# Group cell phones are feasible and acceptable for promoting optimal breastfeeding practices in a women's microcredit program in Nigeria

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## Abstract

As part of a breastfeeding promotion intervention trial in Nigeria, we provided one cell phone per group of 5-7 microcredit clients, and instructed the group's cell phone recipient to share weekly breastfeeding voice and text messages with group members. We measured the feasibility and acceptability of using group cell phones by conducting semi-structured exit interviews with 195 microcredit clients whose babies were born during the intervention (target group), in-depth interviews with 8 phone recipients and 9 non-phone recipients, and 16 focus group discussions (FGDs) with other microcredit clients. Women in the target group said the group phone worked well or very well (64%). They were motivated to try the recommended practices because they trusted the information (58%) and had support from others (35%). Approximately 44% of target women reported that their groups met and shared messages at least once a week. Women in groups that met at least weekly had higher odds of exclusive breastfeeding up to 6 months (OR 5.6, 95% CI 1.6, 19.7) than women in groups that never met. In-depth interviews and FGDs indicated that non-phone recipients had positive feelings toward phone recipients, the group phone met participants' needs, and messages were often shared outside the group. In conclusion, group cell

phone messaging to promote breastfeeding among microcredit clients is feasible and acceptable, and can be part of an effective behavior change package.

## INTRODUCTION

Since 2002, cell phone ownership and use has expanded rapidly in sub-Saharan Africa, with penetration currently >80% in a few countries, including Nigeria (Pew Research Center, 2015). With that expansion, has come growth in mobile health (mHealth) text-messaging interventions focused on health promotion, disease self-management, and medication adherence (Deglise et al., 2012b, Deglise et al., 2012a, Hall et al., 2015). Text-messaging interventions typically require participants to have their own cell phones in order to receive the messages, which are usually sent through one-way push or bulk messaging systems, especially when the aim is to promote or change behavior (Kallander et al., 2013). Disparities in cell phone penetration make it difficult for some individuals in low- and middle-income countries to take advantage of mHealth programs. Men and individuals of both genders with more years of education or higher incomes are more likely to own cell phones, placing women at a disadvantage for multiple reasons (GSMA Development Fund et al., 2010).

We recently conducted a trial among female microcredit clients in Nigeria, which found that women who received cell phone breastfeeding text messages and group breastfeeding learning sessions had increased odds of exclusive breastfeeding to 6 months (OR 2.4, P<0.01) and initiation of breastfeeding within one hour of delivery (OR 2.6, P<0.001) compared to women receiving their usual microcredit program (Flax et al., 2014). Prior to initiating the study, we asked local microcredit organizations to conduct a census of cell phone numbers among their female clients in the target area. We found that approximately 11% of the women had personal phones and that phone ownership was highly clustered within some microcredit groups, particularly those in urban areas. In many of the groups, no women had their own phones.

To address this gap and allow us to implement the mHealth component of our intervention, we provided one low-cost cell phone to each pre-existing small group of microcredit clients in the intervention arm of our study. To our knowledge, no other study has tested a group cell phone messaging intervention, although this strategy could be a useful way of reaching women in settings with disparities in cell phone ownership. The primary aim of the present analysis was to examine the feasibility and acceptability of using a group cell phone to deliver cell phone messages within a multi-component breastfeeding promotion intervention. Our secondary objective was to test the association between participation in small groups and reported breastfeeding practices.

# METHODS

### Study design

This study was a cluster-randomized controlled trial conducted in Bauchi State, Nigeria. The study design and main study outcomes were previously described elsewhere (Flax et al., 2014). Briefly, Partners for Development, a U.S. non-governmental organization (NGO), provided technical support to four local NGOs for intervention implementation. The local NGOs already had functioning microcredit programs, which were used as the platform for the breastfeeding intervention. Small groups of 5-7 women joined the microcredit program together and several of these groups in the same neighborhood met together monthly with their credit officer to repay their loans and receive business education. Randomization was conducted at the level of the larger groups that met together monthly. Ethical approval for the study was obtained from the institutional review board at the University of North Carolina at Chapel Hill and from the National Health Research Ethics Committee of Nigeria. Signed or thumbprinted informed consent was obtained from all participants.

### Intervention components

The intervention had three components: monthly group breastfeeding learning sessions, weekly cell phone breastfeeding text and voice messages, and songs and dramas about the messages generated by participants. Group breastfeeding learning sessions used participatory learning techniques and were led by credit officers during regular monthly microcredit meetings for 10 months. One low-cost cell phone was provided to each small group of 5-7 microcredit participants in the intervention arm. Through a bulk messaging provider, eleven cell phone breastfeeding messages adapted from the key messages in the learning sessions were transmitted weekly in both text and voice message formats for 4 months and then every other week for 3 months. Women entrusted with the cell phone were instructed to share the messages with other small group members either individually or by bringing them together as a group. The groups used their own processes to select a member to be responsible for the phone (referred to hereafter as the cell phone recipient). To further reinforce the messages, small groups were asked to develop one song or drama about a message, which they presented to the other small groups and their credit officer during monthly meetings.

The microcredit groups included women of all ages, ranging from those who were pregnant with their first child to those who were no longer of child-bearing age. The intervention was provided to all members of microcredit groups assigned to the intervention arm because women of reproductive age could benefit from the messages now or in the future and older women could use the information to advise their own adult children on breastfeeding best practices. However, the intervention was tailored specifically for women who were pregnant at baseline and who delivered their babies during the intervention period (described hereafter as the target group).

### Data collection

We used mixed methods to measure the feasibility and acceptability of group cell phones to transmit breastfeeding messages. Semi-structured telephone exit interviews were

administered to the target group (n=195) by trained study staff. The questions focused on the implementation and quality of all three intervention components and included questions about the interviewee's level of participation. Exit interview data were collected on paper forms and then double entered into a CSPro database.

To further understand participants' experiences with the cell phone component of the intervention, we conducted qualitative in-depth interviews with phone recipients (n=8) and non-phone recipients (n=9). In addition, we held 16 focus group discussions (FGDs) (n=146) with microcredit clients who participated in the intervention, but were not part of the target group. Equal numbers of interviews and FGDs were conducted among microcredit clients of each of the four local NGOs in order to capture geographic and programmatic diversity. A single, experienced research assistant collected the qualitative data. She was assisted by a notetaker during the FGDs. Interviews and FGDs were digitally recorded, transcribed verbatim in Hausa, and then translated into English.

### Data analysis

Descriptive statistics were calculated for the background characteristics of the participants and for the exit interview data using Stata (Version 13.0, College Station, TX). We used logistic regression to assess the association between participation in small group activities and breastfeeding practices, including exclusive breastfeeding up to 6 months of age and breastfeeding initiation within 1 hour of delivery. Models accounted for clustering at the level of the monthly meeting groups. Participation in the small cell phone groups was coded as: never, once every 2-4 weeks, or one or more times per week.

In-depth interview and FGD transcripts were entered into Dedoose (Version 5.0.11, SocioCultural Research Consultants LLC, Los Angeles, CA) and coded for key themes using a combination of deductive and inductive codes (Patton, 2001). The code list was developed by one author (VF) and a research assistant, who met together regularly to discuss the codes and adapt the definitions to ensure agreement in their application. We then used data matrices to compare responses across types of participants (phone recipients, non-phone recipients, and non-target group members) (Miles and Huberman, 1994). Illustrative quotes were selected to represent key themes as well as dissenting opinions.

## RESULTS

Exit interviews were conducted with 195 out of 196 participants in the target group. The one woman who did not participate had moved out of the area and could not be contacted. Sample sizes for in-depth interviews and FGDs were as planned. Background characteristics of participants by type of data collection are shown in **Table 1**. Participants in the exit interviews had a lower mean age than other participants, most likely because they were in the target group and were pregnant at baseline. Cell phone recipients had participated in microcredit longer than other participants.

### Exit interviews

Only 6% of women in the target group were phone recipients for their small groups (**Table 2**). More than half of the target group reported living within 10 minutes walking distance of

the phone recipient (61%). Breastfeeding messages were usually shared in the small groups (68% of the time) rather than individually. Small groups met at least once per week to discuss breastfeeding messages (44%), which were frequently shared at each small group meeting (64%). More than half of the small groups practiced songs or dramas about the breastfeeding messages during every small group meeting (59%). Nearly two-thirds of participants (64%) said that having a group phone worked well or very well. Most target group women said they were motivated to try the recommended breastfeeding practices because they trusted the information (58%) or they felt they had support to carry out the practices (35%).

Women in the target group who met with their small group at least once per week (OR 5.6, 95% CI 1.6, 19.7) or every 2-4 weeks (OR 3.1, 95% CI 1.0, 9.7) had higher odds of exclusive breastfeeding up to six months compared to women who never met with their group. Meeting with the cell phone group at least weekly was also marginally associated with higher odds of breastfeeding within one hour of delivery (OR 3.7, 95% CI, 0.8, 17.2).

### Qualitative findings

Our comparative analysis of results from phone recipients and non-recipients and from FGDs found no differences in responses by type of participant. Consequently, we present the combined qualitative data. The key themes that emerged were centered on the following topics: groups' strategies for selecting phone recipients, participants' feelings about phone recipients and sharing a group phone, the process of message sharing, issues with phones, and use of messages by non-target group members.

**Selecting the phone recipient—**Interviewees explained how phone recipients were selected within their small groups. Most were chosen because they were small group leaders or because they were considered to be mature, serious, responsible, or trustworthy. One non-phone recipient explained,

> "We look at maturity in a person and decide that such a person should be our leader who can hold our trust and can communicate effectively with us. Once there is a need for meeting or an urgent message, she tries her best to get the messages across to us. That is why we say she should be our leader and we put the responsibility of the phone upon her. We are sure that when messages come through the phone we will receive them." ID12

Not all groups based the choice of the phone recipient on personal qualities. A few interviewees reported that their groups chose the phone recipient by taking nominations and then voting or by a random process of picking numbers.

**Feelings about the phone recipient and sharing a group phone—**Non-phone recipients uniformly stated that they had neutral or positive feelings toward the phone recipient in their group. One non-phone recipient summarized,

> "For me, I didn't feel anything bad in my mind because she is a faithful person who will be honest. When anything comes up, she gets herself to people's homes to tell

us... Everyone praised her that she was capable and that they do not think she would cheat anyone. No one felt jealousy for her." ID31

Phone recipients generally had similar responses, saying that other group members were happy for them and, in some cases, they felt like they received more respect now that they had the phone. One phone recipient explained her interactions with other group members,

> "I have not seen any change in how the group members behave around me... They only rejoiced with me. And when we met, I told them that it is important that once a meeting is called everyone must be disciplined to attend punctually, because what you hear with your own ears sticks better than what another person may tell you." ID17

In terms of sharing a group phone to receive the breastfeeding messages, the majority of participants accepted this system and felt that it was functional. A member of one FGD described this point of view,

> "One phone is useful to us. We have always had a leader in our group so we do our things in common. She does the running around, even on microcredit matters. We don't doubt her. So, one person having the phone is not an issue because it serves us all." ID14

However, a few participants thought that having only one phone for the group was unacceptable and slowed transmission of the messages. Another focus group participant (ID23) explained how she felt, "We have not enjoyed this.... One phone is truly inadequate. Ten people cannot receive messages unless we have more phones." Other members of this group did not agree with this position and stated that the group phone worked well.

**Message sharing—**Nearly all interviewees and FGD participants explained that messages were shared in a group. When a message came in, the phone recipient would invite the other women to meet and they would share and discuss it. This description by one phone recipient summarizes what most of the participants said about message sharing,

> "Once we [the phone recipients] receive the messages, we go to meet the other women. Because for every cell phone, there is a leader who is the custodian and six members who once the messages come in are called and the messages passed to them. If it's a text, I read [it] and tell them the relevance. If it is a voice mail, after I listen I share with them and explain later. If we are together when the voice mail comes, I put it on handsfree for them to listen. That is how we do it." ID11

Most participants explained that messages were shared promptly. If the message came in the morning, the group would meet to discuss it in the afternoon. Or if it came in the evening, they would meet the following day. However, a non-phone recipient said that her group met irregularly due to the members' involvement in agricultural work,

> "Sometimes she saves about two or three messages because we are not always available. Then she gathers us to tell us in the order they came in. That is how she tells us, because of farms and the rains." ID26

One phone recipient (ID25) reportedly had difficulty bringing the members together to listen to the messages, but this was not a common problem in other groups.

Several interviewees and FGD participants described how the messages were shared outside of their group with other members of the community. The following two quotes from phone recipients show their experiences and happiness with sharing messages with women outside their microcredit groups:

> "Once a message comes in, it is read and you quickly call others in the group and even those outside the group. If you see that it will benefit them, you will tell them and your advice may be taken." ID2

> "I really enjoy learning about exclusive breastfeeding... I will even put the handset to other people's ears. I sell provisions and there are other traders near me. I put it to their ears so they can also enjoy it. Sometimes they wish they could join us. That is the joy of the whole thing." ID28

**Issues with receiving the messages—**Very few interviewees or FGD participants reported problems with receiving the cell phone messages. One group had trouble hearing the messages some of the time, another had a phone that needed to be repaired, and a third had problems with network coverage. The phone recipient in the group with network issues explain how she overcame this problem by coordinating with another small group in the area:

> "Participant: Sometimes the messages do not get in because of lack of service/ network. Interviewer: How did you solve the problem?

> Participant: Two of us have the phones. If one does not receive any message the other will. We then get the message from there." ID6

**Use of messages by non-target women—**Since the majority of women who participated in the intervention were not pregnant when the intervention started, we asked about their experiences with receiving the messages and how they used them. Older women said that they shared the information with their children or neighbors, whereas younger women explained that they used the information to prepare for future pregnancies or advise others. These two quotes illustrate how non-target women used the messages:

> "Honestly, l do not give birth anymore, but what we hear makes us happy. We used to give herb extracts so much that the baby threw up... Now we've seen [the truth], so we tell our children to stop giving their children concoctions. Those truly make children sick. Exclusive breastfeeding surely brings good health to a child. We have made mistakes in our time... but we give advice to our daughters." ID3

> "I was not breastfeeding when we were taught, but after I got home I advised my neighbor. I told her that we have just been taught on exclusive breastfeeding and she said they were told in the hospital. I then said if you do so your baby will be very healthy. She heeded to it and saw the result. She returned to show appreciation because there was a great difference between her first [child] and the second, who hardly was taken to hospital, his body smooth and beautiful." ID1

# DISCUSSION

Within the context of a women's microcredit program, using group cell phones to disseminate messages about optimal breastfeeding practices was generally feasible and acceptable. In terms of feasibility and fidelity to the intervention, messages were disseminated within the small groups at different frequencies, although phone recipients were asked to share the messages weekly. Women who participated in more frequent sharing of cell phone breastfeeding messages were more likely to adopt recommended breastfeeding practices. However, any participation in sharing cell phone messages increased the odds of exclusive breastfeeding, indicating that even imperfect fidelity to the intervention design may be beneficial. Similar variability in fidelity has been documented in other programs that promote recommended infant and young child feeding practices (Durlak, 2008, Avula et al., 2013, Kim et al., 2015).

This study shows that even in countries with supposedly high cell phone penetration, 89% nationally in Nigeria (Pew Research Center, 2015), there are still segments of the population, especially women, without cell phones. For mHealth programs promoting healthy maternal and child health behaviors, it is important to find feasible strategies for reaching out to the poorest and least educated women, who are both less likely than others to have phones and to perform optimal health practices (National Population Commission (NPC) [Nigeria] and ICF Macro, 2009). Providing mHealth programs to groups of women is one option, but we acknowledge that giving microcredit or other community-based groups a cell phone is neither feasible on a large scale nor sustainable. We have identified two possible alternatives for group cell phone messaging. Within a microcredit program, groups could take a loan to purchase a group phone, which would be used to receive health messages and to make loan repayments through a system like m-pesa (The Economist, 2013). Alternatively, within the context of health programs working with existing community-based groups, health messages could be transmitted using phones owned by group members or by relatives or neighbors of group members. This would likely be feasible, since women in low-income countries frequently rely on and use the cell phones of others (GSMA Development Fund et al., 2010).

In terms of acceptability, the majority of participants felt comfortable with one person in the group taking responsibility for the phone, but a small proportion said that this strategy was not ideal. Based on interviews and FGDs, groups where the members trusted their leader and each other were able to adapt and take advantage of health messaging through the group cell phone, whereas groups that were less cohesive felt that this was not a viable way of receiving information.

Another important finding from this study is that participants share mHealth messages with members of their families and with other women in the community. We were not able to measure the spillover effects of our intervention on breastfeeding behaviors of women in the surrounding communities, but such effects have been documented in other health promotion programs (Goebbels et al., 2012). Spillover effects may amplify or extend the benefits of the program and are an important area for future research in the evaluation of mHealth interventions (Angelucci and Di Maro, 2015).

We also noted that older women, beyond child-bearing age, find breastfeeding messages useful and can become conduits of the messages outside the group. Within the area of infant and young child feeding, they may also be important proponents and champions of new practices and contribute to shifting local norms toward optimal behaviors. The importance of grandmothers in supporting infant and young child feeding practices among their daughters has been documented in other studies (Bentley et al., 1991, Bezner Kerr et al., 2008, Aubel, 2012).

The main strength of this study was our use of mixed method to triangulate results. We used exit interviews to quantify participants' experiences with group cell phones and qualitative data to help explain the meaning of those findings. This study also had two main limitations. First, as noted above, giving out cell phones to groups is not widely sustainable and other strategies for group messaging need to be tested. Second, we did not investigate the characteristics of the groups to which we provided cell phones. This type of information would be helpful in understanding what makes group mHealth successful.

In conclusion, in pre-existing community-based groups, such as those found in microcredit programs, use of group cell phones to transmit health messages as part of a behavior change intervention is feasible and acceptable. If appropriate mechanisms for sustainable group phones can be identified, this type of intervention could be extended to village savings and loan associations, women's self-help groups, or other groups dominated by women. Group phones could provide a much-needed mechanism for getting important health messages to the most disadvantaged women, who do not own personal cell phones. Group cell phones may be especially useful when there is a need to shift cultural norms around a specific set of behaviors and when social support for the behaviors facilitates their adoption (Raj and Plichta, 1998, Morhason-Bello et al., 2009, Gallant, 2013). In Nigeria, it may be possible in the future to integrate group cell phone messaging into a national maternal and child health messaging system, such as Mobile Alliance for Maternal Action (MAMA) (Mobile Alliance for Maternal Action, 2015). This could expand the reach of MAMA Nigeria and might have synergistic effects on health outcomes in groups with a financial inclusion mechanism (Leatherman et al., 2012).

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**KEY MESSAGES**

- Group cell phone messaging is feasible and acceptable for promoting optimal breastfeeding practices among Nigerian microcredit clients.

- Any participation in sharing cell phone messages increased the odds of exclusive breastfeeding, indicating that messaging can contribute to behavior change even under conditions of imperfect intervention fidelity.

- Breastfeeding cell phone messages were shared with women outside of microcredit groups, which could help shift social norms around breastfeeding practices.

**Table 1**

Background characteristics of participants

| | Exit interviews (n=195) | In-depth interviews: Phone recipients (n=8) | In-depth interviews: Non-phone recipients (n=9) | Focus group discussions (n=146) |
|---|---|---|---|---|
| Age, *years* | 25.4 ± 5.7 | 32.1 ± 9.4 | 35.4 ± 12.2 | 34.7 ± 12.0 |
| Parity | 4.2 ± 2.4 | 5.0 ± 2.4 | 3.7 ± 2.3 | 4.8 ± 3.0 |
| Education, *years* | 3.9 ± 4.3 | 6.6 ± 6.4 | 7.3 ± 2.7 | 5.0 ± 4.8 |
| Microcredit participation, *years* | - | 4.2 ± 2.7 | 2.7 ± 1.8 | 3.2 ± 2.4 |

Values are mean ± SD.

**Table 2**

Reported use of group cell phones by women in the intervention target group (n=195) [a]

|  | % (N) |
|---|---|
| Was small group phone recipient | 6 (11) |
| Distance to phone recipient (n=184): |  |
| < 5 min walk | 23 (42) |
| 5-10 min walk | 38 (70) |
| >10 min walk | 38 (70) |
| Don't know | 1 (2) |
| Messages were shared: |  |
| Individually all the time | 17 (33) |
| In a group all the time | 68 (133) |
| Individually part of the time and group part of the time | 6 (11) |
| Don't know | 9 (18) |
| Met with the small group that shared a phone: |  |
| One or more times per week | 54 (87) |
| Once every 2-4 weeks | 46 (89) |
| Never | 6 (12) |
| Don't know | 4 (7) |
| Cell phone breastfeeding messages were shared: |  |
| During every small group meeting | 64 (126) |
| During some small group meetings | 15 (29) |
| During a few small group meetings | 11 (21) |
| Never | 6 (11) |
| Don't know | 4 (8) |
| Songs or dramas about the breastfeeding messages were created or practiced: |  |
| During every small group meeting | 59 (115) |
| During some small group meetings | 26 (51) |
| During a few small group meetings | 3 (6) |
| Never | 8 (15) |
| Don't know | 4 (8) |
| Having one phone for several people worked: |  |
| Very well | 24 (46) |
| Well | 40 (79) |
| Not well | 33 (65) |
| Don't know | 3 (5) |
| Factors that motivated women to try the practices (n=192): |  |
| I trusted the information | 58 (112) |
| I felt I had support from women in my group or the credit officer | 35 (67) |
| Other | 7 (13) |
| Don't know | 1 (2) |

[a] Sample size is 195 except where noted.