Evaluation of a volunteer community-based health worker program for providing contraceptive services in Madagascar[*]

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Abstract

Background—Madagascar recently scaled up their volunteer community health worker (CHW) program in maternal health and family planning to reach remote and underserved communities.

Study design—We conducted a cross-sectional evaluation using a systematic sample of 100 CHWs trained to provide contraceptive counseling and short-acting contraceptive services at the community level. CHWs were interviewed on demographics, recruitment, training, supervision, commodity supply, and other measures of program functionality; tested on knowledge of injectable contraception; and observed by an expert while completing five simulated client encounters with uninstructed volunteers. We developed a CHW performance score (0–100%) based on the number of counseling activities adequately met during the client encounters and used multivariable linear regression to identify correlates of the score.

Results—CHWs had a mean performance score of 73.9% (95% confidence interval [CI]: 70.3–77.6%). More education, more weekly volunteer hours, and receiving a refresher training correlated with a higher performance score. We found no other associations between measures of the components previously identified as essential for effective CHW programs and performance score.

Conclusions—Although areas of deficiency were identified, CHWs proved capable of providing high-quality contraception services.

Keywords

Community health workers; Contraception; Evaluation; Multivariable linear regression

1. Introduction

Madagascar is committed to achieving the Millennium Development Goals (MDGs), which include improving maternal health, in part, by realizing universal access to reproductive health [1,2]. Family planning promotion in countries with high birth rates could potentially prevent an estimated 32% of maternal deaths and nearly 10% of childhood deaths [3]. Volunteer community health workers (CHWs) – defined as individuals who have received less training than professional health care workers and typically are members of the community they serve – are seen as critical for meeting the MDGs by increasing accessibility to healthcare, counseling and education [4]. Furthermore, CHWs could improve equity by reaching remote and poorly-served populations [5]. The government of Madagascar has a strong tradition of utilizing non-remunerated CHWs to reach the nation's predominantly rural population.

Madagascar has experienced a dramatic decline in fertility from about 7.3 total births per woman in the 1970s to 4.8 in 2008–2009 [6]. Fertility is higher among rural women than urban women (5.2 and 2.9, respectively) and is inversely related to education. A substantial increase in use of contraception, especially injectable contraception, has driven the overall decrease in fertility in Madagascar [7]. About 29% of women reported current use of a modern contraceptive method in 2008–2009 with injectables being the most prevalent method (18%) followed by oral contraception (6.0%) [6]. Few women reported using implants (2%) or male condoms (1%). The need for contraception has not been addressed adequately among all strata of the population in Madagascar, and the unmet need remains high among low-income women [7]: 23% of married women in the lowest quintile for income reported unmet contraceptive need compared to 16% in the highest quintile in 2008–2009 [8].

Studies in developing countries have demonstrated the safety of CHWs providing injectable contraception [9], and a pilot program in Madagascar demonstrated that community-based distribution of injectable contraception is feasible and could lead to higher uptake of the method among previously-underserved populations [10]. Thus, "task-shifting" contraceptive counseling and provision to CHWs could be an effective mechanism to aid settings with shortages of health care workers to reach several MDGs. With assistance from several health development partners, Madagascar has scaled up their CHW program in maternal health and family planning and, by the end of 2012, established an expansive network of >5,600 volunteers reaching approximately 23% of women of reproductive age, including those in the most remote and underserved rural communities throughout the nation.

CHWs in Madagascar are trained to deliver integrated maternal, reproductive health and family planning services. Specifically, they are trained to promote safe motherhood (e.g., early detection of pregnant women, nutrition counseling, provision of iron folic acid and referral to health facilities for prenatal care) and to provide basic family planning services,

which include counseling and provision of short-acting methods (e.g., condoms, oral and injectable contraceptives) and referral for comprehensible information and access to long-acting and permanent methods. Some CHWs receive a small profit margin from the sale of socially-marketed products (e.g., condoms, oral and injectable contraception) to clients. In addition to counseling, the program provides information to clients through a number of tools such as flip charts designed for illiterate clients, package inserts, and posters. CHWs receive an initial, 10-day training, which includes the following topics: the importance of informed choice, each contraceptive method (e.g., benefits and disadvantages, counter-indications, and side effects), pregnancy screening, counseling techniques and use of job aids, commodity and records management, and reporting. Two-day refresher trainings occur for providing technical updates or for retraining CHWs who do not meet minimum requirements. We evaluated this program in order to 1) determine the quality of CHW performance in contraceptive counseling and 2) identify determinants of high-quality CHW performance.

2. Materials and methods

We conducted a cross-sectional evaluation from September to October 2011 using a systematic sample of 100 CHWs trained and supervised by a United States Agency for International Development (USAID)-funded community-based primary health care program that provides contraceptive and reproductive health services. To be eligible for inclusion in the evaluation, CHWs could not have had other formal healthcare training as a medical professional, and they needed to have provided services for at least six months. We administered a questionnaire to the 100 CHWs to collect information on their demographics, individual characteristics, and measures of program site functionality based on a list of 15 essential components for CHW programs developed by USAID [11]. These components addressed program functionality related to recruitment, CHW role, initial training, continuing training, equipment and supplies, supervision, individual performance evaluation, incentives, community involvement, referral system, opportunity for advancement, documentation and information management, linkages to health systems, program performance evaluation, and country ownership. We included a variable related to each component except for the final three components, which are system level and could not be measured for individual CHWs. CHWs also were tested on their knowledge related to counseling patients on use of depot medroxyprogesterone acetate (DMPA) and were assigned a score for each correct response for a cumulative score of 0–9.

Finally, each CHW completed five client sessions to demonstrate contraceptive counseling, for a total of 500 encounters. The encounters were conducted at the health center with an adequate volume of clients that was located nearest to where the CHW typically provided services in the community. Female patients, 15–49 years of age, who were waiting for a clinical consultation (for themselves or a family member) for a non-emergency condition were recruited and asked for their written consent before participating in the encounters. Because the volume of women seeking a new contraceptive method at sites was observed to be too low to achieve the predetermined sample size, encounters were simulated in that CHWs asked participants about their contraceptive needs and medical history as though the participants were seeking a new method. Participating clients did not receive contraceptive

methods as part of this study; rather, those expressing interest for a specific method were referred to a professional provider at the same site for subsequent service delivery. Expert observers scored the encounters using a standard observation checklist, consisting of two parts: (1) Part 1 assessed the CHW procedures used in welcoming the client and obtaining basic information about her contraception needs, and (2) Part 2 assessed the CHW's ability to determine the client's eligibility for a method in which she showed interest and the quality of counseling provided on that method. Questionnaires and the observation checklist were piloted before the study start. Expert observers were selected based on their experience as CHW trainers, received additional training for the study (including, mock interviews, direct observation of role-plays and written examinations) and were required to demonstrate proficiency in scoring the encounters in a standard manner before beginning data collection. Furthermore, expert observers were assigned to district sites outside of their usual geographic coverage area to minimize the potential for bias resulting from existing relationship with the selected CHVs.

The sampling frame consisted of 53 district-groups of Madagascar that had at least 15 CHWs trained in maternal health and family planning by the program. (The 11 districts with insufficient quantity of CHWs were each combined with a neighboring district.) From the sampling frame (listed in geographical order), we systematically selected every fifth district-group for a total of 10. The communes within each district were combined into commune-groups so that each had at least 15 CHWs. We randomly selected one commune-group from each of the 10 selected district-groups and randomly selected 15 CHWs from the selected commune-groups to comprise the study sample of 100 CHWs. We oversampled CHWs by 50% in order to ensure at least 10 were available for the evaluation.

We calculated weighted binomial or multinomial proportions with 95% Wilson (score) confidence intervals (CIs) [12] for the components related to the functionality of the CHW program and responses on the test of DMPA knowledge. We calculated a CHW performance score (0–100%) for each CHW by averaging their mean scores on Part 1 and 2 (weighted equally) of their five client encounters.

We used multivariate linear regression to assess the variables on demographic and other characteristics (Table 1) and the components on the functionality of the CHW program (Table 2) as potential correlates of the CHW performance scores. Using SAS 9.2 (SAS Institute, Cary, NC) for the analyses, we fit a full model with all potential correlates and then, in a backward stepwise progression, manually removed variables that were not associated with performance scores at the alpha .05 level. We tested for heteroscedasticity and dependence of error and used the Shapiro-Wilk test to ensure that the error terms originated from a normal distribution. We used the Variance Inflation Factor statistic (with a cut point of 10) to confirm the absence of multicollinearity.

The evaluation project was approved by the Ethics Committee in Madagascar and was approved as nonhuman subjects research by the Centers for Disease Prevention and Control.

3. Results

The 100 CHWs interviewed and observed were evenly divided by gender (Table 1). Participants had a mean age of 40 years and had completed a mean of 7 years of education. Only 30% worked within an hour or five kilometers of their assigned primary health center. They had a mean of 26 months of experience as a CHW. Most CHWs (83%) were selected for the role by community members, and 90% reported understanding their role as a CHW to include contraception counseling, prescribing contraceptive pills, administering injectable contraception, and providing condoms (Table 2). Only 28% were trained as a CHW by both a nongovernmental organization and the head of their primary health center.

When tested on their knowledge related to DMPA, 93% of the CHWs knew not to give DMPA to non-menstruating women who were attending an initial, family planning visit; 91% could correctly describe the procedures to follow in case the needle were to hit a blood vessel when administering DMPA; and 98% knew that DMPA is effective for 12 weeks and requires a repeat injection within 16 weeks (Table 3). Seventy-seven percent of CHWs were able to list two conditions to exclude pregnancy among non-menstruating women, 67% were able to list four disadvantages or side effects of DMPA and 57% knew to refer clients returning too late for a repeat injection to a health center to avoid an unwanted pregnancy. Each correct response given to the nine questions on DMPA knowledge was assigned one point for a total possible score per CHW of 9. Overall, CHWs had a mean score of 7.3 (95% CI: 7.0–7.7).

Each of the 100 CHWs was scored by an expert observer during the five client encounters (Table 4). The CHWs helped the client express their needs in 78% of the 500 encounters, and encouraged the client or couple to make an informed choice in 89% of the encounters. During most of the encounters, CHWs presented at least one method advantage for condoms (91%), DMPA (96%), and combination oral contraception (COC) (94%). However, CHWs presented method advantages in fewer of the encounters for implants (56%), progestin-only pills (61%), intrauterine devices (56%), tubal ligation (57%) and vasectomy (54%). Sixty-nine percent of CHWs asked sufficient questions from the checklist for ruling out pregnancy. CHWs asked all necessary questions to assess contraindications in 41% of the encounters in which the client expressed interest in oral contraception use and 83% of the encounters in which the client was interested in DMPA use. CHWs properly classified eligibility in 91% of the encounters involving oral contraception and 93% involving DMPA.

CHW mean performance scores based on their five client encounters ranged from 40.7% to 100% with a mean score of 73.9% (95% CI: 70.3–77.6%). Only three variables were associated with performance scores in the adjusted analysis (Table 5). For every additional year of education completed, performance scores increased by 1.8 percentage points (95% CI: 0.5, 3.1). Every additional weekly work hour as a CHW increased the performance score by 0.3 percentage points (95% CI: 0.0–0.6). Finally, receiving a refresher training after the initial family planning training increased the performance score by 13.2 percentage points (95% CI: 6.7–19.7).

4. Discussion

This evaluation of a systematically selected sample of CHWs trained by the program in Madagascar revealed that many CHWs proved capable of providing high-quality contraception services. This finding is consistent with other evaluations that have identified benefits in delivering contraceptive services associated with CHW programs [13–16] or the use of remunerated lay counselors [17]. However, areas of deficiency were identified in the present evaluation. For example, imperfect results in screening for eligibility for oral contraception and DMPA could lead to medical errors. Also, CHWs appeared, in general, to provide better services related to DMPA than to other contraceptive methods. Given that injectable contraception is the most prevalent method in Madagascar [6], this could reflect a lack of practice or insufficient training on counseling on other methods.

We found few correlates of performance score based on simulated encounters with uninstructed volunteer clients. Education, weekly work hours as a CHW and receiving a refresher training after the initial family planning training were positively associated with CHW performance score. However, the magnitude of these associations was relatively weak. These findings were consistent with an evaluation of a CHW program in Kenya, which did not find an association between intervention-related factors and CHW adherence to service guidelines [18].

CHWs, traditional birth attendants, or other lay health workers could improve reproductive health by extending the reach of health care system in places where highly skilled professionals are in short supply. Arguably, CHWs could be used to deliver a range of services including HIV care [19], interventions to prevent perinatal transmission of HIV [20], and contraceptive services. Many studies suggest that CHW programs can increase rates of contraception use [10,13–15,21–27], and CHWs could be particularly helpful if they are able to administer popular methods of contraception. The pattern of contraceptive use in Madagascar is similar to many resource-limited settings. Notably, injectable contraception is the most popular method in Eastern and Southern Africa, accounting for more than 40% of contraceptive use [28]. The method has a reasonable safety profile and can be safely administered by CHWs [9]. Ethiopia recently introduced the national provision of injectables by female health extension workers, who are paid workers who are not health professionals [29]. A major issue with injectable contraception involves the high proportion of women who are late in attending visits for repeat injections [30], and greater access to local CHWs who could administer the method could be effective in ensuring the women receive timely repeat injections. It is unknown whether CHWs could be trained to safely administer long-acting and "forgettable" methods (e.g., implants and intrauterine devices), which could be expected to be more effective in preventing unintended pregnancy than methods that require more frequent user attention [31].

This programmatic evaluation focused on the quality of the CHW services and did not evaluate the impact of the CHW programs. That is, we did not evaluate the acceptability of the CHW services to clients, client comprehension of the counseling material, or client uptake of contraception. Aside from refresher trainings, none of our measures of the essential components for CHW programs developed by USAID [11] were associated with

performance score. Their relationship, though, with outcomes of program impact remains unknown. Furthermore, we did not evaluate the quality of contraceptive services provided by the health professional counterparts in the survey area, which could have provided more context for interpreting the present results. In addition, the Hawthorne effect, whereby CHWs could have performed better than usual as a result of knowing that they were being observed, could have led to overestimation of the quality of services provided [32–34]. Similarly, observations were conducted at a health center (instead of the CHW's usual work environment) and, thus, may not be representative of actual counseling. However, the evaluation included observation of client encounters, which likely provided a better method of assessing services than simply relying on record reviews or other interviews [35,36]. Finally, the clients were not trained or prepared for the encounters, which could have introduced variability in the content of the encounter and, consequently, also in the scoring of the CHW performances.

A primary strength of the evaluation was use of systematic sampling, which provides results that are likely to be representative of CHW programs throughout Madagascar. Furthermore, each CHW completed five client encounters, which could be expected to provide a more accurate view of services than evaluations relying on only single encounters. Another strength was the use of highly-trained observers to maximize the reliability of scoring between encounters. Because the CHW trainings could vary slightly by region, having a centralized training for the expert observers was important to allow us to understand variations in practices and to ensure the standardization of the techniques used for the observations.

In summary, although areas for improvement were identified, this evaluation demonstrates that community-based family planning services offered by CHWs in Madagascar provide high-quality contraception services. Results of this research have been used to modify existing programs and design future CHW programs in Madagascar. Once implemented, follow-on evaluations will be conducted to measure progress in the quality of care provided by CHWs using similar methodology. Recruiting community members with higher levels of education, establishing a minimum of weekly hours for CHWs to work, and providing refresher trainings might improve the quality of services provided. Alternatively, if increasing weekly work hours is not feasible, facilities could incorporate practice sessions during family planning clinic days to enable CHWs to obtain additional experience. The use of CHWs to provide contraceptive services should be considered to increase access to services especially in other resource-limited settings with inadequate coverage of health care professionals.

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Table 1

Community health worker (CHW) demographics and other characteristics (*N*=100)

	(%)
Gender	
Male	50
Female	50
Age in years	
20–29	12
30–39	36
40–61	52
Highest level of education completed	
3–5 years	33
6–8 years	29
9–13 years	38
Within 1 h or 5 km of assigned primary health center	
Yes	30
No	70
Duration of experience as CHW	
3–17 months	22
18–23 months	51
24 months–10 years	38
Experience as a traditional healer, midwife or community health supply distributor	
Yes	11
No	89
	Mean (SD; range)
Approximate weekly work hours as CHW	11.5 (10.2; 0–42)
Number of women provided contraceptive services to last month	9.8 (12.9; 0–78)

Table 2

Components[a] of the functionality of the CHW program

Component	%	(95% CI)
Selected by community members as CHW		
Yes	82.6	(81.1, 84.0)
No	17.4	(16.0, 18.9)
Understands role to include contraception counseling, prescribing contraceptive pills, administering injectable contraception, and providing condoms		
Yes	89.6	(88.4, 90.7)
No	10.4	(9.3, 11.6)
Trained as CHW by both nongovernmental organization and head of primary health center		
Yes	28.0	(26.3, 29.7)
No	72.0	(70.3, 73.4)
Received refresher training after initial family planning training		
Yes	31.2	(29.5, 32.9)
No or do not know	68.8	(67.1, 70.6)
Uses family planning patient checklists and has continued supply of stock		
Yes	28.6	(26.9, 30.3)
No	71.4	(69.7, 73.1)
Provided services in presence of supervisor at site or at primary health center during last supervision		
Yes	47.5	(45.6, 49.4)
No	52.5	(50.6, 54.4)
Received performance evaluation in prior 12 months with direct observation at last evaluation		
Yes	31.2	(29.6, 33.1)
No	68.7	(67.0, 70.5)
Receives 3 benefits for work as CHW[b]		
Yes	89.2	(88.0, 90.3)
No	10.8	(9.7, 12.0)
Receives 3 benefits from community for work as CHW[c]		
Yes	12.4	(11.1, 13.7)
No	87.6	(86.3, 88.8)
Refers patients to primary health center and always or most of the time receives feedback on referrals		
Yes	32.4	(30.6, 34.2)
No	67.6	(65.8, 69.4)
Opportunities for promotion or progression		
Yes	75.7	(73.4, 77.2)
No	24.4	(22.8, 26.0)

Component	%	(95% CI)
Supervisor checked patient registers and monthly report at last evaluation		
Yes	41.8	(39.9, 43.6)
No	58.2	(56.4, 60.1)

[a] Components from a toolkit developed by USAID [11].

[b] Benefits could include feedback, support, profit from sale of socially-marketed products to clients, per diem for training, non-monetary incentives for recognition of work, trainings for work, official appreciation or recognition.

[c] Benefits could include retrospective information, support or encouragement, profit from sale of socially-marketed products to clients, non-monetary incentives for recognition of work, and official appreciation or recognition.

Table 3

DMPA knowledge

	%	(95% CI)
Knows not to give DMPA to non-menstruating woman attending initial, family planning visit		
Yes	93.0	(91.9, 93.9)
No	7.0	(6.1, 8.1)
Can list 2 conditions to exclude a pregnancy among non-menstruating women before providing DMPA		
Yes	76.8	(75.2, 78.4)
No	23.2	(21.6, 24.8)
Can describe steps before administering DMPA (clean the injection site with alcohol or clean water and determine the exact injection zone)		
Yes	77.6	(76.0, 79.2)
No	22.4	(20.9, 24.0)
Can describe steps needed if the needle hits a blood vessel when administering DMPA		
Yes	91.0	(89.8, 92.0)
No	9.1	(8.0, 10.2)
Can list 4 disadvantages or side effects of DMPA		
Yes	66.6	(64.8, 68.4)
No	33.4	(31.6, 35.2)
Can list 2 signs for women using DMPA that should prompt referral to primary health center		
Yes	79.0	(77.4, 80.5)
No	21.0	(19.5, 22.6)
Knows that DMPA is effective for 12 weeks		
Yes	98.1	(97.5, 98.5)
No	1.9	(1.5, 2.5)
Knows that 16 weeks after initial injection is too late for second injection		
Yes	96.7	(95.9, 97.3)
No	3.3	(2.7, 4.1)
Knows to refer client who returns too late for second injection to health center to avoid unwanted pregnancy		
Yes	57.1	(55.2, 58.9)
No	43.0	(41.1, 44.8)

Table 4

Community health worker (CHW) activities during client encounters (*N*=500)

Activities	%	(95% CI)
Part 1: welcome and obtain basic information		
Wears blouse/badge		
Yes	89.2	(88.7, 89.7)
No	10.8	(10.3, 11.3)
Welcomes the client		
Yes	98.8	(98.6, 99.0)
No	1.2	(1.0, 1.4)
Assures the client about the confidentiality and privacy of the session		
Yes	40.8	(39.9, 41.6)
No	59.2	(58.4, 60.1)
Inquires about the client's residence[a]		
Yes	61.9	(61.1, 62.7)
No	38.1	(37.3, 38.9)
Inquires about client's age		
Yes	59.4	(58.5, 60.2)
No	40.6	(39.8, 41.5)
Helps the client to express needs		
Yes	77.9	(77.2, 78.6)
No	22.1	(21.4, 22.8)
Uses documents for counseling on available contraceptive methods		
Yes	96.0	(95.7, 96.3)
No	4.0	(3.7, 4.4)
Presents at least one advantage for the method		
Condoms	90.5	(90.0, 91.0)
CycleBeads (method based on fertility awareness)	79.7	(79.0, 80.4)
Lactational amenorrhea	53.2	(52.3, 54.0)
DMPA	95.8	(95.5, 96.2)
Contraceptive implant	55.7	(54.9, 56.5)

Activities	%	(95% CI)
Combination oral contraception (COC)	94.3	(93.9, 94.7)
Progestin-only pill	61.3	(60.4, 62.1)
Intrauterine device (IUD)	56.0	(55.2, 56.9)
Tubal ligation	56.8	(56.0, 57.6)
Vasectomy	54.2	(53.3, 55.0)
Encourages client or couple to make an informed choice		
Yes	89.1	(88.6, 89.6)
No	10.9	(10.4, 11.4)
Part 2: assess eligibility and provide counseling		
Asks sufficient questions from checklist to be able to rule out pregnancy		
Yes	68.9	(68.2, 69.7)
No	31.1	(30.3, 31.9)
Does not suspect pregnancy among those with ≥1 factor from checklist ruling out pregnancy (*N*=322)		
Yes	96.3	(96.0, 96.6)
No	3.7	(3.4, 4.0)
Asks all necessary questions to assess contraindications for oral contraception use among those expressing interest in this method (*N*=63)		
Yes	40.6	(38.1, 43.0)
No	59.5	(57.0, 61.9)
Properly classifies eligibility for oral contraception use among those expressing interest in this method (*N*=63)		
Yes (eligible with no contraindications reported or ineligible with ≥1 contraindication reported)	91.3	(89.6, 92.8)
No (eligible with ≥1 contraindication reported or ineligible with no contraindications reported)	8.7	(7.2, 10.5)
Provides adequate counseling messages on oral contraception use (i.e., describes ≥1 method advantage and disadvantage, instructions on daily pill use and instructions on missed pills) among women who choose and are eligible for the method (*N*=43)		
Yes	12.8	(10.9, 14.9)
No	87.3	(85.1, 89.1)
Asks all necessary questions to assess contraindications for DMPA use among those choosing this method (*N*=315)		
Yes	83.0	(82.2, 83.8)
No	17.0	(16.2, 17.8)
Properly classifies eligibility for DMPA use among those choosing this method (*N*=315)		
Yes (eligible with no contraindications reported or ineligible with ≥1 contraindication reported)	93.0	(92.4, 93.5)
No (eligible with ≥1 contraindication reported or ineligible with no contraindications reported)	7.0	(6.5, 7.6)

Activities	%	(95% CI)
Provides adequate counseling messages on DMPA use (e.g., describes ≥1 method advantage and disadvantage and instructs that injectable is effective for three months) to women who choose and are eligible for the method (*N*=307)		
Yes	43.0	(42.0, 44.1)
No	57.0	(55.9, 58.1)

[a] This information allows the CHW to determine if the client should be referred to another CHW who is geographically closer to the client's residence.

Table 5

Correlates of CHW performance score from linear regression

	Crude		Adjusted[a]	
	β	(95% CI)	β	(95% CI)
Gender				
Male	1.5	(−4.9, 7.9)		
Female	1.0			
Age	−0.2	(−0.6, 0.2)		
Years of education completed	1.7	(0.3, 3.0)	1.8	(0.5, 3.1)
Within 1 hour or 5 kilometers of assigned primary health center				
Yes	−2.3	(−9.1, 4.4)		
No	1.0			
Duration of experience as CHW	0.1	(−0.1, 0.4)		
Experience as a traditional healer, midwife or community retailer				
Yes	−2.8	(−12.6, 7.0)		
No	1.0			
Approximate weekly work hours as CHW	0.3	(−0.1, 0.6)	0.3	(0.0, 0.6)
Number of women provided contraceptive services to last month	0.1	(−0.1, 0.3)		
Selected by community members as CHW				
Yes	−1.2	(−9.6, 7.3)		
No	1.0			
Understands CHW role includes contraception counseling and provision				
Yes	−0.1	(−10.6, 10.4)		
No	1.0			
Trained as CHW by both nongovernmental organization and head of primary health center				
Yes	1.3	(−5.9, 8.4)		
No	1.0			
Received refresher training after initial family planning training				
Yes	10.5	(3.9, 17.1)	13.2	(6.7, 19.7)
No or do not know				
Uses family planning patient forms and has continued supply of stock				
Yes	−4.0	(−11.1, 3.0)		
No				
Provided services in presence of supervisor at site or at primary health center during last supervision				
Yes	0.5	(−5.9, 7.0)		
No				
Received performance evaluation in prior 12 months with direct observation at last evaluation				
Yes	4.0	(−2.9, 10.9)		
No				
Receives 3 benefits from assigned district for work as CHW				
Yes	−0.4	(−10.8, 9.9)		

	Crude		Adjusted[a]	
	β	(95% CI)	β	(95% CI)
No				
Receives ≥ 3 benefits from community for work as CHW				
Yes	13.9	(4.5, 23.2)		
No				
Refers patients to primary health center and always or most of the time receives feedback on referrals				
Yes	0.1	(−6.7, 7.0)		
No				
Opportunities for promotion or progression				
Yes	5.8	(−1.6, 13.2)		
No				
Supervisor checked patient registers and monthly report at last evaluation				
Yes	−1.5	(−8.0, 5.0)		
No				
DMPA knowledge[b]	3.6	(1.5, 5.6)		

[a]
Adjusted for all variables in the column.

[b]
DMPA knowledge score (0–9) based on responses in Table 3.