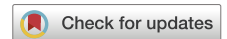


A Rapid Review of Interventions to Prevent First Pregnancy among Adolescents and Its Applicability to Latin America



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ABSTRACT

Study Objective: To summarize recent literature on the effectiveness of interventions to prevent adolescent pregnancy and to explore the applicability of these interventions to Latin America (LA).

Design, Setting, Participants, Interventions, and Main Outcome Measures: We carried out a rapid review of the literature (2005-2019). Studies were included if: they evaluated interventions targeting adolescents and prevention of pregnancy; they used a randomized controlled design; and pregnancy was measured as an outcome. Applicability of the interventions to LA was assessed using the following information: target population; intervention design and resources; type, skills, and training of providers; system arrangements; and acceptability and social context.

Results: Nine studies were included, 5 described interventions in African countries, 2 in the United Kingdom, and 2 in the United States. Interventions were rated as highly applicable to LA in the context of target population, profile of the providers, and design; however, variations arose when assessing system arrangements and social context. Incentive-based interventions showed significant effects in the prevention of adolescent pregnancy and were rated as highly applicable.

Conclusion: This review provides professionals, policymakers, researchers, and educators potential criteria to consider when adapting successful evidence-based interventions to prevent adolescent pregnancy in LA.

Keywords: Rapid review, Adolescent pregnancy, Latin America, Applicability

Introduction

Despite important progress in the prevention of adolescent pregnancy (AP) in some regions, AP remains a major social and public health concern globally.^{1,2} It is estimated that in 2017 there were 42.5 births per every 1000 women aged 15-19 worldwide.³ The rate in Latin America (LA) and the Caribbean is much higher than the average, however, with the second-highest adolescent fertility rate in the world at 63 births per 1000 girls aged 15-19 years.³

Globally, there have been numerous efforts in the past 2 decades directed at assessing and summarizing the evidence about what works to prevent AP, mainly in the form of systematic reviews.^{4,5} Some of these reviews focus on interventions implemented in low- and middle-income countries, where most adolescent pregnancies take place.^{6,7} However, evidence from LA is limited and under-represented in such reviews.^{7,8} In fact, a comprehensive evidence gap map on the available evidence of the effectiveness of adolescent sexual and reproductive health programs in low- and middle-income countries shows that, of all of the identified studies that measured effects in terms of births, pregnancies, and similar indicators among adolescents, only 4 are from LA.⁸

Today, we know that there is no single best intervention to prevent AP because it is a complex event that depends heavily on the setting and available resources as well as the cultural context in which adolescents are immersed.^{6,9} In many countries, AP rates are higher among those in lower social strata and with a lower educational level, highlighting the reality that AP causes are deeply rooted in social disadvantages and inequality.^{1,2,10} Therefore, because of the lack of studies, a question remains regarding how much of the evidence from effective interventions summarized in existing systematic reviews can be generalizable to the specific context of LA.

Currently, there is a growing awareness (particularly among decision-makers) that systematic reviews should report on the applicability of interventions as a step in promoting evidence-informed policy.¹¹⁻¹³ In the context of effectiveness, applicability can be understood as the extent to which an intervention designed for a specific setting or population could be applied in another.¹⁴ Ideally, syntheses of the evidence must take into account differences across countries with regard to social norms, access to services, and availability of resources because these factors are likely to influence whether interventions can be successfully applied or replicated in other contexts.^{11,14-16}

Considerations regarding the applicability of interventions are even more relevant in areas where resources are limited.^{14,17} However, existing reviews generally have only

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a limited discussion, without an appraisal of how context-specific factors could influence the applicability of interventions in a specific setting.^{14,16} The aim of this study was therefore to summarize the international literature on the effectiveness of interventions to prevent first pregnancies among adolescents, and to draw some lessons regarding the potential applicability of these interventions to the LA context.

Materials and Methods

We carried out a rapid review of the literature published from 2005 to 2019 on the effectiveness of interventions to prevent AP and assessed their applicability to LA. The rapid review methodology consists of an evidence synthesis of the literature that is systematic and rigorous while also allowing to produce information in a timely manner.¹⁸ A rapid review reproduces the steps of a standard systematic review, however some of these steps are modified. Therefore, our review was conducted following standards from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.¹⁹ However, on the basis of a rapid review approach we narrowed the breadth of academic databases searched to allow for a faster production of our synthesis.

Ethical Approval

This study was approved by the Research Ethics Committee at the National Institute of Public Health from Mexico (reference number 1621).

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria: (1) a focus on adolescents (ages 10–19 years), (2) main objective of the intervention was the prevention of AP, (3) used a randomized controlled design, and (4) measured AP as an outcome. AP could have been self-reported, reported by others, or measured using biological indicators such as pregnancy tests. Studies were excluded if the intervention's objective was to prevent repeat pregnancies among adolescents and if data collection occurred before 2000.

Identification and Selection of Studies

We searched for documents (February to March 2019) in PubMed and in the Impact Evaluations Repository of the International Initiative for Impact Evaluation (3ie). We consulted these 2 sources considering that the former is one of the largest medical and public health academic databases whereas the latter concentrates a large number of impact evaluations from low- and middle-income countries. The electronic search was built from the combination of several key terms grouped in 4 concepts according to our structured question: population (adolescent, teenage, teen, or youth), intervention (prevention, preventive, program, intervention, or promotion), outcome (pregnancy), and type of study (randomized controlled trial). These terms were searched in the library search engine of both databases and

in the Medical Subject Headings of PubMed. Two reviewers independently screened the titles and abstracts of all studies retrieved from the electronic search to identify their possible inclusion. Articles that potentially met inclusion criteria were retrieved for full text assessment to define their final inclusion, which was also carried out independently by a pair of reviewers. A third reviewer resolved any disagreements regarding study selection.

Data Management and Synthesis

For each of the included studies, the following information was extracted into a predesigned form: study identification (author and year), randomization unit (community, adolescent, school, or other unit), target population (sample size, age of participants, and country), setting (community, school, clinic), type of program (sex education, youth development, material/economic incentives, risk reduction, or clinic-based), description of intervention's strategies and outcome measurement (self-report or pregnancy test), and results of the impact evaluation. We then carried out a narrative synthesis with summary tables.

Quality Appraisal

Assessment of study quality was on the basis of an adaptation of the Critical Appraisal Skills Programme Randomised Controlled Trial checklist.²⁰ This tool consists of 11 questions that can be answered “yes,” “no,” or “can't tell” to address whether the results of the trial are valid, what the results are, and whether the results will help locally. Nine of the questions were considered relevant for our review and were used to assess study quality.

Applicability Assessment

Because of a lack of consensus regarding the best method to assess applicability¹⁶ and particularly limited guidance for the authors of systematic reviews,¹² we based this exercise on the findings of a systematic mapping of tools assessing applicability, transferability, and related concepts.¹² The authors of the systematic mapping carried out a content analysis on criteria listed in 25 checklists to assess applicability of interventions in health and social welfare and found 7 main categories of criteria and (within these) a comprehensive list of factors that other authors have used for the assessment.¹²

Each of the authors in this rapid review independently reviewed the factors listed by Munthe-Kaas et al¹² and ranked them for applicability in the LA context. The research team then compared and discussed the individual selection until an agreement was reached in terms of which factors to consider as well as questions and clues to ponder when assessing each item. When a preliminary list of factors was identified, a data extraction sheet was created, piloted, and adjusted until a final decision was reached regarding which domains/items to retain. The final set of domains used for applicability assessment was: (1) target population; (2) intervention setting, design, and resources; (3) type, skills, and training of providers/facilitators; (4) system arrangements; and (5) social context and accept-

Applicability themes selected from the systematic mapping by Munthe-Kaas et al., 2019	Domains used for this rapid review	Questions used to guide the applicability assessment
Population: <ul style="list-style-type: none"> • Participants' characteristics • Characteristics of illness (description of condition and comorbidities, other risk for adverse effects) 	Population characteristics	<ul style="list-style-type: none"> • Are there large differences between the study population and adolescents in LA considering characteristics, risk factors, conditions or comorbidities?
Intervention: <u>Intervention delivery:</u> <ul style="list-style-type: none"> • In which settings was the intervention delivered? (physical setting, etc) • Can the intervention be tailored for different settings? • How often/intensely was the intervention delivered? (frequency/intensity) • How long the intervention was implemented? (duration) <u>Intervention characteristics:</u> <ul style="list-style-type: none"> • Intervention design (complexity and clarity) 	Intervention's setting, design, and resources	<ul style="list-style-type: none"> • Considering intervention's setting, design, and resources (<i>complexity, duration, frequency, intensity, and resources needed</i>) could this intervention be tailored to the same or other setting in LA? • Essential resources needed for the intervention are easily available or accessible in LA?
Implementation context: <u>Service providers:</u> <ul style="list-style-type: none"> • Type of service providers • Skills of service providers • Training of service providers 	Type, skills, and training of providers / facilitators	<ul style="list-style-type: none"> • Does the type of provider needed for this intervention exist in LA? • Can providers in LA receive training to do so? • Are there reasons to suspect differences in roles, training or capacities that could affect implementation in LA?
Environmental context: <ul style="list-style-type: none"> • Systems context (Health systems arrangements) • Social acceptability at community level • Social context generally (including racial/ethnic issues) 	System arrangements	<ul style="list-style-type: none"> • Are there different standards of practice, organization or coordination in the education or health system in LA that could affect intervention delivery?
	Social context and acceptability	<ul style="list-style-type: none"> • What social/cultural factors could affect the implementation and acceptability of this intervention in LA?

Fig. 1. Items for the applicability of the interventions to the setting of Latin America (LA), on the basis of systematic mapping of tools for assessing applicability (Munthe-Kaas et al¹²).

ability. Figure 1 shows questions and indications used to assess these domains together with the original presentation of the systematic mapping published by Munthe-Kaas et al.¹²

All of the authors participated in the applicability assessment of the selected articles. First, 2 pairs of researchers independently read each article and then assessed the applicability domains together. In addition to extracting relevant data for each applicability domain, the pair of coauthors also ranked each domain as “high,” “medium,” or “low” considering potential challenges or complications that might emerge during implementation of the interventions in the LA setting. A third researcher then reviewed and standardized the applicability assessment for all articles considering discussions and agreements within pairs and prepared a summary table. The applicability table was

discussed with the full research team and revisions were made.

Results

A total of 435 records were obtained from the electronic search. The PRISMA flow diagram presented in Figure 2 outlines the study selection process. In total, 9 studies were included (Table 1).^{21–29}

Description of the Studies

Five studies included in this review were implemented in Africa,^{21,24,25,28,29} 2 in the United Kingdom,^{22,27} and 2 in the United States.^{23,26} Most were implemented in a

Table 1
Characteristics of the Included Randomized Controlled Trials.

Reference	Randomization unit	Target population	Setting	Type of program	Intervention description	Outcome measurement	Results*		
							First follow-up	Second follow-up	Third follow-up
Baird et al ²¹	Communities (cluster)	Never married female students and recent dropouts, aged 13–22 years, in 176 localities (n = 3796); Zomba, Malawi	Community	Material/economic incentives	CCTs (4, 6, 8, or 10 times per month for parents and 1–5 times per month for adolescents) and exempted school fees to stay or return to school for 2 years UCTs (4, 6, 8, or 10 times per month for parents and 1–5 times per month for adolescents) and exempted school fees for 2 years. Control: No cash transfers	Ever been pregnant; self-report	1 Year: CCT schoolgirls, 0.008	2 Years: CCT Schoolgirls, 0.027	3 Years: CCT Schoolgirls, –0.026
							1 Year: CCT dropouts, –0.058†	2 Years: CCT dropouts, –0.081†	3 Years: CCT dropouts, –0.038†
							1 Year: UCT schoolgirls, –0.010	3 Years: UCT schoolgirls, –0.063†	3 Years: UCT Schoolgirls, –0.004
Bonell et al ²²	Adolescents	Female students in 22 schools aged 13–15 years (n = 489); England	School and nursery	Youth development	Teens and toddlers: (1) 3-hour weekly sessions (18–20 weeks) in local preschool nurseries to care for children younger than 5 years old; (2) 90-minute sessions of a curriculum covering self-esteem, emotional literacy, social skills, aspirations and goal-setting, adolescent sexual health and, adolescent pregnancy; sources for and support on sexual health; and responsible parenthood; (3) counseling sessions with a facilitator to address issues raised by participants such as pressure to have sex and negotiation; (4) journaling activity to explore participants' thoughts and feelings and for recording of volunteering experience Control: Usual education in school	Pregnancy (new) since baseline; self-report	6 Months: female students (OR), 1.0	1 Year: female students (OR), 0.8	NA
Bull et al ²³	Boys and girls clubs (cluster)	Young men and women aged 14–18 years from 8 boys and girls clubs (n = 852); Colorado, United States	Community	Youth development	Youth All Engaged!: (1) TOP consisting of delivery of a youth development and sexuality education curriculum in 25 weekly sessions over 9 months plus 20 community service learning hours; (2) delivery of 5–7 weekly text messages to mobile phones Control: TOP and 20 community service hours without the text messages-based program	Ever been pregnant or caused a pregnancy; self-report	4 Years: young men and women (OR), 0.73	NA	NA

(continued on next page)

Table 1 (continued)

Reference	Randomization unit	Target population	Setting	Type of program	Intervention description	Outcome measurement	Results*		
							First follow-up	Second follow-up	Third follow-up
Duflo et al ²⁴	Schools (cluster)	Female and male sixth grade students in 328 public primary schools (n = 9487 female and 9802 male); Butere-Mumias and Bungoma, Kenya	School	Material/economic incentives and H	S: provision of 2 free school uniforms over the school year H: training for teachers from primary school to help them deliver Kenya's national HIV/AIDS prevention curriculum emphasizing abstinence SH: S plus H Control: standard education curriculum	Ever been pregnant; self-report	3 Years: S girls, -0.027 [†]	5 Years: S girls, -0.04 [†]	NA
							3 Years: S boys, -0.002	5 Years: S boys, 0.005	NA
							3 Years: H girls, -0.007	5 Years: H girls, 0.001	NA
							3 Years: H boys, -0.002	5 Years: H boys, 0.004	NA
							3 Years: SH girls, -0.011	5 Years: SH girls, -0.011	NA
							3 Years: SH boys, -0.006 [†]	5 Years: SH boys, 0.000	NA
							5 Years: young women (RR), -0.071 [†]	NA	NA
Dupas et al ²⁵	Adolescents	Female and male secondary school students (mean age, 17 years; n = 682); Ghana	School	Economic incentives	Scholarship program: the intervention comprised payment of full school tuition and fees, paid directly to the schools and covering the entire school bill for 3 years. Fees included government-approved fees; parent-teacher association dues; and other levies and supplies, including exam fees Control: Students without the scholarship	Ever been pregnant; self-report	5 Years: young men (RR), -0.018	NA	NA
							6 Months: female and male students: -0.01		
LaChausse et al ²⁶	Schools (cluster)	Female and male 9th-12th grade students in 21 public high schools (n = 1784); California, United States	School	Risk reduction	Positive Prevention PLUS: 11 lessons (45 minutes each) curriculum delivered in 3 weeks. Topics covered were benefits of abstinence, assertive communication, refusal skills, accessing reproductive health services, condom negotiation, and condom use Control: standard health, science, or physical education curriculum	Ever been pregnant or gotten someone pregnant; self-report			
Martin et al ²⁷	Adolescents	Adolescent female users of family planning services (mean age, 16.6 years; n = 261); Sheffield, England	Clinic	Clinic-based	Implementation intentions: structured questions on when, where, and how to use a contraceptive method of choice, and asking for a plan on how to overcome a series of up to 12 barriers for contraceptive use. Short session of 10-15 minutes Control: standard health family planning service	Pregnancy during follow-up time; pregnancy test	2 Years: female adolescents (RR), 0.58 [‡]	NA	NA

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Table 1 (continued)

Reference	Randomization unit	Target population	Setting	Type of program	Intervention description	Outcome measurement	Results*		
							First follow-up	Second follow-up	Third follow-up
Ross et al ²⁸	Communities (cluster)	Female and male students in years 5–7 in 121 public primary schools at 20 rural communities (mean age, 15.7 years; n = 9645); Mwanza Region, Tanzania	Community	Comprehensive sex education	MEMA kwa Vijana: (1) Teacher-led, peer-assisted program involving twelve 40-minute sessions per school year delivered within normal school hours for 3 years; (2) 1-week training and supervision of 2–4 health workers per health facility in the provision of youth-friendly sexual and reproductive health services; (3) community-based condom promotion and distribution by peers trained in social marketing of condoms; (4) community-wide activities including community mobilization, annual youth health weeks, twice-yearly youth health days at health facilities, and quarterly video shows with discussions Control: Standard education curriculum	Pregnancy during follow-up; pregnancy test	3 Years: Female students (RR), 1.09	NA	NA
Taylor et al ²⁹	Schools (cluster)	Female and male eighth grade students in 16 high schools (mean age, 14.6 years; n = 816); KwaZulu-Natal, South Africa	School	Comprehensive sex education	Teen pregnancy prevention program: the curriculum involved 12 weekly lessons to provide information, address students' attitudes, and encourage intentions to prevent teen pregnancy. The topics discussed were knowing yourself, the choice is yours, relationships, making choices, body development, contraception, peer pressure, culture, parenthood, responsibility, and human rights. Gender norms were a core component of all of the modules Control: Compulsory classroom-based life skills program	Pregnancy (first) during follow-up time; Ever been pregnant or caused a pregnancy; self-report	3 Years: female students (RR), 1.03 8 Months: female and male students (OR), 0.27	NA	NA

Original data extracted from the publication were transformed into odds ratios using the Campbell Collaboration effect size calculator (<https://www.campbellcollaboration.org/research-resources/effect-size-calculator.html>). CCT, conditional cash transfer; H, HIV education; NA, not applicable; OR, odds ratio; RR, relative risk; S, education subsidy; SH, joint program; TOP, teen outreach program; UCT, unconditional cash transfer.

* Results are expressed as regression coefficients unless otherwise stated.

† $p \leq .05$; ‡ $p \leq .01$

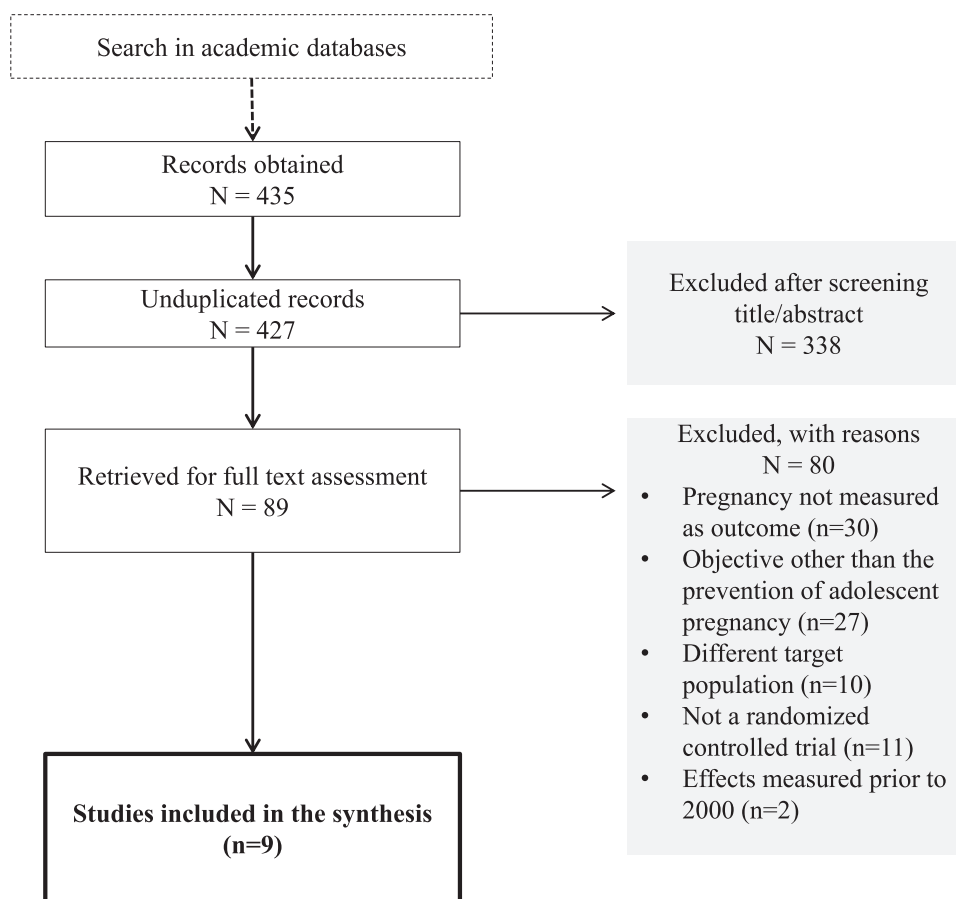


Fig. 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram for this study.

school setting. No studies were found for LA. Three studies focused exclusively on young women.^{21,22,27} Follow-ups ranged from 6 months to 5 years, with most studies having only 1 follow-up. Most of the studies measured pregnancy according to self-report. For 1 study,²⁴ we excluded results of the last follow-up (after 7 years) because, by that time, participants were older than 19 years and therefore no longer considered adolescents.

In terms of the interventions implemented, 2 of the programs were used material/economic incentives,^{21,25} 2 were youth development interventions,^{22,23} 2 were on the basis of comprehensive sex education curriculums,^{28,29} 1 was a clinic-based intervention,²⁷ and another was a risk reduction curriculum.²⁶ In addition to these, the study by Duflo et al.²⁴ evaluated 3 types of interventions: an abstinence-based HIV education program, an intervention using economic or material incentives, and the combination of both. Three of 9 studies documented significant effects in the prevention of AP, either in one of the intervention arms, follow-ups, or subgroups.^{21,24,25} One such study showed positive effects from 2 different interventions.²⁴ The remaining 6 studies showed no effects on AP as a result of the interventions (Table 1).

Quality Appraisal

In general, most of the studies can be regarded as high-quality because all had clearly focused questions, a ran-

dom allocation of participants to the intervention or control group, similarity between groups at the beginning of the study, and groups treated equally apart from group allocation. Only 2 studies did not report confidence intervals or standard errors to help assess the accuracy of the intervention effects.^{26,27} Because of the nature of the interventions evaluated, it is highly unlikely that participants were blinded. Related to this, in most of the studies it was unclear whether providers and study staff were blind to the intervention condition and only 2 studies explicitly reported this aspect.^{22,27} Although no studies reported significant harm or negative effects as a result of the intervention, Teens and Toddlers, evaluated by Bonell et al.,²² was deemed to be not worth the harms and costs because of its lack of effectiveness and concerns expressed by intervention participants regarding their low attendance to school activities because of the intervention (Table 2).

Applicability of the Interventions

No intervention was entirely classified as inapplicable to the LA context; however, there were variations in the specific domains used to evaluate applicability (Table 3). Interventions were classed as highly applicable with regard to their target population because all of them focused on adolescents who are vulnerable or at high risk of pregnancy, which are characteristics in common with adolescents in LA. Most interventions were also highly applicable with re-

Table 2
Quality Assessment of the Included Studies*

Reference	Did the trial address a clearly focused question?	Was the assignment to intervention randomized?	Were all of the participants who entered the trial properly accounted for at its conclusion?	Were providers and study personnel blind to treatment?	Were the groups similar at the start of the trial?	Aside from the experimental intervention, were the groups treated equally?	Is there information to estimate the precision of the intervention effect?	Are the benefits worth the harms and costs?
Baird et al ²¹	Yes	Yes	Yes	Unclear	Yes	Yes	Yes, standard errors are presented	Yes
Bonell et al ²²	Yes	Yes	Yes	No	Yes	Yes	Yes, 95% CIs are presented	No
Bull et al ²³	Yes	Yes	Yes	Unclear	Yes	Yes	Yes, 95% CIs are presented	Yes
Duflo et al ²⁴	Yes	Yes	Yes	Unclear	Yes	Yes	Yes, standard errors are presented	Yes
Dupas et al ²⁵	Yes	Yes	Yes	Unclear	Yes	Yes	Yes, standard errors are presented	Yes
LaChausse et al ²⁶	Yes	Yes	Yes	Unclear	Yes	Yes	No	Yes
Martin et al ²⁷	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Ross et al ²⁸	Yes	Yes	Yes	Unclear	Yes	Yes	Yes, 95% CIs are presented	Yes
Taylor et al ²⁹	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes, standard errors are presented	Yes

* Using an adaptation of the Critical Appraisal Skills Programme Randomised Controlled Trial checklist.²⁰ Refer to [Table 1](#) for study details and intervention effects. CI, confidence interval.

gard to facilitator skills and training. Just 1 was classified as medium applicability because it required diverse profiles that might be difficult to ensure in LA.²²

There was greater disparity in intervention applicability when the design, context of implementation, and necessary resources were considered. Five interventions (4 studies) were classified as highly applicable because of processes that are easy to implement or require scant intersectorial coordination, such as money transfers or grants,^{21,25} providing school uniforms and training teachers as part of the official education curriculum,²⁴ or conducting a brief questionnaire on family planning services.²⁷ Three interventions were considered to have medium applicability because they required coordination among diverse actors/sectors as well as time to carry out the intervention in schools, which is not always possible.^{26,28,29} Two interventions were classified as having low applicability—the first for depending on digital technology for which access cannot be guaranteed throughout the LA population,²³ and the second for requiring access to specific settings such as day care, which can be highly restricted in LA ([Table 3](#)).²²

Most of the interventions were evaluated as having medium applicability taking into account aspects linked to the local context. Most local systems relevant for intervention implementation (system arrangements) require the participation of more than 2 types of sectors. This need could complicate coordination and decrease the possibility of intervention application. Two interventions had the least applicability. The first, from Martin et al²⁷ requires adolescent-friendly services (which are scarce in LA) in addition to a health care system with reliable clinical records to allow for the effective follow-up of clients. The second intervention, from Bonell et al,²² requires coordination among day cares and schools, but such coordination

is probably either complicated or nonexistent in many LA countries. With regard to the social context and acceptance by the general population, most of the interventions were only somewhat applicable because of possible resistance or even opposition by parents, teachers, and the overall community with conservative ideologies regarding AP ([Table 3](#)).

Applicability of the Subgroup of Interventions with Significant Effects

Considering the potential applicability of the interventions to LA and their effectiveness in preventing AP, in our study 3 of the 4 interventions that significantly prevented teenage pregnancies used incentives and were classified by us as highly applicable to LA for all parameters assessed ([Table 3](#)).^{21,24,25} These highly applicable programs mainly depended on the educational sector to coordinate the distribution of incentives.^{21,24,25} Consequently, it might be less complicated to design the interventions as well as to coordinate with the relevant actors; there might also be less community resistance to these types of programs.

Baird et al²¹ reported significant effects from a conditional cash transfer program with teenage school dropouts in the first, second, and third year of follow-up as well as in the group of school-going teenagers who received unconditional cash transfers in the second year of follow-up. Dupas et al²⁵ reported significant effects in women who received a scholarship program up to 5 years into the follow-up. Finally, Duflo et al²⁴ documented significant effects in the prevention of pregnancy in girls who received school uniforms at 3 and 5 years of follow-up. The remainder of the interventions that showed no significant effects in preventing teenage pregnancy revealed greater variations in their applicability.^{22,23,26–29}

Table 3
Applicability of the Interventions to the Setting of LA*

Reference	Population	Intervention setting, design, and resources	Type, skills, and training of providers/facilitators	System arrangements	Social context and acceptability
Baird et al ^{21,†}	High Applicable to female adolescent students and recent dropouts in rural zones with a high risk of early onset of sexual activity, older male partners and great exposure to HIV and STI	High This intervention could be delivered in LA because its design demands only cash transfers and coordination with staff	High No facilitators are needed; only staff to coordinate with school personnel, participants, and researchers/survey staff. Characteristics of staff are unknown although it is likely that staff needed for this intervention could be found in LA and be trained for intervention delivery	High Although this intervention involves the participation of the private and public educational sector, there are no reasons to suspect that this intervention could be affected by differences in the education system in LA	High There are no reasons to suspect that localities in LA would oppose the delivery of cash to students
Bonell et al ²²	High Applicable to at-risk female students with some of the following characteristics: low self-belief, anger, alcohol/drug use, low aspirations, sexual activity, positive views on teenage parenthood, previous pregnancy or STI, family history of teenage pregnancy, history of abuse, and others	Low The design might be complex for delivery in LA because it relies on out-of-school time spent by participants in school and at preschool nurseries, demanding the availability of a number of nurseries and coordination between them and high schools	Medium The intervention involves diverse staff profiles and abilities such as counselors, facilitators trained on the Teens and Toddlers youth development curriculum, school and nursery staff, although similar providers could be found in LA and be trained for intervention delivery	Low Challenges for this intervention might arise in LA because it relies largely on the coordination and collaboration between schools and preschool nurseries, which does not exist in LA, to grant access to students to a generally closed system	Low At-risk adolescents in LA and their parents could show resistance because of the amount of after-school time involved, which can be needed for school homework, housework, or for helping in family business, and because of costs of transportation to nurseries that could be located far from their homes. Nurseries might oppose the involvement of at-risk adolescents in the care of infants Medium There could be some resistance from community leaders, parents, and other stakeholders in LA with a conservative ideology toward delivery of the sexuality education curriculum
Bull et al ²³	High Applicable to minority and high-risk youth living in poverty who are members of Boys and Girls Clubs	Low The intervention setting is Boys and Girls Clubs, which do not exist in LA, however, other known groups or settings in the region could be used. It might be complex to guarantee access to computers, tablets, or cell phones by the target population and the services needed for delivery of the text message-based component. The coordination of adolescents for completing community hours might also be complex, as well as the standardization of text messages in areas with heterogeneous and/or indigenous populations	High Characteristics of facilitators are unknown; however it is likely that facilitators for this type of intervention could be found in LA and be trained for intervention delivery	Medium Challenges for this intervention might be the referral, coordination, and support of adolescents by different organizations for completing the assigned community hours of service	Medium There could be some resistance from community leaders, parents, and other stakeholders in LA with a conservative ideology toward delivery of the sexuality education curriculum
Duflo et al ^{24,‡} , intervention 1 [†]	High Applicable to male and female primary school students	High This intervention could be delivered in LA because its design involves school uniforms, easily available in LA, and organization for the delivery of uniforms	High No facilitators are needed; only staff for distribution of school uniforms and coordination with school personnel. This profile could be available in LA and receive training for intervention delivery	High There are no reasons to suspect that this intervention could be affected by differences in the education system in LA	High There are no reasons to suspect that localities in LA would oppose the delivery of school uniforms
Duflo et al ^{24,‡} , intervention 2	High Applicable to male and female primary school students	High This intervention could be delivered in LA because it relies largely on human resources available at schools (teachers), and the nationally approved HIV prevention official curriculum	High Facilitators are teachers and professionals specialized in the topics of the curriculum. These providers could be found in LA and receive training for intervention delivery	Medium Coordination between NGOs, the education sector, and other government entities demanded by this intervention might be a challenge in LA because of the lack of intersectoral coordination	Medium The HIV prevention curriculum is the official abstinence-based national curriculum and there is no reason to suspect resistance to it from communities or schools in LA. Resistance could come from teachers and school staff who need to attend voluntary out-of-school training during 5 days

(continued on next page)

Table 3 (continued)

Reference	Population	Intervention setting, design, and resources	Type, skills, and training of providers/facilitators	System arrangements	Social context and acceptability
Duflo et al ^{24,‡} , intervention 3	High Applicable to male and female primary school students	High This intervention could be delivered in LA because it relies largely on human resources available at schools (teachers), the nationally approved HIV prevention official curriculum, and delivery of school uniforms	High Facilitators are teachers, professionals specialized in the topics of the curriculum, and other staff for distribution of school uniforms. These providers could be found in LA and receive training for intervention delivery	Medium Coordination between NGOs, the education sector, and other government entities demanded by this intervention might be a challenge in LA because of the lack of intersectoral coordination	Medium The HIV prevention curriculum is the official abstinence-based national curriculum and there is no reason to suspect resistance to it from communities or schools in LA. Resistance could come from teachers and school staff who need to attend to voluntary out-of-school training during 5 days. No reasons to suspect opposition to delivery of school uniforms
Dupas et al ^{25,†}	High Applicable to female and male students with financial constraints and possibility of being admitted into secondary school	High This intervention could be delivered in LA because its design demands only coordination between high schools, participants, and education services and other staff	High No facilitators are needed; only staff to coordinate the scholarship program. Characteristics of staff are unknown although it is likely that staff needed for this program could be found in LA and be trained for intervention delivery	High Although this intervention involves the participation of 3 different entities/bodies, there are no reasons to suspect that this intervention could be affected by differences in the education system in LA	High There are no reasons to suspect that communities in LA would oppose student scholarships and waived tuition fees
LaChausse et al ²⁶	High Applicable to male and female adolescent students in suburban public high schools	Medium This intervention could be delivered in LA because it relies largely on human resources available at schools (teachers). Challenges relate to the number of sessions delivered in a short time frame (11 sessions in 3 weeks)	High Facilitators are teachers and personnel trained in the intervention curriculum. These types of providers could be found in LA and be trained for intervention delivery	Medium This intervention takes place within school hours. It might be complex to fit the intervention in the space and time of the official school timetable in LA	Medium Acceptability of this risk reduction-focused curriculum by adolescents and adults in LA might be high. Resistance could come from teachers and school staff who need to attend to voluntary 3-day training and 1 online course
Martin et al ²⁷	High Applicable to sexually active girls with a high propensity of using contraception, at higher risk of becoming pregnant, a high deprivation index, and who attend family planning clinics	High This intervention could be delivered in LA because its design demands low-cost techniques, easy implementation procedures, 1 short session, and resources available at clinical settings	High Facilitators are staff at family planning clinics; their specific characteristics are unknown, neither is clear if they received training for intervention delivery although potentially, training could be feasible in LA	Low The intervention relies greatly on the existence of a health system with established timely and reliable patient registries and a good coverage of adolescent-friendly family planning clinics. These characteristics might not be easily available in LA	Low The intervention is feasible for contexts with high acceptability of family planning services for adolescents. In LA there is a not a broad acceptability of adolescents' sexual practices or the use of family planning services by unmarried adolescents
Ross et al ²⁸	High Applicable to male and female adolescents from rural settings with a high risk of pregnancy, STI, and low prevalence of condom use	Medium This intervention might be complex to implement in LA because of the high degree of coordination demanded to deliver the school curriculum, community activities, health youth weeks, and for training of teachers, peers, and health staff	High Facilitators are teachers, health staff, peers, staff from the African Medical and Research Foundation, and other community leaders. Similar providers could be found in LA and be trained for intervention delivery	Medium Challenges for this intervention might arise in LA because of the lack of intersectoral coordination between the health and education systems that is needed for intervention delivery, as well as coordination with community leaders. It also might be complex to fit the teacher-led component to the space and time of the official school timetable in LA	Medium There could be some resistance from community leaders, parents, teachers, health professionals, and other stakeholders with a conservative ideology in LA toward the delivery of this intervention to students in primary schools, particularly toward condom promotion and distribution by peers. Resistance could also come from teachers or health staff who need to attend to voluntary training
Taylor et al ²⁹	High Applicable to male and female adolescent students with a high vulnerability to socioeconomic deprivation, HIV, and sexual violence	Medium This intervention could be delivered in LA because its design demands only few facilitators (2 male/female teams) to visit schools once per week. Challenges relate to the large number of sessions (12) delivered per week	High Facilitators are young men and women from a background similar to that of the students; although their specific characteristics are unknown, it could be possible to find similar profiles in LA and be trained for intervention delivery	Medium This intervention takes place within school hours, when specific contents need to be included under the compulsory school subjects. It might be complex to fit the intervention in the space and time of the official school timetable in LA	Medium Acceptability of this comprehensive sex education curriculum could be high among adolescents in LA but low among teachers, school authorities, parents, or other stakeholders with a conservative ideology

LA, Latin America; NGO, non governmental organization; STI, sexually transmitted infection.

* On the basis of systematic mapping of items that measure applicability and transferability of research findings by Munthe-Kaas et al.¹²

† Intervention showing effect in the prevention of adolescent pregnancy ($P \leq .05$).

‡ This is a single study on the effectiveness of 2 interventions as well as the combination of both. We present a separate applicability assessment for each intervention.

Discussion

This rapid review contributes to the body of evidence on interventions to prevent AP. Two relevant elements of this analysis are the summary of rigorous studies that have measured a pregnancy indicator and not just associated factors, and the analysis of applicability of these interventions in the Latin American context.

Our analysis distinguished 2 groups of interventions: (1) those that documented an effect in reducing AP and that were also rated as highly applicable to LA contexts,^{21,24,25} and (2) those that, on the basis of the parameters analyzed, showed no significant effects in preventing pregnancy and also gave mixed results on applicability.^{22,23,26–29} Interestingly, all of the interventions targeted vulnerable populations of male and female adolescents considering different individual, family, and/or community aspects, and therefore were rated as applicable in terms of the population. However, interventions varied across other applicability domains evaluated, particularly those relating to the social context and systems. This means that, although most interventions were designed for adolescents most at risk of an AP, there are other elements that moderate the possibility of a successful implementation of the interventions.

A key characteristic of the interventions that we believe would be effective and highly applicable to LA is that they used the delivery of material and/or financial incentives such as school uniforms, school subsidies, or cash transfers as a way of increasing mainly school attendance or the opportunity cost of school absence.^{21,24,25} The intervention effects remained over time after their conclusion, that is, the window of protection of these programs was broader compared with the rest of the interventions examined.

Our findings are consistent with available evidence that shows the general protective effects of incentive-based interventions, as summarized in a previous systematic review.³⁰ For example, another systematic review has shown the effects of cash transfers on sexual risk behaviors, supporting the assumption that incentive-based interventions can influence reproductive health.⁵

The public and/or private initiatives that provide revenue or material goods aim to reduce the inequality or economic and social vulnerability of groups with a social gap.³¹ In that regard, stipends could theoretically be paid as an explicit incentive to delay pregnancy, although most conditional cash transfers reward either school enrollment or completion.⁵ The conditions and compensation associated with the transfer of goods benefit the accumulation of human resources in the short or long term, favor overcoming mechanisms of intergenerational poverty reproduction, and promote short- and long-term social protection.³² These assumptions explain the mechanism by which these particular interventions reported significant effects in preventing pregnancies.

A relevant discussion related to this type of programs lies in a comparison of the effectiveness of conditional and unconditional programs. Interestingly, the study by Baird et al²¹ reported pregnancy prevention in a group of teenaged girls who had dropped out of school and received

cash transfers conditional on returning to and staying in school, but a lack of pregnancy prevention in the group of girls who had not dropped out and received unconditional cash transfers. Unfortunately, available evidence on this comparison is not yet conclusive.³⁰

Today it is widely understood that adolescent fertility is a complex and nuanced issue. In this regard, it is worth pointing out that some interventions that showed no effects in preventing pregnancy but seemed to be moderately applicable to the LA context might have different results if implemented in this region. Most of the interventions that were neither highly applicable nor particularly effective were mainly those that simply provided a curriculum.^{22,23,26,28,29} Historically, reproductive health programs for adolescents have focused on educational interventions, such as school-based programs or workshops to improve knowledge of sexually transmitted infection transmission, pregnancy prevention, and reproductive health. These programs increase youth's knowledge and their capacity for making informed choices⁵ and could be relevant for LA youth.

Furthermore, evidence has shown that programs that include several key actors—parents, teachers, health providers, and community leaders—are more effective than programs that only incorporate one of them⁴ and that, to be effective and maintained over time, programs must be oriented to promote social and structural changes, community awareness, and changes in adolescent knowledge, skills, and behavior.³³ These elements could be incorporated into a comprehensive strategy to prevent AP. Interventions such as those evaluated by LaChausse et al,²⁶ Ross et al,²⁸ and Taylor et al,²⁹ for instance, showed no significant effects, however, they could be adapted to the LA context because they were assessed as moderately applicable. Because they consist of a school curriculum, they require a number of sessions that could be complex to implement within the existing official school content and available school time. Furthermore, because the curriculum deals with sexuality, acceptability might be low among parents, teachers, and school officials. Nevertheless, these obstacles could be reduced by adapting the approach of the interventions.

Additionally, it is important for any effort directed toward the prevention of AP, including the adaptation of international successful evidence-based interventions, to be framed under an approach centered on access to comprehensive sex education and sexual and reproductive rights. In Latin American societies where strong conservative and religious norms prevail, openness toward these topics is key. Therefore, advancing the recognition of adolescents' use of contraception and access to safe abortion is imperative.

The results of this study must be taken with consideration of certain limitations. One is the very methodology used for a rapid review, in which no attempt was made to record the review protocol, the number of databases explored was limited, and gray literature was omitted to speed up the review process. It is thus possible that we missed relevant studies in our analysis, increasing the chance of bias. A second limitation concerns the scope of

the applicability analysis—although there are economic, political, and sociocultural similarities between the countries of LA, there are also huge differences. Finally, our applicability analysis approach is vulnerable to bias because it was not on the basis of a structured, standardized, and validated methodology. Despite all of this, the indicators used are relevant for the assessment because they are on the basis of a systematic review of existing guidelines.¹³ Moreover, the pair-based review, analytical documentation, and classification increase the quality of our applicability assessment.

Although some guidance in assessing and reporting applicability elements is available, efforts should be directed to develop and test such guidelines within the scope of systematic reviews.^{34,35} Such detailed protocols will facilitate complete and transparent assessments of applicability as well as evaluation, reporting, and interpretations of findings. What is more, a further challenge is that not all of the necessary information for an in-depth analysis of applicability is easily available in study reports or, at least, it is not always clear or complete. Authors should invest more effort in reporting aspects related to the general context, implementation time, and long-term effects of the intervention because this might help in the analysis of applicability. Another important element to reflect on in this analysis is costs. We did not include costs in this rapid review because only 5 of the studies reported intervention costs, and they generally referred to the economic value of the main intervention component and not to the global cost of the intervention. Information on that aspect is needed for a more in-depth assessment of applicability. Including an economic evaluation will make the results of an evaluation much more useful for decision-makers.²¹

Recognizing that an applicability analysis is just 1 step on the road to implementing evidence-based interventions, future studies could also include a transferability analysis to explore whether an intervention's effectiveness is repeatable in a different context. This could provide greater accuracy in determining which strategies might be moderately or highly transferable and applicable in Latin American contexts, and thereby provide more useful data on the best interventions to be used.¹⁴ In addition, other recent social and political elements must be considered.

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