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Review article

Interventions to Prevent Unintended and Repeat Pregnancy Among Young People in Low- and Middle-Income Countries: A Systematic Review of the Published and Gray Literature

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A B S T R A C T

Adolescent pregnancy, particularly unintended pregnancy, can have lasting social, economic, and health outcomes. The objective of this review is to identify high-quality interventions and evaluations to decrease unintended and repeat pregnancy among young people in low- and middle-income countries. PubMed, Embase, PsycInfo, Cinahl Plus, Popline, and the Cochrane Databases were searched for all languages for articles published through November 2015. Gray literature was searched by hand. Reference tracing was utilized, as well as unpacking systematic reviews. Selected articles were those that were evaluated as having high-quality interventions and evaluations using standardized scoring. Twenty-one high-quality interventions and evaluations were abstracted. Nine reported statistically significant declines in pregnancy rates (five cash transfer programs, one education curriculum, two life-skills curricula, and a provision of contraception intervention), seven reported increases in contraceptive use (three provision of contraception interventions, two life-skills curricula, a peer education program, and a mass media campaign), two reported decreases in sexual activity (a cash transfer program and an education and life-skills curriculum), and two reported an increase in age of sexual debut (both cash transfer programs). The selected high quality, effective interventions included in this review can inform researchers, donors, and policy makers about where to make strategic investments to decrease unintended pregnancy during young adulthood. Additionally, this review can assist with avoiding investments in interventions that failed to produce significant impact on the intended outcomes. The diversity of successful high-quality interventions, implemented in a range of venues, with a diversity of young people, suggests that there are multiple strategies that can work to prevent unintended pregnancy.

IMPLICATIONS AND CONTRIBUTION

Of the 21 interventions identified as high quality, 17 reduced pregnancy or had a positive impact on proximal outcomes to pregnancy. This study can help inform strategic investments to reduce unwanted pregnancy among young people in low- and middle-income countries.

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Adolescent pregnancy, while on the decline globally, remains an important health issue with consequences that persist through adulthood. In some settings, where early marriage is common, adolescent pregnancy and births may be wanted; however, in many settings, adolescent pregnancies and births are unintended—either mistimed or unwanted. Each year, 12 million adolescents give birth, and 3.2 million will have an unsafe abortion [1]. The United Nations Population Fund reports that the greatest increase in pregnancy among adolescent girls less than 18 years of age over the next 20 years is likely to happen in sub-Saharan Africa [2]. Authors project that over the next 15 years, numbers of early pregnancies will grow by 1.8 million and 1.5 million per year for West and Central Africa and Eastern and Southern Africa, respectively [2]. Recent estimates have shown that approximately one third of adolescent pregnancies in these regions are unintended [3]. In some settings, rapid repeat pregnancy (within 2 years of the index pregnancy) is also a concern. While data in low- and middle-income countries (LMIC) are limited, a review of U.S.-based rapid repeat pregnancy notes that 35% of adolescents have another pregnancy in less than 2 years, and that most of these pregnancies are unintended [4,5]. Recent evidence from the United Kingdom shows that one in four women under the age of 20 presenting for an abortion had a previous pregnancy [5].

Pregnancy during adolescence or young adulthood can have adverse social and economic consequences as well as adverse health consequences [6]. Current studies point to higher rates of adverse newborn outcomes for adolescent mothers [7], and the social, educational, and economic consequences of young motherhood can be profound [8,9] and long lasting [10]. While researchers have been debating the actual risk of dying during pregnancy in adolescence (see [11,12] for recent examples), it is evident that the maternal mortality ratio is elevated during adolescence compared with older women. In lower income countries, pregnant adolescents face additional risks such as anemia, spontaneous abortion, obstructed labor, and obstetric fistulae [13–15]. Data on rapid repeat pregnancy during adolescence is scarce in low- and middle-income settings, but the evidence suggests that short birth intervals increase the risk of infant and child mortality [16] and other adverse child outcomes [17,18].

Prevention of unintended pregnancy among young people is of paramount importance in the global arena, as well as for national policy makers. To inform prevention efforts, this review is motivated by the continuing need for rigorous evaluation and stronger evidence about what works and, does not work, to prevent unintended and repeat pregnancy during young adulthood. We focus on interventions and evaluations of the highest quality to create an evidence base that can be better used to inform future programming and policy initiatives. The objective of this systematic review is to identify high-quality interventions and evaluations targeting unintended and repeat pregnancy among young people in LMIC.

Methods

Definition of outcomes

As pregnancy is difficult to measure in many settings, we also included search terms on birth and abortion. We considered articles that included childbirth rates, total number of live births, time between pregnancies or births, and time between marriage and first birth. As contraceptive use is an intermediary outcome, we also included interventions that targeted contraceptive uptake although we did not specifically search for contraceptive interventions.

Search strategy

We undertook a systematic search of published literature to identify interventions that address “early pregnancy” and “repeat pregnancy” in LMIC. We used six databases—PubMed, Embase, PsycInfo, Cinahl Plus, Popline, and the Cochrane Databases—in conducting these searches. In building the searches, we combined a list of terms that describe young people with a list of terms that describe pregnancy and repeat pregnancy. We then combined this search with a list of LMIC, as defined by the World Bank at the time of the search and regional search terms. We searched the literature from 2000 to November 2015.

We also searched gray literature for both “early pregnancy” and “repeat pregnancy” by first targeting organizations involved in prevention of early pregnancy as well as through the use of the Google search engine for publications about early pregnancy and repeat pregnancy interventions, separately. We also hand searched the literature based on identified citations in the published and gray literature for additional titles.

The results of the initial search of both published and gray literature were stored using EndNote reference manager software. All titles resulting from the searches were screened for interventions related to early pregnancy or repeat pregnancy among adolescents or young people and these remaining articles were abstracted.

Inclusion/exclusion criteria

Articles were included for abstract screening if they met all the following criteria: (1) they report on interventions addressing early pregnancy or repeat pregnancy; (2) the intervention addressed young people, ages (10–24); (3) the intervention was in a low- or middle-income country; (4) the article or publication was written in English, French, Spanish, or Portuguese; and (5) and the article was published in 2000 or later.

Abstraction ranking strategy

We devised a spreadsheet for abstracting and ranking all articles that met the inclusion criteria (available on request from the corresponding author). Each abstractor was given two sample articles, and the abstractions were reviewed for comparability. The abstraction spreadsheet includes basic information on the design of the intervention and evaluation as well as a ranking of each.

For each of the abstracted articles, the quality of both the intervention and the evaluation of the intervention’s effects were assessed and rated on a scale from 1 (weak) to 5 (strong). To assess the strengths and weaknesses of the intervention, reviewers were asked to consider whether the intervention was grounded in theory, if the intervention was first pilot tested to assess feasibility and acceptability, whether and what kind of training personnel involved in the intervention received, what steps were taken to prevent crossover or contamination between intervention and control groups, the duration of the intervention, and whether and how randomization, of the intervention and/or evaluation took

place. A ranking of 1 or 2 was given when the weaknesses of the intervention and study design heavily outweighed any identified strengths. Articles were ranked as a 3 when, on balance, the study design had about as many strengths as weaknesses. Those that were ranked as 4 or more had more identified strengths than weaknesses, and those assigned a 5 had few, if any, weaknesses.

To assess the strengths and weaknesses of the evaluation, reviewers were asked to consider several aspects of the evaluation design and evaluate the strengths and weaknesses before assigning a ranking score. These included the analytic techniques used to evaluate change attributable to the intervention, the use of an appropriate comparison group, sample size, operationalization, and measurement of exposure to the intervention, length of follow-up, and the number of evaluation time points (particularly whether there was baseline and endline data collection or just endline). To assign a ranking score (1–5) for the evaluation, the same methodology was used as for ranking the intervention. The quality of the intervention and evaluation of each included article was assessed by two reviewers, and discrepancies were arbitrated by a third reviewer.

Each abstracted article then received a total score that combined both the intervention score and the evaluation score for a range of 2–10. Overall, an article was considered high quality if it had a total score of 8 or above, and both the intervention score and evaluation score were at least a 4. Following this ranking process, only high-quality articles were retained, regardless of the intervention's impact on the outcome.

Analysis

The most common goals of the identified pregnancy interventions were to prevent pregnancy including unintended pregnancies, promote contraceptive use, decrease sexual activity (including ever/never having sex and recent sex), increase age of sexual debut, and promote abstinence or secondary abstinence for the purpose of pregnancy prevention. The most common goal of interventions targeting repeat pregnancy was uptake of contraceptive use following a birth or abortion. While many studies included knowledge, norms, and behavioral outcomes, this review focuses on behavioral outcomes, as changes in knowledge and norms are not necessarily sufficient to produce behavior change. Studies that did not include behavioral outcomes were excluded from this review. In addition, due to the heterogeneity of the interventions, populations, and outcomes, a meta-analysis was not performed. However, results are summarized to show the features of the interventions, populations, and impact of the interventions on preventing unintended and repeat pregnancy. Table 1 provides the description of the intervention and the key impact on the targeted behavior by outcome. The description includes the age range of participants at the time of the intervention, the duration of the intervention, the age range at the time of the evaluation, the venue of the intervention, and participant characteristics. Table 2 summarizes the findings of each article by study across all targeted behavioral outcomes, highlighting the main finding for each outcome.

Box 1. Behavioral outcomes

Primary outcome

- Pregnancy rates

Proximal outcome

- Contraceptive use

Distal outcomes

- Recent sexual activity
- Age of sexual debut
- Abstinence

Results

Figures 1 and 2 are flow diagrams showing the identification, screening, and included articles. The initial search of published literature yielded more than 28,000 articles for pregnancy. After title and abstract screenings, 112 published or gray articles were abstracted, resulting in 30 articles that had high-quality interventions and evaluations. Thirteen were excluded for two reasons: not having a behavioral outcome (n = 10) or because they were an earlier evaluation of an intervention that had multiple time points of follow-up (n = 3). Ultimately, we had 17 pregnancy articles (12 published and 5 gray literature) that were included for this review.

More than 2,300 articles were identified for repeat pregnancy. Following title screening to remove articles that were duplicates, had no adolescents in the intervention or evaluation groups, and had no specific intervention, 13 articles remained for abstraction. Following abstraction, seven low-quality interventions and two low-quality evaluations were eliminated resulting in four retained articles for repeat pregnancy—three published and one from the gray literature.

Based on the number of articles retained out of the number identified, our search result's yield was approximately .05% and .13% for pregnancy and repeat pregnancy, respectively, when only the published literature is considered (see Figures 1 and 2). Although we undertook the initial searches separately (early and repeat pregnancy), given the few results we had for repeat pregnancy and that the intervention strategies are similar, we have combined these outcomes for the purposes of reporting. Thus, in total, we report on 21 total articles.

We considered three categories of behavioral outcomes—the primary outcome (pregnancy), proximal outcome (contraceptive use), and distal outcomes (sexual activity, including ever having sex, recent sex, and number of partners, primary abstinence and secondary abstinence, and age of sexual debut) (Box 1). Table 1 provides the description of the intervention and the key impact on the targeted behavior by outcome. The description includes the age range of participants at the time of the intervention, the duration of the intervention, the age range at the time of the evaluation, the venue of the intervention, and participant characteristics. Table 2 summarizes the findings of each article by study across all targeted behavioral outcomes, highlighting the main finding for each outcome.

Quality of the evidence

For each of the abstracted articles, the quality of both the intervention and the evaluation of the intervention's effects were assessed and rated on a scale from 1 (weak) to 5 (strong). High-quality interventions often included common positive aspects

Table 1
Description of high-quality pregnancy interventions and evaluations

Country	Intervention		Evaluation	Venue and participants	Main intervention components	Impact
	Age	Length	Age			
Pregnancy (primary outcome)						
Jamaica [19]	11–16	Not specified	15–20	Community: Girls	Skills training and job placement assistance for mothers over 16; classroom instruction and support for mothers under 16	+
Kenya [20]	18–24	7 months	19–26	Facility: Girls seeking contraception	Provision of implant or originally preferred method	+
Kenya [21]	4 years	Not specified	12–24	Community: Girls	Unconditional cash transfer to households, eligibility based on the presence of an OVC or poverty level	+
Mexico [22]	9–21	Ongoing	14–21	Community: Girls	Cash transfers conditioned on school attendance; provision of SRH education and services	+
South Africa [23]	None specified	Not specified	<21	Household: Boys and girls	Unconditional cash transfer program, eligibility determined by poverty level	+
South Africa [24]	None specified	Not specified	13–18	Household: Boys and girls	Unconditional cash transfer program, eligibility determined by poverty level	+
Uganda [25]	14–20	4 months	16–22	Community: Girls	Life-skills curriculum, vocational training	+
Kenya [26]	15 on average	8 months (4 months per arm)	16 on average	School: Boys and girls	Sexual and reproductive health (SRH) education curriculum; teacher training program	+/–
Malawi [27]	13–22	2 years	14–23	Community: Girls	Cash transfers, conditioned on school attendance or unconditional	+/–
China [28]	<25	6 months	<25	Facility: Girls	Provision of contraceptive materials, counseling, involvement of male partner	NS
Kenya [29]	13.5 on average	5 months	20.5 on average	School: Boys and girls	Provision of school uniforms, teacher training program (7-year follow-up)	NS
Malawi [30]	13–22	2 years	14–23	Community: Boys and girls	Cash transfers conditioned on school attendance and payment of school fees	NS
South Africa [31]	14 on average	4 months	15 on average	School: Boys and girls	SRH education curriculum: 12 weekly lessons	NS
Zambia [32]	None specified	3 years	<25	Household: Boys and girls	Unconditional cash transfer to households, eligibility based on poverty level	NS
South Africa [33]	15–26	12 months	17–28	Community: Boys and girls	Reproductive health education program including lectures, plays, and dramas	-
Contraceptive use (proximal outcome)						
Cameroon [40]	None specified	18 months	12–25	Community: Boys and girls	Peer education program	+
China [36]	15–24	20 months	17–26	Community: Boys and girls	Educational materials, counseling, provision of free contraception	+
China [28]	<25	6 months	<25	Facility: Girls	Provision of contraceptive materials, counseling, involvement of male partner	+
Ethiopia [37]	10–19	2 years	10–19	Community: Girls	Social mobilization, nonformal education, and livelihood training	+
India [39]	15–24	4 months	15–25	Community: Girls (with at least 1 child or pregnant)	Community education campaign via mass media	+
Kenya [20]	18–24	7 months	19–26	Facility: Girls seeking contraception	Provision of implant or originally preferred method	+
Uganda [25]	14–20	4 months	16–22	Community: Girls	Life-skills curriculum, vocational training	+
India [34]	14–24	2 years	14–24	Community: Boys and girls	Youth groups; peer education; income-generating skills; youth-friendly services	+/–
South Africa [31]	14 on average	4 months	15 on average	School: Boys and girls	SRH education curriculum: 12 weekly lessons	+/–
Senegal [35]	10–19	15 months	10–19	Community: Boys and girls	Life-skills training, radio programming, adolescent-friendly health services, reproductive health curriculum	-
Sexual activity (proximal outcome)						
Senegal [35]	10–19	15 months	10–19	Community: Boys and girls	Life-skills training, radio programming, adolescent-friendly health services, reproductive health curriculum	+/–
South Africa [24]	None specified	Not specified	13–18	Household: Boys and girls	Unconditional cash transfer program, eligibility determined by poverty level	+/–
South Africa [31]	14 on average	4 months	15 on average	School: Boys and girls	SRH education curriculum: 12 weekly lessons	NS
Age at sexual debut (proximal outcome)						
Mexico [22]	9–21	Ongoing	14–21	Community: Girls	Cash transfers conditioned on school attendance; provision of SRH education and services	+
Kenya [21]	4 years	Not specified	12–24	Community: Girls	Unconditional cash transfer to households, eligibility based on the presence of an OVC or poverty level	+/–
Abstinence (proximal outcome)						
Senegal [35]	10–19	15 months	10–19	Community: Boys and girls	Life-skills training, radio programming, adolescent-friendly health services, reproductive health curriculum	NS

Studies appear more than once based on number of measured behavioral outcomes.
+ = statistically significant positive effect; +/– = mixed effects; – = statistically significant negative effect; NS = no statistically significant effect; OVC = orphan or vulnerable child.

Table 2
Impact summary of high-quality pregnancy interventions and evaluations among young people

Country	Intervention	Behavioral outcome				
		Primary	Proximal	Distal		
		Pregnancy (decrease expected)	Contraceptive use (increase expected)	Sexual activity (decrease expected)	Age at sexual debut (increase expected)	Abstinence (increase expected)
China [36]	Provision of contraception; counseling		↑			
China [28]	Provision of contraception; counseling	—	↑			
Kenya [20]	Provision of contraception	↓	↑			
Ethiopia [37]	Life-skills training; school support		↑			
Jamaica [19]	Life-skills training; school support	↓				
Uganda [25]	Life-skills training	↓	↑			
Senegal [35]	Life-skills training; SRH services; SRH education		↓	↓[a]		—
Kenya [26]	SRH education program; teacher training	↓[b]				
South Africa [31]	SRH education program	—	↓[c]	—		
India [34]	Peer education program; life-skills training		↑[d]			
Cameroon [40]	Peer education program		↑			
India [39]	Mass media campaign		↑			
South Africa [33]	Mass media campaign	↑				
Kenya [21]	Unconditional cash transfers	↓			↑[d]	
Malawi [27]	Conditional/unconditional cash transfers	↓[e]				
Malawi [30]	Conditional cash transfers	—				
Mexico [22]	Conditional cash transfers; provision of SRH services	↓			↑	
South Africa [23]	Unconditional cash transfers	↓				
South Africa [24]	Unconditional cash transfers	↓		↓[d]		
Zambia [32]	Unconditional cash transfers	—				
Kenya [29]	School uniforms; teacher training	—				

Effect significant at $p < .05$. Effect significant at $p < .01$. Effect significant at $p < .001$.

[a] No impact among out of school boys.
[b] Declines among education curriculum arm; no impact among teacher training arm.
[c] No impact on condom use consistency.
[d] Declines among girls; no impact among boys.
[e] Declines among unconditional transfer arm; no impact among conditional transfer arm.

such as including relevant stakeholders in the design and implementation of the intervention, including a pilot phase or formative work, basing the intervention on a theory of change, and being well planned and organized. Notable limitations of these high-quality interventions focused on the difficulties of implementing a complex set of components simultaneously and spillover/contamination effects of the intervention to control groups or populations. Lower quality interventions often had limited information about the intervention and the activities, the intervention was too short or limited, concerns that the intervention had too many components or concurrent activities to sort out the intervention effect, had an unclear implementation strategy, or simply did not provide enough detail to assess the strengths and weaknesses.

We also evaluated the strength of the evaluation. The positive aspects of high-quality evaluations included sophisticated statistical analyses able to attribute findings to the intervention, randomization, a measure of exposure to the intervention, and use of an appropriate control groups. Weaknesses included loss-to-follow-up in longitudinal studies or the inability to follow the same group from baseline to endline. Lower quality evaluations had many more limitations including concerns of spillover/contamination, limitations in analytic techniques, no baseline evaluation (post test only), lack of randomization, no to very limited data, limited statistical power to make inferences, no measure of exposure to the intervention, no true measure of impact of the intervention, the evaluation did not match the intervention in terms of measured outcomes, or having no or an inappropriate comparison group.

Primary outcome

Pregnancy. Pregnancy as an outcome was measured in a number of ways across the identified studies. Some measured pregnancies since baseline, others ever pregnant, while still others as pregnant at the time of the follow-up interview. We identified 16 articles that reported on interventions that measured impact on pregnancy [19–33], with two specifically focusing on repeat pregnancy [19,31]. Of these, nine had a statistically significant impact on pregnancy—six with a positive impact [19–25], two with a mixed impact [26,27]—and five with no measurable impact on pregnancy [28–32]. One intervention, a sexual and reproductive health education program in South Africa, found a statistically significant increase in pregnancy [33]. The intervention strategies that were effective in decreasing pregnancy included five that utilized economic incentives (e.g., cash transfers and school uniforms) [22–24,27,38], three that implemented education or life-skills curricula as part of a multicomponent campaign [19,25,26], and one that provided a contraceptive method to those seeking the intervention at a facility [20] (see Tables 1–2).

Proximal outcome

Contraceptive use. We identified 10 articles [20,25,28,31,34–37,39,40] that reported on contraceptive use, a proximal outcome to pregnancy. The definition of contraceptive use as an outcome varied between studies, with some reporting on modern use, others on current or ever use (see Table 1). Of these 10 articles, the majority had a positive impact on contraceptive use [20,25,28,36,37,39,40], one had a mixed impact [34], and the final two saw significant impacts in the opposite direction, decreasing contraceptive use [31,35]—both included a sexual and reproductive health education component. Among those with a positive impact, five were community based while two were at facilities. Three of the effective interventions included provision of contraception [20,28,36], while three had a life-skills training or education component [25,34,37], and one was a mass media campaign [39].

Distal outcomes

We include three distal outcomes as part of our assessment of effective interventions—sexual activity, abstinence, and age at sexual debut. While these outcomes may impact unwanted and repeat pregnancy, these outcomes alone (with the exception of abstinence) do not directly impact pregnancy. We include articles in this list that either had pregnancy or contraceptive use as an outcome in addition to these distal measures.

Sexual activity. We identified three articles that included sexual activity as an outcome of the intervention [24,31,35]. Two, a multicomponent intervention and an unconditional cash transfer program, had mixed results [24,35], and the third, an education curriculum, had no significant impact on ever or recent sex [31].

Age of sexual debut. One of the interventions, the conditional cash transfer program by the Mexican government [22], showed a statistically significant increase in the reported age of sexual debut by recipients of the intervention while an unconditional cash transfer program reported an increase in the age of sexual debut among female recipients but not among males [21].

Abstinence. One article with abstinence as an outcome of the intervention—a multicomponent intervention—had no significant impact on secondary abstinence [35].

Discussion

Unintended pregnancy, primarily mistimed, among young people, remains a serious concern, despite the lifting of restrictions to access for young people and efforts on the global level to make contraception readily available and affordable to all. Overall, we find very few high-quality articles (both intervention and evaluation) for intervening to prevent pregnancy and repeat pregnancy. When reviewing the interventions that worked to prevent pregnancy, the primary outcome in this review, the majority with the strongest results were cash transfer programs, both conditional and unconditional. While recent debates have suggested that national or government-sponsored cash transfer programs may increase pregnancy rates (see [32] for an excellent summary of this debate), our review suggests that many successfully reduced pregnancy, although some have no impact. Importantly, none found an increase in pregnancy among young people. Despite the success of cash transfer programs, they may be unsustainable in terms of cost, and it is unclear whether changing norms is needed for sustained long-term change.

For the proximal outcome of contraceptive use, those with the strongest results were those that provided contraception directly to young people. The three included interventions had uniformly significant impact on contraceptive use. Direct provision has several strengths; however, careful attention to informed choice is particularly important for young people. In addition, getting

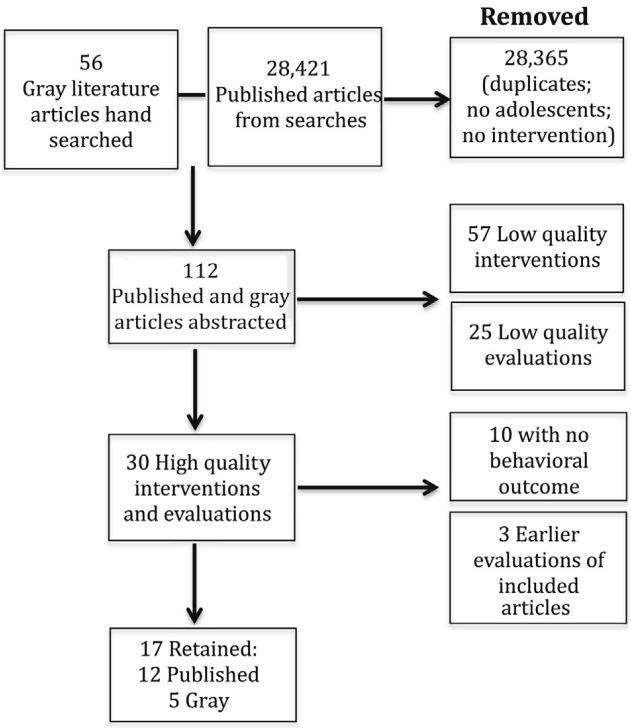

Figure 1. Flow diagram: Early pregnancy.

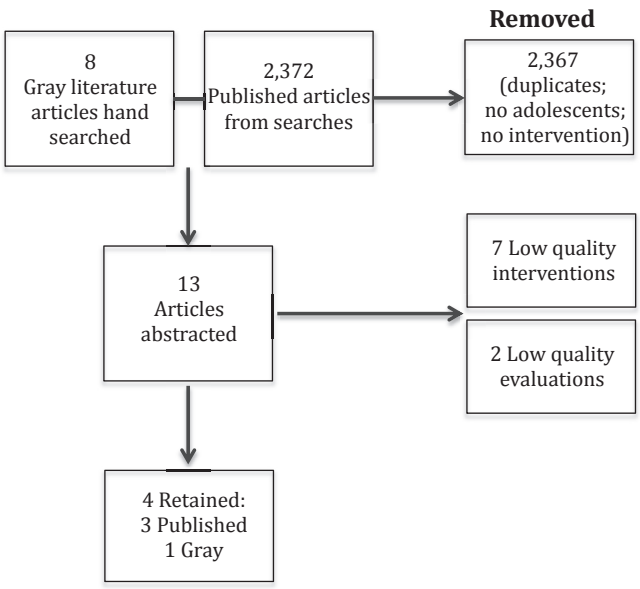

Figure 2. Flow diagram: Repeat pregnancy.

young people to health services is often a barrier to provision of contraception. Interventions that take advantage of young people already at the site of services (postpartum, postabortion) have potential to have significant impact on reduction of repeat pregnancy.

The most common intervention design targeting contraceptive use was life-skills training programs, with very mixed results. Limited evidence of effective evaluations on distal outcomes (sexual activity, abstinence) showed mostly mixed or null results. Given the time it takes to follow-up for sexual activity, contraception, and pregnancy, it is perhaps not reasonable to expect life-skills programs to have a direct effect on these outcomes. Despite the relatively weak findings for life-skills training, life-skills, or comprehensive sexuality education is important for young people and is still a worthwhile intervention to improve knowledge and gender norms [41].

Three of the interventions described in this review had unintended or unexpected impacts on the outcomes. Contraceptive use and condom use decreased in one of the intervention sites in Senegal. The authors suggest that the decline may be due to a shift from more casual partners at baseline to more regular partners in the follow-up period [35]. The second found that one of the intervention arms had a significant increase in multiple partners, ever having sexual intercourse, and transactional sex among boys. For girls, it led to an increase in ever having sexual intercourse. This was explained by the author as a change or shift in patterns of sexual behavior, away from older partners to same-aged partners [26]. A third found that combining two intervention strategies—a teacher training and school uniform provision—decreased the impact of the school uniform intervention alone on pregnancy [29]. This unintended impact is particularly important to note, as the authors were able to tease out the effect of different intervention components—something that many multicomponent interventions are unable to do.

There are a number of limitations from this review to consider. First, pregnancy is likely underreported, particularly for pregnancies that ended in early spontaneous abortion or induced abortion. This limitation results in more conservative estimates of intervention impact. Interventions did not distinguish intended from unintended pregnancy. In addition, although we include both gray and published literature, and did not limit our reporting to only positive results, it is likely that some interventions with null findings were never reported. Furthermore, as is described in the literature review, there is no clear evidence for exact age of potential adverse impact of early pregnancy, but it is likely that pregnancies in the later age range in our study may not carry the same degree of consequences. It is, for example, less clear that pregnancy during the early 20s is as much of problem as those that occur under the age of 18. The included studies and evaluations in this review represent a broad range of ages that may mask heterogeneity in potential adverse consequences within these age groups within an evaluation. Finally, we include the most recent evaluation of a particular intervention with the same outcome. For example, if a group reported on short-term and longer term follow-up of pregnancy, we use the most recent report on the intervention and its impact. This limitation is important to consider as some interventions may have short-term impact but not long-term impact (or vice versa). This decision was made to avoid redundancy but may not fully represent all the effects of a given intervention.

Despite the above-mentioned limitations, the selected high-quality effective interventions included in this review can inform researchers, donors, and policy makers about where to make strategic investments to decrease the health and economic consequences of unintended pregnancy during young adulthood. Additionally, this review can assist with avoiding investments in interventions that failed to produce significant impact on the intended outcomes.

There is no single answer to the best intervention strategy to prevent unintended pregnancy or repeat pregnancy among young people—it depends on the outcome of interest, the setting, and resources. The analysis suggests that the direct

provision of contraception will increase contraceptive use but this intervention strategy is not feasible in settings where young people do not access health services. Similarly, cash transfer programs decrease pregnancy in most settings but not all and are resource intensive. The diversity of successful high-quality interventions, implemented in a range of venues, with a diversity of young people, suggests that there are multiple strategies that can work to prevent unintended pregnancy among young people.

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