

# What mechanisms drive uptake of family planning when integrated with childhood immunisation in Ethiopia? A realist evaluation

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## Research article

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# Abstract

**Background:** Maternal and child health are key priorities among the Sustainable Development Goals , which include a particular focus on reducing morbidity and mortality among women of reproductive age, newborns, and children under the age of five. Two key components of maternal and child health are family planning (FP) and immunisation. Providing these services through an integrated delivery system could increase the uptake of vaccines and modern contraceptive methods (MCMs) particularly during the post-partum period.

**Methods:** A realist evaluation was conducted in two woredas in Ethiopia to determine the key mechanisms and their triggers that drive successful implementation and service uptake of an intervention of integrated delivery of immunisations and FP. This evaluation included the: 1) development of an initial programme theory; 2) review of relevant published theories; 3) analysis of project monitoring data; 4) analysis of qualitative data from 23 semi-structured interviews to determine key mechanisms and drivers; and 5) development of a revised programme theory comprised of context-mechanism-actor-outcome and context-mechanism-intervention-actor-outcome configurations based on empirical findings.

**Results:** The proportion of women who brought their children for immunisation and received MCMs was 63.0% (4,260/6,764) overall [74.3% (2,944/3,961) in Assosa woreda and 46.9% (1,316/2,803) in Bambasi woreda]. Key contextual factors identified were: a strong belief in values among religious leaders and community members that challenged FP; a lack of support for FP from male partners based on religious values; and the use of trained Health Extension Workers (HEWs) to deliver FP services. Within these contexts, intervention components that focused on the alignment of religious texts with FP, the promotion of FP by religious leaders, and the training of HEWs and health care workers on FP counselling and service delivery, influenced the implementation of the intervention and triggered several mechanisms of acceptability, access, and adoption of innovations.

**Conclusions:** Linking context and intervention components to the mechanisms they triggered helped explain the intervention outcomes, and more broadly how and for who the intervention worked. This enabled the development of a programme theory that could be used to inform the integrated delivery of FP services in similar contexts.

## Background

Integrated approaches to health service delivery in low- and middle-income countries have steadily increased in scope and scale over the last decade. Evidence suggests that integrating health services can effectively address accessibility issues created or perpetuated by disjointed health services and fragmented funding (1). For instance, a systematic review of strategies for integrating health services suggested that it can lead to more efficient service delivery and that by reducing the burden on those seeking health care, it may increase access to health services overall (1). The review also recognised the

potential of integration to over-burden health care workers (HCWs) leading to their burnout and reducing the quality of the care they deliver, and highlighted that integration does little to address pre-existing inequities.

Recently, the integration of essential services such as childhood immunisations and reproductive health services has garnered attention from policy makers, implementers and researchers, in light of the Sustainable Development Goal of reducing child mortality and improving maternal health (2). However, to date, few studies have focused on the integration of FP services and childhood immunisation as an approach to increase uptake of modern contraceptive methods (MCMs) and to improve maternal and child health (3-9), despite evidence linking short interpregnancy intervals to adverse health outcomes for mothers, infants, and children. Such adverse outcomes include: maternal death, third-trimester bleeding, and anaemia in mothers, as well as preterm birth and low birthweight in infants (10-12).

An intervention that integrated the delivery of FP with childhood immunisation services in Assosa and Bambasi woredas (districts), in the Benishangul-Gumuz Regional State (BGRS) of Ethiopia, offered the opportunity to contribute to this evidence base. An evaluation of the intervention was conducted with the aim of determining why (or why not) and for whom the intervention worked, which included an interrogation of the contextual factors and mechanisms driving how the intervention worked.

## Methods

### *Study site*

BGRS is one of nine regional states in Ethiopia. It is predominantly rural and consists of twenty woredas (districts) and 398 kebeles (smallest administrative unit) [12]. Assosa and Bambasi are part of BGRS and encompass 74 and 40 kebeles respectively. Within BGRS, there are five native Ethnic groups (Bertha, Gumuz, Mao, Komo and Shenash) and other dwellers (predominantly Oromo and Amhara). The region has relatively low levels of literacy (60.9% of women and 30.3% of men are illiterate), and high religiosity, with Islam and Orthodox Christianity being the predominant religions (51.3% and 28.2% respectively) (13, 14). At the time of the 2016 Demographic Health Survey (DHS), full immunisation coverage in BGRS was 57.4% compared to nearly 89.2% in the capital of Addis Ababa and a national average of 38.3%. The proportion of women aged 15 to 49 using any FP method in BGRS was 28.5% compared to 55.9% in Addis Ababa [14]. Knowledge about FP was only slightly lower in BGRS compared to Addis Ababa (97.6% vs 100.0% respectively). There was also more male involvement in decision-making about FP in BGRS compared to Addis Ababa: 9.8% compared to 2.4% of women reported that their male partner was the main decision maker about FP, while 14.4% compared to 25% of women said they made the decisions about FP. However, the majority of respondents said that decision making was done jointly (75.9% vs 72.2%) [14].

In BGRS, the Health Extension Programme (HEP) plays a key role in health service delivery by providing primary health services at health posts in rural communities. It was adopted by the government of Ethiopia in 2003 to achieve universal health coverage among rural populations by 2009 [15]. The HEP is driven by model families, the Health Development Army (HDA) and HEWs [15]. Model families are male and female headed households that have received specific training on the HEP and that follow best practices for health and hygiene. They serve as role models within the community (15). The HDA is an organised community based movement aimed at improving health sector capacity by engaging with communities and community leaders. Typically, HDAs consist of groups of household members in small communities, divided into smaller groups focusing on specific health issues, such as prenatal care (15). Health Extension Workers (HEWs), commonly women, typically staff health posts in pairs and provide services such as community integrated management of childhood illness, immunisations, injectable contraceptives, implant insertions (but not removals), as well as basic curative services such as first aid and malaria treatment. HEWs are the lowest level health cadre in Ethiopia, usually with an education up to Grade 10, supplemented with a one year didactic and practical training in different health care packages. Among other responsibilities, HEWs conduct household visits and outreach activities and refer cases to health centers as needed.

### *Intervention*

The intervention was implemented in government-run health posts with support from the International Rescue Committee between January 2016 and May 2018 in all 114 government health posts of Assosa and Bambasi woredas. It aimed to strengthen FP, and childhood immunisation services, refine referral pathways for all services, improve immunisation monitoring, and build HEW capacity. The intervention included: 1) Training and mentoring of facility-based HEWs on FP counselling and short-acting MCM provision and implant insertions. Training for HEWs included the use of anatomic models for the practice of implant insertions and clinical coaching of insertions in the community. 2) Expanding the range of MCM options available at health posts to include implant insertions (but not removals). 3) Designing a job aid to support HEWs and the HDA to improve immunisation defaulter tracing. 4) Developing community engagement strategies that involved community leaders and kebele command posts, which reviewed health post performance data and helped HEWs troubleshoot problems they encountered. The intervention also provided general health systems strengthening support.

The intervention was mainly delivered by HEWs who provided FP counselling and administered MCMs during household visits and at health or outreach posts (in particularly large woredas) [16]. Specifically, post-partum women were counselled on FP during the 1st, 3rd and 7th day post-natal checks and MCMs were provided alongside the child's '45 day immunisation' or at a later date during a household visit or at health a post or outreach post The 45 day immunisation takes place 6 weeks after birth and encompasses the first round of immunisations including Penta1 (DTP-HepB1-Hib1,OPV1,PCV1, Rota1) [17].

The provision of implants by HEWs was a central component of the intervention. Though HEWs were trained to insert implants, national policy at the time of the intervention stipulated that implant removal should not be performed by HEWs so this task was not included in the intervention (16). Other HCWs, such as nurses and midwives, also played a key role in delivering the intervention by providing clinical coaching to HEWs and accepting referral clients from health posts at larger health facilities.

## Study design and components

The intervention was evaluated using a realist approach. Realist evaluation is a theory-driven, process-focused evaluation method that seeks to answer the questions of what works, for whom, and under what circumstances using a context-mechanisms-outcomes (CMO) framework (17). The evaluation used a mix of newly developed and existing theory from the literature, together with monitoring data and empirical data from stakeholder interviews. The data sources, and their contribution to findings, interpretation, and recommendations are detailed in Figure 1.

The use of theory: Theory was used at three main stages in the study. First, an initial programme theory was developed through discussions with intervention designers and implementers in a workshop 15 months post-implementation of the intervention. During this exercise, CMOs were defined to explain how the intervention worked and how it was enabled or hindered. This initial theory was used in developing themes for interview guides and in identifying stakeholders for interview. Second, data from stakeholder interviews (see below) was used to develop empirical CMOs. And third, a non-systematic, targeted search of the literature was conducted in PubMed for published theories and frameworks to support and explain the intervention mechanisms identified in the initial programme theory. Linking the empirically derived mechanisms of the CMOs to published frameworks allowed a higher level of abstraction, that is a shift of thinking from the specific site to transferability across sites, and an increased potential for further empirical testing of theories generated by the study. Three theoretical frameworks were identified as particularly helpful in understanding how mechanisms drive the acceptability of interventions (18), the diffusion (and adoption) of innovations (19, 20), and the constructs of access (21). Sekhon *et al* describe acceptability using seven constructs: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy (18). Roger's diffusion (and adoption) of innovations framework consists of five constructs: relative advantage, compatibility, trialability, observability and complexity (20). Finally, Penchansky and Thomas describe access using five constructs: availability, accessibility, accommodation, affordability and acceptability (21).

Monitoring data: was used to calculate the proportion of women who took up an MCM after an immunisation visit at least once during the monitoring period. The number of children immunised with Penta1 was used as a proxy for the number of women who brought their child for immunisation or had their child immunised at home at least once. This proxy assumes that this is the vaccination that most children would have received and was therefore the best estimate of at least one visit to immunisation services. Method uptake was monitored among new and repeat MCM users. New acceptors were defined

as women who received an MCM for the first time irrespective of the method used. Each acceptor was enumerated once in the year, at the first consultation for contraception in the calendar year. Repeat acceptors were defined as women who previously took up an MCM irrespective of the method used. Long-acting MCM users were also counted as repeat users every year (i.e. someone on a 3-year method would be counted as a repeat user each year) including routine check-up for ongoing use of long-acting methods, such as Norplant or intrauterine devices (IUDs).

Semi Structured Interviews: with key stakeholders involved in the delivery and uptake of the intervention were conducted to identify contextual factors that triggered mechanisms that led to intervention outcomes. The final component of our analyses, the development of a revised programme theory, was influenced by the five preceding components.

## **Sampling and empirical data collection**

Purposive sampling was used for SSIs to select key stakeholders involved in, or with an interest in, the intervention including implementing partners, government officials, HEWs, and community leaders. Participants were selected to offer a range of perspectives and opinions of the intervention. HEWs selected were involved in the delivery of childhood immunisation and/or FP services, and were from health posts where the intervention was perceived to be more, or less, well received based on project monitoring data.

Interview and discussion guides were developed for SSIs and were informed by the initial programme theory that was developed with programme implementers. Broad themes included workload, socio-cultural norms, and healthcare access, and questions specific to particular participant groups and particular aspects of the intervention within the study context added. This ensured that key issues captured within the initial programme theory were included in the interviews. CMOs developed with the implementers were included in these interview and discussion guides (22). Interviews were conducted in October 2017 and March 2018 in Amharic and Afan Oromo by local research assistants with guidance and oversight from a researcher from the London School of Hygiene & Tropical Medicine and an implementation supervisor. All interviews were recorded, transcribed *verbatim* and then translated into English.

## **Data management and analysis**

Descriptive analyses of monitoring data were conducted using Microsoft Excel.

The SSIs' translated transcripts were imported into NVivo 11.2 for coding and analysis. Quotes were anonymized, but the type of respondent attributable to each quote was retained to aid analyses. Key themes were identified based on the interview guides and supported by quotes from interview transcripts.

Coding and analysis was based on an initial framework of: interventions; actors; context; mechanisms; outcomes and initial CAMO and CIAMO configurations. These categories were populated inductively with themes and sub-themes as they were identified from the data.

CAMO/CIAMO configurations were developed from the analysis of stakeholder interviews. Overarching contextual factors were identified as well as contextual and intervention triggers for specific mechanisms that drove outcomes. The outcomes included in the CAMOs and CIAMOs were both outputs and outcomes. The identified mechanisms were then linked to with constructs of the theories and frameworks identified from the literature.

## Results

The initial programme theory (Figure 2) included factors that intervention designers and implementers perceived as the major drivers of the intervention. These were adherence to clinical and counselling guidelines among HEWs, and community and religious leader support for FP. The initial programme theory also described potential barriers and mitigating factors to intervention implementation including the lack of tracking for referrals to higher level facilities for FP made by HEWs at health posts, long wait times at health posts in densely populated communities, and the lack of HEW training on implant removals.

### Family planning uptake

The proportion of women who brought a child for immunisation at least once between January 2017 and May 2018 and who received an MCM was 63.0% (4,260/6,764) overall and specifically 74.3% (2,944/3,961) in Assosa and 46.9% (1,316/2,803) in Bambasi. These data reflect the communities that were exposed to the intervention for 12 to 17 months. A total of 25,058 FP acceptors were recorded in Assosa and Bambasi between January 2017 and May 2018, of which 7,945 (31.7%) were new FP acceptors and 17,113 (68.3%) were repeat acceptors. Across the 17 month period, implants and injectables were the most popular method among new users in Assosa (53.7% implants; 28.5% injectables) and Bambasi (33.3% implants; 57.1% injectables), respectively.

### Perceptions of stakeholders

Twenty-three stakeholder SSIs were conducted (Table 1). Results are presented according to community and service delivery contexts. While only one woman was interviewed for her role as an FP user alone,

some members of the HDA and other community volunteers were also female FP users and therefore also provided their perspectives as FP users on non-users.

### Community context

Religion was the major contextual factor influencing MCM acceptance at the community level, and the perceptions and beliefs of religious leaders were powerful within the community. Preventing a child from being born was considered to directly oppose religious principles, particularly Islam. Religious beliefs that were barriers to the uptake of FP services included that preventing births is *haram* (forbidden) under Islamic law; dying and being buried with an implant in place is *haram*; blood spotting or losing blood that wasn't part of their menstrual cycle is *haram*; and male partners did not want women cooking during Ramadan whilst using an implant. There was also a suggestion that women were choosing short-acting methods as these better aligned with their religious beliefs than other methods.

*"They [religious leaders] originally had negative thoughts about this topic..... [and] were teaching the community that using implants and especially dying and being buried with an implant was Haram, it took some work to change their views in this. " Maternal and Child Health Woreda Officer\_1*

Community leaders and male partners were also perceived by interview respondents to influence women's decision-making on MCM use in these communities. Many male partners were not supportive of FP. Beliefs about FP among male partners were influenced by their religious faith and the views of their religious leaders; if the latter were more open about FP, male partners were more willing to support MCM use.

*"Some women used to previously access family planning without the knowledge of their husbands but since the religious leaders have now accepted it as a good thing we have now seen the effects trickle down to the husbands. We include them whenever we do community based training. They are now happy as far as I am aware. But they were previously against family planning." District level administrator\_1*

According to women, HEWs, and community volunteers, factors that influenced women's decision making about MCM use included: their health and the health of their family, cultural, societal, and religious norms and attitudes towards FP. Women interviewed preferred to decide about MCM use with their

husbands. Women needed to feel that there was community support for choices about MCM use. Having support from their religious leaders, other community members, and husband, having encouragement from HEWs about the benefits of FP, and knowing that FP resources were available were all perceived by women, HEWs, and community volunteers, as factors encouraging them to use MCMs.

### Service delivery context

HEWs and HDA members worked together to deliver immunisation and FP services in intervention communities by promoting both services during household visits, as well as in the community.

*"I do home visitations and check if children are healthy and doing well. I have been trained by the health extension workers. When I go door to door I also teach about immunisations and family planning." – HDA leader\_1*

The link between HEWs and HDA members was seen as a positive outcome of the intervention among HEWs and other HCWs, with both cadres working together to address the needs of clients.

*"Firstly [the intervention] has increased the usage of family planning. Secondly, it has allowed us to work with other members of the community such as the development army, the 1 to 5 group and the religious leaders. We have seen many positive changes. Prior to this project we had many children with malnutrition due to mothers having babies in quick succession."– HEW\_1*

**HCWs felt positive about the training HEWs received on providing FP services, but some expressed concern that they were not trained in implant removal, and worried about how this might influence implant uptake among women.**

*"There are many good things to this project such as having fully trained extension workers, having the two services integrated. An improvement I would suggest would be to train us in removals. Women are currently being referred 27km away. Transport is 30 birr [approximately \$1 USD] return. This is a burden to them and is hindering the project from reaching higher coverage levels. If we have 4 or more women we call the health facility workers here to carry out the removals." – Nurse\_1*

## Revised programme theory

Three CAMOs and six CIAMOs were identified from the analysis (Table 2) and lead to the development of the revised programme theory (RPT) (Figure 3) which was comprised of community and service delivery contexts. The revised programme theory described the impact of two key intervention components: information, education, and communication on the benefits of FP and socio-cultural alignment within the community; and training on EPI and FP integrated service delivery for HEWs, and HCWs. For each of these two components, the RPT describes the actors affected by each component, the mechanisms that drove that actors response to the component, and how that response lead to intervention outcomes

### Community context

Mechanisms triggered by the community context included: 1) religious/community leaders acceptance of the alignment between FP and their religious beliefs; 2) male partners' respect and trust in religious leaders' views leading to FP acceptability; 3) women feeling supported by their partners and the wider community when making decisions about FP; and 4) a negative mechanism of post-partum women worrying about the lack of services available for implant removal.

FP acceptability was low among religious leaders and men, and this context made it more challenging for women to take up and use MCMs according to women, HEWs, and community volunteers. Finding alignment between Islamic texts and the principles of FP enabled religious leaders to perceive the intervention as having a high level of ethicality and compatability with the religious context in the community. For these leaders to recognise that FP does not conflict with their religion meant that they did not need to forgo any of their beliefs (i.e. there was a limited opportunity cost) and were then able to advocate for its uptake. The vocal support for FP by religious leaders was sufficient for men to be convinced and to change their attitudes towards FP. With religious leaders and men finding FP acceptable and in line with their religious beliefs, the community context was open to women confidently accepting FP when it was offered to them which in turn meant that women ultimately experienced high levels of self-efficacy by being able to decide about MCM use.

The training of HEWs on implant insertions was perceived as a positive aspect of the intervention among HEWs and women. Knowing that long-acting MCMs were available meant that women felt confident in

their ability to access these methods resulting in feelings of self-efficacy. However, HEWs' inability to remove implants presented a problem. Removals required women to travel to distant health centres or await the availability of a nurse at the health post to perform the removal, creating a burden for women seeking removals. There was, therefore, a lack of accessibility, availability and accommodation of services to fit the needs of women for implant removals.

### Service delivery context

Mechanisms driven by the service delivery context included: 1) HEWs' confidence in their ability to insert implants; 2) women knowing about the availability of long-acting contraceptives and therefore wanting to use them; 3) HEWs' observation that providing both services together has more impact on FP and immunisation uptake than providing the services separately; 4) HEWs perceiving a reduced workload due to immunisation/FP service integration; and 5) a negative mechanism of HEWs feeling limited in their ability to provide comprehensive FP services due to their lack of training on implant removals.

The HEW training was viewed positively, with the practical elements of using anatomical models for the practice of implant insertions and the clinical coaching of insertions in the community helping to increase the self-efficacy of HEWs. This training also meant that the intervention was triable by HEWs, as it allowed them to practice implant insertions. It positively influenced how they felt, or their affective attitude, about the intervention. Conversely, HEWs also felt limited in their ability to remove implants which negatively influenced their perceptions of self-efficacy.

HEWs reportedly viewed integrated service delivery of immunisation and FP positively. They perceived the co-location of these services to be effective and acknowledged the relative advantage of integration compared to providing services separately. They could also observe the health benefits of integration within the community and see how the intervention was compatible with the community context. Further, HEWs perceived a decrease in their workload, particularly due to the 45 day immunisation checks that involved both immunisations and FP counselling and/or provision of MCMs triggering constructs of burden, and relative advantage. These factors positively influenced their affective attitude towards the intervention as they observed the benefits of the intervention within their work environment.

## **Discussion**

This realist evaluation sought to identify key mechanisms driving the implementation of an intervention of integrated childhood immunisation and FP services in BGRS, Ethiopia. It contributes to a growing body

of literature that seeks to understand uptake of MCMs when FP services are integrated with other health services (7-9, 23-26). Recent studies from Rwanda, Zambia, and Ghana have looked specifically at the integration of FP with immunisations services and have found varying levels of success (7-9). Issues such as inconsistent training for HCWs, poor monitoring systems, and disjointed referral systems have all been cited as barriers to effective integration (7-9). Central to this evaluation was the exploration of if and how integration worked, for whom and what mechanisms drove MCM uptake. There is currently a lack of literature in which context and mechanisms may explain intervention implementation, and this evaluation offered a unique opportunity to explore this.

### *Integration*

In terms of understanding how integrated the services were, and the level of service uptake over the study period, the monitoring and DHS data reviewed illustrate two important issues. First, the monitoring data demonstrated that uptake of MCMs among women who brought their children for at least one immunisation during the intervention period was approximately two-thirds (63%) with slight differences across Assosa and Bambasi. This indicates that FP services were quite well integrated and promoted, and that MCMs were appropriately offered during the provision of childhood immunisations. In this study context, FP counselling was offered by HEWs and HDA members predominantly at health and outreach posts, but also during household visits as these were all important locations where women received services. This is in line with evidence that suggests that flexibility about the point of delivery of integration is crucial for ensuring effective service delivery (9).

Second, the 2016 Ethiopia DHS data indicates a full immunisation rate in BGRS which, although higher than the national average, is well below the rate in several regions (14) and suggests that further community based healthcare approaches might help to increase access in BGRS. A study from the rural Dabat region of Ethiopia found that immunisation coverage rates were low when women had to travel long distances to health posts for immunisation services (27), which may also be the case for BGRS. Household visits by HEWs, in this context, were found to be a key component of the integration intervention. The benefits of using community based outreach approaches, such as household visits, have been shown to positively influence health seeking behaviours in rural and peri-urban areas, particularly in terms of immunisations (28).

### *Perceptions of key actors*

Our findings suggest that acceptability of FP by religious leaders, and community members, including men, was a key factor that drove wider community acceptability and in turn, influenced a woman's decision to use an MCM. The influence of religious leaders on the health seeking behaviours of communities is well documented. A recent study from Nigeria found that women's attendance at ANC

services increased after religious leaders in the community began promoting ANC services as an essential component of maternal and child health (29). In this context, religious leaders had a key role in delivering health messages to religious constituents. Similarly, Azmat et al (2011) determined that religious leaders in Pakistan had a strong influence within the community and that they should play a key role in informing the community about the benefits of FP. FP acceptance among religious leaders was influenced by exposure to messaging and information about FP from medical professionals (30). In the current evaluation, FP acceptance among religious leaders was influenced by their ability to see that FP aligned with their religious beliefs. Understanding how and why religious leaders accept FP is important when seeking to design and implement similar interventions in contexts where religious leaders have a strong influence over community members' decision-making.

Similarly, this evaluation provides an understanding of how and why community members, particularly men, accept FP. Our findings suggest that male partners seeing religious leaders actively promote FP triggered them to accept FP themselves. Ethiopia's 2016 DHS data indicate that men have more decision-making power than women within couples regarding FP in BGRS compared to almost every other region in the country (14). Studies from Nigeria and Malawi support the argument that men influence women's decision-making about FP and that a key component of FP interventions should be male partner education to encourage their support for FP (31-33). Interventions that promote joint decision making may be successful. An intervention supported by the IRC in Ethiopia assessed the impacts of the use of a color-coded health calendar to increase uptake of immunisation services and found that the calendar promoted health discussions within households (34). DHS data also indicate that women in BGRS have lower rates of FP use than women in almost every other region in the country (35). They are also less likely to give birth with skilled birth attendants either in health facilities or at households (35). This indicates poor links with the formal health system and limited access to health services. Given this context, it is especially important to engage male partners and religious leaders to promote and protect women's health and increase the women's confidence as decision-makers. Hoyt et al demonstrate the influence of peers, male partners and the wider community on women's decision making about MCM use in Benin, Ethiopia, Kenya, Malawi and Uganda (36).

Our findings also suggest that male partner education could be considered alongside gender transformative strategies that challenge traditional gender norms which may affect women and girls' ability to access and use services. Research demonstrates that gender-transformative approaches that engage men in dialogue about FP and gender norms can increase FP access among women (37, 38) and have been successful at improving FP, antenatal care, maternal and child health behaviors and outcomes (39).

The willingness of the HEWs to attend training and to adhere to training guidelines was a key contributor to intervention outcomes, as these translated into HEWs feeling high levels of self-efficacy when delivering FP services. Understanding that interventions that increase feelings of self-efficacy among HCWs may yield positive intervention outcomes can help to improve intervention programming. However, HEWs were not trained in implant removal and this may have adversely affected uptake of implants by

women, and self-efficacy of HEWs. National policy in Ethiopia does not task HEWs with implant removal (16). This has resulted in an unmet need of implant removal in the many rural and hard to reach areas (16, 40). To address this, the Integrated Family Health Programme (IFHP) has attempted to scale-up the availability of trained health professionals who can provide this service, but the programme has yet to be extensively rolled out. The Ethiopia Ministry of Health had begun to pilot the training of select HEWs in implant removal across the country, including in BGRS. Despite the lack of removal services by HEWs, the monitoring data indicated that implants were the most commonly accepted MCM among post partum mothers that brought a child for immunisation at health posts in Assosa during the study period. Similar findings have been documented in other studies within the context of Ethiopia (41). In this study, HEWs expressed concerns about women having to travel far distances and incur costs to access larger health facilities where implant removals are carried out. There is a wide body of literature that discusses the inverse relationship of distance and time spent travelling to a health facility and health care access and utilisation (42-44). This raises the issue of whether an intervention that encourages the adoption of a health service but that does not ensure an effective system for follow-up has a positive impact overall, or whether it contributes to health disparities.

HEWs perceived integration of immunisation and FP services to be advantageous. Relative advantages included reduced workloads, and a clear fit with their schedule, which focused on providing FP counselling during post-natal household visits and MCMs during the '45 day immunisation' visit. A recent Cochrane review of integrated interventions found that HCWs may become overloaded or deskilled in integration interventions leading to negative impacts on service provision and health outcomes (1). Our findings suggest that HEWs may perceive the integration of services differently when they are tasked with providing integrated services in households, compared to when they deliver such services to clients in health facilities. This may be due to the fact that health posts are usually staffed by two HEWs and are sometimes supported by additional HCWs. In our study, teamwork among HEWs, HCWs and HDA members was cited as a reason for manageable workloads. This evaluation identified mechanisms that included constructs of relative advantage and burden, indicating that in this context, in order for health workers to perceive the intervention positively, they needed to see how it would be advantageous to them or their clients, and how it would reduce their workload. Studies that have explored the training of community-based health workers have cited manageable workload, organisation of tasks, supportive supervision, adequate supplies and equipment, and respect from the community and the health system as key drivers of successful service delivery (9, 45). A recent study by Mayhew *et al* further supports our findings by concluding that structural factors at the health facility level, including issues of staffing and workload in integrated interventions can be mitigated and managed by HCWs themselves (46). The authors highlight that when HCWs felt agency or power over their own decision-making, they were able to overcome potential challenges of integration (46). These factors were mentioned by the HEWs interviewed in this evaluation and indicate that while the training they received was important, its effectiveness was dependent on having a supportive work environment that included workload sharing with colleagues which triggered constructs of self-efficacy.

Self-efficacy was a key construct within both the service delivery and community contexts. Self-efficacy has been described as 'an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments' (47). Among HEWs, feelings of self-efficacy were seen to drive motivation for and perceptions of the intervention. HEWs felt confident that they were sharing their workload with their co-workers. HEWs knew that they could carry out their work effectively, as the work was being shared, and this fostered a sense of teamwork among them. Studies that have assessed self-efficacy among health workers have found strong links between feelings of self-efficacy and motivation and have emphasized the links between team work, task-sharing, and self-efficacy (48-50). Among women, feelings of self-efficacy were triggered when there was community support for FP use, particularly from male partners. A study from Guatemala found that lack of knowledge about and availability of methods, fear of side effects and infertility, husbands being against family planning all negatively impacted feelings of self-efficacy (51). In the current evaluation, knowledge about the availability of FP methods, and support from husbands meant that women in the community felt confident in their ability to choose FP, thus leading to high levels of self efficacy. Karp *et al* describe a framework for women's and girls' empowerment in sexual and reproductive health with three key components: the existence of choice, the exercise of choice, and the achievement of choice (52). This has resonance with our study where the combination of the availability of FP services and the community support for FP meant that there was choice. This combination of factors allowed women to exercise their choice. Together, this led to the achievement of choice.

### *What does this study add?*

This evaluation demonstrates the role that religious leaders, community members, and health workers played in the implementation and uptake of an FP intervention in this study. By linking our empirical findings to published theories of acceptability, diffusion of innovations, and accessibility, we were able to identify drivers of outcomes, that is mechanisms, with a higher level of abstraction than those identified in the empirical data alone. These constitute middle range theories that may be tested in other geographic sites. For example, we identified relative advantage and the related construct of self efficacy as an important mechanism in the acceptability and implementation of integrated FP and immunisation by health workers. More simply, we were able to provide theories identifying mechanisms that need to be triggered to facilitate the acceptability and implementation of FP when integrated with immunisation and improve the selection and implementation of effective interventions in the future.

### *Limitations*

This study used data on the number of children immunised with Penta1 as a proxy measure for the total number of women who brought a child for immunisation at least once; however, this proxy does not take into account the number of times a woman brought a child for an immunisation relative to whether she

took up an MCM. These data do not account for women who were already using an MCM when they accessed the immunisation clinic, that is continuation, and therefore may underestimate use when defined as new acceptance and continuation.

Further, while SSIs were conducted with a wide range of stakeholders with selection based on the initial programme theory, it is possible that a larger sample size would have yielded data describing additional CIAMOs to those presented in this paper. Also, only one woman was interviewed specifically for her role as an FP user. HDA members and other community volunteers were sometimes also female FP users. While they provided their perspectives as female FP users, they were not interviewed specifically for that role. A larger sample of female FP users and non-users would have yielded more perspectives from these groups.

## Conclusions

In this study, the community and service delivery context played a key role in driving the implementation of the intervention and its outcomes. Key contextual factors identified were: a strong belief in values among religious leaders and community members that challenged the use of MCMs; a lack of support for MCM use from male partners based on religious values; and, the predominant use of trained HEWs to deliver FP services at health posts and in communities. These contextual factors, combined with intervention components that emphasised the alignment of religious texts with FP concepts, the use of religious leaders as agents of change, and the training of HEWs and HCWs on FP counselling and service delivery, were found to trigger several mechanisms of acceptability, accessibility, and adoption of innovations. Additionally, mechanisms included: religious leader acceptance of FP; acceptance of FP among communities and male partners; and a perceived relative advantage of integration and increased self-efficacy among HEWs and HCWs. By linking context and intervention components to the mechanisms they triggered, this evaluation describes how the intervention worked and for whom. Results led to the development of a revised programme theory that can be applied to the integrated delivery of FP services in similar contexts.

## Abbreviations

A: Actor; BGRS: Benishangul-Gumuz Regional State; C: Context; CIAMO: Context-Intervention-Actor-Mechanism-Outcome; CAMO: Context-Actor-Mechanism-Outcome; CMO: Context-Mechanism-Outcome; FP: Family Planning; HCW: Health Care Worker; HDA: Health Development Army; HEW: Health Extension Worker; I: Intervention; In: Interviewer; IRC: International Rescue Committee; IUD: Intrauterine Device; M: Mechanism; MCM: Modern Contraceptive Method; O: Outcome; SSI: Semi-Structured Interview.

## Declarations

**Ethics approval and consent to participate:** Ethics approval was obtained from the Benishangul-Gumuz Regional Ethical Review Board in Ethiopia and the ethics committee of the London School of Hygiene & Tropical Medicine.

All participants completed a detailed informed consent procedure before being enrolled in the study.

**Consent for publication:** Not applicable

**Availability of data and materials:** The datasets generated and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests

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**Authors' contributions:** JW conceived the idea for this research. JW and SK wrote the first draft of the study tools and developed the study design and sampling approach with inputs from TC, JKH, JL, NS, and SD. SK and SM oversaw the data collection activities in Ethiopia with advice from JW, JKH and SD. The data analysis was carried out by JW, JH and SK. SK drafted the manuscript. All authors made substantial and important contributions to revising the manuscript and provided final approval of the version to be published.

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## Tables

Table 1  
Participants in stakeholder interviews (SSIs)

Type of Participant	Number of participants
Religious leader	1 SSI
Health Extension Worker (HEW)	4 SSIs
Health Development Army (HDA)	2 SSIs & 2 SSIs
Mother (FP user)	1 SSI
Nurse	2 SSIs
Health professional	1 SSI
HEW supervisor	1 SSI
Woreda level officers	5 SSIs
Kebele leaders	3 SSIs
Group 1–5 leader	1 SSI

Table 2

Context-Intervention-Actor-Mechanism-Outcome (CIAMO) and Context-Actor-Mechanism-Outcome (CAMO) configurations and acceptability constructs

Context	Project intervention	Actor, mechanism, and outcome	Constructs of acceptability, diffusion of innovations, and/or accessibility
CIAMO 1: Strong belief in religious values among religious leaders and within the community (C)	Analysis of religious text together with religious leaders (I)	Religious leaders (A) accept that FP aligns with their religious values (M) and support the use of FP (O)	Ethicality, opportunity costs, compatability,
	<i>"R: The religious leaders were first saying that family planning was Haram but since the project they had increase awareness and now are fully on board to point that they are teaching about family planning in the Mosque." MCH Woreda officer_1</i>		
CIAMO 2: Religious leaders accept that FP aligns with religious values (C)	Religious leaders openly promote alignment of FP with religious principles (I)	Male partners (A) respect and trust the views of religious leaders (M) and support the use of FP (O)	Ethicality, opportunity costs, compatability
	<i>"R: I did have a situation where the women wanted the contraception on the same day as the immunisation day but her husband, who was with her at the time did not want her to take any contraception... What I then did was go to their house together with another religious leader to educate the husband about the benefits of family planning. To my surprise he actually agreed for his wife to have the 3 year implant." HEW_1</i>		
CAMO 1: Supportive community environment for FP (C)	No defined intervention (I)	Women (A) feel supported by their partners and the wider community when making decisions about FP (M) and choose to take up an MCM (O)	Self-efficacy
R – respondent			
In – interviewer			

Context	Project intervention	Actor, mechanism, and outcome	Constructs of acceptability, diffusion of innovations, and/or accessibility
	<p><i>"In: What is your husband's opinion regarding this program? R: He says nothing. We have agreed. There is no problem. In: What did he say when you first start it? R: After we have agreed, he asked me how long it was for and I told him that the 3 years is better. I explained to him that after our children grow with good health and clothes, I will then remove it and have another child. In: Did he agree on that? R: Yes, we have agreed."</i> Woman user_2</p>		
CAMO 2: HEWs are unable to remove implants (C)	No defined intervention (I)	Women (A) worry about their inability to access implant removal (M) and may not choose to take up an implant (O)	Self-efficacy, accessibility, availability, burden, accommodation
	<p><i>"R: There are many good things to this project.... An improvement I would suggest would be to train us in removals. Women are currently being referred 27 km away. Transport is 30 birr return. This is a burden to them and is hindering the project from reaching higher coverage levels."</i> Nurse_1</p>		
CAMO 3: HEWs are unable to remove implants (C)	No defined intervention (I)	HEWs (A) worry about not being able to remove implants (M) and therefore are limited in the FP services they can provide (O)	Self-efficacy
	<p><i>"R: I have only taken training with regarding to administering the contraceptives. I have not had training in removals. Removals are a bit of challenge here because none of us are currently carrying them out."</i> Nurse_1</p>		
CIAMO 3: FP delivery is conducted by HEWs (C)	HEWs given on-the job mentoring on implant insertion (I)	HEWs (A) feel confident in their ability to provide implants for women (M) and therefore provide integrated services, including implants (O)	Self-efficacy, affective attitude, trialability

R – respondent  
In – interviewer

Context	Project intervention	Actor, mechanism, and outcome	Constructs of acceptability, diffusion of innovations, and/or accessibility
	<p><i>"R: Previously, the long-acting family planning was given at health centre level. Currently, it is given by the health extension workers after they take training....They took the training but since they haven't done this before, they may lack confidence. We overcame this by onsite mentorship with the presence of trained officer from the Woreda office, IRC and us. We made appointments with mothers to come and mentored the extension workers to practice giving the service while the team is there. Then we got in to the actual work after they practiced and started doing by themselves. Now it is good..."</i> Regional level coordinator_1</p>		
CIAMO 4: Women want long-acting MCMs (C)	Provision of long-acting contraceptives (I)	Women (A) feel confident in their ability to access implants (M) and choose to take up long-acting contraceptives (O)	Self-efficacy
	<p><i>"R: The awareness that we have gained about family planning has also been great... now thanks to the implant I can't get pregnant while I still have it in. We now try to have a 3-5 year gap between each child." HDA member_1</i></p>		
CIAMO 5: Healthcare delivery is conducted by HEWs at health posts and in homes (C)	Ongoing training of HEWs on EPI and FP integrated service delivery (I)	HEWs (A) feel that providing both services together has more impact' (M) and therefore provide integrated services (O)	Perceived effectiveness, relative advantage, compatability, observability
	<p><i>"R: Because this project has allowed me and other health workers to address vaccinations and family planning together as one package. Therefore, I feel our efforts have more of an impact than they did prior to the project. We are now seeing better outcomes because of its introduction." HEW_2</i></p>		
CIAMO 6: Healthcare delivery is conducted by HEWs at health posts and in homes (C)	EPI and FP services offered at the 45 day post-natal check (I)	HEWs (A) perceive a reduced work burden due to EPI/FP service integration (M) and therefore provide integrated services (O)	Burden, affective attitude, observability, relative advantage
(C) respondent			
In – interviewer			

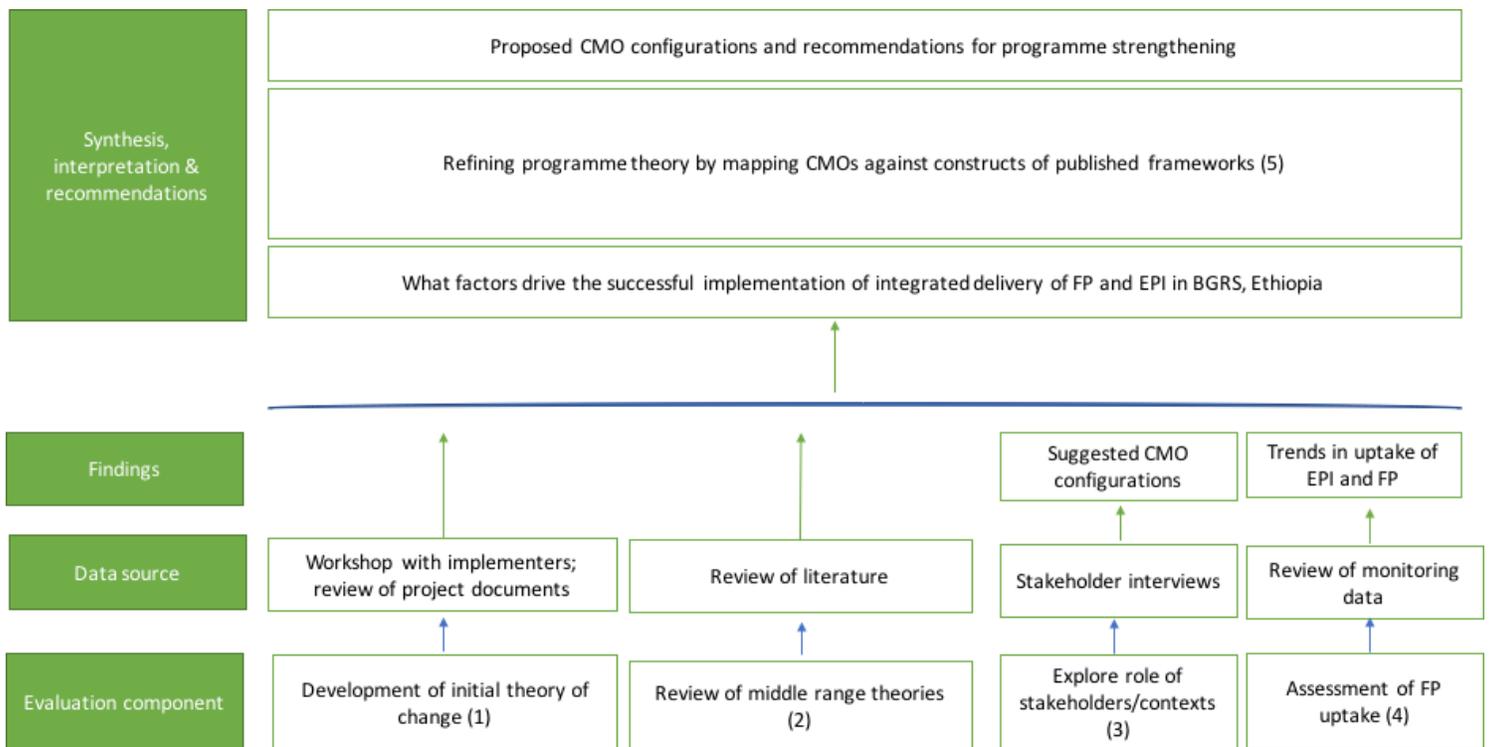
Context	Project intervention	Actor, mechanism, and outcome	Constructs of acceptability, diffusion of innovations, and/or accessibility
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*“R: I strongly feel that having everything integrated is beneficial and actually makes my job easier. For example, when we go to vaccinate a child at 45 days we have to meet with the mother anyway and so that opportunity is used to also offer contraception. In my opinion this is a reduction of work rather than an increase.” HEW\_3*

R – respondent

In – interviewer

## Figures



**Figure 1**

Outline of data sources and study components and process Key study components included: the development of an initial programme theory, a review of published theories, an exploration of stakeholder perceptions, and a review of monitoring data. The findings from stakeholder interviews led to the development of initial CMO configurations. The findings from these four study components led to an initial understanding of what factors drove the successful implementation of integrated FP and EPI services. A revised programme theory was then developed by mapping empirical CMOs against

constructs of published frameworks. By linking our empirical findings to published theories of acceptability, diffusion of innovations, and accessibility, we were able to identify triggers of mechanisms with a higher level of abstraction.

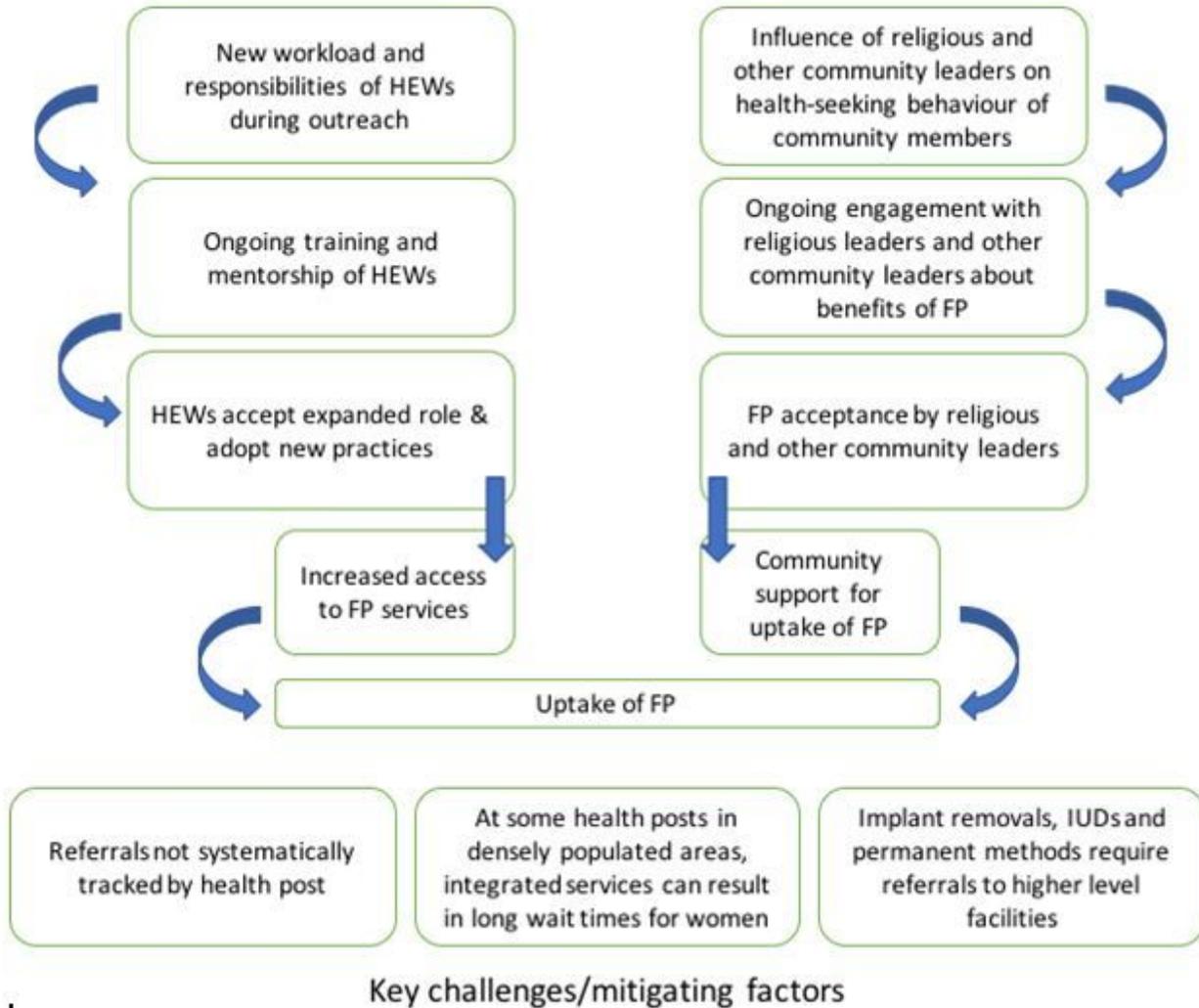


Figure 2

Initial programme theory

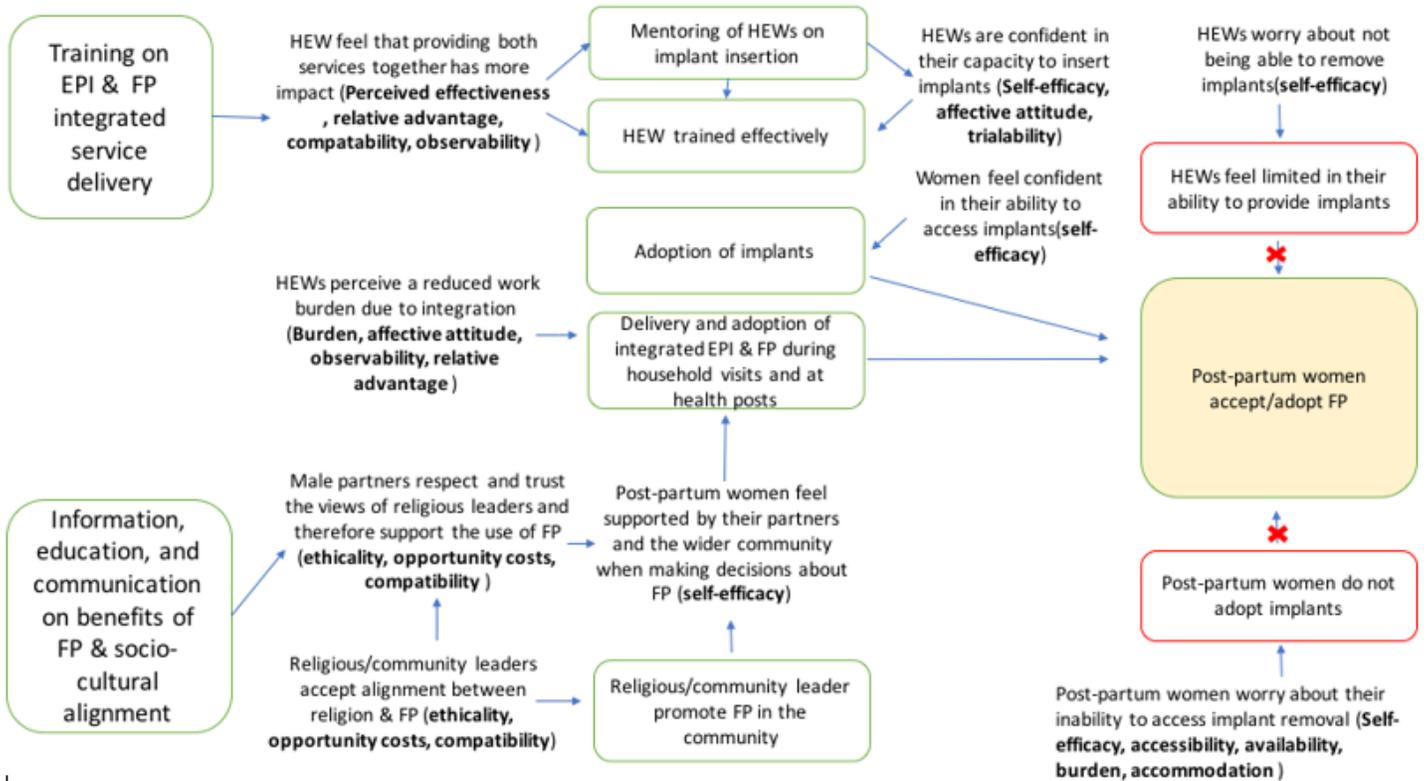


Figure 3

Revised programme theory Intervention inputs include: training on EPI & FP on integrated service delivery, and information, education and communication about the benefits of FP & socio-cultural alignment. This influenced actor-mechanism configurations and triggered the theoretical constructs, shown in brackets, for each.