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Implementation evaluation of ARCHES for menstrual regulation and post-abortion care clients in Bangladesh

Dipika Paul · Barbara Burke · Rabeya Akter Konika · Maria Persson · Jamie Menzel · Abul Khair · Jasmine Uysal · Jay G. Silverman · Sayed Rubayet · Erin Pearson

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Abstract

Intimate partner violence (IPV) and reproductive coercion (RC) are forms of gender-based violence (GBV) that significantly hinder women's reproductive autonomy and contribute to unintended pregnancies. These issues are especially severe in low- and middle-income countries (LMICs) like Bangladesh, where IPV prevalence is among the highest globally, and patriarchal norms limit women's decision-making power in healthcare. The ARCHES (Addressing Reproductive Coercion in Health Settings) intervention is a single counseling session designed to address RC and connect clients with available IPV support services to support their reproductive autonomy. ARCHES was originally implemented in the United States and later adapted in Kenya and further adapted to the Bangladesh context for menstrual regulation (MR) and post-abortion care (PAC) clients. This paper describes the implementation fidelity and contextual effectiveness of the ARCHES intervention for MR and PAC clients in Bangladesh. A cluster-randomized controlled trial (cRCT) was conducted to evaluate the effectiveness of the adapted ARCHES intervention among MR and PAC clients in Bangladesh. The trial was registered on clinicaltrials.gov (NCT03539315) on 29/05/2018. Implementation was assessed using[1] the Consolidated Framework for Implementation Research (CFIR) to evaluate fidelity and identify factors influencing successful integration, and[2] an as-treated sensitivity analysis to determine the effect of fidelity on continuous contraceptive use. Evaluation results indicate high implementation fidelity of all components of ARCHES, increasing the odds of subsequent continuous contraceptive use twelve months after exposure. Providers found the intervention feasible and acceptable, noting its usefulness in enhancing client engagement and supporting reproductive decision-making. Key determinants of successful implementation included provider motivation, quality of training, and institutional support. The ARCHES intervention was successfully adapted and implemented in MR and PAC settings in Bangladesh with high fidelity, improving contraceptive use in context of partner/husband and/or family opposition. It was deemed acceptable and feasible by providers, highlighting its potential for empowering reproductive health choices in clinic settings. Future efforts should focus on optimizing the scalability of the ARCHES intervention, ensuring alignment with client preferences, and improving acceptability and accessibility of referral pathways within the local context.

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Barbara Burke, Rabeya Akter Konika, Maria Persson, Jamie Menzel, Abul Khair, Jasmine Uysal, Jay G. Silverman, Sayed Rubayet and Erin Pearson are contributed equally to this work.



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Abbreviations

ARCHES	Addressing Reproductive Coercion in Health Settings
BAPSA	The Association for Prevention of Septic Abortion, Bangladesh (BAPSA)
BMRC	Bangladesh Medical Research Council
CFIR	Consolidated Framework for Implementation Research
cRCT	Cluster-Randomized Controlled Trial
DV	Domestic Violence
FP	Family Planning
GBV	Gender Based Violence
IPV	Intimate Partner Violence
ITT	Intent-to-treat (ITT)
LMIC	Low and Middle-Income Countries
MR	Menstrual Regulation
OCC	One-Stop Crisis Centers
PAC	Post Abortion Care
RA	Research Assistant
RC	Reproductive Coercion
RHSTEP	Reproductive Health Services Training and Education Program

Introduction

Intimate partner violence (IPV) and non-partner sexual violence, forms of gender-based violence (GBV), affect one-third of women at least once in their lifetime[1]. Reproductive coercion (RC), a specific form of GBV, limits women's ability to use contraception and make decisions about pregnancy[2,3]. Both IPV and RC are associated with unintended pregnancy, including increased odds of abortion[2–4] and delayed contraceptive initiation following abortion[5]. RC has also been linked to contraceptive discontinuation, further undermining women's reproductive autonomy[3]. Interventions to reduce IPV and RC are needed to improve and support continuous contraceptive use, especially among post-abortion clients.

Bangladesh faces an alarmingly higher prevalence of IPV, with 72.6% of ever-married women reporting lifetime exposure[6]. In Bangladesh, abortion is legal only to save a woman's life, while menstrual regulation (MR), a procedure to establish non-pregnancy, is permitted up to twelve weeks following a woman's last menstrual period[7,8]. The methods recommended for MR under the national MR policy are the same as those recommended by the World Health Organization (WHO) for abortion procedures[9,10]. Estimates from 2014 in Bangladesh indicate that among the 1.19 million unintended pregnancies ending in induced abortion, only 15% (430,000) were managed through MR procedures at a facility, suggesting that a substantial proportion of abortions likely occurred under unsafe conditions[11]. Contraceptive discontinuation, although showing improvement, remains a significant challenge in the country. The 2022 Bangladesh Demographic and Health Survey (BDHS) reported a discontinuation rate of 32% within twelve months of initiation (NIPORT, 2022), decreasing from 37% in 2018 (NIPORT, 2020) and 30% in 2014[12]. Despite this progress, the rate remains substantially higher than Bangladesh's FP2020 commitment of 20%[13].

Bangladesh's patriarchal social structure further limits women's autonomy in reproductive decision making[14]. Husbands or male partners and extended family often influence contraceptive use and access to services[15,16]. Only a small proportion (12%) of women report independent decision-making power regarding their own healthcare[15].

These structural and social constraints highlight the need for interventions that support women's reproductive autonomy and address gender-based power dynamics[17].

Although there is a lack of evidence-based interventions to reduce RC and IPV in low- and middle-income country (LMIC) settings, the Addressing Reproductive Coercion in Health Settings (ARCHES) intervention has been shown to be effective in the United States with family planning (FP) clients[18]. The intervention is a single-session, clinic-based counseling intervention delivered to women seeking contraceptive services. It incorporates education on RC and IPV, adapted safety planning, and support for contraceptive methods less disposed to partner or familial interference[19]. The intervention is delivered within clinics as women seeking reproductive health services are twice as likely to have been exposed to IPV than the general population[2]. In the United States, exposure to ARCHES has been shown to increase client knowledge of IPV resources and improve self-efficacy for using harm reduction strategies and reduce RC over time[18,19]. Building on this foundation, the intervention was adapted for FP clients in Kenya, where it demonstrated similar positive outcomes, including increased contraceptive continuation and acceptability in an LMIC context[20].

ARCHES was further adapted in Bangladesh to address the unique needs of MR and postabortion care (PAC) clients, with materials adapted from the Kenya model and modified for the local context. Details of the adaptation process have been described elsewhere[16,19]. In Bangladesh, the term domestic violence (DV) was used instead of IPV, reflecting cultural norms where coercive behaviors often involve extended family members, such as in-laws. The intervention retained core ARCHES elements, including education on DV and RC, harm reduction strategies such as covert contraceptive use, referrals for DV support, family counseling to address patriarchal family norms, and the provision of a mini-booklet containing reproductive health and coercion information[16,19].

The Bangladesh ARCHES intervention was piloted, modified, and formally tested through a cluster-randomized controlled trial (cRCT)[19]. The cRCT results using an intent-to-treat approach show a significant increase in the odds of continuous contraception use at both three- and twelve-month follow-up periods[19]. While the intervention has demonstrated effectiveness in increasing continuous contraceptive use in LMIC settings, its implementation in MR and PAC contexts has not been systematically evaluated[19,20]. To address this gap, this study evaluates the implementation of ARCHES in Bangladesh through three specific objectives: (1) to examine implementation fidelity, (2) to estimate the effect of fidelity on continuous contraceptive use, and (3) to explore determinants of successful implementation.

Methods

Ethical approval

The study received ethical approval from the Bangladesh Medical Research Council (BMRC) (BMRC/NREC/2016–2019/570) and the University of California, San Diego Human Research Protections Program (171903SX). All methods were performed in accordance with the relevant ethical guidelines and regulations of both institutions. All study participants provided written informed consent. All data analyzed for this paper were deidentified; consent forms containing identifying information were stored in a password-protected folder separately from the deidentified data, only accessible to the authors.

ARCHES Bangladesh intervention

Ipas, an international organization working to advance reproductive justice and expand access to abortion and contraceptive care, in collaboration with the Center on Gender Equity and Health at the University of California San Diego, the Reproductive Health Services Training and Education Program (RHSTEP), and the Association for Prevention of Septic Abortion, Bangladesh (BAPSA) adapted and implemented the ARCHES intervention for MR and PAC clients in Bangladesh. Formative research and workshops were conducted with the implementing

providers to adapt the ARCHES intervention considering local context[16,19]. Modifications were made to align the intervention with the reproductive health clinic workflow and to adapt the content and materials specific to MR/PAC services. The intervention was piloted in three facilities and further refined through provider and client feedback before implementation of the cRCT[19].

Prior to implementation of ARCHES, Ipas Bangladesh conducted a three-day training for all implementing providers in the intervention facilities. The training included information on RC and DV, orientation to the integrated ARCHES counseling approach, and a full day of role-play exercises to build skills in delivering the intervention. As providers were already using the WHO GATHER counseling framework in routine practice, the training emphasized delivery of the adapted ARCHES counseling approach within the GATTHER framework, including screening for RC and DV, harm-reduction strategies, use of ARCHES materials, and referral processes. Implementing providers also met with OCC staff to learn about available violence support services and referral pathways. Following the training, Ipas Bangladesh provided six months of mentorship and implementation support, including monthly in-person coaching visits and weekly phone check-ins. After six months, phone check-ins were conducted bi-weekly and continued throughout the study recruitment period. Providers in control facilities received no additional training and continued standard MR/PAC and post-abortion contraceptive counseling.

In Bangladesh, ARCHES was delivered as a single session during one clinic visit for MR/PAC services. Because of the timing and flow of routine service delivery in Bangladesh, this single session was delivered across two counseling contacts within the same visit: pre-counseling and post-counseling. Routine MR/PAC and FP counseling typically required approximately 20 min, and the additional ARCHES counseling component required an average of 10 min, resulting in a total counseling duration of approximately 30 min per client. The counseling aimed to educate women on FP, MR and PAC procedures, RC, and DV; provide harm-reduction strategies, including guidance on private/covert use of FP and MR when desired; offer warm referral to One-Stop Crisis Centers (OCCs) for women disclosing DV; provide a mini-booklet take-home material for women with key messages and resources for RC/DV; and offer optional family counseling as a Bangladesh-specific adaptation.

To integrate ARCHES into existing counseling workflows, ARCHES content was embedded within the WHO GATHER FP counseling framework. The GATHER framework served as the counseling structure through which ARCHES components were delivered, while ARCHES remained the intervention being implemented and evaluated. The Bangladesh adaptation included the addition of a dedicated “T for Talk” step to facilitate confidential discussion and screening for RC and DV. In addition, ARCHES-specific content was integrated across multiple existing counseling steps, including confidentiality procedures, discussion of private use strategies for MR and family planning methods, screening and documentation of RC and DV experiences, optional family counseling, and referral support. These adapted components are highlighted in blue in Fig. 1. Together, these modifications integrated ARCHES into routine counseling while maintaining the underlying GATHER framework.

In the pre-counseling phase, providers followed the GATTHER steps (G, A, T, T, H, and E), offering information on MR/PAC procedures, FP options, and harm-reduction strategies. RC/DV screening was conducted during the newly introduced “T for Talk” step. In the post-counseling phase, providers reinforced FP/MR strategies, reviewed the mini-booklet, facilitated referrals for additional support, and where appropriate, offered family counseling while completing the remaining GATTHER steps (E and R). (Fig. 1 Adapted GATTHER Model)

The intervention materials included[1]: a poster displaying modern FP methods and available MR/PAC procedures[2]; a counseling flipchart integrating ARCHES content on private use strategies, RC/DV discussion, and referral information[3]; a job aid outlining the GATTHER steps[4]; an ARCHES client card documenting disclosures and desired services while supporting confidential handover across staff; and[5] a mini-booklet for clients to take home if safe.

Study design, setting, and participants

This implementation evaluation used a mixed-method design drawing on quantitative and qualitative data collected alongside a cluster-randomized controlled trial (cRCT) of the Bangladesh adaptation of ARCHES. The

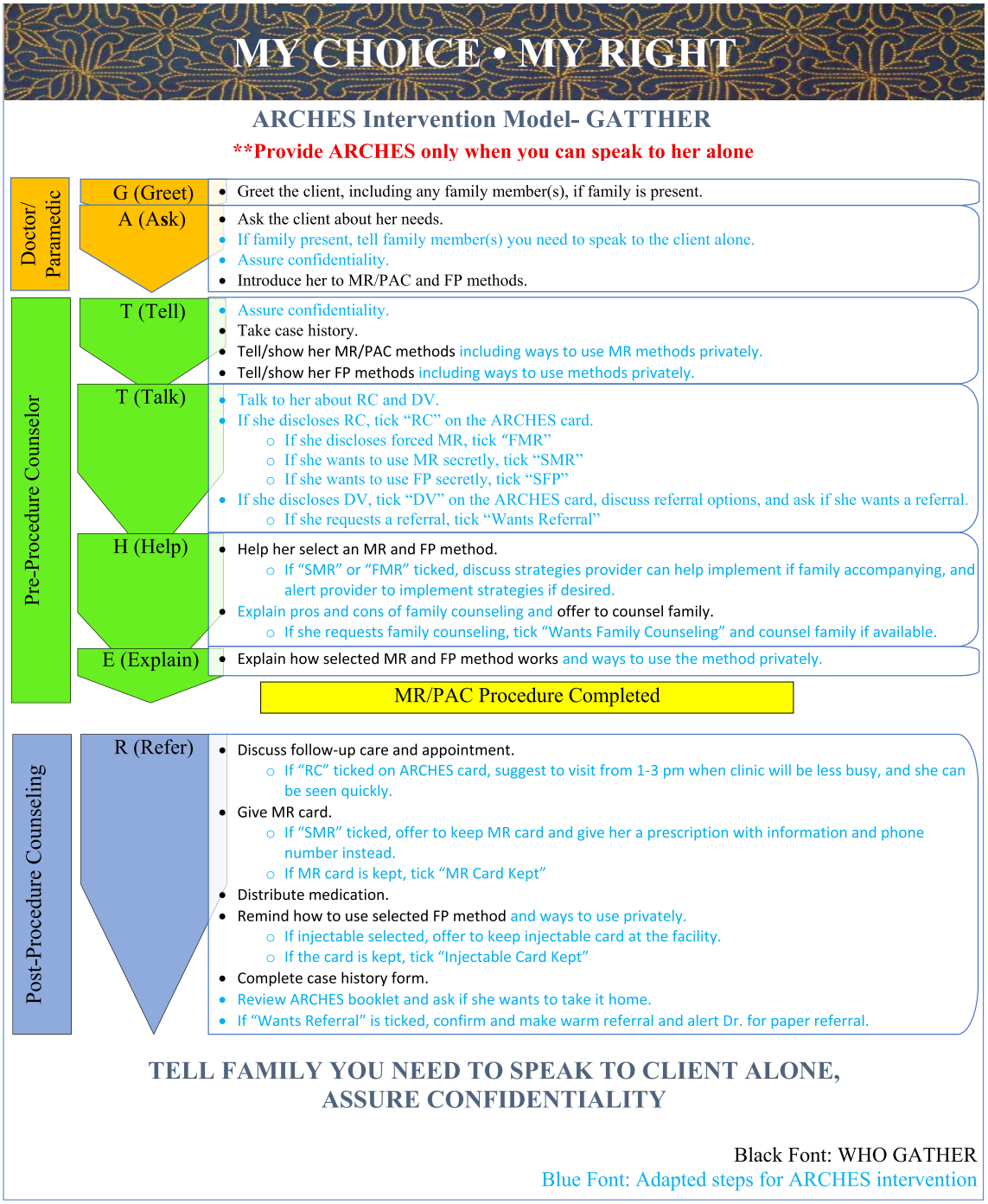


Fig. 1 Adapted GATTHER Model.

cRCT was conducted between January 2019 and January 2021 in six facilities, three randomized to the intervention group and three randomized to the control group in urban Bangladesh.

Participants in the trial were MR and PAC clients aged 18–49 years who could provide safe recontact information and could be interviewed privately without a husband/partner or other family member present. Eligible and consenting participants completed baseline surveys before the MR/PAC procedure, exit surveys after the clinic visit (or within seven days if needed), and follow-up surveys at three and twelve months. A total of 1492 intervention participants and 1237 control participants were enrolled. Available data were analyzed at each follow-up

period: 1331 intervention and 1069 control participants at the three-month follow-up, and 1269 intervention and 1050 control participants at the twelve-month follow-up. Additional details about the cRCT study design can be found in Pearson et al., 2024.

Qualitative data came from a process evaluation involving all nine implementing providers (two nurses, one paramedic, and six counselors) and 17 MR/PAC clients exposed to ARCHES. The client interview sample was defined using two pre-specified categories[1]: clients reporting RC at baseline and again at the three-month follow-up, and[2] clients reporting RC at baseline only. The original target was 15 clients in each category; however, only four women met the first criterion at three months, and two of them consented and were interviewed. The final client interview sample therefore included 2 clients with RC at both baseline and three months and 15 clients with RC at baseline only as shown in Table 1.

Data collection, management, and analysis for process evaluation

Qualitative data was collected through in-depth interviews with implementing providers and MR/PAC clients. These interviews were guided by semi-structured guidelines aligned with the objectives of the process evaluation. All nine implementing providers responsible for delivering the ARCHES intervention participated in in-depth interviews. The interviews lasted approximately 45 min and focused on providers' experiences with implementing the ARCHES intervention, their perspectives on barriers and facilitators, and their feedback on the delivery process. Providers did not receive any financial incentive for participation.

Seventeen MR/PAC clients were also interviewed based on their responses to the quantitative surveys. Given the limited number of clients meeting the first category's criteria (reported RC both at baseline and three-month follow-up), both eligible and consenting clients were included in the sample, alongside the 15 clients from the second category (who reported RC only at baseline). The interviews, conducted in Bangla, explored clients' perceptions of the quality and confidentiality of ARCHES counseling, their engagement with intervention content, and any changes in their contraceptive practices. Each interview lasted approximately one hour and was conducted by two trained female qualitative research assistants (RAs) at a time and place chosen by the respondents. MR/PAC clients received an incentive of 200 BDT for their participation.

During the later stages of the study, the COVID-19 pandemic affected only the twelve-month follow-up data collection. Implementation of the facility-based ARCHES intervention, along with baseline, exit, three-month follow-up, and process evaluation data collection, had already been completed before the COVID-19 outbreak in Bangladesh. Therefore, 12-month follow-up interviews were conducted by telephone.

All interviews were audio-recorded, transcribed verbatim in Bangla, and translated into English by an external consultant. The study team thoroughly reviewed the translations to ensure accuracy and consistency.

The qualitative analysis followed a deductive coding approach, guided by the Consolidated Framework for Implementation Research (CFIR). This framework provided a structured lens for exploring implementation processes and determinants across domains such as intervention characteristics, organizational settings, individual attributes, and overall implementation processes[21,22]. A comprehensive codebook was developed after reviewing interview transcripts, focusing on key CFIR domains and emerging themes. The codebook was iteratively refined during the coding process to capture distinctions in the data.

To ensure rigor and reliability, all transcripts were double coded using the Dedoose Desktop App (version 9.0.17). Two coding pairs were involved, with each pair consisting of one Bangladeshi and one non-Bangladeshi

Table 1 Demographic Details of the Process Evaluation Interview Respondents.

Respondent Type	*n*	Category	Age Range
Implementing Providers	6	Counselors	28–45
	2	Nurses	
	1	Paramedic	
Clients	2	Reporting RC both at baseline & follow-up	18–40
	15	Reporting RC at baseline only	

coder. Each transcript was independently coded by one coding pair. When questions arose regarding language, meaning, or cultural context during coding, the Bangladeshi coder reviewed the original Bangla transcripts and audio recordings to clarify interpretation. Coding discrepancies were resolved through discussion to achieve consensus. The thematic analysis explored barriers and facilitators of implementation fidelity using the CFIR framework, providing insights into factors affecting the implementation.

Particular attention was given to how clients perceived the quality and confidentiality of ARCHES counseling and whether it resulted in changes in contraceptive practices or reproductive health decision-making.

Family counseling

To evaluate the additional family counseling component, client survey data is contextualized using the qualitative results. The client exit survey data includes responses to questions on whether clients were offered family counseling, if they wanted family counseling, and if they received family counseling. In the codebook, a code for the family counseling component was added and applied whenever it was discussed. The themes were identified from excerpts coded to family counseling.

Implementation fidelity and continuous contraceptive use

To evaluate the fidelity of the ARCHES intervention and its effect on continuous contraceptive use, the conceptual framework for implementation fidelity was applied, incorporating both quantitative and qualitative data. Fidelity was assessed across four key components: adherence to intervention content, coverage, frequency, and duration, and was moderated by delivery quality, participant responsiveness, intervention complexity, and facilitation strategies[23]. Data from client exit surveys and interviews with providers and clients formed the basis of this evaluation.

Quantitative fidelity measures were derived from client exit surveys, assessing whether participants received core ARCHES components. These components included counseling on covert contraceptive use and MR/PAC services, screening for RC and DV, and being offered a mini-booklet and/or referrals to DV services. Fidelity was defined as full exposure to these components. Constructs like intervention complexity and participant responsiveness, less explicitly measured in survey data, were explored through qualitative interviews with providers and clients.

The fidelity assessment also examined the impact of adherence on contraceptive continuation. Sensitivity analyses were conducted on data from cRCT, using mixed-effects linear probability models to estimate the effect of fidelity on uninterrupted contraceptive use at three- and twelve-months post-intervention. Unlike the intent-to-treat (ITT) analysis[19], this analysis adjusted for fidelity by using self-reported exposure to ARCHES components from client exit surveys as the key independent variable. Statistical models controlled for client-level characteristics, including religion, number of living children, cohabitation with a husband, type of MR/PAC service received, and baseline reports of RC. These adherence-adjusted analyses estimated the effect of the ARCHES intervention if all MR and PAC clients in intervention facilities had received the ARCHES components. This was equivalent to an instrumental variables approach[24], which assumes that the effect of the ARCHES intervention is solely through receipt of the core ARCHES components. Statistical significance was assessed at $p < 0.05$ for all analyses. Analyses were conducted in Stata/SE 17.0 (Stata Corp, College Station, TX).

Results

ARCHES beneficiaries and implementers

Beneficiaries of the ARCHES intervention were women who received MR or PAC services at one of the participating clinics and consented to the study. Among eligible clients in intervention facilities, 96% agreed to participate. Of the 1,492 participants enrolled in intervention facilities, 1,468 (98.4%) were exposed to the ARCHES intervention. Most were Muslim and married. 86% of clients lived with their husbands and 71% were above 24 years old. Half of the clients resided in rural locations and 64% had a primary education or less. 87% of the clients had at least one child, with 19% having three or more children. At baseline, 13% of clients reported ever experiencing RC and 47% reported ever experiencing DV by their husband or partner and/or other family members. At each intervention clinic, ARCHES was implemented by one provider and two counselors. On average, the providers and counselors worked at RHSTEP for 14.4 years and worked in FP for 12.8 years, as shown in Table 2.

Table 2 Characteristics of Facilities, Providers, and Clients who Participated in ARCHES cRCT.

	Number	Percentage
Description of Providers		
Total number of participating providers	9	
Number of participating providers by facility	3	
Cadre		
Nurse/paramedic	3	
Counselor	6	
Average years of experience of providing FP service	12.8	
Average years of experience in RHSTEP	14.4	
Description of Clients		
Number of eligible women who participated in the study	1,468	
Previous exposure to DV and RC		
Ever experienced RC	190	12.9%
Past 3-month incidence of RC	107	7.3%
Ever experienced DV by husband/partner	689	46.9%
Past 3-month incidence of DV by husband/partner	145	9.9%
Marital Status and Home Enviornment		
Married	1449	98.7%
Living with husband	1265	86.2%
Living with in-laws	471	32.2%
Rural residence	744	50.7%
Age		
18–19 years	97	6.6%
20–24 years	327	22.3%
25 + years	1043	71.1%
Education		
None/less than primary	270	18.4%
Primary	675	46.0%
Secondary or higher	523	35.6%
Religion		
Islam	1399	95.3%
Hinduism	64	4.4%
Another religion	5	0.3%
Number of living children		
None	185	12.6%
1	360	24.5%
2	641	43.7%
3+	282	19.2%
Worked in past 12 months	358	24.4%

Implementation fidelity

The intervention was delivered with high adherence, with all components of the intervention being implemented in 81.4% of client interactions. Regarding individual components, screening for RC and DV occurred in about 90% of client visits. Discussions on covert strategies for FP use were conducted in 90% of visits, and 86% of clients reported receiving guidance on private use of MR methods. Almost all clients (98%) reported being offered the mini-booklet, as shown in Table 3. Together, these findings indicate high adherence to the ARCHES counseling package delivered during the clinic visit.

The moderators of ARCHES fidelity, which included the quality-of-service delivery, client engagement with the content, and facilitation strategies, were supportive of successful implementation. 98% of clients reported being treated with respect, trusting the confidentiality of their care, and feeling heard by service providers, suggesting high quality of care. The intervention was generally seen as acceptable and feasible by both implementing providers and clients, with 96% of eligible clients agreeing to participate. Clients generally found the intervention components acceptable, as evidenced by their engagement with the counseling content and willingness to share information from ARCHES with others. About half of clients shared information from ARCHES with others, suggesting they found it relevant and useful. One client shared,

> *"The counseling helped me understand how to protect myself and make decisions about my health. I felt respected, and it was good to know my rights."* (MR/PAC Client, IDI).

Another client emphasized the importance of privacy, stating,

> *"They told me about ways to use contraception privately. That was very helpful for me."* (MR/PAC Client, IDI).

The intervention was viewed by implementing providers as easy to implement. However, they faced challenges, as some clients were reluctant to engage in the intervention prior to their MR/PAC service. This reluctance was

Table 3 Implementation Fidelity of ARCHES Counseling Protocol in Bangladesh.

	Results
Adherence	
Details of content	Of clients who received ARCHES, 90% were screened for DV, 91% were screened for RC, 90% reported staff discussed ways to use FP privately, and 86% reported staff discussed ways to use menstrual regulation privately. Almost all clients (98%) reported provider offered them the mini-booklet.
Coverage	Among clients enrolled in ARCHES, 13% reported ever experiencing RC, with 7% reporting RC in past 3 months. 47% of clients reported ever experiencing DV by husband/partner, with 10% reporting DV in past 3 months.
Frequency	One-off counseling session
Duration	77% of clients were exposed to the full intervention
Moderators	
Quality of delivery	Almost all clients reported RHSTEP staff treated them with dignity and respect, listened to their needs and concerns, and trusted staff to give confidential care.
Participant responsiveness	All trained, participating providers counseled used ARCHES.Providers thought the intervention was acceptable and feasible. Clients thought the intervention was acceptable. Of the 1,560 clients eligible for ARCHES counseling at intervention facilities, 96% agreed to receive ARCHES At the 12 month follow-up survey, almost half of clients shared information about services for women and girls experiencing partner violence, and/or about using family planning methods privately. Two in five women shared information about how male partners and family members can make using contraception difficult. These results indicate clients are engaged with the intervention content.
Intervention complexity	Easy to implement, but clients' thought it took too much time
Facilitation strategies	Observation checklist and feedback, and phone call check-ins

primarily attributed to constraints on clients' time and concerns or anxiety related to receiving MR/PAC services. One provider (paramedic) explained,

> *"I ask them (clients), 'What did that sister (counselor) talk to you? What did they say?' They said, 'They (counsellors) told us a lot of things.' And there are some clients who don't even want to tell…That time they have concern that when the service will be provided. They enter into the OT (operation theater) with fear. They are concerned about the matter that when the process will be ended. Sometimes, they don't even listen to my questions. They have only one concern in their mind that when it (MR/PAC service) will finish, when they will be free from it."* (Implementing Provider, IDI).

Facilitation strategies played a critical role in maintaining fidelity. These included post-training follow-up and support provided by an ARCHES trainer who conducted observation, provided feedback, and made phone check-ins. In-person observation and feedback were done to support implementing providers to implement ARCHES correctly, including ensuring privacy and confidentiality. Observations were conducted using a checklist, and regular phone check-ins were carried out throughout implementation to support fidelity to the ARCHES model. The purpose of the calls was to share performance feedback, motivate and encourage implementing providers, and address any questions related to intervention delivery.

Determinants of successful implementation

The qualitative findings identified determinants that supported or hindered implementation across the CFIR domains of intervention characteristics, characteristics of individuals, inner setting, and outer setting.

Characteristics of the intervention

This domain reflects how the design, content, and tools of ARCHES influenced implementation. The design and delivery of the ARCHES intervention were widely regarded as significant improvements in the previous service practices for MR and PAC services at the participating facilities. Implementing providers highlighted how the inclusion of counseling on RC, DV, and reproductive rights addressed critical gaps in service delivery. One provider noted,

> *"Now we conduct counseling here. Before that, there wasn't any counseling [on RC or DV]. We found some cases, but we did not do the counseling strongly. And when we are working for ARCHES, we are said to work in that way so that we can reduce violence, we can ensure the right of women. So that women and their family could be benefited through our counseling."* (Implementing Provider, IDI).

Prior to ARCHES, providers often relied on family members for decision-making, lacking an understanding of women's reproductive autonomy. The ARCHES training emphasized respecting women's autonomy and confidentiality, empowering providers to counsel clients privately and support their decisions. One implementing provider explained,

> *"When I take her in my [counseling] room and close the door behind, she sees no one is there. What I first tell her is, 'The conversation that takes place here will be fully confidential.' Then she tells everything with full trust in me."* (Implementing Provider, IDI).

Implementing providers emphasized that ARCHES improved their ability to address sensitive topics in a supportive and private setting. The intervention materials, such as the flipchart and mini-booklet, were key to facilitating these discussions. However, some clients with limited literacy found the materials challenging to use. One client stated,

"The booklet is good, but I cannot read (due to limited literacy), so I could not fully understand it. But the counselor explained it to me." (MR/PAC Client, IDI).

Both implementing providers and clients suggested expanding the mini-booklet to include additional visuals and practical examples, especially on private use strategies for FP. Many clients appreciated its utility and shared the information with others. As one client shared,

"I showed the booklet to my neighbor. She also thought it was helpful." (MR/PAC Client, IDI).

The intervention received strong support for scaling, with recommendations for integrating ARCHES into community outreach programs, antenatal care, and contraceptive services. Providers emphasized its relevance to broader reproductive health needs.

Characteristics of individuals

This domain reflects the knowledge, attitudes, and motivations of providers and clients involved in implementation. Providers reported that the ARCHES training increased their confidence in addressing RC and DV while reinforcing the importance of respecting women's reproductive autonomy. One provider reflected,

"I learned how to talk to clients with empathy and to listen carefully to their problems. It has changed how I approach counseling." (Implementing Provider, IDI).

Clients appreciated the respectful and private nature of the counseling sessions, which encouraged them to share personal concerns. One client noted,

"The counselor (provider) asked about my problems and listened to everything. It made me feel like I could trust her." (MR/PAC Client, IDI).

However, challenges arose when clients were preoccupied with anxiety or discomfort during MR/PAC procedures, which affected their ability to fully engage in counseling. One provider described,

"Some clients are very anxious about the procedure, and they don't focus on the counseling much because their mind is somewhere else." (Implementing Provider, IDI).

Despite these challenges, clients reported feeling empowered by the counseling sessions. One client explained,

"I didn't know I had the right to make decisions about my own body. Now, I know it depends on me, not my family." (MR/PAC Client, IDI).

The interaction between skilled, empathetic providers and engaged clients was a key factor in achieving the goals of ARCHES.

Inner setting

This domain reflects organizational factors within clinics that influenced implementation. The organizational environment within clinics facilitated the implementation of ARCHES by promoting teamwork and collaboration among counselors and medical staff. Implementing providers emphasized the importance of working together to ensure comprehensive care for clients. One provider explained,

"It was 100% helpful because nothing is possible without everyone's support. The counselors are doing counseling, and I am providing the service. We are helping each other." (Implementing Provider, IDI).

The use of ARCHES materials, such as counseling cards and flipchart, helped streamline communication between team members, ensuring consistent service delivery. Warm referrals to OCCs provided additional support for

clients experiencing DV, though some socio-economic barriers limited access. Providers highlighted the need for logistical improvements, such as larger and more private counseling spaces, to enhance client confidentiality and comfort.

Outer setting

This domain reflects broader social and cultural influences affecting implementation. Cultural and societal norms influenced how ARCHES was received. Many clients faced family pressures to prioritize household harmony over personal autonomy, reflecting deeply entrenched patriarchal values. One counselor noted,

> *"We couldn't change the aspect that 'My husband can do such things with me, it doesn't matter. I have to obey whatever my husband tells me.' It's not only the perception of those who are unemployed but also the perception of those who are employed and have enough money every month. In that case, for the sake of society, we obey whatever the husbands say. We endure it even if they beat us. We think if anyone gets to know [about the abuse], it will damage my reputation. To maintain the family, for the sake of children, we couldn't escape."* (Implementing Provider, IDI).

Timing constraints also posed challenges, as counseling was often conducted immediately before or after MR/PAC procedures when clients were experiencing physical or emotional distress. One client recalled,

> *"I guess they did [counseling], but I was in a lot of pain and mostly I was sick, so I could not concentrate. I don't remember much."* (MR/PAC Client, IDI).

Despite these barriers, ARCHES empowered clients to assert their reproductive rights. Counseling sessions and materials provided practical tools to navigate family dynamics and advocate for themselves. One client shared,

> *"The usefulness [of ARCHES] is… knowing about different [contraceptive] methods… woman can have their wish; their wish is valued…Women can do anything she wants… They are not born to be abused. If he [husband] tells me something now, (laughs) I'll show him the number [in the mini-booklet] and say, 'I'll call these numbers and say that you are abusing me.' Then he says, (laughs) 'I won't say anything anymore'."* (MR/PAC Client, IDI).

Cross cutting themes

Across qualitative interviews, several recurring themes emerged that influenced both implementation fidelity and client engagement with the ARCHES intervention.

One key theme was the timing of counseling within the clinic visit. Counseling provided immediately before or after MR/PAC procedures often coincided with clients' physical discomfort or anxiety, which limited their ability to fully engage with or retain information from the ARCHES counseling package.

Sociocultural norms and stigma related to DV and RC also shaped client engagement. Many participants expressed reluctance to disclose experiences of violence or to seek formal support services due to concerns about social judgment, family reputation, and maintaining household harmony.

Family dynamics played a central role in shaping reproductive decision-making and responses to counseling messages. Partners or husbands, mothers-in-law, and other family members often influenced contraceptive use and access to services, sometimes acting as barriers and in other cases as potential sources of support through family counseling.

Taken together, these findings indicate that both client engagement and implementation fidelity were shaped not only by how the intervention was delivered, but also by broader contextual factors within clinical, household, and community environments.

Additional family counseling component

The ARCHES intervention included an additional family counseling component, offered to 88% of clients. Of those, 49% expressed interest in family counseling, and 54% received it (Table 4). Implementing providers advocated for clients' reproductive health choices and overall wellbeing during these sessions, focusing particularly on counseling husbands and mothers-in-law. Providers reported that family counseling often encouraged supportive attitudes among family members and, in some cases, helped husbands and mothers-in-law better understand and respect the client's health needs. One provider shared,

> *"The mother in-law wants to keep her daughter in-law's baby, but the woman and her husband do not want to. Now in that situation if they abort the baby, then it will impact on [the mother-in-law's] mentality. But if we try to convince the mother in-law by saying that 'She can't have a baby at such a young age. She can have the baby when she is mature enough, like 18 or 20 years old.' Then [the mother-in-law] says, 'You make me understand it. I never thought in that way. I was wrong. I will keep your words. I'll take care of her as my daughter.'"* (Implementing Provider, IDI).

Implementing providers approached clients for family counseling with care, typically first explaining the potential benefits of involving family members in discussions on reproductive health. They asked clients if they wanted to include their husbands, mothers-in-law, or other family members in the counseling session, highlighting that it could help some family members better understand the client's health needs and address any misconceptions regarding MR, PAC and contraceptive services. When involving husbands in counseling, providers adapted their tone and language to address common concerns about how FP methods might affect conjugal life. This approach often eased husbands' reservations and was described by providers as one mechanism for supporting clients' reproductive choices within the family context.

In cases where clients disclosed violence experiences, providers were cautious, avoiding direct discussion of abuse with family members to protect the client's safety. Instead, they encouraged family members to support the woman's health broadly, advising on care and nutrition, and promoting a respectful atmosphere. While ARCHES training emphasized a respectful and non-judgmental approach to family counseling, empowering clients to decline family involvement if preferred, some clients received family counseling despite expressing a desire for privacy. Specifically, 12% of family counseling sessions involved clients who indicated they did not want family members involved.

Table 4 Additional Family Counseling Component.

Questions	Results
Client was offered family counseling on family planning methods or MR/PAC	
Yes	88.20%
No	11.80%
Client wanted their family to be counseled on family ploanning methods/information or MR/PAC	
Yes	49.40%
No	50.40%
Family was counseled on family planning methods/information and/or MR/PAC (or will they be counseled)?	
Yes	54.00%
No	45.90%
Client did not want family counseling, but family was counseled	
Yes	12.90%
No	87.00%
Client wanted family counseling, but family counseling was not done	
Yes	3.80%
No	96.20%

Sensitivity analysis

Fidelity of implementation was high with 81.4% of participants exposed to all four core ARCHES intervention components (data not shown). The adherence-adjusted analyses estimated that the ARCHES intervention could have resulted in a 7.8% point (pp) increase in modern contraceptive use at the three-month follow-up (95% CI: 0.050–0.105) and a 5.7 pp increase at the twelve-month follow-up (95% CI: 0.028–0.087) if all participants had received the core ARCHES components (compared to a 6.5 pp increase at three-month follow-up and a 4.7 pp increase at the twelve-month follow-up in the ITT analysis) (Table 5). Similarly, the intervention could have resulted in a 3.2 pp reduction in physical and sexual IPV (95% CI: −0.062 - −0.001) over the combined follow-up period if all participants had received the core ARCHES components, compared to a 2.6 pp reduction in IPV in the ITT analysis. Finally, the intervention could have resulted in a 28.5 pp increase in knowledge of available IPV support services over the combined follow-up (95% CI: 0.234–0.337), compared to a 23.3 pp increase in the ITT analysis.

Discussion

The implementation of the ARCHES intervention in Bangladesh reveals that achieving high fidelity in intervention delivery is essential for its impact, especially in sensitive cases like RC and DV. The sensitivity analysis indicated that clients receiving the full ARCHES intervention had significantly higher odds of continuous contraceptive use at both three- and twelve-months follow-up.

Compared to a previous evaluation of the ARCHES intervention in the U.S., where adoption and fidelity varied with only 68% of clients reporting that providers discussed relationship issues[25], the Bangladesh implementation achieved higher fidelity. The Bangladesh implementation also achieved higher fidelity compared to a recent trial in Nairobi, which found that 77% of clients received all four core ARCHES components[20]. This improvement is likely attributable to the facilitation strategies employed in Bangladesh, such as regular feedback sessions, observation, and phone check-ins, which reinforced consistent delivery of the intervention. Additionally, the Bangladesh model adopted a team-based approach, involving all implementing providers participating in the woman's MR/PAC care to deliver relevant aspects of the ARCHES counseling, including the MR/PAC provider, the pre-procedure counselor, and the post-procedure counselor, in contrast to the single-provider model used in the U.S. and Kenya[18,20]. However, findings indicate that implementing providers could benefit from ongoing training in women-centered comprehensive abortion care, including MR, PAC, FP, and screening and counseling on RC and DV, to further enhance client-centered care.

Timing for counseling was a crucial challenge, as ARCHES counseling took place immediately before or after MR or PAC procedures, times when clients may be preoccupied with medical concerns or physical discomfort. Given the single-visit delivery structure, improving the positioning of counseling within the visit may enhance engagement. This aligns with findings in other contexts as well; in the U.S., clients had more flexibility to engage in counseling sessions without immediate procedural constraints, enhancing their ability to focus on the counseling content[25].

ARCHES creates opportunities for women and girls to disclose RC and DV experiences to trained providers and also share strategies for using modern contraceptive methods privately in face of partner opposition. Evidence from previous ARCHES studies supports the role of private, client-centered counseling in empowering women to use contraception despite potential partner opposition[18]. In Bangladesh, confidentiality was vital in enabling disclosures of DV and RC, allowing implementing providers to provide support without external pressures.

The DV referral mechanism faced cultural barriers; despite ARCHES' warm referrals to OCCs, many clients did not follow up, often due to concerns about family reputation and economic dependence. Bangladesh requires culturally sensitive, accessible options for preventing violence against women and children, as well as raising

awareness about OCCs, which could reduce stigma and build trust. These efforts would strengthen the referral system.

The additional family counseling component introduced in Bangladesh allowed implementing providers to remove family members' myths and misconceptions about contraception and advocate for clients' reproductive choices within the family context, particularly with partners or husbands and mothers-in-law who often influence these decisions. Finding that about 12% of clients received family counseling despite a desire for privacy raises ethical concerns related to autonomy and confidentiality. This highlights the importance of ensuring that family counseling remains voluntary and guided by clients' preferences, informed choice, and reproductive autonomy[9,10]. The issue was addressed during implementation through regular feedback provided to implementing providers to reinforce adherence to client-centered counseling practices and respect for client preferences.

The mini-booklet, a shared feature across ARCHES implementations, proved effective in reinforcing counseling messages and enabling clients to share information with others. In Bangladesh, clients valued the booklet as a tool for discussing sensitive topics at home, though some faced literacy challenges. Suggestions to enhance the booklet with visuals could improve accessibility, allowing more clients to benefit. Similar feedback from ARCHES in Kenya indicated the importance of clear, visual information in low-literacy settings[26].

Nearly half of clients in Bangladesh shared information of ARCHES with others, highlighting the intervention's reach beyond immediate participants. This aligns with previous research on social diffusion in community-based health interventions, which shows that when clients share their knowledge, it strengthens public awareness and expands the intervention's reach[27]. Clients in Bangladesh recommended scaling up ARCHES through community events. They also emphasized the need for counseling on contraceptive in school programs for adolescent girls, and media campaigns aimed at building general awareness and enhancing knowledge around reproductive health, particularly targeting men and adolescent girls to extend the intervention's impact within their communities.

Overall, the effectiveness of ARCHES in Bangladesh relies on high-fidelity implementation, particularly for covert use of contraceptive and MR, PAC services and DV referrals. Adjusting counseling timing, respecting client preferences for family involvement, enhancing referral pathways, and refining educational materials will be key to optimizing the intervention's impact. The culturally responsive and client-centered adaptations incorporated into the Bangladesh ARCHES model contributed to its successful implementation and should be maintained in future implementation efforts to support informed reproductive health decision-making among women, particularly in contexts where sociocultural and health system factors influence implementation and engagement.

Limitations

The sensitivity analysis yielded results that were consistent with the primary analysis. As with any as-treated analysis, interpretation should consider that randomization was not preserved after treatment assignment. There was a lack of variation in fidelity, which limited qualitative analysis as we were unable to compare themes across varying degrees of fidelity to the intervention at the facility-level. Findings may have limited generalizability because the social and cultural context of Bangladesh shaped both implementation and acceptability of the intervention. These contextual factors may differ in other settings; therefore, the findings should be interpreted most directly as relevant to Bangladesh.

Conclusion

This study provides evidence for ARCHES use with MR and PAC clients in Bangladesh. The high-fidelity implementation of ARCHES can promote sustained contraceptive use and reproductive autonomy among these clients. Further research is needed to identify core components required to develop a more streamlined and scalable version of the intervention, and to identify context-appropriate referral options for clients who have experienced DV. Future efforts to optimize implementation should focus on scalability, alignment with client preferences, and

Table 5 Intent-to-treat and adherence-adjusted effects of ARCHES Bangladesh intervention on outcomes of interest at 3-month, 12-month, and combined follow-up surveys.

	3-month follow-up survey (n = 2400)							12-month follow-up survey (n = 2319)							3- or 12-month follow-up survey (n = 2511)						
ITT (assigned to intervention vs. control group)																					
	Intervention (n = 1331)		Control (n = 1069)		β	p-value	(95% CI)	Intervention (n = 1269)		Control (n = 1050)		β	p-value	(95% CI)	Intervention (n = 1384)		Control (n = 1127)		β	p-value	(95% CI)
	n	(%)	n	(%)				n	(%)	n	(%)				n	(%)	n	(%)			
Primary Outcome																					
Past 3-month use of modern contraception without interruption[1]	1194	(89.7)	897	(83.9)	0.065	<0.001	(0.038–0.091)	1064	(83.9)	845	(80.5)	0.047	0.002	(0.018–0.076)	1289	(93.1)	1024	(90.9)	0.031	0.003	(0.010–0.051)
Additional Outcomes of Interest																					
Past 3-month physical or sexual intimate partner violence[2]	27	(2.0)	25	(2.3)	−0.017	0.159	(−0.041–0.007)	48	(3.8)	45	(4.3)	−0.02	0.124	(−0.045–0.005)	63	(4.6)	64	(5.7)	−0.026	0.043	(−0.051–0.001)
Knowledge of intimate partner violence support services[2]	946	(71.1)	336	(31.4)	0.423	<0.001	(0.378–0.469)	1128	(88.9)	730	(69.5)	0.11	<0.001	(0.089–0.132)	1277	(92.3)	809	(71.8)	0.233	<0.001	(0.192–0.273)
Adherence-adjusted (received core ARCHES elements vs. did not receive core ARCHES elements)																					
	Intervention (n = 1106)		Control (n = 1294)		β	p-value	(95% CI)	Intervention (n = 1035)		Control (n = 1284)		β	p-value	(95% CI)	Intervention (n = 1129)		Control (n = 1382)		β	p-value	(95% CI)
	n	(%)	n	(%)				n	(%)	n	(%)				n	(%)	n	(%)			
Primary Outcome																					
Past 3-month use of modern contraception without interruption[1]	1002	(90.6)	1089	(84.2)	0.078	<0.001	(0.050–0.105)	873	(84.4)	1036	(80.7)	0.057	<0.001	(0.028–0.087)	1062	(94.1)	1251	(90.5)	0.037	0.006	(0.011–0.065)
Additional Outcomes of Interest																					

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Table 5 (continued)

Adherence-adjusted (received core ARCHES elements vs. did not receive core ARCHES elements)

	Intervention (n=1106)		Control (n=1294)		β	p-value	(95% CI)	Intervention (n=1035)		Control (n=1284)		β	p-value	(95% CI)	Intervention (n=1129)		Control (n=1382)		β	p-value	(95% CI)
	n	(%)	n	(%)				n	(%)	n	(%)				n	(%)	n	(%)			
Past 3-month physical or sexual intimate partner violence[2]	21	(1.9)	31	(2.4)	−0.02	0.152	(−0.048–0.007)	37	(3.6)	56	(4.4)	−0.024	0.115	(−0.055–0.006)	49	(4.3)	78	(5.6)	−0.032	0.042	(−0.062 – −0.001)
Knowledge of intimate partner violence support services[2]	800	(72.3)	482	(37.3)	0.513	<0.001	(0.457–0.569)	941	(90.9)	917	(71.4)	0.136	<0.001	(0.109–0.162)	1056	(93.5)	1030	(74.5)	0.285	<0.001	(0.234–0.337)

[1]Single timepoint analysis adjusted for baseline RC, living with husband, religion, number of living children, and MR or PAC service, accounting for facility-level clustering.

[2]Difference-in-difference analysis adjusted for living with husband, religion, number of living children, and MR or PAC service, accounting for facility-level and individual-level clustering.

improving acceptability and accessibility of referral pathways considering local context, to support sustainable and client-centered delivery of the ARCHES intervention in Bangladesh.

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Author contributions DP, EP, SR, JM, and JGS adapted the ARCHES intervention for use in Bangladesh. All authors contributed to study protocol and tool development, and DP, RAK oversaw ARCHES implementation by RHSTEP and data collection by our partners at BAPSA with support from EP and JM. DP, EP, JM, AK and RAK verified the data underlying the key results. EP and JU developed the statistical analysis plan, and DP, EP, JM, RAK and BB conducted both qualitative and quantitative data analysis. DP led implementation and evaluation activities with support from RHSTEP and BAPSA. All authors had full access to the study data and contributed to the manuscript. All authors have read and approved the final version of the manuscript and have no conflicts of interest to declare.

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Declarations

Competing interests The authors declare no competing interests.

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Authors and Affiliations

Dipika Paul[1] · Barbara Burke[2] · Rabeya Akter Konika[1] · Maria Persson[3] · Jamie Menzel[4,5] · Abul Khair[1] · Jasmine Uysal[5] · Jay G. Silverman[6] · Sayed Rubayet[1] · Erin Pearson[4,5]

✉ Dipika Paul
pauld@ipas.org

[1] Ipas Bangladesh, Dhaka, Bangladesh

[2] Department of Global Health, University of Washington, Seattle, WA, USA

[3] Department of Public Health Sciences, Stockholm University, Stockholm, Sweden

[4] Ipas, Chapel Hill, NC, USA

[5] Center on Gender Equity and Health, University of California, San Diego, CA, USA

[6] Center on Community-Engaged GBV Research, Tulane University, New Orleans, LA, USA