatal, psychological, and social outcomes. Prevention requires comprehensive reproductive health education, supportive families and communities, and accessible adolescent-friendly services. Future intervention studies should measure pregnancy outcomes directly rather than relying on changes in knowledge.

Keywords: *adolescent pregnancy, health impacts, interventions, risk factors, systematic review*

INTRODUCTION

The World Health Organization (WHO) defines adolescence as the period between 10 and 19 years of age; adolescent pregnancy therefore refers to pregnancy occurring in this age group. Adolescent pregnancy remains an important public health concern worldwide, particularly in low- and middle-income countries. In Indonesia, child marriage remains common and is closely linked to early childbearing, underscoring the need to strengthen adolescent reproductive health education and access to appropriate services[1, 2].

Adolescent pregnancy is a reproductive health problem with multiple determinants. Individual factors include educational level, reproductive health knowledge, risky sexual behavior, and contraceptive use[3–5]. Interpersonal factors include a history of violence or sexual abuse, lack of social support, peer influence, and early marriage[3, 6, 7]. Environmental factors, such as family socioeconomic conditions, place of residence, and the accessibility and quality of reproductive health services, also shape the risk of adolescent pregnancy[8–11].

Adolescent pregnancy has physical, psychological, and social consequences. The psychological condition of pregnant adolescents is influenced by unplanned pregnancy, early marriage, and limited reproductive health knowledge, particularly in developing countries[12]. Pregnant adolescents in developing countries are also at greater risk of adverse psychological outcomes than their peers in developed countries[13].

The Sustainable Development Goals (SDGs) include

targets to reduce the global maternal mortality ratio to less than 70 per 100,000 live births, to ensure universal access to sexual and reproductive health services and quality education, and to eliminate harmful practices such as child marriage[14, 15].

Although many factors contributing to adolescent pregnancy have been identified, its incidence remains high, and its physical, psychological, and social consequences persist, indicating that existing prevention efforts have not been fully effective. Previous reviews have generally examined determinants, complications, or psychological impacts separately[3, 12], whereas programme planning requires an integrated view that links these domains with the available interventions. Therefore, this review aimed to synthesize evidence on the factors associated with adolescent pregnancy; its maternal, neonatal, psychological, and social impacts; and the interventions that can be implemented to prevent adolescent pregnancy and support pregnant adolescents.

METHODS

Study design and search strategy

This study was a systematic literature review reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Literature searches were conducted in Google Scholar, ScienceDirect, PubMed, SINTA, Garuda, and ResearchGate using the keywords “adolescent pregnancy”, “determinants of teenage pregnancy”, “risk factors of adolescent pregnancy”, and “adolescent pregnancy prevention”. To ensure a comprehensive search, screening was not limited to the first pages of results; all indexed records that matched the search strings were screened against the eligibility criteria.

Eligibility criteria

Eligible articles were published between 2016 and 2025 in national or international journals, were written in English or Indonesian, and were available in full text. The inclusion and exclusion criteria were structured using the PICOS framework (Table 1).

Study selection and quality appraisal

Records were first screened to remove duplicates, articles without accessible full text, and titles unrelated to the research topic. Titles and abstracts that met the initial screening criteria were then reviewed independently by two team members. Disagreements about article eligibility or data extraction were resolved through discussion and consensus with a third, senior team member. The methodological quality and risk of bias of the selected studies were evaluated using the Joanna Briggs Institute (JBI) critical appraisal checklist appropriate to each study design, and studies that met the quality standards were retained for data extraction. The selection process is presented in Figure 1.

Data extraction and synthesis

The research team jointly extracted the research objectives, design, findings, and conclusions of each included study into a standardized table (Table 2). Because the included studies differed in design, population, and outcome measures, the findings were synthesized narratively under three themes: determinants of adolescent pregnancy, its health impacts, and interventions for prevention and support. This synthesis served as the basis for a conceptual framework of the determinants of adolescent pregnancy and strategies for its prevention.

Table 1. Eligibility criteria based on the PICOS framework

Criteria	Inclusion	Exclusion
Population	Adolescents, particularly adolescent girls or pregnant adolescents, in relation to adolescent pregnancy	Studies not related to adolescent pregnancy or to pregnancy among adolescents
Intervention/exposure	Risk factors, health impacts, or interventions related to adolescent pregnancy, including reproductive health education, family or community involvement, and access to contraception or reproductive health services	Studies not addressing factors, impacts, or interventions for the prevention or management of adolescent pregnancy
Comparison	Comparison groups related to the factors, outcomes, or interventions of interest, where applicable	Comparisons unrelated to adolescent pregnancy, its risk factors, health impacts, or prevention
Outcome	Epidemiology, risk factors, maternal and neonatal health impacts, psychological and social impacts, or interventions related to adolescent pregnancy	No findings relevant to the epidemiology, risk factors, health impacts, or prevention of adolescent pregnancy
Study design	Original research articles with clearly reported findings	Duplicate articles, articles unrelated to the research topic, and articles without clear outcome data
Publication year	2016–2025	Published before 2016 or after 2025
Language	English or Indonesian	Other languages

Criteria	Inclusion	Exclusion
Full-text availability	Full text available for review and data extraction	Full text not accessible

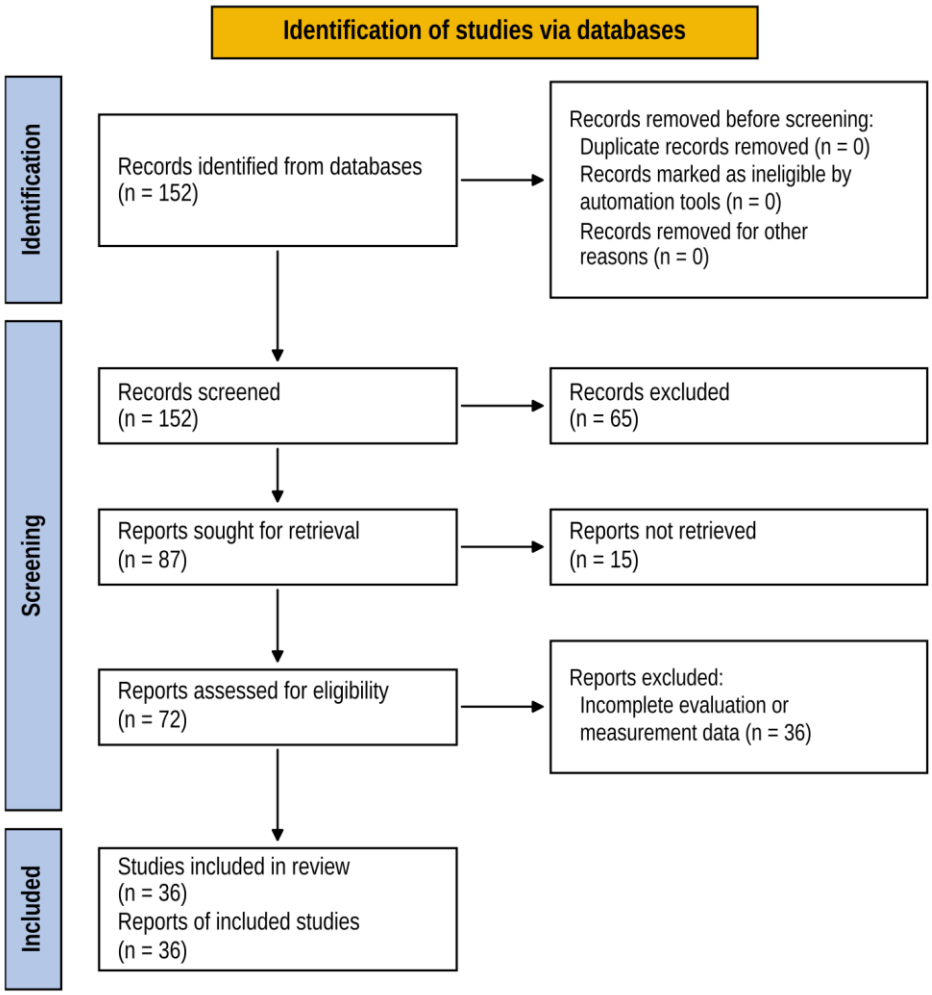

Figure 1. PRISMA flow diagram of the literature search and study selection process

RESULTS

Characteristics of the included studies

A total of 36 studies published between 2017 and 2025 were included[16–51]; their characteristics and main findings are summarized in Table 2. The studies were conducted in 17 countries, namely Kenya, Ethiopia, India, Uganda, Rwanda, Tanzania, Bangladesh, Malawi, Indonesia, The Gambia, Sierra Leone, the United States, Ecuador, Iran, Romania, Brazil, and Ghana, together with several multicountry analyses covering sub-Saharan Africa, East Africa, 46 low- and middle-income countries, and 106 countries[25, 32, 33, 40, 49]. The study designs included cross-sectional, cohort, case-control, qualitative, randomized controlled, quasi-experimental, and mixed-methods studies. Participants were mainly adolescent girls and young women aged 13–24 years[16, 17, 34, 40].

Determinants of adolescent pregnancy

The most frequently reported determinants were early marriage, early sexual initiation, poverty, low educational attainment, limited reproductive health knowledge, inadequate contraceptive use, peer influence, and lack of parental support[18, 20, 22, 25, 29, 30, 33]. Marriage before the age of 15 years (AOR = 30.1; 95% CI: 16.8–53.9) and sexual initiation before the age of 15 years (AOR = 7.9; 95% CI: 4.6–13.8) were most strongly associated with adolescent pregnancy[18]. In Sierra Leone, married adolescents had markedly higher odds of pregnancy than unmarried adolescents (aOR = 15.31; 95% CI: 11.17–20.98)[39]. Other reported factors included rural residence, non-use of contraceptives, and lack of parental discussion about reproductive health[34], as well as sexual violence and alcohol use[22, 27, 36]. The reported prevalence of adolescent pregnancy ranged from 12.8% among Ethiopian adolescents aged 15–19 years[17, 21] to 21.8–22.1% in Burji

District, Ethiopia, and Sierra Leone[34, 39].

Health impacts of adolescent pregnancy

Adolescent pregnancy was associated with inadequate prenatal care, preterm delivery, and low birth weight; adolescents aged ≤15 years had higher odds of preterm delivery (OR = 1.84) and low birth weight (OR = 1.75) than older mothers[46]. Children of adolescent mothers faced higher mortality[40] and a high burden of undernutrition, with stunting, wasting, and underweight prevalences of 32%, 31%, and 27%, respectively[44]; poor maternal nutritional status among mothers aged ≤15 years was associated with small-for-gestational-age births[47]. Psychosocial impacts included school dropout, family rejection, domestic violence, anxiety, stress, and depression[16, 22, 24, 45].

Interventions for prevention and support

Reported interventions included reproductive health education, contraceptive access, parental involvement, and community collaboration. Educational sessions and focus group discussions significantly improved adolescents' knowledge of pregnancy prevention[26, 51], and community-based psychoeducation improved both adolescents' and parents' knowledge about preventing unwanted pregnancy[50]. Community stakeholders recommended sex education, parental supervision, and community engagement[20], whereas a policy analysis from Ecuador concluded that information-only strategies are insufficient without addressing poverty and gender-based violence[43]. Among pregnant adolescents, midwife-led psychoeducational life skills training reduced pregnancy-related anxiety, stress, and depression[24]. None of the included intervention studies measured the occurrence of pregnancy as an outcome.

Table 2. Characteristics and main findings of the included studies (n = 36)

No.	Study (setting)	Objective	Design and sample	Main findings
1	Zulaika et al., 2022; Kenya[16]	To measure the effects of the COVID-19 pandemic on adolescent pregnancy and school dropout among schoolgirls in Kenya	Cohort study	Girls exposed to COVID-19 containment measures had twice the risk of becoming pregnant before completing secondary school (aRR = 2.11; 95% CI: 1.13–3.95), three times the risk of school dropout (aRR = 3.03; 95% CI: 1.55–5.95), and 3.4 times the risk of school transfer before examinations (aRR = 3.39; 95% CI: 1.70–6.77) compared with pre-pandemic learners, after adjustment for age, household wealth, and orphanhood. They were also more likely to be sexually active (aRR = 1.28) and less likely to report their first sex as desired (aRR = 0.49).
2	Tigabu et al., 2021; Ethiopia[17]	To assess the spatial distribution and spatial determinants of teenage pregnancy in Ethiopia	Cross-sectional study with geographically weighted regression; 3,381 adolescents aged 15–19 years	The prevalence of adolescent pregnancy was 12.8% (95% CI: 11.73–13.95). Cases were spatially clustered (Global Moran's I = 0.45; $p < 0.001$), with high-risk areas in Afar, Harari, and Somali, where the risk in some clusters was 2–5.38 times higher than in other regions.
3	Birhanu et al., 2019; Ethiopia[18]	To identify individual- and community-level determinants of teenage pregnancy in Ethiopia	Cross-sectional study (multilevel analysis)	Of the respondents, 79.6% had experienced pregnancy during adolescence. Risk factors were sexual activity before the age of 15 years (AOR = 7.9; 95% CI: 4.6–13.8), marriage before the age of 15 years (AOR = 30.1; 95% CI: 16.8–53.9), rural residence (AOR = 2.2; 95% CI: 1.4–3.6), and residence in a community with low contraceptive use (AOR = 2.3; 95% CI: 1.5–3.5).

No.	Study (setting)	Objective	Design and sample	Main findings
4	Saikia et al., 2023; India[19]	To identify social and public health factors associated with teenage pregnancy in four aspirational districts of Assam	Comparative cross-sectional study	Adolescent mothers more often had education only up to grade 10 (86.9% vs 76.8%; $p < 0.001$) and came from large families (44.6% vs 37.6%; $p = 0.049$) than the comparison group. Elopement accounted for 38.4% of cases among adolescent mothers (vs 29.1%), and 43% of cases were attributed to tradition. Adolescent mothers also had lower knowledge of contraception.
5	Nabugoomu et al., 2020; Uganda[20]	To describe the perceptions and recommendations of young mothers, family members, and community members on the causes and reduction of teenage pregnancy in rural Uganda	Qualitative study	Teenage pregnancy was attributed to limited reproductive health knowledge, low contraceptive use, peer pressure, minimal parental supervision, poverty, cultural norms favoring early marriage or pregnancy, media influence, and lack of sex education.
6	Alemayehu et al., 2024; Ethiopia[21]	To assess the spatial variation and factors associated with teenage pregnancy in Ethiopia using nationally representative data	Cross-sectional study (spatial and multilevel analysis of EDHS 2019)	The prevalence among adolescents aged 15–19 years was 12.89% (95% CI: 11.56–14.36%). SaTScan identified a primary cluster in Gambella (LLR = 14.02; $p < 0.001$), with high prevalence in Somali, Afar, Gambella, and southern Oromia. Associated factors were age, primary-to-secondary education, Protestant religion, television ownership, knowledge of contraception, sex of the household head, and residence in smaller peripheral regions.
7	Nshutiyukuri et al., 2025; Rwanda[22]	To identify perceived factors contributing to teenage pregnancy and its perceived effects on the health of teenage girls	Cross-sectional study	Contributing factors were poverty (73%), lack of reproductive health knowledge (56%), relationships with boyfriends (44%), sexual violence or deception (39%), peer influence (34%), lack of reproductive health information (34%), and alcohol or drug use (30%). Consequences included school dropout (73.1%), perceiving early motherhood as a burden (77%), family rejection (80.5%), rejection by close persons (43.2%), and health risks during pregnancy (91.83%).
8	Ramachandran et al., 2024; Uganda[23]	To determine risk and protective factors for repeat adolescent pregnancy in Uganda	Cross-sectional study; 115 adolescents with a single pregnancy and 93 with a repeat pregnancy	Most participants had dropped out of school (92%) and had only primary education (67%). Age at sexual debut and at first pregnancy was lower among those with repeat pregnancies. Risky behavior (AOR = 3.0) and experience of violence (AOR = 4.67) increased the risk of repeat pregnancy, whereas being single, first pregnancy at ≥16 years, and a live birth were protective.

No.	Study (setting)	Objective	Design and sample	Main findings
9	Yousefi et al., 2025; Iran[24]	To assess the effect of midwife-led psychoeducational life skills training, incorporated into childbirth preparation classes, on anxiety, stress, depression, and social support in pregnant adolescents	Randomized controlled trial	Compared with the control group, the intervention group showed significant reductions in pregnancy-related anxiety, stress, and depression immediately after the intervention and at one month. Perceived social support increased in both groups, without a significant between-group difference.
10	Mekonen, 2024; sub-Saharan Africa[25]	To estimate the pooled prevalence and associated factors of teenage pregnancy among women aged 15–19 years in sub-Saharan Africa	Cross-sectional secondary analysis of Demographic and Health Survey data, 2019–2022	Teenage pregnancy was associated with low education (OR ≈ 1.8), low economic status (OR ≈ 1.6), and early marriage, which was the strongest factor (OR ≈ 3.5).
11	Shintya, 2025[26]	To increase adolescents' knowledge about pregnancy prevention through an educational intervention	Quasi-experimental study with pre- and post-test knowledge assessment	The intervention significantly increased adolescents' knowledge about pregnancy prevention (pre-test vs post-test, $p < 0.05$).
12	Kumma et al., 2023; Ethiopia[27]	To determine the prevalence of teenage pregnancy and associated factors among preparatory and high school students in Wolaita Sodo town	Institution-based cross-sectional study	Early sexual intercourse (OR ≈ 3.4), alcohol consumption (OR ≈ 2.1), and insufficient reproductive health knowledge (OR ≈ 2.5) were associated with teenage pregnancy.
13	Otika et al., 2024; Uganda[28]	To determine the prevalence of and factors associated with teenage pregnancy in refugee settlements of northern Uganda after COVID-19 (2020–2023)	Cross-sectional study	Early marriage (OR ≈ 3.2) and low educational attainment (OR ≈ 1.7) were associated with teenage pregnancy.
14	Stephano et al., 2025; Tanzania[29]	To analyze trends and predictors of teenage pregnancy in Tanzania from 2004 to 2022	Multilevel analysis of Demographic and Health Survey data, 2004–2022	Early marriage (OR ≈ 4.2) and low educational attainment (OR ≈ 1.8) were associated with teenage pregnancy; both individual- and community-level factors were relevant.
15	Alam et al., 2023; Bangladesh[30]	To compare the prevalence and determinants of adolescent childbearing between the 2014 and 2017–18 surveys	Cross-sectional comparative analysis of Bangladesh Demographic and Health Survey data	Poverty (OR ≈ 1.6), low educational attainment (OR ≈ 2.0), and early marriage (OR ≈ 3.8) were associated with adolescent childbearing.
16	Mamo et al., 2024; Ethiopia[31]	To identify predictors of adolescent childbearing among Ethiopian women with adjustment for spatial effects	Cross-sectional study with spatial analysis	Early marriage (OR ≈ 3.6) and low educational attainment (OR ≈ 1.9) were associated with adolescent childbearing.

No.	Study (setting)	Objective	Design and sample	Main findings
17	Wado et al., 2019; five East African countries[32]	To examine risk and protective factors for pregnancy and early motherhood among adolescents	Multilevel analysis of survey data from five East African countries	Poverty (OR ≈ 1.8) and early marriage (OR ≈ 4.1) were associated with a higher risk of adolescent pregnancy.
18	Worku et al., 2021; East Africa[33]	To determine the prevalence and associated factors of pregnancy among adolescents aged 15–19 years in East Africa	Multilevel cross-sectional study	Early marriage (OR ≈ 3.7) and low educational attainment (OR ≈ 1.8) were associated with adolescent pregnancy.
19	Sifer et al., 2025; Ethiopia[34]	To assess the prevalence and factors associated with teenage pregnancy among adolescent girls in Burji District	Community-based explanatory sequential mixed-methods study; 458 girls aged 13–19 years (questionnaires, logistic regression, in-depth interviews, and focus group discussions)	The prevalence of teenage pregnancy was 21.8% (95% CI: 18.0–26.0). Associated factors were rural residence (AOR = 3.68; 95% CI: 1.29–10.44), being married (AOR = 2.75; 95% CI: 1.06–7.15), non-use of contraceptives (AOR = 5.75; 95% CI: 2.22–14.86), and lack of parental discussion about reproductive health (AOR = 2.60; 95% CI: 1.01–6.76). Qualitative findings highlighted educational barriers, cultural influences, social relationships, and economic circumstances.
20	Kalulu et al., 2024; Malawi[35]	To identify factors associated with teenage pregnancy in Malawi to inform prevention interventions	Community-based case-control study using 2015–2016 Malawi DHS data; 3,435 women aged 20–24 years (2,226 cases, 1,209 controls)	Not marrying during adolescence (AOR = 0.13), secondary education (AOR = 0.26), higher education (AOR = 0.39), and belonging to the richest wealth quintile (AOR = 0.51) were associated with lower odds of teenage pregnancy. Contraceptive use and domestic violence by a parent were also significant factors.
21	Ayuandini et al., 2023; Indonesia[36]	To explore pathways to adolescent pregnancy in Indonesia and how social expectations, relationships, and individual experiences shape them	Qualitative study using participatory timeline interviews with 79 girls aged 15–21 years in West Java and Central Sulawesi; follow-up interviews with 19 participants	Six pathways were identified: three within marriage (financial circumstances, protection of personal and family reputation, or advancing a romantic relationship) and three outside marriage (consensual, unwanted or pressured, and forced sex). Child marriage, gender-based violence, social expectations, and limited access to sexual and reproductive health information and services also contributed.
22	Shri et al., 2023; India[37]	To examine the prevalence and correlates of adolescent pregnancy, motherhood, and adverse pregnancy outcomes in Uttar Pradesh and Bihar	Cross-sectional secondary analysis of the UDAYA survey; 4,897 married girls aged 15–19 years	About 61% had been pregnant and 42% had given birth before the age of 20 years. Marriage before 18 years was associated with pregnancy (OR = 1.79; 95% CI: 1.39–2.30) and motherhood (OR = 3.21; 95% CI: 2.33–4.43), and physical violence with adverse pregnancy outcomes (OR = 1.41; 95% CI: 1.08–1.84).

No.	Study (setting)	Objective	Design and sample	Main findings
23	Terefe, 2022; The Gambia[38]	To determine the prevalence and associated factors of teenage pregnancy and early motherhood among girls aged 15–19 years	Cross-sectional secondary analysis of the 2019–2020 Gambian DHS; 2,633 weighted adolescent girls	The prevalence of pregnancy and early motherhood was 13.42%. Older age (aOR = 2.15; 95% CI: 1.93–2.39), knowledge of the ovulatory cycle (aOR = 1.99; 95% CI: 1.23–3.22), and household size above ten members (aOR = 1.25; 95% CI: 1.01–1.55) were associated with higher odds, whereas higher household wealth and education were associated with lower odds.
24	Nuwabaine et al., 2023; Sierra Leone[39]	To determine the prevalence and factors associated with teenage pregnancy in Sierra Leone	Cross-sectional secondary analysis of the 2019 Sierra Leone DHS; 3,427 female adolescents	The prevalence of teenage pregnancy was 22.1% (758/3,427): 17.8% had given birth, 4.2% were pregnant, and 1.2% had terminated a pregnancy. Married adolescents had higher odds than unmarried adolescents (aOR = 15.31; 95% CI: 11.17–20.98), and adolescents from the poorest households had 2.5 times the odds of those from the richest households.
25	Noori et al., 2022; 46 low- and middle-income countries[40]	To examine the association between maternal age at first birth and stillbirth, neonatal, infant, and under-five mortality	Observational analysis of DHS data (2004–2018) from sub-Saharan Africa and South Asia; firstborn children of mothers aged ≤25 years; mixed-effects logistic regression	Children of mothers who first gave birth before the age of 16 years had higher mortality than those of mothers aged 23–25 years. In sub-Saharan Africa, the ORs were 1.92 (95% CI: 1.60–2.30) for neonatal, 2.13 (95% CI: 1.85–2.46) for infant, and 2.39 (95% CI: 2.13–2.68) for under-five mortality; in South Asia, they were 2.46, 2.62, and 2.59, respectively.
26	Byonanebye et al., 2020; Uganda[41]	To investigate geographic variation and sociodemographic factors associated with teenage pregnancy in Uganda over time	Analysis of the 2006 and 2011 Uganda DHS; current pregnancy among girls aged 15–19 years	The teenage pregnancy rate increased from 7.3 per 1,000 in 2006 to 8.1 per 1,000 in 2011, with the East Central region consistently highest. Marital status (married, cohabiting, or separated vs single) and household wealth were significant predictors.
27	Murphy et al., 2021; United States[42]	To compare pregnancy characteristics, HIV-related outcomes, and pregnancy outcomes between adolescents and adults living with HIV	Retrospective cohort study; 90 pregnant adolescents aged 13–24 years and 250 pregnant adults living with HIV (2003–2015)	Adolescents more often had unintended pregnancy (83.6% vs 68.7%; p = 0.016) and less often achieved viral suppression at delivery (50.0% vs 69.7%; p = 0.001). They had lower rates of preterm labor (11.0% vs 24.1%; p = 0.012) and preterm premature rupture of membranes (3.7% vs 16.7%; p = 0.003). About one-third were discharged without a contraception plan.
28	Herrán & Palacios, 2020; Ecuador[43]	To evaluate Ecuador's adolescent pregnancy prevention policies and propose improvements	Policy analysis	Ecuador had the highest adolescent fertility rate in Latin America and the Caribbean (111 births per 1,000 adolescent girls). The SADAs (2007) and MAIS-FCI (2011) strategies were judged ineffective because they focused mainly on health information, although 96% of women knew of contraception. Births occurred among 11% of adolescents from wealthy households versus 28% from poor households. Recent policies have begun to address root causes such as sexual violence and the justice system.

No.	Study (setting)	Objective	Design and sample	Main findings
29	Basanyukira et al., 2025; Uganda[44]	To assess the nutritional status of children aged 1–24 months born to adolescent mothers and associated factors	Cross-sectional study	The prevalences of stunting, wasting, and underweight were 32%, 31%, and 27%, respectively. Child age >12 months (OR = 4.2; 95% CI: 2.12–8.32), lack of financial support from a partner (OR = 2.09; 95% CI: 1.10–3.97), chronic illness (OR = 3.9; $p < 0.001$), and low birth weight (OR = 3.5; $p < 0.003$) were associated with malnutrition.
30	Mona et al., 2023; Iran[45]	To determine the prevalence of domestic violence against pregnant adolescents and its protective and risk factors	Cross-sectional study	Emotional violence was most common (23.52%), followed by physical (13.33%) and sexual violence (9.01%). Risk factors included the husband's substance use (OR = 2.41; 95% CI: 1.25–4.62), exposure to violence in childhood (OR = 1.85; 95% CI: 1.46–2.51), low husband education (OR = 1.41), and husband unemployment (OR = 1.14); high social support was protective.
31	Socolov et al., 2017; Romania[46]	To assess the risks associated with adolescent pregnancy in Romania over an 8-year period	Hospital-based cohort study (2007–2014)	Adolescent mothers were predominantly rural (68.5%) and unmarried (93.1%). Those aged ≤15 years had higher odds of no prenatal care (OR = 3.66; 95% CI: 2.75–4.87), preterm delivery (OR = 1.84; 95% CI: 1.44–2.35), and low birth weight (<2,500 g; OR = 1.75; 95% CI: 1.38–2.22) (all $p < 0.001$).
32	Alves et al., 2023; Brazil[47]	To assess the association between the nutritional status of mothers aged ≤15 years and small-for-gestational-age (SGA) births	Cross-sectional study; 364 adolescent mothers aged ≤15 years	Of the infants, 34.61% were born SGA. Mothers with very low nutritional status had a higher risk of delivering an SGA infant than mothers with better nutritional status.
33	Senkyire et al., 2022; Ghana[48]	To identify socioeconomic factors associated with adolescent pregnancy and motherhood using the 2017 Ghana Maternal Health Survey	Cross-sectional secondary analysis	Overall, 14.6% of adolescents had been pregnant and 11.8% had given birth. Pregnancy was more common among adolescents with low education or low economic status, those living in rural areas, and those who were married.
34	Hailu & Beyene, 2025; 106 countries[49]	To estimate the prevalence, trends, and projections of adolescent marriage, maternity, and limited access to education	Bayesian analysis of multicountry data	Adolescent marriage and pregnancy remained highly prevalent in sub-Saharan Africa and Latin America. Global prevalence has declined since 1990, but some countries showed increases and persistent disparities in girls' access to education.
35	Fatchurrahmi & Sholichah, 2021; Indonesia[50]	To prevent unwanted pregnancy among adolescents through community-based psychoeducation for adolescents and parents	Community-based intervention study	Psychoeducation on reproductive health for adolescents and on effective communication for parents improved adolescents' and parents' knowledge about preventing unwanted pregnancy.

No.	Study (setting)	Objective	Design and sample	Main findings
36	Immawanti et al., 2025; Indonesia[51]	To optimize reproductive health education to improve adolescents' knowledge of pregnancy risk management	Quasi-experimental study using focus group discussions	Adolescents' knowledge of pregnancy risk management increased significantly after the FGD-based education ($p < 0.05$).

DISCUSSION

This review indicates that adolescent pregnancy is shaped by interacting social, economic, behavioral, family, and environmental factors. Across settings, early marriage, early sexual initiation, low economic status, and low educational attainment were the most consistent determinants[18, 25, 29, 30, 33, 39]. Birhanu et al. found that marriage before the age of 15 years was associated with a 30-fold increase in the odds of adolescent pregnancy (AOR = 30.1; 95% CI: 16.8–53.9) and sexual activity before the age of 15 years with an almost 8-fold increase (AOR = 7.9; 95% CI: 4.6–13.8)[18]. These findings are consistent with a community-based study in Tanzania, in which adolescents with low economic status (AOR = 3.83; 95% CI: 1.77–8.30) and low educational attainment (AOR = 3.46; 95% CI: 1.47–8.11) had higher odds of adolescent pregnancy[5].

These findings indicate that adolescent pregnancy results not from a single factor but from the interaction of several interconnected factors. Low educational attainment can limit knowledge of reproductive health and pregnancy prevention, and poor economic conditions can restrict adolescents' access to education and health care. Persistent challenges include insufficient comprehensive reproductive health education, high rates of early marriage, and limited access to information among adolescents with low socioeconomic status. Reproductive health education, early-marriage prevention programmes, and adolescents' access to health information should therefore be strengthened together.

Adolescent pregnancy also increases the risk of maternal complications. In the included Romanian cohort, adolescents aged ≤15 years had 1.84-fold higher odds of preterm birth and 1.75-fold higher odds of delivering a low-birth-weight infant than older mothers[46]. Similar patterns have been reported elsewhere: in Ethiopia, adolescent mothers had higher odds of preeclampsia (AOR = 3.89), preterm labor (AOR = 4.21), and low birth weight (AOR = 4.56)[52].

These complications may arise because the reproductive system of adolescents is not yet fully mature for pregnancy and childbirth. In addition, the high nutritional requirements of a still-growing mother may lead to competition between the mother and the fetus for nutrients. Low utilization of antenatal care and delayed detection of complications among adolescents remain important challenges. Access to and the quality of antenatal care should therefore be improved, and education about pregnancy danger signs should be provided early in pregnancy.

Adolescent pregnancy also affects infant and child health. Noori et al. found that mothers who gave birth before the age of 16 years had a higher risk of neonatal death (aHR = 1.73; 95% CI: 1.40–2.13) and under-five mortality (aHR = 1.65; 95% CI: 1.45–1.88) than mothers aged 20–24 years[40]. Basanyukira et al. reported stunting, wasting, and underweight prevalences of 32%, 31%, and 27%, respectively, among children born to adolescent mothers[44].

These risks may reflect suboptimal maternal health and nutritional status during pregnancy, which can impair fetal growth and development. Inadequate monitoring of the nutritional status of pregnant adolescents and limited access to quality health care remain challenges. More intensive nutritional monitoring, appropriate supplementation, and better maternal and child health services are needed to reduce the risk of adverse neonatal outcomes.

Beyond its physical effects, adolescent pregnancy has psychological and social consequences. In Rwanda, 80.5% of pregnant adolescents reported rejection by their families and 73.1% dropped out of school[22]. Among pregnant adolescents in Iran, 23.52% had experienced emotional violence, 13.33% physical violence, and 9.01% sexual violence[45]. Evidence from Sri Lanka further shows that mothers younger than 20 years were more likely to have an unplanned pregnancy (OR = 7.85; $p = 0.014$) and that pregnancy at this age was associated with antenatal depression ($p = 0.028$)[53].

These findings indicate that adolescent pregnancy is often accompanied by psychological stress and social problems. Unpreparedness for motherhood, concerns about the future, and social stigma can worsen the psychological condition of pregnant adolescents, while counselling services and psychosocial support remain limited. Sustained psychological support, family assistance, and a supportive social environment are therefore needed to help adolescents cope with pregnancy.

Behavioral factors also contribute to the risk of adolescent pregnancy. Alcohol consumption was associated with teenage pregnancy among Ethiopian students[27]. In a multicenter study of adolescent emergency department patients, alcohol use (OR = 1.6; $p < 0.001$), cannabis use (OR = 1.9; $p < 0.001$), and combined alcohol and cannabis use (OR up to 2.2) were associated with sexual intercourse without contraception[54], and among justice-involved adolescent girls in Australia, ecstasy use was associated with unintended pregnancy (aOR = 3.795; $p = 0.022$)[13].

Risky behavior can therefore reduce adolescents' ability to make safe decisions about their reproductive health, and many adolescents are unaware of how substance use affects sexual behavior. Education about healthy lifestyles and the prevention of substance use should be incorporated into

adolescent reproductive health programmes.

Intervention findings must be interpreted according to the outcomes actually measured. The included intervention studies mainly assessed knowledge[26, 50, 51] or psychological outcomes[24], and none measured the occurrence of pregnancy. Evidence from outside this review suggests that broader programmes can affect behavioral outcomes: in the evaluation of the Sista2Sista programme in Zimbabwe, participants who completed all 40 exercises had higher odds of returning to school (OR = 1.41; 95% CI: 1.18–1.69) and of using a family planning method (OR = 1.38; 95% CI: 1.21–1.56), and lower odds of becoming pregnant as adolescents (OR = 0.41; 95% CI: 0.24–0.72)[8].

Gains in knowledge therefore do not necessarily translate into behavioral change. Education alone is unlikely to reduce adolescent pregnancy rates unless it is supported by an enabling environment and adequate access to services. Persistent barriers include stigma surrounding adolescents' use of reproductive health services, limited access to contraception, and insufficient family involvement. Prevention therefore requires comprehensive interventions built on collaboration among health professionals, schools, families, communities, and the government.

This review has several strengths, including its broad geographic coverage, the inclusion of Indonesian national databases, independent screening by two reviewers, and quality appraisal using JBI checklists. It also has limitations. Most included studies were cross-sectional, which limits causal inference. Heterogeneity in designs and outcome measures precluded meta-analysis. Searches in Google Scholar and ResearchGate are difficult to reproduce, and restricting the review to English and Indonesian publications may have excluded relevant studies. Finally, few studies were conducted in Indonesia, and the available intervention studies measured short-term knowledge rather than pregnancy outcomes.

CONCLUSIONS

Adolescent pregnancy is associated with interconnected educational, economic, behavioral, family, and health-service factors and has maternal, neonatal, psychological, and social consequences. The reviewed interventions measured different outcomes, including knowledge, psychological wellbeing, school return, contraceptive use, and pregnancy occurrence, and these outcomes should not be treated as interchangeable. Reproductive health education can improve knowledge, but evidence of reduced first or repeat pregnancy requires studies that measure pregnancy outcomes directly. Services should therefore combine context-appropriate prevention for adolescents who have never been pregnant, voluntary support to prevent repeat pregnancy, and comprehensive antenatal and psychosocial care for adolescents who are already pregnant. In Indonesia, these approaches should be adapted to local cultural contexts and integrated with accessible adolescent-friendly health services.

Future research should evaluate these approaches using clearly defined outcomes, including knowledge, contraceptive use, first pregnancy, repeat pregnancy, maternal and neonatal outcomes, and psychosocial wellbeing. Studies in Indonesian service settings are needed to assess feasibility, acceptability, and effectiveness before wider implementation.

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REFERENCES

1. World Health Organization. Adolescent pregnancy: evidence brief [Internet]. Geneva: World Health Organization; 2019 [cited 2026 Oct 19]. Available from: https://www.who.int/publications/i/item/WHO-RHR-19.15
2. UNICEF Indonesia. Child marriage in Indonesia [Internet]. Jakarta: UNICEF Indonesia [cited 2026 Oct 19]. Available from: https://www.unicef.org/indonesia/reports/child-marriage-in-indonesia
3. Abate BB, Sendekie AK, Alamaw AW, Tegegne KM, Kitaw TA, Bizuayehu MA, et al. Prevalence, determinants, and complications of adolescent pregnancy: an umbrella review of systematic reviews and meta-analyses. AJOG Glob Rep. 2025;5(1):100441. doi:10.1016/j.xagr.2025.100441
4. Hall KS, Beauregard JL, Rentmeester ST, Livingston M, Harris KM. Adverse life experiences and risk of unintended pregnancy in adolescence and early adulthood: Implications for toxic stress and reproductive health. SSM Popul Health. 2019;7:100344. doi:10.1016/j.ssmph.2018.100344
5. Moshi FV, Tilisho O. The magnitude of teenage pregnancy and its associated factors among teenagers in Dodoma Tanzania: a community-based analytical cross-sectional study. Reprod Health. 2023;20(1):28. doi:10.1186/s12978-022-01554-z
6. Faith EG, Ikwara EA, Marvin M, Isiko I. Teenage Pregnancy and Its Associated Factors Among Girls Aged 13–19 Years in Apac District, Uganda: A Community-Based Cross-Sectional Study. Health Sci Rep. 2025;8(2):e70471. doi:10.1002/hsr2.70471
7. Munshi SC, Hoex ECI, Weggelaar-Jansen AM, Knijff EM, Van Der Wilk EC, Steegers EAP, et al. Integrated care for multi-domain vulnerability during pregnancy: a retrospective cohort study. Arch Womens Ment Health. 2025;28(4):699–709. doi:10.1007/s00737-024-01554-x
8. Oberth G, Chinhengo T, Katsande T, Mhonde R, Hanisch

D, Kasere P, et al. Effectiveness of the Sista2Sista programme in improving HIV and other sexual and reproductive health outcomes among vulnerable adolescent girls and young women in Zimbabwe. Afr J AIDS Res. 2021;20(2):158–64. doi:10.2989/16085906.2021.1918733

9. Poulin D, Ouraou R, Hudon C. Medical complications and psychosocial outcomes of adolescent pregnancy in high-income countries: a scoping review. BMC Public Health. 2026;26(1):586. doi:10.1186/s12889-026-26269-9
10. Sibusiso M. Service delivery inaccessibility as a predictor of teenage pregnancy in South Africa. Afr Health Sci. 2023;23(3). doi:10.4314/ahs.v23i3.9
11. Sserwanja Q, Sepenu AS, Mwamba D, Mukunya D. Access to mass media and teenage pregnancy among adolescents in Zambia: a national cross-sectional survey. BMJ Open. 2022;12(6):e052684. doi:10.1136/bmjopen-2021-052684
12. Moniz MDF, Astuti AW, Hakimi M. Psychological Impact of Adolescent Pregnancy in Developing Countries: A Scoping Review. Women Midwives Midwifery. 2024;4(2):1–13. doi:10.36749/wmm.4.2.1-13.2024
13. Smith H, Wilson M, Donovan B, Jones J, Butler T, Nathan S, et al. Factors associated with unintended pregnancy and contraceptive practices in justice-involved adolescent girls in Australia. PLoS One. 2024;19(6):e0304825. doi:10.1371/journal.pone.0304825
14. World Health Organization. World health statistics 2017: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2017.
15. Moumen H. Is an end to child marriage within reach? [Internet]. New York: UNICEF DATA; 2023 [cited 2026 Oct 19]. Available from: https://data.unicef.org/resources/is-an-end-to-child-marriage-within-reach/
16. Zulaika G, Bulbarelli M, Nyothach E, Van Eijk A, Mason L, Fwaya E, et al. Impact of COVID-19 lockdowns on adolescent pregnancy and school dropout among secondary schoolgirls in Kenya. BMJ Glob Health. 2022;7(1):e007666. doi:10.1136/bmjgh-2021-007666
17. Tigabu S, Liyew AM, Geremew BM. Modeling spatial determinates of teenage pregnancy in Ethiopia; geographically weighted regression. BMC Womens Health. 2021;21(1):254. doi:10.1186/s12905-021-01400-7
18. Birhanu BE, Kebede DL, Kahsay AB, Belachew AB. Predictors of teenage pregnancy in Ethiopia: a multilevel analysis. BMC Public Health. 2019;19(1):601. doi:10.1186/s12889-019-6845-7
19. Saikia K, Nisha S, Malvika S, Shailendra KBH, Ashwin D. Understanding the Factors Leading to High Prevalence of Teenage Pregnancies in the Four Aspirational Districts of Assam, Namely Goalpara, Barpeta, Dhubri, and Darrang. Indian J Public Health. 2023;67(1):66–71. doi:10.4103/ijph.ijph_925_22
20. Nabugoomu J, Seruwagi GK, Hanning R. What can be done to reduce the prevalence of teen pregnancy in rural Eastern Uganda?: multi-stakeholder perceptions. Reprod Health. 2020;17(1):134. doi:10.1186/s12978-020-00984-x
21. Alemayehu MA, Birhanie AL, Abebe MT, Tilahun WM, Asferie WN, Yalew AK, et al. Spatial distribution of teenage pregnancy and its associated factors in Ethiopia: spatial and multilevel analysis of EDHS 2019. Arch Public Health. 2024;82(1):165. doi:10.1186/s13690-024-01380-8
22. Nshutiyukuri C, Uwingabire F, Musabwasoni MGS, Rutayisire JB, Rutayisire R, Benimana I, et al. Perceived factors contributing to teenage pregnancy and their perceived effects on teenage females health in eastern province of Rwanda. Womens Health (Lond Engl). 2025;21:17455057251325044. doi:10.1177/17455057251325044
23. Ramachandran R, Namatovu S, Atwine D, Tumuhairwe J, Nyakato VN, Kemigisha E, et al. Repeat adolescent pregnancies in Southwestern Uganda: A cross-sectional study. Womens Health (Lond Engl). 2024;20:17455057241302449. doi:10.1177/17455057241302449
24. Yousefi S, Montazeri S, Javadifar N, Ghanbari S, Ahmadi A. Midwife-led psychoeducational life skills training reduces anxiety, stress, and depression in pregnant adolescents: a randomized trial. Sci Rep. 2025;15(1):45081. doi:10.1038/s41598-025-32021-x
25. Mekonen EG. Pooled prevalence and associated factors of teenage pregnancy among women aged 15 to 19 years in sub-Saharan Africa: evidence from 2019 to 2022 demographic and health survey data. Contracept Reprod Med. 2024;9(1):26. doi:10.1186/s40834-024-00289-5
26. Shintya LA. Increasing knowledge about pregnancy prevention among adolescents through education intervention. [Journal name, year, volume, pages, and DOI to be completed by the authors]
27. Kumma WP, Chaka FG, Daga WB, Alemayehu MA, Meskele M, Wolka E. Prevalence of teenage pregnancy and associated factors among preparatory and high school students in Wolaita Sodo town, southern Ethiopia: an institution-based cross-sectional study. BMJ Open. 2023;13(6):e070505. doi:10.1136/bmjopen-2022-070505
28. Otika D, Odongo G, Muzaki RMM, Lamwaka BO, Bongomin F, Pebolo FP. Prevalence and factors associated with teenage pregnancy in refugee settlements of northern Uganda post-COVID-19 (2020–2023): a cross-sectional study. BMJ Open. 2024;14(12):e089361. doi:10.1136/bmjopen-2024-089361

29. Stephano EE, Yusheng T, Yamin L, Mtoro MJ. A multilevel analysis of trends and predictors associated with teenage pregnancy in Tanzania (2004–2022): evidence from demographic and health surveys. BMC Public Health. 2025;25(1):2559. doi:10.1186/s12889-025-23752-7
30. Alam N, Mollah MMH, Naomi SS. Prevalence and determinants of adolescent childbearing: comparative analysis of 2017–18 and 2014 Bangladesh Demographic Health Survey. Front Public Health. 2023;11:1088465. doi:10.3389/fpubh.2023.1088465
31. Mamo S, Dessie ZG, Abate A. Predictors of adolescent childbearing among Ethiopian women with spatial effect adjustment. BMC Public Health. 2024;24(1):2783. doi:10.1186/s12889-024-20341-y
32. Wado YD, Sully EA, Mumah JN. Pregnancy and early motherhood among adolescents in five East African countries: a multi-level analysis of risk and protective factors. BMC Pregnancy Childbirth. 2019;19(1):59. doi:10.1186/s12884-019-2204-z
33. Worku MG, Tessema ZT, Teshale AB, Tesema GA, Yeshaw Y. Prevalence and associated factors of adolescent pregnancy (15–19 years) in East Africa: a multilevel analysis. BMC Pregnancy Childbirth. 2021;21(1):253. doi:10.1186/s12884-021-03713-9
34. Sifer SD, Abere AM, Worku B. Prevalence and Risk Factors of Teenage Pregnancy at Burji District, Southwestern Ethiopia; Mixed Approach Study. Int J Public Health. 2025;70:1608389. doi:10.3389/ijph.2025.1608389
35. Kalulu JJ, Masoambeta J, Stones W. Determinants of teenage pregnancy in Malawi: a community-based case-control study. BMC Womens Health. 2024;24(1):335. doi:10.1186/s12905-024-03166-0
36. Ayuandini S, Habito M, Ellis S, Kennedy E, Akiyama M, Binder G, et al. Contemporary pathways to adolescent pregnancy in Indonesia: A qualitative investigation with adolescent girls in West Java and Central Sulawesi. PLOS Glob Public Health. 2023;3(10):e0001700. doi:10.1371/journal.pgph.0001700
37. Shri N, Singh M, Dhamnetiya D, Bhattacharyya K, Jha RP, Patel P. Prevalence and correlates of adolescent pregnancy, motherhood and adverse pregnancy outcomes in Uttar Pradesh and Bihar. BMC Pregnancy Childbirth. 2023;23(1):66. doi:10.1186/s12884-023-05354-6
38. Terefe B. The prevalence of teenage pregnancy and early motherhood and its associated factors among late adolescent (15–19) years girls in the Gambia: based on 2019/20 Gambian demographic and health survey data. BMC Public Health. 2022;22(1):1767. doi:10.1186/s12889-022-14167-9
39. Nuwabaine L, Sserwanja Q, Kamara K, Musaba MW. Prevalence and factors associated with teenage pregnancy in Sierra Leone: evidence from a nationally representative Demographic and Health Survey of 2019. BMC Public Health. 2023;23(1):527. doi:10.1186/s12889-023-15436-x
40. Noori N, Proctor JL, Efevbera Y, Oron AP. The Effect of Adolescent Pregnancy on Child Mortality in 46 Low- and Middle-Income Countries. BMJ Glob Health. 2022;7(5):e007681. doi:10.1136/bmjgh-2021-007681
41. Byonanebye J, Brazauskas R, Tumwesigye N, Young S, May T, Cassidy L. Geographic variation and risk factors for teenage pregnancy in Uganda. Afr Health Sci. 2020;20(4):1898–907. doi:10.4314/ahs.v20i4.48
42. Murphy E, Keller J, Argani C, Milio L, Powell A, Sheffield J, et al. Pregnancy in an Urban Cohort of Adolescents Living with Human Immunodeficiency Virus: Characteristics and Outcomes in Comparison to Adults. AIDS Patient Care STDS. 2021;35(4):103–9. doi:10.1089/apc.2020.0262
43. Herrán K, Palacios I. Evaluating and Improving upon Ecuador's Adolescent Pregnancy Prevention Policies in an Era of Increased Urgency. Ann Glob Health. 2020;86(1):110. doi:10.5334/aogh.3030
44. Basanyukira G, Okaba V, Kiboneka E, Kiguli S. Malnutrition and associated factors among children of adolescent mothers attending a tertiary hospital in Uganda. Afr Health Sci. 2025;24(4):408–19. doi:10.4314/ahs.v24i4.51
45. Mona R, Zahra Bostani K, Zahra H. Domestic violence against Iranian pregnant adolescents: protective and risk factors. Afr Health Sci. 2023;23(4):399–405. doi:10.4314/ahs.v23i4.43
46. Socolov DG, Iorga M, Carauleanu A, Ilea C, Blidaru I, Boiculese L, et al. Pregnancy during Adolescence and Associated Risks: An 8-Year Hospital-Based Cohort Study (2007–2014) in Romania, the Country with the Highest Rate of Teenage Pregnancy in Europe. Biomed Res Int. 2017;2017:9205016. doi:10.1155/2017/9205016
47. Alves MFA, Corleta HVE, Capp E, Lubianca JN. Poor nutritional status of fifteen-year-old or younger adolescent mothers enhances the risk of small-for-gestational-age newborns. Clin Biomed Res. 2023;43(1). doi:10.22491/2357-9730.122432
48. Senkyire EK, Boateng D, Boakye FO, Logo DD, Ohaja M. Socio-economic factors associated with adolescent pregnancy and motherhood: Analysis of the 2017 Ghana maternal health survey. PLoS One. 2022;17(12):e0272131. doi:10.1371/journal.pone.0272131
49. Hailu BA, Beyene J. Adolescent marriage, maternity, and limited access to education in 106 countries: Bayesian analysis of prevalence, trend, and prediction. Sci Rep. 2025;15(1):9584. doi:10.1038/s41598-025-93893-7
50. Fatchurrahmi R, Sholichah M. Pencegahan kehamilan tidak diinginkan pada remaja [Prevention of unwanted

pregnancy in adolescents]. Community Empowerment. 2021;6(7):1149–58. doi:10.31603/ce.5013

51. Immawanti I, Adhysti WA, Evawati E, Muzdalia I, Yuliani E, Nurhidayah N. Optimalisasi edukasi kesehatan reproduksi untuk meningkatkan pengetahuan remaja dalam mengendalikan risiko kehamilan [Optimizing reproductive health education to improve adolescents' knowledge in controlling pregnancy risk]. Jurnal Kesehatan Marendeng. 2025;9(2):193–200. doi:10.58554/jkm.v9i02.128
52. Abebe AM, Fitie GW, Jember DA, Reda MM, Wake GE. Teenage Pregnancy and Its Adverse Obstetric and Perinatal Outcomes at Lemlem Karl Hospital, Tigray, Ethiopia, 2018. Biomed Res Int. 2020;2020(1):3124847. doi:10.1155/2020/3124847
53. Ranatunga IDJC, Jayaratne K. Proportion of unplanned pregnancies, their determinants and health outcomes of women delivering at a teaching hospital in Sri Lanka. BMC Pregnancy Childbirth. 2020;20(1):667. doi:10.1186/s12884-020-03259-2
54. Chernick LS, Chun TH, Richards R, Bromberg JR, Ahmad FA, McAninch B, et al. Sex Without Contraceptives in a Multicenter Study of Adolescent Emergency Department Patients. Acad Emerg Med. 2020;27(4):283–90. doi:10.1111/acem.13867