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Use of mobile phone among patients with HIV/AIDS in a low-middle income setting: a descriptive exploratory study

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ABSTRACT

The use of mobile phone and factors influencing usage have least been explored in spite of its relevance in mHealth adoption. We conducted a descriptive exploratory study to evaluate the use of mobile phone alarm application, text messaging and voice call among HIV positive clients. We randomly selected 362 respondents who were 18–65 years and receive care from two health facilities in Accra, Ghana. Questionnaires were administered and data analysed to describe and predict mobile phone use. SPSS version 20 was used to process data for analysis. Findings revealed respondent ($n = 338$, 93%) did not share their mobile phones. Voice call was predominantly used ($n = 227$, 63%) while text messaging and mobile alarm functions were sparingly used. Majority ($n = 285$, 78.9%) did not use the mobile phone application to support adherence. Age and employment predicted the use of mobile phone alarm (OR ± 1.56, $p < 0.05$), test messaging (OR ± 1.48, $p < 0.05$) and voice calls (OR ± 1.25, $p < 0.05$). We observed that younger age and employment influence the use of mobile phones. Voice calls are more acceptable because it is simple and easy to use. Knowledge and persuasion are fundamental to mobile phone literacy skills development and should be integrated in mHealth interventions.

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KEYWORDS
Mobile phone; alarm; text messages; voice call; HIV clients

1. Introduction

Mobile phone use for health care in low-middle income countries is gradually becoming a common phenomenon. Hitherto, mobile phones were accessible to some sections of the population and issues of household sharing practices affected phone privacy. Nowadays, there is an increasing access to mobile phone; most people have their own handsets and do not have to depend on other members of the family to communicate with the phone (Wesolowski et al. 2012). However, the individual competency in operating the features of the mobile phone is usually not evaluated. The mobile phone has applications such as alarm function, text messaging, voice call and more sophisticated application depending on the type of mobile phone. The World Health Organisation (WHO) has recommended the use of text messaging in adherence support in HIV care (WHO 2016). However, familiarity in using the mobile phone applications and factors enhancing acceptance or rejection need to be understood. Technology literacy has been identified as one of the barriers affecting acceptance of mHealth interventions (Wyche, Simiyu, and Othieno 2018). Mobile phone users usually depend on user manual to operate the features while others learn to discover the features through trial and error. Recognising how inability to operate mobile phone features could affect our prospective intervention, we conducted a baseline assessment. The rationale was to assess the use of mobile phone among HIV-infected clients prior to introducing mobile phone intervention to support medication adherence in the same population.

2. Mobile phone diffusion and context

Access and penetration of mobile phone will continue to experience significant improvement especially in developing economies. Global System for Mobile Communication (GSM) report indicates that worldwide, there were 5 billion mobile phone subscribers in 2017 with a likelihood of 2.1% increase by 2025. Mobile phone penetration was 66% in 2017 and is expected to reach 71% by 2025. People connected to one or more networks worldwide constitute two-thirds of the population. Developing countries such as India, China and Sub-Saharan Africa would direct the trend in mobile

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telephony growth. Sub-Saharan Africa had the lowest mobile phone penetration rate of 44% in 2017 which is expected to reach 52% by 2025 (GSMA-Intelligence 2018). Notably, Nigeria, a West African nation, was featured as one of the top 10 largest countries with a 49% subscriber penetration rate and is expected to reach 55% by 2025 (GSMA-Intelligence 2018).

The rate of mobile phone diffusion requires innovative application of mobile phone in promoting various aspects of socioeconomic existence including healthcare interventions. In countries where connectivity is challenging, simple applications and devices are relevant to the technology integration arguments. Mobile phone owners require skills in operating simple applications such as alarm, text messaging and voice calls. The competency of individuals to utilise mobile phone application facilitates the acceptance and adoption of this technology in healthcare even among service providers (Illiger et al. 2014).

Situating the access to mobile phone within the sociocultural context, it is relevant to assess ownership, usage of presumable simple features such as voice call, text messaging and alarm of the mobile phone irrespective of the type of phone. This is because these applications do not require data or internet connectivity to function. Simple mobile phones are more available, accessible and affordable in low-middle income countries. Smartphones are more complicated, costly and require internet connectivity. The internet connectivity of mobile phone in Ghana is low attributable to the number of second-generation cellular technology (2G). Reports suggest 53% of connections as at 2017 were 2G network. However, this is expected to improve as service providers invest in fibre optic transmissions and upgrade their systems (GSMA-Intelligence 2018). Assessing the use of mobile phone alarm, SMS and voice call among HIV/AIDS clients in Ghana were necessary prior to implementing an integrated mobile phone adherence intervention.

3. Evidence on use of mobile phones

Mobile phone is predominantly used as a communication device for exchanging different forms of information. Mobile phones facilitate connection with family, friends and other social networks in everyday life (Linke 2013). The advancement in mobile phone technology has led to its application in the field of agriculture, business, politics, finance and health (GSMA-Intelligence 2018). Donner (2008) in a review summarised evidence on mobile phone in three thematic areas; adoption of the technology, the impact and the interrelationships. The adoption studies focused on the application of mobile phone in commerce, banking and the rate of penetration. Impact studies evaluated the economic benefit of mobile phones in different settings while the interrelationship studies explored mobile phone technology and the usage among different populations (Donner 2008). Donner (2008) proposed a disaggregation of the artefact of the mobile phone through evaluating the handset and application in order to understand the complexity of mobile technologies. The disaggregation process generated a plethora of events that has transformed mobile telephony in a pluralistic and ubiquitous manner. However, the user has to discover and use the multi-functionalities associated with the changes enacted within the disaggregation process (Middleton, Scheepers, and Tuunainen 2017).

Wyche, Simiyu, and Othieno (2018) explored the use of mobile phone among rural women in Kenya and reported that the women did not understand the features of the mobile phone. Text messaging features were hardly used except when the women want to delete messages to free their phone memory. This means that mobile phone interventions would have to include literacy in the design and implementation process. Text messaging is effective in literate population because it requires higher order cognition especially where the receiver is expected to provide feedback. The mobile phone user should be able to receive, retrieve, read and return messages. The lack of knowledge and skills in using the mobile phone limits the affordance of the user (Wesolowski et al. 2012; Wyche, Simiyu, and Othieno 2018).

4. Use of mobile phone in health care

Mobile health is a component of the broader concept of Telehealth. It involves application of information, communication and technology in the management of a range of health issues spanning from policy to the point of care service delivery (Aranda-Jan et al. 2014). Telehealth applies more advanced technologies including remote surgical intervention. Mobile health (mHealth) focuses on the use of cellular phones with primary applications to the use of more sophisticated devices including smartphone to deliver health service (Adibi 2015). In high-income countries, mobile phone-based healthcare has advanced, and the applications and purpose of use differ considerably. Researchers in developed countries are busy exploring mobile phone affordance with much emphasis on smartphone and web-based media applications (Karnowski and Jandura 2014). Smartphone access in low-middle income countries are improving, however, mobile phone literacy, cost and connectivity are major

barriers to implementing mHealth intervention (Alvarado et al. 2017).

Mhealth interventions have been used in communicating diagnostic tests results; monitoring clients, promoting adherence, scheduling clinic appointments while promoting interaction between clients and service providers (Chib, van Velthoven, and Car 2015; Hall et al. 2014). Mobile phones are also valuable in gathering health data and remotely monitoring clients in emergency situations (Aranda-Jan 2014; Krishna, Austin, and Balas 2009). Mobile phone applications such as SMS and multiple media messaging have been used to facilitate interaction between clients as well as providing educational and motivational information, to promote behaviour change, in different populations including clients infected with HIV/AIDS (Gurol-Urganci et al. 2013; Horvath et al. 2012). However, SMS applications dominate the literature with varied reports relating to its effectiveness (Amico 2015; Cole-Lewis and Kershaw 2010).

In a cross-sectional study to assess feasibility and acceptability of using Short Message Service (SMS) in clients receiving antiretroviral therapy in Uganda, Kim et al. (2015) revealed the readiness of respondents who owned mobile phones to use their phones for health communication. However, in developing interventions it is necessary to identify the skill deficits train and introduce intervention in a manner that is acceptable. Airtime supply will meet a critical need but inability of the mobile phone user to utilise applications minimises the benefits. Studies have reported that the use of mobile phones for adherence support in patients with HIV/AIDS improves treatment outcome (Gurol-Urganci et al. 2013; Horvath et al. 2012; Thirumurthy and Lester 2012). However, discourse on using the mobile phone to support treatment adherence in HIV/AIDS in developing countries remains diverse (Thirumurthy and Lester 2012).

Most of the studies reviewed evaluated use of the short messaging system (SMS) or text messages in adherence intervention. Lester et al. (2010) suggest weekly text messaging improves adherence level and quality of life in HIV-infected clients. Horvath et al. (2012) in a meta-analysis of two studies also concluded that weekly text messaging increase adherence and improves outcome. One of the reports indicated preference for text message in the indigenous language. This means in contextualising the use of text messages, the cultural orientation of the end user must be taken into consideration in mHealth interventions.

Mobile phone alarm has also been used to support adherence in clients with HIV (Xuan Tran et al. 2013). The alarms which are set according to medication schedule are able to prompt and improve medication taking. However, setting the alarm requires some level of phone literacy. Voice call and automated voice messages also facilitate adherence and are often preferred (Rodrigues et al. 2015). Notably, voice calls are easier to operate and are associated with some sense of actual interaction. Wyche, Simiyu, and Othieno (2018) in their study recognised that the women were familiar with 'red and green' buttons for receiving and ending calls. However, even with voice calls there are issues of language preference that the literature did not address. Language is an element of culture and a medium of transmitting information. Service providers as part of culturally competent practice should recognise the language preference of their patients. This facilitates consensus building on decisions about the language of choice while addressing perceived disparities in healthcare (Betancourt et al. 2016). However, language is not the only determinant affecting mobile phone use.

Individual characteristics such as age, education, ability to use the technology and ownership of device contribute to the willingness to use mobile phones (Patrick et al. 2008). Age influences mobile phone adoption with regard to performance expectancy, effort, social influence and prevailing conditions (Zhou, Rau, and Salvendy 2014). Young people tend to use mobile phones frequently while the older generations are less incline to technology especially if the device is more complex (Kurniawan, Mahmud, and Nugroho 2006). The older people learn to use specific functions and stick to it while the younger people are more exploratory. However, young people are able to influence the old through sending information using new features on their phone which enhances implicit adoption (Zhou, Rau, and Salvendy 2014).

Studies suggest association between technology acceptance and literacy (Illiger et al. 2014; Wyche, Simiyu, and Othieno 2018). Literacy in the broad context transcends beyond formal classroom education although the latter predicts effort expectancy (Wesolowski et al. 2012). Education enhances ability to read in order to determine how to use mobile phone features. Additionally, using mobile phone device over time is an informal way of learning which facilitates mobile phone use (Wyche, Simiyu, and Othieno 2018).

Employment facilitates the ownership and use of mobile phones (Kim et al. 2015; Wesolowski et al. 2012) since it is an indication of financial empowerment. The type of phones, technology acceptance, fear of change and cost of airtime also affects the implementation of M-health interventions in Sub-Saharan Africa (Aranda-Jan 2014; Belzer et al. 2015). Aranda-Jan,

Mohutsiwa-Dibe, and Loukanova (2014) suggested bridging of these gaps by developing a local content approach to project design which should include training, supply of airtime and partnerships between clients, health institutions, stakeholders such as telecom operators and the government.

5. Method

5.1. Study design and selection of respondents

This was a descriptive exploratory study that sought to assess whether clients infected with HIV had the requisite skills in using the mobile phone applications and factors contributing to mobile phone skill literacy. Mobile phone skill assessment was important in determining the training gaps prior to introducing an integrated mobile phone intervention program in the current population. Although these skills are not disease entity specific, their skill in using alarm function, sending and receiving text messages and voice calls were evaluated as part of the intervention planning phase. It was also relevant to assess the language preferences and privacy issues in order to develop appropriate strategies for enhancing program success. The exploration of predictors further enabled an understanding of the factors that were to be controlled to promote efficient use of the mobile phone applications during study implementation.

We estimated sample size using the Fleiss continuity correction criteria. In view of this, a total of 362 respondents were recruited in the study based on statistical estimation of the prevalence data and population parameters. We assumed a two-tailed significance level of 95% and power of 80% with a prevalence ratio of 1.1. The sample size was therefore adequate and the margin of error also within acceptable range.

Respondents were recruited from two hospitals in Accra, Ghana. The eligibility criteria included having a mobile phone, taking antiretroviral therapy, being at least 18 years old and the ability to communicate verbally. Respondents were excluded if they were very weak or experiencing symptoms that affect their ability to grant interviews for at least 5 minutes.

5.2. Study context

Ghana is a country located in West Africa with an estimated population of 29.47 million people and a growth rate of 2.18% (Ghana Poupulation 2018) and a land area of 238,538 square kilometres. Ghana is bordered by Burkina Faso in the north, Cote d'Ivoire to the west and Togo to the east. The southern boundary is covered by Gulf of Guinea, a coastline that stretches about 560 kilometres. There are 10 regions namely Upper West, Upper East, Northern, Brong Ahafo, Ashanti, Western, Central, Eastern, Volta and Greater Accra regions.

Mobile phone subscription ratio was 139/100 in 2017 and Ghana ranked 7th in Africa and 116th globally on the IDD ranking (ITU 2018). The indicators further show that subscribers have more than one sim card and connect to different networks. The subscriber penetration for voice call was 130.9% and 79.9% for data subscription in 2017 (NCA 2018).

Greater Accra region was purposively selected as the study site because there were 319 health facilities providing Prevention of Mother-to-Child Transmission of HIV (PMTCT) services and 24 antiretroviral therapy (ART) sites. HIV prevalence rate was 1.5% with 12,077 new infections as at 2011 (NACP 2014). The average daily attendance in the tertiary facility was 1500 clients while client admissions were about 250 patients daily. A total of 22, 480 clients attended the ART clinic in 2013, of this number, new clients were 1054 with an estimated daily attendance of 250 clients (KBTH 2013).

5.3. Data collection instrument

The data collection instrument was developed based on the desired skill competencies expected for using mobile phone alarm, text messaging and voice messages. The theory of affordances (Hartson 2003) underpinned the constructs that were measured relative to the phone type and the population. It was important to explore cognitive and functional affordances by assessing the use of the applications of interest in this study. Phone sharing practices were assessed leaning to findings by Hampshire et al. (2015) about phone ownership practices. The questionnaire had ten (10) items that evaluated the use of mobile phones. The use of mobile reminders was excluded following pretesting due to the redundancy of responses. The questions which were mainly categorical, assessed phone sharing practices, the use of alarm, text messages, voice calls and language preference for communication on the mobile phone. Additionally, responses were elicited on preference for training on the use of mobile phone. The variables were dichotomous therefore not eligible for the estimation of internal consistency coefficient. Face and content validity were maintained by ensuring the items measured exactly what was intended.

5.4. Data collection procedure

Data was collected within a period of 1 month (February to March 2014 on clinic days). The respondents were

recruited from the outpatient unit on clinic days. A general information was provided to the clients early in the morning during their routine health education sessions. Respondents who express interest in participating and met eligibility criteria received additional information on the benefits of the study, risk involved and the right of withdrawal. Consents forms were also signed. Two trained research assistants administered the structured questionnaire to the respondents in a face-to-face interview (this approach was used to minimise response error and address possible language related issues). The structured interviews were conducted in a private room at the clinic in English and Akan. The questions were read and responses filled out with pen on printed questionnaires. The sociodemographic information was obtained from patients and compared with client records. This was necessary in instances where respondents were unable to determine their age or diagnosis related information. Each respondent received snack and a token for transport but this did not influence the study outcome since incentive package was not disclosed until interview was over.

5.5. Data analysis

Data was entered and cleaned using SPSS software version 20. Descriptive statics was used to estimate the mean, standard deviation, frequencies and percentages relating to the usage of mobile phone among respondents. We also explored for the association between variables using Chi-square independent test. Sociodemographic variables were explored using a direct logistic regression model. Mobile phone alarm, text messages and voice call were included as the dependent variable which was compared with age, education, employment and gender to determine predictive patterns (independent variables).

Table 1. Demographic characteristic of respondents.

Variables	Frequency	$n = 362$ Percentage	*M* (SD)
Age			44 (9.82)
Sex			
Male	134	37	
Female	228	63	
Education			
Tertiary	21	5.8	
Basic/advanced	306	84.5	
None	35	9.7	
No education			
Marital status			
Married	181	50	
Not married	181	50	
Employment			
Formal	89	24.6	
Informal	232	64.1	
Unemployed	41	11.3	

Logistic regression procedure enabled the comparison of the factors that will determine if respondents use a specific application. The rule is to first conduct descriptive study to decide what variables to include in the final logistic regression model. Reporting the model fit also enhances interpretation of results appropriately.

5.6. Ethical issues

Respondents were given adequate information about the study: the right to participate, decline and withdraw was protected. Informed consent was signed by each respondent. The study was approved by two institutional review boards in Ghana and South Africa.

6. Results

6.1. Profile of respondents

The mean age was 44.4 ($SD = 9.82$) with 228 (63%) female respondents. Majority 306 (84.5%) had at least elementary education although 35 (9.7%) had not been through any formal education. More than half ($n = 210$, 58%) disclosed their status to their spouse, but a majority ($n = 312$, 86%) did not reveal status to friends as indicated in Table 1.

6.2. Usage of mobile phone

Results revealed voice call was the most used among respondents ($n = 227$(63%) out of the three mobile phone applications assessed. Majority of respondents ($n = 272$, 75%) did not use alarm application. Similarly, 250 (69%) were not using text message application. However, less than 40% admitted they require training to use the alarm, text messages and voice calls. Respondent did not use the phone to support their medication ($n = 285$, 79%) although majority indicated not sharing their cell phone with other individuals (Table 2).

Table 2. Usage of mobile phone among respondents.

Variable	Outcome			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Use alarm	90	24.9	22	75.1
Use text	112	30.9	250	69.1
Use call	227	63.1	133	36.9
Phone for medication	77	21.3	285	78.9
Training alarm	111	30.7	251	69.3
Training text	140	38.7	222	61.3
Training call	123	34	239	66.0
Sharing of phone	24	7	338	93.0

The most common language in which respondents sent or received messages was English ($n = 241$, 67%). Some respondent ($n = 83$, 23%) noted receiving messages but not being able to read. The respondents also reported using mainly indigenous language ($n = 266$, 74%) for voice communication with only 95 (26%) using the English language (not reported in table).

6.3. Factors influencing mobile phone usage

The factors that predict use of mobile phone were explored using logistic regression model (Table 3). The modelling for alarm use was statistically significant X^2 (5, $n = 362$) = 30.4, $p < .001$ but explained only 8% (Cox and Snell R square) and 12% (Nagelkerke R squared) of variation. The model correctly classified 75% of the cases. As shown in Table 3 age significantly predicted use of alarm ($OR = 1.56$, CI = 1.19, 2.03, $p < .001$).

The results show that the likelihood of using alarm increased by 1.56 times if the person is younger. Additionally, being employed contributed to the use of alarm ($OR = 1.76$, CI = 1.11, 2.80, $p < .05$) among respondents with a 1.7 chance if the person is employed. The Model for use of text messaging was also significant X^2 (5, $n = 362$) = 37.1, $p < .001$. The differences in using text messaging application were explained by 9.7%% (Cox and Snell R square) and 13.7% (Nagelkerke R squared) and the model correctly classified 72% of the cases. Age ($OR = 1.48$, CI = 1.16, 1.88, $p < .005$), education ($OR = 3.13$, CI = 1.52, 6.48, $p < .005$) and employment ($OR = 1.61$, CI = 1.05, 2.45, $p < .05$) significantly predicted the use of text message among respondents.

The result indicates that the likelihood of using text messaging increased by 1.48 times in younger respondents, while those who have some level of education had 3.13 possibility of using text applications. Respondents with employment also had a 1.61 probability of using text message application.

The use of voice call was included as the dependent variable with two covariates (age and employment) to determine the influence of these factors on those who use voice call. The model was statistically significant X^2 (2, $n = 360$) = 8.85, $p < .05$ but explained only 2.4% (Cox and Snell R square) and 3.3% (Nagelkerke R squared) of the differences in cases while classifying 64.4% correctly. Age ($OR = 1.25$, CI = 1.01, 1.54, $p < .05$) and employment ($OR = 1.46$, CI = 1, 2.12, $p < .05$) were significant in determining the use of voice calls. As age increased, the likelihood of using voice calls increased by 1.25 times while for employment it increased by 1.46 times as shown in Table 3. The results demonstrated that younger age, education and being employed influence the use of mobile phone applications.

Table 3. Predictors of mobile phone usage among respondents.

Predictors	B (S.E.)	Wald	Df	95% C.I.	Odds ratio	*p-value*
Use of Alarm						
Age	.444 (.134)	11.2	1	[1.19, 2.03]	1.56	.001*
Sex	.300 (.280)	1.14	1	[.779, 2.34]	1.35	.285
	.572 (.354)	2.61	1	[.886, 3.54]	1.77	.106
Education						
Marital status	.472 (.261)	3.28	1	[.962, 2.67]	1.60	.070
	.566 (.237)	5.71	1	[1.11, 2.80]	1.76	.017**
Employed						
Constant	−3.53 (.955)	13.67	1		.029	.000
Text						
Age	.389 (.124)	9.93	1	[1.16, 1.88]	1.48	.002*
Sex	.476 (.263)	3.28	1	[.961, 2.69]	1.61	.070
	1.14 (.371)	9.50	1	[1.52, 6.48]	3.13	.002*
Education						
Marital status	−.003 (.245)	.000	1	[.617, 1.61]	.997	.989
	.475 (.215)	4.86	1	[1.05, 2.45]	1.61	.027**
Employed						
Constant	−4.27 (.977)	19.1	1		.014	.000
Voice call						
Age	.220 (.107)	4.25	1	[1.01, 1.54]	1.25	.039*
	.378 (.191)	3.92	1	[.1, 2.12]	1.46	.048
Employed						
Constant	−191 (.488)	15.4	1		.147	.001

Logistic regression was significant at *$p < .01$ and **$p < .05$.

7. Discussion

Mobile phone use among respondents depended on the type of application and language of communication. Voice call use was more common compared with text messaging and alarm function use. Mobile phone sharing was not a common characteristic in this population. In the past, mobile phone access was limited, hence individuals received or made calls using phones belonging to family members, neighbours or friends. The sharing practices endangered privacy for HIV related communication especially for patients who do not want their HIV status known. Hampshire et al. (2015) compared ownership and usability of the mobile phone in young people in three countries including Ghana. The outcome revealed that 35% of young Ghanaians had a mobile phone while 93% of household in Ghana own mobile phones (Hampshire et al. 2015). Ownership of mobile phone is one of the key elements to consider when planning mHealth interventions especially in patients living with HIV/AIDS because of the privacy concerns.

HIV/AIDS is predominantly transmitted through sexual intercourse therefore associated with negative stereotyping. Obtaining information about privacy facilitates confidentiality and client autonomy. A few respondents mentioned sharing their cell phone

although they had personal mobile phones. Although sharing phone was not a common practice among respondents, charging phone batteries in homes and shops of family members and friends was a regular practice. Findings suggest inconsistencies in mobile phone sharing practices reported in other studies (Aker and Mbiti 2015; Shet et al. 2010). Privacy of mobile phone is vital to preventing stigma and discrimination. However, Shet et al. (2010) mentioned sharing mobile phones did not lead to stigma in HIV some patients. The issue that ought to be explored in the context of assumptions by Shet et al. is whether their respondents were concerned about disclosing their status. If an HIV-infected person has any reason to suspect stigma or discrimination, there is a likelihood of employing secrecy as a strategy to curb the effect. In such instances, they will not allow access to information communicated about their HIV status and treatment on their mobile phone. Further evaluation of mobile intervention is required to rule out the influence of stigma on acceptance of mHealth interventions (Dzansi, Tornu, and Chipps 2020; Shet et al. 2010). However, the association of stigma and phone sharing practices was not predicted in our model. A comparison of status disclosure and mobile phone sharing practices did not demonstrate any influence. Nevertheless, it is important to note that respondents were not using the mobile phone to support medication adherence at this stage of the study. Arguably, patients using mobile phone for adherence support could have concerns about possible stigma. Rodrigues et al. (2015) noted that patients recognise the value of reminders but are apprehensive about the unintended disclosure of their HIV status. The preference for voice calls is suggestive of the intention to prevent stigma. In case of voice call, recipient is aware of the person on 'the other side' before deciding the kind of information that could be shared.

The predominant use of voice call in this population is consistent with other studies that reported preference for voice calls (Rodrigues et al. 2015). The findings suggest a further examination of use of text message intervention in adherence support, medication refill and scheduling of clinic appointment. Respondents in this study were on ART for at least 3 months but most of them were not using their mobile phone to support adherence. Without orientation about the diverse features of mobile phone, users will limit their activities to receiving and ending calls as reported by Wyche, Simiyu, and Othieno (2018). The diffusion theory suggests that knowledge and persuasion are relevant to technology acceptance, therefore unless deliberate efforts are made to inform HIV clients to use the phone to support adherence they are less likely to do so voluntarily (Straub 2009). The preference for voice call in the indigenous language (Akan) reiterates the importance of evaluating language preference and tailoring intervention accordingly. Voice call was mostly used and preferred probably because it was simpler and required minimum literacy. In the WeTel study (Lester et al. 2010) indigenous language was used for text messages, but respondents in this survey preferred text messages in English. This is attributable to the use of English as the primary language of instruction in all school and its dominance in written communication.

Text messaging was not a feature in their routine communication; nevertheless SMS interventions dominate the literature on MHealth interventions (Cole-Lewis and Kershaw 2010; Horvath et al. 2012). The use of the text message required English language literacy and ability to identify and use the keypad to construct the messages. Even if the messages are received retrieving and reading it would pose challenges for those with literacy limitations. This finding is consistent with the rural women from Kenya who were reported to be deleting messages obviously because of literacy concerns (Wyche, Simiyu, and Othieno 2018). However, the skill gap of the women was associated with the nature of the keypads.

Mobile phone alarms use was also limited in spite of its usefulness as prompter in waking up from sleep and in supporting medication adherence (Shet et al. 2010). The low use of alarm is worth noting and adds to the debates surrounding the appropriateness of Mhealth interventions in low-middle income countries without filling in the competency gap. The regression outcome suggests the low usage is attributable to education, age and employment status. The alarm function requires technical skill and an understanding of the features on the particular mobile device. It is not surprising that most respondents in this study were not enthusiastic about using alarm. The respondents did not receive any education about using the mobile phone features, therefore, majority concentrated on using the mobile phone for everyday communication purposes.

Respondent did not know how to operate the features of the mobile phone. However, less than 40% of respondents were interested in being trained in spite of the skill deficits observed. We observed an association between education and mobile phone usage, therefore, recommend training for all individuals recruited into mhealth interventions program. It is important to ensure that other measures for stimulating learning readiness are integrated in the process to achieve the desired outcome.

Factors that predicted mobile phone usage in this population were consistent with other studies that

reported higher education and formal employment influenced the usage of mobile phones (Shet et al. 2010). Individuals with higher education have better literacy skills and able to manipulate complex mobile phone applications. Formal employment implies having at least primary education and consistent income and being able to afford airtime. Notably, there was an association between SMS applications, younger age and education. Young people are more fascinated by using the mobile phone, more adventurous and willing to embrace technological advancement (Belzer et al. 2015).

Our study demonstrated that although there is increasing ownership of mobile phone, capacity building is necessary to ensure the optimum benefits of usage accrue to individuals and institutions. The success and failure of mHealth intervention is dependent on whether users find it easy and simple to use and could integrate it in their daily routines consistent with the theoretical assumptions of technology acceptance model (Straub 2009). The adoption of mHealth intervention will be more acceptable in younger people, the highly educated and economically independent. Voice-based interventions will be more acceptable and user friendly in older people and those with technology literacy challenges. The diversity in the factors influencing the usage of mobile phone calls for the use of an integrated approach in mHealth interventions. Policy makers, educators and health practitioners initiating mHelath intervention ought to conduct assessment of mobile phone literacy, the sociodemographic characteristics of users (education and age) and client preferences prior to implementation. Knowledge transmission through training and persuasion will facilitate the decision to use and accept mobile phone-based health interventions.

Our study excluded HIV/AIDS patient with no access to mobile phone and those initiating treatment for less than 3 months. We did not compare duration of using mobile phone and type of phone to determine the effect on usage. Only three applications (alarm, SMS and voice function) were assessed. Future studies could explore a wider scope of mobile phone applications cognisant of the penetration and ownership of smartphones. Additionally, further investigation into the econometrics of mobile phone usage, coverage and system related issues are worth exploring. The findings were instructive in building the capacity of respondents in the second phase of the study which involved adherence evaluation and implementation of integrated mobile adherence program in the same population.

Disclosure statement

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