



Original Article

Smartphone-based supportive counseling to reduce pregnancy-specific stress in pregnant adolescents

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A B S T R A C T

Background: Adolescence is a psychologically vulnerable period, and pregnancy during this stage increases the risk of stress, particularly when pregnancies are unintended or accompanied by social stigma. Although psychosocial support is essential, evidence on supportive counseling specifically for pregnant adolescents is limited, and most interventions rely on traditional face-to-face methods. To address this gap, this study developed a smartphone-based supportive counseling model to strengthen maternal mental health among Indonesian adolescents.

Purpose: To examine the effect of smartphone-based supportive counseling on pregnancy-specific stress among pregnant adolescents.

Methods: A quasi-experimental pre- and post-test non-equivalent control group design was used involving 60 pregnant adolescents. Participants were assigned to an intervention group ($n = 30$) or a control group ($n = 30$) using purposive sampling. The intervention group received smartphone-based supportive counseling sessions (60–120 minutes) over three weeks, while the control group received routine antenatal care. Pregnancy-specific stress was measured before and after the intervention. Data were analyzed using paired t-tests and independent t-tests.

Results: The intervention group showed a significant reduction in pregnancy-specific stress after supportive counseling ($p < 0.001$), whereas the control group showed no significant change ($p = 0.069$).

Conclusion: Smartphone-based supportive counseling is effective in reducing pregnancy-specific stress among pregnant adolescents and may serve as an accessible psychosocial support model in resource-limited settings.

INTRODUCTION

Adolescent pregnancy remains a major global public health concern due to its complex medical, psychological, and social consequences. Adolescents constitute approximately 16% of the world's population, yet many initiate sexual activity with limited reproductive health knowledge. In Nigeria, 48.69% of adolescents reported sexual activity and 6.01% experienced pregnancy, while globally an estimated 21 million girls aged 15–19 give birth each year.¹ In Indonesia, adolescents represent 24% of the population—around 67 million individuals—with adolescent fertility rates rising from 20.49 per 1,000 in 2021 to 26.64 in 2022, and reported at 18 per 1,000 in 2024.^{2–4} These trends highlight the urgent need for targeted reproductive and mental health interventions.

Teenage pregnancy is associated with disrupted education, compromised physical health, socioeconomic instability, and persistent stigma. Adolescent mothers frequently experience low self-esteem, limited access to healthcare, and a heightened risk of psychological distress. Rates of depression in this population range from 8% to 39%, and adolescents are 1.6 times more likely than adults to experience pregnancy-related stress.^{5–11} Chronic stress and mood disorders during pregnancy can impair fetal development, hinder maternal–infant bonding, and contribute to long-term emotional and behavioral problems in children.^{10–14} These vulnerabilities underscore the need for mental health interventions specifically addressing adolescents' developmental and psychosocial challenges.

Supportive counseling has shown promising benefits for improving psychological well-being in pregnancy. Previous studies indicate that counseling grounded in positive psychology enhances coping among women with nausea

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and vomiting, reduces stress during the COVID-19 pandemic, and lowers perceived stress while increasing empowerment in high-risk pregnancies.¹³⁻¹⁴ Emotional and informational support consistently strengthens resilience and adaptation during pregnancy. However, existing evidence is largely limited to adult or high-risk pregnant women and typically delivered through conventional face-to-face models.

A substantial research gap persists regarding mental health interventions tailored to pregnant adolescents—who face developmental immaturity, social stigma, constrained reproductive autonomy, and limited psychosocial support. Digital mental health solutions for adolescent mothers remain scarce, particularly in low-resource settings such as Indonesia, where shortages of trained mental health professionals restrict access to counseling. Addressing these unmet needs requires innovative, accessible, and developmentally appropriate approaches.

To respond to this gap, the present study developed and evaluated smartphone-based supportive counseling delivered through the CS Mama application. This platform integrates psychoeducation, emotional regulation strategies, and peer-support features using interactive modules and animated videos, providing confidential and continuous psychosocial assistance. Unlike conventional counseling, this digital model offers enhanced accessibility, privacy, flexibility, and alignment with adolescent-friendly care principles.

Accordingly, this study aims to assess the effectiveness of smartphone-based supportive counseling in reducing pregnancy-specific stress among pregnant adolescents. By focusing on a highly underserved and vulnerable population, the study provides new evidence on the role of digital psychosocial interventions in maternal healthcare. The findings are anticipated to support the integration of technology-enabled counseling into national maternal health programs and contribute to the achievement of Sustainable Development Goal 3, which emphasizes healthy lives and mental well-being across all ages.

METHOD

Study Design

This study employed a quantitative quasi-experimental design using a pre-post-test non-equivalent control group approach.¹⁵

Setting and Respondents

The study was carried out from April to October 2025 at several community health centers in Banyumas Regency, Central Java, Indonesia, an area with consistently high rates of adolescent pregnancy. The study population included all pregnant adolescents under 20 years living in the health center catchment areas. Participants were recruited using purposive sampling. Sample size estimation with G*Power (power 0.80; 95% confidence level) indicated a minimum of 27 participants per group; therefore, 30

adolescents were enrolled in each group to anticipate attrition, resulting in a total sample of 60 participants.

Inclusion criteria were pregnant adolescents aged <20 years, gestational age <35 weeks, primigravida, owning an Android smartphone, and willing to provide informed consent. Exclusion criteria included diagnosed psychiatric disorders, cognitive impairment, or any condition that could hinder participation in the counseling sessions.

Intervention Procedure

Participants in the intervention group received six sessions of smartphone-based supportive counseling delivered through the CS Mama application. A technical orientation was conducted via Zoom prior to the intervention. Counseling sessions were provided over three weeks, with two sessions per week lasting 60–120 minutes each. The intervention included psychoeducation, stress-management strategies, emotional regulation, problem-solving, and peer-support discussions, supported by follow-up monitoring through Zoom and WhatsApp groups. The CS Mama application was developed and validated by the research team before implementation.

The control group received routine antenatal care from midwives according to national guidelines without additional psychological intervention. Both groups completed pre- and post-intervention assessments using the same digital platform.

Variables, Instruments, and Measurement

The primary outcome measured was pregnancy-specific stress, assessed at baseline and immediately after the 3-week intervention. Stress levels were measured using the Pregnancy-Specific Stress Questionnaire, a validated and reliable instrument consisting of 25 items across six domains: maternal health, newborn safety, family relationships, maternal and infant preferences, personal concerns, and work-related aspects. Each item was rated on a 5-point Likert scale from 0 (“never”) to 4 (“always”), with higher scores indicating greater stress. Sociodemographic data—including age, education, income, and gestational age—were collected through a structured questionnaire to describe participant characteristics and support covariate analysis.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Normality of continuous variables was tested using the Kolmogorov–Smirnov test. Within-group differences between pre-test and post-test scores were examined using paired t-tests, whereas between-group differences were analyzed using independent t-tests. Analysis of covariance (ANCOVA) was conducted to assess the effect of supportive counseling on pregnancy-specific stress while controlling for baseline scores and relevant covariates. Statistical significance was set at $p < 0.05$.¹¹

Ethical Consideration

Ethical approval was obtained from the Health Research Ethics Committee of Universitas Harapan Bangsa (Approval No. B-LPPM-UHB/1744/04/2023).

RESULTS

A total of 60 pregnant adolescents participated in this study, with 30 in the intervention group and 30 in the control group. Table 1 presents the sociodemographic characteristics of both groups. Most participants in the intervention group (80%) and in the control group (76.7%) were in late adolescence (17–19 years). Junior high school was the most common education level (46.7% and 56.7%, respectively). Half of the intervention group and 40% of the control group reported monthly incomes below 1.5 million rupiah, while 26.7% and 30% had no income. Regarding gestational age, 50% of adolescents in the intervention group were in the second trimester, whereas most participants in the control group (90%) were in the first trimester. Unplanned pregnancy was reported by 86.7% of the intervention group and 70% of the control group.

Table 2 shows the comparison of pregnancy-specific stress scores before and after the intervention. In the intervention group, the mean pregnancy-specific stress score decreased significantly after receiving smartphone-based supportive counseling, with a mean difference of -19.40 (SD 13.07; $p < 0.001$). In contrast, the control group showed a minimal and non-significant change (mean difference - 0.87; SD 2.52; $p = 0.069$).

Table 1. Sociodemographic Characteristics of Participants

Characteristics	Intervention	Control
Age		
Early adolescence (12–16 yrs)	6 (20.0%)	7 (23.3%)
Late adolescence (17–19 yrs)	24 (80.0%)	23 (76.7%)
Education		
Not finished elementary school	1 (3.3%)	0 (0.0%)
Elementary school	5 (16.7%)	6 (20.0%)
Junior high school	14 (46.7%)	17 (56.7%)
Senior high school	10 (33.3%)	7 (23.3%)
Income		
No income	8 (26.7%)	9 (30.0%)
<1.5 million rupiah	15 (50.0%)	12 (40.0%)
1.5–2.5 million rupiah	7 (23.3%)	6 (20.0%)
2.5–3.5 million rupiah	0 (0.0%)	3 (10.0%)
>3.5 million rupiah	0 (0.0%)	0 (0.0%)
Gestational Age		
First trimester	8 (26.7%)	27 (90.0%)
Second trimester	15 (50.0%)	2 (6.7%)
Third trimester	7 (23.3%)	1 (3.3%)
Pregnancy Status		
Wanted	4 (13.3%)	9 (30.0%)
Unwanted	26 (86.7%)	21 (70.0%)

Table 2. Pre–Post Differences in Pregnancy-Specific Stress Scores

Group	Mean Diff ± SD	95% CI	p-value
Intervention group	-19.40 ± 13.07	14.52 – 24.28	<0.001
Control group	-0.87 ± 2.52	-0.07 – 1.81	0.069

Between-group analysis using independent t-test confirmed that the reduction in pregnancy-specific stress was significantly greater in the intervention group than in the control group ($p < 0.001$). ANCOVA, adjusting for baseline scores, also indicated a significant treatment effect ($p < 0.001$), as shown in Table 3.

Table 3. Between-Group Differences in Pregnancy-Specific Stress

Analysis	Mean Diff (95% CI)	p-value
Independent t-test	Significant reduction in intervention group vs control	<0.001
ANCOVA (adjusted for baseline score)	Significant treatment effect	<0.001

DISCUSSION

This study showed that most participants were in late adolescence (17–19 years), a stage marked by biological maturity but limited psychological readiness and reproductive health knowledge. Such developmental characteristics increase susceptibility to risky sexual behavior and unintended pregnancy, consistent with evidence linking adolescent pregnancy to low reproductive autonomy, limited self-efficacy, and inadequate access to sexual health education.¹⁷⁻²¹ Lower educational attainment—reported by nearly half of participants—further heightens vulnerability by restricting decision-making capacity, reducing contraceptive use, and limiting access to health services.²²⁻²⁵ Low household income was also common among participants, aligning with literature showing that economic hardship contributes to early marriage, transactional relationships, and unprotected sexual activity.²⁶⁻³⁰

Most pregnancies in this study occurred in the first and second trimesters, periods characterized by increased psychological instability due to physical changes, uncertainty, and social pressure.^{31,32} Low education, low income, and the high proportion of unplanned pregnancies observed in both groups likely intensified psychosocial vulnerability. Prior studies have demonstrated that unintended adolescent pregnancy is associated with emotional distress, reduced maternal–infant bonding, and increased anxiety, which in turn elevate pregnancy-specific stress and risk of adverse obstetric outcomes such as preterm birth and low birth weight.³⁸⁻⁴¹ These findings highlight the need for psychosocial support that addresses emotional, cognitive, and behavioral aspects of stress during pregnancy.⁴²⁻⁴⁴

The present study found that smartphone-based supportive counseling significantly reduced pregnancy-specific stress

among pregnant adolescents, while routine antenatal care alone produced no meaningful change. These results align with prior evidence showing that supportive counseling improves psychological well-being, coping, and prenatal health behaviors by providing empathetic communication, structured information, and guided reflection.^{13,48,49} Supportive counseling has also been shown to enhance self-esteem, reduce stress, and improve emotional adjustment in various reproductive health contexts, including infertility, post-IVF failure, and postpartum care.^{50,51}

Several mechanisms may underlie the effectiveness of the intervention. Emotional validation and empathetic communication may have reduced perceived stigma and increased feelings of acceptance. Psychoeducation likely improved cognitive understanding of pregnancy-related changes, reducing fear and uncertainty. Stress-management and problem-solving strategies may have strengthened coping and emotional regulation. The peer interactions and continuous communication enabled through the CS Mama application likely enhanced perceived social support, an important protective factor for adolescent mental health. These mechanisms align with existing evidence on how psychosocial interventions reduce stress by improving cognitive appraisal and coping responses.^{33,34,48-51}

This study has several strengths, including the use of a standardized intervention protocol, validated and culturally adapted instruments, and a smartphone-based model that improved accessibility and continuity of care—particularly beneficial for adolescents facing stigma or mobility barriers. The absence of participant dropout further strengthens internal validity. However, limitations must be acknowledged. The quasi-experimental design and non-random sampling may introduce selection bias, and baseline differences in socioeconomic and educational characteristics could serve as residual confounders despite statistical adjustment. Additionally, the study was conducted in a specific regional context, which may limit generalizability. Future studies using randomized controlled designs, larger and more diverse samples, and longer follow-up periods are recommended to evaluate sustained effects and explore additional mental health outcomes such as anxiety, depression, and mother-infant bonding.

CONCLUSIONS AND RECOMMENDATION

This study demonstrated that smartphone-based supportive counseling effectively reduced pregnancy-specific stress among pregnant adolescents. The integration of emotional support, psychoeducation, and peer interaction within a digital platform strengthened coping ability and enhanced psychological well-being. As a practical and accessible approach for resource-limited settings, this intervention has the potential to complement adolescent-friendly maternal health services at community health centers. Strengthening the capacity of health workers to identify stress early and provide empathetic,

technology-assisted follow-up may further improve outcomes. Future studies with larger and more diverse samples are recommended to validate these findings and explore long-term impacts on maternal and child health.

REFERENCES

1. Badan Kependudukan dan Keluarga Berencana Nasional (BKKBN). Angka kelahiran remaja naik, BKKBN dorong peningkatan kesadaran kesehatan reproduksi. Published 2023. Accessed April 5, 2024. <https://www.bkkbn.go.id>
2. Reyes MR, Hangdaan BM, Sadang KMC, Pasion MG. Start of a life health risk, struggles and coping as experienced teenage mothers. *Int J Public Health Sci.* 2022;11(2):479-489. <https://doi.org/10.11591/ijphs.v11i2.20955>
3. Lestari S, Widyawati Y. Gambaran parenting stress dan coping stress pada ibu yang memiliki anak kembar. *J Psikogenes.* Published online 2016. Accessed April 5, 2024. <http://academicjournal.yarsi.ac.id/index.php/Jurnal-Online-Psikogenesis/article/view/516>
4. Parfitt Y, Ayers S. Transition to parenthood and mental health in first-time parents. *Infant Ment Health J.* 2014;35(3):263-273. <https://doi.org/10.1002/imhj.21443>
5. Woollett N, Bandeira M, Marunda S, et al. Adolescent pregnancy and young motherhood in rural Zimbabwe: findings from a baseline study. *Health Soc Care Community.* Published online 2021. <https://doi.org/10.1111/hsc.13362>
6. Oliver H, Thomas O, Neil R, Moll T, Copeland RJ. Stress and psychological wellbeing in British police force officers and staff. *Curr Psychol.* Published online 2022. <https://doi.org/10.1007/s12144-022-03903-4>
7. Erfina E, Widyawati W, McKenna L, Reisenhofer S, Ismail D. Adolescent mothers' experiences of the transition to motherhood: an integrative review. *Int J Nurs Sci.* 2019;6(2):221-228. <https://doi.org/10.1016/j.ijnss.2019.03.013>
8. Kristensen IH, Simonsen M, Trillingsgaard T, Pontoppidan M, Kronborg H. First-time mothers' confidence, mood, and stress in the first months postpartum: a cohort study. *Sex Reprod Healthc.* 2018;17:43-49. <https://doi.org/10.1016/j.srhc.2018.06.003>
9. McLuckie A, Matheson KM, Landers AL, et al. The relationship between psychological distress and perception of emotional support in medical students and residents and implications for educational institutions. *Acad Psychiatry.* 2018;42(1):41-47. <https://doi.org/10.1007/s40596-017-0800-7>
10. Wuermli AJ, Yoshikawa H, Hastings PD. A bioecocultural approach to supporting adolescent mothers and their young children in conflict-affected contexts. *Dev Psychopathol.* 2021;33(2):714-726. <https://doi.org/10.1017/S095457942000156X>
11. Sanadi AB, Anuchithra S, Radhakrishnan G. Mental health and wellbeing during transition to parenthood. *Asian J Nurs Educ Res.* 2016;6(1):109.

- <https://doi.org/10.5958/2349-2996.2016.00023.9>
12. Hvolgaard Mikkelsen S, Olsen J, Bech BH, Obel C. Parental age and attention-deficit/hyperactivity disorder (ADHD). *Int J Epidemiol.* 2017;46(2):409-420. <https://doi.org/10.1093/ije/dyw073>
 13. Abbasi M, Maleki A, Ebrahimi L, Molaei B. Effects of supportive counseling using a positive psychology approach on coping patterns among pregnant women with nausea and vomiting. *BMC Pregnancy Childbirth.* 2022;22(1):1-11. <https://doi.org/10.1186/s12884-022-04603-4>
 14. Gust DA, Gvetadze R, Furtado M, et al. Factors associated with psychological distress among young women in Kisumu, Kenya. *Int J Womens Health.* 2017;9:255-264. <https://doi.org/10.2147/IJWH.S125133>
 15. Creswell J. *Research Design.* Published online 2017.
 16. Navidpour F, Dolatian M, Yaghmaei F, Majd HA, Hashemi SS. Examining factor structure and validating the Persian version of the Pregnancy's Worries and Stress Questionnaire for pregnant Iranian women. *Glob J Health Sci.* 2015;7(6):308-318. <https://doi.org/10.5539/gjhs.v7n6p308>
 17. Worku MG, Tessema ZT, Teshale AB, et al. Prevalence and associated factors of adolescent pregnancy (15–19 years) in East Africa: a multilevel analysis. *BMC Pregnancy Childbirth.* Published online 2021. <https://doi.org/10.1186/s12884-021-03713-9>
 18. Calle M de la, Bartha JL, Lopez CM, Turiel M, et al. Younger age in adolescent pregnancies is associated with higher risk of adverse outcomes. *Int J Environ Res Public Health.* Published online 2021. Accessed April 5, 2024. <https://www.mdpi.com/1225990>
 19. Maheshwari MV, Khalid N, Patel PD, Alghareeb R, et al. Maternal and neonatal outcomes of adolescent pregnancy: a narrative review. *Cureus.* Published online 2022. Accessed April 5, 2024. <https://www.cureus.com/articles/100936-maternal-and-neonatal-outcomes-of-adolescent-pregnancy-a-narrative-review>
 20. Pertiwi L, Ruspita R, et al. Pengaruh pemberian penyuluhan kesehatan dengan metode ceramah dan video terhadap pengetahuan remaja tentang seks bebas pada siswa kelas X di SMK. *Midwifery J.* Published online 2020. Accessed April 5, 2024. <https://jurnal.stikes-alinsyirah.ac.id/index.php/kebidanan/article/view/367>
 21. Alukagberie ME, Elmusharaf K, Ibrahim N, Poix S. Factors associated with adolescent pregnancy and public health interventions to address in Nigeria: a scoping review. *Reprod Health.* 2023;20(1):1-24. <https://doi.org/10.1186/s12978-023-01629-5>
 22. Amoadu M, Hagan D, et al. Adverse obstetric and neonatal outcomes of adolescent pregnancies in Africa: a scoping review. *BMC Pregnancy Childbirth.* Published online 2022. <https://doi.org/10.1186/s12884-022-04821-w>
 23. Akombi-Inyang BJ, Woolley E, Iheanacho CO, Bayarara K, Ghimire PR. Regional trends and socioeconomic predictors of adolescent pregnancy in Nigeria: a nationwide study. *Int J Environ Res Public Health.* 2022;19(13):8222. <https://doi.org/10.3390/ijerph19138222>
 24. Paudel A, Wentworth SM, Fortner KB, Carbone L, et al. COVID-19 pandemic and adolescent pregnancy: urban vs rural Appalachian populations. *Am J Obstet Gynecol.* Published online 2022. Accessed April 5, 2024. [https://www.ajog.org/article/S0002-9378\(21\)01818-4/abstract](https://www.ajog.org/article/S0002-9378(21)01818-4/abstract)
 25. Widyaningsih V, Mulyaningsih T, Rahmawati FN, Adhitya D. Rural remote health. *Rural Remote Health.* 2021;21(3):1-11.
 26. Malunga G, Sangong S, Saah FI, Bain LE. Prevalence and factors associated with adolescent pregnancies in Zambia: a systematic review from 2000–2022. *Arch Public Health.* 2023;81(1). <https://doi.org/10.1186/s13690-023-01045-y>
 27. Akombi-Inyang BJ, Woolley E, Iheanacho CO, et al. Regional trends and socioeconomic predictors of adolescent pregnancy in Nigeria: a nationwide study. *Int J Environ Res Public Health.* Published online 2022. Accessed April 5, 2024. <https://www.mdpi.com/1712720>
 28. Akanbi MA, Ope BW, Adeloye DO, Amoo EO, et al. Influence of socio-economic factors on prevalence of teenage pregnancy in Nigeria. *Afr J Reprod Health.* Published online 2021. Accessed April 5, 2024. <https://www.ajol.info/index.php/ajrh/article/view/221412>
 29. Kelly S, Bruno B, Alexandre H, et al. Prevalence, socioeconomic factors and obstetric outcomes associated with adolescent motherhood in Ceará, Brazil: a population-based study. *BMC Pregnancy Childbirth.* 2021;21(7):1-10.
 30. Maharaj NR. Adolescent pregnancy in sub-Saharan Africa: a cause for concern. *Front Reprod Health.* 2022;4:984303. <https://doi.org/10.3389/frph.2022.984303>
 31. Swaraswati Y, Sugiaranti, Rizki BM, Figi. Memahami self-compassion remaja akhir berdasarkan trait kepribadian big five. *Intuisi J Psikol Ilm.* 2019;11(1):69-81.
 32. Azeez Fagbenro D, Benjamin EO, Folasade AO. Influence of stages of pregnancy on the psychological well-being of pregnant women in Ibadan, Nigeria. *Int J Caring Sci.* 2018;11(2):719-724. Accessed April 5, 2024. <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=131851611&site=ehost-live>
 33. Adha HD. Hubungan dukungan keluarga dan kesejahteraan psikologis pada ibu pekerja penuh waktu. Published online 2018.
 34. Goyal M, Singh S, Sibinga EMS, et al. Meditation programs for psychological stress and well-being: a systematic review and meta-analysis. *JAMA Intern Med.* 2014;174(3):357-368. <https://doi.org/10.1001/jamainternmed.2013.13018>
 35. Nordin N, Wahab RA, Yunus FW. Psychological well-being of young unwed pregnant women: implications for extension education and programs. *Procedia Soc Behav Sci.* 2012;68:700-709. <https://doi.org/10.1016/j.sbspro.2012.12.260>
 36. Ermiami, Nugraha E, Pratiwi N, et al. Psychological impact of unwanted pregnancy on adolescents: a

- literature review. *J Nurs Care*. 2021;4(3):203-210.
37. Ajayi AI, Odunga SA, Oduor C, Ouedraogo R. "I was tricked": understanding reasons for unintended pregnancy among sexually active adolescent girls. Published online 2021:1-11. <https://doi.org/10.1186/s12978-021-01078-y>
 38. Crooks R, Bedwell C, Lavender T. Adolescent experiences of pregnancy in low- and middle-income countries: a meta-synthesis of qualitative studies. Published online 2022:1-18. <https://doi.org/10.1186/s12884-022-05022-1>
 39. Chakole S, Akre S, Sharma K, Wasnik P, Wanjari MB. Unwanted teenage pregnancy and its complications: a narrative review. *Cureus*. 2022;14(12):e32662. <https://doi.org/10.7759/cureus.32662>
 40. Taquette SR, Moraes CL, Borges L, et al. Teen-dating violence: conception of adolescents in a Brazilian metropolis. Published online 2020. Accessed April 5, 2024. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7487130/>
 41. Claudien T, Id U, Muganwa K, et al. Factors affecting the prevention of unwanted pregnancies among young adolescents in secondary schools in the Eastern Province of Rwanda: an explorative qualitative study. Published online 2024:1-18. <https://doi.org/10.1371/journal.pone.0301248>
 42. Olajubu AO, Omoloye GO, Olajubu TO, Olowokere AE. Stress and resilience among pregnant teenagers in Ile-Ife, Nigeria. Published online 2021:1-9.
 43. Amoadu M, Ansah EW, et al. Sociocultural factors influencing adolescent pregnancy in Ghana: a scoping review. *BMC Pregnancy Childbirth*. Published online 2022. <https://doi.org/10.1186/s12884-022-05172-2>
 44. Okeke SR, Idriss-Wheeler D, et al. Adolescent pregnancy in the time of COVID-19: implications for sexual and reproductive health and rights globally. *Reprod Health*. Published online 2022. <https://doi.org/10.1186/s12978-022-01505-8>
 45. Diabelkov J, Rim K, Dorko E, Urdz P, Houžvi A. Adolescent pregnancy outcomes and risk factors. Published online 2023:0-9.
 46. Shri N, Singh M, Dhamnetiya D, et al. Prevalence and correlates of adolescent pregnancy, motherhood and adverse pregnancy outcomes in Uttar Pradesh and Bihar. *BMC Pregnancy Childbirth*. Published online 2023. <https://doi.org/10.1186/s12884-023-05354-6>
 47. Honorato DJP, Fulone I, Silva MT, et al. Risks of adverse neonatal outcomes in early adolescent pregnancy using group prenatal care as a strategy for public health policies: a retrospective study. *Front Public Health*. Published online 2021. <https://doi.org/10.3389/fpubh.2021.536342>
 48. Esfandiari M, Faramarzi M, Nasiri-Amiri F, et al. Effect of supportive counseling on pregnancy-specific stress, general stress, and prenatal health behaviors: a multicenter randomized controlled trial. *Patient Educ Couns*. 2020;103(11):2297-2304. <https://doi.org/10.1016/j.pec.2020.04.024>
 49. Mojriani M, Alidoosti K, Tirgari B, Mehdizadeh A, Jahani Y. Effect of supportive counseling on symptoms of acute stress disorder following emergency cesarean section. *J Midwifery Reprod Health*. 2018;6(2):1208-1214. <https://doi.org/10.22038/JMRH.2018.10372>
 50. Shafaghi M, Ahmadinezhad GS, Karimi FZ, Mazloun SR. Effect of supportive counseling on self-esteem of infertile women after in vitro fertilization (IVF) failure: a randomized controlled trial. Published online 2024.
 51. Eskandari B, Nourizadeh R, Mehrabi E, Heshmati R, Ivanbagha R. Evaluating the impact of home supportive counseling and telephone supportive counseling on postpartum depression and anxiety: a randomized controlled trial. Published online 2025.