

Effectiveness of mobile phone text message reminder on birth preparedness in a rural community in Kenya

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ABSTRACT

Background: Birth preparedness is a strategy that has been found effective in preventing obstetric delays. Use of mobile technology can enable access and efficiency of health messages delivered during antenatal care. The mobile technology can be more effective in conveying health messages owing to its accessibility and enables follow up.

Materials and Methods: This was a randomized control trial carried out among pregnant women attending public health antenatal clinics in Migori County. Four health facilities were randomized. Two facilities each were randomly picked for the study and control groups respectively. A total of 379 participants were recruited into the study. The study group participants received a verbal message on birth preparedness and a mobile phone text message reminder one month to their expected date of delivery. Follow up was done to both groups through their mobile phone contacts. Data was collected using an interviewer-administered questionnaire and analyzed using Stata version 11. Proportion tests were done to compare the groups.

Results: The success rate of the study was 90.5% ($n = 343$). Most of the participants (73%) were aged between 20 and 34 years. Majority of them were married (79.2%) and most of them had primary level of education. Protestant was the predominant religion (55.2%). Housewives and businesswomen constituted 34.2% and 27%, respectively. The respondents in the study group who were birth prepared were 74.3% ($n = 136$) while those in the control group were 48.1% ($n = 77$).

Conclusion: The use of mobile phone text message reminder in addition to verbal messages is more effective.

Key words: Antenatal; birth preparedness; delivery; message reminder; mobile phone.

Background

Maternal mortality is an issue of public health global challenge with the biggest burden in sub-Saharan Africa where an estimated 830 women die every day due to pregnancy related complications.^[1] Several strategies have been laid down to avert maternal deaths. One of the strategies is birth preparedness and complication readiness strategy which is aimed encouraging skilled birth attendance. Birth preparedness enables the mother and her family to make all plans for skilled care at birth.^[2] Birth preparedness and complication readiness (BP/CR) matrix describes the roles of policy makers, health providers, families, and the


women in enabling skilled birth attendance thus lessening delays which may lead to maternal mortality.^[3] Complications related to pregnancy and childbirth are unpredictable thus a birth preparedness plan is recommended.^[4] During antenatal care visits (ANC), pregnant women are taught about birth preparedness. In most cases, health education is provided in the clinic and rarely is follow up made. With the advent of technology, utilization of mobile phones in health education has been found to improve health outcomes. In Kenya, the

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maternal mortality rate is 362/100000 live births^[5] while it is 693/100000 in the study setting (Migori County).^[6] Most of these deaths occurred during labour and delivery and were mainly linked to obstetric delays.^[7] This indicates the need to intervene so as to avoid such delays. One such way is through the use of mobile phone technology in health education.

There is an increase in mobile phone ownership in Africa. Kenya is one of the most technologically advanced country in Africa with a mobile phone penetration of over 90% according to the communications authority.^[8] Randomized controlled trials in a review study established that mobile technology can help improve health outcomes in chronic conditions, self-management and post-hospitalization care.^[9] In health education, mobile phones can be used to deliver health messages through short messages services (SMS), learning modules or video lectures.^[10] A systematic review on mobile text messaging for health establish that there were good outcomes of its utilization, however, there was need to assess the long term intervention effects and cost-effectiveness of the technology.^[11] The literacy level of women of reproductive age in Kenya is 88% while at Migori County is 75–90%.^[5]

This study utilized a modified approach of delivering health messages on birth preparedness to pregnant women attending ANC rather than the routine approach. The routine approach is a package of ANC where all the necessary topics in pregnancy are generalized. During ANC, some of the critical topics such as labour and delivery processes are rarely covered.^[12] The modified approach adopted delivery of specific birth preparedness information through verbal messages and a mobile phone text message reminder on key points on birth preparedness. The short message service (SMS) reminder was done one month to the expected date of delivery.

Materials and Methods

This was an interventional study which involved two groups of pregnant women attending antenatal care (ANC) clinics in the public health facilities in the Migori County. The control group received health education information about birth preparedness during their routine ANC visits through the usual routine approaches. The study group received the intervention using the modified approach. The modified approach involved the intervention which was provision of verbal health messages on birth preparedness and a reminder through a mobile phone text message one month to the expected date of delivery (EDD). There was one session for sharing verbal message on birth preparedness during the client's first visit to ANC and a review was done on birth preparedness during the second visit. Contact details of the participants in both groups were taken so that follow up

would be done to establish their level of birth preparedness within 24 hours after delivery. The text message which was translated to the language well understood by the clients was short and informative, and it read:

“Remember to come and deliver in the hospital. Maternity services in the government hospitals are free. Identify transport means and set aside fare. Carry a bag with your supplies and baby clothes”.

At first, all public health facilities in the County were listed and classified as high or low client volume. Those which were high client volume were listed and simple random sampling was used to select Randomization was done at the level of the facilities whereby two facilities were the control while two formed the study group. The inclusion criteria was pregnant women who were less than 32 weeks gestation. The sample size of the study was 370 therefore 185 respondents per group which was obtained through systematic sampling. Ethical approval was sought from the Kenyatta National Hospital (KNH)/University of Nairobi (UON) ethical review committee. Data were collected using an interviewer-administered questionnaire which was uploaded on the open data kit (ODK) software. Once completed, data analysis was done using Stata version 11 software. Descriptive analysis was done where frequencies and percentages were reported. Proportion tests were done to compare the study and control groups. To assess the effectiveness of the modified approach, an evaluation was done on the knowledge and practice of birth preparedness. Data was presented in form of figures and tables.

Results

The respondents who were successfully followed up were 90.5% ($n = 343$). Those lost to follow up were 9.5% ($n = 36$) because of providing wrong phone numbers hence they could not be reached.

Socio-demographic characteristics of the respondents

Slightly more than half of the respondents 55.1% ($n = 209$) resided in the village. The age of the respondents ranged from 15 to 44 years with the mean age being 25 years. Most of the respondents 86.5% ($n = 328$) were married and the education level for the majority was primary level. Housewife and business woman were the most common occupation. The pre-dominant religion was protestant 53.6% ($n = 203$) [Table 1].

Comparative results of study and control groups on birth preparedness

The key aspects of birth preparedness that were assessed were knowledge and practice. These were compared between the study and control groups.

Table 1: Socio-demographic characteristics of the respondents

Variable	Control group (<i>n</i> =174)		Study group (<i>n</i> =205)	
	Frequency (<i>n</i>)	Percent (%)	Frequency (<i>n</i>)	Percent (%)
Age				
19 years and below	39	22.4	34	16.6
20-24	69	39.7	62	30.2
25-29	33	19	43	21
30-34	22	12.6	41	20
35 and above	11	6.3	25	12.2
Total	174	45.9	205	54.1
Marital status				
Married	156	89.7	172	83.9
Single	17	9.8	28	13.7
Separated	0	0	3	1.5
Widowed	1	0.6	2	1
Residence				
Town/shopping centre	77	44.3	93	45.4
Rural (village)	97	55.7	112	54.6
Total	174	45.9	205	54.1
Education level				
Primary and below	112	64.4	126	61.5
Post primary	62	35.6	79	35.5
Religion				
Protestant	109	62.6	98	47.8
Catholic	34	19.5	37	18
SDA	24	13.8	56	27.3
Others	7	4.1	14	6.9
Total	174	45.9	205	54.1
Occupation				
Student	12	6.9	13	6.3
Peasant farmer	37	21.3	27	13.2
Casual laborer	6	3.4	8	3.9
Housewife	51	29.3	85	41.5
Business woman	55	31.6	55	26.8
Employed (salaried)	10	5.7	14	6.8
Others	3	1.7	3	1.5
Total	174	45.9	205	54.1

Knowledge of the respondents on birth preparedness was assessed in the study and control groups after the intervention. Using the knowledge score developed based on the components of BP, a score of ≥ 4 was regarded as knowledgeable while < 4 was considered as low knowledge on BP. The findings indicated that the level of knowledge among the respondents in the study group was 85.8% ($n = 157$) while in the control group was 63.1% ($n = 101$).

Regarding birth preparedness, 62.4% ($n = 214$) of the respondents were birth prepared. The variables that indicated preparation were hospital delivery, having a ready bag with baby clothes, having transport means and setting aside fare to pay for transport. For those respondents who delivered in hospitals other than the government facilities where delivery services were free, readiness included having money to pay hospital delivery fees. The clients in the intervention group

who were birth prepared were 74.3% ($n = 136$) while those in the control group were 48.1% ($n = 77$) [Table 2].

Effectiveness of the mobile phone technology

The mobile phone technology through the use of mobile text message reminders was an effective tool in enhancing birth preparedness. The respondents who were birth prepared in the study group were 74.8% ($n = 137$) while in the control group were 48.1% ($n = 77$).

Respondents in the intervention group of the study appreciated the use of the mobile phone text message to remind them what they needed to prepare especially those who had received health education only once during their ANC attendance. Access of the researcher's mobile phone contacts enabled the respondents to inquire any further information pertaining pregnancy and childbirth. Some

Table 2: Comparison of birth preparedness among study and control groups

Phase of study	Study group		Control group	
	Frequency (n)	Percentage	Frequency (n)	Percentage
Knowledge				
At recruitment	106	58.0	83	52.0
Post-intervention	157	85.8	101	63.1
Practice				
At recruitment	108	59.0	87	54.4
Post-intervention	136	74.3	77	48.1

raised concerns after delivery about having difficulty in breastfeeding, minor complications of puerperium or any other problem they experienced. The mobile phone provided a forum for sharing information and reassurance to the respondents. These are some of the phone conversations with the respondents.

'I received the SMS before I had started preparing and it helped to remember what I needed'.

'The SMS reminded me what I was supposed to do so that I could not be caught unaware during delivery'

'This (SMS) is a good thing. You know sometimes we are very busy and we forget but this reminded me what I was to prepare'.

'Thank you for sending the SMS. You see now I am able to call when I have a problem'.

'I started bleeding after I received the SMS and the telephone contact enabled me to ask what to do'.

'I am happy because you sent the SMS which helped me to prepare. In addition, I was able to ask what to do when I went into labour since I didn't know. This is my first child'.

Discussion

The knowledge of birth preparedness enables the woman and her family to make adequate plans for childbirth. Without the knowledge, emergencies that could arise may not be handled in good time. Birth preparedness is part of the ANC package and health messages are shared with all women attending ANC clinics. Women who are knowledgeable about birth preparedness are more birth prepared.^[13] The practice of birth preparedness enables the women to prepare, plan for delivery and be ready at the time of childbirth. The study established that most of the respondents believed in birth preparedness. Slightly more than half the respondents had favourable practices on birth preparedness, which included having basic knowledge of danger signs, identifying place of delivery, making transport arrangements, obtaining basic

supplies for delivery; identifying a birth companion and making arrangements for a caretaker for the home while away for delivery. These findings are in agreement with a Ugandan study which established low practice of birth preparedness.^[14,15] In addition, the respondents in this study had prepared for childbirth in various ways. Most of the respondents had a ready maternity bag (with razor blade, baby clothes, and sanitary pads) in addition to buying baby clothes. During ANC, having these items is emphasized therefore it is likely that women will prepare and have the items ready.

Manual follow up and tracking of clients receiving health care services can be difficult owing to the massive numbers. Mobile phone is a technology that has been used and found effective in providing health education owing to its convenience and accessibility and ease of use. Use of mobile phones in improving health care has been found to be cost effective.^[16] In the study group, the respondents received a mobile phone text message as a reminder on birth preparedness in addition to the verbal messages and those in the control group only received verbal messages during antenatal care sessions. Most of the respondents in the intervention group of the study were more birth prepared as compared to their counterparts in the control group. This could be attributed to the use of mobile text message reminder for respondents in the intervention group. Findings of this study are similar to the findings of studies on mobile phone messaging reminders for attendance at healthcare appointments which established that use of mobile reminders improved attendance to health care as compared to where there were no reminders.^[17,18] The findings of this study are also in agreement with a study examining use of mobile phone text message in Zanzibar which established that its use led to increased antenatal care attendance and utilization of skilled birth attendance.^[19] The use of the mobile phone text message in this study contributed to the birth preparation by helping the clients to be reminded of what to prepare a month to their expected date of delivery. A systematic review to assess the role of mobile technology established that use of mobile phones can be used to improve health.^[9] A systematic review of 60 studies where short message service (SMS) reminders were used to remind patients about medication and reduce treatment interruption showed improved outcomes in 46 of the 60 studies.^[20]

Conclusion

Use of mobile phone text messages in combination to verbal message in delivery of health education messages is more effective as compared to use of verbal messages only. Introduction of the use of mobile phone text message

reminders in addition to the verbal messages in the health facilities is vital to facilitate and enhance more birth preparation among the clients.

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Conflicts of interest

There are no conflicts of interest.

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