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Mobile phone use among mothers seeking postnatal services in Kakamega County, Kenya

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Abstract

Background/Aims Mobile phone use is increasing globally, with Kenya having increased use in rural and urban areas. Despite the widespread use of mobile phones, their use in health delivery services, such as to enhance postnatal care attendance, is low. Kenya is exploring interventions such as the use of mobile health to improve uptake. This study aimed to determine mobile phone use among postnatal mothers in Kakamega County, Kenya.

Methods This was a descriptive cross-sectional study using quantitative data. It was carried out among 240 postnatal mothers in Kakamega County. Systematic sampling was used to recruit the participants from three hospitals and data were collected using questionnaires. Data were analysed using the Chi squared test to determine associations between sociodemographic characteristics and perceptions of mobile phone use to improve postnatal care attendance.

Results The majority of participants (87.0%) owned a mobile phone. Over half (53.0%) used their mobile phone many times a day, with 61.0% sending SMS many times a day and 65.0% making voice calls many times a day. Almost all participants (93.0%) said they would recommend the use of an SMS or voice call service for postnatal care attendance to their friends. Frequency of mobile phone use (P=0.000), SMS use (P=0.042) and voice call use (P=0.007) were all significantly associated with perception of mobile phone use to improve postnatal care attendance, as was antenatal care visits (P=0.005).

Conclusions The majority of participants owned mobile phones and felt positive about mobile phone use to improve postnatal care. The county government of Kakamega should integrate mobile phone technology with the delivery of postnatal services to improve attendance.

Key words: Maternal health; Mobile phone technology; Postnatal care; Postnatal mothers

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Background

M-health is the process of integrating mobile phones into the provision of healthcare services. Mobile phones are used worldwide for communicating with patients, record keeping and data collection (Free et al, 2010). Globally, approximately 80% of people live in an area with good mobile phone connectivity, which has enabled more than 3.5 billion people to use mobile phones (GSM Association, 2019) and efforts are being made to use mobile phones in improving healthcare (Rathbone and Prescott, 2017). Mobile phone coverage in Kenya is over 90% and mobiles can be used to promote health (Kemibaro, 2016). Sahu et al (2014) reported that mobile phone technology can be used to distribute health messages about clinic appointments and improve uptake of health services. In Kenya, 53% of postnatal mothers attend postnatal care, but in Kakamega County, only 34% do so, one of the lowest rates of postnatal care attendance in the 15 counties of Kenya (Kenya National Bureau of Statistics et al, 2015). A study in Kenya by Oramisi et al (2019) cited the main reason for not attending postnatal visit was forgetting about appointments.

Many studies have explored strategies to improve maternal health and postnatal care. Chelagat et al (2018) proposed six strategies to improve maternal health, including postnatal care, one of which was improving follow-up and coordinated postnatal care. Olajubu et al (2020) reported that mobile health has the potential to improve uptake of postnatal care services in health facilities. Many m-health strategies have shown evidence of creating

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awareness of various health issues and increasing uptake of health services (Mbuthia et al, 2019). Sustainable development goal 3 is to to decrease global maternal mortality to 70:100 000 by 2030 and reduce neonatal mortality to 12 per 1000 live births (United Nations General Assembly, 2015). To achieve such a goal may require several different interventions, including m-health. More than 3.5 billion people in the world use a mobile phone, with 80% of the global population living in areas with mobile phone coverage (Kelvin, 2019). There is increasing use of mobile phone technology to pass health messages (Marcolino et al, 2018). Mobile phone technology has been evaluated by medical experts as to whether its use can improve appointment attendance and results show it has a positive influence (Sondaal et al, 2016).

Kikuchi et al (2018) observed that low attendance at postnatal clinics may result in maternal and neonatal complications. Lack of postnatal care resulting from failure to attend postnatal clinics may lead to maternal and neonatal mortalities (Timilsina and Dhakal, 2015). Olajubu et al (2020) reported that SMS reminders and educational health messages were able to improve use of postnatal care services in four visits. Jones et al (2020) reported that after receiving SMS reminders, postnatal mothers were 1.8 times more likely to use family planning services. The aim of this study was to determine ownership and use of mobile phones among postnatal mothers in Kakamega County. The study also evaluated mothers' attitudes to mobile use to improve postnatal care.

Methods

This was a descriptive cross-sectional study carried out in Kakamega County, Kenya. It aimed to explore ownership and use of mobile phones to improve postnatal care attendance among mothers seeking such services.

Participants

Simple random sampling was used to select three clusters from the 12 subcounties in Kakamega County. Stratified and purposive sampling was used to select three public hospitals from the three clusters: Shibwe, Malava, Navokholo. A total of 240 study participants (80 from each hospital) were randomly recruited using systematic sampling. The sample size was calculated using the Fisher's exact test.

Postnatal mothers who had one previous birth and owned a mobile phone who sought postnatal services at the clinics of the hospitals were eligible for inclusion in the study. Mothers who were not residents of the study sites, or who were sick or of unsound mind were excluded.

Data collection

Data were collected from the participants using questionnaires developed by the researchers and written in Kiswahili (local language). To ensure reliability and validity, the questionnaires were pretested at Manyala hospital and reviewed for accuracy, completeness and typing errors.

Three researchers and two research assistants at each study site collected data using the questionnaires. The research assistants were trained on how to collect data. The questionnaires were subdivided into sections that included demographic characteristics, mobile phone ownership/use, and attitude on whether mobile phones can improve postnatal visits.

The questionnaires were issued to participants in the clinic after undergoing eligibility assessment and contained a mixture of open-ended and closed questions.

Data analysis

Data were analysed with the Statistical Package for Social Sciences (version 21). The Chi-squared test was used to determine associations between sociodemographic characteristics and participants' perception of mobile phone use to improve postnatal care attendance. A 5-point Likert scale was used to assess this perception from 'strongly agree' to 'strongly disagree'. Those who strongly or slightly agreed that mobile phone use can improve postnatal care attendance were considered to have a 'positive' attitude, while those who disagreed were considered to have a 'negative' attitude. The results were considered significant at $P<0.05$.

Ethical considerations

The study was reviewed and cleared by the Kenyatta University Ethical Committee (approval number: KU/ERC/VOL.1 License NO. NACOSTI/P/19/1400) and necessary permission given. Informed consent was obtained from the study participants after the study procedures were explained. Anonymity was maintained as participants did not report their names on their questionnaires.

Results

Table 1 outlines the participants' sociodemographic characteristics. The majority (66.7%) were less than 30 years old, had a formal education (94.4%), with the greatest proportion having completed secondary education (37.1%), and were married (86.7%).

Table 2 presents the participants' socioeconomic characteristics. The majority (53.3%) were not employed, had an income of less than 10 000 KShs per month (88.8%) and used a motorcycle to reach the hospital (62.5%). The greatest proportion (45.6%) took 21–40 minutes to reach the hospital.

Mobile phone ownership and use

Most participants (86.6%) had their own mobile phone, while 12.5% shared their mobile with others in their household. Only 0.8% borrowed mobile phones. Table 3 shows participants' mobile phone use. The majority (52.6%) used their mobile phone many times a day, with 61.3% sending text messages many times a day and 65.3% using voice calls many times a day.

Perception of mobile phone use in healthcare

Table 4 shows the participants' perception of using mobile phones to improve postnatal attendance. Most of the participants (57.1%) strongly agreed that mobile phone reminders could improve postnatal clinic attendance. All participants reported that they would accept receiving mobile phone reminders about postnatal visits and 92.9% said they would recommend

Table 1. Sociodemographic characteristics

Variable	Category	Frequency, *n*=240 (%)
Age (years)	<20	12 (5.0)
	20–25	67 (27.9)
	26–30	80 (33.3)
	31–35	59 (24.6)
	36–40	17 (7.1)
	>40	5 (2.1)
Education	No formal education	15 (5.6)
	Primary	112 (46.7)
	Secondary	89 (37.1)
	College/university	24 (10.0)
Marital status	Married	208 (86.7)
	Unmarried	23 (9.6)
	Separated	9 (3.8)
Antenatal care visits attended	One	8 (3.3)
	Two	37 (15.4)
	Three	45 (18.8)
	Four or more	149 (62.1)

Table 2. Socioeconomic characteristics

Variable	Category	Frequency, *n*=240 (%)
Occupation	Unemployed	128 (53.3)
	Self employed	97 (40.4)
	Formally employed	15 (6.3)
Income (KShs)	<10 000	213 (88.8)
	10 001–20 000	23 (9.6)
	20 001–30 000	1 (0.4)
	>30 000	3 (1.6)
Mode of transport	Matatu	56 (23.3)
	Motorcycle	150 (62.5)
	Bicycle	10 (4.1)
	Walking	21 (8.8)
	Taxi	3 (1.3)
Time taken to reach hospital (minutes)	<20	85 (35.4)
	21–40	110 (45.8)
	41–60	37 (15.4)
	>60	8 (3.3)

Table 3. Mobile phone use

Variable		Frequency, *n*=240 (%)
Mobile phone use per day	Once	34 (14.2)
	Twice	21 (8.7)
	Three times	58 (24.2)
	Many times	126 (52.6)
SMS use	Do not use	3 (1.3)
	Rarely	1 (0.4)
	Once per week	6 (2.5)
	Once per day	28 (11.7)
	Twice per day	16 (6.7)
	Three times per day	39 (16.3)
	Many times per day	147 (61.3)
Voice call use	Rarely	13 (5.4)
	Once per week	4 (1.7)
	Once per day	20 (8.3)
	Twice per day	14 (5.8)
	Three times per day	32 (13.3)
	Many times per day	157 (65.4)

Table 4. Study participants' perception of mobile phone reminders to improve postnatal attendance

Question/statement	Frequency, *n*=240 (%)
The use of mobile phone reminders will improve postnatal attendance	
Strongly agree	137 (57.1)
Slightly agree	37 (15.4)
Not sure	45 (18.7)
Slightly disagree	19 (7.9)
Strongly disagree	0 (0.0)
Would you accept mobile reminders for future postnatal care visits?	
Yes	240 (100.0)
No	0 (0.0)
Would you recommend the use of SMS/voice calls for postnatal care services?	
Yes	223 (92.9)
No	17 (7.1)

Table 5. Opinions of possible negative effects of mobile health

Opinion	Frequency, *n*=240 (%)
No negative effects	90 (37.5)
Family conflict	37 (15.4)
Message delay	19 (7.9)
May refuse to respond	33 (13.8)
I don't know	64 (26.7)

the use of mobile health to their friends. Table 5 summarises the participants' opinions of using mobile phone SMS and voice calls for health purposes. Over one third (37.5%) of participants said there were no negative effects to using mobile health but 26.7% said they don't know what effect it may have and 15.4% thought it was likely to cause family conflict.

Barriers to using mobile phones in health

Table 6 shows perceived barriers to using mobile phones in health. Many participants (33.8%) thought lack of power to charge a mobile phone would be a barrier to their use in health, and 27.9% said network challenges could be a barrier.

Variables associated with perception of using mobile phones

Table 7 summarises the variables associated with participants' perception of mobile phone use to improve postnatal attendance. Frequency of mobile phone use (P=0.000), SMS use

Table 6. Perceived barriers to using mobile phones in health

Barriers	Frequency, *n*=240 (%)
Network challenges	67 (27.9)
Lack of power to charge	81 (33.8)
Language barriers	28 (11.7)
Lack of mobile	39 (16.2)

Table 7. Variables associated with attitude to mobile phone use for postnatal services

Variable		Attitude		Chi-square
		Positive (%)	Negative (%)	
Age (years)	<20	9 (81.8)	2 (18.2)	x^2=6.56, df=5, *P*=0.255
	20–25	50 (90.9)	5 (9.1)	
	26–30	59 (93.7)	4 (6.3)	
	31–35	41 (82.0)	9 (18.0)	
	36–40	8 (72.8.0)	3 (27.2)	
	>40	4 (80.0)	1 (20.0)	
Marital status	Married	156 (90.2)	17 (9.8)	x^2=10, df=2, *P*=0.487
	Unmarried	14 (82.4)	3 (17.6)	
	Separated	4 (80.0)	1 (20.0)	
Education	No formal	10 (76.9)	3 (23.1)	x^2=2.4, df=3, *P*=0.494
	Primary	88 (89.8)	10 (10.2)	
	Secondary	62 (91.2)	6 (8.8)	
	University	14 (87.5)	2 (12.5)	
Occupation	Unemployed	89 (90.8)	10 (9.2)	x^2=6.5, df=2, *P*=0.721
	Self employed	68 (87.2)	10 (12.8)	
	Formally employed	7 (87.5)	1 (12.5)	
Income	<10 000	157 (89.7)	18 (10.3)	x^2=0.662, df=2, *P*=0.718
	10 000–20 000	15 (93.7)	1 (6.3)	
	20 001–30 000	2 (66.7)	1 (33.3)	
Mobile phone use per day	Once	22 (88.0)	3 (12.0)	x^2=40, df=8, *P*=0.000
	Twice	17 (94.4)	1 (5.6)	
	Three times	38 (86.4)	6 (13.6)	
	Many times	96 (89.7)	11 (10.3)	
SMS use	Many times/day	100 (87.9)	15 (12.1)	x^2 2.1, df=5, P=0.042
	Once/day	21 (95.5)	1 (4.5)	
	Twice/day	10 (90.9)	1 (9.1)	
	Three times/day	26 (87.1)	3 (12.9)	
	Once a week	4 (80.0)	1 (20.0)	
	Do not use SMS	2 (66.7)	1 (33.3)	
Voice call use	Many times/day	120 (90.9)	12 (9.1)	x^2=15.8, df=5, *P*=0.007
	Once/day	14 (93.3)	1 (6.7)	
	Twice/day	9 (90.0)	1 (10.0)	
	Three times/day	23 (85.2)	3 (14.8)	
	Once/week	4 (80.0)	1 (20.0)	
	Rarely	4 (50.0)	4 (50.0)	

Table 7. Variables associated with attitude to mobile phone use for postnatal services (cont.)

Variable		Attitude		Chi-square
		Positive (%)	Negative (%)	
Antenatal care visits	One	4 (80.0)	1 (20.0)	x^2=12.7, df=3, *P*=0.005
	Two	18 (69.2)	8 (30.8)	
	Three	29 (87.9)	4 (12.1)	
	Four or more	103 (93.6)	7 (6.4)	

(*P*=0.042) and voice call use (*P*=0.007) were significantly associated with the perception of mobile phones in healthcare. Antenatal care visits were also associated (*P*=0.005).

Table 8 shows the time of day participants reported they would like to receive a mobile phone health message. The greatest proportion of participants (34.2%) said they would like to receive health messages in the morning.

Discussion

This study aimed to examine mobile health in improving postnatal attendance among mothers in Kakamega County. Participants' mobile phone ownership and use were assessed, as well as their perceptions of mobile phone reminders of postnatal appointments, possible barriers to and negative effects of mobile health. Most participants owned their own mobile phone and used it multiple times a day, for either text messaging or voice calls. Participants reported mostly positive perceptions of mobile health to improve postnatal care attendance, with some reporting possible barriers such as network challenges or lack of power to charge their phone. Perceived negative effects of mobile health in postnatal care included that it may cause family conflict or that participants may not respond, but the greatest proportion of respondents felt there were no negative effects. Participants' sociodemographic and economic characteristics were assessed for their association with a positive or negative attitude towards mobile health to improve postnatal attendance. Mobile phone use, SMS use and voice call use were all significantly associated, as was antenatal care attendance.

The majority of participants owned a mobile phone, a finding in line with the Kenyan Demographic Health Survey which found that 86% of the Kenyan population owned a mobile phone (Kenya National Bureau of Statistics et al, 2015). This high level of mobile phone ownership is consistent with observation by the Communication Authority of Kenya (2017). However, Marron et al (2020) reported only 59% of participants in a study in Malawi owned a mobile phone. The high ownership of mobile phones by residents provides an

Table 8. Receiving SMS or voice calls as reminders for postnatal visits

Answer	Frequency, *n*=240 (%)
Would you like to receive SMS/voice call to remind you about postnatal visits?	
Yes	219 (91.2)
No	21 (8.8)
Time proposed to receive health messages	
Evening	69 (28.8)
Afternoon	34 (14.2)
Morning	82 (34.2)
Any time	55 (22.9)

opportunity for health workers to integrate m-health into the provision of health services and improve uptake of these services.

This study established that the majority of the participants (50%) used their mobile phones multiple times a day. Similarly, Rosales-Huamani et al (2019) conducted a study in Peru that found participants frequently used their phone. Most postnatal mothers in the present study (61%) sent short text messages multiple times a day. This is a lower proportion than the 76.7% reported by Berhanu et al (2018) in northwest Ethiopia but consistent with a study in South Africa conducted by Peyper (2013). However, Domek et al (2018) reported some participants in their study in Guatemala could not use SMS. Subramani et al (2017) reported in their study in Malaysia that 68.8% of male participants felt dependent on their mobile phones in their daily life. This frequent mobile phone use may aid in passing on health messages, as they are unlikely to miss a message.

Most participants said they would accept receiving health-related messages in the morning, which agrees with Otieno and Malar (2014) who reported that many participants in their study in west Kenya read SMS messages in the morning. Otieno and Malar (2014) also reported that almost all (99.7%) of their clients would accept SMS health messages. This indicates that mobile phones are likely to be accepted by the population for promoting maternal and neonatal health, as well as offering routine care. Frost & Sullivan (2018) noted that mobile health has the potential to transform the healthcare sector, including postnatal care attendance.

Almost a third of participants reported the perception that network connectivity challenges would be a barrier to the use of mobile phone reminders for postnatal care appointments. In Kenya, mobile phone penetration was 88.1% in 2018 (Communication Authority of Kenya, 2019). It was estimated that by 2019, there would be 4.68 billion mobile phone users globally (Technology and Telecommunication, 2020).

This study established that participants felt positively about mobile phone reminders to improve attendance at postnatal care. Frequency of mobile phone use (P=0.000), SMS use (P=0.042) and voice call use (P=0.007) were all significantly associated with perception of mobile phone use to increase postnatal care visits. Watterson et al (2015) and Sondaal et al (2016) both reported similar findings in their reviews of literature surrounding mobile health. The perception that mobile phone use can improve postnatal care attendance is a good opportunity for health workers to integrate mhealth to increase uptake of postnatal services in Kenya.

Conclusions

The majority of postnatal women in Kakamega County own mobile phones and frequently use them for text messaging and/or voice calls. The population studied was positive about the use of mobile phones for health messages to improve postnatal care attendance.

The Kakamega County government should integrate the use of mobile phone technology in the delivery of postnatal services and other related health services. This may help improve attendance, working towards achieving Sustainable Development Goal 3.

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Conflicts of interest

The authors declare there are no conflicts of interest.

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