

Effect of mHealth educational intervention on intention of exclusive breastfeeding among mothers in Diете-Koki Memorial Hospital, Opolo, Bayelsa State, Nigeria

A One-Group Pretest/Post-Test Quasi-Experimental Study
Nkamare MB¹[ID](#), Anokwuru RA²[ID](#), Ademuyiwa IY³[ID](#)

¹Department of Maternal and Child health Nursing, Faculty of Nursing Sciences, Niger Delta University Wilberforce Island, Bayelsa State, Nigeria

²Department of Maternal and Child Health Nursing, School of Nursing Babcock University, Ilishan-Remo, Ogun State, Nigeria

³Department of Nursing Science, Faculty of Clinical Sciences, College of Medicine, University of Lagos, Idi Araba, Lagos State Nigeria

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Abstract

Objective: This study assessed the effectiveness of M-Health Educational intervention on Exclusive Breastfeeding intention among mothers in Diете-Koki Memorial Hospital (DKMH), Opolo Bayelsa State Nigeria with one hypothesis stating that there is no significant difference in the mean score of the pre and post-intervention scores of Exclusive Breastfeeding intention among mothers in DKMH, Opolo Bayelsa State.

Method: A one-group pretest/ posttest quasi-experimental design was employed. 148 participants were purposively selected among pregnant women with a gestational age of thirty-six weeks and above attending ANC at DKMH, Opolo. Data was collected using structured and validated instruments with Cronbach's alpha coefficient of 0.90 and 0.82. WhatsApp was used as the medium for online support. Four chats were dropped every week in the group within the study period to educate the participants. The chats addressed the value of exclusive breastfeeding, early initiation, benefits of EBF to the mother and baby, techniques of successful breastfeeding and latching. Data was analyzed using descriptive and inferential statistics. Student t-test was used at a 5% level of significance.

Results: The difference between the pre-test and post-test ($t=16.4$; $p < 0.001$; $df = 147$) scores indicated that the M-Health educational intervention increased the Exclusive Breastfeeding intention of mothers.

Conclusion: Utilizing WhatsApp as a medium for breastfeeding education improved maternal breastfeeding intention. This study recommends M-Health educational intervention in addition to regular antenatal education to improve breastfeeding intention among mothers.

Keywords: mHealth, WhatsApp educational intervention, Exclusive breastfeeding, Intention to breastfeed, Mothers

Plain English summary

Breastmilk, which is available to every baby, provides all the nutrients needed by a child for the first six months of life. WHO and UNICEF recommend that all infants be put on this very important diet.

Correspondence

Nkamare, Maureen B
Department of Maternal and Child Health Nursing, Faculty of Nursing Sciences
Niger Delta University Wilberforce Island
Bayelsa State, Nigeria
+2348027228842, maureen.nkamare@ndu.edu.ng

However, many mothers no longer intend to feed their babies with only breastmilk from birth to six months (Exclusive breastfeeding (EBF)) due to preconceived ideas and poor knowledge. Hence, there is a need for an intervention to help mothers have the intention to breastfeed exclusively.

This study assessed the effect of M-Health Educational Intervention on EBF intention among 148 mothers in DKMH, Opolo, Bayelsa State, Nigeria. The mothers' intention to breastfeed was assessed before and after online educational support. A WhatsApp group was used as the medium to educate the women on the Value and benefits of EBF and techniques for successful breastfeeding.

The study result showed Majority of the participants indicated intention to breastfeed after the intervention, as against a few who indicated intention to exclusively breastfeed before the intervention. M-Health educational intervention increased the women's intention to breastfeed exclusively.

Background

The ideal infant feeding for sustained growth includes the initiation of breastfeeding within the first hour of life, exclusive breastfeeding for six months, timely complementary feeding with appropriate foods, and continued breastfeeding for two years and beyond (1). It is evident that despite efforts on Breastfeeding, only 40% of all infants under six months of age are exclusively breastfed (1).

The EBF intention conceived by a pregnant woman is the most important predictor of breastfeeding initiation, duration, and continuation, and the greater the intention to breastfeed during pregnancy, the more likely a mother is to breastfeed exclusively after childbirth (2, 3).

Breastfeeding is a choice made by mothers based on many circumstances and factors. Among the leading factors are knowledge, attitude, and perceptions of expecting mothers toward the importance of breastfeeding (4, 5, 6). Mothers' knowledge and attitude play key roles in the process of breastfeeding, as good knowledge of EBF will result in good practice. (7). Adequate knowledge about EBF is said to be the fundamental tool that can direct the course of EBF practice among mothers (8).

Adequate support given to a pregnant woman will improve EBF knowledge and enhance breastfeeding initiation and continuation when the intention for EBF of a pregnant woman is predicted (9). Efforts directed to intervention Programmes to improve mothers' knowledge and practice of EBF will improve the nutritional status of children and will result in a reduction of child morbidity and mortality.

Consequently, there are many approaches to promoting breastfeeding which may target pregnant women, their families, wider communities, society, or the health service. Interventions to promote breastfeeding are delivered before the first feed, and it is targeted to individual women which include health education, peer support, and practical skills training that may be delivered to groups or one-to-one, in formal or

informal settings, and be delivered by health professionals, maternity support workers, or peer supporters (10). There is increasing focus on health education approaches to predict and support behaviour change, such as motivational interviewing and the Theory of Planned Behaviour (11, 12).

Mobile health (mHealth) is a general term for the use of mobile phones and other wireless technology in medical care. The most common application of mHealth is the use of mobile devices to educate consumers about preventive healthcare services. It is used for disease surveillance, treatment support, epidemic outbreak tracking, and chronic disease management, and it is becoming a popular option in under-served areas where there is a large population and widespread mobile phone use (13). WhatsApp holds a unique position among the apps employed in M-health education interventions. This messenger app enables users to make voice calls and send instant messages, photos, videos, and voice messages over the internet (13). In contrast to the original text messaging function on mobile phones, WhatsApp allows users to send and receive messages at no cost per message (14). It supports the formation of group chats and permits numerous users to participate, observe, and respond to conversations (13). It is the third most popular social networking platform in the world, after Facebook and YouTube (which comes second). (15, 16). In Nigeria, WhatsApp is the most preferred social media platform among active users aged 16 to 64 years (17).

Several studies have used WhatsApp as a health education intervention, but there is limited literature available on its application among pregnant women, especially on breastfeeding intention. This study aimed to assess the Effect of M-Health Educational Intervention (WhatsApp) on Exclusive Breastfeeding intention among Mothers in DKMH, Opolo, Bayelsa State, Nigeria.

Methods

Research Design

This study adopted a one-group pre-test /post-test quasi-experimental design to assess the effectiveness of M-Health Intervention on the intention of exclusive breastfeeding among mothers in DKMH, Opolo, Yenagoa, Bayelsa State. This design was used to ensure all mothers who are eligible and willing to participate benefit from the intervention. This design not only shows that there was an optimal intention to exclusive breastfeeding after the intervention but also indicates how much of a change occurred between the pre-test and the post-test.

Population

The population of this study consisted of all pregnant women with gestational age greater than or equal to thirty-six weeks attending the antenatal clinic in DKMH, Opolo, Bayelsa, with a total number of 209 pregnant women according to the hospital record.

Sample size and sampling Technique

A total of one hundred and forty-eight (148) mothers who were willing to participate in the study were recruited using a purposive sampling technique.

An online app (Raosoft sample size calculator) was used to calculate the minimum sample size required for the study. The calculation resulted in 136 participants. An attrition of 20% was added to allow for non-response and improperly filled questionnaires. A total of 163 questionnaires were administered, but 155 were retrieved, out of which 7 were not properly filled and were rendered invalid, making the response rate approximately 91%.

Diete Koki Memorial Hospital, Opolo, Bayelsa State, was purposely selected for the study due to the large attendance of antenatal mothers during each clinic day and its strategic location.

Method of Data Collection

Data was collected within ten (10) weeks and in three (3) phases, pre-intervention, intervention, and post-intervention, using a self/interviewer-administered questionnaire. All pregnant women at 36 weeks gestation or above who attended Diete-Koki Memorial Hospital from December 11th, 2023, to February 19th, 2024, and were willing were recruited to participate in the study. Four midwives working in the antenatal unit and infant welfare clinic of the facility were recruited as research assistants for data collection after explaining the purpose of the study to them.

Pre-intervention phase: The researcher explained the purpose and the nature of the study to mothers during the antenatal clinic, and written informed consent was obtained from each mother before data collection. Participants completed the initial set of questionnaires, which consisted of maternal socio-demographic information, obstetric information, and the infant feeding intention scale questionnaire.

Intervention phase: A WhatsApp group titled M-Health Breastfeeding Intervention was created, and prenatal mothers who consented and filled out the questionnaire were either added or sent an invite link to join the group. A total of 148 participants were recruited to join the WhatsApp group, four messages were sent every week in the WhatsApp group. One message was dropped at 5 am every Monday and Wednesday, while two messages were dropped on Friday evenings at 8 pm.

The messages sent, which were drawn from WHO/UNICEF online publications, addressed the value of exclusive breastfeeding, early initiation, benefits of EBF to the mother and baby, techniques of successful breastfeeding, and latching. The intervention lasted eight weeks.

Post-intervention Phase: The postnatal questionnaire was administered to the participants within three days after delivery to reassess the intention to exclusively breastfeed. The assessment was carried out after delivery, before the mother and baby were discharged from the hospital.

Method of Data Analysis

Data was analyzed using descriptive and inferential statistics with the aid of the computer software IBM SPSS (Statistical Product and Service Solutions). Statistics version 26.0. Data collected from participants was viewed for completeness, edited, coded and entered into the computer. The prevalence of EBF intention and initiation was analyzed using descriptive statistics of mean and standard deviation.

Paired Samples Statistics/Test was used to test if there was a significant difference in the mean score of the pre- and post-intervention intention of exclusive breastfeeding among mothers in Diete-Koki Memorial Hospital, Opolo, Bayelsa State. Frequency and Percentage counts were used for demographic characteristics and were displayed in tables.

Inclusion criteria

Eligible participants were all pregnant women in their third trimester who were 18 years of age or

older; who were able to read and write English; who had a singleton birth, and had WhatsApp-enabled phones, with internet access & data.

Exclusion criteria

Mothers were excluded if pregnancy ended either in miscarriage or stillbirth. The study also excluded mothers who had medical factors that could significantly interfere with breastfeeding.

Results

Table 1 reveals that the modal class of the respondent's age group was 30 to 39 years, while the mean ± SD was 29.6±5.3. On the marital status, 79.7% were married. Also, 64.2% of the respondents had tertiary education, and 69.6% were self-employed. 50.6% of the respondents had 1 – 2 children, and 87.8% were below 40 weeks' gestational age (GA) with an average GA of 37.9 weeks.

Table 1: Demographic Characteristics of the Participants

Variable	Response	Frequency (%)
Age (Mean ± SD = 29.6±5.3)	Less than 20	4(2.7)
	20 – 29	39(26.4)
	30– 39	64(43.2)
	40 – 49	41(27.7)
	Total	148(100)
Marital status	Married	118(79.7)
	Single	30(20.3)
	Total	148(100)
Educational status	No formal	1(0.7)
	Primary	4(2.7)
	Secondary	48(32.4)
	Tertiary	95(64.2)
	Total	148(100)
Occupation	Student	1(0.7)
	Housewife	9(6.1)
	Self employed	103(69.6)
	Private sector employed	18(12.2)
	Government employed	17(11.5)
	Total	148(100)
Parity	None	52(35.1)
	1 – 2	75(50.6)
	Above 2	21(14.3)
	Total	148(100)
Gestational age (Mean ± SD = 37.9±1.4)	Below 40	130(87.8)
	40 and above	18(12.2)
	Total	148(100)

Table 2 shows that the majority (93.2%) of the respondents attended ANC regularly, and 64.2% of the respondents were educated on EBF. The

breastfeeding intention score of the majority (86.5%) before intervention was below 16 points.

Table 2: Obstetrics information of Participants

Variable	Response	Frequency (%)
ANC attendance	Yes	138(93.2)
	No	10(6.8)
Number of visits (Mean ± SD = 5.6±1.7)	1 – 3	12(6.1)
	4 – 6	92(62.1)
	7 and above	44(31.8)
	Information on breastfeeding	Yes
	No	41(27.7)
	Cannot remember	12(8.1)

EBF intention score before intervention (Mean ± SD = 10.9±3.6)	1 – 5.9	12(8.1)
	6 – 10.9	54(36.5)
	11 – 15.9	62(41.9)
	16	20(13.5)

Table 3 reveals that 91.8% of the respondents' babies were aged 1 – 3 days, 60.8% of the deliveries were SVD and 98.0% of the mothers delivered in the hospital. 52.7% had education on

Exclusive breastfeeding after delivery. At post-intervention, 89.9% of the respondents had an EBF intention score of 16 and 99.3% did not have difficulty in breastfeeding.

Table 3: Postnatal information of Participants

Variable	Response	Frequency (%)
Baby's age(days) (Mean ± SD = 1.7±0.9)	Below 1	6(4.1)
	1 – 3	136(91.8)
	4 and above	6(4.1)
	Mode of delivery	
Place of delivery	CS	58(39.2)
	SVD	90(60.8)
	Church	1(0.7)
EBF education	Home	2(1.3)
	Hospital	145(98.0)
	Yes	78(52.7)
EBF intention score after intervention (Mean ± SD = 15.5±1.6)	No	70(47.3)
	Below 16	15(10.1)
Difficulty in breastfeeding	16	133(89.9)
	Yes	1(0.7)
	No	147(99.3)

Testing of Hypotheses

Hypothesis One: (H₀₁): There is no significant difference in the mean score of the pre- and post-

intervention intention to exclusively breastfeed among mothers in Diете-Koki Memorial Hospital, Opolo, Bayelsa State.

Table 4: Paired Samples Statistics/Test

EBF INTENTION	Mean	N	Std. Deviation	Std. Error Mean	T	df	Sig. (2-tailed)
Before intervention	10.949	148	3.5789	.2942	-16.365	147	.000
After intervention	15.50	148	1.558	.128			

The pre-intervention score of breastfeeding intention had a mean of 10.9, while the mean improved to 15.5 at post-intervention. The difference was significant (t=16.4; p < 0.001).

Discussion

This study assessed the effect of M-Health intervention on the intention of exclusive breastfeeding among mothers in DKMH Opolo, Bayelsa State, with one hundred and forty-eight participants. Mothers with a gestational age of 36 weeks and above were utilized for the study. The mean age of participating mothers was 29.6 years. The study consisted of a few mothers who are less than twenty years old, which conforms to studies conducted in Ibadan, which revealed that adolescents are less likely to attend antenatal care due to social reasons of stigma and school dropout.

Most of the mothers were married, had attained a tertiary level of education, and were self-employed. There was a low prevalence of grand multiparity in the study, which conforms with a study conducted in Sudan (19) in which multi-parity was associated with low antenatal care attendance. The majority of the participants attended antenatal care regularly, with the majority having four visits and above before delivery, but only 64.2 % of participants had information on breastfeeding from health personnel. This percentage is inadequate if the target of WHO/UNICEF of 70% of babies to be exclusively breastfed by the year 2030 must be achieved. Although 60.8% of the deliveries were spontaneous Vaginal Delivery (SVD), the study revealed a high prevalence (39.2%) of caesarean section, which is higher than a study conducted in Nigeria (20) with 2.1 % and Southwest having the

highest prevalence of 4.7%. It is also higher than the study conducted in Nigeria (21), where the overall prevalence of CS in facilities across Nigeria was 17.6%, with a higher prevalence of emergency CS (75.9%) compared to elective CS (24.3%). Also, a significantly higher CS prevalence in facilities in the south (25.5%) compared to the north (10.6%) was also identified.

On intention to breastfeed, the pre-intervention Mean was 10.9, with all participating mothers having the intention to breastfeed their babies after delivery. This is, however, not strange in an African setting where breastfeeding has been a traditionally acceptable method of infant feeding before the advent of exclusive breastfeeding (EBF). Africans believe that breastfeeding facilitates a strong bond between a mother and her child (22).

The findings revealed a low intention to exclusively breastfeed among participants before the intervention. The pre-intervention prevalence is lower than studies conducted in the southwestern and southeastern parts of Nigeria (22, 23, 24) where the prevalence of breastfeeding intention was 62.7%, 37.6%, & 34%, respectively. However, the study showed an increase in intention to exclusively breastfeed after the intervention, with a Mean of 15.5, and the majority (89.9%) of mothers had the intention to breastfeed exclusively.

This post-intervention increase in exclusive breastfeeding intention is attributed to an increase in breastfeeding knowledge due to the M-Health intervention, which focused on knowledge, attitude and benefits of breastfeeding to mother and child, proper breastfeeding positions and the dangers of not breastfeeding. Invariably, the findings of this study are suggestive of the fact that health education using WhatsApp is effective in improving the breastfeeding intention of mothers. This is in support of a study in 2022 where online support groups and telephone contact with health professionals were effective and resulted in 90% intention to EBF among mothers (25). It is also in line with the suggestion by authors in the southeast of Nigeria that Poor EBF intentions may be improved by facility-based and in-house methods of breastfeeding counselling, education and support, especially to intending and expectant mothers (22).

A similar study also suggested that mothers without EBF experience should be provided with greater support to promote exclusive breastfeeding intention and outcome (26). This study agrees with the Theory of Planned Behavior, which suggests that a person's intention to perform a behavior will eventually lead to the performance of the behavior

with the right knowledge, which will affect the attitude towards the behavior.

Conclusion

Following the results from the study on M-Health intervention on Exclusive Breastfeeding intention among mothers in DKMH Opolo Bayelsa State, the researcher concluded that it is very important and necessary to support antenatal mothers using the M-Health intervention as it increased the mothers' intention to exclusively breastfeed. The authors, therefore, recommend that antenatal teachings on breastfeeding by health personnel during antenatal clinic days should be well-organized and intentional with the use of audiovisual aids and an mHealth component.

List of abbreviations

ANC: Antenatal Clinic
BUHREC: Babcock University Health Research Ethics Committee
CS: Caesarean Section
DKMH: Diете-Koki Memorial Hospital,
EBF: Exclusive Breastfeeding
SDG: Sustainable Development Goals
TPB: Theory of Planned Behaviour
UNICEF: United Nations Children's Fund
WHO: World Health Organization

Declarations

Ethics approval and consent to participate

The following ethical principles were considered in protecting the rights of the participants and ensuring the scientific integrity of the study. Approval to conduct the study was obtained from the Babcock University Health Research Ethics Committee (BUHREC) with number 838/23. Ethical clearance was obtained from the research ethics committees of Diете Koki Memorial Hospital, Opolo, Bayelsa State. The participants were given correct and detailed information about the study. Informed Consent and participation written informed consent was obtained from all the participants, and they were informed that they could pull out at any point in the study if they wished. The researcher ensured that no participant was harmed physically, psychologically, emotionally, socially, or otherwise. Information entrusted to the researcher was used purely for the research purpose and was not revealed to anyone not directly involved in the study. The researcher ensured anonymity by omitting names on the instrument for data collection. The participants' right to take part in the research study was respected without external control, coercion, exploitation, or persuasion.

Consent for publication

All the authors gave consent for the publication of the work under the Creative Commons Attribution-Non-Commercial 4.0 license.

Availability of Data

Data for this work is available from the authors and may be provided upon reasonable request.

Conflict of interest

The authors have declared no conflict of interest

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Authors' contributions

The title and research design were conceptualized by NMB, ARA and AIY. Resources for the study were obtained by NMB and ARA. All authors presented and agreed on the methodology. The validation process was carried out by NMB. Data collection was carried out by NMB. The first draft of the writing was done by NMB. The task of reviewing and editing the writing was undertaken by NMB and ARA. The supervision of the study was done by ARA and AIY.

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Author contributions

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