CHILDBEARING WOMEN'S PERCEPTION ABOUT THE USE OF mHEALTH FOR MATERNAL HEALTH INFORMATION IN RURAL COMMUNITIES, ILE-IFE, NIGERIA

Titilayo Dorothy Odetola RN, PhD[1], Love Bukola Ayamolowo RN, MSc[2], Sunday Joseph Ayamolowo RN, MSc[3]

[1] Department of Nursing, University of Ibadan, Nigeria
[2] Medical and Health Services, Obafemi Awolowo University, Ile-Ife, Nigeria
[3] Department of Nursing Science, Obafemi Awolowo University, Ile-Ife, Nigeria

Abstract

Background: Poor access and utilisation of maternal health services among rural women is a major contributor to the high maternal mortality in Nigeria. Inadequate healthcare facilities and personnel in the rural communities are some of the major factors militating against women's access and use of maternal health services. Harnessing mobile health (mHealth) in supporting health services delivery to widely-dispersed women will improve access to reproductive healthcare and reduce maternal mortality. This study aimed at assessing women's perception about the use of mHealth for maternal health information in rural communities. Methods: This was a descriptive community-based cross-sectional study that involved 403 women of childbearing age (15 to 49 y) who gave birth within the five years prior to the study. Data were collected over two weeks using structured questionnaires. Results: The majority of the women possessed mobile phones, 91%, but only 48% currently used them for maternal health information and 87.3% had a positive perception about use of mHealth for maternal health information. Women who had positive perception had higher odds of accessing a health institution for delivery compared to those who had poor perception (OR=1.72, SE=0.6, CI=0.92-3.22). Conclusion: Women had positive perceptions about use of mHealth but current use of mobile phone for maternal health information was poor. Innovative methods like mHealth to strengthen maternal health services delivery for the hard to reach populations are urgently needed to support Nigeria efforts towards desirable global maternal and child health targets against year 2030.

Keywords: mHealth; rural communities; childbirth; maternal mortality; maternal health information; eHealth readiness

Introduction

Globally, approximately 287,000 women die every year and 830 every day due to complications related to pregnancy and childbirth.[1,2] Ninety-nine percent of maternal deaths occur in developing countries, more than half occurring in sub-Saharan Africa and more frequently in women living in rural areas and among poorer communities.[1] The risk of a woman in a developing country dying from a maternal-related cause during her lifetime is about 33 times higher compared to a woman living in a developed country.[2] According to a UNICEF report, Nigeria loses a great number of children's lives during pregnancy and childbirth and the country loses about 2,300 under-five year olds every single day.[3] Nigeria is regarded as the second largest contributor to the under–five and maternal mortality rate in the world.

The high maternal mortality in south western region of Nigeria has been reported to be predominantly among the rural women due to poor utilisation of maternal health services.[4] More than 70 per cent of the Nigerian population live in rural areas with little or no proper healthcare services and facilities, and even where they exist, striking poverty hinders most of them from accessing the services.[5] Compared to urban women, who are wealthier, more educated and use antenatal care services optimally,[6] rural women are less privileged and of low socio-economic status.[7] They tend to engage in different agricultural activities which involve strenuous physical labour with different unpleasant effects on their health especially during pregnancy. The women are sometime already malnourished and suffering from iron deficiency anaemia,[7] increasing their need for skilled birth attendants for optimal maternal and neonatal health.

There has been inadequate and ineffective provision of concise information to women especially during pregnancy and childbirth because of the serious dearth of facilities and skilled workers like nurses and

midwives at the rural level in Nigeria.[8] This predisposes women to the risk of not accessing maternal healthcare services or adopting healthy perinatal behaviours. Various maternal and child health initiatives in Nigeria focus on promoting health, preventing disease, and reducing maternal and child mortality, but these are not reaching rural areas. The use of mobile devices is growing in the health sector, providing time-saving and cost effective approaches to delivery of quality healthcare information about antenatal care, skilled birth attendant and postnatal care services at the primary care level in Nigeria. mHealth interventions for healthcare consumers have been designed to increase healthy behaviour such as adequate uptake of available maternal health services. For women in the rural areas, these will potentially provide the opportunity to obtain, process, and understand the basic health information and services required for appropriate health decisions,[9] and facilitate universal access to reproductive healthcare services via mHealth. This will invariably reduce maternal, neonatal and child morbidity and mortality in Nigeria.

There is limited information about perception of using mHealth for disseminating maternal health information among the women in rural communities in Osun state and Ile-Ife, the study site. For mHealth initiatives to accelerate maternal health goals, requires, in part, that women in the rural communities have good knowledge of mHealth technology and a positive attitude and good perception of mHealth services. The literature and anecdotal observation have shown that most people in the rural areas possess or have access to mobile phones.[10,11] It is imperative to explore how the mobile phone can be used to bridge the gap between skilled healthcare workers and clients and facilitate meeting the Sustainable Developmental Goal in 2030 and the global aspiration of optimal reproductive health.

The aim of this study was to provide an understanding of the perception of childbearing women in rural communities of the use of mobile health for maternal health information.

Methods

A descriptive cross-sectional, community-based study was conducted among women of reproductive age (15-49 y) in selected rural communities in Ile-Ife, South western Nigeria. The population is made up of people of different cultural and socioeconomic background.

The indigenes are Yoruba speaking and depend largely on agriculture.

A pre-tested, structured, researcher-administered questionnaire was used to obtain the relevant data. Multistage sampling procedures were used to select eligible respondents. A rural community was defined as having a population less than 30,000 and lacking facilities like electricity, potable water, telephone services, banks, and good intra-city roads network. Five wards were randomly selected from the 11 wards in the Ife East Local Government by balloting while one ward with a rural community was purposively selected from Ife Central Local Government. Two rural communities were randomly selected from each of the selected wards; a snowball sampling method was used to select eligible and consenting respondents in the selected communities. Advocacy visits were made to the village head of the selected rural communities in order to establish rapport. The inclusion criteria were all women within the age range of 15-49y who had had a child born in the 5 years prior the survey. Informed consent was obtained from the women, with the nature and the purpose of the study was explained to them by the researcher and the trained research assistants. Ethical approval for this study was obtained from the Health Research Ethics Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Nigeria (HREC NO: IPHOAU/12/873).

The questionnaires elicited information about the demographic and the obstetric characteristics of the respondents. A three-point Likert scale was used to measure respondents' perception which was scored as: Agreed (3), Undecided (2), Disagreed (1). The minimum and maximum scores were 9 and 27 respectively. Scores on items 6, 7, and 9 were reversed to reduce response bias. Respondents with scores less than 18 were classified as having a negative perception, while those with scores greater than 18 as having a positive perception.

The Chi-square test was used for the bivariate analysis and multivariate analysis was performed using linear logistic regression model. Alpha was set at 5%.

Results

The demographics of the 403 respondents are shown in Table 1. The mean age of respondents was 32±7.4y, 34% were traders, 28% farmers and only 8.2% were unemployed. A third (34%) of the respondents had no

schooling. Yoruba (82.1%) was the predominant ethnic group among the respondents representing and the majority (88%) of the respondents were presently married. (Table 1)

Table 1. Socio-demographic characteristics (N=403).

Marital status	n (%)	Ethnicity	n (%)
Single	33 (8.2)	Yoruba	331 (82.1)
Married	355 (88.0)	Igbo	32 (7.9)
Divorced	11 (2.7)	Hausa	23 (5.7)
Widowed	4 (1.0)	Others	17 (4.2)
Occupation		**Highest educational level**	
Artisan	56 (13.9)	No schooling	138 (34.2)
Civil servant	62 (15.4)	Primary	85 (21.1)
Farming	114 (28.3)	Secondary	134 (33.3)
Trading	138 (34.2)	Tertiary	46 (11.4)
Unemployed	33 (8.2)		

Mean parity was 3±1.5 babies and the 73.5% of the respondents obtained antenatal care (ANC) during their last pregnancy in a hospital but 41.7% and 42.4% of respondents planned delivering their last and next baby respectively in a hospital. While 91% of the women had a mobile phone only 48% of respondents used mobile phone for maternity care information with their healthcare providers. (Table 2)

Overall, the mean perception of the women about using mobile phone for delivery of maternal healthcare information was 22±3.1 and 352 (87.3%) had a positive perception.

The majority of respondents had positive perception about use of mobile health technology for maternal health information, 87.3%. (Table 3) Most respondents believed that use of phone is good for sharing maternal and child health information among women in the rural community, 83%, but respondents were less positive

Table 2. Obstetric characteristics (N=403).

Parity	n(%)
1-2	180 (44.7)
3-4	176 (43.7)
5 & above	47 (11.7)
Last pregnancy attendance of ANC	
Yes	347 (86.1)
No	56 (13.9)
Place for ANC attendance	
Hospital	296 (73.4)
Outside Hospital	107 (26.6)
Planned place for delivering my last baby	
Hospital	168 (41.7)
Outside Hospital	235 (58.3)
Place I will deliver my next baby	
Hospital	171 (42.4)
Outside Hospital	232 (57.6)
Use of phone with maternity care provider	
Yes	192 (47.6)
No	211 (52.4)

about the ability of mobile technology reaching rural women 40.7% with a further 6% undecided. Similarly about half of the women were concerned about privacy and confidentiality of pregnancy related information. Age and parity did not influence perception about mHealth, but education status did with positive perception increasing with educational status (p=0.015).

Logistic regression showed that respondents who had positive perception about use of mobile health technology for maternal health information had higher odds of accessing a health institution for delivery compared to those who had poor perception about use of mobile health technology (OR=1.72, SE=0.6, CI=0.92-3.22).

Table 3. Perception about use of mobile phone for maternal health information (N=403).

Question	Agreed n (%)	Undecided n (%)	Disagreed n (%)
Mobile phone is good for sharing maternal and child health information between women and community health providers	336 (83.4)	3 (0.7)	64 (15.9)
Mobile phone provides free and easy communication linkage with the health workers	328 (81.4)	6 (1.5)	69 (17.1)
mHealth can influence women's plan for preferred place of birth	347 (86.1)	9 (2.2)	47 (11.7)
mHealth can improve the use of health facility by women	292 (72.5)	48 (11.9)	63 (15.6)
Using mobile phone for healthcare is not cost effective	130 (32.2)	35 (8.7)	238 (59.1)
Too much use of phone can cause cancer	40 (9.9)	103 (25.6)	260 (64.5)
Mobile technology cannot reach women in the communities	164 (40.7)	24 (6.0)	215 (53.3)
It becomes easier by mobile phone to contact other pregnant women to share healthcare information with them	369 (91.6)	4 (1.0)	30 (7.4)
No privacy and confidentiality of information about childbirth via mobile phone	177 (43.9)	29 (7.2)	197 (48.9)

Discussion

This study showed that the general perception of the benefits of mHealth for providing information was high. There was no difference in perception based on age or parity and the least educated were least positive. However, 40% of respondents did not think mobile health would reach rural women and 44% expressed concerns about confidentiality and privacy while using the mobile phones for sharing and gaining information. Respondents who had a positive perception about use of mobile phone for disseminating maternal health information had higher odds of accessing a health institution for delivery compared to those who had poor perception about use of mobile health technology.

There is limited literature on the perception of women about the use of mHealth for maternal health information in rural communities. In a study in urban-rural communities in Argentina, 91% of women were interested in receiving educational information via text based messages and 87% showed interest in receiving phone calls with similar prenatal and postnatal educational information.[9] More people in our study had no schooling 34% than in the Argentinian study 17.1%[9] and lack of education influenced perception.

The majority of the respondents in the rural communities had mobile phones. This supports the findings from previous studies where the majority of people in the rural areas had mobile phones,[10,11] suggesting that communication among women and their healthcare providers becomes easier in the hard to reach communities. However, 40% of respondents did not think that mobile phone based interventions would reach rural women, this is probably due to poor network coverage in the rural places, a reflection of reality. This has serious implications for future mHealth implementations.

Mobile phone applications (Apps) for maternal health care services are being pilot-tested in Nigeria[8,12] but were not available in the region at the time of the study and people were not aware of it or its benefits. Most women had a positive perception about using their mobile phones for receiving maternity care information from their healthcare providers and even though there was no service in place nearly half already used their phones to communicate with their maternal health providers. Whether this was to gain information is not known. Assessing the eHealth readiness of the rural women prior to implementation will help identify potential obstacles and facilitate successful adoption of the services. A study in Oyo State showed that the majority of the health workers had poor knowledge of mHealth and that very few of them were aware of mobile health being pilot-tested in Nigeria.[8] From this perspective, understanding women's perceptions about the strategy will help in designing and implementing of mHealth interventions in communities. Those implementing mHealth solutions should facilitate training and retraining of health workforce and enlighten the populace on the benefits of mHealth.

Literature has shown that access to and acceptance of information and support during pregnancy and childbirth by family have important implications for maternal choices of type of maternity care, place of delivery and effective use of available reproductive health services.[13] In the current study 73% of women agreed that health facility use will be improved if women use mobile phones for maternal health information and getting information from health workers during pregnancy and childbirth through mobile phone can influence women's choice for place of birth.

Since the majority of the women owned mobile phones and had a positive perception about using mHealth for maternal health information, childbearing women in Nigeria could benefit from an mHealth programme if implemented. These findings are similar to the study in Argentina.[9] The current study showed that the majority of women agreed that the mobile phone would provide a free and easy communication linkage with the health workers. This corroborates the study in Ondo- a South-western part of Nigeria where 59% found the easy and free communication linkage with the health workers the most important benefit of the mobile phone.[13]

Care must be taken when interpreting these positive perceptions. The high ownership of mobile phones and generally positive perception of mHealth use in pregnancy does not necessarily equate to subsequent use of mHealth, as 41% of respondents felt that mHealth technology will not reach rural women, 44% had concerns about confidentiality and privacy, and 32% felt that using mobile phones was not cost effective. In a study at semi-urban hospital in Nigeria, doctors with a high level of knowledge, attitude and willingness to adopt mHealth, considered concerns about confidentiality and privacy as a major constraint to mHealth.[14] This is not surprising with the high level of insecurity and data theft across all application platforms. More research into measures to effectively

minimise risk to privacy and security in mHealth is needed.

Despite the greater number of women attending hospital for ANC during their last pregnancy, in this study, 58% of respondents did not deliver their child in a hospital nor plan to deliver their next child in a hospital. This is higher than reported in a study in Ebonyi State where 25% of women had non-institutional delivery but lower than in Kaduna where 76% of women had home delivery despite 98.2% of them attending antenatal care.[15] An Ethiopian study reported a notable number of pregnant women, especially among slum residents, still choosing to deliver at home despite the adequate ANC attendance during pregnancy.[16] In the current study women who had good perception about use of mobile health technology for maternal health information had higher odds of accessing a health institution for delivery.

The use of cell phones in Kenya and Nigeria improved facility utilisation and maternal health and generally improved healthcare services for pregnant women.[13,14,17] mHealth implementers in Nigeria need to devise strategies of leveraging mHealth for maternal and new-born care, particularly in this under-resourced health ecosystem. There should be sensitisation, awareness and training of the community health providers and the populace about the uses of mHealth technology particularly in the rural communities. This will encourage the development of innovative mHealth solutions and harmonise the regulation between the delivery of traditional healthcare services and mobile health services.

Conclusion

The majority of women possessed a mobile phone and rural women had a positive perception about using mobile health technology to obtain maternal health information from their healthcare providers. Even in the absence of an mHealth maternal health service, almost half the women were using their phones to communicate with their maternal health providers. Innovative methods of strengthening the healthcare system for maternal and newborn health as well as new approaches like mHealth technology which is capable of reaching the hard-to -reach populations are urgently needed to support Nigeria efforts towards desirable global maternal and child health targets set against the year 2030. The perception that mHealth will not reach rural women and concerns over confidentiality and privacy need further investigation.

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Corresponding author:
Love Bukola Ayamolowo
Medical and Health Services
Obafemi Awolowo University
Ile-Ife, Nigeria
Email: *ayamolowobukola@yahoo.com*
Tel: *+23408132750008*

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