




Use of implementation science to advance family planning programs in low- and middle-income countries: A systematic review

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Objective: As environmental and economic pressures converge with demands to achieve sustainability development goals, low- and middle-income countries (LMIC) increasingly require strategies to strengthen and scale-up evidence-based practices (EBP) related to family planning (FP). Implementation science (IS) can help these efforts. The purpose of this article is to elucidate patterns in the use of IS in FP research and identify ways to maximize the potential of IS to advance FP in LMIC.

Design and methods: We conducted a systematic review that describes how IS concepts and principles have been operationalized in LMIC FP research published from 2007–2021. We searched six databases for implementation studies of LMIC FP interventions. Our review synthesizes the characteristics of implementation strategies and research efforts used to enhance the performance of FP-related EBP in these settings, identifying gaps, strengths and lessons learned.

Results: Four-hundred and seventy-two studies were eligible for full-text review. Ninety-two percent of studies were carried out in one region only, whereas 8 percent were multi-country studies that took place across multiple regions. 37 percent of studies were conducted in East Africa, 21 percent in West and Central Africa, 19 percent in Southern Africa and South Asia, respectively, and fewer than 5 percent in other Asian countries, Latin America and Middle East and North Africa, respectively. Fifty-four percent were on strategies that promoted individuals' uptake of FP. Far fewer were on strategies to enhance the coverage, implementation, spread or sustainability of FP programs. Most studies used quantitative methods only and evaluated user-level outcomes over implementation outcomes. Thirty percent measured processes and outcomes of strategies, 15 percent measured changes in implementation outcomes, and 31 percent report on the effect of contextual factors. Eighteen percent reported that they were situated within decision-making processes to address locally identified implementation issues. Fourteen percent of studies described measures to involve stakeholders in the research process. Only 7 percent of studies reported that implementation was led by LMIC delivery systems or implementation partners.

Conclusions: IS has potential to further advance LMIC FP programs, although its impact will be limited unless its concepts and principles are incorporated more systematically. To support this, stakeholders must focus on strategies that address a wider range of implementation outcomes; adapt research designs and blend methods to evaluate outcomes and processes; and establish collaborative research efforts across implementation, policy, and research domains. Doing so will expand opportunities for learning and applying new knowledge in pragmatic research paradigms where research is embedded in usual implementation conditions and addresses critical issues such as scale up and sustainability of evidence-informed FP interventions.

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KEYWORDS

implementation science, strategy, research, family planning, low- and middle-income country

Introduction

Decades of experience make it clear that interventions to improve family planning (FP) policies and programs can be effective at low cost in relatively controlled environments, be they in externally supported projects, short-term studies or small-scale public initiatives (1–3). Yet, integrating them and promoting their scale-up and sustained effectiveness in health systems remains a challenge, particularly in low- and middle-income countries (LMIC) (4–7). Implementation science (IS) is the study of methods to promote the systematic uptake of research findings and other evidence-based practices (EBP)¹ into routine practice (8) in order to improve the coverage, quality, sustainability, and effectiveness of health services (9). Although embedding research in FP programs is not new to LMIC (10), applying IS as a formal discipline in global health initiatives is nascent, and can contribute to large-scale successes needed to achieve universal healthcare coverage (UHC) and the Sustainability Development Goals (SDGs) (11–14). Recognition of this potential illuminates a gap in understanding how well and widely IS is employed and how its principles, concepts and methods could be applied to increase impact of FP programs in LMIC (15, 16).

IS builds on multiple research traditions that have their own set of core disciplines, audiences, and methodologies (17). Many of these have been applied to evaluate and enhance FP programs. For example, operations research has been a mainstay of strategies to introduce and improve FP services in health systems (18, 19). Organizational science has helped

guide the transfer of project innovations to the public sector (20), evaluate policy implementation (21, 22) and systematically introduce new contraceptive technologies (23, 24). The recommendations of the International Conference on Population and Development (ICPD) in 1994 led to research on FP integration within a wider spectrum of SRH services, quality of care, client perspectives, and community empowerment (25–29). In the past 15 years, FP researchers have focused on implementation of EBP and scale-up (30).

The parallel histories of contributing research disciplines, siloed funding and infrastructure, and the lack of standards for adapting and reporting on their use perpetuate debates over the definitions and boundaries of IS (31, 32). Yet, there is convergence that IS is the systematic use of research methods to improve EBP coverage, delivery, sustainment and spread throughout complex systems. IS emphasizes attention and adaptation to local context, stakeholders, local care resources and meaningful end-user engagement (17, 33). Furthermore, there is consensus on prominent features of IS, including adequate description of the EBP and the implementation problem targeted. Adaptation and targeting of implementation strategies vis-à-vis these underlying circumstances should be clear, including the actors who enact the strategy (34–36), so as to promote effective tailoring of intervention and evaluation approaches (37–39). The importance embedding research in the “real world” and using feedback loops that facilitate uptake of findings in “real time” is widely understood, as is the need to study the effect of contextual factors on outcomes and processes. Research teams should include diverse stakeholders and empower decision-makers to act as both “research producers” and the consumers of new knowledge (31, 40–42). IS methods ought to evaluate the effects of interventions to improve the adoption, delivery and sustainability of EBP, balance focus on processes and outcomes, and be flexible to contextual shifts (8, 43, 44). IS emphasizes responsiveness to knowledge needs of target audiences and engagement of stakeholders in

¹EBPs in this paper are defined as programs, practices, principles, procedures, products, pills (or other treatments), and policies that are proven to improve health behaviors or outcomes.

evidence generation and use (45–47). Understanding the degree to which these facets of IS are employed across the spectrum of FP research is critical for determining ways to guide evidence-informed strengthening of policies and programs.

We review how the concepts, methods, and principles of IS have been applied to the adaptation, specification, and evaluation of implementation strategies that aim at maximizing the potential of EBP related to FP in LMIC. The goal of this review is to inform decision-making on how IS can be better applied to enhance the integration, delivery, spread and sustainability of FP interventions in these settings. This will have the potential to lead to downstream improvements in SRH of women, girls, gender-diverse individuals, their families, and communities.

Methods

Research questions

We performed an integrated, mixed method systematic review of relevant literature of IS studies about FP in LMIC (PROSPERO registration CRD42020199353), following the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISMA) guidance (48). To define our research question, we employed the “PICCO” framework, i.e., participants, interventions, comparisons, contexts, and outcomes (PICCO) (Supplementary Material 1). The review addresses two research questions:

1. How have users of IS applied IS concepts and constructs in the design and execution of implementation strategies to enhance the performance of FP-related EBPs in LMIC?
2. How have users of IS employed theories, methods, and principles of IS in implementation research on strategies to enhance FP-related EBP delivery in LMIC?

Study search and title-abstract review

Studies for the review were identified via a literature search of PubMed, Scopus, Cochrane, Web of Science, EMBASE and CINAHL using search terms on implementation strategies, implementation outcomes, geographic area of focus and year of publications (January 2007 until December 2021)². The

²2007 was selected as a boundary for the review because in this year the WHO published the book “Scaling up health service delivery: from pilot innovations to policies and programmes”, which synthesized a great deal of the work which had applied implementation science to advance FP programs previously and directed attention at the need for doing more of this in future. It also established a parameter which

identified studies were uploaded into the systematic review software, Covidence, for review. Three researchers (CB, CS and HM) independently reviewed titles and abstracts to assess their eligibility for full-text review. There were four criteria for this: (1) an explicit focus on FP-related EBP (e.g., contraceptive method, individual behavior or attitude related to FP, a delivery or management intervention that emphasizes FP, or a policy or large scale program that emphasizes FP); (2) having taken place in an LMIC in the above timeframe (determination of LMIC status was based on the World Bank classification); (3) specification of an implementation problem, issue or challenge around the performance of the EBP that was the target of an intervention and; (4) evaluation of implementation-related outcomes associated with an implementation strategy, including contraceptive uptake. Studies were deemed eligible for full-text review if two researchers agreed that the above criterion were met. When disputes arose, a third reviewed the study abstract and the majority opinion was put into effect. Systematic reviews were not considered for full text review. However, researchers did review the reference sections of pertinent systematic reviews to obtain the titles of possibly eligible studies, and such studies were included in the title/abstract review. In addition, studies were only eligible for full text review if they were written in English.

Full-text review

Full-text analysis was completed in a computerized data extraction form in Redcap software. There were three steps to the full text review: (1) assessment of whether the research was of sufficient quality according to research quality assessment tools for quantitative and qualitative studies produced by the Effective Public Healthcare Panacea Project and Critical Appraisal Skills Program (49, 50); (2) assessment of whether the studies were sufficiently detailed vis-à-vis questions in Boxes 1 and 2 and, of the studies that met the above quality criteria; (3) descriptive analysis of salient IS descriptors grouped around the two research questions (Boxes 1, 2). Five researchers contributed to the first stage of the full text review (CB, CS, HM, AD and ST). Studies admitted into the descriptive analysis were reviewed by two researchers. Disagreements were resolved through discussion with coauthors until consensus was reached.

To classify implementation strategies, we drew upon the WHO health systems building blocks framework (51). We added other descriptors for this classification because they applied to many studies in the full text review. Standardized

allowed the authors to maintain a manageable set of titles/abstracts for review.

BOX 1 Key characteristics for reporting implementation strategies

1. The underlying implementation or decision-making issue that needs to be addressed to improve adoption, implementation and sustainability of an EBP.
2. Evidence on the intervention and contextual information that supports its selection to address the issue.
3. Use of knowledge or data on context to adapt, or customize, the strategy.
4. The actors that lead and contribute to the strategy, emphasizing co-creation of strategies across sectors and/or disciplines.
5. The beneficiary targets and modifiable factors the strategy aims at changing to best address the issue.
6. Activities or components the strategy comprises.
7. The sequence and amount of each activity or component to be implemented.

BOX 2 Key characteristics for reporting implementation research

1. Use of theories, models and frameworks for guiding research and evaluation.
2. Description of how findings support better adoption, implementation and sustainment of evidence-based practices (i.e., to address the implementation or decision-making issue).
3. Dual focus on process and outcomes.
4. Incorporation of contextual analysis on strategy design, implementation processes and outcomes.
5. Positioning of research within decision-making, evidence-use frameworks, responsive to local information needs.
6. Collaboration between decision-makers, implementation leaders and researchers on research plans and evidence-use.
7. Embedded in realities of implementing health systems, organizations and communities with a focus on sustainment.

classification taxonomies have been developed to foster an evidence base on effective implementation strategies. These range from clinically-oriented categorizations to those focused on improving systems performance (52, 53). In our review, we built upon the latter, and classified strategies using criteria

informed by the Consolidated Framework of Implementation Research (CFIR) (54), Expert Recommendations on Implementing Change Project (36), and, especially, the taxonomy applied by Leeman et al. (2017) (35, 55). Within each grouping of strategies, one researcher (CB) analyzed studies more finely to identify trends in terms of actor roles, strategy components and modifiable factors they sought to address.

To synthesize findings on implementation research, researchers sought consensus on the research objectives that each selected study prioritized. Those called out in this paper were selected based on reviewer pairs' shared opinion on the strength of their example in this regard. To assess the use of implementation outcomes, we drew upon the "implementation outcomes framework" delineated by Proctor et al. (2013) (56). We calculated descriptive statistics and cross-tabulations to describe the sample's distribution and identify patterns in the adaptation and use of IS to enhance FP-related EBP in LMIC health systems.

Finally, we conducted an in-depth qualitative synthesis of a subset of studies with most complete reporting of salient IS characteristics. Studies included in the descriptive analysis were eligible for the qualitative synthesis if they met at least five of the criteria described in Table 5 or if three reviewers agreed that the study met three criteria in Table 5 and was particularly exemplary vis-à-vis one of them.

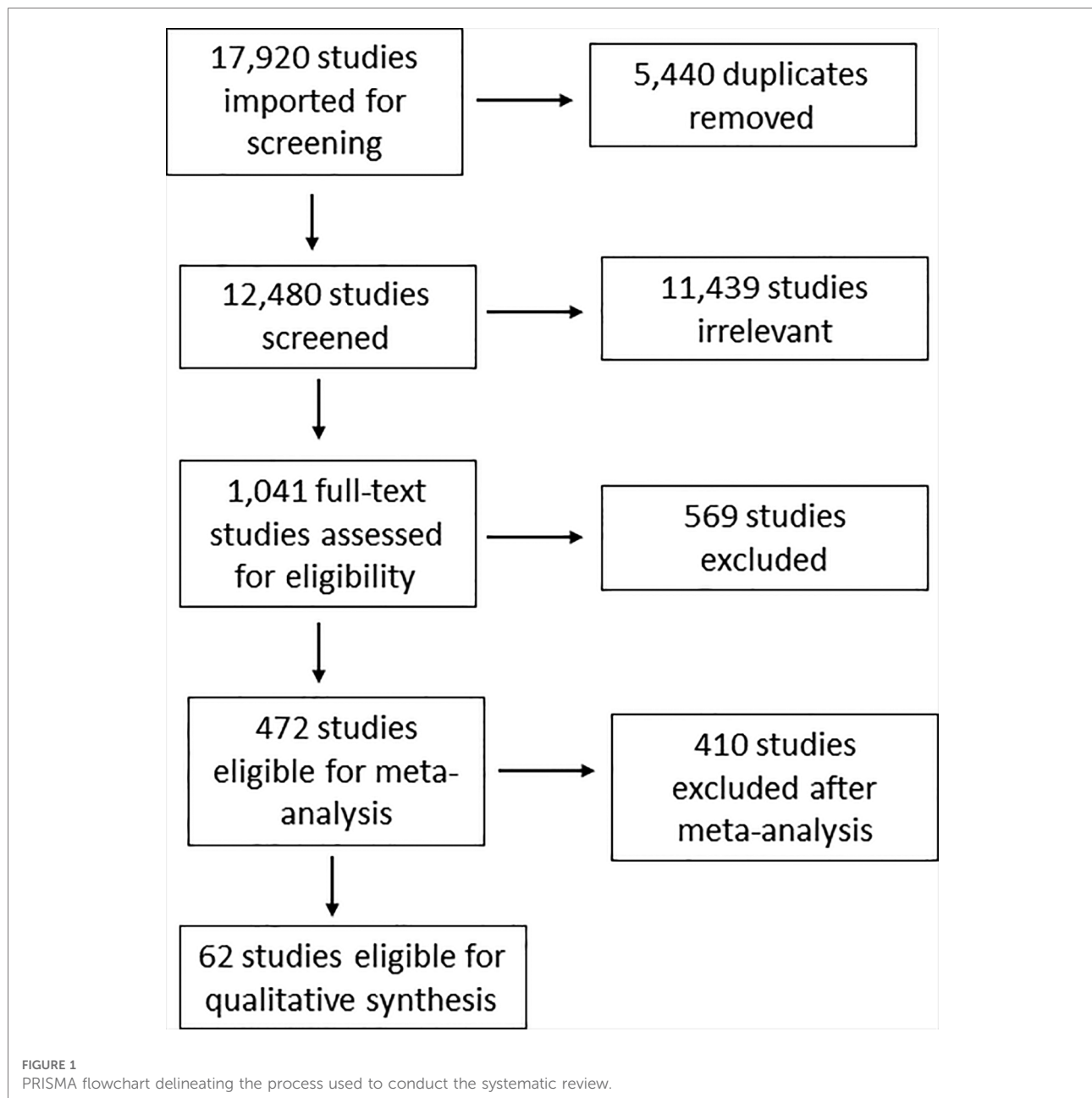
Results

Descriptive analysis

Background and evidence-based practices

Figure 1 is the PRISMA flow chart of our systematic review. The initial search generated 17,920 studies, of which 5,440 were duplicates and removed. Of the remaining 12,480 potentially eligible studies, 1,041 (8%) were selected for full-text review. In the descriptive analysis were included 472 studies of which 238 considered contraceptive methods as the only or primary EBP (the object that the implementation strategy sought to improve coverage, quality and/or sustainability of), and 51 focused on an individual FP-related behavior or attitude.

Approximately 39 percent of studies focused on a service delivery intervention ($n = 129$), management or organizational level intervention ($n = 30$, 6%) or policy or large-scale program ($n = 24$, 5%) as the EBP. In 72 percent of studies, EBP targeted women of reproductive age ($n = 340$), while fewer targeted couples ($n = 75$, 16 percent) and adolescents/youth ($n = 57$, 12 percent). Over 30 percent of studies fully reviewed took place in East Africa ($n = 176$, 37 percent), followed by West and Central Africa ($n = 102$, 21 percent), Southern Africa ($n = 90$, 19 percent), South Asia ($n = 90$, 19 percent), China and other Asia ($n = 24$, 5 percent), Latin



America ($n = 21$, 4 percent), Middle East and North Africa ($n = 17$, 4%), and Eastern Europe/ former Soviet Republics ($n = 2$, <1 percent). Ninety-two percent of studies ($n = 432$) were carried out in one region only, whereas 8 percent ($n = 40$) were multi-country studies that took place across multiple regions.

Implementation strategies

Implementation strategies constitute the “how to” component of change in routine practice (34). In examining the articles, we found that 62 percent ($n = 291$) definitively reported who led implementation strategies, and the balance reported that strategies were led by some combination of

delivery system and support system actors. Thirty-six percent of studies ($n = 164$) targeted eligible contraceptive users only as the object of the intervention, whereas 56 percent ($n = 266$) targeted potential users and other member(s) of the service delivery system. Similarly, most implementation strategies focused on promoting individuals’ use of FP services ($n = 257$, 54 percent), while fewer prioritized implementation objectives (Table 1).

Of the strategies reviewed fully, more than half ($n = 251$, 53 percent) were classified as “integration strategies”, reflecting programs’ targeting of factors in individuals’ spheres, service delivery settings or the wider health system and community

TABLE 1 Specification of implementation strategies—prevalence of key intervention descriptors.

	N (%)
Salient implementation strategy activities are described*	
<i>WHO Health System Building Blocks Classification</i>	
Service delivery improvements (e.g., service quality improvements, strengthening of counseling, integration of FP with other services)	233 (49)
Health workforce ((re)deployment, (re)orientation health workers or capacity building beyond the level of routine training in the manner of task shifting or an innovative approach to packaging or coordinating training)	193 (40)
Health information systems	23 (5)
Technological solutions to expand the reach of FP information and services or address limitations in the method mix available	113 (24)
Financing and social protections	68 (14)
Leadership and governance	11 (2)
<i>Other</i>	
Community engagement (i.e., delivery or support system actor elicits participation of community health workers, leadership, or groups to implement the EBP)	159 (34)
Social and behavioral change communication	62 (13)
Leader of implementation strategy is explicitly defined	
Delivery system (i.e., members of the health system responsible for delivering routine care)	199 (42)
Support system (i.e., implementation partner organizations that build the capacity of delivery systems to deliver EBP)	84 (18)
Synthesis and translation system actors (i.e., organizations that manage new knowledge, disseminate and promote uptake of evidence during implementation)	8 (2)
Combination of delivery system and support system.	181 (38)
Primary target(s) of implementation strategy is explicitly defined*	
Users of FP services	266 (56)
Health workers	193 (41)
Community health workers (including volunteers or groups based in communities)	88 (19)
Private sector health workers	56 (12)
Local government authorities (e.g., district health management team)	40 (8)
Men or couples	40 (8)
National level policymakers	24 (5)
Objectives of implementation strategies are clear (the foremost objective of the implementation strategy is...)^{a,b}	
To enhance or promote individuals' use, understanding of and uptake of contraception and FP services	257 (54)
To enhance or promote the implementation or delivery of FP-related EBP	94 (20)
To enhance or promote systems' adoption of FP-related EBP	90 (19)
To enhance or promote the sustainment of FP-related EBP	6 ^{b,c} (1)

*Multiple classifications can apply per study.

^aMore than one descriptor can apply but provided are our assessment of the principal objective for each strategy.

^b25 studies featured strategies that prioritized a combination of objectives equally.

^cAlthough only 7 studies prioritized enhancing the sustainability of FP-related EBP, sustainability issues were addressed by 56 strategies to some extent (49 giving it less emphasis than adoption and implementation).

environment that impede and/or facilitate use of FP methods. The second most-common classification was of “capacity building” strategies, which are led by support system actors that target delivery systems to enhance individual and team motivation, self-efficacy, and skills to implement EBP (18 percent, $n = 84$) (57).

We classified 14 percent ($n = 68$) of implementation strategies as scale up strategies, i.e., strategies led either by support system actors or high-level actors in delivery systems (e.g., Ministries of Health) with the goal of getting multiple settings to implement specific FP-related EBP. Only 8 percent ($n = 40$) of studies featured implementation process strategies

that were enacted by those working within FP service delivery systems and pertain to processes or activities that implementation teams perform to plan, select, and integrate FP-related EBP into routine practice. Whereas capacity building and integration strategies aim at promoting better adoption and implementation of specific EBP, implementation process strategies target how well teams execute processes that apply to EBP generally (including EBP bundles) (58). Finally, 6 percent ($n = 29$) of studies were classified as having dissemination strategies, which utilize communication and awareness-raising activities to target the attitudes, knowledge, and intentions of audiences to accept and adopt FP-related

TABLE 2 Classification of implementation strategies assessed in studies included in full text review ($n = 472$) using the taxonomy of leeman et al. (2017) (35).

Integration strategies

Target/purpose: To address factors that facilitate or hinder the adoption and integration of an FP-related EBP in a setting to promote higher levels of use of the practice (focus on user and implementer).

Type of strategy found in literature	Examples	
Technological solutions to reposition FP within lifeworld of user, and enhance the opportunities, intentions, abilities to use FP.	mHealth FP education/ awareness messages, referral to services; mHealth reminder systems for current users, telemedicine counselling to support contraceptive self-care.	McCarthy et al (2018, 2019); Smith et al (2017); Reiss (2017, 2019); Harrington (2019); Bates et al (2018); McConnell, et al. (2018) (60–67).
Changes in the service delivery environment or efforts to enhance the organizational capacity or climate to increase opportunities and motivations to use the EBP.	For users, better counseling, or access to information (e.g., leaflets), co-location of FP counseling or methods in other health service delivery settings. For implementer, job aids, decision-support tools, financial or material inputs to improve readiness, coaching and mentoring, customized tools to enhance referrals.	Dulli, et al. (2019); Tran (2018; 2019); Church et al. (2015); Warren, et al. (2012); Ojanduru, et al. (2018); Biswas, et al. (2017); Grossman, et al. (2013); Farouk-Eslamou et al. (2013); Chabikuli, et al. (2009) (68–77)
Revision or expansion of health worker roles, including involvement of non-traditional actors, to better situate the FP vis-a-vis users, enhance opportunities, motivations, and abilities to use.	Deployment of community-health volunteers or workers to make FP services convenient; recruitment of SRH focused peer educators in schools and non-traditional health settings; configuring an FP service within the private sector to increase access; self-administered contraception, including injectable contraception.	Bates, et al. (2019) Bacqui et al. (2018); Mudioppe et al. (2017); Cover (2018); Burke (2018; 2018); Hernandez, et al. (2018); Mullany, et al. (2010) (78–86)
Social and behavioral interventions aimed at removing social and cultural barriers and enhance individuals' confidence and self-efficacy vis-à-vis the EBP.	Formation of peer groups to promote an enabling environment for SRH care seeking; targeting gatekeepers; gender transformative interventions to advance autonomy of women and girls, and gender-diverse individuals, male engagement, couples' communication	Huda, et al. (2019); Bapolisi, et al. (2020); Challa (2019); Chirwa-Kambole, et al. (2020); Subramanian, et al. (2018) (87–91).
Pro-poor financial interventions to offset the costs and promote affordability of FP use.	Targeted voucher schemes.	Ovugi, et al. (2017); Ali, et al. (2019); Atukunda et al (2019); Bellows et al (2011) (92–95)
Capacity building strategies		
<i>Target/purpose: To enhance individuals' motivation and capability to implement an EBP (focus on implementers).</i>		
Task sharing to different levels of care and cadres.	Training and deploying community health workers to deliver FP; training women to self-inject DMPA-SC; task sharing tubal ligation to health officers; private sector provision of postabortion care.	Reiss et al. (2018); Jacinto et al. (2016); Cover et al. (2017); DiGiorgio et al. (2018); Nuccio, et al. (2016); Ogu et al. (2012) (96–102)
Building management capacity.	Training in business management, strengthening and support for organizational structures to promote sustainability.	Ugaz et al. (2017); Canning, et al. (2016); Mugore, et al. (2016); Karra et al. (2019); Hackett et al. (2020) (103–107)
Training and post-training follow up vis-à-vis a specific EBP.	In-service trainings in postpartum FP and postabortion FP; training community health workers in FP; trainings of health care workers in rights-based approaches and incorporating them in service delivery.	Kiemtore et al. (2019); Cooper et al. (2020); LeFevre et al (2018); Hardee et al. (2019); Wendot, et al. (2018) (108–112).
Strategies to strengthen or improve upon existing capacity building approaches or trainings.	Online training approach for postpartum IUD insertion; peer mentoring as a strategy for capacity building; digital health training package in community-based distribution of FP	Zafar et al (2019); Ndwiga et al (2014); Limaye et al (2020) (113–115)

Scale up strategies

Target/Purpose: To enhance motivation and capacities to integrate a specific EBP or package of EBP into practice across multiple settings; to enhance the ability of EBP coverage to expand.

Type of strategy found in literature	Examples	
Results-based incentivization of adopting EBP packages throughout national health systems.	Pay for performance schemes led by national figures that engage local leaders in policies that contain EBP, reward facilities or districts for EBP implementation, encourage use of rewards to improve service delivery, and public performance benchmarking.	Zeng et al (2018, 2018); Nahimana et al. (2016); Friedman et al. (2016) (116–119)
Policy driven initiatives led by NGO to strengthen human resource at large scale vis-à-vis specific EBP.	Training and technical support to expand youth friendly LARC and postabortion FP; integrating non-	Fikree et al. (2019); Samuel et al. (2016); Dunbar et al. (2018) (120–122)

(continued)

TABLE 2 Continued

Integration strategies

Establishment of social franchise networks, including targeted voucher schemes, to expand EBP adoption and use.	communicable disease interventions into existing national CHW platform; Promote and enforce service provision and quality standards; expand networks through capacity building; financial incentives to remain in network and offset care seeking costs.	Prata et al. (2013); Bellows et al. (2017); Pereira et al. (2015); Liu et al. (2018); Azmat et al. (2013) (123–127).
Top-down policy implementation led by Ministries of Health.	Adolescent health programming and implementation of the national RMNCH policies in India; public-sector financing of maternal health and family planning in Mexico; task sharing in Burkina Faso.	Barua et al. (2020); Taneja et al. (2019); Avila-Burgos et al. (2016); Millogo et al. (2019) (128–131).
Projects that transition from NGO initiatives to national programs achieving larger scale	Incorporation of ExpandNet framework for scaling up into NGO activities that progressively achieve wider scale, increasingly through the structures and resources of national public health systems.	Igras et al. (2014); Keyonzo et al. (2015); Aichatou et al. (2016); Mai et al. (2019); Ntabona et al. (2021) (132–135)

Implementation process strategies

Purpose/target: How well teams execute processes to select, adapt and integrate EBP or packages of EBP into routine practice; processes are not exclusive to specific EBP but are/ can applied to this effect with respect to any EBP.

Stakeholder engagement, use of evidence, planning.	National stakeholder planning of costed implementation plans; effectiveness of guidelines and their promotion to improve laws and policies; district-level health planning and priority setting; advocacy frameworks to promote policy changes.	Lipsky et al. (2016); Shilton, et al. (2019); Chitama et al. (2011); Gichane et al. (2018) (136–139)
Execution of processes aimed at optimizing performance of EBP already in practice.	Strengthening of organizational networks to improve cross-level referral in municipal health system; models for putting service integration into place and maximizing access; interventions to strengthen the functionality of supply chain; “plan, do, study, act” processes to strengthen service integration and quality.	Thomas et al. (2016); Faye et al. (2015); Cavallaro et al. (2016); Hasselback et al. (2017); Krug et al. (2020); Tawfik, et al. (2014) (140–144)
Use of research as a strategy to facilitate EBP adaptation and adoption in health systems.	Engaging stakeholders in using data to make decisions on scale up FP services; pilot research as advocacy; formative and process evaluation to guide develop models for service improvements.	Byrne et al. (2012); Binanga et al. (2016); Spring et al. (2016); Milford et al. (2018) (145–148)

Dissemination strategies

Purpose/target: To build societal-level or systems-wide awareness of and knowledge about specific EBP, attitudes in favor of the EBP, intentions to adopt the EBP.

User and/or gatekeeper targeted	Spread awareness, understanding and intention to use, or support others' use, of contraception or other desirables SRH behaviors.	Burke et al. (2014); Okigbo et al. (2015); Beaudoin et al. (2016); Atagame et al. (2017); Babalola et al. (2017) (149–153)
Health care worker or manager targeted	Spread awareness, understanding and intentions to adopt best practices for implementing FP.	LeMay et al. (2012); Kraft et al. (2018) (154, 155).

EBP (59). See **Table 2**. Less than half of the studies (42 percent, $n = 199$) clarified the temporal sequence of delivery of intervention components. While most studies identified implementation outcomes that strategies sought to change (80 percent, $n = 378$), a minority (11 percent, $n = 50$) provided a detailed theory of change, causal pathway or conceptual model. Few studies provided information on the amount, duration or intensity of implementation that was required, or delivered, to achieve outcomes (14 percent, $n = 68$) (156–158).

Implementation research

Core to IS is the use of theories, models, and frameworks to gain insight on why and to what extent implementation succeeds or fails (159). These have centered on three aims: (1)

describing, or guiding, the process of translating evidence into practice; (2) understanding and/or explaining what influences implementation outcomes; and (3) evaluating implementation and the effectiveness of strategies (160). Initially, this review sought to quantify the frequency with which studies explicitly used a common IS theory, model, or framework, and found that only 3 percent ($n = 14$) studies did so, of which six called out “process models”, five determinants frameworks, and three evaluation frameworks. An additional forty-four articles referenced other theories, models, or frameworks, mostly concerning health behavior change, to articulate theories of change.

To understand underlying influences of theoretical perspectives, reviewers classified studies by whether they

TABLE 3 Classification of research objectives prioritized in fully reviewed studies ($n = 472$).

Type of research objective	N (%)	Examples
Determine effectiveness of implementation vis-à-vis intended outcomes.	301 (64)	Phillips et al. (2012); Baqui et al. (2018); Carmichael et al. (2019) (80, 161, 162)
Understand the factors that influenced whether a strategy was successful.	147 (31)	Mutemwa et al. (2013); Myers et al. (2018); Hackett et al. (2020) (103, 163, 164)
Examine processes of integrating EBP within a setting.	113 (24)	Tessema et al. (2019); Zulu et al. (2019); Milford et al. (2018) (145, 165, 166)
Assess the spread of EBP to target audiences	58 (12)	Awoonor-Williams et al. (2013); Gold et al. (2017); Adenini et al. (2018) (167–169)
Understand whether a strategy was being implemented according to a plan and if implementation could improve.	48 (10)	Rawlins et al. (2013); Agha et al. (2010); LeFevre et al. (2018) (109, 170, 171)
How research participants and stakeholders can learn from findings and be empowered to act.	12 (3)	Butler et al. (2020); Boydell et al. (2018); Tran et al. (2018); Chhoun et al. (2019) (172–175)

addressed specific research objectives, recognizing that more than one descriptor could apply to a single study (Table 3). Sixty-three percent ($n = 301$) of studies evaluated implementation effectiveness in terms of uptake of a health behavior, including service utilization, 31% ($n = 147$) sought to understand the barriers and facilitators that influenced whether a strategy was successful, 24% ($n = 113$) to examine processes of integrating EBP within a setting, 12% ($n = 58$) to assess the spread of EBP to target audiences, 10% ($n = 48$) to understand whether a strategy was being implemented according to a plan and if implementation could improve, and 3% ($n = 12$) how research participants and stakeholders can learn from findings and be empowered to act.

Sixty-three percent ($n = 299$) of studies used quantitative methods only, while the remainder either drew upon qualitative methods only (19 percent, $n = 87$) or were mixed method (18 percent, $n = 86$). Of the quantitative studies, 24 percent ($n = 91$) were randomized trials, 69 percent ($n = 265$) employed quasi-experimental designs, and 7 percent ($n = 26$) triangulated cross-sectional data with qualitative methods. Of the qualitative studies, 24 percent ($n = 42$) were formative studies to guide adaptation of implementation strategies, 35 percent ($n = 61$) described or explained processes, and 41 percent ($n = 71$) obtained data to explain quantitative outcomes.

We classified studies according to outcome type, distinguishing outcomes of effectiveness (rows 9–10 in Table 4) from implementation outcomes (rows 1–8), recognizing that many studies assess more than one (Table 4). Overall, 72 percent ($n = 341$) evaluated an implementation outcome, whereas the remainder (28 percent, $n = 131$) reported only behavior or service utilization

TABLE 4 Variables measured by fully reviewed studies.

	Quantitative measures (%)	Qualitative measures (%)
Implementation Variables (56)		
1 Acceptability	74 (16)	123 (26)
2 Adoption	50 (11)	19 (4)
3 Appropriateness	6 (1)	25 (5)
4 Costs	38 (8)	0 (0)
5 Feasibility	40 (8)	104 (22)
6 Fidelity	46 (10)	17 (4)
7 Penetration	41 (9)	7 (1)
8 Sustainability	11 (2)	14 (3)
Effectiveness Variables		
9 Health or behavioral outcome	188 (40)	29 (6)
10 Service utilization	297 (62)	11 (2)

outcomes. Forty-eight percent ($n = 228$) were classified as “implementation-effectiveness hybrid designs” as they measured both outcome types (44). Of these, 73 percent ($n = 166$) placed greater emphasis on the effectiveness variable, and 24 percent ($n = 113$) focused solely on implementation outcomes.

Table 5 features examples of studies that are related to the following implementation research themes: (1) focus on processes and outcomes, (2) incorporation of contextual analysis, (3) responsiveness to evidence demands and fitness to purpose, (4) multidisciplinary and multisectoral collaborations, and (5) embeddedness of research in real world implementation scenarios.

Of the 341 studies that measured implementation outcomes, 14 percent ($n = 49$) measured changes in implementation variables over time, and 34 percent ($n = 117$) measured both outcomes and processes. Sixteen percent ($n = 53$) of studies reported whether implementation processes deviated from implementation plans. Only one-third ($n = 156$) of studies provided information on the context of the EBP and if the implementation strategy was adapted to it. Thirty-one percent ($n = 147$) reported how contextual factors affected implementation and outcomes (202).

We found that 46 percent ($n = 215$) of studies clearly articulated the target audience and that 29 percent ($n = 136$) link results with recommendations that address implementation problems. Eighteen percent ($n = 85$) of studies indicated how they were situated within local decision-making frameworks and address stakeholder-expressed implementation challenges and demands for new knowledge. Only 10 percent ($n = 48$) of studies reported how research designs and methods were adapted to emergent information needs and context, and 31 percent ($n = 148$) reported that researchers involved stakeholders (including national decision-

TABLE 5 In-depth review of iS studies with more complete reporting of salient iS characteristics.

Criteria	Examples	
Focused on processes and outcomes		
Evaluation of processes to explain outcomes and/or how implementation can be improved.	Explain factors that affected the implementation and effectiveness of PPIUD initiative; Assess effect of integrating HIV risk counseling on injectable contraceptive uptake; Elucidate contextual factors affecting quality and uptake of FP during immunization services; Process evaluation of reproductive health voucher program; Tracking user interactions with providers in an mHealth intervention to identify ways to refine implementation; Process evaluation of quality improvement collaborative and implementation barriers and facilitators focused on community-based distribution of FP.	Hackett et al. (2020); Barden O'Fallon et al. (2020); Nelson et al. (2019); Abuya et al. (2012); Smith et al. (2017); Kim et al. (2019) (63, 104, 177–180).
Monitor deviations from implementation protocols, i.e., lapses in fidelity to implementation plans.	Monitoring implementer fidelity to counseling protocol during a PPIUD intervention trial; Mapping planned vs actual implementation of a FP-focused social accountability intervention; Assessment of fidelity to design of community-based distribution program; Monitoring of FP stock outs and investigating lapses in supply chain management; Tracking success rate of a mHealth intervention at connecting callers to health workers to receive tele-counseling; Comparing facilities' sustainment of integrated SRH/FP service delivery; Monitoring fidelity to original community-based health planning and services intervention package during scale up.	Karra et al. (2019); Boydell et al. (2019); Hasselback et al. (2017); Mayhew et al. (2017); Phillips et al. (2012) (107, 162, 176, 180, 181)
Determine whether interventions improve or cause change in implementation outcomes.	Effect of digital training tools on quality of FP counseling; changes in the quality of FP service delivery during and after a donor-funded program; Measuring change in adolescent perceptions of the acceptability of modern contraception after an mHealth education intervention; Assessing effect of post-training provider coaching mentoring on quality of abortion-care services; Effect of business-skills and clinical capacity building intervention on management and FP service delivery in the private sector; Effect of network strengthening meetings on HIV-FP referral processes.	Limaye et al. (2020); McCarthy et al. (2019, 2018); Benson et al. (2017); Ugaz et al. (2017); Thomas et al. (2016) (104, 116, 141, 182, 183)
Incorporation of contextual analysis		
Explain how implementation strategies were adapted and/or customized according to local programmatic contexts.	Political economy analysis to guide strategy on how civil society organizations should adapt work plans and promote SRH in local political context; Qualitative formative research to develop integrated community-based HIV prevention and SRH services for women that inject drugs; Participatory methods to build an mHealth intervention for female entertainment workers; Qualitative formative research to inform design of private sector FP training and referral system; Participatory action research to develop postpartum FP interventions; Health information needs assessment to develop a national model for SRH knowledge exchange; Use of organizational capacity assessments to guide strategy on adding long acting reversible contraceptives to the method mix; Embedding qualitative research in scale up to adapt rural implementation models for urban settings.	Butler et al. (2020); Ayon et al. (2019); Chhoun et al. (2019); Bates et al. (2019) Tran et al. (2018); LeMay et al. (2012); Sprockett (2016); Adongo et al. (2014) (78, 155, 172–174, 184–186).
Measure and/or explain how contextual factors affected implementation and outcomes.	Examine how different contexts trigger mechanisms of acceptability with respect to the delivery of FP services in childhood immunization settings; Understand barriers and facilitators to implementation-effectiveness of female FP volunteers; Provider perceptions of the constraints and facilitators to using national guidelines for FP service delivery; Systems analysis to identify context-specific constraints to FP service delivery to guide scale up planning.	Webster et al. (2021); Marston et al. (2020); Tessema et al. (2019); Church et al. (2015); Byrne et al. (2012) (68, 147, 165, 187, 188)

(continued)

TABLE 5 Continued

Criteria	Examples	
Research that is fit for purpose and responsive to local demands for knowledge		
Research design and methods are flexible, adaptive to emergent information needs and context.	Use of human-centered design to develop and evaluate context-specific youth-driven solutions to unmet need for FP; Triangulation of intervention fidelity monitoring, rapid provider surveys and documentation review to guide mid-project course corrections of community-based distribution program; Systematic adaptation and use of routine M&E to guide scale up of Standard Days Method; Embedded data quality assurance and support for real-time data analysis for decision-making vis-à-vis key performance indicators to guide mid-program action of a performance-based financing project; Use of behavioral economics to iteratively refine postabortion FP counseling quality improvement interventions.	Atchison et al. (2018); Doyle et al. (2019); Hernandez et al. (2018); Igras et al. (2017); Nahimana et al. (2016); Spring et al. (2016) (79, 118, 134, 189–191)
Positioned within a local decision-making framework, driven by demand for knowledge on local implementation challenges and solutions.	Government commissioned evaluation of adolescent sexual and reproductive health policy implementation to guide improvements and scale up; Embedded implementation research to guide FP task sharing policy development and scale up; Evaluation of national results-based financing program to guide decisions on scale up; Pilot research as advocacy to guide introduction and scale up of Sayana Press; Review and assessment of compliance with policy implementation milestones to guide scale up of community-based primary health care and family planning.	Barua et al. (2020); Friedman et al. (2016); Binanga et al. (2016); Awoonor-Williams et al. (2013) (119, 130, 146, 166)
Multidisciplinary and/or multidisciplinary collaboration		
Emphasizes co-creation of implementation research plans by practitioners, researchers, decision-makers.	Donor-implementer-policy collaboration to guide task sharing for FP services; Pragmatic trial of public-sector led community-based health systems strengthening (includes FP); Government and research partner collaboration to embed a cluster randomized trial into the roll out of a public sector led reproductive and child health systems intervention that evaluates impact on government set endpoints; Government led evaluation of RMNCH policy implementation strategy using routine data from supervisions across multiple states (included FP); Design and evaluation of supply and demand-side interventions urban reproductive health initiative.	Millogo et al. (2019); Lauria et al. (2019); Carmichael et al. (2019); Taneja et al. (2019); Aichatou et al. (2016) (128, 131, 162, 192, 193).
Describes engagement of practitioners, decision-makers and/or communities in use of evidence or translation of knowledge to practice.	Translating evidence in policy changes on community-based distribution of injectable contraception; Using program knowledge to develop and refine strategies for scaling up throughout wider health system; Government adaptation and use of WHO FP guidelines and tools to formulate laws, policies, and strategies; Developing a model for integrating sexual and reproductive health services with HIV prevention and care; Explore the policy and systems factors that shape district-level priority-setting and planning processes for FP and MCH interventions.	Gichane et al., (2019); Mai et al (2019); Shilton et al. (2021); Milford et al. (2018); Kraft et al. (2016); Keyonzo (2015); Chitama et al. (2011) (132, 133, 136, 137, 139, 145, 154)
Embedded in the “real world”		
Implementation is led by local delivery systems without help from a support system actor or help from a local support system actor.	Assessing a referral model for better integration HIV and FP services using routine data; Using a behavioral economics approach to address contraceptive discontinuation; Integrating community health assistant driven sexual and reproductive health services in community health systems; Investigation of whether changes in national health expenditure patterns were consistent with relevant policy objectives; Small clinic network staff strategically plan and execute intervention to integrate FP services with HIV care and treatment.	Chabikuli et al. (2019); Karim et al. (2019); Zulu et al. (2018); Mulubwa et al. (2020); Avila-Burgos et al. (2016); Phiri et al. (2013); Tweya et al. (2018). (69, 129, 166, 194–197)

(continued)

TABLE 5 Continued

Criteria	Examples
Generates knowledge on how to promote sustainment of implementation strategy.	The sustainability of the impact of the urban reproductive health initiative; Integration and sustainment of community-based adolescent sexual and reproductive health interventions; Sustainment of the impact of the community health and family planning project; Institutionalizing PPIUD implementation as a lasting, integral component of maternal health care; Using demand-side financing strategies to make high quality FP services available at scale. Speizer et al. (2019, 2019); Zulu et al. (2018); Phillips et al. (2012); Canning et al. (2016); Azmat (2014) (105, 161, 165, 198–201)

makers and local implementation teams) in the design of the implementation strategy and research. Fewer (14 percent, $n = 68$) included measures to strengthen local research capacity, facilitate stakeholder use of findings, or involve stakeholders in the research process.

Assessing whether studies were situated within the realities of implementing organizations and led by local actors was challenging owing to gaps in reporting on funding, management support to interventions, and roles of partners. Approximately 7 percent of studies ($n = 35$) were led by delivery systems or support system actors from the host country and provided detail on how implementation was conducted through routine systems and communities. Forty-five percent ($n = 212$) were either led or supported by international organizations that intervened in implementation conditions and processes; and 48 percent ($n = 225$) of studies did not provide enough detail on implementation arrangements to make a “real world” distinction. Of the thirty-five studies given that classification, ten (29 percent) indicated an intent for the strategy to improve EBP sustainability and two (6 percent) measured this as an implementation outcome.

Finally, we classified studies according to the primary purpose and utility of findings. We found that 38 percent ($n = 179$) of studies primarily addressed whether a strategy helped improve health outcomes, 27 percent ($n = 128$) how to improve health services delivery and management, 19 percent ($n = 89$) how to best design a policy or program, 11 percent ($n = 52$) how to strengthen systems and/or scale up, and 5 percent ($n = 24$) how to empower communities and beneficiaries.

In-depth review

Of the studies included in full text review, 8 percent ($n = 38$) were eligible for the in-depth review because they met at least five criteria described in [Table 5](#). Twenty-five other studies were included in the in-depth review because they met three criteria and reviewers agreed that they were particularly exemplary vis-à-vis one of them. See [Table 5](#).

Focusing on processes and outcomes

Two-thirds of the studies that studied processes and outcomes ($n = 79$) did so to explain the generative process that led to contraceptive uptake. For example, Hackett et al. employed the “implementation outcomes framework” developed by Proctor and colleagues to explain the effectiveness of an intervention to increase postpartum intrauterine device uptake (PPIUD) in the context of a cluster-randomized trial in Tanzania (103). Few studies explained how different implementation variables affect each other along the causal pathway. Abuya et al. examined processes for implementing an SRH voucher intervention in Kenya, explaining how acceptability and feasibility outcomes arise due to specific features of the intervention and how alternative voucher distribution and claim processing practices led to different levels of client satisfaction and efficiency (176). Few studies assessed whether strategies were carried out according to plan. In exception, Karra et al. incorporated implementation fidelity tracking into a cluster-randomized trial to determine if study participants received counseling during pregnancy and estimated an “adherence-adjusted effect” of a PPIUD intervention in Sri Lanka.

Fewer studies that investigated implementation fidelity explored the drivers of patterns. Mayhew et al. retrospectively triangulated an analysis of systems “hardware”, “software” and contextual factors to illuminate barriers and facilitators that influence adherence to SRH-HIV service integration protocols in Kenya (180). Hasselback et al. monitored implementation fidelity associated with an FP supply chain intervention in Senegal and studied whether the program reduced stockouts (181). Overall, there is a paucity of studies that measure whether strategies improve implementation outcomes. A notable exception used organizational network analysis to evaluate whether network strengthening meetings improved the success rate of FP-related referrals between FP and HIV health care providers in Ethiopia (140). Ugaz et al. (2017) found that clinical and business skill trainings to private providers in Nigeria improved the range of FP services available and the quality of counseling (104).

Incorporation of contextual analysis

Although one-third of studies reported on use of contextual knowledge or information to adapt implementations strategies, only 42 (27 percent) of them elaborated on an actual contextual analysis. Ayon et al. conducted qualitative formative research to guide efforts to integrate FP-HIV and community outreach strategies for female drug users in Kenya, and Bates et al. did so to inform the design of a private sector capacity building and referral system strengthening intervention in Bangladesh (78, 184). Other studies employed participatory action research (PAR). For example, Tran et al. report on using PAR to adapt postpartum FP interventions in Burkina Faso and the Democratic Republic of the Congo (DRC) and Chhoun et al. to customize mHealth interventions for female entertainment workers in Cambodia (172, 173). EngenderHealth uses the “organizational capacity assessment toolkit”, to tailor capacity building approaches focused on implant and IUD introduction to implementation environments (185). Whereas most studies that use contextual analysis did so to help guide EBP integration into settings, fewer did so to help sustain good practices or scale up (145). Adongo et al. conducted a qualitative appraisal outside Accra, Ghana to inform strategy on adapting the Community-based Health Planning and Systems program, a rural intervention, for urban settlements (186). Projects that used the ExpandNet model incorporated mid-project assessments to guide adaptations of scale up strategies (132–134).

Studies that explained how contextual factors shaped outcomes, for the most part, illuminated the contextual influences on individual reactions or experiences with EBP or implementation strategies, e.g., studies on the contextual conditions that help trigger mechanisms of acceptability of contraception (187, 203–205) and factors that underlie healthcare worker perceptions of the feasibility of adopting EBP or enacting implementation strategies (165, 206, 207). Fewer studies examined organizational adoption of EBP. In exception, the INTEGRA reported on contextual influences that shape healthcare teams’ ability to routinely implement integrated SRH-HIV services (68). There is a dearth of contextual analyses that explore scale up and sustainment. Fikree and Zerihun help to fill this gap in a retrospective, mixed method study of factors that helped and hindered a scale up of youth friendly contraceptive services in Ethiopia (120).

Research that is fit for purpose and responsive to local demands for knowledge

We observed that few studies described how research designs and methods were adapted to emergent information needs and context. Atchison et al. and Doyle et al. describe the experience of concurrently using human centered design

methods (HCD) and designing an evaluation of Adolescent 360 interventions in Ethiopia, Nigeria, and Tanzania (189, 190). The application of HCD involved customizing formative research and testing methods to reflect lessons learned in real time and created opportunities for intervention refinement and optimization. Co-creating the evaluation protocol during these steps enabled researchers to embed data analysis and learning to support adaptive management and course correction during implementation. Hernandez et al. in the DRC describe the experience of the “AcQual” Project in local health zone authorities, which used community-based distributors (CBD) (79). After initial monitoring indicated suboptimal performance of CBD, researchers adapted qualitative and survey research and M&E practices into a multipronged process evaluation that identified where lapses had occurred and informed targeted midcourse corrections that were implemented during the project cycle.

The review identified studies that were responsive to locally articulated demands for evidence on implementation problems. These were, mostly, integration and capacity building strategies to help reposition or improve delivery of the EBP in settings (79, 172); however, there are examples of studies that were embedded in scale ups. Binanga et al. report on embedding IR within policy-decision making and pilot replication processes to help advocate and guide scale up of Sayana Press in the DRC (146). Awoonor-Williams et al. report on similar experiences in Ghana with respect the local to national scale up of community-based primary health care and FP (167).

Multisectoral and/or multidisciplinary collaboration

Our review noted studies in which collaboration between stakeholders helped align implementation research, program, policy, and funding cycles. One example of this is an embedded IR project in Burkina Faso led by a consortium of policy decision-makers, WHO, a local research institute, the national FP association, and international NGOs. Together, these actors coordinated a pilot program for task sharing FP services across an integrated cycle that blended demand generation, training, cascaded supervisions, monitoring and evaluation, advocacy, and policy and standard changes (128). Lauria et al. describe a collaborative, multi-sectoral and -disciplinary model used in a pragmatic implementation-effectiveness trial of an integrated community-based health systems strengthening initiative in Togo (192). The study established oversight mechanisms at community, local government and national level and an organizational structure that helps circulate and promote use of input to guide decision-making and adaptations to the implementation strategy.

The review searched for studies of stakeholder collaboration that emphasized evidence utilization and strengthening systemic capacity to adapt and adopt EBP, and found that there was a

dearth of research on those subjects. Chitama et al. conducted a mixed-method study in Tanzania to understand the priority setting and planning steps used by district-level healthcare authorities to select and put into practice health EBP including FP (136). The authors recommend revisions to processes of stakeholder engagement, capacity building to strengthen abilities to use EBP, and call for tools to support data use during planning. Three studies focused on country-level stakeholders' adaptation and adoption of WHO global FP guidance and tools. These were noteworthy because of their focus on the strategic and contextual elements that influence whether systems could adapt evidence and put EBP into practice locally, yet the studies were small-scale, and based on qualitative interviews with small numbers of stakeholders (137, 154, 207).

Investigating implementation strategies in the “real world”

Studies that we were able to classify as “embedded in the real world” varied in terms of implementation arrangements used. Chabikuli et al. describe an evaluation of the Global HIV/AIDS Initiative Nigeria (GHAIN) FP-HIV integration model, which did not change the basic programmatic and service arrangements within health facilities, but introduced enabling inputs, such as onsite trainings, job aids, and tools to help document and facilitate referral, which were adopted by staff teams that received periodic coaching from GHAIN staff (69). Karim et al. describe an intervention aimed at strengthening Health Extension Program structures in Ethiopia to deliver community-based FP and other health services in which capacity building of frontline staff was carried out by local civil society organizations (194). Other studies evaluated strategies that were led by local delivery systems alone. In Zambia and Mexico, Zulu et al. and Avila-Burgos et al. embedded IR in national policy implementation processes (129, 166). In the former, investigators studied the feasibility and acceptability of using community health assistants to integrate adolescent SRH care into community health systems. Avila-Burgos et al. conducted a longitudinal descriptive analysis of the national Mexican Reproductive Health Subaccounts to determine whether the level and distribution of public revenue for maternal health and FP adhered to the objectives of overarching policies. Phiri et al. and Tweya et al. evaluated FP-HIV care implementation strategies conceived by actors within a small network of clinics in Malawi that operated independently from an external support system actor (195, 196).

Although this review indicates there is a paucity of studies that focused on sustainability, it identified useful examples. In a study on the long-term impact of the Community Health and Family Planning program in northern Ghana, Phillips et al. found that the program effects achieved in the late 1990s-early 2000s were not sustained and associated this with

lapses in the delivery of community-driven social and behavioral change communication and male engagement pieces of the original intervention package (161). Speizer et al. examined the sustainability of the Nigerian Urban Reproductive Health Initiative, using longitudinal data on FP service quality and contraceptive attitudes and behaviors between 2011 and 2017 (198, 199). The authors found that although the quality improvements that had been achieved by 2014 had diminished in the subsequent three years, the behavioral effect of implementation in the first phase continued after implementation ended. Fewer studies examined the sustainability of interventions that build organizational capacity. An exception is the PPIUD Initiative in Nepal, Sri Lanka and Tanzania. This study investigated the degree to which the initiative's efforts institutionalized PPIUD training as a regular part of obstetrical-gynecological training programs, measuring whether the personnel trained during the intervention continued to deliver PPIUD counseling and services after the intervention ended and if new personnel were trained in PPIUD by peers that were trained during the intervention (105). Qualitatively, these studies examined how the program affected organizational culture and whether changes supported the spread and sustainment of PPIUD service provision.

Discussion

Our review illuminated ways in which programs and researchers have harnessed IS to advance FP in LMIC. Though it synthesized the extensive literature that has valuably contributed to these efforts it also identified gaps in the formulation and description of implementation strategies, and inconsistencies in the application of IS theories, frameworks, principles, and research methods. Recognizing these is important so that future IS efforts can generate new knowledge where gaps exist and report findings in a manner that better supports use of new knowledge outside of studies' original settings.

Most studies examined strategies aimed at improving contraceptive use whereas relatively few prioritized implementation outcomes. This underscores the need for future FP research to adopt a focus on strategies to improve the coverage, implementation, and sustainability EBP in LMIC healthcare landscapes. Studies tended to lack a consistent and thorough delineation of the roles and relationships of stakeholders involved in implementation, and information shared to specify strategies tended to lack appreciable detail on the determinants they targeted, intervention components and how implementing them was to generate the desired outcomes. Future studies should address these gaps since specifying implementation strategies is key to enabling readers

to best assess findings and use implementation lessons to inform policies and programs beyond the research environment.

Integration strategies were the most common in this review. Most of these aimed at repositioning FP within the sphere of the user and target factors that impede or enhance the opportunities, intentions, and abilities of the client to use a method. There were a few studies that targeted factors in the environment of implementers to improve the opportunities, intentions, and abilities of health workers to adopt and deliver FP-related EBP and reach populations equitably with those services. Capacity building strategies tended to focus on building individuals' capacity to deliver specific EBP, rather than the capacity of teams and organizations to adopt and sustain, i.e., "institutionalize" EBP implementation, or nuanced approaches to improving upon standard training interventions.

Studies of strategies that sought to spread EBP were relatively few given the recent emphasis placed on scaling up. The review noted the tendency to study scaling up as a special project experience that engaged government programs and local health systems, rather than health system initiatives led by governments that received support implementation partners. This underscores the need for strategies that strengthen how public health systems not only enhance motivation and capacity to integrate specific EBP into routine practice, but also for improving the processes health systems employ to expand effective coverage of EBP generally. There was a paucity of dissemination strategies and among them, all but a few involved social and behavioral communication interventions to affect FP ideation and behaviors. Future projects ought to increase knowledge on dissemination and what works to promote a large scale understanding of FP-related policies and how to implement them. While noting this, it is important to acknowledge that funding constraints, frequently, prevent studies from adopting the extensive scope and timelines required to evaluate scale up and dissemination, both of which take place over long periods and large geographic areas.

Implementation process strategies seek to improve how well teams execute processes to select, adapt and integrate EBP into routine practice. While there is a need to expand the use of such strategies in general, this may especially be the case for strategies that strengthen frameworks and improve processes, already in place in many LMIC health systems, for fostering engagement of stakeholders, and annual planning and monitoring of local health care program implementation. Of the implementation process strategies identified, very few were led by teams that identify, translate, and disseminate knowledge on EBP, i.e., synthesis and translation systems actors. Future projects should focus on ways to expand and optimize the role of these actors to accelerate the spread of EBP adaptation and adoption in countries' national FP programs.

The use of theories, models and frameworks is critical in IS to help studies gain insights into the ways in which

implementation strategies are (in)effective. The dearth of studies that explicitly employed these represents a gap since it undermines the ability of researchers to synthesize evidence on implementation outcomes, adapt them to external settings and establish generalizable understandings of the effect of strategies, determinants, and process of translating evidence into practice.

Among the most distinguishing characteristics of IS is the primacy of the implementation outcome variable. Yet, our review found that over a quarter of studies eligible for full-text review did not include them, and of "implementation-effectiveness hybrid" studies, nearly three-fourths prioritize effectiveness measures. FP research stakeholders, including funders, should reflect critically on the degree to which donor interests and the timing and timelines of projects contribute to this gap. In addition, stakeholders should consider lessons from the IS literature which demonstrate the value of measuring implementation outcomes, particularly how doing so provides key insights for implementation. The relative brevity of project timelines precluded most studies from demonstrating the effect of routinely monitoring implementation outcomes, and gleaning lessons from this for adaptation, on downstream health and behavioral effects of programs. Nevertheless, the review provides some illustrative examples of why monitoring implementation outcomes is important: Karim et al. and Spring et al. describe how the application of behavioral economics in formative research generated valuable insights on the acceptability of features of FP interventions, which implementers used to design strategies that resulted in better method continuation and uptake (191, 194). Tawfik et al. describe how the monitoring of implementation fidelity during quality improvement cycles drove iterative improvements in the integration and uptake of postpartum FP (144). Phillips et al., Hernandez et al. and Hasselback et al. leveraged the availability of monitoring data on implementation fidelity to diagnose lapses in management and program delivery processes, identify solutions and inform decisions to improve the health and behavioral effect of FP programs (79, 161, 181).

In highlighting these examples, we call for programs to select implementation outcome variables that are coherent with the underlying theory of change and local, practice needs for implementation evidence, and incorporate more rigorous methods to measuring them during routine monitoring and evaluation. Furthermore, FP funders and others in influential roles should consider the need for extended program and study timelines so that researchers and implementers can do such work, pause and reflect on insights that implementation monitoring produces, and undertake programmatic deliberations with stakeholders accordingly. Researchers are encouraged to apply IS theories and frameworks to this issue and study processes and determinants evidence utilization during programmatic cycles and generate guidance on how to

make this effective. To maximize learning, metrics on implementation outcomes and knowledge translation should be linked with effectiveness measures (e.g., FP method uptake) to enable understanding of the dynamics between these three key elements of FP programming.

In addition, regarding measurement and use of implementation outcome variables, we noted few examples of studies that evaluated implementation costs, cost effectiveness and affordability. Similarly, among the reviewed studies we observed that limited scientific attention has been directed at understanding and improving the sustainability of FP programs. We echo the remarks of earlier works that have reflected upon this gap and call for more rigorous economic evaluations and research on the determinants of and strategies to enhance the sustainability of FP interventions (208, 209). Most studies that sought to explain barriers and facilitators elucidated why interventions affected health and behavioral change rather than implementation outcomes. Most examinations of integrating EBP within settings did not use theory to critically examine knowledge translation, and usually gave this information in the way of segueing into reporting on evaluations of effectiveness of EBP introduction on a health outcome.

Few studies evaluated changes in implementation outcomes over time or between study groups. Thus, there is little evidence on strategies for improving EBP coverage, implementation, and sustainability in terms of feasibility, costs, and acceptability. Scant in the reviewed literature were findings on the interplay between implementation outcome variables. This is problematic for evaluations of scaling up, which should explain, for example, whether implementation quality and costs change as coverage increases and over time. In addition, future diffusion and scale up research should fill evidence gaps on the barriers and facilitators to the adoption of FP-related EBP in health systems, strategies that accelerate pace and completeness of scaling up, and factors that influence whether EBP implementation becomes institutionalized where introduced.

Despite the emphasis of IS on evaluating complexity in adaptive systems, the sample of studies we reviewed did not reflect this ideally. Eighteen percent of studies combined quantitative and qualitative research methods and 25 percent evaluated processes and outcomes. Underlying this observation was the lack of consistent reporting vis-à-vis key principles of IS, including whether there were deviations from implementation plans and the degree to which research collaborators positioned their studies within implementation and decision-making systems. Moreover, the studies reviewed provided little information on whether they adapted protocols and methods to ensure contextual relevance and fitness for purpose, the effect of contextual factors on implementation, and the extent to which interventions were applied by and within “real world” implementation systems. In elucidating these gaps, this review calls for more rigorous design and reporting practices to maximize the potential value of IS to

FP programs in LMIC. Finally, we observed a dearth of studies which meaningfully included communities and health system stakeholders in evaluation design, including the use of adaptive measures for assessing dynamic interventions and the effects of contextual shifts. In pointing this out, we help illuminate the need for more significant involvement of communities and local level implementers. Specifically, IS practitioners should emphasize steps that garner these actors’ ownership of the strategic implementation and research process early, provide frequent opportunities for learning and collaboration between communities and the formal health system, and build local capacity to sustain the benefits that arise applying of IS.

This systematic review has limitations. As described above, the review identified gaps in the specification of interventions and inconsistent reporting on study characteristics. Studies included in the full-text review were not immune to these gaps and yet the review team strove to synthesize their findings, anyway, believing that this would maximize the overall value of the review. This may have resulted in the misclassification of some implementation strategies and overestimation of the prevalence of key descriptors of IS. Studies were deemed eligible for full-text review based on the criteria described above rather than explicit statements of authors. The authors of the reviewed work were not bound to follow specific study design or reporting criteria, which emerged in the IS field during the period of the review with limited cross-over into field of FP research. Therefore, this paper should be received as an examination of how IS has been operationalized and recommendations on ways to strengthen its application, not a critique of authors’ works. In addition, journal word limits and writing requirements can restrict what is included in publications. We observed that some projects published numerous studies which have addressed different review criteria, and yet the analysis offered in these pages is of individual studies. Finally, our review only considered studies that were disseminated in English and, therefore, may have missed valuable studies that were written up in other languages.

Conclusion

As the deadline for achieving SDG approaches, countries’ need for contextually appropriate, effective, and sustainable strategies to reach populations with evidence-based FP interventions grows more acute. Our review has demonstrated that IS has promise to support the strengthening FP programs in LMIC, but there is more work to do. We propose three recommendations to maximize its potential to support large-scale impact: (1) donors and Ministries of Health should establish strong structures for research agenda setting that position FP research within implementation and decision-

making systems, facilitate multi-stakeholder collaboration, ensure that FP research occurs under usual management conditions, and promote a pragmatic paradigm for FP research that is responsive to context and flexible in studying implementation strategies; (2) FP research should address critical implementation issues such as scale up of complex interventions, the institutional capacity to sustain them, the dissemination of policies and programs, and the translation of knowledge on FP-related EBP into routine implementation and; (3) donors and global FP research leaders should commit to strengthening research capacity in LMIC, including within ministries of health, local health systems and in universities and research institutions, ensuring that FP research, and the benefits that arise from it, unfold in a manner that is equitable and most conducive to evidence use at national levels.

Better reporting of IS is needed so that consumers of FP literature can more thoroughly understand and apply the strategies, concepts and findings associated with efforts to improve FP programs in LMIC. Even though this review identified several strong pieces of research, to enhance learning and the delivery of FP-related EBP more widely, there is a need for more high-quality peer reviewed publications that reflect the full range of implementation problems, contexts, and strategies, and the use of more rigorous and adaptive research methods and designs.

Data availability statement

The data set used for the first stage of the full-text review is available from the authors upon reasonable requests. Requests to access this dataset should be directed to cbaynes@uw.edu.

Author contributions

CB and PS conceptualized the systematic review and CB designed the systematic review protocol, led the review of the studies, and wrote up the manuscript. PS, JK, MN and KS reviewed and revised versions of the systematic review protocol and manuscript. KS oversaw the team that reviewed the studies and the development of the manuscript. CS, HM, and AD participated in the title-abstract review and full text review process. ST helped with full text review and managed the data base where full-text review findings were managed. The authors alone are responsible for the views expressed in

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this article, and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fgwh.2022.1038297/full#supplementary-material>.

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