

Utilization of mobile phone short message to enhance focused ante natal care among women in Kenya

1.0 Background

Short message service (SMS) is part of mhealth. Short message service is a service in telecommunication networks providing the served user the ability to send and receive Short Messages. Mobile health (mhealth) is defined as medical and public health practice supported by mobile devices, such as mobile phones, personal digital assistants, and other wireless devices. This could be in form of voice calls, sending or receiving SMS or sending images. Short message service can improve service delivery by health workers. It can also increase health service demand among the clients (1).

The rapid growth of mobile technology, falling market prices of products due to free market and increasing coverage have the potential to change health care delivery if harnessed. A wide range of medical services could be improved by providing patient-focused support and management through the health-care system (2). One of the services that can be improved and is targeted by this study is focused ante natal care. Proper care during pregnancy and delivery is important for the health of both the mother and the baby. Antenatal care (ANC) has the capacity to reach large segments of the pregnant population and has interventions that can detect, treat and prevent conditions that could result in maternal mortality and morbidity. Ante natal care is one of the interventions that can improve skilled birth attendance. Skilled birth attendance is a major intervention in prevention of maternal mortality (3).

Focused ante natal care as a model emphasizes quality of care rather than quantity of ante natal visits. World health Organisation (WHO) recommends a minimum of four targeted ante natal visits. Each focused antenatal care visit includes interventions that are appropriate to the woman's stage of pregnancy and which address her overall health. The interventions include laboratory tests (ante natal profile) on haemoglobin levels, blood group, Khan test for syphilis and Human Immuno Deficiency virus (HIV). It also includes malaria prophylaxis, tetanus vaccine and iron supplementation. Advice on nutrition, health promotion and individual birth plan is done. Individual birth plan includes identification/planning on costs of delivery, means of transport to health facility, a birth companion, a care taker for the home/other children during delivery, skilled attendant and place of delivery (4).

Maternal health problems pose a major challenge in many nations. According to the World Health Organization (WHO), 99 percent of all maternal deaths take place in the developing countries (5). Maternal mortality in Kenya is high at 362 per 100,000 live births. This is deemed high by the global standard which deem a maternal mortality ratio of above 300 deaths per 100 000 live births to be high (6).

According to Kenya demographic and health survey 2014-15, only 58 percent of women attended four or more antenatal visits for their most recent birth in Kenya. Rural women who attended the recommended visits were fewer than urban women (51 percent and 68 percent, respectively). In Tharaka Nithi County, about 44% of the women did not attend the recommended ANC visits (6). Despite the continued routine safe motherhood initiatives the progress to reducing maternal mortality is still slow. The government has proposed innovations like mhealth as some of the interventions to increase the uptake of maternal and child health

services (7). Despite known benefits of SMS in other health aspects, its influence on focused ante natal care has not been established. The viability of mobile phone short message service (SMS) as a reminder for appointment for focused ante natal care had not been tested in Kenya prior to this study. Therefore this study seeks to determine the influence of short message service on uptake of focused ante natal care.

2.0 Methodology

2.1 Design and Target population

The study design was single blind randomized controlled trial (RCT). There was an intervention of mobile phone SMS that was sent to the intervention group while no SMS was sent to the control group. This design is deemed the best in showing cause and effect through manipulation of variables. The target population was pregnant women in Tharaka sub county, Tharaka Nithi County.

2.2 Setting

The study was conducted in Tharaka Nithi County (Tharaka sub-county), Kenya. Tharaka Nithi County as at 2015 was projected to have a total population of 406, 995. The County has three sub-counties; Maara, Chuka/IgambaNg'ombe and Tharaka. Tharaka Sub County was projected to have a total population of 130,098 people among whom 67,211 are women. The number of women of reproductive age was projected to be 35,145. The number of pregnant women was projected to be 5,272 (8).

2.3 Description of the intervention

The respondents were recruited based on the inclusion and exclusion criteria. This included collection of baseline information of the respondents that was entered into a data base. A computerised randomization was used to allocate the respondents to experimental and control arm of the study. The experimental group were sent automated monthly short message reminders in addition to the routine reminder on their ante natal clinic book. The control group was not sent the messages. Exit was done one month after delivery.

2.4 Sampling, Sample size determination, data collection and analysis

The county was purposively selected because it one of the middle performers on uptake of focused ante natal care. Tharaka Sub County was also purposively selected because it had the lowest uptake of focused ante natal care. The respondents were sampled through systematic sampling using the inclusion and exclusion criteria. The sample size was calculated according to the formula developed by Chan for comparison of 2 proportions (two-sided) at 5% level of significance and 80% power (10). In Tharaka Nithi County 40% of women attend the four targeted visits for ante natal care (11). The study is targeting to show an interventional effect of 20% after using SMS reminders thus increasing the FANC uptake from 40% to 60%. The formula for the sample size is as shown below;

$$M = \frac{cX\pi_1(1 - \pi_1) + \pi_2(1 - \pi_2)}{(\pi_1 - \pi_2)^2}$$

= 95 per group,

Assuming a dropout rate of 30%, each group will have 124 and a total of 248 participants. The final sample that was analysed was 241 respondents. Data was collected using structured questionnaires. Trained research assistants were used in data collection. Data was entered into Stata Version 11 for analysis. Descriptive statistics was used to generate proportions and percentages. Chi square was used to test association between dependent and independent variables. Binary and multiple logistic regression was used to generate odds ratios that would predict the outcomes.

2.5 Ethical and logistical considerations

Ethical review and clearance was done by Kenyatta University ethics review committee.

4.0 Results

4.1 Utilization of Focused ante natal care

Figure one shows the utilization of focused ante natal care. Analysis on all women indicated that slightly above half (57%) of the respondents in the current study did utilize the focused ante natal care. Three quarters (75%) of the women that received short messaged reminders utilized focused ante natal care. Only one in 10 (10%) women utilized focused ante natal care among the control arm of the study. The mean number of visits for the entire sample was 3.3 ± 0.082 . The mean number of visits of ante natal visits in the intervention group was 4.0 ± 0.097 compared to 2.5 ± 0.087 visits in the control group.

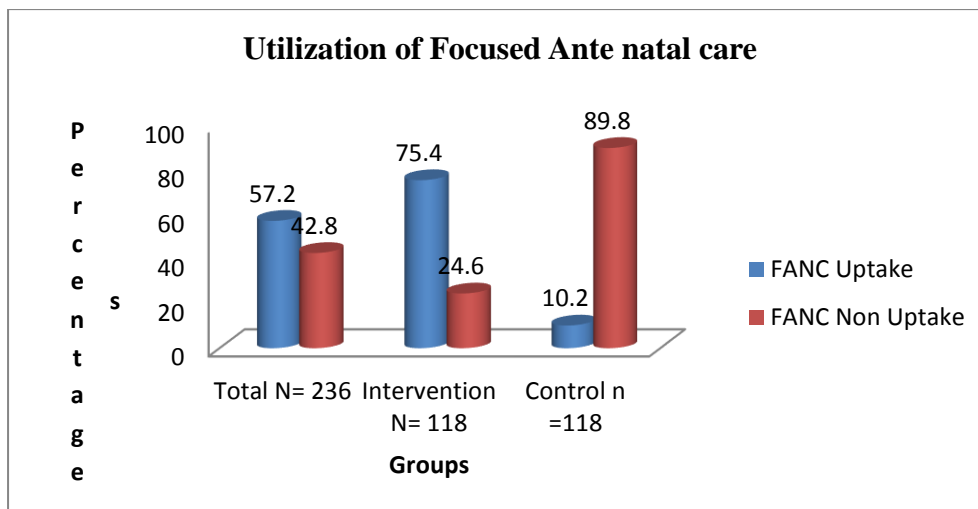


Figure 1: Utilization of focused ante natal care

4.2 Association of and influence of short message service on focused ante natal care

Table 2 shows the association and influence of short message service on focused ante natal care. This analysis was done to establish the association and influence of short message service on uptake of focused ante natal care. Chi square was used to test association while binary logistic regression was used to establish the influence. The intervention group had a higher proportion of uptake of focused ante natal care (75%) compared to 10% in the control group.

There was significant association between the short message reminder and the focused ante natal care ($p < 0.001$). On binary logistic regression, the chances of uptake of FANC was increased by 27 times by receiving a short message reminder compared to routine reminders which are written on the mother and child booklet.

Table 2: Association and influence of short message service on Focused ante natal care

Association of SMS reminders on Focused ante natal care						
Group	Utilization of focused ante natal care	Non utilization of focused ante natal care	Chi Square	Degrees of freedom	P value	
Control (no SMS) N = 118	12 (10.2%)	106 (89.8%)	102.6	1	<0.001	
Intervention (SMS) (N = 118)	89 (75.4%)	29 (24.6%)				
Influence of SMS reminders on Focused ante natal care (logistic regression)						
Variable N= 236	FANC uptake	Non Uptake of FANC	Odds ratio	P Value	Confidence Interval	
No SMS (Reference)	12	106	27.11	<0.001	13.07	56.22
SMS reminder	89	29				

5.0 Discussion, Conclusions and recommendations

The level of utilization of focused ante natal care among all the women was 57%. The utilization among the intervention group was 75%. The utilization among the control group was 25%. The national uptake of focused ante natal care is at 58% which almost similar to the general uptake in this study. There are rural urban differences that exist in the country that is 51% and 68% respectively. Eastern province where Tharaka Nithi County lies had an uptake of 56% (6). The uptake of focused ante natal care in the sub county of study (Tharaka) is at 40% (11). Based on these findings, the uptake of focused ante natal care is higher among the women in the intervention group. It is also noted that without intervention, the uptake is very low. The explanation of the difference in the usual uptake (40%) and the control group uptake (25%) can be due to data report practices where over reporting could be happening in some facilities. In study on determinants of focused ante natal care utilization in the same area, the uptake was found to be 52%. The determinants were number of births, highest level of education, employment status, the level of income and marital status (12). The mean number of visits was 3.3 for all women. The mean number of visits for the intervention group was 4. The mean number in the control arm was 2.4 times. A study done in western Kenya, found the average number of visits was three (13).

Short message service provides a low cost opportunity to provide services and communication to rural and hard to reach clients. The mobile short message service increased the chances of utilization by 27 times. This shows the great potential mobile health has in improving the uptake of health services. A change of 10% between interventional and control group was found in a related study by assessing ante natal care attendance (14). Previous studies using short messages in Zanzibar indicated an increase in uptake of skilled birth attendance. In addition to skilled birth attendance, the confidence and trust of the women on health workers increased. In Rwanda, the text messages were also found to increase the level of health facility deliveries. This was done through community health workers who mobilized the pregnant women to utilize health services (15). Furthermore, use of short message services improved the uptake of obstetric fistula services. This was done in Sierra Leone, Tanzania and Kenya (16).

5.2 Conclusion

Focused ante natal care is a main entry to critical services in maternal health. Utilization has been linked to skilled birth attendance that is known to reduce maternal morbidity and mortality. There existed a gap prior to this study on the influence of short message services on uptake of focused ante natal care. This study established that mobile short message reminders can improve the utilization of focused ante natal care among rural women.

5.3 Recommendations

The ministry of health and relevant stakeholders should put in place measures to implement mobile based reminders to improve uptake of focused ante natal care among pregnant women.

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