

EFFECT OF INNOVATIVE CONTRACEPTIVE PROGRAM ON FAMILY PLANNING UTILIZATION RATE IN KHARTOUM, SUDAN: A RANDOMIZED CONTROLLED TRIAL

Waled Amen Mohammed Ahmed

ABSTRACT

Background: Family planning was initiated in Sudan in 1965 and incorporated into the Primary Health Care System in 1985. However, the utilization rate of family planning services still remains low, which is among the lowest countries in the region.

Objective: The study aims to evaluate the effect of an innovative contraceptive intervention program on contraceptive utilization rate and mothers' knowledge in Khartoum, Sudan.

Methods: This is a cluster randomized controlled trial. It was conducted in Khartoum, Sudan, over one year (January–December 2015). An innovative contraceptive intervention program was used as intervention. The participants included married women from Khartoum, Sudan, after obtaining their informed consent. The sample size was calculated using the equations from a study conducted by R. Hayes and S. Bennett; the sample size was found to be 400 mothers for both the intervention and control groups. A questionnaire was used to collect data on mothers' knowledge and contraceptive usage before and after intervention. The data collected was analyzed using the computerized method Statistical Package for Social Sciences, Version 20. Thereafter, the data of both groups was compared. In addition, the factors and challenges affecting contraceptive usage were identified. The study was registered with the Pan African Clinical Trials Registry, number PACTR201403000787182.

Results: The findings of the study show that mothers' knowledge increased after the innovative family planning intervention program. Moreover, the utilization rate of family planning methods significantly rose from 37.5% to 59% after intervention. Contraceptive pills and intrauterine devices were the dominant family planning methods used before and after intervention.

Conclusion: The innovative family planning intervention program significantly increased mothers' knowledge and contraceptive usage in Khartoum, Sudan.

Keywords: Innovative contraceptive program, family planning utilization, Khartoum

Citation: Ahmed WAM. Effect of innovative contraceptive program on family planning utilization rate in Khartoum, Sudan: a randomized controlled trial. *Gulf Medical Journal*. 2016;5(1):41–47.

INTRODUCTION

In the Eastern Mediterranean region (EMR), the maternal mortality rate (MMR) has increased in countries with an inefficient national policy and those facing civil conflicts. For some countries in the EMR, such as Sudan, the reduction in MMR did not exceed 25%¹. Nearly 75% of maternal deaths in Sudan occur

during delivery and the immediate postpartum period². According to the Sudan Household Health Survey, the MMR is about 750 per 100,000 population³. Furthermore, Sudan has one of the highest MMR in the region; for every woman who dies, about 20 more develop long-lasting complications⁴.

Family planning is an essential approach for promoting maternal health. It promotes healthy living through suitable spacing of birth and by avoiding pregnancy for high-risk groups⁵. However, just 22.1% women in sub-Saharan Africa use contraceptives⁶. Although family planning services were initiated in 1965 in

Correspondence: Waled Amen Mohammed Ahmed, Assistant Professor, Faculty of Applied Medical Sciences, Albaha University, Saudi Arabia Phone: +966508245369. Email: weliameen1980@yahoo.com

Sudan and incorporated into the Primary Health Care System in 1985, the utilization rate of these services still remains low at 9% in 2012, which is the lowest in the EMR^{7,8}.

According to a recent study conducted in 172 countries, the utilization of family planning services is a preventative strategy to reduce the MMR⁶. Several studies conducted in Sudan showed that 50% of women used modern family planning methods, of which contraceptive pills was the most used method (47.7%), followed by intrauterine contraceptive devices (10.2%), injectable hormones (7.5%), and condoms and sterilization^{9–11}. The utilization rate of family planning methods is affected by several barriers, such as geographic accessibility, affordability, perceptions, and socio-cultural conditions¹². Another factor that impacts the decision to use family planning services is related to the unequal power relations that exist between men and women¹³. Numerous studies have been carried out globally to help gain a better understanding of the social factors influencing the use of family planning services. Traditionally, men often play the dominant role in decisions vital to the reproductive health of women. However, family planning professionals assume that men take less interest in matters that concern reproduction^{13,14}.

Family planning is influenced by numerous factors, which affect the utilization rate of family planning methods. J.C. Caldwell and P. Caldwell emphasized that the social culture of African countries is essential in maintaining the high levels of fertility in the region⁷. In numerous African societies, it is forbidden to be childless. In this way, high fertility results in acknowledgment and endorsement from various community groups and religious leaders. A woman's age, area of residency (urban or rural), training, and socioeconomic status may significantly affect the utilization rate of family planning methods and are liable to influence the method she chooses⁷. In addition, the effectiveness of innovative intervention programs focusing on contraceptive utilization

would support the field of family planning services. Furthermore, W.P. Mauldin and S.J. Segal found that the use of family planning services is rapidly increasing in most countries, but is significantly slower in Arab and sub-Saharan countries¹⁵. Some studies reported that designing contextually appropriate programs could effectively improve the access to maternal health from the demand side, while different intervention programs could be implemented to increase the use of contraceptive methods^{16–19}. This study aims to assess the effect of an innovative family planning intervention program on the use of contraceptive methods among mothers in Khartoum, Sudan.

METHODS

This is a cluster randomized controlled trial. The study used an innovative intervention program to improve the utilization rate of contraceptive methods and mothers' knowledge in Khartoum, Sudan, during January–December 2015. The trial included mothers of childbearing age that attended antenatal care centers for a follow-up in Khartoum, Sudan. Mothers who refused to participate in this trial were excluded.

This study used the cluster randomized sampling technique to select four localities from Khartoum. From each locality, two administrative units were randomly selected; subsequently, one health center was randomly selected from each administrative unit. From each center, 50 women enrolled in this study when they visited the center for an antenatal follow-up.

The health centers were randomly selected and assigned into two groups: four health centers were placed in the intervention group and the other four in the comparison group.

Table 1. Health center groups

Intervention group	Comparison group
1. Tooty Health Center	2. Sameer Health Center
3. Kalakelah Algalah Health Center	4. Mayo Health Center
5. Alshaheeda Nada Health Center	6. Alelifoon Health Center
7. Alrakha Health Center	8. Abused Health Center

The sample size was calculated based on the main outcome of contraceptive utilization, which is the anticipated uptake in contraceptive utilization among surveyed mothers in Khartoum. The calculations were based on the mathematical statements of a study conducted by R. Hayes and S. Bennett, wherein for two unmatched groups of the same size, we estimate k (the between-group coefficient of variance), which is equal for the intervention and comparison groups, and add 2 to the evaluated group number to represent the loss of degrees of opportunity subsequent to stratification²⁰. The value of k was calculated to be 0.30; this was used as intervention is expected to increase the uptake of family planning methods by 30% to 11.7% from the current utilization rate of 9%.

The study respects the rights of participants. The participants' data was treated with confidentiality, and the intervention program was not intended to impact the mothers as they were counselled. Prior to enrolling in the trial, the researcher and assistants explained the aim of the study to all midwives and mothers. In addition, the process of intervention was clearly explained to the participants and their autonomy was sought to participate in the study. Informed consent was obtained from each participant before enrolling in the study. The right of the participants to withdraw at any time was explained and preserved during the study. The study was registered with the Pan African Clinical Trials Registry, number PACTR201403000787182.

The intervention program of this study included encouraging mothers during the postnatal period and training of family planning service providers, along with offering family planning methods in primary health care centers. The provision of family planning services at the primary level will promote the mothers to utilize these services. This could be achieved using the following methods:

1. Training of midwives in primary health care centers by conducting workshops on the availability of contraceptive choices,

counselling for mothers on family planning, and how to provide the services;

2. Provision of family planning services to be carried out by trained midwives, who will explain the different contraceptive methods to mothers during their follow-up antenatal care, counsel the couple to choose the appropriate method to keep the mother and child healthy, encourage the mothers to utilize family planning services and attend family planning centers to avail these services via telephone calls, and provide pills, injections, intrauterine devices, condoms, and implants;
3. Explaining and encouraging mothers during the postnatal period about family planning methods and their availability.

A questionnaire was used to collect data on the knowledge and behavior of mothers in both groups. The questionnaire was also used to collect data about the utilization rate of family planning methods. The questionnaire was tested before finalizing the preparation to enroll participants in the main study. The test included validity, reliability, and internal consistency. Cronbach's alpha for the test was above the acceptable level of 0.7.

The data was analyzed using the Statistical Package for Social Sciences (SPSS), Version 20, to obtain the score of mothers' knowledge and contraceptive utilization rate. The total score of knowledge was calculated and compared between the two groups. The statistical analysis tests conducted included pre- and post-tests to measure the difference before and after intervention. The independent t-test and ANOVA were used to investigate the differences between the two groups in knowledge (primary outcome) and contraceptive utilization rate (secondary outcome).

RESULTS

Table 2 shows the distribution of mothers in eight different areas (50 mothers in each area). Nearly 55.5% of these mothers were aged 25–40 years, while majority of them did not receive

university education. In addition, most mothers (62.5%) had their own houses, while 78% of them stayed with nuclear families and 66.25% were not working. Furthermore, about 74% mothers were married for more than 10 years.

Table 3 shows that mothers' knowledge increased after intervention on all parameters, including the meaning of family planning (from 76% to 87%), methods of family planning (from 53% to 76%), benefits of family planning (from 56% to 81%), provision of family planning services (from 43% to 74%), natural

methods of family planning (from 56% to 83%), and modern methods of family planning (from 36% to 72%).

Table 4 shows that the utilization rate of different family planning methods before and after intervention. The utilization rate significantly increased to 59% after the program from 37.5% before the program. Moreover, the utilization rate of natural methods and contraceptive pills substantially rose to 16.25% and 24.5% from 5.5% and 19%, respectively.

Table 2. Demographic characteristics of mothers in Khartoum, Sudan

Parameters	Items	Frequency	Percentage
Study areas (health centers)	Tooty Health Center	50	12.5%
	Kalakelah Algalah Health Center	50	12.5%
	Alshaheeda Nada Health Center	50	12.5%
	Alrakha Health Center	50	12.5%
	Sameer Health Center	50	12.5%
	Mayo Health Center	50	12.5%
	Alelifoan Health Center	50	12.5%
	Abused Health Center	50	12.5%
Housing tenure	Rented	150	37.5%
	Owner-occupancy	250	62.5%
Family type	Nuclear	312	78%
	Extended	88	22%
Occupation of mothers	Worker (outside home)	135	33.75%
	Not worker (outside home)	265	66.25%
Age of mothers	Less than 25 years	100	25%
	25-40 years	222	55.5%
	More than 40 years	78	19.5%
Level of mothers' education	Illiterate	82	20.5%
	Primary	154	38.5%
	Secondary	104	26%
	University or above	60	15%
Length of marriage	1-5 years	15	3.75%
	5-10 years	89	22.25%
	>10 years	296	74%
Total		400	100%

Table 3. Mothers' knowledge about family planning services in Khartoum, Sudan

Parameters	Items	Pre-test	Post-test	p-value
Mothers' knowledge about the meaning of family planning	Aware	304 (76%)	350 (87.5%)	0.03
	Unaware	96 (24%)	50 (12.5%)	
Mothers' knowledge about the methods of family planning	Mean ± SD	53% ± 2	76% ± 2	0.02
Mothers' knowledge about the benefits of family planning	Mean ± SD	56% ± 1.2	81% ± 1.5	0.01
Mothers' knowledge about the provision of family planning services	Mean ± SD	43% ± 3	74% ± 2	0.00
Mothers' knowledge about the natural methods of family planning	Mean ± SD	56% ± 2.1	83% ± 1.6	0.01
Mothers' knowledge about the modern methods of family planning	Mean ± SD	36% ± 1.7	72% ± 2.3	0.00
Total mothers' knowledge about family planning		53.3% ± 1.7	78.8% ± 1.7	0.02

Table 4. Utilization rate of different family planning methods in Khartoum, Sudan

Parameters	Pre-intervention	Post-intervention	p-value
Utilization rate of natural methods	22 (5.5%)	65 (16.25%)	0.01
Utilization rate of intrauterine devices	40 (10%)	55 (13.75%)	0.08
Utilization rate of contraceptive pills	76 (19%)	98 (24.5%)	0.04
Utilization rate of implants	12 (3%)	18 (4.5%)	0.10
Average utilization rate of family planning methods	150 (37.5%)	236 (59%)	0.03

DISCUSSION

This study was conducted on 400 mothers in Khartoum, Sudan. They were of the childbearing age and with different educational levels. The study investigated mothers' knowledge and the utilization rate of different methods of family planning before and after the innovative intervention program.

The results of this study indicate an increase in mothers' knowledge after the intervention program on all parameters, including the meaning of family planning, methods of family planning, benefits of family planning, provision of family planning services, and natural and modern methods of family planning. The results of this study are similar to the findings of a study conducted in Sudan, which reported that women who were encouraged by midwives to take positive actions regarding child health were likely to be innovative in fertility regulation²¹. Furthermore, the results of the current study are consistent with the findings of the Sudan Household Health Survey, which showed increased contraceptive usage and improved knowledge²². The findings of the current study indicate a positive change in mothers' knowledge about contraceptive usage in the intervention group compared with the comparison group. These results are similar to the findings of a study that used a community-based intervention program in India, which showed significant improvement in mothers' knowledge on contraceptive usage and fertility days¹⁷. Moreover, the findings of a study that involved a school-based reproductive health education program in Zimbabwe showed that mothers' knowledge improved after intervention¹⁹.

The findings of the current study show that the utilization rate of family planning methods increased after intervention. Moreover, the utilization rate of natural methods and contraceptive pills rose significantly, whereas the increase in the utilization rate of intrauterine devices and implants was not statistically significant. Similar findings were reported from a community-based project in Sudan, which showed that the training of midwives to deliver health messages related to family planning and other issues significantly improved contraceptive usage²¹. Several studies have used different intervention programs to improve contraceptive usage. Similar to our findings, the results of a study in Bangladesh, which used a credit intervention program, showed credit programs are contributing factors to improving contraceptive usage¹⁸. Furthermore, the findings of another community-based intervention program conducted in India showed a rise in contraceptive usage¹⁷. In addition, the results of a school-based reproductive health education study in Zimbabwe indicated increased contraceptive usage after intervention¹⁹.

The results of the current study show that contraceptives pills are the most frequently used family planning method before and after intervention, followed by intrauterine devices. These findings are similar those of a study conducted in the US, which showed that pills are the dominant method, followed by sterilization, which is different from our findings²³.

CONCLUSION

The innovative family planning intervention program significantly increased mothers' knowledge and contraceptive usage in

Khartoum, Sudan. This study is of importance in improving the contraceptive utilization rate in one of the unique cultures of Africa. The outcome of this study is expected to alter the practice of providing family planning services in Sudan. Therefore, these findings are useful to improve the uses of different methods of family planning. However, when interpreting the results, it is essential to note that the study was limited to only one state of Sudan, Khartoum, and the participants were distributed into two equal groups. Thus, the scope for the generalizability of the results is limited, and additional extensive studies using more diversified samples are recommended.

REFERENCES

1. World Health Organization. Reducing the global burden: postpartum haemorrhage. A Newsletter of Worldwide Activity. 2007.
2. Abdel-Tawab N, El-Rabbat M. Maternal and neonatal health services in Sudan: results of a situation analysis. Project Brief. Cairo, Egypt: Population Council; 2010.
3. Federal Ministry of Health, Central Bureau of Statistics. Sudan Household Health Survey. Khartoum; 2010.
4. WHO, UNICEF, UNFPA, The World Bank. Trends in maternal mortality: 1990 to 2010. Geneva: WHO; 2012.
5. Taha TET. Family planning practice in central Sudan. *Soc Sci Med.* 1993;37(5):685–9.
6. Ahmed S, Li Q, Liu L, Tsui AO. Maternal deaths averted by contraceptive use: an analysis of 172 countries. *Lancet.* 2012;380(9837):111–25.
7. Caldwell JC, Caldwell P. Africa: the new family planning frontier. *Stud Fam Plann.* 2002;33(1):76–86.
8. UNDP Sudan. Status of millennium development goals in Sudan. New York: UN; 2012.
9. Ibnouf AH, van den Borne HW, Maarse JA. Utilization of family planning services by married Sudanese women of reproductive age. *East Mediterr Health J.* 2007;13(6):1372–81.
10. Ali AA, Rayis DA, Mamoun M, Adam I. Use of family planning methods in Kassala, eastern Sudan. *BMC Res Notes.* 2011;4(1):43.
11. Umbeli T, Mukhtar A, Abusalab M. Study of unmet need for family planning in Dar Assalam, Sudan 2001. *East Mediterr Health J.* 2005;11(4):594–600.
12. Ahmed WAM, Shokai SB, Abduekhair IH, Boshra AY. Factors affecting utilization of family planning services in a post-conflict setting, South Sudan: a qualitative study. *AIMS Public Health.* 2015;2(4):655–66.
13. Mustafa MA, Mumford SD. Male attitudes towards family planning in Khartoum, Sudan. *J Biosoc Sci.* 1984;16(4):437–49.
14. Ghosh U. Male involvement in family planning: an analysis based on NFHS [dissertation]. New Delhi: Jawaharlal Nehru University; 1999.
15. Mauldin WP, Segal SJ. Prevalence of contraceptive use: trends and issues. *Stud Fam Plan.* 1988;19(6 Pt 1):335–53.
16. Elmusharaf K, Byrne E, O'Donovan D. Strategies to increase demand for maternal health services in resource-limited settings: challenges to be addressed. *BMC Public Health.* 2015;15(1):870.
17. Daniel EE, Masilamani R, Rahman M. The effect of community-based reproductive health communication interventions on contraceptive use among young married couples in Bihar, India. *Int Fam Plan Perspect.* 2008;34(4):189–97.
18. Schuler SR, Hashemi SM, Riley AP. The influence of women's changing roles and status in Bangladesh's fertility transition: evidence from a study of credit programs and contraceptive use. *World Development.* 1997;25(4):563–75.
19. Mbizvo MT, Kasule J, Gupta V, Rusakaniko S, Kinoti SN, Mpanju-Shumbushu W, et al. Effects of a randomized health education intervention on aspects of reproductive health knowledge and reported behaviour among adolescents in Zimbabwe. *Soc Sci Med.* 1997;44(5):573–7.
20. Hayes R, Bennett S. Simple sample size calculation for cluster-randomized trials. *Int J Epidemiol.* 1999;28(2):319–26.
21. El Tom AR, Farah AA, Lauro D, Fenn T. Community and individual acceptance:

- family planning services in the Sudan. Ahfad Journal. 1987;4(1):12-30.
22. Federal Ministry of Health, Central Bureau of Statistics. Sudan Household Health Survey. 2010.
23. Mosher WD, Martinez GM, Chandra A, Abma JC, Willson SJ. Use of contraception and use of family planning services in the United States: 1982-2002. Hyattsville, MD: National Center for Health Statistics; 2004.