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CLINICAL ARTICLE

Evidence from cluster surveys on the association between home-based counseling and use of family planning in conflict-affected Darfur

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ABSTRACT

Objective: To examine the association between home counseling and awareness and use of modern family planning (FP) methods among women in internally displaced person (IDP) camps in conflict-affected West Darfur, Sudan. *Methods:* In a community-based cross-sectional study, two questionnaire-based surveys were performed in three camps. Home-based counseling had been introduced in March 2006. An initial survey (February 2007) and a follow-up survey (April 2009) targeted women of child-bearing age. A sample of 640 randomly selected women aged 15–49 years who had experienced pregnancy after joining the camp were interviewed for each survey. *Results:* Overall, modern FP use increased from 10.9% (70/640) in 2007 to 21.6% (138/640) in 2009 ($P < 0.001$). As compared with the initial survey, women in the follow-up survey were more likely to be aware of and to use any modern FP method (adjusted odds ratio [aOR] 5.4, 95% confidence interval [CI] 3.9–7.4; and aOR 2.8, 95% CI 2.0–4.1, respectively). Contraceptive pills were the most common modern method used. Home counseling and loss of a child under 5 years were the most significant predictors of awareness and use of modern FP methods. *Conclusion:* After the introduction of home-based FP counseling for couples and FP services in clinics, women's awareness and use of modern FP methods increased in a conflict-affected setting.

1. Introduction

A high maternal mortality ratio of 1056 deaths per 100 000 live births in the conflict-affected West Darfur region of Sudan has been reported since 2003, when the civil war began [1–3]. This high mortality is accompanied by a high fertility rate, poor prenatal care, and poor perinatal outcomes among married women of reproductive age (15–49 years) in camps of internally displaced persons (IDPs) [4].

In African societies, cultural imperatives encourage women to bear many children to maintain social power and achieve economic advancement. By contrast, a limited number of children is a symbol of disempowerment [5]. Sudan has one of the highest fertility rates in the Eastern Mediterranean region, with a 2010 estimate suggesting 5.9 births per woman [6]. Countries with high total fertility rates are characterized by low contraceptive use and poor socioeconomic status [7]. In Sudan, contraceptive use is uncommon, with only 9% of Sudanese women using any family planning (FP) method [8]. Although FP was introduced in 1965, many constitutional and cultural challenges have hindered service use in Sudan [5]. Nevertheless, a 15% increase in contraceptive use has been correlated with a reduction of one birth per woman in low-resource countries [9].

Priorities of food and security make reproductive health a neglected service in humanitarian relief. Even when reproductive health services are available, they are not accessible because of illiteracy, misinformation, and traditions [10–13]. In Darfur, conservative culture, illiteracy, and limited resources have hindered access to modern FP [14]. Furthermore, the cultural and ethnic diversity of local communities in Darfur limit the effectiveness of mass media communication for health education about FP [15,16].

In January 2005, non-governmental organizations sponsored an emergency reproductive health program through primary healthcare (PHC) units in three IDP camps in West Darfur, Sudan: Krending, Krenik, and Habillah. The program aimed to reduce maternal mortality, prevent unwanted pregnancy, and ensure informed choice about contraceptive use. Reproductive health services were provided on the basis of a "minimum initial service package for sexual and reproductive health in disasters" [11,12]. The package included basic emergency obstetric and newborn care, prenatal care, FP services, and hygiene promotion.

In this intervention, male condoms, oral contraceptive pills, injectable contraceptives, and intrauterine devices were made available in clinics in accordance with service-user choice. The oral contraceptive pills available were combined oral contraceptives (ethinyl estradiol <0.035 mg and levonorgestrel 0.15 mg) and progestogen-only pills (levonorgestrel 0.03 mg or norethisterone 0.35 mg) [17]. The injectable

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contraceptives included depot medroxyprogesterone acetate (Depo-Provera), given as one injection every 3 months [16]. Supportive counseling was provided at clinics by medical professionals during follow-up visits to help women to tolerate any adverse effects, such as changes in menstrual cycle bleeding patterns [17]. Owing to cultural and legal reasons, sterilization or abortion services were not provided.

To mobilize women in the catchment area and create awareness of FP, a complementary community-based approach of home-based FP counseling that targeted couples was adopted in March 2006. Maternal health workers (MHWs) were selected in each camp and given an intense 3-week training course on counseling skills. Home-based FP counseling sessions for couples were organized to clarify the benefits of FP for mothers, children, and the whole family. MHWs tried to overcome the misunderstandings about FP perspectives in Islam, ensure informed choice concerning modern FP [13,18,19], and refer women to obtain FP methods at clinics in the camp. MHWs were equipped with information, education and communication materials, such as flipcharts, posters, pamphlets, and booklets (Supplementary Material S1). In-depth information was provided concerning the advantages and/or disadvantages, and use of each contraceptive method, including pills, injectable, condoms, intrauterine devices, and sterilization. Furthermore, the traditional methods of FP were also highlighted, including abstinence, withdrawal, rhythm (calendar method), and the breastfeeding lactational amenorrhea method.

There is a lack of knowledge concerning FP services in conflict-affected settings, and few studies with an intervention design have been conducted. The aim of the present study was to examine the association between home-based counseling and awareness and use of modern FP.

2. Materials and methods

In the present cross-sectional questionnaire-based study, community-based cluster surveys were conducted among women in the catchment area of three PHC clinics in Krending, Krenik, and Habillah, West Darfur, Sudan. An initial survey was undertaken in February 2007, with a follow-up survey performed in April 2009. Both surveys were conducted after starting the implementation of home-based counseling and provision of contraceptives. The study protocol was reviewed by the institutional review board of the Faculty of Public Health, University of Khartoum, Sudan. Approval was given by the General Directorate of Reproductive Health, Federal Ministry of Health, and Humanitarian Aid Affairs. Respondents were invited to participate in the survey and oral informed consent was obtained before interviews.

The sample size required for each survey to show an effect of 1.6 was 640. Multistage cluster sampling was used within Krending, Krenik, and Habillah to guarantee proper representation of the area. For 20 women to be sampled in each cluster, 32 clusters would be required to achieve the required sample size. With a total number of women of childbearing age in the three camps of 17 796, each cluster would have to contain approximately 556 women. In each camp, IDPs were divided into various small villages on the basis of the timing of their arrival. There were 17 villages in total: six in Krending, five in Krenik, and six in Habillah. The size of the population in each village was taken into account during the identification of the clusters. Overall, there were eight clusters in Krending, 15 in Krenik, and nine in Habillah. In each cluster, 20 households were randomly selected for sampling. One eligible woman of childbearing age (15–49 years), who had experienced pregnancy after joining the camp, was interviewed from each household. If the household included more than one eligible woman, one respondent was randomly selected. If the household did not include an eligible woman or she was absent at the time of interview, the interviewer skipped to the nearest household.

To ensure data accuracy, validate data collection, and satisfy cultural perspectives, only local female interviewers were recruited for the survey. Two independent groups of interviewers were recruited and received training for 5 days before the initial and follow-up surveys.

The questionnaire used in the interviews was adapted from the "Reproductive Health Assessment Toolkit for Conflict-Affected Women" developed by the US Centers for Disease Control and Prevention [20]. In addition to FP, the questionnaire covered a wide range of reproductive health components, but the present study focused on the FP findings. The questionnaire was translated and back-translated from English into Arabic; translations were revised and reviewed by professional translators and the survey team.

On the basis of Sphere guidelines [21], the three main PHC clinics were established in 2005 within accessible walking distance from women' shelters (≤5 kilometers) to provide maternal health care and FP services. MHWs were assigned to organize home-based FP counseling for couples and to refer those who declared their need for FP services to the clinics. A monthly honorarium of US$50 was paid to each MHW.

Data were entered into a Microsoft Excel 2010 (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS version 22 (IBM, Armonk, NY, USA). The Pearson χ^2 test was used to assess differences in demographic and socioeconomic characteristics by receipt of home-counseling across survey phase. Analysis of variance (ANOVA) was used to estimate the correlation of continuous variables between groups.

Logistic regression models were generated to control for potential confounders in multivariate analyses estimating the odds ratio (OR) of awareness and current use of modern FP in the initial and follow-up surveys separately. This model controlled for demographic and socioeconomic characteristics, birth history, and home-based FP counseling.

In the final model, the two datasets of initial and follow-up surveys were combined to identify predictors of knowledge of any traditional or modern FP method in addition to predictors of the current use of any of these methods. This model was adjusted for phase of survey, demographic and socioeconomic characteristics, and birth history. Statistical significance was set at $P < 0.05$.

3. Results

Overall, two independent samples of 640 eligible women participated in the initial and follow-up surveys. A response rate of 100% was achieved in both the initial and follow-up surveys. Table 1 shows the demographic and socioeconomic characteristics, and birth history of the respondents by receipt of home-based FP counseling and phase of survey.

The proportion of women receiving home-based FP counseling showed a significant increase from 7.3% (47/640) to 59.8% (383/640) between the initial and follow-up surveys ($P < 0.001$). In the follow-up survey, significant associations were noted between receipt of home counseling and demographic and socioeconomic characteristics, and birth history variables (all $P < 0.001$) (Table 1). In the initial survey, associations were recorded for only education and current employment (both $P < 0.001$) (Table 1).

Current use of modern types of contraception showed a significant increase between the initial and the follow-up survey (Fig. 1). Overall modern FP use increased 10.7% from 10.9% (70/640) to 21.6% (138/640; $P < 0.001$). Use of contraceptive pills—the most popular FP method—increased 7.3% from 8.0% (51/640) to 15.3% (98/640; $P < 0.001$), whereas injectable methods showed a 3.0% increase from 2.0% (13/640) to 5.0% (32/640; $P = 0.004$). However, no significant association was shown for condoms ($P = 0.591$), although it did increase by 0.4% from 0.9% (6/640) to 1.3% (8/640).

Table 2 shows the demographic and socioeconomic characteristics, and birth history of respondents in the initial and follow-up surveys by knowledge and current use of any modern FP methods. Women aged 20–30 years and 40 years and older were, respectively, 0.3 and 0.2 times less likely to use any modern FP methods in the initial and follow-up surveys as compared with younger women younger than 20 years.

In the initial survey, basic education was significantly associated with awareness and use of any modern FP method (both $P < 0.001$). Similarly, significant associations were found between camp of residence (Krenik or Habillah) and awareness of any modern FP method

Table 1
Characteristics of survey participants by receipt of home counseling on family planning and year of survey.[a]

Characteristic	All women (n = 1280)	Initial survey in 2007 (n = 640)			Follow-up survey in 2009 (n = 640)		
		Received home counseling (n = 47)	Did not receive home counseling (n = 593)	*P* value [b]	Received home counseling (n = 383)	Did not receive home counseling (n = 257)	*P* value [b]
Age, y				0.148			<0.001
<20	238 (18.6)	4 (8.5)	111 (18.7)		70 (18.3)	53 (20.6)	
20–30	455 (35.5)	23 (48.9)	207 (34.9)		105 (27.4)	120 (46.7)	
31–40	502 (39.2)	16 (34.0)	233 (39.3)		174 (45.4)	79 (30.7)	
>40	85 (6.6)	4 (8.5)	42 (7.1)		34 (8.9)	5 (1.9)	
Camp				0.507			<0.001
Krending	320 (25.0)	14 (29.8)	146 (24.6)		74 (19.3)	86 (33.5)	
Krenik	600 (46.9)	23 (48.9)	120 (48.8)		204 (53.3)	96 (37.4)	
Habillah	360 (28.1)	10 (21.3)	61 (24.8)		105 (27.4)	75 (29.2)	
Education level				<0.001			<0.001
Below basic	745 (58.2)	9 (19.1)	358 (60.4)		213 (55.6)	165 (64.2)	
Basic	419 (32.7)	22 (46.8)	196 (33.1)		119 (31.1)	82 (31.9)	
Secondary or higher	116 (9.1)	16 (34.0)	39 (6.6)		51 (13.3)	10 (3.9)	
Currently employed				<0.001			<0.001
Yes	775 (60.5)	38 (80.9)	308 (51.9)		301 (78.6)	128 (49.8)	
No	505 (39.5)	9 (19.1)	285 (48.1)		82 (21.4)	129 (50.2)	
No. of living children				0.538			<0.001
≤3	237 (18.5)	5 (10.6)	100 (16.9)		71 (18.5)	61 (23.7)	
4–6	686 (53.6)	28 (59.6)	325 (54.8)		175 (45.7)	158 (61.5)	
≥7	357 (27.9)	14 (29.8)	168 (28.3)		137 (35.8)	38 (14.8)	
Mean no. of living children	5.28 ± 1.85	5.5 ± 1.7	5.3 ± 1.8	0.663	5.5 ± 2.0	4.8 ± 1.7	<0.001
Loss of child <5 y				0.184			<0.001
≥1	543 (42.4)	16 (34.0)	261 (44.0)		192 (50.1)	74 (28.8)	
0	737 (57.6)	31 (66.0)	332 (56.0)		191 (49.9)	183 (71.2)	

[a] Values are given as number (percentage) unless indicated otherwise.
[b] By χ^2 test for categorical variables and one-way analysis of variance for continuous variables.

($P < 0.001$ for both) and use of any modern FP method ($P = 0.001$ and $P = 0.023$, respectively) in the initial survey. The number of living children was significantly associated only with the use of any modern FP method in the follow-up survey for women with 4–6 and ≥7 children ($P = 0.039$ and $P < 0.001$, respectively). Significant associations were found between the loss of a child under 5 years and awareness ($P = 0.005$ in follow-up survey) and use of any modern FP methods ($P = 0.028$ in initial survey; $P = 0.001$ in follow-up survey), except for awareness of any modern FP method in the initial survey. Receipt of home counseling was significantly associated with awareness ($P = 0.006$ in initial survey; $P < 0.001$ in follow-up survey). Similarly, home counseling was associated with the use of any modern FP methods in the follow-up survey ($P < 0.001$); however, no such association was found between home counseling and use of any modern FP method in the initial survey.

Table 3 shows the knowledge of any traditional or modern type of FP method, and the current use of any of these methods by respondents in the initial and follow-up surveys. Overall, women in the follow-up survey were more likely to be aware of and use any traditional or modern type of FP method as compared with the initial survey. As compared with the initial survey, women in the follow-up survey were 1.5, 5.4, and 5.1 times more likely to be aware of any traditional, modern, or either type of FP method, respectively (all $P < 0.001$); furthermore, they were 0.5 times less likely to use traditional FP methods ($P = 0.034$); and 2.8 and 1.9 times more likely to use any modern or any type of FP method, respectively (both $P < 0.001$).

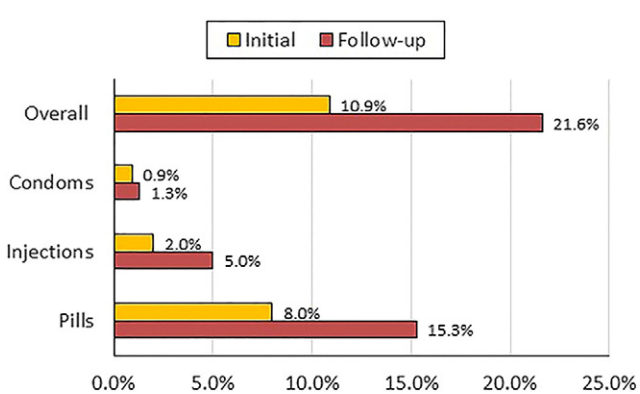

Fig. 1. Current use of modern family planning, by method, in the initial (2007) and follow-up (2009) surveys. There were 640 participants in each survey.

4. Discussion

The intervention of both modern FP provision at health facilities and home-based FP counseling for couples has been shown to be associated with significant increases in the awareness and use of modern FP methods among women in IDP camps in West Darfur. The present study has shown that the overall prevalence of modern FP use among women has almost doubled during 3 years of the project, from 10.9% in the initial survey to 21.6% in the follow-up survey. According to the West Darfur Ministry of Health, modern FP methods were not provided in the villages of origins of IDPs before the crisis (oral communication, Abdul-Salam Mustafa, June 2004). Additionally, a large cross-sectional survey conducted in six conflict-affected areas in Sudan, northern Uganda, and the Democratic Republic of Congo [10] showed that only 12% used modern contraceptive methods, and that knowledge of modern contraceptives in West Darfur was low in 2007. However, the vast majority of female IDPs previously used traditional FP (mainly lactational amenorrhea). Therefore, the intervention was most probably behind the recorded improvement between the initial and follow-up surveys.

Among the methods of modern FP provided, use of contraceptive pills doubled, becoming the most common method, followed by injectable contraceptives and condoms. These findings are consistent with the Sudan Household and Health Survey in 2010 [8] and the results of baseline surveys for the RAISE initiative [10]. They demonstrate that women in conflict settings accept and use modern FP methods when available for free at PHC clinics and when introduced to couples through a home counseling approach. Although contraception use increased significantly in the study area, it was still much lower than the original target of universal access. This might be partly attributed to an intention to

Table 2
Characteristics of survey participants by awareness and current use of modern FP methods.[a]

Characteristic	Awareness of modern FP methods[b]				Current use of modern FP method[b]			
	Initial survey (n = 640)		Follow-up survey (n = 640)		Initial survey (n = 640)		Follow-up survey (n = 640)	
	n/N (%)	aOR (95% CI)	n/N (%)	aOR (95% CI)	n/N (%)	aOR (95% CI)	n/N (%)	aOR (95% CI)
Age, y								
<20	82/115 (71.3)	1.0	108/123 (87.8)	1.0	5/115 (4.3)	1.0	10/123 (8.1)	1.0
20–30	126/230 (54.8)	0.5 (0.2–1.1)	187/225 (83.1)	1.5 (0.4–5.3)	14/230 (6.1)	0.3 (0.1–1.0)[c]	20/225 (8.9)	0.3 (0.2–1.5)
31–40	142/249 (57.0)	0.7 (0.3–1.7)	215/253 (85.0)	1.7 (0.4–7.0)	41/249 (16.5)	0.6 (0.2–1.9)	93/253 (36.8)	0.6 (0.1–2.7)
>40	35/46 (76.1)	2.5 (0.7–8.8)	34/39 (87.2)	2.7 (0.4–16.4)	10/46 (21.7)	0.5 (0.1–2.4)	15/39 (38.5)	0.2 (0.0–0.9)[d]
Education level								
Informal/none	134/367 (36.5)	1.0	299/378 (79.1)	1.0	20/397 (5.4)	1.0	73/378 (19.3)	1.00
Basic	196/218 (89.9)	21.8 (12.1–39.2)[e]	184/201 (91.5)	2.6 (1.4–4.8)[d]	32/218 (14.7)	4.6 (2.2–9.5)[e]	44/201 (21.9)	1.7 (1.0–3.1)
Secondary or higher	55/55 (100.0)	2113450532.9 (0.0–NA)	61/61 (100.0)	155915344.53 (0.0–NA)	18/55 (32.7)	10.4 (4.0–27.0)[e]	21/61 (34.4)	1.7 (0.8–3.7)
Currently employed								
Yes	257/346 (74.3)	1.2 (0.7–1.8)	397/429 (92.5)	3.1 (1.8–5.3)[e]	55/346 (15.9)	1.3 (0.6–2.6)	109/429 (25.4)	0.8 (0.4–1.6)
No	128/294 (43.5)	1.0	147/211 (69.7)	1.0	15/249 (5.1)	1.0	29/211 (13.7)	1.0
Camp								
Krending	63/160 (39.4)	1.0	113/160 (70.6)	1.0	6/160 (3.8)	1.0	24/160 (15.0)	1.0
Krenik	194/300 (64.7)	3.9 (2.2–6.9)[e]	276/300 (92.0)	3.3 (1.8–6.1)[e]	44/300 (14.7)	5.0 (1.9–13.1)[d]	82/300 (27.3)	2.0 (1.0–4.1)
Habillah	128/180 (71.1)	6.8 (3.6–13.1)[e]	155/180 (86.1)	3.0 (1.6–5.9)[d]	20/180 (11.1)	3.4 (1.2–9.6)[c]	32/180 (17.8)	0.93 (0.4–2.1)
No. living children								
≤3	69/105 (65.7)	1.0	115/132 (87.1)	1.0	0/105 (0.0)	1.0	7/132 (5.3)	1.0
4–6	202/353 (57.2)	1.7 (0.7–4.3)	282/333 (84.7)	0.9 (0.3–3.2)	27/353 (7.6)	347909715.2 (0.0–NA)	41/333 (12.3)	5.6 (1.1–28.9)[c]
≥7	114/182 (62.6)	1.7 (0.6–5.0)	147/175 (84.0)	0.5 (0.1–2.3)	43/182 (23.6)	1973112288.9 (0.00–NA)	90/175 (51.4)	27.0 (4.6–159.3)[e]
Loss of child <5 y								
Yes	168/277 (60.6)	0.9 (0.6–1.5)	218/266 (82.0)	0.39 (0.2–0.8)[d]	34/277 (12.3)	0.5 (0.3–0.9)[c]	108/266 (40.6)	3.4 (1.9-6.1)[d]
No	217/363 (59.8)	1.0	326/374 (87.2)	1.0	36/363 (9.9)	1.0	30/374 (8.0)	1.0
Received home counseling								
Yes	45/47 (95.7)	10.5 (2.0–55.4)[d]	361/383 (94.3)	6.56 (3.6–12.0)[e]	11/47 (23.4)	1.6 (0.7–3.9)	136/383 (35.5)	63.3 (14.9–270.4)[e]
No	340/593 (57.3)	1.0	183/257 (71.2)	1.0	59/593 (9.9)	1.0	2/257 (0.8)	1.0

Abbreviations: FP, family planning; aOR, adjusted odds ratio; CI, confidence interval; NA, not available.
[a] The model controlled for age, education, employment, camp of residence, number of living children, loss of child under 5 years, and receipt of home counseling on FP.
[b] Modern FP included pills, injections, and condoms.
[c] $P < 0.05$.
[d] $P < 0.01$.
[e] $P < 0.001$.

bear more children, fear of adverse effects, and husbands' objections [22]. The national figures on FP in Sudan document a low rate of contraceptive use of 9%, and a low unmet need for contraception of 29% [8], indicating poor knowledge and high levels of unawareness regarding FP among women.

Awareness of any type of modern FP method increased from nearly two-thirds in the initial survey to more than four-fifths in the follow-up survey. The finding of the initial survey is consistent with another study on the awareness of FP in conflict-affected African countries [10]. The present intervention—which was the only one implemented in the area and guided by theoretic perspectives on cognition, attitude, and behavior [13,19]—was probably behind this marked change in FP awareness.

In the follow-up survey, home-based FP counseling was positively associated with awareness and use of modern FP methods. In this regard, the findings concur with the FALAH (Family Advancement for Life and Health) project in Pakistan [19] and an FP project in conflict-affected northern Uganda [13]. The approach of direct communication through home-based FP counseling in a private environment

Table 3
Likelihood of knowledge and current use of traditional and modern types of FP.[a]

Knowledge and use of FP methods	Initial survey (n = 640)	Follow-up survey (n = 640)	OR (95% CI)	aOR (95% CI)[b]
Knowledge				
Aware of any traditional FP method[c]	248 (38.8)	319 (49.8)	1.6 (1.3–2.0)[d]	1.5 (1.2–1.9)[d]
Aware of any modern FP method[e]	385 (60.2)	544 (85.0)	3.8 (2.9–4.9)[d]	5.4 (3.9–7.4)[d]
Aware of any FP method[f]	481 (75.2)	593 (92.7)	4.2 (3.0–5.9)[d]	5.1 (3.5–7.5)[d]
Current use				
Use of any traditional FP method[c]	32 (5.0)	16 (2.5)	0.5 (0.3–0.9)[g]	0.5 (0.3–1.0)[g]
Use of any modern FP method[e]	70 (10.9)	138 (21.6)	2.2 (1.6–3.1)[d]	2.8 (2.0–4.1)[d]
Use of any FP method[f]	102 (15.9)	154 (24.1)	1.7 (1.3–2.2)[d]	1.9 (1.4–2.6)[d]

Abbreviations: FP, family planning; OR, odds ratio; CI, confidence interval; aOR, adjusted odds ratio.
[a] Values are given as number (percentage) unless indicated otherwise.
[b] Adjusted for phase of survey, age, education, camp, employment, number of living children, and loss of child under 5 y.
[c] Included lactational amenorrhea method, abstinence, and withdrawal.
[d] $P < 0.001$.
[e] Included pills, injections, and condoms.
[f] Included any type of traditional or modern method.
[g] $P < 0.05$.

encouraged women to speak frankly about their unmet needs. The attendance of husbands at counseling sessions assisted women in the decision-making process and ensured informed choice about contraceptives. The discussion between MHWs and women highlighted the health and socioeconomic benefits of FP, and resolved misinformation about the adverse effects of contraceptives. The experience of the MHWs might be compared with that of healthcare workers who have mobilized communities to use FP in resource-poor settings in Bangladesh [18], Afghanistan [23], and Tanzania [24].

Basic education was a very important predictor of awareness and use of modern FP methods in both the initial and follow-up surveys. These findings are consistent with other studies showing a positive association between education and awareness and use of FP methods [14,25].

Despite rigorous procedures to apply the same equal standards in the package of FP services across all sites of operations, the camp of residence was a very important predictor of awareness and use of modern FP. This might be explained by the disparities in socioeconomic characteristics of IDPs who fled from different sites of origin. However, the use of modern FP methods was not statistically different among camps in the follow-up survey, which demonstrates the success of the program in bringing all of the intervention areas to the same level of outcome.

Women who had experienced the loss of a child younger than 5 years were less likely to be aware of modern FP methods, but they were more likely to use modern FP methods in the follow-up survey after they had received the FP intervention. Experiencing child loss could be a very important factor encouraging women to use modern FP methods. Not surprisingly, multiparous women were more likely to use modern FP methods in the follow-up survey. This finding is inconsistent with another study in North Darfur [14], which reported no association between parity and FP use; however, women in that area were found to desire more children and to obtain FP methods for spacing rather than limiting reasons.

The present intervention study in Darfur, Sudan, has examined the effectiveness of an FP project among IDPs. The trained interviewers, who were familiar with the respondents' traditions and local dialects, facilitated the data collection and achieved a high response rate. The design of initial and follow-up cluster surveys cannot establish a causal inference between the intervention of the FP project and the measured outcomes. Nevertheless, logistic regression models were generated to control for potential confounders related to characteristics of respondents or sites of intervention. Owing to practical and ethical determinants of security, logistics, population movement, and the right of women to obtain FP services, it was not possible to establish a randomized control trial.

The results of the study might be generalized to other conflict-affected settings; as a result, non-governmental organizations should be encouraged to generate evidence-based interventions to address poor awareness and low prevalence of FP in humanitarian settings.

In conclusion, the present study suggests that, when FP counseling is introduced to couples in a private home environment, and when FP services are made available at clinics in conflict-affected settings, women will have a positive awareness of modern FP methods and will choose to use them. The complementary approach of community-based provision of FP services can make FP acceptable among conservative communities and increase the awareness and use of contraceptives over time.

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Conflict of interest

The author has no conflicts of interest.

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