PERCEPTION OF HEALTH WORKERS ON USE OF IMMUNIZATION MOBILE APPLICATION AT PRIMARY HEALTH CARE FACILITIES IN KANO STATE, NIGERIA.

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ABSTRACT

Mobile applications are increasingly being used to attain improved access and quality of health care services, particularly in rural areas of low and middle-income countries. The purpose of this study was to explore the perceptions of health workers on the use of immunization mobile application at primary health care facilities in Kano State. An explorative qualitative design was used in this study. Twenty participants were selected using the purposive sampling technique. An interview guide was used to collect data from the participants using the interview method. Findings revealed that many participants who could not use the immunization mobile app mentioned lack of time as the reason why they couldn't use the app. We concluded that time constraint limits the use of mobile app, even though the app may provide access to immunization data.

Key words: Perception, health workers, immunization mobile application, primary health care

INTRODUCTION:

Recent years have seen an increased adoption of Mobile applications (Apps) by healthcare professionals as well as the general public. The use of mobile Apps is getting more attention in healthcare delivery globally and in some areas, may be considered indispensable. Researchers have also shown that mobile applications are now acceptable and feasible interventions for many healthcare problems[1].

Mobile application is a software application developed specifically for use on small, wireless computing devices, such as smartphones and tablets, rather than desktop or laptop computers.[2] Basically, it is a computer generated programme, designed and developed to run on small mobile devices. It has an operating system that supports stand-alone software.[3] They are available through application distribution platforms, which are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Store and BlackBerry App World.

Globally, mobile phone use is rapidly increasing, with an estimated six billion mobile phone users worldwide at the end of 2019.[4] In particular, mobile application has gained popularity among people living in low-income and middle-income countries and may be the key to penetrating hard to reach areas in the developing world. Mobile application has proven to be a cost-effective method of relaying health information than the more traditional methods such as face-to-face, phone calls, pamphlets, mail and email.[4] As immunization usually requires up-to-date knowledge and skills, mobile application can be used to provide such information at the point of care.

A study by Haman[5] on the perception of Tanzanian health care workers towards the use of mobile phone clinical applications suggests that while health workers are willing to participate in clinical trials of mobile technology, when the trials are over or

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when supervisory personnel are absent, the health workers cease to use the technology and revert back to traditional modes of care. Therefore, examining the perceptions of health workers on the use of mobile application is vital, as it will provide clear indications on how to ensure maximal adoption of this technology at all levels.

Immunization is widely regarded as one of the most cost-effective public health interventions that help to reduce global child morbidity and mortality. Low coverage of vaccinations is a major public health concern. In Africa alone, more than seven million children did not receive the full spectrum of vaccinations recommended before reaching 1 year of age in 2009. It is also estimated that 1.5 million children died globally from vaccine-preventable diseases where World Health Organization prequalified vaccines were available.[6]

Intensification of immunization programme has contributed to a significant decline in infant mortality rate in last few years, but still there is lack of up to date knowledge, regarding immunization among health workers. Adequate knowledge and practices in vaccination and the cold chain system are important to keep potency of vaccines and effectiveness of immunization. It has been shown that knowledge gaps do exist, regarding storage and usage of vaccines among health workers.[6]

A study by Nilseng, Gustafsson and Eriksen[7] showed that all the interviewees used mobile phones. Twelve used the internet, and eight reported using smartphones to access the internet. All participants stated that they were interested in improving their skills and they also thought that the technology could be helpful in their jobs.

Madon et al[8] published the results of a qualitative case study of community health workers using a mobile phone-based management information system for the control of neglected tropical diseases. Madon et al interviewed fifty-five respondents including fifteen key informants with a combination of community health workers, village leaders and health officials and held four focus group discussions with three to four persons from village health committees. They found that mobile phones increased the efficiency of routine work and boosted the motivation and self-esteem of community health workers. However, studies of such nature were rarely reported in the context of immunization. Therefore, the present study was designed to explore the perceptions of health workers on the use of immunization mobile application at primary health care facilities in Kano State.

Methodology:
An explorative qualitative design using an in-depth interview was used to explore the perception of health workers on the use of mobile application in routine immunization. Ethical clearance was obtained from the Ethical Review Committee of the Kano State ministry of health and Permission of the Kano State Primary Health Development Agency was granted. An informed Consent was also obtained from each participant. Twenty (20) participants from various professions, age groups and socio-economic status were selected using purposive sampling technique. An in-depth interview guide was used to collect the qualitative data. The in-depth interview guide comprised of open-ended questions that aided in collection of information about the perception of the study group on the use of the mobile application and was adapted from the work of Harman[5] on the perception of Tanzanian health workers towards the use of mobile application. The guide comprised of seventeen items. The interview took place at the respondents' health facilities and ran between 45 and 60 minutes. Participants were first provided with the detail information about the purpose of the study. They were then asked questions about why they used or couldn't use the immunization mobile App. The interviews were audio-recorded, transcribed verbatim, and content analyzed. Important phrases and sentences that were of relevance to the objective of the study were highlighted and assigned a code. Codes that have common elements were

grouped to form themes; which were revised for clarity and appropriateness. The data were analyzed using the thematic content analysis.

RESULTS:

Most of the respondents were female (60%). A significant proportion of the respondents (40%) have National Diploma as their highest professional qualification and most of the respondents are either in the lower or middle rank with 40% each (Table 1 attached.).

The nine themes that emerged includes Usage, Access to Information, Technical Problem encountered, Clients' Concern, Benefits, Discouraging Factors, Motivating Factors,, Need for Modification and Readiness .

Table 1: Socio-demographic characteristics of the health workers used for the qualitative study

Gender	Frequency	Percentage
Male	8	40.0
Female	12	60.0
Age (years)		
20-29	4	20.0
30-39	6	30.0
40-49	6	30.0
50-59	4	20.0
Rank/Position		
Lower	8	40.0
Middle	8	40.0
Higher	4	20.0
Professional group		
CHEWs	4	20.0
CHOs	4	20.0
Dentists	2	10.0
EHOs	4	20.0
Midwives	2	10.0
Nurses	4	20.0
Highest qualification		
National Diploma	8	40.0
High National Diploma	6	30.0
Bachelor's Degree	6	30.0
Used mobile app		
Yes	10	50.0
No	10	50.0

Table 1 above shows that most of the re spondents were female (60%). A significant proportion of the respondents (40%) have National Diploma as their highest professional qualification.

Usage:
Ten respondents who used the immunization mobile app and ten respondents who could not use the immunization mobile app where purposely selected in order to explore their perceptions about the use and non use of mobile app for immunization services. As such, 50% of the participants indicated that they used the app and 50% of the participants indicated that they did not use the app. A male nurse that could not use the app has this to say: "*I did not make any effort to use the mobile app. I think I don't have the time for it*".
"*Yes, I couldn't use the mobile app because I tried several times to download the app but I couldn't succeed. I think is the network problem.*" Said a Female community health extension worker.

Access to Information:
Participants who used the immunization mobile app and even those who were unable to use the immunization mobile app mentioned that the mobile application will provide access to information on routine immunization at any time and at any place. A midwife has this to say. "*You know, with the mobile app now I can access information about routine immunization anytime. I don't have to carry big text books*".

Technical Problems encountered:
Many of the respondents reported experiencing one technical problem or the other. These technical problems range from unclear writings to delay in opening the app and problems not directly linked to app but related to the mobile phone they are using. A male community health officer stated that "sometimes *opening the app will take unnecessary long time*"(P8). Also, A female dentist stated that: "*The problem I encountered while using the mobile app I think is not from the application. My phone became very slow in operation and that generally affect how it use all other applications*".

Clients' Concern:
The use of information and communication technology and gadgets including mobile app may be a new thing in this part of the world. As such, clients are expected to show their concern about how the health workers make use of the technology. The participants reported different concerns about the use of the application by their clients/patients. A female nurse stated. "*The clients don't know what am using my mobile phone for, so I don't think they have problem with my use of mobile application*". A female environmental health officer mentioned "*I don't think the clients are concerned about the mobile app. Most of the time, they don't even know what we are using the mobile phone for. I think they were happy seeing me using the mobile app. They were a little bit more relaxed knowing that one cannot make mistakes if information are confirmed via the technology*".(P3)

Benefits:
Many of the participants who used the immunization mobile application mentioned that the application has a lot of benefits to the health workers. Some of the benefits they outlined include: provision of information on immunization, ensure efficient immunization services as errors are avoided and improving the image of the health workers. A male community health officer stated "*very well, the app has really helped in improving my knowledge. More often, I open the app to read the information. May be I am motivated because of the need to write a post test.*" A female nurse who used the immunization mobile app said: "*Yes, use of mobile app ease access to information on immunization. Before one have to check textbooks or search on the internet and when the network is bad you can't access the information. I now easily update my knowledge on immunization*".

Discouraging Factors:
Among those that used the immunization mobile app and those that couldn't use the app, certain factors were identified as discouraging factors that hindered them from making efficient use of the app or totally prevented them from using the app. These discouraging factors include: lack of time, poor electricity supply, rapid power consumption from the battery, slow opening of the app and lack of interest among others. A

female nurse participant, who used the app stated "*On several occasions I tried to use the immunization mobile application but couldn't use it because of too much work demand. Sometimes, I will even open the application but I have to go and attend to my clients*". A male nurse participant, who couldn't use the application stated. "*I did not make any effort to use it I think I don't have the time for it*".

Motivating factors:

There are many internal and external factors that help the participants to either start or continue to use the immunization mobile app. Some of these factors include: giving the application free of charge, reduced workload, provision of standby power charge, making the information clearer, provision of a tablet or a bigger mobile phone free and giving money or certificate as a reward, among others.

A female community health extension worker when asked about what will motivate health workers to use the immunization mobile app, she responded: "*I think making it free and improving power. The phone can also be given free*". A male community health extension worker when asked about the same questions responded: "*You know our Nigerians! Money! If you can give them money for using the mobile app, you would see a lot of health workers using the app*".

Need for a Modification:

In addition to the information on routine immunization with diagrammatic illustrations, many participants felt that the mobile app need to be modified in order to make it an effective tool for health workers involved in immunization services. They suggested various means by which the app can be modified to enhance its use. These include: capability for an update from time to time, video clips of immunization procedures, questions for revision at the end of each chapter, opportunity to contact experts and capability for management of immunization data. A male environmental health officer stated: "*I will like to see a mobile app that contain video clips demonstrating some procedures related to immunization activities like reconstitution of vaccines, arrangement of ice packs in cold boxes and geostyle vaccine carrier etc*". Similarly, a female community health officer said: "*I would like to see an application that can be updated with current up to date information. Also, an application that can provide opportunity to contact various experts in the field of immunization to ask questions and receive responses from time to time*".

Readiness:

Among the participants who could not use the immunization mobile app, many of them expressed their readiness to use the immunization mobile app. A male environmental health officer said: "*Actually, on several occasions I tried to use the mobile app but I couldn't due to other work demands*". A male nurse also stated: "*Yes, initially I wanted to use it but I couldn't download it. I think the problem is the poor network connection or my phone has problem*".

Feelings:

The participants expressed different feelings when they heard of the mobile applications. Majority of the participants who could not use the immunization mobile application were caught unawares about mobile application. Many of them heard the word "*Mobile Application*" for the first time, although some say it's possible they heard about it before but could not remember.

Their feelings range from excitement, amusement, strange, elation, to surprised feeling. A female dentist stated: "*I was excited, because I use other mobile apps but I don't have anyone on immunization services*". A male environmental health officer said: "*I was elated on hearing the word "mobile application" I know is something related to mobile phone*".

DISCUSSION:

A qualitative study to explore the perception of health workers about the use of immunization mobile application was conducted. The participants were drawn from various professions, age groups and socio-

economic status. Nine themes were identified following a thematic analysis. Ten participants who used the immunization mobile and ten participants who could not use the mobile app were recruited purposely for the study. This was to provide a clear picture of why health workers use or did not use the immunization mobile app.

Many participants who did not use the immunization mobile app mentioned lack of time and awareness as the reason why they couldn't use the app. The finding of this study is in agreement with that carried out by Peng, Kanthawala, Yuan and Hussain who also identified lack of time and awareness as reason for non-usage of mobile app.[9]

Among participants who used the immunization mobile app and those who couldn't use the app, there was indication that immunization mobile app provide access to information at any place and any time. This observation is totally in agreement with the findings from the work of Dennison et al and Burguess.[10,11] Their results both demonstrated that mobile app is a means of providing access to information at any time and any place.

Unlike in some previous studies[10,11], where participants did not experience any technical difficulty in the use of the mobile app, participants in the present study encountered technical problems, such as lack of clarity of information and slow opening of the mobile application.

This study also found lack of awareness about the potential benefits of immunization mobile application, particularly among the older participants, thus corroborating and complementing some other previous studies.[12-17] There is therefore the need for government and the professional associations to enlighten their members on the significance of using mobile app and other technologies in immunization services.

CONCLUSION:
Many participants who could not use the immunization mobile app mentioned lack of time and awareness as the reason why they couldn't use the app. Among participants who used the immunization mobile app and even among those who couldn't use the app there was strong indication that immunization mobile app provide access to information at any place and any time. There is therefore, the need for the government to recruit more health workers in order to reduce their workload and allow them make efficient use of mobile technologies.

Conflict of interest:
None declared.

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