

Effect of Mobile Phone Based Health Education Reminder on Neonatal Cord Care among Postnatal Mothers in Ekiti State, Nigeria

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Abstract: This study investigated the effect of mobile phone based health education reminder on neonatal cord care among postnatal mothers in Ekiti state. The study adopted quasi-experimental of pretest- posttest control group research design. The population for the study comprised of postnatal mothers attending health facilities in Ekiti State. A total of 364 postnatal mothers consented to be part of the study. Baseline information was collected using a self-developed questionnaire. The questionnaire was subjected to face and content validity. The reliability of the instrument was determined using Cronbach Alpha reliability to obtain a coefficient of 0.82. Intervention package consisted of carefully prepared text messages designed to remind mothers of important aspects of neonatal cord care were sent to the mobile phones of the selected mothers for four weeks. Post intervention data were collected at the sixth week of the study. The data collected were subjected to descriptive statistics of frequency counts and percentages and inferential statistics of paired sample t-test.

The findings of the study revealed that the participants had fair knowledge of neonatal care. However, the study showed that mobile phone health education reminder significantly improves knowledge of neonatal care among postnatal mothers. It was concluded that mobile phone based health education reminder was effective in improving knowledge and practice of neonatal cord care. The study recommends the use of mobile phone health education reminder for postnatal mothers attending health facilities.

Keywords: Health education, neonatal cord care, mobile phone, text messages.

I. INTRODUCTION

A. Background Information

Mobile phone health technology refers to medical and public healthcare support provided through mobile and smart phones (Adibi, 2015). Mobile health technology has a potential for prevention and management of diseases especially in developing countries. This may be due to emergence and availability of mobile phones and improved telecommunication infrastructures in developing countries. Mobile health has the potential of promoting better health communication to achieve healthy lifestyles, improving

decision made by health professionals (and patients) and enhancing healthcare quality by improving access to medical and health information and facilitating instantaneous communication in places where this was not previously possible (Zhuang, Xang, Han, Yang & Zhuang, 2016).

Despite the availability of mobile devices in developing countries especially in Nigeria, it seems that the number of women who could operate mobile phones for health information are very low due to technological gap (Odetola, Ayamolowo & Ayamolowo, 2018) yet accessing health care in rural area is a major issue as most rural areas are mostly remote and distant from the urban health system. Facility-based health education is common in rural settings almost all women attending antenatal care in health facility would have been exposed to health education on neonatal cord care (Akinwaare, Oyebode, Brown, Ogunniran & Adeleye, 2021). Yet there continue to be poor neonatal cord care and poor health outcome of cord care on the new born (Afolaranmi, Hazzan, Ofakunrin & Sule, 2018).

Suboptimal neonatal cord care in Nigeria is one of the major factors contributing to high neonatal deaths in Nigeria as neonatal cord infections singlehandedly contribute up to 49% of neonatal deaths (Afolaranmi, Hazzan, Ofakunrin & Sule 2018). World Health Organization (WHO, 2013) recommended that nothing should be put on the cord but it should be allowed to dry and falls on its own or application of topical antiseptics in countries with poor hygienic conditions. Nigeria is being one of the countries with poor hygiene and high cord infection rates, hence Nigerian government recommends that Methylated spirit should be used to wipe the cord several times daily till the stump falls and the cord is completely healed. However, studies in Nigeria reported applications of multiple agents on the cord (Adejuyigbe, 2015; Coffey & Brown, 2017; Ndikom and Oluwatosin, 2020). Some of the substances place on the neonates' umbilical cord stump included powder, hot compress, herbs, salt, sand, saliva, palm oil, toothpaste, olive oil, antiseptics, engine oil, breast-milk, petroleum jelly, banana, pounded cassava, animal dung, and many others

(Adejuyigbe, 2015; Coffey & Brown, 2017; Ndikom and Oluwatosin, 2020). Neonatal cord infection is significantly high in Nigeria and an estimated 30 percent of all neonatal deaths have been attributed to cord infections (Coffey and Brown, 2017).

One of the interventions aimed at reducing neonatal death is the hospital based health education service which is a mode of passing health information from health care givers to their clients in a bid to improve healthy living and lifestyle modifications. In Nigeria, almost all primary health care centers give health education especially during antenatal care. Pregnant women receive health education about different topics relating to pregnancy, labour, child birth and neonatal care; neonatal cord care, keeping the baby warm, bathing the baby and breastfeeding.

In spite of the routineness of health education in antenatal clinics, it appears that there is not much improvement in neonatal care over the years. Recent research findings indicate poor neonatal cord care which makes Nigeria to remain one of the countries with highest neonatal death rates in the world (Ndikom & Oluwatosin, 2020).

This indicates that hospital based health education seems not to be effective especially in neonatal cord care. It is worth noting that hospital based health education is very easy, very simple, cheap and can reach a large number of women at the same time. However, the tendency to forget the health information is very high. This may be due to multiple health instructions that are provided at one visit, hence, the use of mobile health technology to complement and reinforce such onsite neonatal care education become necessary.

Globally, the rapid development of mobile technology had created new ways of addressing public health challenges and shifted the paradigm of health care access and delivery. Mobile health technology has been used in many countries such as Kenya and India, (Nyang'echi & Osero, 2021; Kumar, De Costa, Das, Srinivassa, D'Souza & Rodrigues, 2019) by health workers to remind clients of health information especially in places where home visit is not feasible. Reminder messages or calls are often sent to clients' cell phone to improve uptake of different health care services including antenatal services, compliance to Anti-retroviral Therapy and uptake of childhood immunization.

A major barrier to improving neonatal cord care may be due to lack follow-up and health education reminder. In developing countries, preventive health care service and communication between health workers and clients seem to be very poor. Mobile phone text messages reminder is a proposed strategy for the continuity of care in settings with various challenges to health care delivery such as shortage of healthcare personnel, inadequate funding, and lack of transportation. Deaths from cord infections can be prevented if cord care is optimized. Mobile-phones technology therefore, may be a possible intervention that bridges the gap in

communication which may in turn improve neonatal cord care.

It is not out of place to reason that despite the increase global penetration of mobile health technology, its usage among health providers in Ekiti state with regard to text message reminder on neonatal cord care has rarely been investigated. It is against this background that the present study assessed the effect of mobile phone based health education reminder on neonatal cord care among postnatal mothers in Ekiti state.

B. Statement of the Problem

One of the prominent interventions in health care settings to improve maternal and child health is hospital based health education which refers to specific planned education programme designed for the patient by health care personnel. It is an integral part of health care delivery commonly provided in outpatient clinics in almost all public health care facilities. The main purpose of hospital based health education is to promote, maintain, and improve health outcomes. However, ability to remember the details of health information given to patients during health education classes has been a major challenge to patients' adherence to health instructions. This might be as a result of the large amount of information usually presented to patients at the same time during clinic days.

For example, during antenatal care at various health institutions, mothers receive health education as part of the strategies to promote maternal health and the health of the new born baby. Different health topics, such as danger signs of pregnancy, personal hygiene, birth preparedness, labour and child birth, care of the newborns; clean or hygienic umbilical cord care, keeping the baby warm otherwise known as thermal care, and exclusive breastfeeding and a host of others are discussed with pregnant women attending antenatal care in health facilities in Ekiti state.

Although, health education is of major importance in disease prevention, however, it seems not to have reflected significant impact on neonatal cord care over the years, especially in Nigeria. This may be because health education on neonatal care is usually given to pregnant women during antenatal classes as part of other antenatal multiple activities. Unfortunately, the focus of health education at this time is on care during pregnancy and delivery processes. Thus, health education on neonatal care is usually very brief among the various health education topics that are covered. This may account for the major reason why mothers may not remember the detail of such instruction after delivery.

Based on this trend, it is clear that hospital-based health education alone may not help much in neonatal care. This necessitates the need for reminder to provide post discharge follow ups and during-the-care instructions. Client reminder differs depending on the aspects involved. Reminder messages could be carried out through telephone calls, text

messages, post cards or other forms of interventions that combine both home visits and other forms of reminder.

Despite the increasing penetration of mobile devices in low and middle income countries, the numbers of fully operating mobile health solutions implemented are very low. Most reviewed mobile health literature revealed that mobile health in developing countries is still at experimental stage (Nyang'echi & Osero, 2021; Kumar, De Costa, Das, Srinivassa, D'Souza & Rodrigues, 2019). Nigeria is said to be second to India in neonatal mortality (Inter-Agency for Child Mortality Estimation IGME, 2012), yet only a few mobile based studies were found in Nigeria and none of these was on neonatal cord care,

Based on the absence of sufficient and reliable data in Ekiti State on which generalization could be based, the present study was carried out to assess the effects of mobile phone based health education reminder on neonatal cord care among postnatal mothers in Ekiti State, Nigeria.

C. Research objectives

The study was developed to assess the effect of mobile phone based health education reminder on neonatal cord care among postnatal mothers in Ekiti State, Nigeria. Specifically, the study sought to:

- i. assess the knowledge of neonatal cord care among postnatal mothers;
- ii. investigate the neonatal cord care practices among postnatal mothers in Ekiti State;
- iii. Evaluate the effects of mobile phone based health education reminder on neonatal cord care practices among postnatal mothers.

D. Research Questions

- i. What is the knowledge of neonatal cord care among postnatal mothers?
- ii. What is the effect of mobile phone based health education reminder on neonatal cord care among postnatal mothers

II. RESEARCH METHODOLOGY

A. Research Design

The study adopted a pretest-posttest quasi –experimental research design. Participants were grouped into one experimental and one control group.

The pattern of the design used is shown below:

The pattern of the design is as follows;

E: $O_1 X_1 O_2$ Experimental group with treatment
C: $O_3 X_c O_4$ Control group with no treatment

Where:

$O_1 O_3$ –Observations before treatment

$O_2 O_4$ -Observations after treatment

X_1 -Treatment via intervention package for cell phone

X_c - Control group without treatment

B. Population

Population for the study comprised of postnatal mothers attending health facilities in Ekiti State.

C. Sample and Sampling Technique

The sample consisted of 364 mothers randomly selected from four two rural and urban public health facilities. Using purposive sampling technique, 184 mothers were selected into experimental group, and 180 mothers into the control group.

Mothers included into the study were mothers who newly delivered live babies; had previous experience of neonatal cord care; possessed a mobile phone with valid phone numbers and literate to read text messages.

D. Research Instrument

The instrument for this study was a self-designed questionnaire titled 'Neonatal Care Questionnaire' for Postnatal Mothers (NCQ). The questionnaire has two sections. Section A was designed to collect demographic information of the postnatal mothers, such as age, educational background, marital status and location of residence. Section B was designed to collect information on the practice of neonatal cord care

In order to ascertain the face and content validity of the instrument, the questionnaire was given to three experts in Health Education, Community Medicine, Tests and Measurement, in Ekiti State University, Ado-Ekiti. These experts vetted the instrument to ensure that it adequately covers the entire contents that it should cover.

The reliability of the instrument was established by pretesting the validated version to 20 postnatal mothers at Ekiti State University Teaching Hospital, Ado-Ekiti who were not part of the study. The Cronbach Alpha method was adopted to determine the internal consistency. A reliability coefficient of 0.82 was obtained. This indicated that the instrument was appropriate for the study.

The experimental procedure was carried out in three phases; phase one was the pre-intervention stage when the baseline survey was done while phase two was the intervention phase when mothers in the intervention groups received health education reminder via text messages on neonatal cord care three times a week for 4 weeks. The post-intervention phase was the assessment for all enrolled groups which occurred at the 6th week of the study during postnatal clinic appointment at the selected health facilities.

The pretest and posttest were collected and analysed using descriptive statistics of frequency counts, percentages, mean score and inferential statistics of t-test at 0.05 level of significance.

III. RESULTS AND DISCUSSION

Research Question1: What is the knowledge of neonatal cord care among postnatal mothers?

Five different areas of neonatal cord care were identified. The results are presented in Table 1.

Table I: Percentage Of Responses On Knowledge Of Neonatal Cord Care

| Items | Intervention group | | Control group | |
|--|--------------------|------|-------------------|------|
| | Correct responses | | Correct responses | |
| | N | % | N | % |
| One of the reasons for cord care is to prevent infections | 136 | 37.4 | 128 | 35.2 |
| Proper cord care does not prevent the baby from having abdominal pain | 134 | 36.8 | 129 | 35.4 |
| Proper cord care will not hasten the fallen off of the umbilical stump | 136 | 37.4 | 129 | 35.4 |
| A very good way to care for the cord is to apply nothing on the cord but leave it to dry | 7 | 1.9 | 8 | 2.2 |
| A good way of caring for the cord is the use of antiseptics; methylated spirit or chlorhexidine gel only | 131 | 36 | 130 | 35.7 |
| | | | | |

Table 1 showed that the participants in the intervention group 136 (37.4%) and control group 128 (35.2%) shared almost the same view that cord care prevent infection. Similarly, both the intervention group 134 (36.8%) and the control group 129 (35.4%) almost agree that proper cord care will not prevent the baby from having abdominal pain. However, 7 (1.9%) in the intervention group and 8 (2.2%) in the control group agree that the cord can be left to dry on its own without applying anything on it. Also, the participants in the intervention group 131 (36.0%) and control group 130 (35.7%) revealed that antiseptics such as methylated spirit and chlorhexidine gel are used for cord care.

Research Question II: What is the effect of mobile phone based health education reminder on the practice of neonatal cord care among postnatal mothers?

Participants were asked to indicate the methods they used for neonatal cord care. The results are presented in table II

Table II: Pre and Post- Intervention Scores On Methods Of Neonatal Cord Care

| Study Group | Pre- intervention | | | | Post-intervention | | | |
|-------------|-------------------|------|----------------|------|-------------------|------|----------------|------|
| | N | % | X ² | SD | N | % | X ² | SD |
| 1 | 99 | 27.2 | 6.67 | 1.93 | 128 | 35.2 | 7.70 | 1.68 |
| 2 | 96 | 26.4 | 6.63 | 1.87 | 93 | 25.4 | 6.68 | 1.90 |

Key: Group 1= intervention, Group 2 control group

Table II revealed that differences exist in the methods of neonatal cord care between the participants in intervention group and control group. In other to test if the differences observed in the methods of cord care are statistically

significant, t-test analysis was computed. The results of the analysis are presented in Table III

Table III: T-Test Summary On Methods Of Neonatal Cord Care

| Study Group | Pre-intervention | | Post intervention | | df | t-cal | P. value |
|-------------------------|------------------|-----|-------------------|-----|-----|-------|----------|
| | Mean | SD | mean | SD | | | |
| Intervention N = 184 | 6.67 | 1.9 | 7.70 | 1.6 | 363 | 7.43 | .000 |
| Control N = 180 | 6.63 | 1.8 | 6.68 | 1.8 | 179 | .73 | .468 |

Table III showed that $t = 7.43$; $p \text{ value} = 0.000 < 0.05$. The results revealed a significant difference between the pre and post intervention on the methods of neonatal cord care.

This implies that mobile phone health education reminder significantly improves neonatal cord care among postnatal mothers attending health facilities in Ekiti State.

IV. DISCUSSION

The findings of this study provide support in some respects for many of the findings of previous studies. The findings of the present study revealed that the participants had a fair knowledge of neonatal cord care. The findings could be due to adequate health education received by the study participants on the neonatal cord care through onsite health education at the health facilities during antenatal visits. The findings is consistent with the studies of Afolaranmi, et al, [2018]; Ndikom and Oluwatosin, [2020] who reported that mothers who received health education during antenatal care are more likely have better knowledge of neonatal care compared to mothers who did not make themselves available for health education on antenatal care. However, the findings disagreed with early studies of Nnebue, Duru, Uwakwe & Ifeadike [2016] and Osuchukwu, Ezerugbo & Eko, [2017] who revealed poor knowledge of neonatal cord care among their respondents. The reason for the differences could be because majority of the respondents in their studies was primiparous women who are not likely to have any previous experience of neonatal care.

In this study, more than half of the participants indicated that cord care should be done for the purpose of preventing infection. Surprisingly, more than a quarter of the participants viewed that cord care should be done for the purpose of quick detachment of the cord stump and for the prevention of abdominal pain. These findings corroborated the earlier studies of Ndikom and Oluwatosin [2020] who revealed that mothers' impression about the reasons for cord care seems not to have changed over the years and this might have accounted for sub-optimal cord care practices among postnatal mothers.

Another key finding of the study was the low level and improper neonatal cord care practices among the participants. The recommended practice by the World Health Organization [WHO, 2017] was not to apply any substances on the umbilical cord stump until it dries and fall off by itself. This was not practiced by majority of the participants. The findings

of the study further showed that more than half of the participants used multiple agents on the on the cord. These agents include application of heat from lantern or hot water, herbs, toothpaste, mentholatum, dusting powder and red oil to treat the cord. This is indicative of sub-optimal neonatal cord care. A number of studies by Amare, [2014], Berhan & Guleman, [2018], Kaoje, Okaforagu, Raji, Adamu, Nasir, Bello, & Ango [2018] and Ndikom & Oluwatosin, [2020] have earlier reported similar findings. These findings suggest that despite improved antenatal clinic attendance and multiple health education classes during the antenatal care, the WHO's recommendations on cord care have not been strictly adhered to. The findings of the present study showed that mobile phone health education reminder significantly improved neonatal cord care among the participants.

V. CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it was concluded that mobile phone health education reminder was effective in improving knowledge and practice of neonatal among postnatal mothers in Ekiti State. The study, therefore, recommended that mobile phone based health education reminder should be used for postnatal mothers to follow up hospital based health education.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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