Review Article

Integrating mHealth into adolescent sexual and reproductive health promotion in Nigeria: prospects and barriers

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ABSTRACT

Adolescent sexual and reproductive health (ASRH) is a key public health issue because of its impact on health and development. Adolescent SRH is linked to available information which often determines sexual behaviours. The use of mobile phones for health (mHealth) has shown success in delivering health education and behaviour change interventions for young people for smoking cessation, nutrition and in SRH. This article explores the possible prospects and barriers to the use of mHealth for ASRH promotion in Nigeria. This paper reviews secondary data from international and local literature obtained from database search. A conceptual framework and an applicability and transferability (A&T) tool guided the analysis of ASRH issues and feasibility of mHealth use in ASRH in Nigeria. The prospects of mHealth use for ASRH in Nigeria include the widespread coverage of mobile phone services and the acceptability of its use for health by Nigerian adolescents, unmet need in ASRH information provision and the similarity of some characteristics of Nigerian adolescents to other study populations where mHealth has been successfully used. Other prospects include the Nigerian government's focus on ICT solutions and the availability of essential technical and organisational expertise for implementation. Possible barriers to the successful use of mHealth include poor funding for ASRH and inadequate information on implementation costs and cost-effectiveness which may make it difficult to present a business case. In conclusion, the use of mHealth in ASRH promotion in Nigeria is feasible and can be effective, however, measures must be taken to address specific barriers identified.

Keywords: Adolescent, Reproductive health, Mobile phones, mHealth, Nigeria

INTRODUCTION

Globally, adolescent sexual and reproductive health (ASRH) is regarded as a key public health issue. This is because there are 1.2 billion adolescents worldwide who make up 18% of the world's population.[1] The WHO defines adolescence as a period between ages 10 to 19 years, characterised by series of major physical and psychological changes which affect their sexual and reproductive health (SRH). It is a phase of transition between childhood and adulthood with significant changes in social interactions and relationships.[2]

Adolescents worldwide face a number of SRH problems like unwanted pregnancy, sexually transmitted infections (STIs) and HIV infections.[3] According to UNAIDS, adolescents account for 42% of new HIV infections globally and 80% of young people with HIV lived in sub-Saharan Africa.

The developmental stage of adolescence in developing countries including Nigeria has been associated with the challenge of poor access to information on sexuality issues.[5] Parents, teachers and healthcare workers fail to discuss SRH issues with adolescents because of socio-

cultural norms around chastity and shifting of responsibility among these adults on who should provide SRH information. This puts adolescents at risk of making poor SRH choices with the possibility of negative SRH outcomes.[6]

Behavioural interventions for ASRH aim to reduce negative SRH outcomes by providing necessary information and skill to help them postpone sexual debut, promote safe sexual behaviour and promote SRH seeking behaviour.[3] The mode of delivery, content, as well as timing of these interventions all have a role to play in influencing its impact on adolescents knowledge and behaviour.[5]

MOBILE TECHNOLOGY AND HEALTH

The arrival of mobile technology three decades ago was hailed as a technological breakthrough.[7] Since then, it has completely changed the global landscape of communication with a proliferation of mobile technology advancements, coverage and subscriptions. In 2013, the number of mobile phone subscriptions globally grew to 6.8 million, about 96% of the world's population (Figure 1).[8]
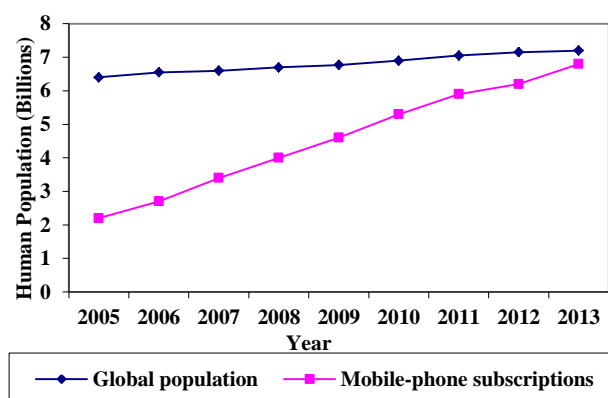
Figure 1: Global mobile subscription compared to human population (2005-2013).

Mobile phone penetration rates stand at 89% in developing countries. In Nigeria, it stands at 70%, almost three times internet penetration.[8] Owning and using a mobile phone in Africa and indeed Nigeria has become an important part of most people's professional, business, health and social lives.[9] This rapid global spread especially in developing countries stimulated research into the use of mobile phones for health gains and led to the creation of the field of mHealth.[10] The term mHealth is defined as the use of mobile communications technology and portable electronic devices like mobile phones to provide health services and information.[10,11] This could be via short message service (SMS), calls, mobile internet or applications (apps).

mHealth is an emerging field with many projects in the pilot stage. It has been used in aiding treatment

compliance, data collection and disease surveillance, health information systems, emergency medical response, health promotion, education and awareness.[10, 12] In the area of health promotion, SMS and phone calls have commonly been used in behaviour change interventions for chronic medical conditions and SRH.[13-15]

In developing countries, mHealth is considered as a means of overcoming some health system challenges, reaching hard-to-reach groups, reducing inequity and increasing access to quality health care.[16] Studies have shown that young people including adolescents in Nigeria and other developing countries are willing to access SRH information through mobile phones.[17-19] This could benefit adolescents in developing countries who are disadvantaged in terms of their access to SRH information and services.

Objectives

This study explored the current state of ASRH issues in Nigeria, the effects of mHealth on ASRH promotion and identified the possible prospects and barriers to the use of mhealth in ASRH promotion in Nigeria.

METHODOLOGY

This review used secondary data from published and unpublished electronic and non-electronic literature. This comprised local and international literature from electronic databases, websites of relevant international agencies and experts on ASRH and mHealth. The search keywords were focused to identify global literature on mHealth use in ASRH and local publications on ASRH in Nigeria. A conceptual framework (Figure 2) and an analytical tool (Table 1) are used to guide the discussion.
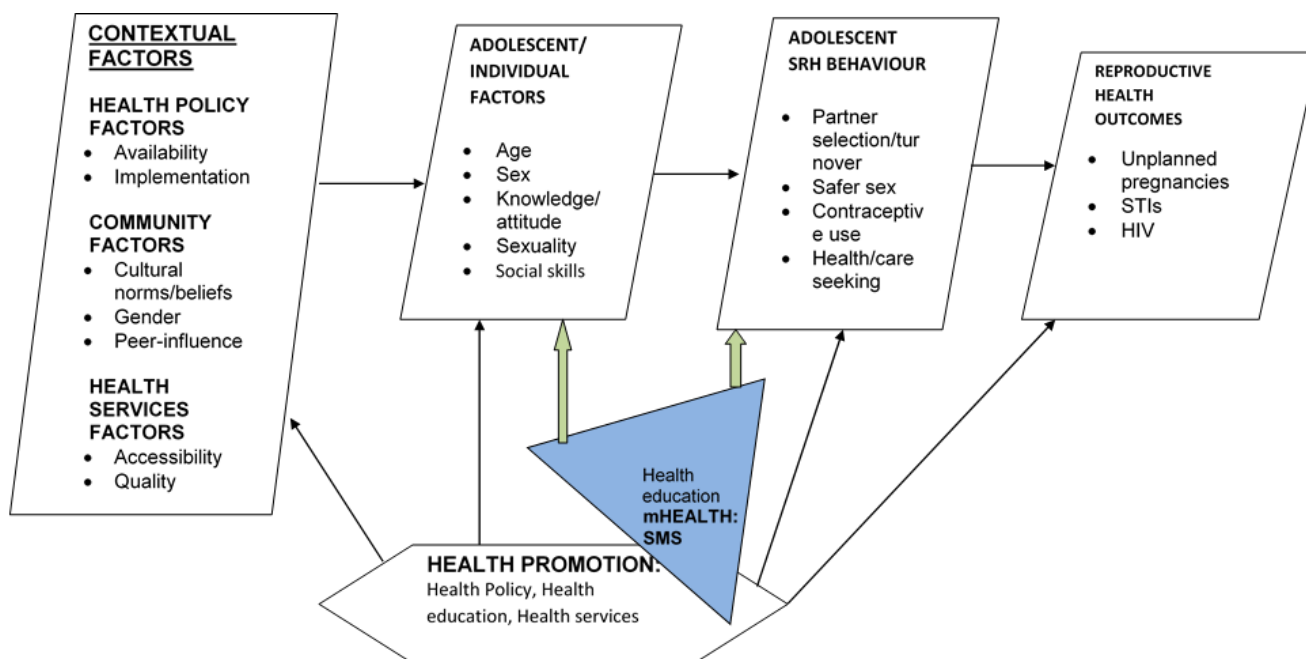
Conceptual framework

The conceptual framework is adapted from a review of three frameworks on ASRH and mHealth.[20-22] It identifies the interactions around contextual factors, ASRH factors, behaviour and outcomes and the focus of health promotion interventions. mHealth is considered in the broad scope of ASRH promotion, not as a separate intervention but as delivery strategy for health education which is one of the fundamental pillars of health promotion.[23,24]

Analytical tool

The analytical tool used is the applicability and transferability tool by Buffet et al.[25] This tool is used to assess if an intervention can work in a local context (applicability), and produce similar results/outcome (transferability) based on evidence from other studies.[25,26] It analyses a set of criteria to determine if they are potential facilitators or barriers to the uptake of the intervention in the local context. The constructs and criteria are described in Table 1.

Table 1: Applicability and transferability tool.

Construct	Factors/Criteria
Applicability (feasibility) **Can the intervention (mHealth) work in Nigeria?**	Political acceptability: - A key criterion - Relates to political will to ensure the intervention works in the local context. - Assesses relevance of intervention to present political priorities.
	Social acceptability: Assesses acceptability of intervention by target population.
	Available resources (personnel and financial) for implementation: - Assesses if trained staff and necessary skills for implementation is present. - Assesses cost of the intervention for the local setting and availability of funds for implementation.
	Organisational expertise and capacity: Assesses the ability of the implementing organisation to effectively use the intervention locally.
Transferability (generalizability) **Can we expect similar results/ effectiveness?**	Magnitude of health issue in local setting: Assesses the extent of need.
	Magnitude of "reach" and cost-effectiveness: Assesses the extent to which the target population are able to receive the intervention and the cost-effectiveness.
	Target population characteristics: Assesses comparability of the target population to study population socio-demographically and otherwise; and if any difference is likely to affect the effectiveness of the intervention.

Figure 2: Conceptual framework (Source: Author).

SITUATION ANALYSIS OF ASRH IN NIGERIA

Adolescent reproductive health outcomes

Adolescents constitute 22% of Nigeria's population and the reproductive health outcomes of particular concern in them include sexually transmitted infections (STIs) including HIV/AIDS and early pregnancies which may be planned or unplanned. Teenage pregnancy among adolescent girls is a common occurrence across sub-Saharan Africa and accounts for about half of the births recorded in the region.[5,27] Unmet needs for SRH

information and contraceptive services for adolescents resulting in failure to use condoms and other contraceptives consistently and correctly has been implicated as a factor in teenage pregnancy.[28]

The WHO reports that the highest rates of STIs are found among young people aged 15-24 years, accounting for up to 60% of new infections.[29] According to Okonta, the incidence of STIs among sexually active adolescents in Nigeria is about 40%. Many of these adolescents seek care from informal health providers resulting in poorly treated STIs which increase chances of HIV infection.[6,30]

Nigeria has a HIV sero-prevalence of 3.1% and young people account for over 30% of cases and 60% of new infections.[31,32] Gender inequalities and inequities reflected in low social status and earning capacity of young females propel the disproportionate distribution of HIV among females and they are thrice more likely to be infected than males.[33] The high HIV infection rate among young people including adolescents emphasises the need for focus on their SRH.

ADOLESCENT FACTORS

Adolescent sexual behaviour

Age at sexual debut is an important indicator of ASRH outcomes. Young people who experience sexual debut at an early age have a higher risk of becoming pregnant or contracting an STI than those who delay sexual initiation.[33]

Majority of adolescents in the country initiate sexual activity between ages 16-19 years with suggestions that there may be a progressive decrease in the age of initiation sexual activity in Nigerian adolescents.[34,35] In addition, majority of sexually active Nigerian adolescents generally delay the use of any form of contraceptive by an average of about a year after sexual debut with early sexual debut being associated with low condom use.[6,34]

Statistics also show an increase in multiple sexual partners among young people including an increase in cross-generational and transactional sex among sexually active female adolescents in Nigeria.[6,33,36] These risky sexual behaviours increase the risk of negative SRH outcomes; behavioural intervention programmes are therefore aimed at reducing these behaviours.

Adolescent SRH knowledge/information

Knowledge of and access to accurate SRH information among adolescents remains a major challenge in Nigeria.[6] The NPC in 2009, reported that less than 30% of adolescents had comprehensive knowledge of HIV/AIDS. Knowledge of STIs shows similarly poor statistics.[33] Studies on Nigerian adolescents identified an association between poor knowledge and attitude about SRH issues and risky sexual behaviour as indicated by the high

prevalence of STIs among adolescents discussed earlier.[6,34]

Poor access to accurate SRH information by adolescents from their parents, teachers and healthcare workers due to cultural norms cause adolescents to turn to their peers for information which is often inaccurate, resulting in poor sexual choices.[30] Knowledge of SRH issues among adolescents is however influenced by factors surrounding access, source and quality of the information.[34]

CONTEXTUAL FACTORS

This describes the underlying factors within the Nigerian context that influences knowledge, behaviour as well as the reproductive health outcomes of adolescents.

Sociocultural factors

Socio-cultural norms, expectations and the extent of parental influence play a significant role in shaping an adolescent's knowledge, attitude and behaviour.[37,38] In the Nigerian socio-cultural context, it is traditionally regarded as a taboo for adolescents to discuss sexual issues with their parents or older adults. Task-shifting on who should provide sex education often occurs and sometimes false information on sex is given by parents to instil fear and encourage abstinence. This lack of transparency and socio-cultural stigma around sex coupled with the inquisitive nature of adolescents creates a situation where many Nigerian adolescents turn to peers for answers.[38] Peers are therefore the commonest source of SRH information for Nigerian adolescents, this information is often inaccurate.[30,34,39] Peers also influence adolescents' first sexual experience and may include pressure to engage in unprotected sex to prove camaraderie and acceptance by peers.

The patriarchal nature of Nigerian society, poor socio-economic status and traditional customs put girls at a disadvantage and more at risk of SRH problems than boys. Girls unduly bear the consequences of the poor access to SRH information and services, male dominance in sexual negotiation and early pregnancy.[40] Early marriage in teenage girls also makes a significant contribution to the occurrence of teenage pregnancy especially in northern Nigeria.[41]

Health policy and service factors

The Nigerian policies focussing on adolescent health have a common goal of adolescent health development using strategies of health promotion and behaviour change communication, adolescent-friendly health services and capacity building for healthcare workers.[42] However, a national review of the state of ASRH programming revealed that most of the policies are yet to be properly implemented with sexuality education including life skills not being taught in most schools.[43] A major problem is the poor budgetary allocation to ASRH

promotion due to the budget constraint faced by the Health ministry. Nigeria is among African countries that are yet to finance health at the minimal WHO recommended target of $44 per capita.[24]

Study findings report that less than 10% of public health facilities offer youth-friendly services and one of the reasons given by staff was the fear of promoting promiscuity.[44,45] These services when available at primary health centres (PHC) are under-utilised by adolescents due to the poorly tailored nature of the service to adolescents and the general assumption that PHC services are for pregnant women and children.[44-46] In addition, accessibility barriers in terms of location and cost of services and provider barriers bothering on confidentiality and judgemental attitudes limit uptake of services.[46]

Other problems identified include poor awareness and political support of policies at lower tiers of government.[43] The result is an unfavourable contextual environment for ASRH promotion affecting SRH services and programmes.

MOBILE PHONE USE AND HEALTH IN NIGERIA

Nigeria has an ICT policy that pursues the integration of ICT into various sectors of the economy with health and agriculture being classic examples.[47] Nigeria has experienced an exponential growth in mobile telecommunications since it began in 2001 with less than a million subscriptions. It is presently Africa's largest mobile market with subscriptions in excess of 110 million (70% of total population).[8] Despite the impressive growth and coverage, network quality remains a major problem in Nigeria affecting mobile service delivery. Figure 3 shows progression of mobile phone subscription in Nigeria.
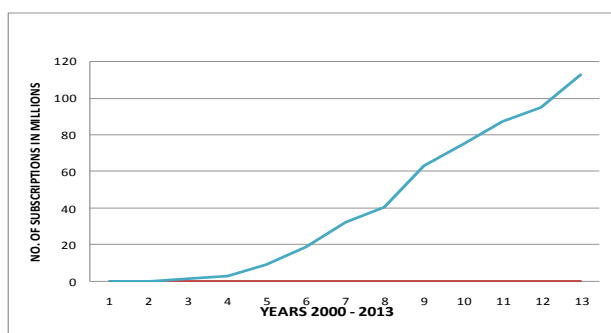
Figure 3: Nigeria: mobile phone subscriptions (2000-2013).

According to a report, 59% of Nigerian subscribers use basic-feature phones capable of calls and SMS but without internet connection abilities. Advanced-feature phones (basic phones with internet capabilities) and smart phones (phones with computer functions) are used by 25% and 16% of the subscribers respectively.[48] This

would have implications on the design and delivery of mHealth-based interventions for which SMS is the commonest.[7]

The National health policy of Nigeria does not have any section addressing the use of mHealth or other ICTs in the health sector.[49] However, the FMOH is working to leverage ICT including mHealth into some aspects of health service delivery like the "Saving One Million Lives" (SOML) initiative for maternal and child health (MCH).[50] Partnerships and collaboration were formed with mHealth Alliance, Intel, GSMA and other technical partners to integrate and maximize mobile technologies as part of the initiative. There is also the Mobile Authentication Service (MAS) used in the fight against fake drugs, it uses SMS to validate authenticity of drugs.[51]

MOBILE PHONE USE AMONG NIGERIAN ADOLESCENTS

A study of young girls in six Nigerian states showed that 98.6% of them have access to a mobile phone, 66.6% of whom own one while 32% borrow from a family member (usually a sibling).[17] This comes close to the 77% adolescent ownership rate of the United States.[52] This underscores the opportunity available for reaching adolescents with mobile phones for health purposes.

Adolescents worldwide prefer using the SMS over calls as a means of communication.[10] This is assumed to be same in Nigeria although the situation hasn't been explored. Akinfaderin-Agarau et al reported that young people in Nigeria are willing to access SRH information using the mobile phone.[17] Key characteristics of the mobile phone which encourages its use in young people's SRH globally include its ubiquitous nature and its "always on" feature.[7,53]

A web-based pilot project with mobile phone call and SMS components promoting HIV/AIDS awareness and prevention among young people is presently ongoing in the country. It is the "My Question and Answer" service by the NGO 'Education as a Vaccine'.[54] More males than females were found to use the service.

Although the effect of the programme hasn't been fully evaluated, a qualitative study found that some young females perceived cost associated with using the service as a barrier to its use. Other perceived barriers include socio-cultural beliefs which consider it unacceptable for girls to discuss SRH issues and some concerns over confidentiality.[17] These findings will be an important consideration when designing a national mHealth programme for ASRH.
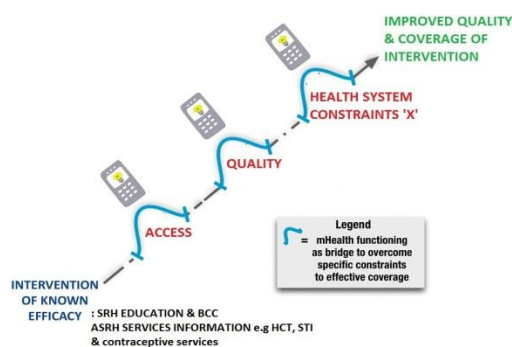
USE OF mHEALTH IN ASRH PROMOTION

Traditionally, health education and communication interventions for adolescents have been delivered using

school-based programs and mass media like the television, radio and billboards.[55] The rapid growth and use of ICT like the mobile phone and internet is gradually causing shifts in the preferred method of delivery in order to effectively reach targeted populations.[56]

Although mHealth has generated a lot of hype as a new health intervention, it is in reality a health systems catalyst or tool for delivering existing intervention strategies of proven benefits which have been constrained due to health system challenges.[24] mHealth as a field within the health system thrives on multi-sector partnerships especially in program design and implementation.[57]

mHealth in ASRH rides on existing health interventions (e.g. health education), working to bridge existing gaps to improve its effect and coverage as shown in Figure 4.[24] As shown below, gaps in the ASRH promotion around access to and quality of SRH education, behavioural change communication (BCC) and ASRH services information can be bridged by mHealth. An example of this is the face-to-face health education programs in schools or health centres which could be reinforced using SMS.[18,58] Although SMS and calls are used in mHealth SRH programmes, the SMS is more commonly used due to its advantages over calls.[7]

Figure 4: mHealth in ASRH as a catalyst for effective coverage of existing health interventions (adapted from Mehl et al).[24]

mHEALTH-SMS EVIDENCE FOR ASRH PROMOTION

There is limited evidence on mHealth use specifically for ASRH programs. Evidence generally centres on its use in young people and revolve around 3 thematic areas which include knowledge and attitude; sexual behaviour: condom use, multiple sex and sexual healthcare seeking behaviour.

Adolescents view the dissemination of SRH information via SMS as a good delivery method for ensuring their access to accurate information.[53] Improved knowledge is regarded as the most consistent effect of SMS on SRH of adolescents and young people.[13,59] Gold et al and Lim et

al reported a significant improvement in knowledge of SRH following transmission of SMS containing SRH information to Australian youths.[60,61] In addition, participants of both studies reported sharing messages perceived as interesting with their peers. This ripple-effect could be an added advantage in terms of increasing coverage of the intervention for SRH knowledge among Nigerian adolescents where SRH information from SMS could be shared with peers without mobile phones.

In Uganda, the text-to-change project reported an increase in knowledge and awareness about HIV/AIDS following the use of an interactive two-way SMS quiz.[62] The project however faced challenges of literacy (messages were sent in English) and issues around sharing of phones. This brings to light submissions following research, that health education programs using SMS must consider the context of their target population while designing interventions.[46] This should also be considered in Nigeria's ASRH mHealth program design. The use of SMS to provide information and improve knowledge on SRH issues could be especially important in developing country settings like Nigeria, where parents and health workers find it difficult to discuss SRH issues and sexual health education in schools is poorly implemented.[38]

Mobile SMS has the potential of encouraging an individual to think about certain behaviours of interest, supporting them on a path of motivation towards behaviour change. This was highlighted as the reason behind its positive effect on smoking cessation, medication compliance and other areas of health promotion.[13,59] The positive effect of SMS on sexual behaviour of young people was described in a study in Australia.[63] The study reported a significant increase in condom use and fewer multiple sex-partners. Study participants also reported an increased consciousness and consideration of their risk of STIs and this may have played a vital role in the sexual behavioural change recorded. It is therefore important that SMS developed for ASRH promotion for a Nigerian context possess the right content and capacity to stimulate this consciousness as Nigerian adolescents are known to underestimate their risk of STIs.[38] Other studies using SMS for young people's sexual behaviour showed positive effect on at least one of the behaviours.[64,65]

The effect of SMS on sexual healthcare seeking behaviour was evaluated among young people in the United States using the SEXINFO free SRH-SMS information and referral service.[57] The service was instituted in response to the rising gonorrhoea rates among African-American young people in San Francisco. The study reported a significant increase in STI testing and use of clinical services. This effect was also replicated in Australia with participants acknowledging that the SMS messages changed their perception of apprehension around STI testing thus increasing uptake.[60]

The mobile for reproductive health (m4RH) programme in Tanzania and Kenya involved the use of SMS for promoting access to contraceptive information and use. It was a multi-country pilot project which employed an automated two-way text message system that provided SRH information specific to client's request sent from their mobile devices. The project reported a significant improvement in uptake of family planning.[46] The Ugandan text-to-change SMS project also helped increase the uptake of HIV voluntary counselling and testing (HCT).[62]

Thus, mHealth use in ASRH could help address barriers faced by adolescents in developing countries like Nigeria around sexual healthcare seeking behaviour by helping identify location and information on youth friendly SRH

centres, changing attitude and perception about services while reassuring on privacy and confidentiality.[19]

ANALYSIS (APPLICABILITY AND TRANS-FERABILITY) OF mHEALTH EVIDENCE TO ASRH PROMOTION IN NIGERIA

The A&T tool was used to appraise existing evidence for the use of mHealth in context of the Nigerian situation. The A&T tool criteria were analysed and graded using a Likert-scale (very favourable; favourable; uncertain; unfavourable; very unfavourable) to highlight the possible prospects and barriers to the use of mHealth in ASRH promotion in Nigeria. The findings are summarised in Table 2.

Table 2: Applicability and transferability of mHealth-SMS use in ASRH promotion in Nigeria.

Construct	Factors	Grading
Applicability (feasibility) Can mHealth work in our context?	Political acceptability	+
	Social acceptability	++
	Available resources for implementation: personnel	+
	Financial	+/-
	Organizational expertise and capacity	+
Transferability (generalizability) Can we expect similar results?	Magnitude of health issue in local setting	++
	Magnitude of "reach"	++
	Cost effectiveness of the intervention	+/-
	Target population characteristics	++

Grading: ++ = very favourable; + = favourable; ± = uncertain;− = unfavourable; − − = very unfavourable.

APPLICABILITY

Political acceptability

Lack of political will to translate policy into action in the area of ASRH is seen in the poor implementation of the school ASRH programs.[43] This may be a barrier to mHealth adoption. However, the recent focus and interest of government in ICT development as a socio-economic driver may encourage support; the government may see the adoption of mHealth in ASRH as a technological achievement with quick political gains.

Examples of the use of mHealth by the government includes its "saving one million lives" (SOML) MCH initiative and the MAS for counterfeit drugs.[51,66] In the agricultural sector mobile phones were distributed to farmers nationwide by government and used to support supply chain of fertilisers to farmers and tackle system corruption.[67] This is a positive signal of the government's willingness to adopt ICT. Political acceptability may therefore be considered favourable.

Social acceptability

There is growing enthusiasm within Nigeria's population around the use of mobile phones for delivering health solutions and the youth have shown willingness to access

SRH information through their phones.[17, 68] Mhealth for ASRH promotion has the potential of being available across socio-economic and gender divide, as well as to 'in' and 'out-of-school' adolescents, hence promoting equity.[18] Social acceptability may be considered as very favourable.

Available essential resources (personnel and financial) for implementation

Developing and implementing mHealth programs requires a mix of personnel from the public and private sectors among whom are technology experts and health program designers.[57] The partnership of the government with mHealth alliance and intel for technical support for mHealth solutions and the training of over 10,000 healthcare workers for the MCH programme could provide a foundation for the ASRH-mHealth programme.[50] Availability of human resources is therefore favourable.

The financial implication of embarking on a National-scale integration of mHealth into ASRH is unknown. Although mHealth is generally viewed as cost-effective, there is a dearth of evidence on cost of the intervention on a large scale. This scarcity of cost-effectiveness information coupled with the previous history of inadequate funding for ASRH programs by the

government makes the availability of financial resources uncertain.

Organizational expertise and capacity

The process of leveraging ICT by the Nigerian FMOH as well as technical support and experience provided by mHealth Alliance and other technical partners for the SOML initiative could provide a foundation for integrating mHealth into ASRH at the national level.[50] Organisational expertise and capacity could therefore be considered as favourable.

TRANSFERABILITY

Magnitude of health issue in local setting

The situation analysis of ASRH in Nigeria elaborated on the burden of unwanted pregnancies, STIs and HIV/AIDS.[6,33] It also highlighted the need for access to accurate and reliable information on SRH issues and services and behavioural change communication among Nigerian adolescents.[30,44] This need creates a huge potential for mHealth use in ASRH in Nigeria. This is considered very favourable.

Magnitude of the "reach" and cost effectiveness of the intervention

Mobile phone ownership among young people in Nigeria stands at 66% and another 32% having some form of access.[17] The coverage and reach of mHealth for ASRH is therefore expected to be wide. This is considered very favourable.

Although mHealth is generally viewed as cost-effective, there is a dearth of evidence on cost-effectiveness analysis for mHealth.[46] Evidence from HIV-medication adherence studies shows the use of SMS as cost-effective; however, literature demonstrating evidence of cost-effectiveness in SRH is scarce.[69] Hence this is uncertain.

Target population characteristics

Young people in Nigeria differ socio-culturally with those in the study populations of Australia, USA. They however face similar SRH risks though the risk of HIV is higher in Nigeria. They also face problems of poor knowledge and risky sexual behaviours.[32,56,57] In addition, the use of SMS is a common means of mobile communication among young people in Nigeria.[17]

Socio-economically, although dissimilar to counterparts in the western hemisphere, Nigerian adolescents and young people are relatively similar and will likewise face same challenges in this regard to study participants in Uganda, Kenya and Tanzania. Literacy rates between these 4 countries range from 75% to 85% and Nigeria has a slightly higher GDP per capita ($3,000) compared to

the study countries which are less than $1000.[70] In spite of the low socio-economic state, mHealth was used successfully in these 3 study countries for SRH interventions.[46,62]

The comparability of Nigeria's target population to the study populations in Africa can be considered as favourable.

CONCLUSION

It can be concluded from the foregoing that mHealth has prospects for applicability and transferability to Nigeria based on government's interest in ICT and the availability of technical manpower. The acceptance by the target audience as well as the similarity of their problems and characteristics with adolescents from other countries also creates a strong potential for its successful transfer.

It may however face challenges arising from government priority and funding as well as lack of information on cost-effectiveness and estimated cost of the project. It can be concluded from the analysis that the use of mHealth in ASRH promotion in Nigeria is feasible and can be effective provided measures are taken to address the possible barriers identified.

Recommendations

It is recommended that the Nigerian Government set up an mHealth technical team with a mandate for drawing up policy guidelines, instituting stakeholder collaboration, advocacy for funding priority, formative research and scale-up of mHealth interventions for ASRH promotion in Nigeria.

Study limitations

The exclusion of non-English publications limits the number of publications available for review and analysis by the authors. They may have contained important findings.

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