


CLINICAL ARTICLE

Gynecology

Sustained impact of community-based interventions on contraceptive use among married adolescent girls in rural Niger: Results from a cluster randomized controlled trial

Blake Erhardt-Ohren¹  | Mohamad Brooks¹ | Sani Aliou² | Akim Assani Ossen² |
 Alhassane Oumarou² | Sneha Challa³ | Shweta Tomar³ | Nicole Johns³ | Jay Silverman³

¹Pathfinder International, Watertown, Massachusetts, USA

²Pathfinder International, Niamey, Niger

³University of California, San Diego, California, USA

Correspondence

Blake Erhardt-Ohren, 3900 Adeline Street, #230, Emeryville, CA 94608, USA.
 Email: blakeerhardt@gmail.com

Funding information

Bill and Melinda Gates Foundation

Abstract

Objective: To evaluate the sustained impact of community-based family planning (FP) interventions on current modern contraceptive and long-acting reversible contraceptive (LARC) use among married adolescent girls in rural Niger.

Methods: We used a cluster randomized controlled trial design following married adolescent girls and their husbands over 3 years. Villages were randomized to one of four arms: household visits, small group discussions, combined intervention, or control. For 1.5 years, couples were exposed to one intervention activity per month and 1.5 years after implementation ended, we used a multi-level mixed effects logistic regression model to evaluate changes in key FP outcomes.

Results: We analyzed survey data from 404 married adolescent girls with data at baseline and endline. Small group discussions (+35.6%; adjusted odds ratio [aOR] 7.94, $P < 0.001$) and the combined intervention (+17.9%; aOR 4.53, $P = 0.005$) led to statistically significant increases in the odds of using modern contraceptives at endline compared with the control. The combined intervention (+14.2%; aOR 7.98, $P < 0.001$) and home visits (+12.6%; aOR 8.09, $P < 0.001$) led to statistically significant increases in odds of using LARC methods at endline compared with the control. Increase in LARC use was driven by implant use across all intervention groups.

Conclusion: This study contributes to the empirical evidence base on the sustained impact of community-based interventions on increases in FP use among married adolescent girls in low- and middle-income countries.

KEYWORDS

adolescent, community-based, contraception, family planning, Niger, randomized controlled trial

1 | INTRODUCTION

Early marriage and sexual debut, coupled with the lack of modern contraceptive use, puts adolescent girls at increased risk of unintended pregnancy. In 2019, approximately 218 million women

of reproductive age in low- and middle-income countries had an unmet need for modern contraception, many of them living in rural and hard-to-reach areas.¹ A recent Guttmacher Institute report estimated that in West Africa, 42% of pregnancies among girls aged 15–19 years are unintended, of which 59% end in abortion, mostly

performed in unsafe conditions.¹ The same report estimated that 30% of adolescent mothers between 15 and 19 years with a live birth require care for major complications; 32% of their newborns also require care.¹ To improve adolescent health, adolescents need the knowledge, skills, and access to be able to freely choose whether and which contraceptive methods to use to delay, space, and prevent pregnancy.

Niger is a low-income country located in west Africa. In 2017, a nationally representative survey in Niger estimated that by age 18 years, 70.9% of girls of the Niger were married, 72.9% had already experienced their sexual debut, only 9.6% had ever used contraception, and 33.0% had had their first birth.² Consequently, the adolescent fertility rate (births per 1000 women aged 15–19 years) in Niger was 180.5 in 2019, the highest adolescent fertility rate in the world, compared with a global adolescent fertility rate of 41.6.³

A nationally representative 2018 Service Availability and Readiness Assessment⁴ in Niger found that only 37% of health facilities had all the elements required to be considered ready to provide family planning (FP) services: FP guidelines, checklists, or other FP provision job aids, at least one health worker trained in FP service provision, a working blood pressure monitor, and unexpired, usable stock of combined oral contraceptives, injectable contraceptives, and male condoms.⁵ Community-based FP interventions bring information, counseling, and service provision to men and women where they live. These services are especially important where health facilities are not well-equipped to provide FP services, as is the case in Niger.

There is a paucity of evidence to support the use of community-based FP interventions to increase modern contraceptive use and continuation, especially among married adolescent girls. Research that does exist is inconclusive: a study in rural Malawi found that participation in women's groups did not significantly increase contraceptive use among women of reproductive age compared with those that did not participate in groups,⁶ and a study in Mozambique found that FP use did not significantly increase among participants (aged 10–72 years, both sexes) after exposure to a media campaign, maternal and child health-themed plays, and interactions with community health volunteers.⁷ A few studies have shown a positive association between community-based FP interventions and contraceptive use, but only one looked at our population of interest: married adolescent girls.^{8–15} A study in Nigeria investigated the relationship between community-based FP interventions and contraceptive uptake among married parous adolescents; that study found that current modern contraceptive use increased within a group of adolescents exposed to peer groups, small group sessions, and community health worker home visits.¹⁶ Furthermore, no studies to date have evaluated the sustained effects of different community-based intervention strategies on modern contraceptive use after the end of intervention activities.

Pathfinder International's IMPACT I/II project sought to improve both community- and facility-based provision of FP and the Reaching Married Adolescents (RMA) study described in this manuscript intended to generate evidence on which types of community-based

FP interventions increased and sustained modern contraceptive use among married adolescent girls in rural Niger.

2 | MATERIALS AND METHODS

2.1 | Project description

The RMA project was implemented by Pathfinder International in partnership with the University of California: San Diego, between November 2015 and December 2020. The study had two primary aims: to increase the modern contraceptive prevalence rate among married adolescent girls and to generate evidence around the effectiveness of adolescent health interventions in Niger. The RMA intervention approaches sought to engage married adolescent girls and their husbands through home visits and separate male and female small group discussions, and to create a supportive environment using community dialogue sessions. The study theory of change hypothesized that through education about FP and the promotion of gender equity, married adolescent girls would have the knowledge, skills, and access to freely choose whether and which contraceptive methods to use to delay, space, and prevent pregnancy. This education and change in gender norms would allow community health workers to increase demand for FP methods and married adolescent girls would increase their uptake of modern contraceptive methods.

2.2 | Study design

Details on the study design, randomization, and recruitment process can be found in the published study protocol.¹⁷ In summary, the study used a four-arm cluster randomized control design. Within three districts of the Dosso Region, eligible villages were assigned to intervention (12 villages per district) or control (four villages per district). Twenty-five couples in each village were identified from a list provided by local leaders and randomly selected for inclusion in the study. Adolescent girls were eligible for the study if they were 13–19 years old, married, fluent in the local languages of Hausa or Zarma, did not have a permanent contraceptive method, did not plan to move in the next 18 months or leave their village for more than 6 months within the next 18 months, and could provide informed consent. From January 2017 to June 2018, the couples were exposed to one intervention activity per month. Control groups did not have exposure to any intervention.

2.3 | Intervention

2.3.1 | Home visits

Community health volunteers, called *relais*, were recruited from participating villages based on the following criteria: age between 20 and 30 years, married status, support for contraception and

adolescent sexual and reproductive health (SRH), and ability to work on a team. Before the study began, the relais received a 1-week training that covered SRH topics, contraceptive methods, the healthy timing and spacing of pregnancies (HTSP), gender equity, the provision of quality FP counseling, youth and adolescent rights, and reporting procedures. Female relais met with the married adolescent girls and male relais met separately with the married adolescent girls' husbands. These visits relied on confidential discussions about SRH, which were supplemented by illustrated job aids.

2.3.2 | Small group discussions

Mentors were recruited from participating villages to facilitate small group discussions based on their literacy level, ability to lead discussions, and the recommendation of peers. These mentors received a 5-day training before the study began focused on SRH, contraceptive methods, gender equity, HTSP, and how to lead and facilitate group discussions. The small group discussions intervention group participated in gender-separated sessions at health facilities with between 10 and 13 participants. In the adolescent girls' groups, discussions addressed health and life skills, including puberty, contraception, and gender-based violence. Mentors also spoke to the adolescent girls about their hopes, dreams, and challenges. Husband groups' discussions encouraged more equitable gender norms, support for contraceptive use to promote HTSP, positive health-seeking behavior, and increased couple communication.

2.3.3 | Combined intervention

The combined intervention villages component integrated home visits and small group discussions.

2.3.4 | Supplementary component: Community dialogue sessions

Community dialogue sessions supplemented the main intervention approaches. The community dialogues were intended to complement each of the three intervention arms of the study. Community facilitators (FACOMs), both men and women, were recruited by a local non-governmental organization partner and through the recommendation of local community and political leaders, to lead community dialogues. Before implementation began, FACOMs received a 5-day long training focusing on dialogue facilitation skills, SRH, contraceptive methods, HTSP, and gender equity. FACOMs facilitated dialogues at the village mosque or village center. All community members were invited to join, including traditional, religious, and community leaders, parents, in-laws, and co-wives. The sessions aimed to help

create an enabling environment that supported HTSP and FP use among adolescents.

2.4 | Data collection

Longitudinal survey instruments were developed separately for married adolescent girls and their husbands at three points throughout the study. The surveys were drafted in English, translated to French, and then back translated to English to check validity. Longitudinal data were collected for each married adolescent girl and husband at baseline (April–June 2016), midline (April–July 2018), and endline (October–December 2019). Research assistants made up to three attempts to collect data from participants at each time point.

2.5 | Statistical analysis

This study analyzed data specifically for adolescent married girls collected at baseline and endline. Among the intervention arm, we analyzed data within a cohort of individuals that did not receive any RMA interventions from midline to endline, approximately 1.5 years post-intervention. Data were analyzed using STATA software (StataCorp. 2021, Stata Statistical Software: Release 17; StataCorp LLC, College Station, TX, USA). Participants that did not have complete data for the variables of interest at baseline and endline were removed from the final sample. As a result of the longer time period between baseline and endline, married adolescent girls who were pregnant at baseline were included in the analysis. We created a multi-level mixed effects logistic regression model to evaluate current use of any modern contraceptive method at baseline and endline 1.5 years after the villages included in this analysis ended implementation, to look at sustained effects. Additional information about the model-building process is available in the published study protocol by Challa et al.¹⁷ A priori, variables were chosen based on theoretical associations between those variables and the outcome of interest. We controlled for sociodemographic variables collected at baseline for the married adolescent girls: age (very young: 13–14 years, younger adolescent: 15–17 years, older adolescent: 18–19 years), education (government school, Koranic [religious] school only, none), parity (0, 1, 2+), tribe (Hausa, Zarma, Fula, Arab), and work in the last 12 months. We also controlled for the husband's demographic characteristics at baseline: age (<25 years, 25+ years), education (government school, Koranic school only, none), and number of wives (one, two). At the couple level, we controlled for family wealth using the standard household asset list from the Niger 2012 Demographic and Health Survey¹⁸ (less than median compared with the RMA sample, median or above compared with the RMA sample) and food insecurity in the past month. Data were analyzed with village-level and couple-level clustering accounted for via nested random intercept specifications. For interpretability,

we also conducted the same unadjusted multi-level mixed effects regressions using linear rather than logistic specifications to present absolute percentage change differences in outcomes between treatment groups and control. All results are presented with the crude odds ratio, adjusted odds ratios (aOR), 95% confidence intervals (CI) and *P* values.

Married adolescent girls were currently using a modern contraceptive method if they reported current use of an intrauterine device (IUD), implant, injectable, lactational amenorrhea method, oral contraceptives, or male or female condoms at the time of survey administration. Married adolescent girls were considered to be currently using a long-acting reversible contraceptive (LARC) method if they reported current use of an IUD or implant at the time of survey administration. All participants were analyzed within the group they were assigned at baseline.

2.6 | Ethical considerations

The study protocol was approved by the Institutional Review Boards at the University of California, San Diego and the Ministry of Health of Niger. All participants were required to provide verbal consent to be enrolled in the study.

3 | RESULTS

3.1 | Characteristics of study participants at baseline

A total of 404 married adolescent girls were included in our study. In general, characteristics within our sample were similar across study groups (see Table 1). Most married adolescent girl participants were older adolescents, aged 18–19 years (53%, *n*=216), and very few were aged 13–14 years (4%, *n*=15). Most had government schooling (48%, *n*=192), though one-third (33%, *n*=135) had no schooling. Forty percent (*n*=163) of the married adolescent girls in our sample were nulliparous and 25% (*n*=102) had two or more births. Fifty-one percent (*n*=208) of husbands were 25 years or older and 50% (*n*=200) had no education. Sixty-eight percent (*n*=276) of the couples in our study sample were at or above the median household asset score and only 23% (*n*=91) had experienced food insecurity in the past month. Married adolescent girls in the home visits group were more likely to have worked in the last 12 months than individuals in other groups. The number of individuals belonging to Hausa, Zarma, and Fula tribes differed significantly in each group because of village-level sampling, but we did not anticipate tribal affiliation to predict contraceptive use.

3.2 | Current modern contraceptive use

Participation in the small group discussion and combined intervention groups led to statistically significantly higher odds of

current use of any modern contraceptive method at endline compared with the control group (see Table 2). Married adolescent girls residing in villages randomized to receive only small group discussions had a 35.6% (95% CI 22.2%–49.1%, *P* = 0.060) additional modern contraceptive increase at endline compared with the control with an aOR of 7.94 (95% CI 2.96–21.29, *P* < 0.001). Participants randomized to the combined intervention had a 17.9% (95% CI 5.3%–30.5%, *P* < 0.001) additional modern contraceptive increase at endline compared with the control with an aOR of 4.53 (95% CI 1.60–12.87, *P* = 0.005). Married adolescent girls residing in villages randomized to receive only home visits had an 11.5% (95% CI –0.4% to 23.4%, *P* = 0.005) additional modern contraceptive increase at endline compared with the control with an aOR of 4.11 (95% CI 1.42–11.88, *P* = 0.009). All results were statistically significant at *P* < 0.05.

3.3 | Current LARC use

Participation in any intervention group also led to an increase in current use of any LARC method at endline compared with the control group; results for home visit and combined intervention approaches were statistically significant at *P* < 0.05 (see Table 3). Participants randomized to the combined intervention had a 14.2% (95% CI 4.5%–23.8%, *P* = 0.004) additional LARC use at endline compared with the control with an aOR of 7.98 (95% CI 2.92–21.84, *P* < 0.001). Married adolescent girls randomized to home visits had a 12.6% (95% CI 3.5%–21.8%, *P* = 0.007) additional LARC use at endline compared with the control with an aOR of 8.09 (95% CI 2.87–22.77, *P* < 0.001). Married adolescent girls randomized to small group discussions had a 7.1% (95% CI –3.2% to 17.4%, *P* = 0.179) additional LARC use at endline compared with the control with an aOR of 1.35 (95% CI 0.49–3.74, *P* = 0.565). All LARC users at baseline and endline reported use of implants, with no users reporting IUD use.

4 | DISCUSSION

Each of the three intervention approaches in this project—home visits, small group discussions, and the combined intervention—led to statistically significantly higher odds of using modern contraception at endline compared with the control group. These findings align with the only other published study that looked at the association between community-based FP programs and contraceptive use among married youths in low- and middle-income countries published in the last 10 years.¹⁶ Other studies focusing on women of reproductive age found a positive association between exposure to community-based FP interventions and modern contraceptive use.^{8–15} Another study using the same data source, showed that after 1.5 years of implementing the RMA intervention, married adolescent girls had significantly higher likelihood of modern contraceptive use at follow-up relative to control in those villages receiving

TABLE 1 Demographic characteristics of study participants at baseline.^a

Characteristics	Total (n = 404)	Control (n = 158; 39%)	Home visits (n = 93; 23%)	Small group discussion (n = 72; 18%)	Combined intervention (n = 81; 20%)
Wife					
Age					
13–14 years	15 (4%)	8 (5%)	4 (4%)	2 (3%)	1 (1%)
15–17 years	173 (43%)	55 (35%)	42 (45%)	34 (47%)	42 (52%)
18–19 years	216 (53%)	95 (60%)	47 (51%)	36 (50%)	38 (47%)
Education level					
None	135 (33%)	47 (30%)	29 (31%)	29 (40%)	30 (37%)
Koranic only	77 (19%)	34 (22%)	4 (4%)	21 (29%)	18 (22%)
Government school	192 (48%)	77 (49%)	60 (65%)	22 (31%)	33 (41%)
Parity					
0	163 (40%)	60 (38%)	40 (43%)	31 (43%)	32 (40%)
1	139 (34%)	56 (35%)	27 (29%)	28 (39%)	28 (35%)
2+	102 (25%)	42 (27%)	26 (28%)	13 (18%)	21 (26%)
Tribe					
Hausa	111 (27%)	40 (25%)	0 (0%)	71 (98%)	0 (0%)
Zarma	290 (72%)	118 (75%)	93 (100%)	0 (0%)	79 (99%)
Fula	3 (1%)	0 (0%)	0 (0%)	1 (2%)	2 (1%)
Worked in last 12 months					
Yes	183 (45%)	58 (37%)	71 (76%)	21 (29%)	33 (41%)
No	221 (55%)	100 (63%)	22 (24%)	51 (71%)	48 (59%)
Husband					
Age					
<25 years	196 (49%)	75 (47%)	49 (53%)	32 (44%)	40 (50%)
25+ years	208 (51%)	83 (53%)	44 (47%)	40 (56%)	41 (50%)
Number of wives					
1	354 (89%)	141 (89%)	76 (82%)	64 (89%)	73 (90%)
2	50 (11%)	17 (11%)	17 (18%)	8 (11%)	8 (10%)
Education level					
None	200 (50%)	72 (46%)	47 (51%)	43 (60%)	38 (47%)
Koranic only	88 (22%)	34 (22%)	15 (16%)	19 (26%)	20 (25%)
Government school	116 (29%)	52 (33%)	31 (33%)	10 (14%)	23 (28%)
Household					
Assets					
Less than median household asset score	128 (32%)	43 (27%)	39 (42%)	22 (31%)	24 (30%)
Median or above household asset score	276 (68%)	115 (73%)	54 (58%)	50 (69%)	57 (70%)
Food insecure					
Yes	91 (23%)	41 (26%)	17 (18%)	12 (17%)	21 (26%)
No	313 (77%)	117 (74%)	76 (82%)	60 (83%)	60 (74%)

^aData are presented as number (percentage).

only household visits and those receiving the combined intervention (manuscript currently under review). The endline data in this study were collected 1.5 years after completion of the RMA intervention.

Our study design therefore advances this past research by looking at sustained effects of community-based FP interventions and changes in modern contraceptive method mix in the longer term.

TABLE 2 Effect of the intervention on any modern contraceptive use at endline.

Arm	Additional increase in any modern FP use (95% CI)	Crude OR	Adjusted OR (95% CI)	P value for adjusted OR
Home visits	11.5% (-0.4%–23.4%)	4.08 ^a	4.11 (1.42–11.88) ^a	0.009 ^a
Small group discussion	35.6% (22.2%–49.1%) ^a	6.66 ^a	7.94 (2.96–21.29) ^a	<0.001 ^a
Combined intervention	17.9% (5.3%–30.5%) ^a	4.09 ^a	4.53 (1.60–12.87) ^a	0.005 ^a

Abbreviations: CI, confidence interval; FP, family planning; OR, odds ratio.

^aResult is statistically significant at $P < 0.05$.

TABLE 3 Effect of the intervention on long-acting reversible contraceptive use at endline.

Arm	Additional increase in any LARC use (95% CI)	Crude OR	Adjusted OR (95% CI)	P value for adjusted OR
Home visits	12.6% (3.5%–21.8%) ^a	5.27 ^a	8.09 (2.87–22.77) ^a	<0.001
Small group discussion	7.1% (-3.2 to 17.4%) ^a	2.4 ^a	1.35 (0.49–3.74)	0.565
Combined intervention	14.2% (4.5%–23.8%) ^a	5.98 ^a	7.98 (2.92–21.84) ^a	<0.001

Abbreviations: CI, confidence interval; LARC, long-acting reversible contraceptive; OR, odds ratio.

^aResult is statistically significant at $P < 0.05$.

The home visit and combined intervention approaches had a statistically significant positive association with current LARC use at endline compared with the control. These results complement the only other study we found published in the last 10 years that looked at LARC method uptake as the result of community-based FP interventions. A study in Malawi found that community mobilization and demand generation at two facilities increased LARC use compared with two control facilities; although both IUD and implant use increased, there was a greater increase in implant use at both intervention facilities.⁸ A review of national health survey data in 12 LMIC African countries found that implant use has quickly established itself in the contraceptive method mix wherever they are available as an option; however, of the countries included, Niger had the lowest proportion of implant use among married women.¹⁹ This study found that IUD use has quadrupled in Niger in recent years, but still remained only 1.1% of the contraceptive method mix at the last Demographic and Health Survey in 2013.¹⁹ Job aids used by relais, FACOM, and mentors emphasized both LARC methods, but no users in the study reported current use of IUDs at baseline or endline. All intervention groups did, however, report increased use of implants at endline. We believe that the lack of IUD use in the study population may be due to insufficiently trained healthcare providers, who are unable to insert and remove IUDs. More research is needed to investigate contraceptive method mix among married adolescent girls and the factors that influence their decision making in choosing a contraceptive method.

After 1.5 years of follow up post-intervention, married adolescent girls participating in small group discussion showed the greatest increase for any modern contraceptive method (+35.6%) and the combined intervention approach resulted in the greatest increase for LARC methods (+14.2%) compared with the control group. We hypothesize that this finding in both arms where small groups

discussions were implemented may be due to the stronger emphasis on social, gender, and power norm changes that took place in these groups. Small group discussions emphasized equitable gender norms, support for contraceptive use, and increased couple communication. Power imbalances between genders, perpetuated by gender norms that dictate appropriate behavior for men and women, can affect women's reproductive decision making and intended fertility desires. Interventions that address these underlying factors associated with social and gender norms may result in more effective gains in FP use in the longer term.^{20,21} These findings are consistent with the evidence base that suggests changes in social norms lead to more durable, long-lasting changes in behavior than short-term changes in knowledge.^{22–24}

This study benefited from many strengths, and in particular, the rigorous study design. Using a cluster randomized controlled trial, in conjunction with longitudinal cohort design, allows one to decrease selection bias and spillover effects, minimize confounding, and establish causality to determine the impact of the community-based FP intervention. Moreover, the length of follow up in this study, 1.5 years post-intervention, is unique and offers insight into the longer-term effects and sustainability of community-based FP interventions.

There are also important limitations to this study. Married adolescent girls' surveys touched upon reproductive health and contraception, topics that may be considered taboo or inappropriate, and respondents may have censored their responses because of conscious or subconscious social desirability bias. Randomization by village caused differences in the number of individuals belonging to Hausa, Zarma, and Fula tribes in each study arm, which may have biased results if tribal affiliation is at all linked to social norms concerning contraceptive use. We lost several study participants to follow up. This may affect our results if certain demographic characteristics made some individuals more likely to remain in the study

than others. Another limitation is the generalizability of this study. The results may be limited to the rural districts of Niger where the study was conducted, but it is possible that they may be generalizable to similar cultures and geographies.

The present study provides insight into contraceptive use within this specific population: married adolescent girls. We look forward to future research that explores what makes certain community-based interventions more impactful than others within this population.

In conclusion, the present study contributes to a scarce amount of literature documenting the impact of community-based interventions on modern contraceptive use, LARC use, and method mix among adolescent married girls. In this study, community-based FP interventions led to increased current use of modern contraceptive methods and LARC among married adolescent girls. Results from this study suggest that intervention modalities that are tailored to individual needs and target changes in social norms may lead to more longer-term and sustained changes in FP outcomes. Though the content of this study was context-specific, we believe that the intervention may be adapted to other contexts where marriage and sexual debut take place at an early age and modern contraceptive use is low among married adolescents.

AUTHOR CONTRIBUTIONS

MB, SA, AAO, AO, SC, NJ, and JS all designed, planned, and conducted this research project. BEO led data analysis for this manuscript, with assistance from ST. BEO led manuscript writing, with assistance from MB, and review from all other co-authors.

ACKNOWLEDGMENTS

The Bill and Melinda Gates Foundation provided funding for this research.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ORCID

Blake Erhardt-Ohren  <https://orcid.org/0000-0002-0345-5516>

REFERENCES

- Sully EA, Biddlecom, A, Darroch JE, et al. Adding It Up: Investing in sexual and reproductive health 2019. Guttmacher Institute. 2020. doi: 10.1363/2020.31593
- PMA2020/Niger: Family planning brief. July 13, 2018. Accessed June 10, 2021. https://www.pmadata.org/sites/default/files/data_product_results/PMA2020-Niger-National-R2-FP-Brief-EN.pdf
- Adolescent fertility rate (births per 1,000 women ages 15–19). The World Bank. Accessed June 10, 2021. <https://data.worldbank.org/indicator/SP.ADO.TFRT>
- Service availability and readiness assessment. World Health Organization. Accessed June 10, 2021. https://www.who.int/healthinfo/systems/sara_methods/en/
- Report of the results of the Service Availability and Readiness Assessment (SARA), the quality of data in SNIS (DQR), and the quality of care for malaria, tuberculosis, and HIV (QOC). Republic of Niger. Accessed December 28, 2021.
- Zamawe CO, Mandiwa C. Understanding the mechanisms through which women's group community participatory intervention improved maternal health outcomes in rural Malawi: was the use of contraceptives the pathway? *Glob Health Action*. 2016;9(1):30496. doi:10.3402/gha.v9.30496
- Pires PH, Siemens R, Mupueleque M. Improving sexual and reproductive health knowledge and practice in Mozambican families with media campaign and volunteer family health champions. *Fam Med Community Health*. 2019;7(4):e000089. doi:10.1136/fmch-2018-000089
- Lemani C, Kamtuwanje N, Phiri B, et al. Effect of family planning interventions on couple years of protection in Malawi. *Obstet Gynecol Int J*. 2018;141(1):37–44. doi:10.1002/ijgo.12439
- Hackett K, Henry E, Hussain I, et al. Impact of home-based family planning counselling and referral on modern contraceptive use in Karachi, Pakistan: a retrospective, cross-sectional matched control study. *BMJ Open*. 2020;10(9):e039835. doi:10.1136/bmjopen-2020-039835
- Medhanyie A, Spigt M, Kifle Y, et al. The role of health extension workers in improving utilization of maternal health services in rural areas in Ethiopia: a cross sectional study. *BMC Health Serv Res*. 2012;12(1). doi:10.1186/1472-6963-12-352
- Akamike IC, Mbachu C, Onwasigwe C, Okedo-Alex I, Eze I, Eze N. Role of community resource persons in improving use of modern family planning methods among women of reproductive age in a rural area in Ebonyi State, Nigeria. *Int J Health Plann Manage*. 2019;34(2):862–871. doi:10.1002/hpm.2746
- Akamike IC, Okedo-Alex IN, Madubueze UC, Umeokonkwo CD. Does community mobilisation improve awareness, approval and uptake of family planning-methods among women of reproductive age in-Ebonyi State? Experience from a quasi-experimental study. *Pan Afr Med J*. 2019;33:17. doi:10.11604/pamj.2019.33.17.17401
- OlaOlorun FM, Tsui AO. Effect of community health workers' visits on uptake of modern contraception among rural women of reproductive age in Nigeria. *Afr J Reprod Health*. 2020;24(3):108–117. doi:10.29063/ajrh2020/v24i3.12
- Saggurti N, Atmavilas Y, Porwal A, et al. Effect of health intervention integration within women's self-help groups on collectivization and healthy practices around reproductive, maternal, neonatal and child health in rural India. *PLOS ONE*. 2018;13(8):e0202562. doi:10.1371/journal.pone.0202562
- Speizer IS, Corroon M, Calhoun L, et al. Demand generation activities and modern contraceptive use in urban areas of four countries: a longitudinal evaluation. *Glob Health Sci Pract*. 2014;2(4):410–426. doi:10.9745/ghsp-d-14-00109
- Morgan G, Kanesathasan A, Akiode A. Effects of a community-based program on voluntary modern contraceptive uptake among young first-time parents in Cross River State, Nigeria. *Glob Health Sci Pract*. 2020;8(4):783–798. doi:10.9745/GHSP-D-20-00111
- Challa S, DeLong SM, Carter N, et al. Protocol for cluster randomized evaluation of reaching married adolescents - a gender-synchronized intervention to increase modern contraceptive use among married adolescent girls and young women and their husbands in Niger. *Reprod Health*. 2019;16(1):180. doi:10.1186/s12978-019-0841-3
- Institut National de la Statistique - INS/Niger and ICF International. *Enquête Démographique et de Santé et à Indicateurs Multiples du Niger 2012*; INS/Niger and ICF International; 2013. doi:10.1186/1472-6963-12-352
- Jacobstein R. Liftoff: The blossoming of contraceptive implant use in Africa. *Glob Health Sci Pract*. 2018;6(1):17–39. doi:10.9745/GHSP-D-17-00396
- Darteh EKM, Dickson KS, Doku DT. Women's reproductive health decision-making: a multi-country analysis of demographic and health

- surveys in sub-Saharan Africa. *PLoS One*. 2019;14(1):e0209985. doi:[10.1371/journal.pone.0209985](https://doi.org/10.1371/journal.pone.0209985)
21. Upadhyay UD, Gipson JD, Withers M, et al. Women's empowerment and fertility: a review of the literature. *Soc Sci Med*. 2014;115:111-120. doi:[10.1016/j.socscimed.2014.06.014](https://doi.org/10.1016/j.socscimed.2014.06.014)
 22. Munshi K, Myaux J. Social norms and the fertility transition. *J Econ Dev*. 2006;80(1):1-38. doi:[10.1016/j.jdeveco.2005.01.002](https://doi.org/10.1016/j.jdeveco.2005.01.002)
 23. Mayaki F, Kouabenan DR. Social norms in promoting family planning: a study in Niger. *S Afr J Psychol*. 2015;45(2):249-259. doi:[10.1177/0081246315570356](https://doi.org/10.1177/0081246315570356)
 24. Wegs C, Creanga A, Galavotti C, Wamalwa E. Community dialogue to shift social norms and enable family planning: an

evaluation of the family planning results initiative in Kenya. *PLOS ONE*. 2016;11(4):e0153907. doi:[10.1371/journal.pone.0153907](https://doi.org/10.1371/journal.pone.0153907)

How to cite this article: Erhardt-Ohren B, Brooks M, Aliou S, et al. Sustained impact of community-based interventions on contraceptive use among married adolescent girls in rural Niger: Results from a cluster randomized controlled trial. *Int J Gynecol Obstet*. 2023;160:468-475. doi: [10.1002/ijgo.14378](https://doi.org/10.1002/ijgo.14378)