

# Evaluating the long-term impact of Female Community Health Volunteer involvement in a postpartum family planning intervention in Nepal: a mixed-method study at 1 year post-intervention

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## Research article

**Keywords:** Postpartum family planning, female community health volunteers, Nepal

**Posted Date:** June 17th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-33433/v1>

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# Abstract

## Background

This is a 1-year post-intervention study following an initiative to provide orientation to female community health volunteers (FCHVs) on postpartum family planning (PPFP) in Nepal implemented in December 2018. Despite positive results in the earlier post-intervention study, this study was designed to provide a more long-term perspective on sustainability by assessing the effect at 1-year post-intervention.

## Methods

This mixed-methods study was conducted in January 2020 in Morang district, Nepal. We collected quantitative data from a knowledge assessment of FCHVs who had participated in the intervention on PPFP; data on their community-based counseling coverage and through interviews with postpartum mothers in two selected hospitals. Qualitative data was collected through six key informant interviews with health providers working on PPFP and four focus group discussions with FCHVs involved in the intervention. We performed descriptive and multivariable analyses for quantitative data and thematic analysis for qualitative data. Results of 1-year post-intervention were compared with pre-intervention and earlier evaluation study results.

## Results

In total, 206 FCHVs participated in the 1-year post-intervention knowledge assessment with a 15-fold [adjusted odds ratio (AOR) = 14.9,  $p < 0.001$ ] increase in knowledge when compared with the pre-intervention phase. A 20-fold increase in knowledge (AOR = 20.4,  $P < 0.001$ ) had been reported in the post-test conducted immediately after the orientation. The FCHVs counseled 71% of the pregnant women within their communities at 1-year post-intervention. The postpartum mothers in hospitals had 2 times higher odds than in pre-intervention phase of being counseled by FCHVs during their pregnancy at 1-year post-intervention (AOR = 1.9,  $P = 0.036$ ) as compared to a 3-fold higher odds of being counseled at 2-months post-intervention (AOR = 2.9,  $P < 0.001$ ). The qualitative findings suggested a positive impression regarding the FCHV's involvement in PPFP counseling in the communities, however, supervision and monitoring over the longer term was identified as a key challenge and may influence sustainability of community-based and hospital-based PPFP services.

## Conclusion

The FCHVs' knowledge and community-based activities on PPFP remained higher than in the pre-intervention phase. They had however declined when compared to the 2-months post-intervention period. We propose regular supervision and monitoring of the work of the FCHVs in order to sustain progress.

## Background

In low and middle-income countries (LMICs) such as Nepal, not all women attend health facilities to give birth, and among those who do deliver in health facilities, return for follow-up remains a challenge [1]. Globally, the proportion of births attended by skilled health personnel has increased from 64% in 2000–2006 to 81% in 2014–2019 [2]. In Nepal, the proportion of women giving birth in health facilities in presence of skilled birth personnel has increased from 18–57% between 2006 and 2016 [3]. This increase in health facility deliveries provides a golden opportunity for women to have access to maternity care as well as immediate PPFp services through a single visit and stay in the health facility [1].

PPFP methods help to space pregnancies and prevent unintended pregnancies [4]. However, the uptake of PPFp methods remain low in most resource-limited settings due to lack of adequately trained health professionals, lack of preferred PPFp services in the health facilities, and lack of knowledge of PPFp methods among the users [5]. In Nepal, the postpartum intrauterine device (PPIUD) is the sole long acting reversible method available in the immediate postpartum period [6]. PPIUD can be used immediately after childbirth, with minimal side effects for up to 10 years [7, 8]. However, its uptake in Nepal is lower than in many other countries, which has largely been attributed to societal barriers and a lack of knowledge and skills among health providers [1, 9]. A previous study has identified female community health volunteers (FCHVs) in Nepal to play a key role in influencing a woman's decision to choose a PPFp method. It is therefore important that we understand the long-term impact of including this cadre of health worker in PPFp interventions [8].

Based on key findings and recommendations from earlier studies [6, 9, 10], the Nepal Society of Obstetricians and Gynecologists (NESOG) and the International Federation of Gynecology and Obstetrics (FIGO) jointly implemented an intervention to orientate FCHVs on PPFp, including PPIUD. FCHVs are community health workers (CHW), and are considered a special cadre of health workforce in Nepal as they are the first point of contact for people in the communities in need of healthcare [6]. They are respected women in the community selected by them to help in matters related to health. They are the volunteers who receive some incentives and training regarding maternal and neonatal health issues.

The intervention for FCHV was conducted for the first time in Nepal in December 2018 as a pilot in Morang district [6]. This intervention was part of a larger PPFp/PPIUD project that was implemented between 2015 and 2019 in different referral hospitals across Nepal [6, 9–11]. The FCHV intervention was conducted towards the end of the project, running for six months, between December 2018 and June 2019.

The intervention used a multilayer approach involving different tiers of the health system in Nepal from provincial, to district, and peripheral health facility level [6]. In Nepal, peripheral health facilities are the first point of reporting for FCHV activities in the communities and each peripheral health facility supervises around 9–10 FCHVs [12]. This FCHV intervention involved 23 peripheral health facilities reaching 230 FCHVs with orientation on PPFp [12].

The intervention was focused on improving FCHVs' knowledge on PFP through an orientation program and enabling them to counsel pregnant women in their communities on PFP [6]. The facilitators focused on five key messages on PFP in the orientation and assessed FCHVs' knowledge on the key messages before and immediately after the orientation, and addressed any misconceptions on the same day [6]. The FCHVs were then asked to record and report their progress on counseling activities on PFP in their regular monthly meetings at the peripheral health facilities [6].

This study aims to assess the effect of the FCHV's PFP intervention 1 year after its completion, in terms of FCHV knowledge retention on PFP and their PFP community counseling activities in Morang district, Nepal. Comparisons will also be made with the earlier post-intervention study results [6]. An initial evaluation of the intervention, published in early 2020, showed that FCHVs had a significant improvement in their PFP knowledge immediately after the orientation as assessed by a post-test. FCHVs were also able to counsel 83.3% of the 1872 pregnant mothers from the respective communities in the first 2 months after the intervention [6]. The proportion of postpartum mothers who had given birth in the selected 2 facilities reporting that they were counseled by the FCHVs during their pregnancy improved significantly from 7% in the pre-intervention group to 18.1% in the 2-month post-intervention group. The qualitative findings at 2 months post-intervention suggested a positive impression about the intervention among the FCHVs and highlighted the need for sustaining and scaling up such activities [6]. To encourage the expansion of intervention activities across Nepal and replication of similar interventions in other LMICs, it was considered that evidence of the long-term impact and its sustainability was required in order to inform policy.

## Methods

This is a 1-year post-intervention study of an initiative aimed at improving PFP services provided by FCHVs in Morang district, Nepal [6]. The study followed a sequential explanatory method [12] in line with the earlier post-intervention study [6]. Quantitative methods included: knowledge assessment of FCHVs; survey of postpartum mothers admitted at two major referral hospitals on PFP use; and a review of existing monthly data forms on FCHV service coverage for the 2 months prior to the study from November to December, 2019. Qualitative methods included: key informant interviews (KII) with health professionals representing different tiers of the health system in Morang district; and focus group discussions (FGD) with the FCHVs. We followed consolidated criteria for reporting qualitative research (COREQ) when conducting the FGDs and KIIs. The detail of this is provided in the data analysis section.

## Study Settings

To be in line with the earlier post-intervention evaluation [6], this study was conducted at two major referral hospitals in Morang District namely, Koshi Zonal Hospital and Nobel Medical College Teaching Hospital, and the catchment communities of the 23 peripheral health facilities covered by the FCHVs who received the PFP orientation in December 2018.

# Study Participants

## Quantitative study

Eligible participants for this study were all 230 FCHVs who received orientation on PPFP during the intervention phase, postpartum mothers delivering at the two included facilities between January 10, 2020 and February 9, 2020 and wider stakeholders of PPFP who were included in the KII. All FCHVs who had participated in the orientation on PPFP in 2018 [6] and were still working as an FCHV at the time of data collection were considered eligible for both quantitative and qualitative components of the study. Postpartum mothers admitted to the hospital were selected through simple random sampling. The postpartum mothers included in this study represented 30% of an estimated 1000 deliveries for a period of 1 month from the two hospitals. Mothers with severe postpartum complications, physically unable to respond to the questions and admitted in the intensive care units were excluded.

## Qualitative Study

For the qualitative assessment, all those involved in healthcare provision during the implementation of the PPFP/PPIUD intervention were considered eligible. Six key informant interviews (KIIs) were completed, which included a former director of the Provincial Health Directorate of Province One, a senior public health administrator of Morang district health office, a doctor and a nurse (from the two referral hospitals), and personnel in charge of the health facility from two of the peripheral health facilities. The KII participants were selected purposively representing different tiers of the health system within Province One and based on their active involvement in the intervention.

For the FGD, 4 groups of FCHVs affiliated to any of the 23 peripheral health facilities that were involved in the intervention were purposively selected. We purposively selected 2 facilities with FCHVs having higher knowledge scores and 2 facilities with FCHVs having lower knowledge scores.

## Study Tools

### Quantitative tools

For comparison, the same quantitative study tools were used as in the previous post-intervention evaluation study [6]. These included:

- **FCHVs' knowledge questionnaire:** It included five questions which assess knowledge of the key concepts of immediate PPFP and specifically PPIUD (Details in Table 1).
- **FCHVs' monthly reporting form:** Information on counseling coverage was collected for a period of 2 months prior to the start of data collection for this study from November to December, 2019.

Indicators included the total number of pregnant mothers in the communities and the proportion of pregnant mothers counseled on PFP by FCHVs (Table 3).

- **Mothers' interview questionnaire:** We used the same questionnaire used in previous study [6] to assess if the effect of community counseling coverage was reflected amongst the mothers giving birth in the two referral hospitals. To fulfill the objective of this study, we specifically asked if they had been counseled on PFP by FCHVs in their community during their pregnancy.

Table 1  
FCHVs Change in knowledge scores on PFP

Knowledge of PFP	T1 (n = 230)	T2 (n = 230)	T2-T1	T3 (n = 206)	T3-T1
Questions	n (%)	n (%)	(%)	n (%)	(%)
1. Can mothers use contraception immediately after delivery?	105 (45.7)	173 (75.2)	29.5***	193 (93.7)	48***
2. Can Postpartum Intrauterine devices provide protection for up to twelve years?	205 (89.5)	255 (97.8)	8.3***	198 (96.1)	6.6***
3. Can mothers who undergo a caesarean section have postpartum IUD inserted?	115 (50.2)	244 (97.4)	47.2***	144 (69.9)	19.7***
4. Can IUDs be inserted immediately after giving birth?	148 (64.3)	223 (97.0)	32.7***	189 (91.7)	27.4***
5. Should women go for follow up immediately if the IUD strings are seen outside vagina?	180 (78.3)	215 (93.9)	15.6***	181 (87.9)	9.6***
<b>Overall correct answers</b>					
3 or more correct answers	168 (73.4)	225 (98.3)	24.9***	206 (97.6)	24.2***
T1 = Pre-test before the orientation					
T2 = Post-test immediately after the orientation					
T3 = 1-year post-intervention					
*** P-value < 0.001					

Table 3

Proportion of pregnant mothers counseled by FCHVs in the communities and uptake of PPIUD in facilities

	<b>2-months</b>	<b>1-year</b>
	<b>post-intervention</b>	<b>post-intervention</b>
<b>Description</b>	n (%)	n (%)
No. peripheral health facilities maintaining FCHV records	23	13
No. recorded pregnant mothers in the catchment areas of FCHVs	1872	752
No. recorded pregnant mothers counseled by a FCHV on PPF	1559 (83.3)	538 (71.5)

## Qualitative Tools

- For the qualitative study, the researchers used FGD and KII guides. We used the same FGD guide used in previous study [6] and developed a new KII checklist for this study (Additional file 1). The guides included the following topics: knowledge of PPF; impression of the intervention; community-based counseling activities on PPF; perspectives on the challenges of sustainability; and their suggestions for how to increase long-term impact.

## Study Variables

The primary outcome was FCHVs' knowledge retention on PPF at 1 year. Comparisons were also made with results from the previous study at 2-months post-intervention. Other covariates included FCHV's age and number of years working as a FCHV.

The secondary outcome was percentage of women provided PPF counseling by FCHVs. Counseling coverage in the communities was measured directly through FCHVs' monthly reporting forms and indirectly through data collected from mothers who were questioned postpartum at the two study hospitals. The exposure variables for the mothers from the two hospitals included the district they came from for delivery and the facilities where they delivered.

## Sample Size

To compare pre- and post- intervention levels of knowledge with 80% power and a 5% level of significance a minimum sample of 157 of the 230 eligible FCHVs were required [14] With the assumption that counseling coverage would increase from 7 to 15% pre and post-intervention, to detect a difference at 80% power and a 5% level of significance, a minimum sample of 237 postpartum women was required.

Allowing for potential incomplete responses a sample size of 300 was adopted with 150 women from each hospital.

## Data Collection

All data was collected in January 2020. Quantitative data was collected using smart phones and mobile tablets. The structured data collection tools were developed using Open Data Kit (ODK) software. All the tools were available in both English and Nepali [6]. Interviews were conducted in Nepali. Data enumerators were trained on data collection techniques, use of the ODK application for smart phones and mobile tablets, ethical considerations, and were provided with an overview of PFP.

A qualified researcher, independent from the intervention, moderated all the FGDs and conducted the KIs using the interview checklists. The independent researcher (KNP) was accompanied by another female researcher (SP) who assisted with taking field notes and audio-recording the discussions. Only the two qualitative researchers (KNP and SP), and the FCHVs or KI respondents were present in each FGD and KI sessions respectively. The moderator first explained the objectives of the FGD and KI and introduced the research team to the participants. The FGDs and KIs took around 40 to 45 minutes to complete. The moderator (KNP) summarized the discussions based on field notes to the FCHVs and stakeholders for their feedback and to ensure that the research team had understood them correctly.

## Data analysis

### Quantitative analysis

We analyzed three different quantitative datasets using SPSS version 23 with a significance level set at a P-value < 0.05.

- Bivariate and multivariable analyses were conducted to assess FCHV knowledge retention on PFP. Chi-squared tests were completed to assess the change in proportions of FCHVs correctly answering questions on each of the five key messages on PFP, at the post test questionnaire held immediately after the intervention, and 1 year after the intervention as compared to pre-intervention. A logistic regression model was used to assess the association between the time of the intervention phases and PFP knowledge scores, controlling for FCHVs' age and years of working experience. The outcome variable for knowledge was dichotomized to less than 3 correct answers and 3 or more correct answers out of the 5 knowledge questions.
- Descriptive analysis of counseling coverage by FCHVs in the communities was completed, based on their monthly reports of PFP services. Indicators included: total number of pregnant women and the proportion of pregnant women counseled by FCHVs on PFP.
- A chi-squared test was applied to the data collected from postpartum mothers at the two hospitals, to assess the differences in their reports of receiving FCHV counseling between the pre-intervention, 2-month post-intervention, and at 1 year. Multivariable analysis was used to examine the association

between the length of time from the intervention and the proportion of mothers reporting to have received PFP counseling by an FCHV, controlling for the hospital they delivered at and the district from which they came from.

## Qualitative Analysis

- Thematic analysis [15] was conducted on the qualitative data based on the five priori themes generated from the 2-month post-intervention study [6]. All FGDs were conducted in Nepali and were translated into English language during the process of transcription. RD and RCS reviewed the transcripts. RD, KNP and SP analyzed the qualitative data using Dedoose software version 8.0.42. RD, KNP and SP first read and re-read the transcripts to familiarize themselves with the broad ideas and generated initial codes. RD, KNP and SP then gathered all the coded data and collated the codes with the relevant priori themes from the previous study. RD, KNP and SP then selected original quotes from FCHVs and KIs for each theme to provide further insight. RD then compared the responses from the 1-year post-intervention study with the responses from the 2-month post-intervention study for each theme. The themes were then reviewed by all the authors and assessed to determine whether the data was useful in addressing the overall objective of the study.

## Results

### Quantitative Results

Table 1 shows the proportion of FCHVs answering the PFP questions correctly before the orientation (pre-test), immediately after the orientation (post-test), and 1 year after the intervention. A total of 206 FCHVs participated in this 1-year post-intervention study, out of the 230 FCHVs who had participated in the intervention at the start (89.6%).

The proportion of FCHVs answering the questions correctly at 1-year post-intervention remained significantly higher than pre-intervention for all 5 questions. However, the proportions of correct answers were lower as compared with the immediate post-test for all but one question. Pre-intervention, the proportion of FCHVs answering correctly was lowest for the first question - whether contraception can be used immediately after childbirth. The percentage of FCHVs answering the first question correctly improved by 29.5% in the post-test, and by 48% 1-year post-intervention.

At 1-year post-intervention, the lowest score was observed for the question on whether a mother who undergoes cesarean section can use a PPIUD. The increase in the proportion of FCHVs answering this question correctly was 19.7% at 1-year post-intervention as compared to 47.2% post-test immediately after the orientation.

Overall the percentage of FCHVs correctly answering 3 or more questions at 1-year post-intervention had increased by 24.2% which was similar to the 24.9% increase immediately after the intervention.

Table 2 shows the logistic regression model examining the association between the different points of assessment of PFP knowledge among FCHVs. Knowledge of PFP was divided into those with fewer than 3 correct answers and those with 3 or more correct answers. A 20-fold increase in FCHV knowledge had been observed at the post knowledge test (AOR = 20.4, P < 0.001), and at 1-year post-intervention it remained approximately 15 fold higher (AOR = 14.6, P < 0.001) as compared to the pre-intervention point.

Table 2  
Association between intervention phases and knowledge scores<sup>a</sup> of PFP among FCHVs

N = 664 <sup>b</sup>			
Characteristics	AOR	95% CI	P-value
Intervention			
Pre-test <sup>c</sup>	1		
Post-test	20.4	(7.3–57.3)	< 0.001
1-year post-intervention	14.6	(5.7–37.3)	< 0.001
<sup>a</sup> Controlled for age and years of experience of FCHVs			
<sup>b</sup> Pooled data from the three phases			
<sup>c</sup> Reference			

Table 3 shows the descriptive data collected from the peripheral health facilities of the monthly meeting records collected and submitted by FCHVs, on their community-based activities. It shows the service coverage for a period of 2 months before the data was collected for each phase - at 2-months post-intervention and at 1-year post-intervention. At 2-months post-intervention, all the 23 peripheral health facilities had maintained monthly records of PFP service coverage by FCHVs [6]. At 1-year post-intervention, 13 out of 23 facilities had maintained the monthly reporting forms. At 1-year post-intervention, the proportion of pregnant women counseled by FCHVs was 71.5% (n = 538) as compared to 83.3% (n = 1559) at 2-months post-intervention.

Figure 1 show the proportion of postpartum mothers in the hospitals who were counseled by an FCHV during their pregnancy in the community. In total, data was collected from 244 women in the pre-intervention phase, 238 at 2-months post-intervention and 300 at 1-year post-intervention.

The proportion of women that reported they were counseled by FCHVs at 1 year post-intervention was 12.3% (n = 37) of 300 women, which was higher than the pre-intervention phase of 7% (n = 17) of 244 women. However, it was lower than 18.1% (n = 43) of 238 women interviewed at 2-months post-intervention.

Table 4 demonstrates the logistic regression model examining the relationship between time period from intervention and the number of women reporting receiving counseling from a FCHV during their pregnancy. There was an almost 3-fold increase (AOR = 2.9, P < 0.001) in the number of women reporting being counseled by an FCHV at 2-months post-intervention, and an almost 2-fold increase (AOR = 1.9, P = 0.036) at 1 year post-intervention, when comparing to the pre-intervention phase.

Table 4  
Association between intervention phases and FCHV counseling among postpartum mothers delivering in the two hospitals

N = 781 <sup>b</sup>			
Characteristics	AOR	95% CI	P-value
<b>Intervention phase</b>			
Pre-intervention	1		
2-month post-intervention	2.9	(1.6–5.4)	< 0.001
1-year post-intervention	1.9	(1.0-3.5)	0.036
Controlled for facilities the mothers delivered and the districts the mothers came from for delivery			
<sup>b</sup> Pooled data from the three phases			
<sup>c</sup> Reference			

## Qualitative Results

Table 5 summarizes the key themes of the qualitative study comparing the findings between the 2-month post-intervention evaluation study, and the 1-year post-intervention study. These include the FGD findings for the two-month post-intervention, and FGD and KII findings for 1-year post-intervention. There were not any KII in the earlier study. Comparisons were made on the 5 key themes which included knowledge of PFP, perception on the PFP orientation, activities conducted by FCHVs in the communities, challenges of maintaining their work and suggestions to improve sustainability. Original quotes from the responses of the participants' at 1-year post-intervention are included in the description of the findings to provide more contexts.

Table 5

Comparison of the key qualitative findings between the 2-months and 1-year post-intervention studies

Themes	2-months post-intervention FGD	1-year post-intervention FGD and KII
<b>1 Knowledge on PPF</b>	<ul style="list-style-type: none"> <li>• Majority of FCHVs were able to mention timing of insertion and benefits correctly.</li> <li>• Some FCHVs were confused about whether PPIUD can be used among women who had undergone the Cesarean section.</li> </ul>	<ul style="list-style-type: none"> <li>• Majority of FCHVs were able to mention timing of insertion and benefits correctly.</li> <li>• The confusion regarding PPIUD use among women who underwent CS persisted.</li> <li>• Some FCHVs were also confused about follow-up among PPIUD users and lacked knowledge about referring women with strings seen or felt outside the vagina to the health facilities.</li> </ul>
<b>2 Perception of PPF orientation program</b>	<ul style="list-style-type: none"> <li>• The majority of FCHVs considered the PPF program to be useful.</li> </ul>	<ul style="list-style-type: none"> <li>• The majority of FCHVs and stakeholders still considered PPF programs useful.</li> </ul>
<b>3 Activities conducted by FCHVs on PPF</b>	<ul style="list-style-type: none"> <li>• Almost all the FCHVs had actively conducted activities in the communities and raised awareness about PPF in health mothers groups and counseled pregnant women in the communities.</li> <li>• All FCHVs had actively maintained their monthly reporting forms.</li> </ul>	<ul style="list-style-type: none"> <li>• Not all FCHVs were actively involved in counseling activities for pregnant women in the communities.</li> <li>• Many FCHVs had stopped maintaining the monthly FCHV reporting forms citing lack of supervision and support.</li> </ul>
<b>4 Challenges of sustaining their work</b>	<ul style="list-style-type: none"> <li>• FCHVs were concerned about the potential threats they may have to face while counseling women in the communities.</li> <li>• Many FCHVs considered women to face societal barriers to choosing PPF/PPIUD</li> </ul>	<ul style="list-style-type: none"> <li>• No threats were encountered by FCHVs in their community-based activities since the 2-month study.</li> <li>• Many FCHVs still considered societal barriers to exist, preventing women from choosing PPF/PPIUD</li> <li>• FCHVs suggested that a change of new peripheral 'facility in-charge' may have interrupted the regular monitoring of FCHV activities related to PPF services.</li> <li>• Stakeholders highlighted concern regarding a lack of refresher courses and monitoring.</li> </ul>

Themes	2-months post-intervention FGD	1-year post-intervention FGD and KII
5 FCHVs' suggestions on improving sustainability	<ul style="list-style-type: none"> <li>• Strong request for additional refresher courses for their knowledge retention.</li> </ul>	<ul style="list-style-type: none"> <li>• Many FCHVs and KII highlighted the need for refresher courses and better monitoring and supervision of FCHV related activities.</li> <li>• Stakeholders highlighted the need for local greater government involvement for sustainability.</li> </ul>

## 1. Knowledge Of Ppfp

At 1 year, almost all FCHVs still considered PPFP as a new concept. Most were able to list out different methods of PPFP and also explain the time of insertion of PPIUD as well as its benefits as had been true at the 2-months post-intervention study [6].

*"In my knowledge, PPIUD is a convenient method to be inserted in uterus of a recently delivered woman. This protects a woman from unwanted pregnancy. The merit of this method in my view is that one does not need to wait until the next menstrual cycle after childbirth."*FCHV, FGD 1-year post-intervention

Some FCHVs lacked adequate knowledge about certain aspects of PPIUD at 1 year. During the orientation, FCHVs were taught that the uterus involutes over time and therefore, it is important to refer the PPIUD users to the hospital for follow-up as well as to cut the thread when it is seen outside the vagina. Contrary to this, some FCHVs considered having a string seen or coming out of the vulva, to be normal.

*"When the thread/string is seen or felt by the women coming out of vulva outside the body, it is normal. They don't need to worry about it or go for follow-up to the hospital."*FCHV, FGD 1-year post-intervention

## Perception About Ppfp Orientation

FCHVs during the 2-months post-intervention suggested that the orientation had helped to improve their PPFP knowledge [6] and at 1-year post-intervention, all FCHVs from the FGD and stakeholders from KII still considered this to be the case. All participants believed that efforts in continuing the orientation activities must be expanded and refresher orientations should be initiated to maintain the momentum of FCHV led community-based activities on PPFP.

*"It was one of the best trainings that I have ever had! The contents were understandable, trainers motivated everyone to learn, and overall I liked the training session."*FCHV, FGD 1-year post-intervention

*“There is no doubt that FCHV initiated counseling is effective in terms of finding women in ANC and discussing their need for the PPIUD. Training helped them by motivating and identifying new knowledge regarding the method and the need to counsel pregnant women in their communities.”- Public Health Administrator, Health Office, Morang, KII*

## **2. Activities Conducted By Fchvs In The Communities**

In the 2-month post-intervention study all FCHVs appeared to be motivated and had shared their PPFP related activities in the communities enthusiastically, however at a 1-year post-intervention, activities appeared to have slowed down. All the FCHVs at two-month post-intervention mentioned that they had been maintaining the FCHV monthly reporting forms on PPFP. Whereas, at a 1-year post-intervention, almost half of the FCHVs acknowledged that they had stopped maintaining the monthly reporting forms. They cited discontinuation of supervision from those in charge of the health facilities and a lack of reporting forms since the start of the new fiscal year (mid-July, 2019) as some of the key reasons for their discontinuation. A few, mentioned that they still counsel women about PPFP methods as needed even though they had stopped maintaining a record.

Major changes in the stakeholders working at different levels of the health system had occurred since the last evaluation. More than 50% of the peripheral health facilities had newly assigned health facility ‘in-charges’ and staff. Whilst most of the peripheral health facilities which had retained the same people in charge, were able to continue monitoring the FCHV activities on PPFP, those with newly assigned supervisors (who were not involved in the initial intervention) were unaware of the FCHV activities regarding PPFP and had therefore not been monitoring their activities. It seemed that there was little monitoring of activities at a central level.

*“Projects come and go. So we thought it’s the same with this one too. When the project is active everybody is active. Once it phases out no one really asks us to report it either. Our new health facility-in-charge too stopped asking about the data. So we discontinued filling the monthly data for PPFP.”FCHV, FGD 1-year post-intervention*

## **3. Challenges Of Sustaining Their Work**

In the two-month post-intervention research the key challenges expressed by the FCHVs included societal barriers for women to accept immediate PPFP methods such as PPIUD and the fear of potential threats from people in the communities when providing counseling. At 1-year post-intervention, most of the participants still cited the low acceptability of PPIUD due to societal barriers. However, none of the FCHVs had faced challenges from the communities, allaying their early fears.

One of the major challenges indicated by most of the FCHVs and KII participants at 1 year was the lack of monitoring and supervision since the intervention. Some FCHVs also highlighted the gap in linking their

counseling to the actual services women would receive in the two hospitals.

The stakeholders from the two hospitals highlighted that while FCHVs involvement in the communities is useful, they also felt that designated counselors are needed in the hospitals to help bridge the gap and to supplement community-based counseling services.

*“Counseling of the pregnant women in the communities is very useful and it supplements the counseling services in the hospital. However, the women also need thorough counseling again when they come to the hospital. Due to high workload, not all the trained providers in the hospital are able to provide counseling...”*-Nursing in-Charge-Hospital, KII

Other challenges highlighted by FCHVs and stakeholders alike included a lack of clarity in the referral of mothers for PFP services and a lack of PFP services in lower level facilities. *“Sometimes when we counsel pregnant mothers it’s difficult for us to decide where to advise them to go for delivery. It would have been easier if the PFP/PPIUD facilities were available in nearby places. Not all women are ready going to the two big hospitals for delivery and the place of their choice does not have those facilities.”*- FCHV, FGD 1-year post-intervention

Former director of the Provincial Health Directorate, who had been recently transferred to work at central level in Kathmandu, indicated additional challenges for sustainability such as: the short implementation phase of FCHV involvement in the project; inadequate exit strategy for FCHV activities after the project ended; and a lack of involvement of birthing centers who could also have provided PFP services.

*“Involving FCHVs for PFP was the first project of its kind for the government too. But the duration of implementation was too short. Such projects require a minimum period of one or two years of implementation to be sustainable. But this project ended without a detailed exit strategy.”*-Former Director of Provincial Health Directorate of Province 1, KII

## 4. Suggestions On Sustainability

In the two-month post-intervention study, FCHVs had requested a refresher course. At 1-year post-intervention, both FCHVs and other stakeholders highlighted that refresher orientation for FCHVs had not taken place and continued to highlight the importance of such ongoing orientation. Many FCHVs also suggested that having additional counseling materials such as flipcharts on PFP and a sample IUDs would help their counseling to be more effective.

*“There has been no follow-up or refresher orientation for FCHVs. It would be better if they could receive such refresher course in every 6 months. It would also have been helpful if the (government) health office would follow-up and monitor the FCHV activities on a regular basis even though the project has ended.”*- health facility-in-charge, KII

Almost all FCHVs focused on the need for follow-up activities which ended after the completion of the project. Many FCHVs and many stakeholders also urged for an expansion of PPF services into nearby health facilities for increased sustainability and equity of service access.

*“For sustainability, services for PPIUD should be provided in our nearby health facility as the majority of our clients come from poor and unreached backgrounds and not everyone goes to those two hospitals where PPF services are provided.”*FCHV, FGD 1-year post-intervention

## Discussion

The retained knowledge at 1-year post-intervention among FCHVs in this study is remarkable for this cadre of CHWs who do not have a professional degree in health sciences. However, to retain the knowledge in the long run, refresher trainings would be advisable. A review of the existing literature on long-term retention of knowledge suggests that 66 to 75% of the knowledge will be retained after one year in general education as well as in medical education [16]. The FCHVs in this study had a higher retention rate than this. However, knowledge is likely to decrease further by 50% or more in the next five years without any further ongoing training or education [16]. A review of ongoing trainings for CHWs from different LMICs on different health topics have shown positive results for knowledge retention following refresher trainings [17]. A study on refresher training for CHWs in India suggested the knowledge retained among CHWs following the refresher training at 1-year post-intervention was higher than the knowledge retained 2 months after the initial training [18]. Thus, it would be important for the local and provincial government to identify strategies to conduct refresher courses and regular supervision to help the FCHVs retain their knowledge of PPF.

The descriptive data collected from the FCHVs' monthly reporting forms on their PPF counseling coverage showed incomplete recording and reporting of their activities. In general, each government peripheral health facility in Nepal supervises around 9–10 FCHVs [19, 20]. FCHVs conduct health awareness programs every month within the catchment areas of their peripheral health facilities through monthly mother's group meetings. They also counsel pregnant women in the communities on birth preparedness, identify danger signs, and encourage pregnant women to go to health facilities for childbirth [19, 20]. They are provided with a monthly reporting book by the government and use it as a tool to record their activities and report it to the peripheral health facilities towards the end of every month. As part of the intervention for PPF, an additional simple checklist was introduced by the implementers of the intervention [6]. However, the new checklist has not yet been incorporated within the national system for FCHV's monthly reporting book. This could have been one of the reasons behind some FCHVs not continuing recording and reporting activities for PPF.

Moreover, the qualitative findings also indicated that many peripheral health facilities had newly assigned health facility in-charges who were unaware of the intervention and didn't supervise the FCHVs' PPF related activities. At the time of this study, we identified that more than 50% of the peripheral health facilities had newly assigned health facility-in-charges who were not part of the intervention. The changes

in the peripheral health personnel have been a part of the larger reshuffling process taking place in the health system in Nepal [21]. Though there are no studies looking into its effect on the sustainability of the health programs; it could have interrupted the recording and reporting activities among FCHVs for PPF. Therefore, given this lack of proper recording, the actual counseling activities among the FCHVs could have been underreported. Given the retention in their knowledge at 1 year, particularly regarding the value of immediate PPF, it is not unreasonable to assume that counseling would have continued albeit unrecorded.

The qualitative findings of this study showed that FCHVs and PPF stakeholders regarded PPIUD as the most useful PPF method and believed that the FCHV activities must be expanded. They also considered that the orientation of FCHVs was a useful component of the intervention and their continued involvement would support hospital-based PPF services. However, it was also highlighted that the lack of refresher orientation for FCHVs and inconsistent monitoring of their activities after 1 year was problematic for sustainability. The World Health Organization recommends the need for ongoing training activities with regular supervision and refresher training for CHWs [22]. The lack of consistent supervision of PPF activities among FCHVs identified in this study is also likely to affect sustainability of the intervention in years to come. The ongoing training activities have also been regarded as a neglected aspect of most training programs for CHWs in LMICs [23]. The United States Agency for International Development Health Care Improvement Project has recommended that CHWs should be updated every six months from their initial training to sustain the practice of their skills [24].

CHWs all round the world have a peculiar role to play in health care, as they are not government employees and yet are often expected to undertake specific health counseling roles which in many high-income countries would be the remit of salaried, formally trained nurses or midwives. Perhaps one of the issues with CHWs is that they fall into a kind of vacuum of responsibility – because they are not officially recognized salaried government staff, they are often trained and supported by international organizations tasked with filling in the gap. This can result in a fragmented approach to their training and function. This is tragic, given they are highly respected by their communities and so hugely influential, particularly in remote communities such as in rural Nepal and therefore could be instrumental in changing the behavior of communities. One suggestion could be to recognize the value of this cadre of health personnel by remunerating their work appropriately, providing regular training and mentoring as well as monitoring their outputs.

Either way, the continued efforts of FCHVs were reflected amongst the mothers giving birth in the two major referral hospitals. At 1-year post-intervention, the odds of a postpartum mother in the hospitals having been counseled by an FCHV during their pregnancy remained 2 times higher as compared to the pre-intervention period. Moreover, the knowledge retention of PPF among FCHVs at 1-year follow-up and their continued efforts with community-based counseling have both remained higher than in the pre-intervention phase. Despite the lack of continued supervision, the activities are still functioning which is remarkable. However, in order to sustain the progress, the suggestions from the study participants must be taken into account such as the need to provide refresher orientations for the FCHVs and providing

orientations for newly assigned health facility personnel. Timely acknowledgement of such potential barriers by the concerned policymakers of PFPF in Nepal is essential. Further, lobbying for the continuation of refresher courses for FCHVs, ensuring better monitoring, recording and reporting of PFPF activities to enable data-driven decision making, and incorporating PFPF activities into the national FCHV program, are necessary next steps to ensure sustainability of PFPF activities already embarked on.

## Limitations

This study has no control group, which could have provided a comparative perspective on PFPF services in areas without any intervention. However, it would not have been feasible to recruit control groups from the same setting as other FCHVs beyond the intervention catchment area had also received orientations on PFPF at some point and the spill-over effect of the intervention couldn't be ruled out. Due to feasibility issues, it was also not possible to recruit FCHVs from other districts.

Secondly, the recording and reporting of the PFPF counseling activities by FCHVs may not reflect the true picture of the actual counseling activities by FCHVs. Thus, the under-reporting of the PFPF activities is highly likely given the fact that the correct forms were not issued and there was a change of supervisory staff at many peripheral health facilities.

Thirdly, it is difficult to compare two qualitative studies over different time periods. The people interviewed are different and the time the interviews took place is also different meaning comparisons should be made with caution. Similarly, KII were not undertaken in the first 2 months' post-intervention study and so comparisons are not like for like.

This study nevertheless, provided a longitudinal perspective on the changes taking place over time. Moreover, as a mixed-method study, the qualitative findings helped to provide more context to the results obtained from the quantitative study.

## Conclusion

This study showed that the knowledge of PFPF among FCHVs and their counseling activities remained higher at a 1-year follow-up as compared to the pre-intervention phase. Continued supervision and monitoring was identified as a way to maintain PFPF activities amongst FCHVs and refresher trainings would likely help in maintaining knowledge and sustaining progress in the long-term. In view of these findings, incorporating PFPF activities into the national FCHV program would be strongly advised.

## Abbreviations

AOR  
Adjusted odds ratio  
CHW  
Community Health Workers

CI  
Confidence Interval  
COREQ  
consolidated criteria for reporting qualitative research  
FCHV  
Female Community Health Volunteers  
FGD  
Focus Group Discussion  
FIGO  
International Federation of Gynaecology and Obstetrics  
IUD  
Intrauterine contraceptive device  
KII  
Key Informant Interview  
LMIC  
Low and middle income countries  
NESOG  
Nepal Society of Obstetricians and Gynecologists  
PPFP  
Postpartum family planning  
PPIUD  
Postpartum intra-uterine contraceptive device

## **Declarations**

## **Ethics approval and consent to participate**

Ethical approval was obtained from Nepal Health Research Council under Ethical Review Board protocol number 823/2019. The written informed consent was collected from all the participants.

### **Consent for Publication**

Not applicable

### **Availability of data and materials**

All anonymized quantitative data will be available in Figshare repository upon reasonable request. Qualitative data may not be available as it contains personal quotes from the respondents which maybe identifiable.

### **Competing interest**

The authors have no competing interest.

## Funding

This research is led by Green Tara Nepal, a professional non-profit organization in Nepal, as part of the evaluation of the initiative on institutionalization of PPIUD in the communities and selected hospitals of Nepal lead by NESOG. The initiative was funded by an anonymous donor and supported by the FIGO. However, the funds were primarily provided for the implementation and follow-up of the initiative and no separate funds are available for the publication of this research. The donors had no direct role in data collection and analysis, transcription, interpretation of the results and preparation of the manuscript.

## Authors' contribution

RD was involved in designing the study, finalizing the tools, data collection, analysis, and writing the manuscript. RCS was involved in finalizing the study tools, supervision of data collection, analysis, and revisions of the manuscript. KNP was involved in conducting FGD and KII, analysis of qualitative data, and writing the results for qualitative data. SP was involved in coordination of data collection, data analysis and revision of the manuscript. HT was involved in finalizing the study proposal, coordination for data collection and revision of the manuscript. SB and ET were involved in finalizing the study design and study tools, and review of the manuscript. KT was involved in revision and providing technical guidance of the manuscript. AM finalized the study design and tools, and provided the technical guidance and overall supervision on finalizing the manuscript. All authors have read and approved the manuscript.

## Acknowledgement

The authors would like to thank the GTN, FIGO and NESOG team for their support. We are very grateful to the Provincial and local government of Province One of Nepal for their support in implementing this initiative and conducting this research. We are also thankful to the research assistants for their contribution in data collection. We are obliged to all the PFP stakeholders, FCHVs and the postpartum mothers who participated in this study for their valuable time.

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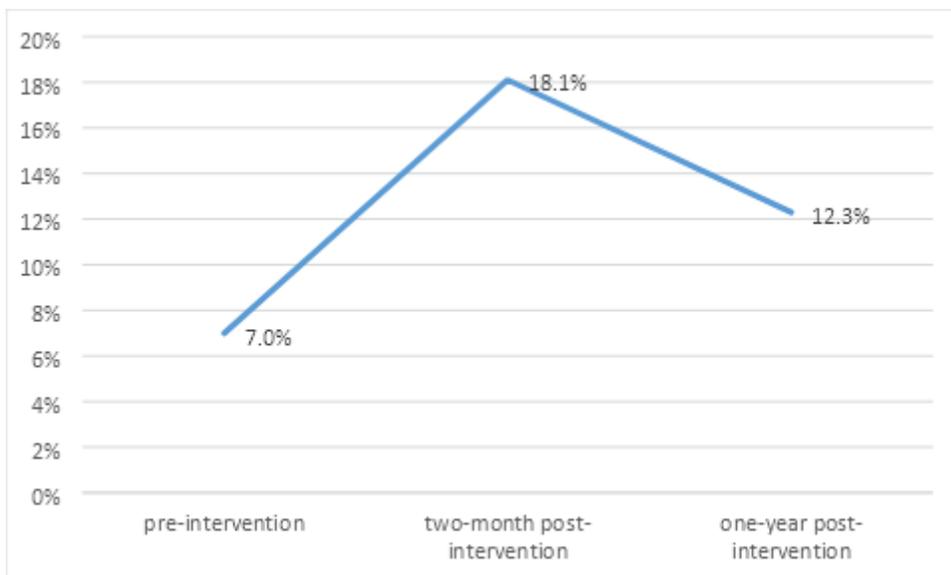
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## Figures



**Figure 1**

Counseling coverage of PPF among the postpartum mothers by FCHVs in the two referral hospitals

## Supplementary Files

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