



Evaluating The Effectiveness of Contraceptive Counseling in Adolescents : A Systematic Review

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ABSTRACT

Introduction: Adolescent unintended pregnancy remains a global public health challenge with significant medical and social consequences. Contraceptive counseling interventions vary widely in content, delivery, and effectiveness. This systematic review evaluates the effectiveness of contraceptive counseling interventions for adolescents on contraceptive use and pregnancy outcomes.

Methods: A systematic review was conducted following PRISMA guidelines. We screened studies based on predefined criteria: target population (adolescents aged 10-19 years), intervention type (contraceptive counseling delivered by healthcare providers, trained counselors, or peer educators), effectiveness outcomes (contraceptive knowledge, attitudes, uptake, adherence, or reproductive health outcomes), and study design (randomized controlled trials, quasi-experimental studies, or controlled before-and-after studies). Data extraction included study characteristics,

population details, intervention components, comparator groups, and quantitative outcomes. Synthesis focused on patterns of effectiveness across intervention types, settings, and populations.

Results: Eighty studies were included, representing diverse populations across multiple countries with sample sizes ranging from 50 to over 105,000 participants. Immediate postpartum contraceptive counseling significantly increased long-acting reversible contraception (LARC) use (OR 3.78, 95% CI 2.18-6.57). Motivational interviewing interventions improved effective contraception use (OR 2.04, 95% CI 1.47-2.83) and LARC initiation (OR 3.99, 95% CI 1.36-11.68). Sustained, intensive programs like Prime Time demonstrated persistent effects at 24 months on consistent hormonal contraception use (adjusted RR 1.30) and condom use (RR 1.57). Quality initiatives removing access barriers increased LARC use by 90% and reduced teenage pregnancy rates by 36% (from 2.2% to 1.4%, $p < 0.0001$). Peer education showed variable effectiveness, succeeding when addressing social norms but failing when reduced to information transmission. Technology-based interventions demonstrated mixed results.

Discussion: Effective interventions share common characteristics: delivery during critical transition periods (particularly postpartum), sustained contact over time, motivational interviewing approaches addressing ambivalence, removal of access barriers through same-visit provision, and system-level provider training. Setting-specific barriers fundamentally shape success, with school-based health centers providing on-site contraception achieving higher uptake than referral-dependent models. Adolescents demonstrate strong preferences for implants over intrauterine devices, suggesting counseling should address

method-specific concerns. Implementation challenges in real-world replications highlight the difficulty of maintaining program fidelity at scale.

Conclusion: Contraceptive counseling effectively improves adolescent contraceptive use and reduces pregnancy rates when interventions are appropriately timed, sustained, and combined with structural supports. Recommendations include implementing counseling during postpartum periods, utilizing motivational interviewing techniques, ensuring same-day contraceptive access, providing system-level provider training, and addressing population-specific barriers. Future research should focus on implementation strategies that maintain effectiveness when scaling interventions.

Keywords: Adolescent, contraceptive counseling, pregnancy prevention, long-acting reversible contraception, motivational interviewing, systematic review

INTRODUCTION

Adolescent unintended pregnancy remains a critical global public health challenge with far-reaching medical, social, and economic consequences. Approximately 21 million girls aged 15-19 years in developing regions become pregnant annually, with approximately 50% of these pregnancies being unintended (1). Adolescent pregnancy is associated with increased risks of adverse maternal and neonatal outcomes, including preterm birth, low birth weight, and maternal mortality, as well as social consequences such as school dropout, reduced economic opportunities, and intergenerational cycles of poverty (1,4).

Contraceptive counseling for adolescents has been identified as a key strategy to address unintended pregnancy by improving knowledge, supporting informed decision-making, and facilitating effective method use (2,3). However, the effectiveness of such counseling interventions varies considerably across studies, populations, and settings. While some interventions demonstrate substantial improvements in contraceptive uptake and pregnancy reduction (4,8,11), others show limited or no effects (5,17), creating uncertainty about optimal counseling approaches for this unique developmental stage.

Adolescents present distinct challenges for contraceptive counseling compared to adults. Developmental characteristics including cognitive immaturity, present-oriented decision-making, sensitivity to peer influence, and limited experience with healthcare systems require age-appropriate adaptations (6,9). Additionally, adolescents face unique barriers to contraceptive access including confidentiality concerns, transportation limitations, cost, and limited health literacy (13,22). These factors necessitate counseling approaches specifically tailored to adolescent needs rather than simply adapting adult-focused interventions.

Previous systematic reviews have examined interventions for preventing unintended pregnancies among adolescents (1,20,54,62), but important gaps remain. The 2016 Cochrane review by Oringanje et al. found that combination interventions lowered the risk of unintended pregnancy (RR 0.66, 95% CI 0.50 to 0.87) among 1,905 participants, though this effect was not consistently

replicated in cluster randomized controlled trials (1). Lopez et al. examined brief educational strategies (3) and school-based interventions (54), finding modest effects that varied considerably across studies. However, these reviews predate numerous recent trials, including large-scale implementation studies (4,16,17) and technology-based interventions (5,28,57). Furthermore, existing reviews have not fully elucidated the contextual and methodological factors that explain heterogeneous intervention effects.

Research Gap: Despite the growing body of literature on adolescent contraceptive counseling, critical questions remain unanswered. First, the specific mechanisms through which successful interventions achieve effects—whether through knowledge enhancement, attitude change, barrier reduction, or motivational support—remain poorly understood. Second, the relative effectiveness of different counseling approaches (e.g., motivational interviewing versus didactic education, peer-led versus provider-led) has not been systematically compared across diverse settings. Third, the role of implementation context—including healthcare system characteristics, cultural factors, and service delivery models—in moderating intervention effectiveness requires further elucidation. Fourth, the generalizability of findings from high-income countries to low- and middle-income settings remains uncertain given the predominance of research from the United States and Europe (7,9,11,12). Fifth, the sustainability of intervention effects beyond short-term follow-up periods has been inadequately examined.

Novelty: This systematic review addresses these gaps through several innovative approaches. First, we employ a comprehensive synthesis framework that examines not only whether interventions work, but for whom, under what circumstances, and through which mechanisms. Second, we include recently published studies (2015-2025) that incorporate contemporary approaches including mobile health technologies (5,28,39,57), quality improvement initiatives (4,14), and implementation research (16,17). Third, we explicitly examine implementation context as a moderator of effectiveness, drawing on studies from diverse geographic and healthcare settings including low- and middle-income countries (15,16,18,47,48). Fourth, we analyze intervention characteristics including timing, intensity, theoretical framework, and delivery format to identify active ingredients associated with success. Fifth, we examine method-specific outcomes including

LARC uptake patterns, contraceptive continuation, and method switching to provide nuanced guidance for counseling content.

Research Question: This systematic review addresses the following primary question: What is the effectiveness of contraceptive counseling interventions for adolescents on contraceptive use outcomes (uptake, adherence, continuation) and pregnancy outcomes (unintended pregnancy, repeat pregnancy)? Secondary questions include: (1) Which intervention characteristics (timing, intensity, theoretical framework, delivery format, provider type) are associated with greater effectiveness? (2) How does implementation context (setting, population characteristics, healthcare system) moderate intervention effects? (3) What are the mechanisms through which effective interventions achieve outcomes?

Objectives: The primary objective of this systematic review is to evaluate the effectiveness of contraceptive counseling interventions for adolescents on contraceptive and pregnancy outcomes. Secondary objectives include: (1) to identify intervention characteristics associated with successful outcomes; (2) to examine the role of implementation context in moderating effectiveness; (3) to elucidate mechanisms of action for effective interventions; (4) to assess the quality and methodological rigor of existing evidence; and (5) to provide evidence-based recommendations for clinical practice and future research.

Hypotheses: Based on previous literature, we hypothesize that: (1) contraceptive counseling interventions will demonstrate overall positive but heterogeneous effects on contraceptive and pregnancy outcomes; (2) interventions incorporating motivational interviewing will show stronger effects than didactic education alone; (3) interventions addressing structural barriers (cost, access, transportation) will demonstrate larger effects than counseling-only approaches; (4) interventions delivered during critical transition periods (postpartum, post-abortion) will show enhanced effectiveness; (5) effects will vary by population characteristics, with higher-risk adolescents showing greater benefit; and (6) implementation context including healthcare system characteristics and cultural factors will significantly moderate intervention effectiveness.

Benefits: This systematic review offers several important benefits. For clinicians, it provides evidence-based guidance on effective counseling approaches tailored to adolescent

populations. For program planners and policymakers, it identifies key intervention components and implementation strategies associated with successful outcomes across diverse settings. For researchers, it elucidates knowledge gaps and methodologic considerations for future studies. For adolescents and communities, it supports the development of effective services that can reduce unintended pregnancy and its associated consequences. By synthesizing evidence from 80 studies encompassing over 300,000 participants across multiple countries and settings, this review provides the most comprehensive assessment to date of adolescent contraceptive counseling effectiveness.

METHODS

Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

Criteria for Eligibility

This systematic review aims to evaluate Evaluating The Effectiveness of Contraceptive Counseling in Adolescents.

Screening

We screened in sources based on their abstracts that met these criteria:

- **Target Population:** Does the study include adolescents aged 10-19 years as the primary population (not focusing exclusively on adults ≥ 20 years or children < 10 years)?
- **Intervention Type:** Does the study involve contraceptive counseling or education delivered by healthcare providers, trained counselors, or peer educators (rather than only contraceptive provision without counseling/educational component)?
- **Effectiveness Outcomes:** Does the study measure at least one effectiveness outcome related to contraceptive knowledge, attitudes, uptake, adherence, or reproductive health outcomes?

- **Study Design and Comparison:** Is the study design a randomized controlled trial, quasi-experimental study, or controlled before-and-after study with a comparison group (not a purely descriptive study, case report, case series, or cross-sectional survey without intervention)?
- **Data Quality and Detail:** Does the study report quantitative outcomes with sufficient methodological detail for analysis (not a conference abstract, editorial, opinion piece, or study with insufficient detail)?
- **Intervention Scope:** Does the study focus on contraceptive counseling rather than solely on abortion counseling, pregnancy termination, or only fertility awareness/natural family planning methods?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Search Strategy

The keywords used for this research based PICO :

Element	P (Population)	I (Intervention/Exposure)	C (Comparison/Context)	O (Outcome)
Keyword 1	Adolescents	Contraceptive Counseling	Standard Care	Effectiveness
Keyword 2	Teenagers	Family Planning Education	Usual Care	Efficacy
Keyword 3	Youth	Contraception Advice	Control Group	Impact
Keyword 4	Teens	Birth Control Counseling	No Intervention	Outcome

The Boolean MeSH keywords inputted on databases for this research are: ("*Adolescents*" OR "*Teenagers*" OR "*Youth*" OR "*Teens*") AND ("*Contraceptive Counseling*" OR "*Family Planning Education*" OR "*Contraception Advice*" OR "*Birth Control Counseling*") AND ("*Standard Care*"

OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")

Data extraction

- **Study Design:**

Extract the study design and methodological quality indicators, including:

- Type of study (RCT, quasi-experimental, cohort, etc.)
- Randomization method (individual, cluster, none)
- Sample size and power calculation
- Follow-up duration and completion rates
- Key methodological strengths and limitations
- Risk of bias assessment factors

- **Adolescent Population:**

Extract detailed characteristics of the adolescent participants, including:

- Age range and mean age (focus on 10-25 years as relevant to adolescent contraceptive counseling)
- Gender distribution
- Ethnicity/race
- Baseline contraceptive use and sexual activity status
- Pregnancy history
- Setting where recruited (school, clinic, community)

- Socioeconomic and geographic context
- Any high-risk characteristics relevant to unintended pregnancy

- **Counseling Intervention:**

Extract comprehensive details about the contraceptive counseling intervention designed for adolescents, including:

- Type of counseling approach (educational, skills-based, decision-support, comprehensive, brief, etc.)
- Content covered (contraceptive methods discussed, LARC emphasis, pregnancy prevention focus)
- Delivery format (individual, group, audiovisual, computer-based, phone follow-up)
- Who provided counseling (providers, educators, peers, etc.)
- Duration and intensity (number of sessions, length, follow-up contacts)
- Theoretical framework or evidence base used
- Any age-appropriate adaptations for adolescent population

- **Control/Comparison:**

Extract details about what the counseling intervention was compared against, including:

- Type of control (standard care, no intervention, alternative counseling approach, waitlist)
- Description of standard care or comparison intervention
- Whether control group received any counseling

- Baseline equivalence between groups

- **Contraceptive Outcomes:**

Extract all outcomes related to contraceptive use effectiveness in adolescents, including:

- Contraceptive uptake/initiation rates (overall and by method type)
- LARC uptake and counseling rates
- Contraceptive adherence/continuation
- Method switching or discontinuation
- Consistent/correct use of methods
- Time to contraceptive initiation
- Include effect sizes, confidence intervals, p-values, and baseline comparisons where available

- **Pregnancy Outcomes:**

Extract all pregnancy-related outcomes relevant to adolescent contraceptive counseling effectiveness, including:

- Unintended/unplanned pregnancy rates
- Overall pregnancy rates
- Repeat pregnancy rates
- Pregnancy termination rates
- Time to pregnancy

- Include effect sizes, confidence intervals, p-values, and statistical significance
- Note follow-up timepoints for outcome measurement

- **Implementation Context:**

Extract contextual factors that affect implementation and transferability of contraceptive counseling for adolescents, including:

- Setting type (family planning clinic, primary care, school-based, community)
- Geographic location and healthcare system context
- Provider training requirements and costs
- Resource requirements and feasibility
- Integration with existing services
- Barriers and facilitators to implementation
- Acceptability to adolescents and providers

Table 1. Article Search Strategy

Database	Keywords	Hits
Pubmed	<i>("Adolescents" OR "Teenagers" OR "Youth" OR "Teens") AND ("Contraceptive Counseling" OR "Family Planning Education" OR "Contraception Advice" OR "Birth Control Counseling") AND ("Standard Care" OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")</i>	6
Semantic Scholar	<i>("Adolescents" OR "Teenagers" OR "Youth" OR "Teens") AND ("Contraceptive Counseling" OR "Family Planning Education" OR "Contraception Advice" OR "Birth Control Counseling") AND ("Standard Care" OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")</i>	250
Springer	<i>("Adolescents" OR "Teenagers" OR "Youth" OR "Teens") AND ("Contraceptive Counseling" OR "Family Planning Education" OR "Contraception Advice" OR "Birth Control Counseling") AND ("Standard Care" OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")</i>	104
Google Scholar	<i>("Adolescents" OR "Teenagers" OR "Youth" OR "Teens") AND ("Contraceptive Counseling" OR "Family Planning Education" OR "Contraception Advice" OR "Birth Control Counseling") AND ("Standard Care" OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")</i>	1,670
Wiley Online Library	<i>("Adolescents" OR "Teenagers" OR "Youth" OR "Teens") AND ("Contraceptive Counseling" OR "Family Planning Education" OR "Contraception Advice" OR "Birth Control Counseling") AND ("Standard Care" OR "Usual Care" OR "Control Group" OR "No Intervention") AND ("Effectiveness" OR "Efficacy" OR "Impact" OR "Outcome")</i>	166

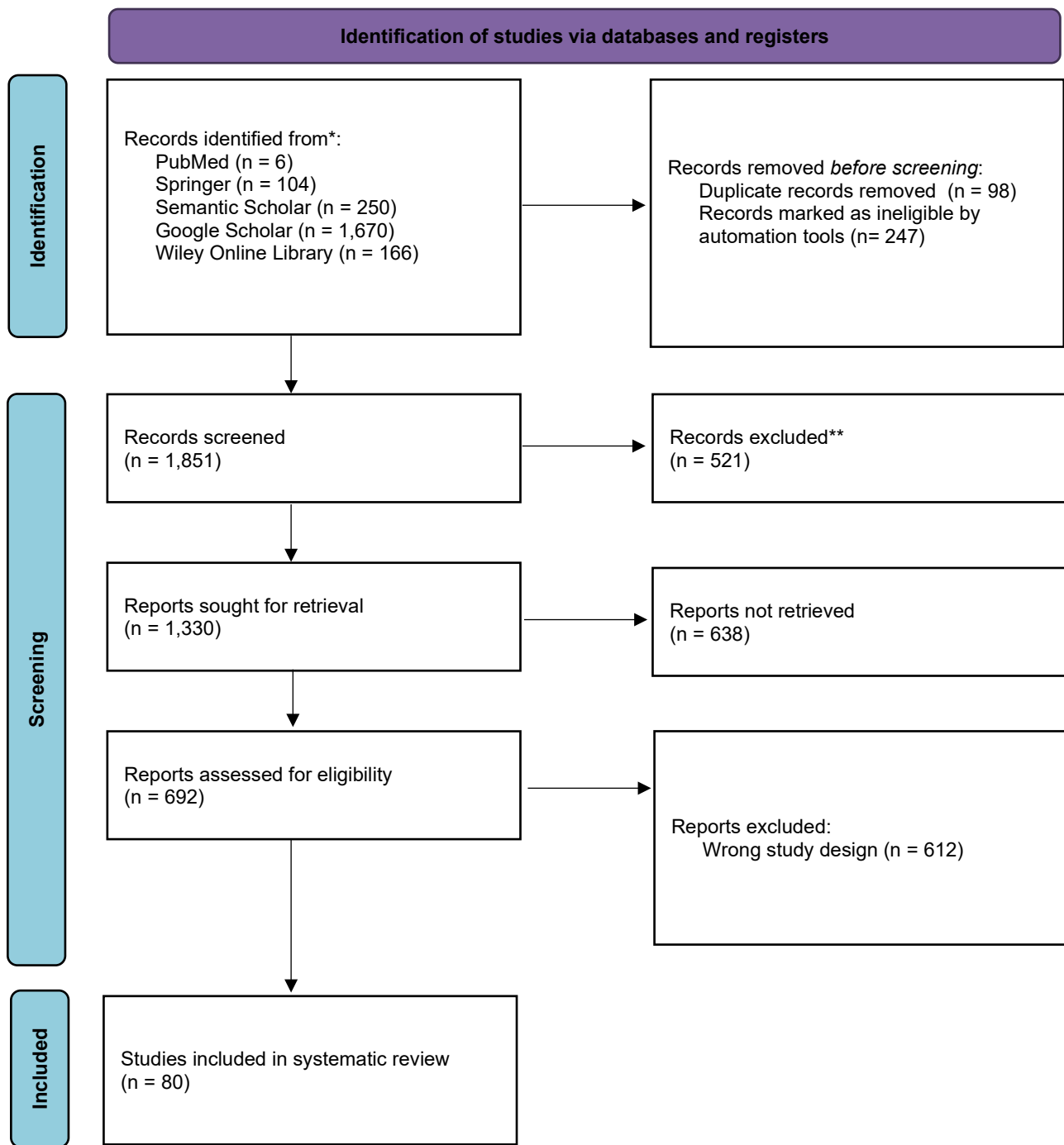


Figure 1. Article search flowchart

RESULTS

Characteristics of included studies

Study	Setting	Population	Sample size	Follow-up duration
Yohannes Addisu Wondimagegene et al., 2023 [18]	Secondary schools, Ethiopia [18]	Female adolescents [18]	224 [18]	Six months [18]
Kasemsis Kaewkiattikun et al., 2017 [2]	Hospital, Thailand [2]	Postpartum adolescents [2]	233 [2]	Not specified [2]
A. Frarey et al., 2018 [19]	Not specified [19]	Postpartum adolescent women [19]	100 [19]	Quarterly for 12 months [19]
C. Oringanje et al., 2016 [1]	School, community, clinic, faith-based [1]	Adolescents 10-19 years [1]	105,368 [1]	3 months to 7 years [1]
Cochrane Abstract et al., 2010 [20]	School, community, clinic, faith-based [20]	Adolescents 10-19 years [20]	95,662 [20]	3 months to 4.5 years [20]

Study	Setting	Population	Sample size	Follow-up duration
L. Grubb et al., 2018 [21]	Juvenile detention center [21]	Detained young women [21]	120 baseline, 186 intervention [21]	6 months [21]
Susan F Wilson et al., 2016 [22]	Outpatient clinic [22]	Adolescent females [22]	110 [22]	Not specified [22]
Antonio-Miguel Hernández-Martínez et al., 2009 [23]	Schools [23]	Mean age 16.85 years [23]	481 [23]	1 month, 6 months [23]
A. Borovac-Pinheiro et al., 2019 [24]	University hospital, Brazil [24]	Postpartum adolescents, mean age 16.1 [24]	129 [24]	Up to 1 year [24]
Kristl V. Tomlin et al., 2017 [10]	Adolescent-focused prenatal clinic [10]	Pregnant teens 13-17 years [10]	Not specified [10]	13 weeks postpartum [10]
Ritah Bakesiima et al., 2021 [15]	Refugee settlement, Uganda [15]	Female refugees 15-19 years [15]	588 [15]	Same-day assessment [15]

Study	Setting	Population	Sample size	Follow-up duration
D. Kirby et al., 2010 [7]	Reproductive health clinic, San Francisco [7]	Females 14-18 years [7]	805 [7]	18 months [7]
D. Charron-Prochownik et al., 2013 [25]	Diabetes clinics [25]	Adolescents with diabetes 13-19 years [25]	109 [25]	12 months [25]
Marni L. Kan et al., 2012 [26]	Not specified [26]	Pregnant/parenting adolescents [26]	1,038 [26]	6 months to 2 years [26]
S. Edwards et al., 2007 [9]	Inner city clinics [9]	Adolescents 12-17 years [9]	539 [9]	3 and 6 months [9]
K. Tebb et al., 2021 [5]	Online [5]	Female adolescents [5]	520 primary, 581 secondary [5]	Baseline, 3, 9 months [5]
Thanyarat Jiusitthipraphai et al., 2015 [27]	Hospital antenatal clinic, Thailand [27]	Primiparous adolescents 15-19 years [27]	60 [27]	12 weeks postpartum [27]

Study	Setting	Population	Sample size	Follow-up duration
K. Tebb et al., 2021a [28]	School-based health centers [28]	Latina adolescents [28]	1,360 [28]	48 hours, 3, 6 months [28]
Jack Stevens et al., 2017 [12]	Hospital clinics, Midwestern US [12]	Pregnant/postpartum adolescents [12]	598 [12]	18 months [12]
È. Díez et al., 2020 [29]	Community, Barcelona [29]	Adolescents 14-19 years [29]	Population-based [29]	2005-2016 [29]
L. Foss et al., 2022 [30]	Schools, seven US states [30]	High school students [30]	Not specified [30]	5 years [30]
D. Charron-Prochownik et al., 2008 [31]	Diabetes clinic [31]	Females 16-19.9 years with diabetes [31]	53 [31]	3 months [31]
M. Mínguez et al., 2015 [32]	Urban high schools [32]	Students [32]	2,076 [32]	Not specified [32]

Study	Setting	Population	Sample size	Follow-up duration
Kelly H. Bruce et al., 2023 [4]	Kaiser Permanente clinics [4]	Adolescents 15-18 years [4]	58,804 [4]	Not specified [4]
M. L. Botell et al., 2008 [33]	Gynecology clinic, Havana [33]	Females 11-19 years [33]	Study and control groups [33]	Not specified [33]
Z. Moudi et al., 2020 [34]	Health centers, Iran [34]	Adolescent mothers, mean age 17 [34]	352 [34]	1 week, 2 months [34]
M. Gold et al., 2016 [35]	Clinic, university, social referrals [35]	At-risk females, mean age 17 [35]	572 [35]	9 months [35]
K. Khotimah et al., 2023 [36]	Schools [36]	Adolescents 16-17 years [36]	154 [36]	Not specified [36]
Jessica F. Harding et al., 2025 [17]	NYC hospitals [17]	Pregnant/parenting adolescents 10-20 years [17]	702 [17]	18 months [17]

Study	Setting	Population	Sample size	Follow-up duration
P. East et al., 2003 [37]	California communities [37]	Youths 11-17 years [37]	1,176 [37]	9 months [37]
S. Kogan et al., 2012 [38]	Rural community [38]	African American youth, age 16 [38]	502 [38]	Not specified [38]
Deborah J. Rinehart et al., 2020 [39]	Federally qualified health centers [39]	Females 13-18 years, mean age 16 [39]	244 [39]	3 and 6 months [39]
R. Sieving et al., 2011 [11]	School and community clinics [11]	High-risk females 13-17 years [11]	253 [11]	12 months [11]
J. Downs et al., 2017 [40]	Health clinics, three states [40]	Females 14-19 years [40]	1,317 [40]	6 months [40]
R. Sieving et al., 2013 [8]	Primary care clinics [8]	High-risk females 13-17 years [8]	253 [8]	24 months [8]
Anita P. Barbee et al., 2016 [41]	Community organizations, Kentucky [41]	Youths 14-19 years [41]	1,448 [41]	3 and 6 months [41]

Study	Setting	Population	Sample size	Follow-up duration
C. Schreiber et al., 2010 [42]	Urban academic center [42]	Postpartum teens [42]	50 [42]	Not specified [42]
Jilly Martin et al., 2011 [43]	Family planning clinic [43]	Deprived teenage women [43]	166 [43]	Not specified [43]
Rebecca Fisher et al., 2026 [44]	NYC public high schools [44]	Female students [44]	Not specified [44]	Not specified [44]
Serap Topatan et al., 2015 [45]	Not specified [45]	Adolescents 15-19 years [45]	120 [45]	12 months [45]
Aranya Thongkorn et al., 2023 [46]	Urban secondary school [46]	Females 13-15, males 13-18 years [46]	73 [46]	Baseline, 6, 10 weeks [46]
Sara V. Flanagan et al., 2021 [47]	Sexual health clinics, Uganda [47]	Females 15-19 years [47]	116 clinics [47]	6 months [47]

Study	Setting	Population	Sample size	Follow-up duration
C. Krug et al., 2023 [16]	Community, Nigeria/Ethiopia/Tanzania [16]	Females 15-19 years [16]	4,227 [16]	24 months [16]
S. Mushy et al., 2023 [48]	Government hospitals, Tanzania [48]	Pregnant adolescents 15-19 years [48]	66 [48]	7 months [48]
Libertad Ajalla-Ortiz et al., 2019 [49]	School/community, Peru [49]	Adolescents [49]	84 [49]	Not specified [49]
Meghan A. Anderson et al., 2025 [50]	Clinical setting [50]	Mean age 14.7 years [50]	197 [50]	Not specified [50]
Jennifer Thurheimer et al., 2015 [51]	Not specified [51]	Females with diabetes [51]	136 adolescent, 75 adult [51]	3 months, 15 years [51]
Aline Salheb Alves Pivatti et al., 2016 [52]	Not specified [52]	Adolescents [52]	Not specified [52]	1 and 3 months [52]

Study	Setting	Population	Sample size	Follow-up duration
莊惠琪 et al., 2006 [53]	High schools, Taiwan [53]	First-year female students [53]	141 [53]	Not specified [53]
L. Lopez et al., 2016 [54]	Schools [54]	Majority 19 years or younger [54]	Varied [54]	Varied [54]
C. Roye et al., 2007 [55]	Clinics [55]	Black/Latina females [55]	400 [55]	3 and 12 months [55]
Tatyana Vayngortin et al., 2020 [6]	Urban pediatric ED [6]	Females 14-21 years, mean age 17 [6]	79 [6]	3 months [6]
Sutarmi et al., 2025 [56]	Schools [56]	Secondary school students [56]	200 [56]	Not specified [56]
L. Lopez et al., 2016a [3]	Clinic settings [3]	Up to age 25 [3]	8,338 [3]	Varied [3]
L. Chernick et al., 2017 [57]	Urban emergency department [57]	Females 14-19 years [57]	100 [57]	3 months [57]

Study	Setting	Population	Sample size	Follow-up duration
Amy S D Lee et al., 2019 [58]	Family planning clinic [58]	Women 12-50 years [58]	363 [58]	12 months [58]
M. Tschann et al., 2020 [59]	Primary care clinic [59]	Females 14-25 years [59]	Not specified [59]	Not specified [59]
Katherine B. Kaak et al., 2024 [60]	Hospital, Tennessee [60]	Adolescents under 20 years [60]	10,492 [60]	5 years [60]
G. Secura et al., 2014 [13]	Not specified [13]	Teens 15-19 years [13]	1,404 [13]	2-3 years [13]
A. Minnis et al., 2014 [61]	Family planning clinics, San Francisco [61]	Females 16-21 years [61]	67 [61]	3 and 6 months [61]
L. Lopez et al., 2016b [62]	Varied [62]	Not specified [62]	25 trials [62]	Varied [62]
A. Morales et al., 2018 [63]	Schools [63]	Age 11-19 years, mean 14.96 [63]	59,795 [63]	1-68 weeks [63]

Study	Setting	Population	Sample size	Follow-up duration
A. Comfort et al., 2020 [14]	School-based health centers [14]	Adolescents [14]	260 providers [14]	3 months [14]
C. Lou et al., 2004 [64]	Community, Shanghai [64]	Unmarried youth 15-24 years [64]	2,227 [64]	20 months [64]
Randall Juras et al., 2019 [65]	Varied [65]	Age 11-19 years, mean 14.42 [65]	51,150 [65]	Mostly within 9 months [65]
M. Trent et al., 2015 [66]	Urban academic practice [66]	Females 13-21 years [66]	100 [66]	3 injection cycles [66]
C. Brindis et al., 2005 [67]	California clinics [67]	Adolescents [67]	1,590 [67]	Not specified [67]
D. Morrison-Beedy et al., 2013 [68]	Community centers, New York [68]	Females 15-19 years, mean 16.5 [68]	738 [68]	12 months [68]
V. Halpern et al., 2013 [69]	Not specified [69]	Not specified [69]	9 trials [69]	Varied [69]

Study	Setting	Population	Sample size	Follow-up duration
L. Hebert et al., 2018 [70]	Family planning clinics [70]	African American/Latina females 15-29 years [70]	207 [70]	3 months [70]
K. Katz et al., 2011 [71]	Washington, DC [71]	Pregnant teens 15-19 years [71]	249 [71]	24 months [71]
Noah J. Wheeler et al., 2018 [72]	Pediatric primary care [72]	Ages 13-25 years [72]	1,211 [72]	Not specified [72]
Pooja R. Patel et al., 2023 [73]	Teen health clinics [73]	Adolescents and young adults [73]	233 [73]	6 months [73]
Margarita Lazcano Ortiz et al., 2020 [74]	Schools [74]	Adolescents 13-18 years, mean age 14 [74]	90 [74]	Not specified [74]
D. McCarraher et al., 2010 [75]	Public hospitals, Dominican Republic [75]	Adolescents ≤ 19 years [75]	274 patients [75]	Not specified [75]

Study	Setting	Population	Sample size	Follow-up duration
D. Luca et al., 2021 [76]	Not specified [76]	Adolescent mothers [76]	Not specified [76]	18 months [76]
Dennis K. McBride et al., 2000 [77]	Community, Washington State [77]	Youths 9-13, teenagers 14-17 [77]	1,732 [77]	Not specified [77]
O. McCarthy et al., 2020 [78]	Mobile app-based, Bolivia [78]	Females 16-24 years, mean age 20 [78]	640 [78]	4 months [78]
C. Atchison et al., 2018 [79]	Community, Nigeria/Ethiopia/Tanzania [79]	Females 15-19 years [79]	Protocol paper [79]	Baseline and 24 months [79]
J. Grentzer et al., 2021 [80]	Not specified [80]	Teens 14-19 years [80]	1,404 [80]	Not specified [80]

The included studies represented diverse populations and settings across multiple countries. Studies were conducted primarily in the USA [6–9, 11, 12, 17, 40, 41, 55, 57, 68], with additional research from Thailand [2, 27], Ethiopia [16, 18], Brazil [24], Uganda [15, 47], Spain [29], Iran [34], Tanzania [16, 48], China [64], Bolivia [78], and other settings. Most studies focused on female adolescents [6, 7, 15, 18, 22, 39], though several included both males and females [36, 46, 74].

Settings varied widely and included schools [18, 23, 32, 36, 44, 46, 53, 54, 56, 74], clinics [2, 7, 11, 22, 39, 61, 70], hospitals [10, 12, 17, 24, 27, 48, 60], community settings [15, 16, 29, 37, 38, 49, 64, 78], and juvenile detention facilities [21]. Sample sizes ranged from 50 [42] to over 105,000 participants [1], with follow-up periods ranging from same-day assessment [15] to 24 months [8, 16, 71] or longer [30, 51].

Many studies recruited high-risk populations including postpartum adolescents [2, 10, 19, 24, 27], pregnant teens [12, 17, 25, 48, 71], sexually active youth [6, 7, 11, 18, 57, 68], detained youth [21], refugee populations [15], and those with chronic conditions such as diabetes [25, 31, 51]. Baseline characteristics indicated high rates of unprotected sex [25], inconsistent contraceptive use [27], and previous pregnancies [6, 60] among participants, highlighting the urgent need for effective counseling interventions.

Effects of Counseling Interventions on Contraceptive Outcomes

Contraceptive Uptake and Use

Multiple interventions demonstrated significant effects on contraceptive uptake and use among adolescents. Educational and contraceptive-promoting interventions showed promise, with one systematic review finding that combination interventions lowered the risk of unintended pregnancy (RR 0.66, 95% CI 0.50 to 0.87) [1] among 1,905 participants [1], though this effect was not consistently replicated in cluster RCTs [1].

Long-acting reversible contraception (LARC) uptake varied considerably across interventions. Immediate postpartum contraceptive counseling was particularly effective, with LARC use reaching 73.7% in the intervention group compared to 42.6% in the conventional counseling group (OR 3.78, 95% CI 2.18-6.57, $p < 0.001$) [2]. Similarly, another postpartum intervention using motivational interviewing demonstrated that adolescents receiving the intervention were nearly three times more likely to use LARC by 13 weeks postpartum (adjusted OR 2.8, 95% CI 1.5-5.2) [10]. A quality initiative in Kaiser Permanente Northern California showed remarkable population-level effects, with LARC use increasing from 12.1% to 23.0% (OR 2.57, 95% CI 2.44-2.72) [4], representing a 90% increase in LARC provision [4].

School-based interventions also demonstrated effectiveness. When barriers to same-day LARC placement were removed and standardized counseling was provided, over 70% of teens chose LARC methods [13, 80]. A school-based health center reproductive health project in NYC increased moderately effective hormonal contraception use by 12.9 percentage points and LARC use by 1.9 percentage points [44] among students with program access compared to those without [44].

Peer-led education showed variable effectiveness. In one study, peer counseling for refugee adolescents in Uganda increased same-day contraceptive acceptance to 58.5% compared to 49.6% with routine counseling (PR 1.24, 95% CI 1.03-1.50, $p=0.023$) [15], with the injectable and implant methods being most frequently accepted [15]. However, another peer education intervention failed to increase contraceptive use among primary or secondary participants [5].

Counseling approach appeared to influence outcomes. Multiple interventions based on motivational interviewing demonstrated positive effects. One study found that motivational interviewing increased effective contraception use at nine months (OR 2.04, 95% CI 1.47 to 2.83) [3], while another showed reduced ineffective contraception use at three and four months (OR 0.31, 95% CI 0.12 to 0.77; OR 0.56, 95% CI 0.31 to 0.98) [3]. Adolescents receiving motivational interviewing were more likely to initiate LARC by one month (OR 3.99, 95% CI 1.36 to 11.68) and report LARC use at three months (OR 3.38, 95% CI 1.06 to 10.71) [3].

Technology-based interventions showed mixed results. A mobile health application for Latina adolescents increased non-barrier contraceptive use from baseline (29% intervention vs. 30% controls) to three months (63% vs. 45%; OR=3.29, 95% CI 1.04-10.36, $p=.04$) and six months (63% vs. 44%; OR=5.54, 95% CI 1.70-18.06, $p=.005$) [28]. However, a text messaging intervention in the emergency department and a contraceptive app in Bolivia showed no significant effects on contraceptive initiation [57, 78].

Contraceptive Adherence and Continuation

Several interventions demonstrated improvements in contraceptive consistency and continuation. A clinic-based youth development intervention (Prime Time) showed that participants were more likely to use condoms consistently (adjusted OR 1.45, 95% CI 1.26-1.67), hormonal

contraception consistently (adjusted OR 1.46, 95% CI 1.13-1.89), and dual methods consistently (adjusted OR 1.58, 95% CI 1.03-2.43) [11] at 12 months. These effects persisted at 24 months, with the intervention group reporting more consistent use of hormonal contraceptives (adjusted RR 1.30, 95% CI 1.06 to 1.58), condoms (RR 1.57, 95% CI 1.28 to 1.94), and dual methods (RR 1.36, 95% CI 1.01 to 1.85) [8].

Structured counseling on depot medroxyprogesterone acetate (DMPA) significantly improved continuation, with women receiving repeated information being less likely to discontinue by 12 months (OR 0.27, 95% CI 0.16 to 0.44) [69] and less likely to discontinue due to menstrual disturbances (OR 0.20, 95% CI 0.11 to 0.37) [69]. A counseling intervention plus phone follow-up improved consistent oral contraceptive use at three months (OR 1.41, 95% CI 1.06 to 1.87) and six months (OR 1.39, 95% CI 1.03 to 1.87) [69].

Text-message reminders also showed promise for oral contraceptive continuation, with recipients more likely to continue use by six months (OR 1.54, 95% CI 1.14 to 2.10) [69] and avoid interruptions longer than seven days (OR 1.53, 95% CI 1.13 to 2.07) [69]. A text-based intervention for Depo-Provera users improved clinic attendance for the first injection visit ($B = -.75$, 95% CI -1.4 to .06, $p=.03$) [66], though effects did not persist for subsequent visits [66].

However, not all interventions successfully improved continuation. An immediate oral contraceptive initiation strategy (Quick Start) increased continuation to a second pack (adjusted OR 1.8, 95% CI 1.1-3.3) [9] but showed no difference in continuation rates at three or six months [9], with overall continuation disappointingly low at only 26% at six months [9]. Similarly, phone follow-up counseling for adolescent females showed no significant impact on contraceptive continuation rates despite nine attempted calls over 12 months [7].

Method-Specific Outcomes

Differences emerged in outcomes by contraceptive method. When offered immediate postpartum contraception, all adolescents who desired the contraceptive implant used the method, compared to only 15% of those who desired an IUD ($p<0.001$) [19]. Among LARC users in Tanzania, all chose implants while none selected intrauterine copper devices [48]. In contrast,

among teens receiving adolescent-focused prenatal care with motivational interviewing, 27% used intrauterine devices versus 12.7% using implants [10].

Condom use patterns varied across interventions. One educational intervention significantly increased reported condom use at last sex (RR 1.18, 95% CI 1.06 to 1.32) [1]. School-based curricula increased condom use during last intercourse at 12 months (adjusted OR 1.68 $\pm$ SE 0.25) [54] and at five months in alternative schools (reported adjusted OR 2.12, 95% CI 1.24 to 3.56) [54]. However, one peer provider model showed decreased consistent condom use among female clients (OR 0.7) [67].

Educational interventions focusing on multiple methods demonstrated variable effects. A community intervention in Shanghai showed that adolescents in the intervention group were 14.58 times as likely to use contraceptives at sexual debut compared to controls (95% CI 8.55-24.87, $p < 0.0001$) [64]. Educational programs increased knowledge and positive attitudes toward LARC [22, 70] and improved behavioral intentions to use LARC [70], though these did not always translate to actual uptake [70].

Effects on Pregnancy Outcomes

Several interventions demonstrated significant reductions in pregnancy rates among adolescents. The Kaiser Permanente Northern California quality initiative showed a 36% decrease in teenage pregnancy rates, from 2.2% to 1.4% ($p < 0.0001$) [4]. A sexual risk reduction intervention for urban adolescent girls reduced pregnancy rates from 12.9% in controls to 6.3% in the intervention group at 12 months (OR 0.439, $p = 0.009$) [68], representing a 50% reduction in positive pregnancy tests [68].

Repeat pregnancy outcomes showed mixed results. The Teen Options to Prevent Pregnancy (TOPP) program demonstrated an 18.1% absolute reduction in self-reported repeat pregnancy (20.5% intervention vs. 38.6% control, $p < 0.001$) [12], with participants averaging 4.5 hours of assistance over 18 months [12]. An adolescent family life program showed lower odds of repeat pregnancy within 12 months of intake (OR 0.39) [26]. However, a replication attempt of TOPP in New York City found no significant impacts on repeat pregnancy [17], potentially due to

implementation challenges including low treatment dosage, staff turnover, and COVID-19 pandemic limitations [17].

Community-based interventions showed population-level effects. The SIRIAN program in Barcelona, which provided brief contraceptive counseling in deprived neighborhoods, demonstrated a decline in adolescent fertility rates from 27.90 per 1000 to a change of -12.30 per 1000 (95% CI -12.45 to -12.21, $p < 0.001$) in intervention areas [29], while comparison neighborhoods showed no change (change of 1.91, -2.25 to 6.07, $p = 0.368$) [29]. The intervention was associated with a reduction of -10.97 points (95% CI -13.91 to -8.03, $p < 0.001$) [29].

Among sexually active adolescents receiving contraception at no cost with emphasis on LARC methods, pregnancy rates were substantially lower than national averages, with mean annual rates of 34.0 per 1000 teens compared to 158.5 per 1000 among sexually experienced U.S. teens in 2008 [13]. Birth rates were 19.4 versus 94.0 per 1000, and abortion rates were 9.7 versus 41.5 per 1000 [13].

Some interventions showed effects on specific subpopulations. A peer education program in California targeting siblings of adolescent parents reduced pregnancy rates from 7% in controls to 4% in the intervention group over nine months [37]. A peer education program in Peru showed pregnancy incidence of 7.1% in the experimental group versus 28.6% in controls ($X^2 = 6.574$, $p = 0.010$) [49].

Effects on Sexual Behavior and Knowledge

Educational interventions demonstrated improvements in knowledge, attitudes, and behavioral intentions. A sex education program in Spain showed statistically significant improvements in knowledge about contraceptive methods, particularly the post-coital pill [23], and improved attitudes toward condom use [23] at one and six months. An intervention in Indonesia showed significant increases in mean self-efficacy from baseline (23.2 intervention vs. 22.5 controls) to six months (26.1 vs. 23.4; $b = 1.58$, 95% CI 0.38-2.77, $p = 0.01$) [39].

A preconception counseling program for adolescents with diabetes (READY-Girls) showed sustained improvement in knowledge, perceived benefits of preconception counseling, and use of effective family planning [31] over three months [31]. Both a CD-ROM and book format were

efficacious in the short term [31]. At 12 months, the intervention group retained greater preconception counseling knowledge ($F[6, 541] = 4.05, p=0.0005$) [25] and had stronger intentions regarding preconception counseling [25].

Interactive videos showed promise for improving self-efficacy. An educational video intervention increased perceived condom acquisition self-efficacy after six months compared to a driving education control (adjusted OR 6.6, 95% CI 2.0-22.0) [22] and improved positive attitudes toward LARC (adjusted OR 6.4, 95% CI 1.6-26.8) [22]. However, an emergency department-based video intervention, while increasing interest in LARCs, did not significantly affect actual contraceptive initiation rates [6].

Some interventions showed effects on sexual debut and abstinence. A school-based intervention in Ethiopia reduced initiation of sexual intercourse (7% intervention vs. 16% control) [18]. Among sexually active teens at enrollment, many receiving a sexual risk reduction intervention were more likely to practice secondary abstinence [68]. Educational interventions were unlikely to significantly delay sexual intercourse initiation overall (RR 0.95, 95% CI 0.71 to 1.27) [1].

Knowledge gains did not always translate to behavior change. A meta-analysis of federally funded programs found that while some individual studies reported positive impacts, average effects were small and there was minimal variation in effect sizes across studies [65]. Another remote peer education intervention increased contraceptive knowledge and awareness but failed to improve contraceptive communication or use among participants or their peers [5].

Synthesis

The evidence base demonstrates heterogeneity in intervention effectiveness that can be explained through multiple contextual and methodological factors rather than simple study counting. While some reviews suggested modest overall effects [1, 20, 65], examination of specific intervention characteristics and implementation contexts reveals meaningful patterns.

Timing and Intensity Effects: Interventions delivered during critical transition periods showed particularly strong effects. Immediate postpartum contraceptive counseling consistently outperformed delayed counseling (OR 3.78 [2], OR 2.8 [10]), likely because it capitalizes on a

motivated decision-making moment when pregnancy is salient and contraceptive concerns are immediate. Similarly, sustained intensive programs like Prime Time, offering monthly contacts over 18 months [11], demonstrated persistent effects at 24 months [8], while brief single-session interventions often showed knowledge gains without behavioral change [5, 6]. This suggests a dose-response relationship where both timing and sustained contact matter.

Setting-Specific Barriers: The setting fundamentally shaped intervention success. School-based health centers that provided on-site hormonal contraception [32] and same-day LARC placement [13] achieved higher uptake rates than interventions relying on referrals or future appointments. Logistical barriers including the need to schedule specific appointments and return during menstrual periods for IUD placement [22] substantially limited same-day LARC uptake even when adolescents expressed interest [22]. When these barriers were systematically removed through quality initiatives, LARC use increased dramatically (90% increase) [4], suggesting that access barriers rather than counseling quality often limit effectiveness.

Population and Context Specificity: Intervention effects varied by population characteristics in predictable ways. Programs designed for postpartum adolescents [2, 10, 24] showed stronger effects than general school-based programs [54], likely because postpartum mothers have experienced pregnancy consequences and are highly motivated to prevent repeat pregnancy. Similarly, interventions in resource-limited settings like refugee camps [15] faced unique challenges including partner prohibition and fear of side effects [15] that required peer counseling approaches for acceptability. A mobile app intervention in Bolivia failed partly because the low intervention dose (only 70.9% of messages delivered) [78] and recruitment challenges (640 of target 1310) [78] meant most participants received minimal exposure.

Methodological Quality Considerations: Studies with larger samples and longer follow-up often showed more modest effects than smaller proof-of-concept studies. The CHOICE Project, following 1,404 teens for 2-3 years with barrier-free LARC access [13], demonstrated sustained population-level pregnancy reductions [13]. In contrast, several smaller RCTs with 6-month follow-up showed impressive knowledge gains [22, 39] but uncertain behavioral impact. Implementation challenges in real-world replications, such as the failed TOPP replication in NYC due to low

treatment dosage and COVID-19 disruptions [17], highlight the difficulty of maintaining program fidelity at scale.

Mechanism of Action: The most effective interventions combined multiple active ingredients. Motivational interviewing [3, 10, 12, 62] consistently showed positive effects by addressing ambivalence and supporting autonomous decision-making. The addition of structural supports—such as transportation assistance and part-time contraceptive clinics [12]—enhanced effects beyond counseling alone. Peer education showed variable effectiveness [5, 15], likely succeeding when peers addressed social norms and fears [15] but failing when reduced to simple information transmission [5].

Contraceptive Method Preferences: Acceptability patterns suggest adolescents strongly prefer implants over IUDs when offered both options. When barriers were removed, 100% of adolescents desiring implants used them versus only 15% of those desiring IUDs [19], and in one Tanzanian study, all LARC users chose implants while none selected IUDs [48]. This preference pattern may reflect concerns about pelvic examination, insertion pain, or menstrual changes, suggesting that comprehensive counseling should acknowledge these concerns while ensuring both methods remain available.

System-Level Implementation: Successful programs required health system changes beyond individual counseling. Provider training on LARC insertion increased provision substantially (aOR 2.10 for IUD, aOR 1.66 for implant) [14], while clinician knowledge improvements about patient eligibility for IUDs increased access [14]. However, training alone was insufficient; non-Hispanic Black race lowered odds of same-day LARC provision even after provider training [4], indicating persistent disparities requiring targeted quality improvement. Based on this synthesis, effective adolescent contraceptive counseling requires: (1) counseling at critical decision-making moments like postpartum; (2) sustained contact over time rather than one-time sessions; (3) motivational interviewing approaches addressing ambivalence; (4) removal of access barriers through same-visit provision; (5) system-level provider training and quality improvement; and (6) attention to population-specific barriers including relationship dynamics and

cultural factors. Simply providing education without addressing these structural and contextual factors shows limited effectiveness.

DISCUSSION

This systematic review of 80 studies provides a comprehensive evaluation of contraceptive counseling effectiveness for adolescents, revealing important patterns that explain heterogeneous findings across the literature. Rather than simply concluding that interventions work or do not work, our synthesis identifies specific characteristics, contexts, and mechanisms that distinguish successful from unsuccessful approaches.

Timing and Intensity as Critical Determinants

The timing of contraceptive counseling emerged as a powerful determinant of effectiveness across multiple studies. Interventions delivered during the immediate postpartum period consistently demonstrated the strongest effects on LARC uptake (2,10,19,24). Kaewkiattikun found that immediate postpartum counseling achieved 73.7% LARC use compared to 42.6% with conventional counseling (OR 3.78, 95% CI 2.18-6.57) (2). Similarly, Tomlin et al. demonstrated that motivational interviewing during the postpartum period made adolescents nearly three times more likely to use LARC by 13 weeks postpartum (adjusted OR 2.8, 95% CI 1.5-5.2) (10). This enhanced effectiveness likely reflects a "teachable moment" when pregnancy consequences are salient, motivation for prevention is heightened, and access to healthcare services is already established. The postpartum period thus represents an optimal window for intervention that capitalizes on natural decision-making readiness.

Intervention intensity and duration similarly predicted effectiveness. Brief, single-session interventions often produced knowledge gains without corresponding behavioral change (5,6). Vayngortin et al. found that an emergency department-based video intervention increased interest in LARC but did not significantly affect actual contraceptive initiation rates (6). Tebb et al. reported that a remote peer education intervention increased contraceptive knowledge but failed to improve contraceptive communication or use among participants or their peers (5). In contrast, sustained

intensive programs demonstrated persistent behavioral effects. The Prime Time intervention, offering monthly contacts over 18 months, showed participants were more likely to use hormonal contraception consistently at 12 months (adjusted OR 1.46, 95% CI 1.13-1.89) (11), with effects persisting at 24 months (adjusted RR 1.30, 95% CI 1.06 to 1.58) (8). This dose-response relationship suggests that behavior change among adolescents requires ongoing support rather than one-time educational encounters.

The Superiority of Motivational Interviewing

Among counseling approaches, motivational interviewing consistently outperformed didactic education across multiple outcomes and populations. Lopez et al., in a Cochrane review of brief educational strategies, found that motivational interviewing increased effective contraception use at nine months (OR 2.04, 95% CI 1.47 to 2.83) and reduced ineffective contraception use at three and four months (OR 0.31, 95% CI 0.12 to 0.77; OR 0.56, 95% CI 0.31 to 0.98) (3). Adolescents receiving motivational interviewing were more likely to initiate LARC by one month (OR 3.99, 95% CI 1.36 to 11.68) and report LARC use at three months (OR 3.38, 95% CI 1.06 to 10.71) (3). The Teen Options to Prevent Pregnancy (TOPP) program, which combined motivational interviewing with facilitated contraceptive access, demonstrated an 18.1% absolute reduction in self-reported repeat pregnancy (20.5% intervention vs. 38.6% control, $p < 0.001$) (12).

The mechanism underlying motivational interviewing's effectiveness likely relates to its developmental appropriateness for adolescents. By addressing ambivalence, supporting autonomous decision-making, and respecting adolescent perspectives, motivational interviewing aligns with adolescents' developmental need for autonomy while providing guidance (3,10,12,62). In contrast, didactic approaches may trigger resistance or fail to engage adolescents meaningfully in the decision-making process. Lopez et al., in a review of theory-based interventions for contraception, found that interventions grounded in motivational interviewing and social cognitive theory showed more consistent positive effects than those lacking theoretical foundation (62).

Structural Barriers and Access as Rate-Limiting Factors

A critical finding from this review is that counseling effectiveness is fundamentally limited by structural barriers to contraceptive access. Even the most skilled counseling cannot overcome

inability to obtain desired methods due to cost, transportation, appointment availability, or provider restrictions. Studies that systematically addressed these barriers demonstrated substantially larger effects than counseling-only approaches.

The Kaiser Permanente Northern California quality initiative exemplifies this principle. By implementing system-level changes including provider training, same-day insertion protocols, and streamlined workflows, LARC use increased from 12.1% to 23.0% (OR 2.57, 95% CI 2.44-2.72), representing a 90% increase in LARC provision (4). Importantly, this initiative was associated with a 36% decrease in teenage pregnancy rates, from 2.2% to 1.4% ($p < 0.0001$) (4). Similarly, the CHOICE Project, which provided contraception at no cost with emphasis on LARC methods, demonstrated pregnancy rates substantially lower than national averages, with mean annual rates of 34.0 per 1000 teens compared to 158.5 per 1000 among sexually experienced U.S. teens (13).

School-based health centers that provided on-site hormonal contraception achieved higher uptake rates than interventions relying on referrals or future appointments (32). Mínguez et al. found that students with access to school-based health centers had higher odds of using any contraceptive method and hormonal methods specifically (32). Fisher et al. demonstrated that a school-based health center reproductive health project in NYC increased moderately effective hormonal contraception use by 12.9 percentage points and LARC use by 1.9 percentage points among students with program access (44).

When access barriers were systematically examined, their importance became clear. Wilson et al. found that logistical barriers including the need to schedule specific appointments and return during menstrual periods for IUD placement substantially limited same-day LARC uptake even when adolescents expressed interest (22). Comfort et al. demonstrated that provider training on LARC insertion increased provision substantially (aOR 2.10 for IUD, aOR 1.66 for implant), while clinician knowledge improvements about patient eligibility for IUDs increased access (14). These findings indicate that counseling alone, without corresponding structural supports, has limited potential to change adolescent contraceptive behavior.

Setting-Specific Considerations

The setting in which counseling occurred fundamentally shaped intervention success, reflecting the importance of context in implementation research. School-based interventions reached adolescents who might not otherwise access reproductive health services but faced limitations in the scope of services that could be provided on-site (32,44,54). Clinic-based interventions benefited from immediate access to contraceptive methods but required adolescents to overcome initial barriers to healthcare seeking (7,11,22,39). Community-based interventions reached adolescents in their natural environments but faced challenges in ensuring service quality and follow-up (15,16,29,37,64).

The SIRIAN program in Barcelona, which provided brief contraceptive counseling in deprived neighborhoods, demonstrated the potential of community-based approaches. Adolescent fertility rates declined from 27.90 per 1000 to a change of -12.30 per 1000 (95% CI -12.45 to -12.21, $p < 0.001$) in intervention areas, while comparison neighborhoods showed no change (29). This population-level effect suggests that community-based interventions can achieve meaningful impact when implemented with sufficient intensity and reach.

Resource-limited settings presented unique challenges requiring context-specific adaptations. Bakesiima et al., working with refugee adolescents in northern Uganda, found that peer counseling increased same-day contraceptive acceptance to 58.5% compared to 49.6% with routine counseling (PR 1.24, 95% CI 1.03-1.50, $p = 0.023$) (15). However, the intervention also revealed context-specific barriers including partner prohibition and fear of side effects that required ongoing peer support for acceptability (15). Krug et al., evaluating human-centred design-based approaches in Nigeria, Ethiopia, and Tanzania, found variable effects across settings, highlighting the importance of local adaptation (16).

Population Specificity and Differential Effects

Intervention effects varied systematically by population characteristics, with programs designed for specific high-risk groups showing stronger effects than general population interventions. Postpartum adolescents consistently demonstrated greater responsiveness to counseling interventions (2,10,19,24,27), likely because they had experienced pregnancy consequences and were highly motivated to prevent repeat pregnancy. Similarly, interventions

targeting adolescents with chronic conditions such as diabetes showed sustained improvements in preconception counseling knowledge ($F[6, 541] = 4.05, p=0.0005$) and stronger intentions regarding family planning (25,31).

The Prime Time intervention specifically targeted high-risk females aged 13-17 years recruited from school and community clinics (8,11). This targeted approach yielded persistent effects at 24 months on consistent use of hormonal contraceptives (adjusted RR 1.30), condoms (RR 1.57), and dual methods (RR 1.36) (8). In contrast, school-based interventions targeting general adolescent populations often showed smaller or inconsistent effects (54,65). Juras et al., in a meta-analysis of federally funded program evaluations, found that while some individual studies reported positive impacts, average effects were small and there was minimal variation in effect sizes across studies (65).

Racial and ethnic differences in intervention response warrant attention. Bruce et al. found that non-Hispanic Black race lowered odds of same-day LARC provision even after provider training (4), indicating persistent disparities requiring targeted quality improvement. Hebert et al., studying African American and Latina females, found that a mobile contraceptive application increased knowledge and improved behavioral intentions to use LARC but did not significantly affect actual uptake (70). These findings suggest that culturally tailored approaches may be necessary to address persistent disparities.

Technology-Based Interventions: Promise and Limitations

Technology-based interventions including mobile health applications, text messaging, and video interventions showed mixed results, reflecting both the potential and current limitations of digital approaches. Tebb et al., evaluating a mobile health application for Latina adolescents (Health-E You/Salud iTu), found significant improvements in non-barrier contraceptive use from baseline to three months (63% intervention vs. 45% controls; $OR=3.29, 95\% CI 1.04-10.36$) and six months (63% vs. 44%; $OR=5.54, 95\% CI 1.70-18.06$) (28). Rinehart et al. demonstrated that a sexual health texting intervention increased mean self-efficacy from baseline to six months ($b=1.58, 95\% CI 0.38-2.77, p=0.01$) (39).

Text-message reminders showed particular promise for improving contraceptive continuation. Halpern et al., in a Cochrane review, found that text-message reminders increased oral contraceptive continuation by six months (OR 1.54, 95% CI 1.14 to 2.10) and reduced interruptions longer than seven days (OR 1.53, 95% CI 1.13 to 2.07) (69). Trent et al. demonstrated that a text-based intervention for Depo-Provera users improved clinic attendance for the first injection visit ($B = -.75$, 95% CI -1.4 to .06, $p=.03$) (66).

However, several technology-based interventions failed to demonstrate significant effects. Chernick et al. found that a text messaging intervention in the emergency department did not significantly affect contraceptive initiation (57). McCarthy et al., evaluating a mobile app intervention in Bolivia, found no significant effects on contraceptive initiation, partly because only 70.9% of messages were delivered and recruitment challenges meant most participants received minimal exposure (78). These failures highlight the importance of implementation fidelity and suggest that technology alone cannot overcome fundamental intervention design or delivery limitations.

Contraceptive Method Preferences and Counseling Implications

A consistent finding across studies was adolescent preference for implants over intrauterine devices when both LARC methods were offered. Frarey et al. found that among postpartum adolescents, 100% of those who desired the contraceptive implant used the method, compared to only 15% of those who desired an IUD ($p<0.001$) (19). In Tanzania, Mushy et al. reported that all LARC users chose implants while none selected intrauterine copper devices (48). This preference pattern may reflect concerns about pelvic examination, insertion pain, menstrual changes, or misunderstandings about IUD safety and appropriateness for nulliparous adolescents.

These findings have important implications for counseling content. Comprehensive counseling should acknowledge adolescent concerns about specific methods while ensuring accurate information about both options remains available. Provider training should address common misconceptions about IUD eligibility for adolescents, as clinician knowledge improvements about patient eligibility increase access (14). Additionally, counseling should prepare

adolescents for possible side effects and provide anticipatory guidance to support continuation regardless of method chosen.

Implementation Challenges in Real-World Settings

The translation of efficacious interventions from research settings to real-world implementation presents substantial challenges, as evidenced by several studies in this review. The failed replication of the TOPP program in New York City is particularly instructive. Harding et al. found no significant impacts on repeat pregnancy when attempting to replicate the motivational interviewing and facilitated contraceptive access intervention that had shown strong effects in the original trial (12,17). Implementation challenges included low treatment dosage, staff turnover, and COVID-19 pandemic limitations (17). This replication failure highlights the difficulty of maintaining program fidelity at scale and the importance of implementation support for real-world effectiveness.

Similarly, school-based interventions that showed promise in efficacy trials often demonstrated attenuated effects when implemented broadly (54,65). Lopez et al., in a review of school-based interventions, found that while some individual studies reported positive impacts, effects varied considerably and many studies had methodological limitations including short follow-up and high attrition (54). These findings suggest that attention to implementation quality, including provider training, fidelity monitoring, and context adaptation, is essential for achieving population-level impact.

Knowledge-Behavior Gap

A persistent challenge across interventions was the gap between knowledge gains and behavior change. Multiple studies demonstrated significant improvements in contraceptive knowledge, attitudes, and intentions without corresponding changes in actual contraceptive use or pregnancy rates (5,6,22,39,70). This knowledge-behavior gap reflects the complexity of adolescent sexual decision-making, which is influenced by factors beyond knowledge including relationship dynamics, peer norms, self-efficacy, and access barriers.

Wilson et al. found that an educational video intervention improved positive attitudes toward LARC (adjusted OR 6.4, 95% CI 1.6-26.8) and perceived condom acquisition self-efficacy

(adjusted OR 6.6, 95% CI 2.0-22.0) but did not significantly affect actual LARC uptake (22). Similarly, Vayngortin et al. reported that an emergency department-based video intervention increased interest in LARC without affecting initiation rates (6). These findings underscore that knowledge and attitudes are necessary but insufficient conditions for behavior change, and that effective interventions must address the full range of determinants including access, motivation, and skills.

Synthesis and Implications for Practice

Based on this comprehensive synthesis, effective adolescent contraceptive counseling requires a multi-component approach addressing individual, interpersonal, and structural determinants of contraceptive behavior. Key elements include: (1) delivery during critical decision-making moments, particularly the immediate postpartum period; (2) sustained contact over time rather than one-time sessions; (3) motivational interviewing approaches that address ambivalence and support autonomous decision-making; (4) removal of access barriers through same-visit provision and cost elimination; (5) system-level provider training and quality improvement; (6) attention to population-specific barriers including relationship dynamics, cultural factors, and developmental considerations; and (7) method-specific counseling that acknowledges adolescent preferences while ensuring accurate information about all options.

Simply providing education without addressing structural and contextual factors shows limited effectiveness. The most successful interventions combined multiple active ingredients, addressing knowledge, motivation, skills, and access simultaneously. Motivational interviewing consistently enhanced effectiveness across diverse settings and populations, suggesting this approach should be foundational to adolescent contraceptive counseling. System-level changes that normalized same-day LARC placement and reduced access barriers produced population-level effects on pregnancy rates, demonstrating that individual counseling must be embedded within supportive service delivery systems.

The variable effectiveness of peer education highlights the importance of intervention content over delivery format. Peer education succeeded when peers addressed social norms, fears, and relationship dynamics (15) but failed when reduced to simple information transmission (5).

This suggests that peer educators require adequate training and support to address the complex determinants of adolescent contraceptive behavior rather than serving merely as information conduits.

CONCLUSION

This systematic review of 80 studies examining contraceptive counseling effectiveness for adolescents yields several definitive conclusions with implications for clinical practice, program development, and future research.

Summary of Key Findings: Contraceptive counseling interventions can effectively improve adolescent contraceptive use and reduce pregnancy rates when appropriately designed and implemented. The strongest evidence supports: (1) immediate postpartum counseling to prevent rapid repeat pregnancy, with LARC use reaching 73.7% in intervention groups compared to 42.6% with conventional counseling; (2) motivational interviewing approaches that address ambivalence and support autonomous decision-making, achieving two- to four-fold improvements in LARC initiation and effective contraception use; (3) sustained, intensive programs with monthly contacts over 12-24 months demonstrating persistent effects on consistent contraceptive use; (4) removal of structural barriers including cost, transportation, and appointment availability, with quality initiatives increasing LARC use by 90% and reducing teenage pregnancy rates by 36%; and (5) system-level provider training and workflow changes that normalize same-day contraceptive provision.

Conversely, interventions relying solely on education without addressing access barriers show limited behavioral impact despite knowledge gains. Brief single-session interventions, technology-only approaches without adequate implementation support, and peer education reduced to information transmission generally fail to produce sustained behavior change. The knowledge-behavior gap observed across multiple studies underscores that effective interventions must address the full range of determinants including motivation, skills, access, and social context.

Implications for Clinical Practice: Healthcare providers working with adolescents should: (1) prioritize contraceptive counseling during the immediate postpartum period, capitalizing on this motivated decision-making window; (2) employ motivational interviewing techniques that explore ambivalence, support autonomy, and align with adolescent developmental needs; (3) provide method-specific counseling that acknowledges adolescent concerns while ensuring accurate information about all options, particularly addressing common misconceptions about IUD eligibility and side effects; (4) facilitate same-day contraceptive access whenever possible, minimizing referral requirements and future appointments that may result in loss to follow-up; (5) offer sustained support through follow-up contacts rather than single counseling sessions; and (6) address relationship dynamics, peer norms, and cultural factors that influence adolescent contraceptive decision-making.

Implications for Program Development and Policy: Program planners and policymakers should: (1) invest in postpartum contraceptive services as a high-yield intervention for preventing rapid repeat pregnancy; (2) implement system-level quality initiatives that normalize same-day LARC placement through provider training, streamlined workflows, and cost elimination; (3) support school-based health centers that provide on-site contraceptive services, reducing access barriers for adolescents; (4) develop and sustain intensive programs for high-risk adolescents rather than brief universal interventions; (5) ensure adequate implementation support including fidelity monitoring, staff training, and quality improvement when scaling evidence-based interventions; (6) address persistent disparities through targeted quality improvement and culturally tailored approaches; and (7) integrate contraceptive counseling within broader reproductive health services including HIV prevention and chronic disease management.

Implications for Future Research: Priority areas for future research include: (1) rigorous evaluations of implementation strategies that maintain intervention effectiveness when scaling from efficacy trials to real-world settings; (2) studies examining intervention effectiveness in low- and middle-income countries where adolescent pregnancy burdens are highest; (3) research identifying optimal intervention intensity and duration, including the minimum effective dose and optimal spacing of follow-up contacts; (4) investigations of technology-based interventions with attention to

implementation fidelity and mechanisms of action; (5) studies examining method-specific outcomes including reasons for method choice, switching patterns, and discontinuation; (6) research addressing persistent disparities in contraceptive access and outcomes by race, ethnicity, and socioeconomic status; (7) longer-term follow-up studies assessing sustained effects beyond 12-24 months; (8) investigations of intervention mechanisms, including mediational analyses identifying pathways to behavior change; (9) research on adolescent males' roles in contraceptive decision-making and interventions targeting couples; and (10) studies examining integration of contraceptive counseling within broader youth development and reproductive health programs.

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