American Journal of Public Health Research, 2020, Vol. 8, No. 5, 163-175
Available online at http://pubs.sciepub.com/ajphr/8/5/5
Published by Science and Education Publishing
DOI:10.12691/ajphr-8-5-5

Effect of Health Education on the Knowledge, Attitude and Involvement by Male Partners in Birth Preparedness and Complication Readiness in Rural Communities of Sokoto State, Nigeria

Habibullah Adamu*, Oche Mansur Oche, Aminu Umar Kaoje

Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria
*Corresponding author: habibullah.adamu@udusok.edu.ng

Received August 05, 2020; Revised September 06, 2020; Accepted September 15, 2020

Abstract Maternal mortality remains a formidable challenge in many developing countries. Most of these deaths occur due to poor preparation for birth, which is largely attributed to poor involvement of male partners. As men are the chief decision-makers, increasing their involvement in maternal health services could lead to improved maternal health outcomes. We studied the effect of health education on the knowledge, attitude and involvement by male partners in birth preparedness and complication readiness (BPCR) in rural communities of Sokoto state, Nigeria. A mixed-method research design involving a quasi-experimental study, with pre and posttest design was used to study 268 married men selected via multistage sampling technique. Data was collected using structured questionnaires and was analysed using IBM SPSS version 23. The mean age of the respondents in both intervention and control groups were 41.6±8.6 years and 43.09±9.34 years (p=0.184), majority were Hausa Muslims. At baseline, 70-75% of the respondents in both groups mentioned ANC and saving money as part of BPCR, however, only half (50%) of the respondents had good knowledge of BPCR; education and occupation were the strongest predictors of having good knowledge. Also, less than half of the respondents in both groups [65(48.2%) and 59(44.3%)] had positive attitude towards BPCR, less than half, [43(32%) vs 47(35%)] were prepared and less than a quarter [38(28.4%) vs 32(23.9)] had high involvement index at baseline. At post intervention, there was significant increase in proportion of respondents with good knowledge, positive attitude and those who were prepared for birth (p<0.005). The intervention was found to be effective in improving the knowledge and attitude of respondents towards BPCR. There is need for the government to organize massive campaign to educate men especially those living in rural areas on BPCR,

Keywords: *birth preparedness, health education, knowledge, attitude, male involvement*

Cite This Article: Habibullah Adamu, Oche Mansur Oche, and Aminu Umar Kaoje, "Effect of Health Education on the Knowledge, Attitude and Involvement by Male Partners in Birth Preparedness and Complication Readiness in Rural Communities of Sokoto State, Nigeria." *American Journal of Public Health Research*, vol. 8, no. 5 (2020): 163-175. doi: 10.12691/ajphr-8-5-5.

1. Introduction

Avoidable mortality and morbidity remains a formidable challenge in many developing countries like Nigeria. Globally, about 830 women die every day from pregnancy related complications, most of which are avoidable. In Nigeria, maternal mortality rate is up to 521/100,000 live births and most of these deaths occur as result of poor preparation for birth [1]. As pregnancy related complications cannot be reliably predicted, it is necessary to design strategies to overcome those problems when they arise. A key strategy that can reduce birth complications and improve pregnancy outcomes is Birth-preparedness and complication-readiness (BP/CR) [2].

BPCR is a comprehensive package aimed at promoting timely access to skilled maternal and neonatal services. The concept involves identifying a skilled birth attendant, planning transportation in advance, saving money, identifying where to go in case of emergency, and identifying a blood donor [3,4]. Having a comprehensive birth plan helps in reducing the delays associated with poor maternal outcomes following pregnancy or delivery.

Full participation of male partners has been shown to be very critical in achieving adequate birth preparedness [5]. Unfortunately, in sub-Saharan Africa, pregnancy and childbirth continue to be viewed as solely a woman's issues. Although some men consider sexual and reproductive health (SRH) services to be important, they give priority to social obligations [6]. In many communities, a male companion at antenatal care and delivery room is rare even though they are the chief decision makers [5]. This makes male partner involvement critical in improving maternal health.

Low level of knowledge of pregnancy danger signs and birth preparedness have been blamed for poor involvement of males in maternal health issues and several studies within and outside Africa have observed low level of knowledge regarding pregnancy danger signs and BPCR among male partners; in Tajikstan, a study revealed that women and men have limited knowledge about possible complications during pregnancy, childbirth, and the period after childbirth. In addition, service providers do not have an adequate professional level of knowledge of perinatal health issues and lacked basic skills to monitor their work [7]. Low levels of knowledge of BPCR were also observed in Bangledesh and Nepal [8,9]. Some socio-cultural factors also contribute a lot to the negative attitude of men and other influential community members towards pregnancy and birth plans. The role played by other relatives especially females like mothers and mothers-in-law influence the level of male involvement [10,11]. In Kathmandu, Nepal, it was reported in a study that only 40% of male partners accompanied their partners to ante-natal clinic, and 57% helped reduce work load at home [12].

In Africa, knowledge of danger signs and birth preparedness has been shown to be low; in Tanzania for example, a study showed that only 43.9% of the men could mention at least one danger sign during delivery [4] and in Ethiopia, a study revealed that 42% of men were aware of danger signs and only 9.4% of them were involved in birth preparedness practice [13]. In Eastern Uganda, a study conducted by Byamugisha and others showed that up to 74% of men had low involvement index; only 5% accompanied their partners to the ante-natal clinic [14]. In Rwanda, a study showed that only 29.4% of men attended antenatal clinic (ANC) and 22.3% accompanied their wives to the labor ward [15].

In Nigeria, low level of knowledge of danger signs among men was reported in a study in the south-west [16]. A study in Benin City for example, showed that male attendance at ANC was 13.9% out of which only 3.0% accompanied their wives to ANC always [17]. In Zaria, north-west Nigeria, it was reported that up to 96% of pregnancies were unplanned and only 32.1% of men ever accompanied their spouses for maternity care. There was very little preparation to have skilled assistance during delivery (6.2%) [18].

A lot of programmes and interventions have been put in place to promote maternal health and thus reduce maternal mortality. Since maternal health issues have often been seen as feminine or as a “woman thing” most of these interventions have focused on women. These are laudable interventions, but are however, not always associated with increased utilisation of maternal health services [19,20]. This is because in our socio-cultural environment, men still wield a lot of powers in decision-making in the family [21]. Some women’s access to and utilisation of maternal health services depend on their male partners. Involving male partners and encouraging joint decision-making will lead to greater utilisation of health services and thus better maternal health outcomes [12,21,22]. For BPCR to be effective, men, as well as the whole community, must be educated on danger signs, in order take appropriate action when labour starts and/or if an emergency occurs [13]. August et al suggested the need to go beyond the health facility by making members of the family and the community aware of the complications, as they participate in one way or another in the decision-making process when a complication occurs [4]. Despite these observations and recommendations however, there is still dearth of educational interventions to increase male partners’ involvement in maternal health, especially in BPCR. This is especially so in the north-west Nigeria, a region with the highest maternal mortality rate in the country [23]. These observations necessitated the need for this study, which aimed at increasing male partners’ knowledge, attitude and involvement in BPCR through an educational intervention.

2. Methodology

The study was conducted in two rural local government areas (LGAs) in Sokoto state; Kware and Bodinga LGAs. Kware LGA is located about 25km north-east of Sokoto metropolis with a total population of 227,536 inhabitants and total 50,058 women of reproductive age group (based on 2018 projected population) [24]. It has 11 political wards and a Comprehensive Health Center located at the LGA headquarter, offering health services in line with the National Primary Health Care Development Agency ward minimum healthcare package. Bodinga LGA is located in the West zone and is 30km away from the state capital, with a total population of 264,643 inhabitants and approximately 58,221 women of reproductive age group (based on 2018 projected population) [24]. It has 11 geopolitical wards including Bodinga, Kasarawa etc, one Secondary Health Facility and several primary healthcare facilities (PHCs and Dispensaries). Hausa and Fulani constitute the predominant ethnic groups in the two LGAs, however, there are also the Zabarma and the Tuareg minority. Islam is the predominant religion while Christianity is practiced by some of the other ethnic groups. Farmers form the largest proportion of the population, while the rest are mostly civil servants, traders and artisans [24].

2.1. Study Design

The study was a classical experimental study conducted among male partners of women who were currently pregnant and have given birth within the last three years. Male partners who were not living together with their female partners and those who were temporary residents in the study are were excluded from the study.

2.2. Sample Size

Sample size estimation was based on the study design to compare proportions in 2 independent groups (intervention and control) with pre and post-test design.

The minimum sample size was determined using the formula [25]

$$n = \left[2\left(Z\alpha + Z_{\beta} \right)^{2} pq \right] / d^{2}$$

where p= (p1+p2)/2.

Based on the formula above, a minimum sample size of 107 per group (214 for both groups) was calculated, however, after adjusting for attrition, (20% attrition rate), a total of 268 (134 per group) respondents were recruited into the study.

2.3. Sampling Technique

A multistage sampling technique was used to select the respondents as follows:

Stage I: Selection of two senatorial zones in Sokoto state using simple random sampling (SRS), by balloting technique (Sokoto-Central and Sokoto-West senatorial zones). Sokoto central was used for the intervention group and Sokoto West used for control.

Stage II: Selection one LGA from each senatorial zone using SRS; Kware (from Sokoto central) and Bodinga (from Sokoto West) LGAs were selected.

Stage III: Selection of one political ward from each LGA using SRSA; Bankanu/Kware ward (from Kware LGA) and Kasarawa ward (Bodinga LGA).

Stage IV: Selection of settlement(s) ("unguwa") from each of the selected wards using SRS. Shiyar Wakili was selected from Bankanu ward whereas from Kasarawa ward, Unguwar Magaji was selected. Thereafter, participants were selected as follows:

In each of the selected settlements, eligible male partners were identified through their pregnant wives in a house-to-house survey carried out by the research team, in company of traditional birth attendants; the male partners were then invited for recruitment into the study. Consecutive eligible participants were recruited within the selected settlements until desired sample size was obtained. Where the sample size was not obtained in one settlement, the next adjoining settlement was selected and the same process of identification/recruitment was followed until the desired sample size (134) was obtained. This same process was followed to select participants in both the intervention and control groups.

2.4. Data Collection

2.4.1. Instrument of Data Collection

A set of structured pre-tested questionnaire adapted from JHPIEGO/MNH Programme was used to collect data [2]. The questionnaire had four sections; section A sought information on sociodemographic characteristics of respondents; section B sought information on knowledge of danger signs and BPCR; section C sought information on attitude of respondents towards BPCR; section D sought information on male involvement in BPCR.

2.4.2. Personnel/training

Fourteen research assistants comprising of two Resident Doctors, eight 500 level medical students (4 males and 4 female students) and four community health extension workers (CHEWS) were trained by the researcher. The training was for a period of two days and it covered general overview of maternal health, BP/CR, male partner involvement, questionnaire/survey instruments, sampling techniques, field activities, ethics of fieldwork, general principles of research and interpersonal communication skills. The CHEWS formed part of a re-visit team that was formed to collect data from male partners that were not present at home when their wives were recruited.

2.4.3. Pretest

The instruments were pretested on 20 participants selected from Giniga village in Wamakko LGA. This allowed for further assessment and modification of the study instruments and the conduct of the study.

2.4.4. Pre-intervention Data Collection

Data was collected from both groups (study & control) using the study instrument with the help of trained research assistants. The overall exercise in each of the groups lasted for about three weeks (including revisits).

2.4.5. Intervention

Two rounds of health education (HE) on danger signs in pregnancy, birth preparedness and complication readiness (given at one-month interval) were given to the intervention group by the researchers. The venue for the intervention was the palace of the district head of Kware. The content of the HE program was based on WHO recommendations on health promotion interventions for maternal and newborn health and JHPIEGO/ Maternal and Neonatal Health Programme [2,26]. The 1st round of the HE started about 10 days after completing the baseline data collection.

The health education sessions were prepared and delivered in Hausa language (the local language of the community). The training module for the health education covered areas on brief overview of maternal health indices of Sokoto state (to facilitate their appreciation of the burden of the problem), spousal communication, joint decision making, husbands' presence at antenatal care, male involvement in household chores, and male involvement in birth preparedness and complication readiness.

Due to their relatively large number, the participants were divided into four small groups, each containing between 30-40 participants who were given the health education intervention. On each day, one group of 30-40 participants was given the intervention, thus all the four groups were given the intervention over a period of four days. The HE intervention was in form of interactive session (with cardboards, flip charts, pictures etc). Feedbacks were elicited during the discussions in form of questions/answers from the participants and further clarifications as required to ensure proper understanding of the issues discussed were offered. Each session lasted for about 45 minutes with 20-30 minutes of discussion and answering of questions. After the training, posters with pictorial demonstrations of the activities undertaken to prepare for birth and its complications were given to each participant and were advised to place it in conspicuous areas in their homes. After a four-week interval, a second round of the health education was carried out to reinforce the information. In addition, there were monthly re-enforcements of the key intervention message via written structured messages which were read to each participant by the VCMs and HF in-charge in their respective settlements.

For the control group, no intervention was given to them and to minimize the possibility of contamination, the control group was selected from a political ward within a different LGA in a different senatorial zone from that of the intervention group. That has hopefully minimized the chances of sharing of intervention message between the intervention and control groups.

2.4.6. Post-intervention Data Collection:

Data was collected from both groups (study & control) four months after the intervention using the same instruments.

2.5. Data Analysis

The data obtained from the questionnaire was entered into and analyzed using IBM SPSS computer software version 23. Each correct response to a knowledge variable was awarded a score of one mark and zero mark was awarded to each incorrect response. For the attitude variables, each positive response was awarded a score of one mark whereas zero mark was awarded to each negative response. The knowledge scores were added up, converted to percentages and graded as either good knowledge (score of ≥50%) or poor knowledge (<50%). Attitude scores were graded as positive (≥50%) or negative attitude (<50%). A composite score was used to assess male partner involvement, as there is no common criteria in the literature that defined male involvement; a combination of different indicators have been used in some studies [16,27]. For each of the male involvement actions [men accompanying their wives to ANC; escorting women to place of delivery; joint decision-making on the place of childbirth; knowledge of at least three or more danger signs in each of the phases (pregnancy, childbirth and the postpartum period); and at least four BP/CR actions performed, a score of one point was awarded and zero point awarded to any of the male involvement indices not performed. The scores for of each of the involvement index performed were added up and converted to percentage; the percentage score was graded as; **≥50%**: High involvement, **<50%:** Low involvement. Continuous variables were summarized as means and standard deviation, categorical variables were summarized and presented as frequencies and percentages. This was followed by inferential statistics (bivariate analysis using Pearson chi square tests) which was used to compare proportions between the two groups.

Effect of intervention on knowledge of key danger signs and BP/CR was determined by comparing the proportion of participants with good knowledge pre and post intervention using McNemar's test (within group comparison); effect of intervention on attitude of male respondents at post intervention was determined using McNemar marginal homogeneity test (within group comparison). Effect of intervention on involvement of the participants in BP/CR was determined using McNemar's test. The results were presented in tables and figures as appropriate. Level of statistical significance was set at 5% ($p<0.05$).

2.6. Ethical Considerations

Ethical approval for the study was obtained from the Sokoto State Health Research and Ethics Committee. Participants were informed of the objectives of the study and were assured of the confidentiality of the information volunteered and thereafter, their informed verbal consent was also obtained.

3. Results

At the pre-intervention stage, 268 questionnaires (134 per group) were administered to the respondents in the intervention and control groups with 100% response rate. At post-intervention, the questionnaire was administered to 118 (88.1%) respondents in the intervention group who participated in the two intervention sessions and 113 (84.3%) in the control group who were present for the post intervention data collection.

The mean ages of respondents in the intervention and control groups were 41.6±8.6 years and 43.09±9.34 years respectively ($t=-1.331$, $p=0.184$) and majority in both groups were Muslims [131(97.8%) vs. 127(94.8%)] and of the Hausa tribe [109(81.3%) vs. 102(76.1%)]. In both groups, those with Quranic school education alone constituted the highest proportion [58(43.3%) vs. 74(55.2%)]; there was no statistically significant difference between the groups in terms their religion, tribe or educational attainment (Table 1).

Regarding knowledge of BPCR pre and post-intervention, in the intervention group, there was significant increase in the proportion of respondents with correct responses to some of the questions; identifying skilled provider [(75.4% at pre-intervention vs. 87.3% at post-intervention), $p=0.007$], identifying mode of transport to health facility [(40.3% at pre-intervention vs 61.9% at post-intervention, $p=0.001$], identifying blood donor [(21.6% at pre-intervention vs. 62.7% at post-intervention, $p<0.001$] and ensuring wife attends postnatal clinic [(32.1% at pre-intervention vs 51.7% at post-intervention, $p=0.001$]. In the control group, there was no significant difference in the proportion of respondents with correct responses to questions regarding knowledge of BPCR at the beginning and end of study ($p>0.05$) [Table 2].

Regarding the overall knowledge of BPCR, at pre-intervention, only 47.8% and 52.21% of respondents in the intervention and control groups respectively had good knowledge of BPCR ($\chi^2 = 0.537$, $p=0.464$). At post-intervention, the proportion of those who had good knowledge of BPCR was up to 75.5% in the intervention group, but 54.0% in the control group ($p<0.001$) [Figure 1].

The difference in difference (DD) estimation for the differential effect of the intervention between intervention and control groups showed that the intervention has had a 27.9% increase in the proportion of respondents with good knowledge of BPCR (Table 3).

Table 1. Socio-demographic profile of male respondents

Variables	Intervention group n = 134 n (%)	Control group n = 134 n (%)	Test Statistics P value
Age group (years)			
20-29	14(10.4)	9(6.7)	
30-39	37(27.6)	34(25.4)	$\chi^2 = 5.823$ **p = 0.215**
40-49	51(38.1)	54(40.3)	
50-59	30(22.4)	28(20.9)	
≥ 60	2(1.5)	9(6.7)	
Mean age	41.6±8.6	43.09±9.34	$t = -1.331$; p = 0.184
Tribe			
Hausa	109(81.3)	102(76.1)	
Fulani	10(7.5)	14(10.4)	
Yoruba	4(3.0)	5(3.7)	Fischer exact p = 0.846
Ibo	1(0.7)	2(1.5)	
Others*	10(7.5)	11(8.2)	
Religion			
Islam	131(97.8)	127(94.8)	Fischer exact p = 0.334
Christianity	3(2.2)	7(5.2)	
Educational Level			
None	3(2.2)	3(2.2)	
Quranic	58(43.3)	74(55.2)	
Primary	31(23.1)	19(14.2)	Fischer exact p = 0.216
Secondary	28(20.9)	22(16.4)	
Tertiary	14(10.4)	16(11.9)	
Occupation			
None	1(0.7)	1(0.7)	
Vocational job	41(30.6)	36(26.9)	
Farmer	25(18.7)	41(30.6)	
Traditional/religious leader	4(3.0)	8(6.0)	Fischer exact P = 0.122
Civil/Public servant	31(23.1)	37(20.1)	
**Others	32(23.9)	21(15.7)	

*Others: Zabarmawa, Ebira, **: petty trader, commercial driver etc.

Table 2. Within Group Comparison of Respondents' Knowledge of Key BPCR Actions at Pre Intervention And Post Intervention

Variables	Intervention group: Pre-Int n = 134 n (%)	Intervention group: Post- Int n = 119 n (%)	Test stat* p value	Control group: BOS n = 134 n (%)	Control group: EOS n = 113 n (%)	Test stat* p value
Ensure that wife attends antenatal clinic						
Correct response	101(75.4)	103(87.3)	**p = 0.007**	107(79.9)	86(76.1)	p = 0.250
Incorrect response	33(24.6)	1(12.7)		27(20.1)	27(23.9)	
Identify mode of transport to health facility						
Correct response	54(40.3)	73(61.9)	$\chi^2 = 11.574$ **p =0.001**	47(35.1)	41(36.3)	p = 0.687
Incorrect response	80(59.7)	45(38.1)		87(64.9)	72(63.7)	
Save money						
Correct response	96(71.6)	78(66.1)	$\chi^2 = 0.679$ p =0.410	100(74.6)	85(75.2)	p = 0.250
Incorrect response	38(28.4)	40(33.9)		34(25.4)	28(24.8)	
Identify skilled provider						
Correct response	38(28.4)	96(81.4)	$\chi^2 = 51.681$ **p <0.001**	33(24.6)	27(23.9)	p = 0.603
Incorrect response	96(71.6)	22(18.6)		101(75.4)	86(76.1)	
Identify place of child delivery						
Correct response	56(41.8)	90(76.3)	$\chi^2 = 30.420$ **p < 0.001**	65(48.5)	61(54.0)	p = 1.125
Incorrect response	78(58.2)	28(23.7)		69(51.5)	52(46.0)	
Identify blood donor						
Correct response	29(21.6)	74(62.7)	$\chi^2 = 41.397$ **p < 0.001**	30(22.4)	23(20.4)	p = 0.250
Incorrect response	105(78.4)	44(37.3)		104(77.6)	90(79.6)	
Ensure wife attends postnatal clinic						
Correct response	43(32.1)	61(51.7)	$\chi^2 = 10.256$ **p =0.001**	39(29.1)	33(29.2)	p = 0.250
Incorrect response	91(67.9)	57(48.3)		95(70.9)	80(70.8)	

*McNemar test statistic BOS: Beginning of study EOS: End of study.

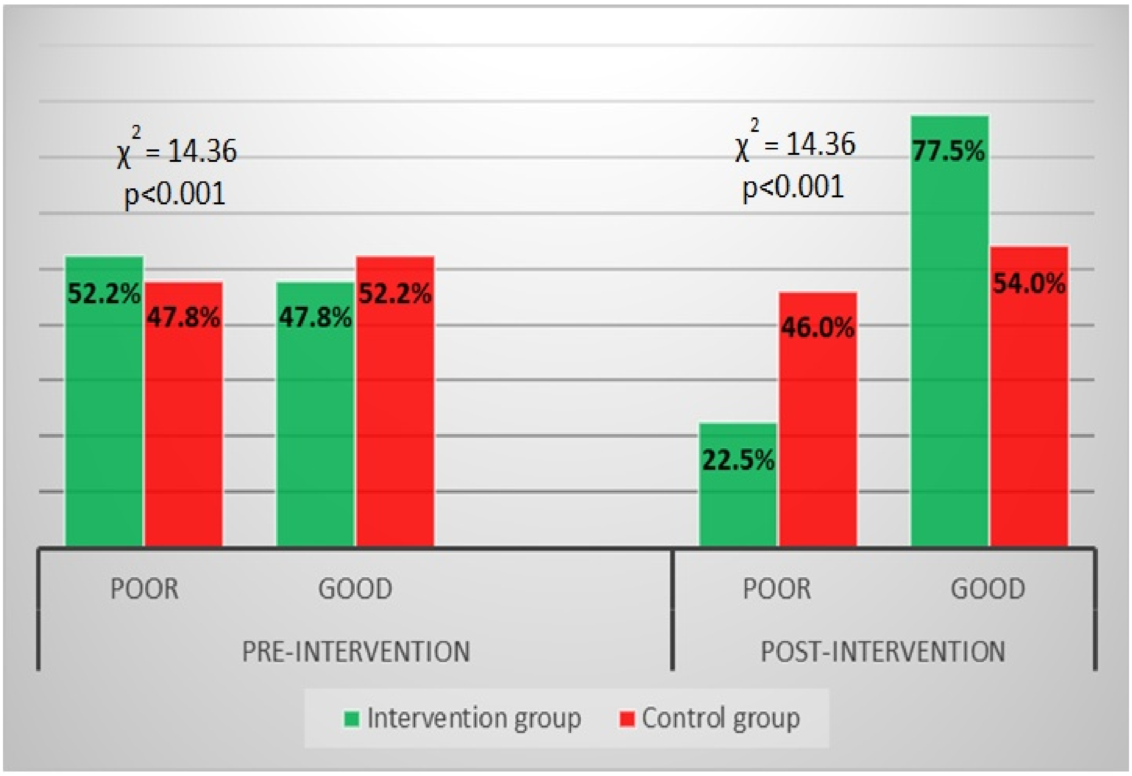

Figure 1. Between Group Knowledge of Respondents on BPCR at Pre and Post-intervention

Table 3. Difference In Difference (DD) Estimation of the Differential Effect of Intervention on the Overall Respondents' Knowledge Of BPCR Between Intervention and Control Groups

	Proportion of male partners with good knowledge of BPCR (%)		
	Intervention group	Control group	**Difference**
Pre-intervention	47.8	52.2	-4.4
Post-intervention	77.5	54.0	23.5
Difference	29.7	1.8	**27.9***

*DD estimate.

There was significant difference between pre and post-intervention proportion of respondents with positive attitude towards BPCR. In the intervention group, there was statistically significant increase in the proportion of respondents who agreed it is necessary for a man to prepare for birth while wife is pregnant (77.6% vs 81.5%, MH=16.00, p=0.031); it is necessary for a husband to accompany wife to ANC (46.3% vs. 54.6%, MH=30.00, p<0.001); man should plan ahead how his wife will get to the health facility (52.2% vs. 60.5%, MH=21.000, p=0.004), it is important for a man discuss his wife's pregnancy/birth plans with skilled provider (41.0% vs 50.4%, MH=21.000, p=0.002) among others. In the control group, there was only a slight increase in the proportion of respondents that agreed with some attitude variables but the increase was not statistically significant (p>0.005) [Table 4].

At pre-intervention, less than half of the respondents (48.2%) in intervention and 44.3% in control group had positive attitude towards male involvement in BPCR (p=0.327), however, at post-intervention, up to 59.3% of the respondents in the intervention had overall positive attitude towards male involvement in BPCR as against those in the control group (46.0%) and the difference in proportion was statistically significant (p=0.049) [Figure 2].

The DD estimation for the differential effect of the intervention on respondents' attitude towards BPCR showed that the intervention has had a 7.3% increase in the proportion of respondents with positive attitude towards BPCR (Table 5).

With respect to respondents that carried out some BPCR practices pre and post-intervention, in the intervention group, there was significant increase in the proportion of respondents who ensured their wives had at least four ANC attendance (54.5% vs. 88.1%, χ^2=30.14, p<0.001); identified means of transport (28.4% vs. 61.0%, χ^2=21.12, p<0.001), blood donor (9.7% vs. 45.8%, χ^2=33.28, p<0.001), health facility (33.6% vs. 62.7%, χ^2 =19.22, p<0.001). In the control group, there was no significant increase (p>0.05) [Table 6].

Regarding overall preparedness, at pre-intervention, only 32.1% and 35.1% of respondents in the intervention and control groups respectively were prepared for their wives' delivery (χ^2 = 0.268, p=0.698). At post-intervention, the proportion of men who were prepared for their wives was up to 58.5% in the intervention group but 37.2% in the control group (p=0.002) [Figure 3].

Table 4. Within Group Comparison of Respondents' Attitude Towards Male Involvement in BPCR at Pre Intervention and Post Intervention

Variables	Intervention group		Test statistics p value	Control group		Test statistics p value
	Pre-int	Post-int		BOS	EOS	
	n = 134	n = 118		n = 134	n = 113	
	n (%)	n (%)		n (%)	n (%)	
It is necessary for a man to prepare for the birth of a child while his wife is pregnant						
Agreed	104(77.6)	97(81.5)	MH = 16.00 **p = 0.031**	108(80.6)	90(79.6)	MH = 8.000 p = 1.000
Disagreed	20(14.9)	17(14.3)		13(9.7)	13(11.5)	
Neutral	10(7.5)	5(4.2)		13(9.7)	10(8.8)	
It is necessary for a man to accompany his wife to ANC						
Agreed	62(46.3)	65(54.6)	MH = 30.000 **P<0.001**	51(38.1)	42(37.2)	MH = 7.000 p = 0.250
Disagreed	64(47.8)	51(42.9)		69(51.5)	58(51.3)	
Neutral	8(6.0)	3(2.5)		14(10.4)	13(11.5)	
A man should plan ahead of time where his wife will deliver						
Agreed	70(52.2)	72(60.5)	MH = 21.000 **p = 0.004**	66(49.3)	55(48.7)	MH = 4.000 p = 1.000
Disagreed	57(42.5)	44(37.0)		52(38.8)	44(38.9)	
Neutral	7(5.2)	3(2.5)		16(11.9)	14(12.4)	
A man should plan ahead of time how his wife will get to the health facility for childbirth						
Agreed	63(47.0)	68(57.1)	MH = 27.000 **p = 0.001**	58(43.3)	49(43.4)	MH = 11.000 p = 0.125
Disagreed	61(45.5)	47(39.5)		56(41.8)	51(45.1)	
Neutral	10(7.5)	4(3.4)		20(14.9)	13(11.5)	
It is necessary for a husband to save money in advance for unforeseen circumstances						
Agreed	101(75.4)	99(83.2)	MH = 21.000 **p = 0.004**	101(75.4)	82(72.6)	MH = 3.000 p = 0.250
Disagreed	28(20.9)	18(15.1)		21(15.7)	22(19.5)	
Neutral	5(3.7)	2(1.7)		12(9.0)	9(8.0)	
It is necessary for a man to discuss his wife's pregnancy/birth plans with skilled care provider						
Agreed	55(41.0)	60(50.4)	MH = 21.000 **p = 0.002**	53(39.6)	45(39.8)	MH = 4.000 p = 0.500
Disagreed	70(52.2)	51(42.9)		66(49.3)	56(49.6)	
Neutral	9(6.7)	8(6.7)		15(11.2)	12(10.6)	
It is important for a husband to accompany his wife to health facility while giving birth						
Agreed	59(44.0)	60(50.4)	MH = 17.000 **p = 0.016**	49(36.6)	43(38.1)	MH = 8.000 p = 0.250
Disagreed	69(51.5)	56(47.1)		77(57.5)	66(58.4)	
Neutral	6(4.5)	3(2.5)		8(6.0)	4(3.5)	
It is necessary for a husband to arrange for blood donor in case of emergency						
Agreed	38(28.4)	41(34.5)	MH = 22.000 **p = 0.047**	47(35.1)	37(32.7)	MH= 5.000 p = 0.500
Disagreed	83(61.9)	67(56.3)		68(50.7)	59(52.2)	
Neutral	13(9.7)	11(9.2)		19(14.2)	17(15.0)	
Giving birth is mostly a woman's issue, men have little contribution to make						
Agreed	93(69.4)	71(59.7)	MH = 9.000 **p = 0.004**	101(75.4)	85(75.2)	MH = 4.000 p = 1.000
Disagreed	38(28.4)	45(37.8)		28(20.9)	24(21.2)	
Neutral	3(2.2)	3(2.5)		5(3.7)	4(3.5)	
A husband should not make joint decisions with his wife regarding pregnancy and child birth						
Agreed	74(55.2)	55(46.2)	MH =17.000 **p = 0.022**	85(63.4)	72(63.7)	MH = 3.000 p = 0.250
Disagreed	54(40.3)	61(51.3)		41(35.4)	34(30.1)	
Neutral	6(4.5)	3(2.5)		8(6.0)	7(6.2)	

MH= Mc Nemars Marginal Homogeneity test **Pre-int** = pre-intervention **Post-int** = Post-intervention **BOS** = Beginning of study **EOS** = End of Study.

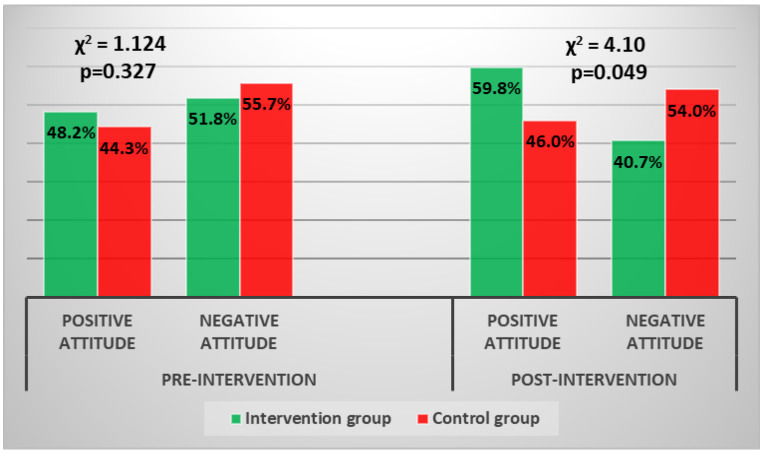

Figure 2. Overall Attitude of Respondents at Post-intervention

Table 5. Difference In Difference (DD) Estimation of the Differential Effect Of Intervention on the Overall Proportion of Respondents With Positive Attitude Towards BPCR Between Intervention and Control Groups

	Proportion of male partners with positive attitude towards BPCR (%)		
	Intervention group	Control group	**Difference**
Pre-intervention	49.3	43.3	6
Post-intervention	59.3	46.0	13.3
Difference	10	2.7	**7.3***

*DD estimate.

Table 6. Within Group Comparison of Respondents' Practice of BPCR at Pre Intervention and Post Intervention

Variables	**Intervention group**			**Control group**		
	Pre-Int n = 134 n (%)	**Post- Int n = 118 n (%)**	**Test stat* p value**	**BOS n = 134 n (%)**	**EOS n = 113 n (%)**	**Test stat* p value**
Ensured that wife attends at least 4 antenatal clinic						
Yes	73(54.5)	104(88.1)	$\chi^2 = 30.140$	67(50.0)	62(54.9)	p = 0.332
No	61(45.5)	14(11.9)	**p = <0.001**	67(50.0)	51(45.1)	
Identified mode of transport to health facility						
Yes	38(28.4)	72(61.0)	$\chi^2 = 21.121$	33(24.6)	31(27.4)	p = 0.503
No	96(71.6)	46(39.0)	**p < 0.001**	101(75.4)	82(72.6)	
Saved money						
Yes	72(53.7)	78(66.1)	$\chi^2 = 2.240$	68(50.7)	60(53.1)	p = 0.581
No	62(46.3)	40(33.9)	p =0.120	66(49.3)	53(46.9)	
Identified skilled provider						
Yes	27(20.1)	59(50.0)	$\chi^2 = 21.780$	20(14.9)	21(18.6)	p = 0.344
No	107(79.9)	59(50.0)	**p = <0.001**	114(85.1)	92(81.4)	
Identified Health Facility						
Yes	45(33.6)	74(62.7)	$\chi^2 = 19.220$	50(37.6)	45(40.2)	p = 1.000
No	89(66.4)	44(37.3)	**p < 0.001**	83(62.4)	67(59.8)	
Identified blood donor						
Yes	13(9.7)	54(45.8)	$\chi^2 = 33.283$	8(6.0)	10(8.84)	p = 0.180
No	121(90.3)	64(54.2)	**p < 0.001**	126(94.0)	103(91.2)	

*McNamar test statistic, BOS: Beginning of study, EOS: End of study.

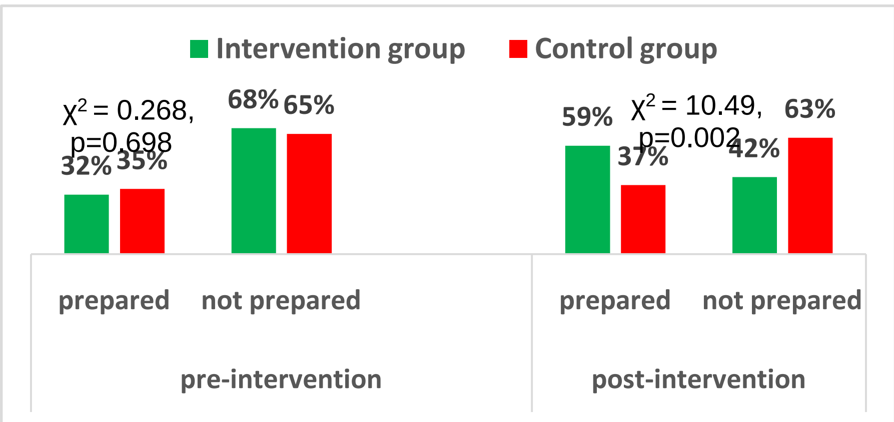

Figure 3. Between Group Comparison of Proportion of Respondents Prepared for Delivery of their Wives

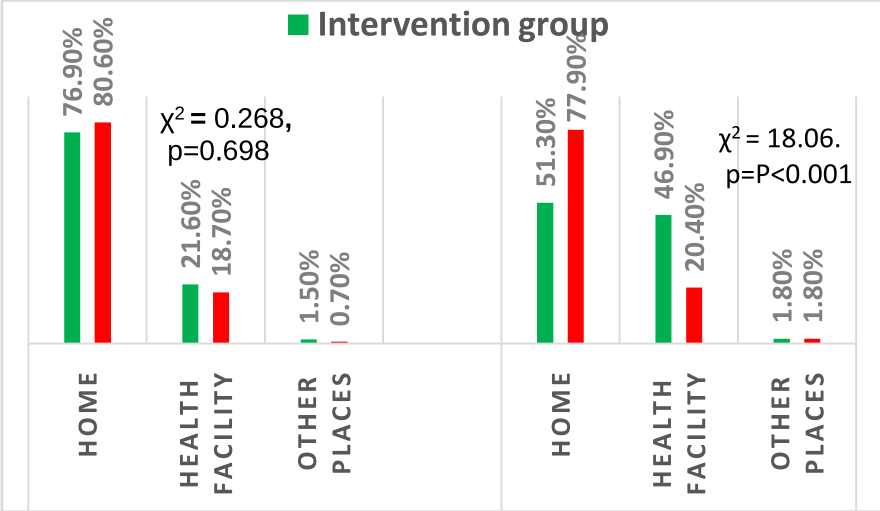

Figure 4. Between Group Comparison of Place Of Delivery of Respondents' Wives at Pre and Post-Intervention

At pre-intervention, only 21.6% and 18.7% of respondents' wives in the intervention and control groups respectively delivered in a health facility during their last delivery ($\chi^2 = 0.748$, p=0.658). At post-intervention, 46.9% and 20.4% of the respondents' wives in the intervention and control groups respectively delivered in a health facility (Fisher exact X^2=16.802, p<0.001) [Figure 4].

Regarding involvement of respondents in some BPCR activities, at pre-intervention, 56.7% of the respondents in intervention group engaged in shared decision with their wives regarding ANC, and this increased to 65.3% at post-intervention (p=0.043); also, proportion of those who engaged in shared decision with wives regarding place of delivery increased from 29.9% at pre-intervention to 41.5% at post-intervention (p=0.002). In the control group, there was no significant difference in proportion of respondents that engaged in any male involvement activity pre and post-intervention (Table 7).

Table 7. Within Group Comparison of Proportion of Respondents Involved in BPCR Activities at Pre Intervention and Post Intervention

Variables	Intervention group			Control group		
	Pre-Int n = 134 n (%)	Post- Int n = 118 n (%)	Test stat* p value	BOS n = 134 n (%)	EOS n = 113 n (%)	Test stat* p value
Engaged in shared decision regarding wife's ANC						
Yes	76(56.7)	77(65.3)	**p= 0.043***	66(49.3)	60(53.1)	p = 0.804
No	58(43.3)	41(34.7)		68(40.7)	53(46.9)	
Accompanied wife o ANC						
Yes	44(32.8)	40(33.9)	p =0.774	35(26.1)	32(28.3)	p = 0.774
No	90(67.2)	78(66.1)		99(73.9)	81(71.7)	
Ensured wife had a leas 4 ANC visits						
Yes	58(43.3)	70(59.3)	χ^2 = 9.818 **p = 0.002**	54(40.3)	45(39.8)	p = 0.754
No	76(56.7)	48(40.7)		80(59.7)	68(60.2)	
Discussed wife's pregnancy with a skilled birth attendant						
Yes	33(24.6)	44(37.3)	**p = 0.001**	24(17.9)	22(19.5)	p = 0.632
No	101(75.4)	74(62.7)		110(82.1)	91(80.5)	
Engaged in shared decision with wife regarding place of delivery						
Yes	40(29.9)	49(41.5)	**P= 0.002**	34(25.4)	28(24.8)	p = 0.774
No	94(70.1)	69(58.5)		100(74.6)	85(75.2)	
Accompanied wife to place of delivery						
Yes	24(17.9)	25(21.2)	p =0.607	15(11.2)	18(15.9)	p =0.180
No	110(82.1)	93(78.8)		119(88.8)	95(84.1)	
Arranged for someone to take care of the house in her absence						
Yes	23(17.2)	24(20.3)	p = 0.687	16(11.9)	12(10.6)	p = 0.500
No	111(82.8)	94(79.7)		118(88.1)	101(89.4)	
Accompanied her to postnatal clinic						
Yes	31(23.1)	25(21.2)	P = 0.727	21(15.7)	16(14.2)	p = 0.596
No	103(76.9)	93(78.8)		113(84.3)	97(85.8)	

*McNamar test statistic, BOS: Beginning of study, EOS: End of study.

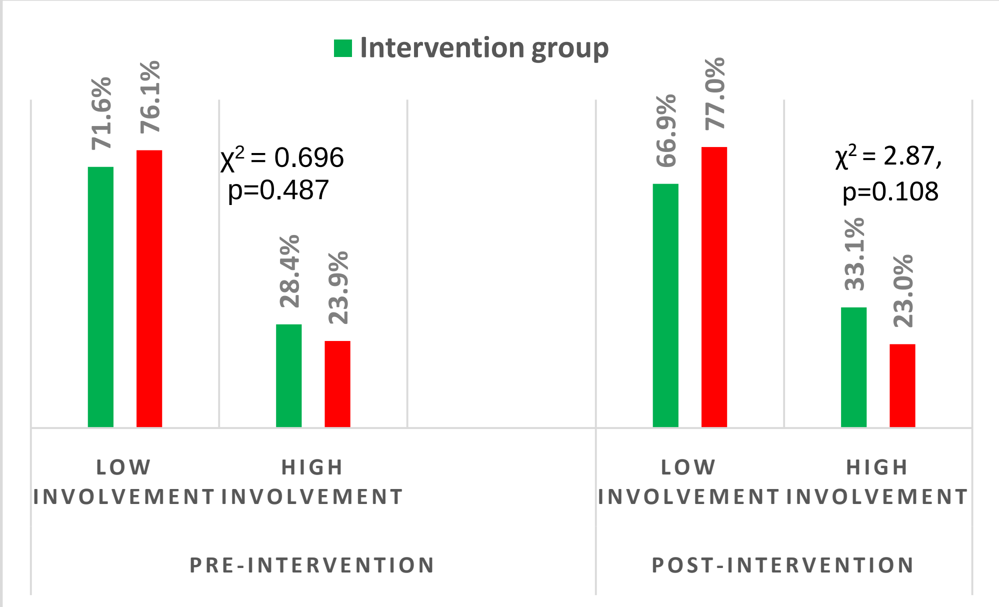

Figure 5. Overall Proportion of Respondents Involved in BPCR at Pre and Post-Intervention

At pre-intervention, 28.4% and 23.9% of respondents in both intervention and control groups respectively had high involvement (χ^2 = 0.696, p=0.487). At post-intervention, 33.1% of the respondents in the intervention group had high involvement whereas in the control group, 23.0% had high involvement which was not statistically significant (X^2=2.87, p=0.108) [Figure 5].

4. Discussion

This study was conducted to determine the effect of health education on the knowledge, attitude and involvement by male partners in birth preparedness and complication readiness in rural communities of Sokoto state.

In this study, there was no significant difference in terms of age distribution of respondents in intervention and control groups; those within the 40-49 year age group had the highest number of respondents in both groups. This is probably because this study was conducted among married men and it was reported in the Nigeria Demographic and Health Survey 2018that, majority of men between the ages of 40 - 49 years were currently married [23]. The high proportion of Muslims and Hausas in this study is a reflection of the study area as reported earlier, although there was a notable proportion of other tribes, including Fulani, Zabarmawa and Yorubas. Another study conducted in the north-west also reported similar findings [28]. These could have possible implications on the findings of this study because utilization of some maternal health services such as ANC, hospital delivery and family planning is reported to be lowest among the Hausas [23].

A greater proportion of the respondents in both groups (43.3% vs. 55.2%) had Quranic school education as their only educational attainment , and this could be explained by the fact that in the study area, adult literacy rate is among men is 40.3% and 10.2% among women; 56.9% and 89.4% of men and women respectively cannot read at all [23]. This may affect the learning abilities of significant proportion of the respondents especially when it comes to reading Information, Education and Communication (IEC) materials containing messages regarding pregnancy danger signs and birth preparedness.

Prior to the intervention, the knowledge of specific BPCR practices among the respondents in both groups was generally low; for example, only about a quarter of the respondents in both groups mentioned identifying skilled provider and identifying blood donor as key BPCR practices. A study conducted by Obi and Okojie in Benin City also reported low level of knowledge of male partners regarding identifying a blood donor [19]. The low level of knowledge on identifying blood donor as a BPCR practice is worrisome because it suggests men are unlikely to make any plan for identifying a potential blood donor in the face of emergency. After the intervention, there was increase in the overall proportion of respondents with good knowledge of BPCR in the intervention group. The proportion of those who knew 'identifying mode of transport to health facility', identifying blood donor and ensuring wife attends postnatal clinic also increased significantly in the intervention group. This increase could be attributed to the effect of the intervention because in the control group, there was either only a slight increase or even decrease in some cases; moreover, at baseline, both groups were comparable. A similar observation was made in an intervention study conducted in Bangladesh, where it was observed that men's knowledge on maternal care was higher in intervention than control group; knowledge on saving money and identifying attendant at delivery were significantly higher in intervention group compared to control [8]. Shefner-Rogers and Sood also demonstrated increase in knowledge of husbands following exposure to messages about birth preparedness [29]. These are positive findings because it suggests educational interventions on BPCR can be designed and implemented with a view to increasing the birth preparedness of community members. Studies have shown that, those interventions that improve knowledge of maternal health in the community especially among expectant fathers, lead to improved male involvement [27,30]. When men become more involved in BPCR activities, their knowledge regarding BPCR is also likely to increase because of continuous exposure to BPCR messages from skilled care providers and the cycle continues. A possible explanation for this is that men's knowledge about the importance of maternal health services increases with active participation in maternal health issues of their partners, which in turn makes them more likely to encourage and support their partners to use such services; this has been observed in other studies [31,32].

At baseline, the respondents in both groups showed varying degrees of attitude towards male involvement in BPCR. More than three-quarters of the respondents in both groups agreed it is necessary for a man to prepare for birth while his wife is pregnant and also save money in advance. However, a large proportion of them believed giving birth is mostly a woman's issue with the men having little contribution to make. Studies conducted within and outside Nigeria also observed varying negative attitude of men towards male involvement in BPCR. In Ghana for example, some of the men interviewed in a study believed that men who accompany their wives to ANC are being dominated and controlled by their wives, even though they believe there are benefits attached to it [33]. In a study in Uganda, the men interviewed said that issues related to pregnancy and childbirth were the exclusive domain of women. Involvement of men was confined strictly to traditional gender roles, with men's main responsibility being provision of funds [34], similar observation was also made in Kenya [35]. After the intervention, the proportion of respondents with overall positive attitude in the intervention group increased significantly, but there was no significant increase in the control group. The increase in the proportion of respondents with overall positive attitude could further be explained by the fact that there was significant increase in the proportion of respondents who responded favourably to some attitude variables after the intervention. For example, there was increase in the proportion of respondents who agreed it is necessary for a man to prepare for birth while wife is pregnant; it is necessary for a husband to accompany wife to ANC and a man should plan ahead how his wife will get to the health facility. There was also a change in the attitude of significant proportion of respondents that received the intervention in relation to the role of men during child birth; there was a 10.4% increase in the proportion of men that disagreed with the statement "giving birth is a woman's issue, men have little role to play". This shows that educating men on the importance of getting involved in their wives' maternal health issues could have a positive impact on their attitude towards birth preparedness and male involvement.

More respondents in the intervention group carried out birth preparedness actions than in the control group. The proportion of those that ensured their wives had at least four ANC attendances, identified mode of transport to health facility, and also identified a potential blood donor all increased in the intervention group. This finding is at variance with that of a study conducted in a rural community in Kaduna state, Nigeria, where only a marginal increase in birth preparedness was observed after intervention [28]. This difference might be due to the difference in the method used to assess birth preparedness. In this study, knowledge of danger signs was included in the overall assessment of birth preparedness level, as recommended in the JHPIEGO matrix [2] and this could have raised the preparedness level; moreover, a significant proportion of respondents in both groups had good knowledge of danger signs even at baseline. In the Kaduna study however, knowledge of danger signs was not included in the assessment of birth preparedness [28]. A study conducted in Nepal also observed increase in birth preparedness following birth preparedness intervention [36].

On the overall involvement index, there was only a slight increase in the proportion of respondents with high involvement after the intervention. This is not surprising because changing one's attitude and practices is very difficult especially where cultural factors play a significant role. Similar observation was made in a study conducted in northern Nigeria, which reported slight improvement in birth preparedness among male respondents after receiving birth preparedness intervention [28]. The reason blamed for the poor involvement in that study was the strong influence of religion and culture because a significant proportion of the respondents believed that God gives pregnancy and knows best how to deliver it safely [28]. Despite the low level of overall male involvement observed after the intervention, significant improvement was observed in some specific male involvement indices after the intervention. For example, there was a significant increase in the proportion of those who engaged in shared decisions regarding wives' ANC and place of delivery in the intervention group. This is an encouraging finding because shared decision-making is often taken as a proxy for spousal communication [16,27,37]. This increase could be attributed to the increase in the proportion of respondents with positive attitude towards male involvement, since after the intervention, the proportion of respondents who agreed it is important for husbands to engage in shared decision regarding place of child birth increased significantly. men are regarded as providers and decision-makers in all matters related to pregnancy and childbirth [38], therefore, increasing their awareness and knowledge on the importance of shared decision with their wives may significantly improve maternal outcome. Involving women in decision-making makes them feel empowered to make decision and also involve their spouses in improving their health -seeking behavior during the prenatal period. This also contributes to more men accompanying their spouses to ANC and eventually increases utilization of skilled care [39].

The study findings have therefore, increased our understanding on men's knowledge and attitude towards birth preparedness. It has shown that formal education is a strong predictor of BPCR and this probably explains the increase in the proportion of men with high involvement among those that received health education on pregnancy danger signs and birth preparedness. It has shown that women have overall positive attitude towards involvement of men in BPCR and this should encourage men to be more involved in birth preparedness activities.

5. Conclusion/Recommendation

Only about half of the respondents in both groups had good knowledge of BPCR at baseline; similarly, less than half of the respondents in both groups had positive attitude towards involvement in BPCR. Only about one-third of the men had practiced BPCR and their overall involvement in BPCR activities was generally low. After the intervention, the health education was effective in increasing the proportion of respondents with good knowledge of BPCR, proportion with positive attitude and those that were prepared for birth, however, there was no significant increase in the proportion of those with high involvement in BPCR.

There is need for the government, through the Sokoto State Primary Health Care Development Agency to organize massive campaign to educate men especially those living in rural areas on BPCR. Traditional and religious leaders should also be involved in any educational intervention aimed at improving involvement of male partners in BPCR. Since the intervention has been effective in increasing the knowledge, attitude and preparedness of men in BPCR, the Sokoto state government should scale up the intervention to include other rural areas in the state

Conflict of Interest

We declare that, there is no conflict of interest.

Acknowledgements

We acknowledge that, the authors presented herein fully conducted and funded the research. We however, acknowledge the technical support of the Network for Behavioral Research for Child Survival in Nigeria (NETBRECSIN).

References

[1] WHO, UNICEF, UNFPA and the World Bank, Trends in Maternal Mortality: 1990 to 2015, WHO, Geneva, 2015.

[2] JHPIEGO/Maternal and Neonatal Health (MNH) Program. Birth Preparedness and Complication Readiness: A Matrix of Shared Responsibility. Baltimore, MD; 2001.

[3] Hiluf M, Fantahun M: Birth Preparedness and Complication Readiness among women in Adigrat town, north Ethiopia. Ethiop J Health Dev. 2007; 22 (1): 14-20.

[4] August F, Pembe AB, Mpembeni R, Axemo P, Darj E. Men's Knowledge of Obstetric Danger Signs, Birth Preparedness and Complication Readiness in Rural Tanzania. PLoS ONE 2015; 10(5): e0125978.

[5] United Nations Department of Public Information. International Conference on Population and Development, ICPD '94: Summary of the programme of action. 1995. http://www.un.org/ecosocdev/geninfo/populatin/icpd.htm. Accessed on 23rd January 2017.

[6] Nungari GM. Factors influencing Male Participation in antenatal Care in Kenya: A case of Kenyatta national hospital, Nairobi, Kenya. MA Dissertation, University of Nairobi 2014.

[7] Wiegers TA, Boerma WGW, de Haan O. Maternity care and birth preparedness in rural Kyrgyzstan and Tajikistan Sexual & Reproductive Healthcare 2010; 1(4): 189-194.

[8] Nasreen H, Leppard M, Al Mamun M, Billah M, Mistry S, Rahman M. et al. Men's knowledge and awareness of maternal, neonatal and child health care in rural Bangladesh: a comparative cross sectional study. *Reproductive Health*, 2012; *9*(1): 18.

[9] Bimala B. An exploratory study of prevailing Knowledge, attitude and practice of husband in regards to factors affecting in supporting Activities during pregnancy, delivery and Post-partum periods. J nob med. Col. 2011; 1: 45-52.

[10] Mullany BC. Barriers to and attitudes towards promoting husbands' involvement in maternal health in Katmandu, Nepal. *Social science & medicine (1982)*, 2006; *62*(11): 2798-2809.

[11] Carter M. Husbands and maternal health matters in rural Guatemala: wives' reports on their spouses' involvement in pregnancy and birth. *Social Science & Medicine*, 2002; *55*(3), 437-450.

[12] Mullany BC, Hindin MJ, & Becker S. Can women's autonomy impede male involvement in pregnancy health in Katmandu, Nepal? *Social science & medicine (1982)*, 2005; *61*(9): 1993-2006.

[13] Tamiso A, Merdekios B, Tilahun M. Association of Men's Awareness of Danger Sign of Obstetric Complication and Male Involvement's in Birth Preparedness Practices at South Ethiopia. International Journal of Public Health Science (IJPHS) 2015; .4(1): 63-70.

[14] Kalisa R & Malande OO. Birth preparedness, complication readiness and male partner involvement for obstetric emergencies in rural Rwanda. *The Pan African Medical Journal. 2016; 25: 91.*

[15] Kura S, Vince J, Crouch-Chivers P. Male involvement in sexual and reproductive health in the Mendi district, Southern Highlands province of Papua New Guinea: a descriptive study. Reproductive Health. 2013. 10: 46.

[16] Byamugisha R, AAstrøm A, Ndeezi G, Karamagi C, Tylleskär T, & Tumwine J. Male partner antenatal attendance and HIV testing in eastern Uganda: a randomized facility-based intervention trial. *Journal of the International AIDS Society*, 2011; *14*(1), 43.

[17] Nwokocha, E. Maternal crises and the role of African men: The case of a Nigerian community. Etude de la Population Africaine, 2007; 22(1): 35-56.

[18] Iliyasu Z, Abubakar IS, Galadanci HS, Aliyu MH. Birth preparedness, complication readiness and fathers' participation in maternity care in a northern Nigerian community. Afr J Reprod Health. 2010; 14(1): 21-32.

[19] Obi AI, Okojie HO. Knowledge of Birth Preparedness and Complication Readiness: Male Perspective in Benin City, Edo State. Annals of Medical and Surgical Practice 2016; 1(1): 23-29.

[20] Fotso JC, Ezeh AC, & Essendi H. Maternal health in resource-poor urban settings: how does women's autonomy influence the utilization of obstetric care services? *Reprod Health*, 2009; *6*(9). Retrieved from http://www.biomedcentral.com/content/pdf/1742-4755-6-9.pdf.

[21] Mistry R, Galal O, & Lu M. Women's autonomy and pregnancy care in rural India: A contextual analysis. *Social Science and Medicine*, 2009; *69*(6), 926-933

[22] Story WT, & Burgard SA. (n.d.). Couples' Reports of Household Decision-making and the Utilization of Maternal Health Services in Bangladesh. *Social Science & Medicine* (2012).

[23] National Population Commission (NPC) [Nigeria] and ICF. 2019. *Nigeria Demographic and Health Survey 2018 Key Indicators Report*. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF.

[24] Discover Nigeria-Facts about Nigeria-Sokoto state. http://www.sokotostate.gov.ng. accessed on 12/02/2017.

[25] Ibrahim T. Research methodology and Dissertation writing; Abuja, Crest Global Links LTD 2009:118.

[26] WHO recommendations on health promotion interventions for maternal and newborn health 2015. Available at http://www.who.int/maternal_child_adolescent/documents/health-promotion-interventions/en/. Accessed 19th July, 2017

[27] Ampt F, Mon MM, Than KK, Khin MM, Agius PA, Morgan C, et al. Correlates of male involvement in maternal and newborn health: a crosssectional study of men in a peri-urban region of Myanmar. BMC Pregnancy Childbirth. 2015; 15: 122.

[28] Ibrahim MS, Idris SH, Abubakar AA, Gobir AA, Bashir SS, Sabitu K. Determinants of male involvement in birth preparedness among married men in two communities of rural northern Nigeria. Journal of Community Medicine and Primary Health Care 2014; 26 (1) 44-58.

[29] Shefner-Rogers CL, Sood S. Involving husbands in safe motherhood: effects of the SUAMI SIAGA campaign in Indonesia. J Health Commun. 2004 May-Jun; 9(3): 233-58.

[30] Davis J, Luchters SH, W. Men and maternal and newborn health: benefits, harms, challenges and potential strategies for engaging men, Compass: Women's and Children's Health Knowledge Hub. Melbourne, Australia: Burnet Institute, 2012.

[31] Kakaire O, Kaye DK, & Osinde MO. Male involvement in birth preparedness and complication readiness for emergency obstetric referrals in rural Uganda. *Reproductive Health*, 2011; *8*(12).

[32] Ahmed A, Hossain SAS, Quaiyum A, et al. Husbands’ knowledge on maternal health care in rural Bangladesh: an untapped resource? Trop Med Int Health 2011; 16: 291.

[33] Ganle JK, Dery I. 'What men don't know can hurt women's health': a qualitative study of the barriers to and opportunities for men's involvement in maternal healthcare in Ghana. Reprod Health. 2015 Oct 10; 12: 93.

[34] Singh D, Lample M, and Earnest J.The involvement of men in maternal health care: cross-sectional, pilot case studies from Maligita and Kibibi, Uganda. Reproductive Health 2014; 11: 68.

[35] Kwambai TK, Dellicour S, Desai M, Ameh CA, Person B, Achieng F, et al. Perspectives of men on antenatal and delivery care service utilisation in rural western Kenya: a qualitative study. BMC Pregnancy Childbirth. 2013; 13(1): 134.

[36] McPherson RA, Khadka N, Moore JM, Sharma M: Are birth-preparedness programmes effective? Results from a field trial in Siraha district, Nepal. Journal of Health Population and Nutrition. 2006; 24 (4): 479-88.

[37] Mullany BC, Becker S, Hindin MJ. The impact of including husbands in antenatal health education services on maternal health practices in urban Nepal: results from a randomized controlled trial. Health Educ Res (2007) 22 (2): 166-176.

[38] Connell R. Gender, health and theory: conceptualizing the issue, in local and world perspective. Soc Sci Med. 2012; 74(11): 1675-83.

[39] Jennings L, Na M, Cherewick M, Hindin M, Mullany B, Ahmed S. Women’s empowerment and male involvement in antenatal care: analyses of Demographic and Health Surveys (DHS) in selected African countries. BMC Pregnancy Childbirth. 2014; 14: 297.