THE USE OF MODERN MEDIA IN SUB SAHARA AFRICA TO PROMOTE YOUNG PEOPLES' SEXUAL AND REPRODUCTIVE HEALTH:

A scoping review for recommendations in Ghana

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Signature: 

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Abbreviations

ADHD	Adolescent Health and Development Program
AIDS	Acquired Immune Deficiency Syndrome
App	Application
ASK	Access, Knowledge and Services
CHE	Current Health Expenditure
FGD	Focus Group Discussion
GBV	Gender Based Violence
GDHS	Ghana Demographic and Health Survey
GDP	Gross Domestic Product
GES	Ghana Education Service
GGE	General Government Expenditure
GGHE	General Government Health Expenditure
GHE-D	Domestic General Government Health Expenditure
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HIV	Human Immunodeficiency Virus
ICT	Information Communication Technology
IRR	Incidence Rate Ratio
ITU	International Telecommunication Union
LGBTIQ	Lesbian, Gay, Bisexual, Transgender, Intersex, Queer
LMIC	Low Middle Income Country
MOE	Ministry of Education
MOH	Ministry of Health
NAYA	Network of Adolescents and Youth of Africa
NGO	Non-Governmental Organization
NHIL	National Health Insurance Levy
NHIS	National Health Insurance Scheme
OOP	Out of Pocket
RE-AIM	Reach, Effectiveness/ Efficacy, Adoption, Implementation and Maintenance
SDG	Sustainable Development Goals
SMS	Short Messaging Services
SNNIT	Social Security and National Insurance Trust
SRH	Sexual and Reproductive Health

SRHR	Sexual Reproductive Health and Rights
SSA	Sub-Sahara Africa
STI	Sexually Transmitted Infection
TCCP	Tanzania Capacity and Communication Project
UGT	Uses and Gratification Theory
UHC	Universal Health Coverage
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
VAT	Value Added Tax
VU	Vrije Universiteit
WHO	World Health Organization
YMK	You Must Know

Glossary

Young people – these are people between the ages of 10 to 24 years. Young people includes adolescents (10 to 19 years) and the youth (15 to 24 years)(1).

Risky behaviour – refers to when an individual knowingly or unknowingly engages in activities that exposes them to harm, with or without considering the consequences(2).

Age-appropriate information – refers to providing young people with evidence-based information on their sexual and reproductive health and rights, suitable for a particular age or age group(3).

Youth-friendly services – this has to do with providing safe, convenient and specially designed services and products targeted at young people. This entails services that all young people are able to obtain, meets young peoples' expectations and needs, as well as improves their health(4).

Modern media – this refers to digital contents which are transmitted via devices such as phones, laptop and tablets. Modern media includes short messages (SMS), internet, websites, software applications and programmes(5).

Intervention planners – refers to organizations, institutions, programme developers and research bodies that put together interventions with the aim to reach a target groups or population and achieve a set objective(5).

Intervention – is the term to describe contents, materials or programmes designed by planners with the objective of reaching a target population with relevant details, to influence their options and choices, as well as to test a hypothesis(5).

Abstract

Background: Young people are exposed to risky sexual behaviours which may affect their health. Various barriers have resulted in low access to information and services on sexual and reproductive health and rights of young people. Transmitting relevant information to young people via modern media is a promising medium to reach them with useful information on sexual and reproductive health.

Objective: The study reviewed the use of modern media by young people in sub-Sahara Africa to expand their access to sexual and reproductive health information and services, for recommendations to intervention planners, policy makers and other stakeholders in Ghana.

Methodology: A scoping review was employed, guided by two frameworks: Uses and Gratification theory, and RE-AIM module for evaluating interventions.

Findings: The study revealed that young people in sub-Sahara Africa are increasingly gaining access to modern media for sexual and reproductive health information. Interventions using modern media have been implemented to enhance young people's access to sexual and reproductive health information and services. However, certain groups of young people such as the disabled and rural dwellers are left behind due to accessibility challenges which hinders their use.

Conclusion: Modern media is a useful tool which can be leveraged upon to reach young people with sexual and reproductive health information and services.

Recommendations: Policy makers and intervention planners must take steps to include sub-groups and increase their access and usage of modern media for their sexual and reproductive health and rights.

Key words: Modern media, Young people, Sexual and Reproductive Health, sub-Saharan Africa

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"Great things He done, greater things He will do …. Unto the Lord be all the Glory"

Introduction

In many settings in sub-Sahara Africa (SSA), there is a culture of silence on issues related the sexual and reproductive health (SRH) of young people ages 10 to 24 years. The human body goes through rapid development during this stage and leaves many young people curious for information to understand the bodily, psychological and sexual changes they go through. Young people during this phase are vulnerable to social, economic, societal, psychological and emotional pressures and may fall prey to risky behaviours. Worldwide, about 16 million young women below age 20 get pregnant and give birth or have an abortion every year, majority of which occur in Africa(6). In Ghana for instance, the prevalence of HIV and other sexually transmitted infections (STIs) in 2017 were higher among young people (5.56%), compared to the general population (19.10%)(7).

Although not the only solution, having access to comprehensive, evidenced-based age-appropriate information and services is an important factor to ensure that young people are better prepared to handle their sexuality and the problems that come with it. However, some adults are of the notion that exposing young people to sexual and reproductive health information and services will make them sexually promiscuous(8). Ironically these young people are expected to know better and remain responsible for their sexual health without the adequate and relevant information to do so.

Governments and other state agencies as well as civil societies in SSA have taken measures to give sexuality education to young people. This has been carried out through the school curriculum, awareness campaigns, activities and advocacies(4,5). Although these efforts are good and laudable, some categories of young people are left behind, and some barriers inhibit the chance of young people gaining the much needed age-appropriate information and services they need(3). As technology has advanced rapidly over the decades, modern media platforms have provided common tools and means of reaching out and communicating to people across the globe. Africa has been noted as the fastest growing continent regarding mobile phone subscription(10), and young people are increasingly gaining access to devices for various purposes, including seeking SRH information and services. It seems modern media is expanding opportunities for intervention planners to reach young people with SRH information and services.

As a professional nurse, I have wondered how modern media technology can enhance young peoples' access to SRH information and services in Ghana. And how it can be leveraged upon by intervention planners for the benefit of young people. Therefore, by this study, I sought to find out how countries within the SSA region are using modern media technology to bridge the knowledge gap for young people, with the aim of recommending to intervention planners and relevant stakeholders to help enhance access to SRH information and services to young people in Ghana. Because the use of modern media in health promotion is a relatively new area in SSA, I have chosen to conduct a scoping review of literature to identify knowledge gaps, and clarify concepts related to the use of modern media to promoting young peoples' SRH.

Chapter 1: Background Information

1.1 Country profile/Demographic

Ghana, a country located in the West African sub-region shares boundaries with Ivory Coast to the West, Burkina Faso to the North, Togo to the East and the Gulf of Guinea in its coastline. The land coverage of Ghana is approximately 24,000 square kilometres and is rich in natural resources such as gold, diamond, manganese and bauxite. The land is fertile for food and cash crop production such as cocoa, coffee, shea-nuts, cashew, maize and vegetables. The climate is mostly warm and humid with two main seasons namely the rainy wet season and the harmattan dry season. Current population is approximately 30 million people(11). Ghana was divided into ten regions until recently when six more regions were added. The capital city of Ghana is Accra, in the Greater Accra Region.

1.2 Culture and religion

Ghana was the first country in the sub-region to gain independence in 1957. Having been colonised by the British, Ghana adopted English as the official language. There an estimate of approximately 92 ethnic groups and spoken languages in Ghana(12). The majority ethnic groups include the Akan, Ga, Adangbe and Ewe in the south, and Dagomba, Gonja and Mamprussi in the north.

Ghana is a secular state and citizens are free to practice whatever religion they believe in. According to the World Population Review (2019), approximately 71% of Ghanaians are Christians and 17% are Muslims, while an unspecified percentage practice African Traditional Religion(13).

1.3 Socio-economic dynamics

Ghana is categorised as a lower middle-income country (LMIC)(14). Internationally, Ghana earns foreign exchange by exporting raw products like gold, cocoa and timber, accounting for about a third of the gross domestic product (GDP)(13). Locally, the economy is primarily agrarian, with some dealing in service and trading. According to a 2016 Index Mundi report, approximately 54.68% of Ghana's population are in urban areas, whiles 45.32% are in rural areas(15).

1.4 Education and literacy

The government of Ghana considers education as one of the priorities of the state - reason for the introduction of the Free Compulsory Universal Basic Education in 1995(16) and also recently the Free Senior High School Education policy in 2017. Literacy rate of the population 15 years and older is approximately 76.6%, with males having a slightly higher average (78.35%) compared to females (65.29%)(17).

1.5 Health

Life expectancy at birth in Ghana increased from 58.87 years in 2006 to 67 years in 2017(18). The increase in the life expectancy over the decade may be attributed to political stability, access to better education and healthcare services, and improved infrastructure systems(19). Ghana is doing relatively better in commitment to health compared to neighbouring countries in the sub-region such as Togo, Benin, Niger and Nigeria(19). Infant mortality for example decreased from 53.56 in 2007 to 35.20 in 2017(18).

1.6 The healthcare system

The Ministry of Health (MOH) is the main body in charge of the healthcare system in Ghana, and the Ghana Health Service (GHS) is the public implementing agency. Management functions are decentralized and managed administratively under three major levels which are: National, Regional and District. Government health facilities dominate healthcare

provider centres in Ghana's healthcare system. Other facilities are quasi-government or privately owned, for example by the religious missions, companies and private individuals.
Ghana is signatory to the Universal Health Coverage (UHC) policy as part of the Sustainable Development Goals (SDG) to make citizens access the needed quality healthcare without causing financial disaster on their pockets(20).
The introduction of the National Health Insurance Scheme (NHIS) in 2003 was a major government step to achieve UHC in Ghana to replace the existing "cash and carry" system of paying for healthcare directly out-of-pocket (OOP). The NHIS operates with funds gathered through membership subscription fees paid annually directly OOP, 2.5% Value Added Tax (VAT) known as the National Health Insurance Levy (NHIL) and 2.5% of the Social Security and National Insurance Trust (SSNIT)(20). Certain categories of individuals for example children below age 18, persons deemed to be living below the poverty line, as well as pregnant women are exempted from the payment of annual subscription premiums. All government health facilities, quasi-government health facilities and some accredited private health facilities are providers under the NHIS.

1.7 Health financing

Ghana's public health expenditure is financed through budgetary allocations and other financing means including donor funds, taxes and cash pooling from the NHIS(19). However, government's investments in health have not been sufficient to meet the needs of the population(19). Socio-economic challenges, withdrawal of donor aid, corruption and competing priorities of government have all contributed to the funding inadequacies of the health sector(19). Ghana failed to meet the Abuja Declaration target of allocating a minimum of 15% of annual government budget towards improving the health sector(21). As at 2016, the Current Health Expenditure (CHE) as a percentage of GDP was 4%; Domestic General Government Health Expenditure (GGHE-D) as a percentage of General Government Expenditure (GGE) was 7%; and GGHE as a percentage of GDP was 2%(22).

1.8 Adolescent and Young People's Sexual Reproductive Health services

Ghana's population is fairly youthful - approximately 29% of the population are young people between ages 10 to 24 years(24,25). As a developing country , this generation of young people face many challenges and issues related to their health and wellbeing including substance and drug abuse, sexual and reproductive health and rights (SRHR) issues, psychological problems, sexual violence, abuse of all kinds, and child marriage(23).

Health services for young people generally are of poor quality with many out of reach due to unequal access and utilization, especially for the females(12,14,15). Young people and adolescents need health and counselling services that contribute to preventing health problems, support and respond to their needs when problems occur(26). Health professionals need to have specialized skills in consultation, interpersonal communication and interdisciplinary care to be able to provide good and effective health and counselling services to adolescents(27). Considering that these groups of people form a majority of the nation's population and contribute to the general economic development, it is imperative that the government focuses special attention to help deal with some of the challenges they face. Deliberate measures, policies and systems are important to safeguard adolescent's physical, sexual and psychosocial wellbeing(28).

In Ghana, a number of initiatives have been undertaken since 1980 resulting in the launch of the National Adolescent Health and Development Programme (ADHD) in 2001 to provide a multi-sectorial support to young people living in Ghana with education and information to lead to the adoption of healthy lifestyles(23). In 2009, a seven year (2009-2015) National ADHD Strategic Plan was developed(23). These policies and programmes support the provision of age-appropriate information and counseling, comprehensive health services complemented by self-care, livelihood and leadership skills or competencies(23).

Chapter 2: Problem statement, Justification and Methodology

2.1 Problem Statement and justification

Young people are considered the "gateway to health" as lifetime behavioural patterns are usually acquired at this stage(29). They are exposed to relatively high risk behaviours especially regarding their SRH(30). Globally, approximately 16 million girls between the ages 15 to 19 get pregnant annually, with about 95% of them occurring in developing countries(6).

Pregnancy, childbirth and abortion complications are the leading causes of death among young women worldwide, largely prevalent in LMICs(18,19). In Ghana, 14% of adolescent girls commence childbirth by age 15 to 19(33). Young females in the rural areas are twice more likely to commence childbearing compared to those in the urban areas(33). Young females face higher risks during pregnancy, whether intended or not, because their bodies are immature to go through the process of pregnancy(34). This often leads to adverse outcomes such as obstructed labour, uterine rapture, obstetric fistula, malnutrition, psychological problems and high risks for maternal and neonatal mortality(14,16,17).

Researchers found that, pregnant young females commonly drop out of school and this in the long run results in single parenthood, health and developmental challenges of their children, long-term socio-economic challenges, poverty and narrowed employment opportunities(16,20). Fifteen percent (15%) of the 22 million unsafe abortions that occur annually are among young women 15 to 19 years in SSA(38). Previous studies indicate pregnant young females usually resort to self-induced abortions as well as engaging the services of non-professional abortion providers, which is a risk for complications and death(21,22). Abortions are highly under-reported in many countries including Ghana, mainly because of the stigma and moral dimensions around termination of pregnancies; as most tribes consider it a criminal act(39).

Young people are more at risk of acquiring STIs and Human Immunodeficiency Virus (HIV) as they face peer pressure to experiment with sex and drugs(27,28). The 2017 HIV report by the Ghana AIDS Commission showed a decline in HIV incidence among the general population from 19.25% in 2013 to about 19.10% in 2017(7). However, the incidence in young people rather increased from 5.30% in 2013 to 5.56% in 2017(7). This may be attributed to young people experimenting and engaging in unprotected sexual activities, multiple sexual partners, 'adolescence/youth myths' - that no harm will occur to them despite indulging in risky behaviours and limitations in accessing medical care(42).

Effective contraceptive methods including condoms, can reduce the incidence of unplanned pregnancies, as well as STIs(32). In Ghana, only about 23% of the youth use modern contraceptive methods(15,24). Studies suggest that it is typically difficult for young females to bargain for safe sex as most sexual encounters are as a result of coercion(39). Other factors include gender based violence (GBV), ignorance, limited access to modern contraceptives, limited control on reproduction decisions, as well as the perceived side effects of contraceptive methods(25,26,27). Masculinity or patriarchal dominance in the society are also reasons for the inability of safe sex negotiations especially for the young female(33,34).

Socio-cultural, economic, religious, and moral factors influence the sexual behaviour of the youth and their right to access SRH information and services(31,32). Some cultural roles and expectations for example early marriage, honour killings and female genital mutilation affect access to information, education as well as improved life opportunities(31,35). It is evident that young people who have close relationships and an open communication with parents or guardians on SRH issues for example, are less likely to engage in risky sexual

activities(31,33). As they benefit from the protective measure of increased awareness and knowledge on SRHR matters(49). Youths without sound financial support and economic skills are more vulnerable to engage in transactional sex for cash and items(47). Sexuality education as well as religious and moral teachings have mostly been on the emphasis of abstinence for non-married young people(34,39).

Access to specific age-appropriate-information and youth-friendly services combined with safe sexual practices are possible measures that can avert the many SRHR risks young people face(31,37,38). However, low access to information and services on SRHR has been reported among young people in Ghana(28). Although sexuality is a popular casual subject, open discussions on sexual subjects are considered a taboo(50). There is the traditional perception and fear that exposing youths to sexual health awareness promotes indulgence in immoral activities(8). Such perceptions are a barrier for most young people to have access to accurate SRH information(27).

Researchers have identified modern media as a promising avenue to help reach specific groups and individuals(52). Modern media technology refers to digital contents created and delivered virtually via digital platforms such as short messaging systems (SMS), the internet; social networking sites and websites(45,46). The traditional mass media – radio, newspaper, television are quite different from modern media but with recent rapid developments, traditional media contents are also delivered through modern digital platforms for example mobile television(53).

Young people are accustomed to the use of modern media with the habit of using cell phones for internet surfing, social networking and instant messaging(54). The youth in Ghana have over the years had increasing access to modern media which they use for various functions including SRHR information and services which increases their awareness and influences sexual behaviour(53). Some contents however may be misguiding, inaccurate and lead to negative influence(46). Yet still, modern media appears to be the innovation of choice to tackle some barriers young people face regarding access to SRHR information and services(10).

In recognizing that improving young people's access to quality information and services is key to improve health outcomes, the Government, Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs) have instituted strategies to improve young people's access to SRHR(9). Key stakeholders in Ghana have at various occasions proposed policies and programs regarding youth SRH, including those related to sexuality education. The Ministry of Education (MOE) in collaboration with the Ghana Education Service (GES) and other key agencies, notably the MOH and the GHS provide sexuality education in schools as part of the curriculum(9).

Traditional sources of SRH information for young people include peers, books, relatives and people in their close circles(22,37). Formal SRH education and sensitization are also channelled through groups or associations, school and youth clubs(3). However, some of these sources sometimes become barriers to accessing information because they are fraught with discomfort, uneasiness and inconvenience(55). In the health sector, few skilled providers are trained to adequately handle issues of young people's SRHR(50). Recent studies indicate that the internet is a preferred source of SRH information to most young people as it provides wide array of information while ensuring privacy and a non-judgmental or punitive response(50).

Modern media has become an integral tool across the sub-region and its usage remain to be fully maximised(41). In Ghana for instance the proliferation of mobile phones has led to an exponential increase in mobile phone users of over 18 million data subscribers with internet access rate of approximately 65% of the total population as at 2015(43,47). Previous

studies have highlighted how modern media are effectively being used in the African sub-region for SRHR access to young people in countries such as Kenya, Senegal, Tanzania and South Africa, through software applications and programmes(52,53,54,55).

Nonetheless, how modern media is used to address young people's access to SRHR in a context as Ghana remains unclear. Another question that remains is how modern media could be maximized to promote access to SRHR of the youth in Ghana. Thus a literature study on how modern media is being used in SSA to address and promote young people's SRHR, will provide suggestions and advice on how it could be applied to the Ghanaian context; for recommendations to policy makers, intervention planners and relevant stakeholders.

Terms synonymously used with modern media in heath include "ehealth" and "mhealth" encompassing electronic information and Information Communication Technology (ICT) for clinical, education, administrative and research functions for health(61). For the purposes of this study, modern media includes text messaging, internet based information from sources such as social media, internet sites, web pages, online streaming, and all digital contents.

2.3 General Objective

To review the use of modern media by young people to expand their access to SRHR information and services in SSA, in order to make recommendations to policy makers and intervention planners in Ghana.

2.4 Specific Objectives

1. To describe young people's access to, and preference for modern media as a source of SRHR information and services in SSA.
2. To identify the challenges and opportunities for young people in the use of modern media to expand their access to SRHR information and services in SSA.
3. To describe some modern media interventions and programs for young people related to SRHR rolled out in SSA.
4. To assess some "best practice" modern media interventions in SSA to identify what works in the context.
5. To make recommendations to policy makers and intervention planners on using modern media to enhance young people's access to SRHR information and services in Ghana.

2.5 Methodology

This study is a scoping review of relevant articles. A scoping review enables a preliminary assessment of the size and scope of available literature to identify the extent of research evidence(62). Data was accessed from peer reviewed scientific articles published in PubMed, Vrije Universiteit (VU) - Amsterdam, Cochrane, Medline, Guttmacher and Google scholar database libraries and search engines. The websites of organizations such World Health Organization (WHO), UNICEF, World Bank, Ghana MOH and GHS, Ghana Statistical Service (GSS) and the Ghana Demographic and Health Survey (GDHS) were used to obtain data from reports, policy guidelines and surveys. Snowball technique was applied on the references of relevant article to find more literature.

Inclusion criteria: interventions on modern media approach for young people, outcomes of the interventions to promote SRHR for young people living in SSA, interventions designed for use by young people, health providers, counsellors, parents and guardians, grey publications and websites that provide sufficient description of the use of modern media for young people's SRHR promotion, and articles on the relevant interventions implemented in

SSA. Published or unpublished documents from the year 2000 to 2019 because that was the period when modern media began widespread in SSA. Only articles written in the English language were used. The search terms used are enlisted in table 1.

Table 1. Summary of search terms

Ghana OR Sub-Sahara Africa OR Africa	AND	Adolescents OR Young people OR Youth	AND	Sexual and Reproductive Health and Rights OR Sexuality OR Sexual behaviour OR Knowledge on Sexual and Reproductive Health OR Awareness of Sexual and Reproductive Health	AND	Modern media OR Internet OR Information Communication Technology OR Social media OR New media OR eHealth OR mHealth	AND	Evaluation OR Reach OR Effective OR Adoption OR Implementation OR Maintenance OR Access OR Preferences OR Outcome OR Challenges

2.6 Conceptual Frameworks

In order to achieve the research objectives, two conceptual frameworks were used. The Uses and Gratification theory (UGT)(63) was used in the findings to bring the results together and examined deeper in the discussion. The RE-AIM model(64) was also used to bring together evaluations from different interventions under the findings and discussion.

The UGT was first developed in the 1940s by curious researchers from the United States who wanted to discover the reasons behind viewer addiction to programs such as soap operas(53). As stated by Liu (2015), modern media is deliberately and actively chosen by individuals/users, because it purposefully satisfies their social and psychological needs(63). Individuals have the power to make their modern media choices based on their needs, preferences and the satisfaction they derive from the content(61,63). The UGT focuses on the assumption that individuals use modern media because it allows – Interactivity [which is the active participation of users in exchanging information or responses via modern media], Demassification [the ability of the user to select from a range of modern media options] and Asynchroneity [the user sending, receiving or retrieving information at their own time and convenience](63). Table 2 provides a visual explanation of the UGT, compiled by the author.

Table 2. Visualization of the UGT

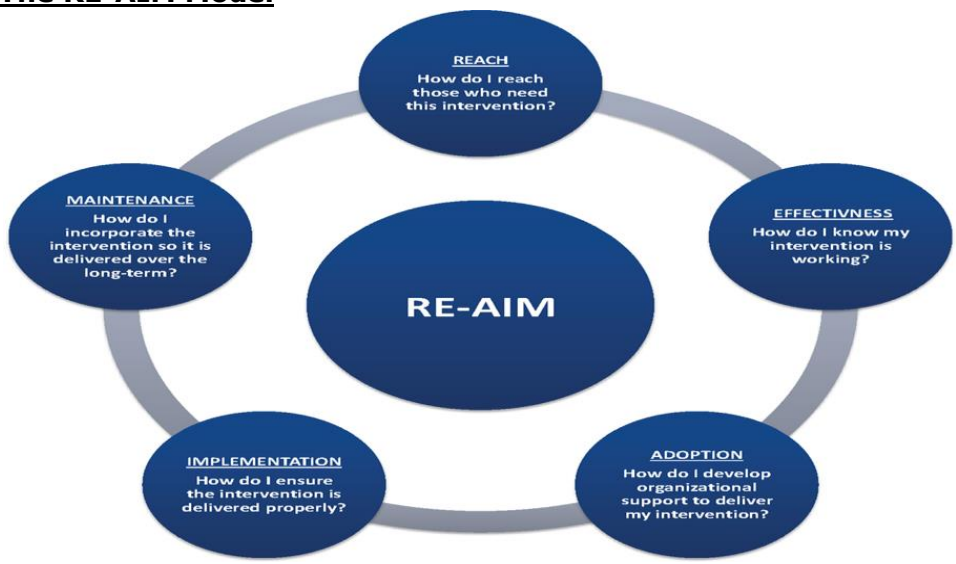
Main assumptions of UGT	Determining factors	Categories of users
Interactivity - the user's control and active participation in exchanging information or responses(63).	**Access** **Preference** **Challenges** **Opportunities**	**Content users**: are satisfied with using modern media to access information specific to their needs(66)
Demassification - the ability of the user to select from a range of modern media options(63).		**Process users**: derive their satisfaction from casual and random navigation to discover information(66).
Asynchroneity - the user sending, receiving or retrieving information at their own time and convenience(63).		**Social users**: derive gratification from creating and maintaining social connections via modern media(66).

Source: Compiled by the author of the thesis

UGT is an ideal theory applicable to modern media use for SRHR, as it can explain the access to and preference for modern media options for young people and other users(63). By this theory, as young people in SSA are having increased access to modern media, they have the choice to actively decide what to use it for, the preference of using it as a source for SRHR information as well as the flexibility of accessing and retrieving information at their convenience(60,62,63). This also brings to the fore, the challenges and opportunities with the use of modern media by young people for SRHR information in SSA.

The RE-AIM model was originally developed by Glasgow et al., (1999) and modified by other researchers over the years(60,61). It was designed to help evaluate interventions and public health programs, to produce a more balanced approach to validity(53,54). The framework has five interconnected dimensions namely Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) as illustrated in Fig.1. With this model, an assessment of how modern media is being used in SSA as well as opportunities on how it can promote young people's access to SRHR information and services is examined.

Fig 1. The RE-AIM Model



Source: Frontiers in Public Health(69).

Reach – this dimension is about the number of users in the target population that access modern media interventions irrespective of other demographics(70). The target population of this study are young people in SSA. Sub populations considered include: young people in rural/urban settings, in-school/ out-of-school youth, young persons living with HIV, marginalized and disabled young persons(66,67).

Effectiveness/ Efficacy – this dimension investigates whether modern media interventions yield the desired or intended results. The effectiveness is in line with the programme objective on the expected outcome after rolling out an intervention(71). Effectiveness was indicated by knowledge gain and behaviour changes reported by users of interventions with regards SRHR(72).

Adoption – basically refers to the willingness of decision makers, implementers and users to accept and utilize the intervention(53,54). As modern media technology offers interventions based generally on anonymity, non-punitive and easily accessible information, it is probable to be adopted by young people(70). Adoption was indicated by user satisfaction and the replication of interventions in other settings or nation-wide rollout, in collaboration with stakeholders and agencies(71).

Implementation – this deals with the extent of roll out or delivery of SRH interventions using modern media technology. Implementation includes the medium of intervention used, location, implementation onset, time frame, convenience with use and cost implications(54,47). Implementation research is key to determine the set of interventions that may be practical and effective enough for the target population(61,67).

Maintenance – this dimension has to do with assessing the extent to which interventions become acceptable, reliable and sustainable to users, organization and the population(64). It includes measures taken to ensure the sustainability of the SRHR interventions after implementation(70).

Chapter 3: Findings of the study

This chapter outlines the findings from relevant literature guided by the conceptual frameworks described above. The UGT was used to identify the determining factors of modern media usage which are access, preferences, challenges and opportunities. The RE-AIM module was used to find some evaluated interventions of which relevant details were available for "best practice".

3.1.1 Young peoples' access to modern media for SRHR information

There are approximately 1.8 billion young people globally, the largest ever in history(73). SSA has the greatest proportion of young people per population; approximately 23% compared to rest of the world(74). With the proliferation of internet and modern media technology, people in the sub-region use this means for various purposes including access to health information(53). According to a report by the International Telecommunication Union (ITU), internet coverage in Africa expanded about tenfold from 17 million users in 2005 to 172 million users in 2014(75).

Mobile phone ownership and usage among young people is found to be increasing as a result of declining cost of mobile devices(60,61,62). Studies show that, over 87% of young adults (including 15 to 24 years) in developing countries are mobile phone users(78), with almost 40% in SSA(10). In 2014, a survey on mobile phone ownership among emerging nations showed that 94% South Africans, 92% Egyptians, 88% Ghanaians, 86% Senegalese, 82% Nigerians and 56% Ugandans within the age range 18-29 years have mobile phones(69,70). Although there is scanty data on age segregation, younger adolescents (10 to 14 years) most often do not have mobile devices of their own, thus they are less likely to be direct beneficiaries of mHealth interventions(77).

Modern media is mostly accessed by young people in the urban areas, leaving those in rural areas at a disadvantage(79). A study in Tanzania revealed that approximately 62% young adults had access to cell phones, 82% were in the urban areas whilst 54% in rural areas(80). This study however was not clear on the age categories of the sample used. The socioeconomic background of young people is also a factor, as most are not economically empowered to afford the costs that come with using modern media(45,69). Although the costs associated with mobile devices seem to be declining, it still is quiet expensive for young people to easily afford as it comes with recurring costs for call credit and airtime, as well as the cost for maintenance and electricity supply(71,75).

A 2006 study conducted in Ghana by Borzekowski et al. (2006), explored the use of the internet by 778 young people (600 in-school and 178 out-of-school) 15 to 18 years of age, in Accra, as a source of health information. It was reported that 66% of in-school young people had ever used the internet while 54% of out-of-school young people had ever used the internet(79). Thirty-three percent (33%) of young people in-school and 39% of those out-of-school respectively, turn to the internet as a source of SRHR information(79). Popular SRHR topics that were searched for by young people using the internet include developmental changes in the human body, pregnancy, contraception, STIs and lesbian, gays, bisexual, transgender, intersex and queer (LGBTIQ) issues(79).

A similar study conducted in Nigeria by Nwagwu (2007) to assess how 1,1011 in-school and 134 out-of-school young girls in Owerri, use modern media for their SRHR needs found similar results. Seventy-four percent (74%) in-school and 68% out-of-school young girls respectively had access to the internet(81). Out-of-school young girls (55.19%) reported the internet as their source of SRHR information, while 25.12% in-school young girls reported the internet as their source of SRHR information. It is possible, that participants in

these studies may actually have more than just one source of information, however this was not clearly captured in these studies.

A qualitative study was conducted among young girls and women (12 to 30 years) in Nigeria by Akinfaderin-Agarau et al (2012) with the objective to probe the issues and context on the use of mobile phones to access SRHR information and services(82). From the study, some participants mentioned that one challenge to accessing SRHR information via mobile devices was the doubt of the legitimacy of anonymous mobile SRHR services, as some stated that they perceive such services as not genuine(82). Participants also mentioned the fear of receiving or making a call to a "deadly" or "evil" number, which is a common myth in some African countries(82). Also most young people do not independently own phones, thus they are required to obtain permission from their spouses if married, or their parents if unmarried, before they can access shared devices(82). With them having to explain the reasons for using the phone, the confidentiality of accessing SRHR information and services is broken(82).

Evidence indicate that access to modern media is gendered, with males having relatively more access compared to females(83). The study by Akinfaderin-Agarau in Nigeria highlighted how young females have relatively minimal time to orient themselves with modern technology as they are occupied with domestic obligations compared to young males, thus making them ignorant of the functions of modern media(82). Similarly, a study in Tanzania conducted among 15 to 19 year old adolescents to explore their user behaviour over the internet (especially social media) for the promotion of SRHR in that country revealed that 76% of boys and 47% of girls had access to use the internet via mobile phones(83). One of the participant in that study in Mtwara, Tanzania had this to say:

> *"Girls spend most of their time at home doing household work… that is why girls do not know how to use or access the internet". (Boy, age 16)* (83)

Parents, guardians and teachers also play a role either in promoting or inhibiting young people gaining access to use modern media(83). This can be attributed to socio-cultural underpinnings where guardians are concerned about young people, especially the girls being exposed to negative influence and meeting the "wrong people" over the internet(83). Thus restricting the access of females to the internet. This also leads to the girls being scared to disclose to their parents and guardians the interests they may have in learning more about modern media and its functions(83). The young girls resort to borrowing phones from colleagues and friends in order to escape these restrictions(83). Some participants from that study had this to say:

> *"…It is well known that boys like using the internet, so they are not afraid of it… I think that [for girls] it is because of rumours and accusations made by parents and teachers and other people who believe that the internet is a bad thing, it destroys the youth." (Girl, age 17, Dar es Salaam, Tanzania)* (83)

"My parents do not allow me to go to the internet cafe (…) they use their mobile phone to access the internet but my phone does not have access to the internet. Boys are free to go to the internet cafe while we girls are not allowed…" (Girl, age 17, Mtwara, Tanzania) (83)

Some other challenges reported with the use of modern media in low resource countries include weak cellular signals, poor electricity and internet connections(77). School policies which restricts the use of modern media devices especially in boarding schools is also a barrier faced by young people(53,79). However, the recent interest by governments in ICT presents an opportunity to translate evidenced based mHealth interventions to full scale implementation for young peoples' SRHR(84).

With the growing interest in the use of modern media for SRHR in SSA, it is imperative to understand some of these challenges and barriers to the use of modern medical platforms among young people. This will help inform appropriate interventions that could improve young people's access to SRHR.

3.1.2 Preferences of using modern media for SRHR

The use of modern media for SRHR is dependent on user's perceptions and choice. As put forward by Baker and White (2010), users of modern media play an active role in choosing and using the media(65). They further reiterated that a user of modern media looks for a media source that can fulfil their particular needs(65).

Previous evidence suggests that the reproductive health needs of young people, including information would be better served in environments specifically designed for them such as youth centres(30). The WHO for instance listed some fundamental features that characterises a youth-friendly service(67,68). These characteristics include facility and provider related characteristics (such as respect for privacy, confidentiality, convenient location and opening-hours) as well as the programme design(67,68,81). Adolescents are more likely to use modern media for SRHR if they perceive the source of information as user friendly and tailored to meet their needs(4).

In Ghana for instance, due to the popularity of inexpensive internet cafes, young people especially older adolescents (15 to 19 years) and those in urban areas have relatively more access and preference for the internet than other sources of SRHR(79). The study conducted in Ghana by Borzekowski et al (2006) revealed that in-school and out-of-school adolescents have various perceptions of choice as a source of SRHR information(79). Out-of-school youth in that study perceived the internet as a relatively more important source of SRHR (ranked 5th importance as a source of SRHR) information than in-school youth (ranked 8th as a source of SRHR)(79). Other important sources of SRHR information stated by participants include health providers, parents, teachers, books, public health campaigns, science classes and television(79). Findings from that study revealed that young people used the internet for SRHR information based on their perception of user friendliness, accessibility, confidentiality and non-punitive/judgemental nature of the internet(79).

Results from a study conducted among young girls in Owerri, Nigeria similarly showed the internet as an important source to obtain SRHR information among the participants(81), although both in-school and out-of-school young girls stated parents/guardians, health providers, books, health class, teachers and television as top sources ahead of the internet

(81). Topics the participants normally searched for on the internet include STDs, HIV, sexual activities, pregnancy, sexual abuse and drug abuse(81).

In Kenya, a study was conducted to assess how young people access SRHR information through modern media platforms. The study was based on a field programme by The Network of Adolescents and Youth of Africa (NAYA), which aims at promoting SRHR for young people (10-24 years) in Kenya (including underserved groups)(57). The study documented reasons for preferences of media platforms for SRHR among young people. These reasons included ease of use, confidentiality, personal preferences and the ability of the programme or platform to ensure anonymity of the user(57). Other reasons included the fact that peers were using a medium, thus providing a platform for discussing issues whilst getting answers to questions and feedback from the online community(57).

In a focus group discussion (FGD) among young males as reported from the NAYA study (52), a participant had this to say:

> *"On Facebook and WhatsApp, people share things, which means that there are many users … the feedback is immediate and there are a lot of people involved. Some of the platforms such Eskimi can be used for getting to know each other better. Some have group discussions where ideas are shared [including topics on sex, HIV and other topics]. It is especially fun discussing these issues with classmates. If you have a view on something, many people tell you their opinion as they comment on it endlessly." FGD, men 20-24 yrs Migori.*

The study participants also shared their preferences for different modern media platforms. Some participants perceived that young people preferred texting on SMS to popular social media platforms (such as Google plus, Instagram and WhatsApp) due to its easiness to activate and operate. A female participant in the study had this to say:

> *"It is good, easier to use and also accessible because you can access it more easily than WhatsApp and you don't need laptops and so on. We dislike WhatsApp [and also Twitter] because it's difficult to access, depending on the type of phone you have. Twitter is also very complicated if you don't know how to tweet. The restriction on the number of characters per tweet makes it complicated. It leaves some of us hanging." FGD female, 20-24yrs, Migori*(57).

Another study conducted in Kenya among young adults in the University, 86% of which were between ages 18 to 24 years, also found that the ease of access to information from modern media enhances its use for SRHR information(86). In that study, there was high preference for internet and social media as the platform for conveying information on SRH services to young people(86). Although other platforms such as TV and radio were suggested, 63% preferred social media platforms such as Facebook and twitter among others whereas only 15% preferred TV or radio(86).

However, not all studies in SSA indicated modern media as the most preferred source for SRHR information. Although studies about marginalized and disabled young people's access to and preference for SRHR information in SSA are scanty, one study conducted in Tanzania focused on marginalized groups for example house-helps, vendors, truants, street

children as well as disabled young people(87). The aim of the study was to examine the accessibility of SRHR information for marginalized adolescents and young people(87). The study indicated that the most preferred sources of information for these groups were peers, parents/guardians, teachers, television, radio and newspapers(87). Marginalized young people and those living with disability are likely to be missed and left behind in accessing SRHR information(87).

3.2.1 Description of modern media interventions to promote young people's access to SRHR information and services

This section presents details of some modern media interventions/programmes designed to enhance access to SRHR information and services for young people in SSA. A summary of the interventions, including their country and outcomes have been presented in Table 3 below. The interventions described includes: You Must Know (YMK) and Adolescent Health (ADH-MApp) mobile applications (app), developed and implemented in Ghana, the Apprendre à Vivre in Senegal, the m4youth in Ethiopia, and the Ma3looma in Egypt. Details of these modern media applications and their outcomes are described below.

You Must Know (YMK) Mobile Application for Young People - Ghana

As part of efforts to improve SRH services to young people, the GHS developed the YMK mobile app specifically for young people(88). YMK was designed in response to the high teenage pregnancy rate, the low patronage of health services among the youth, and challenges associated with the provision of health services in schools(88). YMK was designed to complement other resources by the GHS such as GHS/ADH website, and the GHS-ADH-MApp(88). It is a mobile app that provides access to health resources for young people, with a friendly interface as illustrated in Fig. 2. With this app, health messages/updates are sent to young people on regular basis. The aim of developing the app was to widen access to health information and services for young people 10-24 years(88). The app also equips parents, teachers and guardians to properly support the health needs of their wards. Since its inception, the YMK has helped enhance the access to health information and utilization of services by young people in Ghana(88).

Fig. 2. Interface of the YMK App

Source: Ghana Health Service(88).

Apprendre à Vivre (Learning about Living) - Senegal

In 2010, One World UK, a non-profit organization, implemented the Apprendre à Vivre (Learning about Living) Program in Senegal, with the aim of informing and educating young people about their SRHR through innovative ICT applications to foster behaviour change and improve reproductive health outcomes(58). The program involved training of teachers, counsellors and users on eLearning and mobile phone platforms and also ensured strong participation from different stakeholder organizations including civil societies and the government(58). A total of 143 teachers in 10 schools and 84 youth peer educators were trained in the regions of Dakar and Ziganchour by 2010 to use the eLearning platform to offer comprehensive SRH education(58).

The platform operated by BipInfoAdo and ClickInfoAddo, provides on-demand information and services through trained counsellors via free SMS, the website, Facebook, YouTube and email question-and-answer-services(89). The platform, which is available both online and offline was adapted from an approved curriculum and designed to meet the needs of both in-school and out-of-school youth(89). By 2012, the platform had received over 75,000 unique text questions and by the third year of operation it had answered approximately 250,000 SMS in total, sent by about 67,000 individual users(89).

m4youth – Ethiopia

Pathfinder International, a US based NGO with the organizational vision of promoting access to contraception and improving pregnancy outcomes and a healthy SRHR among individuals, implemented m4youth for young people in the university and peer educators in Ethiopia(87,88). m4Youth is a free, menu-based SMS service launched in 2014 and

designed to improve Ethiopian university students' knowledge of SRH and encourage healthy behaviours, including using health services(92). Attention was set on university students because they are exposed and vulnerable to engaging in risky behaviours that may affect their SRHR(91). With an increase in the number of tertiary institutions from two in 2002 to 30 in 2015, students in these institutions were found to be vulnerable to unwanted pregnancy, unsafe abortion, sexual abuse, GBV, and STIs including HIV(92). The goal was to provide and improve access of students to information on SRHR as well as promote utilization of SRHR services(90). The initiative was expected to reach 17,000 university students, encourage the use of SRH services by students, and increase reporting of GBV(92).

A report by the Pathfinder international shows that the m4Youth SMS project helped disseminate SRH information with privacy and confidentiality. Students were able to access sensitive information, especially for female students, who normally would shy away from asking questions(91). In that report, a peer educator had this to say:

> *"...most students are shy to talk about relationship issues…. since they are shy and very secretive, I just recommend them to text in to the short code if they don't want to talk to me and others. I even tell them even if you don't engage in sexual activities; the information on 8990 is good for the future." female peer educator*(92).

A post-intervention assessment of the m4Youth service reported various challenges that affected the implementation. According to the report, due to network challenges, the short code used to access information failed for more than eight weeks during the implementation(91). This resulted in a progressive decline in the trend of SMS service utilization over the period(91). Some students had these to say:

> *"... when texts are sent to the system, replies don't come as quickly as needed. When we text, the network is sometimes busy. I think that made it hard to use. Apart from that students like the system " A female student*(92).

> *" There is a network problem. Students are discouraged by it. Even when I try to use it in my dorm, my dorm mates told me that the network is poor and sending a text and trying to get a response is just a waste of time. So I just left it alone. I stopped using the service" female student*(92).

The m4RH programme – East Africa

The m4RH is an automated, interactive, and on-demand SMS system aimed at providing simple, accurate and relevant information on reproductive health to young people(93). As summarized in Table 2, the m4RH program was implemented in Kenya, Tanzania, Uganda, Rwanda after initial pilot in Kenya and Tanzania in 2009(93). The initial programme was developed with recourse to existing evidenced-based global resources including the WHO Global Family Planning Handbook(94) and best practices for developing health communication programs(5). Major stakeholders such as the MOH in both Tanzania and Kenya and other affiliated technical working groups made contributions to it as well(93). The m4RH platform provided a unique platform to reach young people. Based on increased

engagement by young people, the scale up of the programme in other countries involved adoption of the m4RH system to reach key adolescent and youth aged 10–24 years(93).

The report indicates that approximately 30% of new users on the m4RH platform requested information once or twice monthly and about 68% of frequent users requested information multiple times monthly(59). Users of the programmes reported increase knowledge of SRH and contraceptive uptake(59).

Ma3looma (information) Facebook page - Egypt

In 2010, the United Nations Population Fund (UNFPA), in association with the Egyptian MOH started the Ma3looma project as a way of using social media to raise awareness to young people about their SRH(95). As indicated in Table 2, the project targeted both in-school and out-of-school adolescents. Using trained counsellors to give quick, accurate and non-judgmental answers to questions posed by the adolescents(96). The project involved the development of a website, called *Ma'alooma* (information) to provide information about SRHR(96). The project initially started as an SMS-based question-and-answer platform that provides responses by trained physicians and counsellors to queries of young people(96).

The purpose of the website was to give tips on prevalent SRHR issues and allow young people to ask related questions anonymously(96). The project also has social media presence on Facebook, Twitter, Instagram, and Ask.fm(97). The *Ma'alooma* website provides articles on SRHR, as well as on lifestyles, including diet and relationships. The Facebook page also acts as a portal to the website and provide linkage to specific articles to engage with young people(96). The platform is known to engage boys and girls alike with a user ratio of 1:1 as compared to Egypt's average Facebook usage of 1.77 males to 1 female(96). This therefore provides a unique platform for adolescent girls who would shy away from sensitive reproductive health issues in such settings(96). A report by the UNFPA shows that about 1,008,612 young people are reached with 1,600 different SRH posts and articles through the main web platform *Ma'alooma* and Facebook page(95). This platform was used also for female empowerment and to raise awareness on GBV(97).

Khuluma – South Africa

The Khuluma project was launched in South Africa in 2013 across clinics in Pretoria and Cape Town. The project was initiated in response to the growing psychosocial problems among HIV positive young people in South Africa where over 15% of the youth and 5% young women aged 15-24 are infected with HIV(60). The Khuluma project provided an integrated, cost-effective and scalable solution to the growing mental health challenge among HIV positive young people(60).

The project involves using digitally enabled platform to enhance discussion among peer-to-peer groups at any time via text messages, after they are put into support groups of 10-15 peers based on similar experiences(60). The discussions are related to their conditions and needs. The project also includes inviting guest speakers into the peer groups to run facilitated discussions on specific topics such as nutrition, education, careers advice and sexual health(60).

An assessment of the intervention in 2014 showed that over 250,000 SMS were sent amongst 40 participants over a period of 3 months(98). The implementers reported that the project significantly increased self-reported medical adherence, perceived levels of social

support and increased knowledge and access to SRHR services while decreasing internalized social stigma(98).

The NAYA social media programme - Kenya

The Network of Adolescents and Youth of Africa (NAYA) developed an active modern media programme, which utilizes bulk SMS, Facebook, Twitter and Google plus. The NAYA intervention was to complement existing programmes such as the ASK (Access, Knowledge and Services) programme that worked with local media to influence discussions on SRHR through radio talk shows and newspaper articles. The NAYA modern media intervention targeted young people aged 10-24, who have access to the internet and mobile phones.

An assessment report of the programme showed that, the NAYA Kenya Facebook page gathered 6,401,094 likes, friends, followers; 17% of whom are based in the study area (Migori) between April and June 2014. The programme implementers trained about 120 youth advocates to promote the social media discussions and to drive traffic to the different social media platforms. There was improved access to SRHR information among young people on topics such as early pregnancy and abortion(57). The young people reached by this intervention opined that they gained knowledge on the consequences of risky behaviours that expose them to unwanted pregnancies, rape and STI(57). It was reported that, In a FGD with 15-19 year-old boys, a participant disclosed this:

> *"We now know the consequences of drug abuse. It can make one to do evil things such as raping a girl and making her pregnant. But raping a girl can also expose you to diseases if the girl is infected." FGD, men 15-19 years. Migori*(57).

The youth in the NAYA programme disclosed various challenges with the use of modern media platforms for SRHR(57). These included the cost of acquiring an internet-enabled mobile phone, poor internet connectivity, data recharge costs, electricity challenges, parental restrictions and school policies on access to phones(57).

The authors reported that some participants in a FGD disclosed these:

> *"Most people don't have electricity in their houses so using computers or mobile phones to access the internet becomes a problem. Another problem is that parents are very protective of their children and are keen to know whatever information they are accessing through their phones. This mostly affects those adolescents in the age group 10-14 years" FGD, boys 10-14yrs Migori*(57).

> *"Some of us have phones without such applications. It is therefore difficult to access the platforms. We have to rely on friends, but some of the information is sensitive and confidential" FGD, girls 20-24yrs Migori*(57).

> *"Some of us are not well conversant with the twitter because that twitter handle is too complicated. Again, most of our friends are not conversant with those things, so to reach them, with the information very fast is a problem. We are limited to just chatting verbally and we learn very little in the process" FGD, women 20-24 yrs, Migori*(57).

Ghana Health Service's (GHS) Adolescent Health App (ADH-MApp) – Ghana

The Ghana Health Service's Adolescent Health App (ADH-MApp) was launched in 2015 by the Ghana National Adolescent Health and Development Programme (AHDP) to assist the health care provider deliver quality health services, especially reproductive and sexual health to the young people(43,72). The ADH-MApp also provides a platform for interaction between care providers and young people(27). The ADH-MApp aimed at improving service providers' knowledge and skills in adolescent health services and also facilitate adherence to service standards, guidelines and protocols on adolescent health service delivery(27). The software works both online and offline, thus does not require constant internet connectivity(27). A resource section of the app helps health providers find a collection of health information and materials including counselling guides, reproductive health policies, family planning and pictures to use during counselling sessions via the interface as illustrated in Fig. 3. The ADH-MApp operates on android system, with plans to operate on windows and IOS platforms in the future(27).

An evaluation of the usefulness and impact of the ADH-MApp found increased acceptability and appreciation of the app by health workers(27). Health workers like the app because it reminds them of things that they might forgot about during service delivery. Participants disclosed that the app has become a daily tool in the delivery of adolescent-friendly-services(27). As reported in the evaluation study, a participant opined:

> *"This app is very helpful and I use it every time an adolescent patient is before me. I remember the other day an adolescent walked into my office with an issue, I didn't have an idea of how to go about it, but after going through the policies and resources on the app I was able to refer her to right person and she got the help that she was looking"*(27)

Fig. 3. The interface of the GHS ADH MApp

Source: Ghana Health Service(88).

Table 3. Summary of interventions/programmes using modern media to promote young peoples' SRHR in SSA.

Name of Intervention, Organization & status	Aim of intervention	Medium used	Outcome	Country of implementation
GHS-YMK mobile app by Ghana Health Service. On-going programme	To address SRHR issues of young people; online counselling by a trained counsellor; provide information on SRHR services	Online platform	Provision of health resource materials to young people. Also involves parents, teachers and guardians to properly support the health needs of their wards. Since its commencement, the YMK app has helped to improve the access to health information and utilization of services by young people(88).	Ghana
Apprendre à Vivre (Learning about Living) by One World UK. On-going programme	Behaviour change to improve SRHR outcome amongst young people through modern media information and services.	SMS, website, Facebook, YouTube and email question-and-answer services	75,000 questions, & 250,000 answers by SMS sent by 67,000 individual users. 143 teachers in 10 schools and 84 youth peer educators trained in Dakar and Ziganchour by 2010(58).	Senegal
m4Youth by Pathfinder Intl. Completed project (2014-2015)	Improve access to SRHR information for students in the university and promote use of SRHR services.	SMS	m4Youth provided confidential and reliable source of information and complemented peer educators' role. The programme led to reported increase in condom use, knowledge of where to find condoms and a reduction in the misconception about contraceptives among students. During the 13-month implementation period, over 10,500 information requests were made(91).	Ethiopia
Ma3looma by One World. On-going programme	Targetting both in-school and out-of-school youth on SRHR issues. Using trained Counsellors to give quick, accurate and non-judgemental answers to questions posed by the young people.	SMS, Emails, Online question-and-answer services, Facebook	The Ma3looma provides a unique platform for young people especially girls who shy away from sensitive SRHR issues. Also for raising awareness about GBV. 1,008,612 young people reached out by 1,600 different SRHR posts and articles through major web platform Ma3looma (information) Facebook page(95).	Egypt
m4RH by FHI 360 On-going programme	Provides SRHR and FP information service for the youth. Sharing success stories of youth champion on	Menu based two-way SMS service	Programme successfully scaled up vertically and horizontally through expansion to new areas in Rwanda, Uganda, and Tanzania. Provided a unique single platform to reach young people. Users reported increase knowledge of SRH and contraceptive uptake. Kenya-13% improvement in contraceptive knowledge after 3 months of use(99).	Tanzania Kenya Uganda Rwanda

	the use of FP		In Tanzania, from September 2013 to August 2016: A total of 3,673,702 queries sent by 409,768 unique users who were mainly adolescents. More than 30% of new users who accessed the m4RH sent queries a couple of times monthly for about 2 months, and 67.86% of frequent users requested information multiple times monthly(59).	
Project Khuluma by SHM Foundation Completed project	Psychological counselling support services to adolescents living with HIV. To encourage adherence to treatment regime	SMS Hot line call services	The project reported a significant increase in self-reported medical adherence, perceived increase of social support, increased knowledge on SRHR and access to SRHR services as well as decreased internalized social stigma(60). 0ver 250,000 SMS were exchanged among 40 participants over a period of 3 months(60).	South Africa
The NAYA Kenya social media programme Completed project	To complement existing programmes by providing a digital media component to promote discussions on SRHR among adolescents aged 10-24 years.	Bulk SMS and use of Facebook, Twitter and Google plus	Provided information and improved knowledge of adolescents on SRHR(57). NAYA Kenya Facebook page gathered 6,401,094 likes, friends and followers between April and June 2014(57). Young people who have accounts in the new media platforms e.g. Facebook, Google plus, Twitter etc. are targeted to like or follow the online discussions(57).	Kenya
GHS-ADH Mapp by Ghana Health Service. On-going programme	A resource tool to guide health workers in communication with young people. Rapid access to policies, guidelines and protocols regarding young people's health.	Online and off-line mobile app. A reference guide for the health care provider. Provides also a platform for interaction between young people and health providers.	GHS-ADH-Mapp has become a daily tool that health workers use in the delivery of youth-friendly services. The app is helpful and improved service delivery to young people(27).	Ghana

SRHR= sexual and reproductive health and rights; SMS= short messaging service; FP= family planning; App=Application

3.3 Evaluation of modern media interventions

The results below are evaluations of some modern media interventions of which enough details could be found, that was used to expand young peoples' access to SRHR information and services in SSA. These interventions are evaluated using the RE-AIM framework which assesses the reach, effectiveness, adoption, implementation and maintenance of the interventions.

m4RH - Tanzania

An evaluation of the m4RH project using observational analysis of electronic data found that from September 2010 to June 2011, users made a total of 4,813 contraceptive queries (2,870 unique users) to the m4RH system(59). As at 2012, there were 25,000 users from 98% of the country's districts. The number of users rose to 500,000 by October 2016, with over 4.5 million queries(59). Natural family planning (21%), followed by condoms (12%) were the most popular contraceptive methods queried(59). Users of the programmes reported increase knowledge of SRH and contraceptive uptake(59). They also acknowledged the unique opportunity for young people to access SRHR information confidentially(59).

To enhance the adoption of the intervention, a 10-step model was developed to guide the scale up of the programme, and this included broadening the score to include additional content on puberty, sex, pregnancy, GBV, HIV, and STIs(90,103). Role model stories that model positive SRH behaviors and service utilization among young people were also included in the new content(93). Aspects of the model included establishing a technical group, identifying priorities, adapting to local context, testing with target audience and monitoring and evaluation as shown in the adaptation model in Fig. 4(93). The model centers on the interaction between stakeholders and end-users of the mHealth program through stakeholder engagement and continuous data collection with mHealth program users throughout the entire program(93).

At the end of the pilot study, users of the m4RH programme demonstrated a high level of acceptability for the mobile phone platform for receiving SRHR information because of the convenience and privacy it provides(93). The implementation of this programme also involved a lot of stakeholders that supported the integration and maintenance of the project. Tanzania Capacity and Communication Project (TCCP) for instance integrated m4RH into its national family planning campaign called "Jiamini!" ("be confident"). The m4RH approach was included in Jiamini! radio and TV spots with a national reach, leading to a dramatic increase in the use of m4RH(100).

Fig. 4. The mHealth adaptation model

Source: Evidence-based adaptation and scale-up of a mobile phone health information service(93).

m4RH - Kenya

The m4RH intervention in Kenya was evaluated using an automatic logging of system queries and in-depth telephone interviews. From January 2010 to June 2011, 4817 unique users accessed the programme in Kenya with 22% being less than or 19 years old(101). Young people assessed information on condoms - 28%, natural family planning - 24.9%, clinic locations - 22.6% and other contraceptives - 12.5%-21.4%(101). One hundred and three (103) young people reported an increase in contraceptive use after having access to the m4RH system.

In 2017, a randomized control trial to assess the impact of the intervention in Kenya found a 13% improvement in contraceptive knowledge after 3 months of use among the intervention group compared to the control group(99). The programme was adopted and expanded nationally and to different countries including Tanzania and Rwanda(101). After successful implementation in Tanzania, the 10-step model (Fig 4) described above was designed. Similar to Tanzania, the involvement of other stakeholders and partners led to the successful implementation. An mHealth task force was formed to maintain the programme with a plan to sustain m4RH even after the donor funding ends(100).

Learning about living - Nigeria

The Learning about Living project was evaluated to document and provide evidence of the process of initiating, planning, implementation and monitoring of the project, using mixed methods(102). In terms of reach, The Learning about Living project received about 60,000 questions from about 49% multiple users(103). Users were from both urban and sub-urban settings. By the end of the pilot phase the project had reached almost 9,000 young people in the different locations(103). At the end of the project, schools were effectively using the intervention and the project to build accurate knowledge and skills in SRHR and life skills of young people, with average knowledge levels increasing by an extra 10%-20% for girls who participated in the intervention compared to those who did not(103).

The greatest impact of the project was seen in areas where initial knowledge levels were low and attitude were poor. For example: pubertal changes, menstrual cycle, condom use and attitude towards safe sex within relationships(103). Generally, users were very satisfied (76%) and the reasons were because the services were free - 24%, prompt - 12%, easy access and available - 24%(103). The project implementation was successful because of collaboration between different partners from civil society, government and international NGOs(103). The flexibility and commitment of the partners was crucial to the success of the project, with each benefiting from the others' strengths. The project also had an effective institutional assessment and schools with adequate infrastructure such as computers were identified as more viable(103).

Text message intervention on young people's SRHR - Ghana

This was a text message intervention study conducted in Accra, to assess the reach and impact of mHealth programs for young people's SRHR needs(100,101). The target population were 756 young females between ages 14 to 22 years in 22 Secondary schools in Accra(104). The intervention period lasted three months, and participants were sent multiple choice questions weekly, to which they were to respond; free of charges(100). Participants who responded correctly were rewarded with airtime credit. The researchers interacted directly with the participants at baseline, end of the intervention (three months) and after a year(100). The evaluation study used data collected during the intervention to assess the reach and effectives of the intervention.

The study reported an overall high responsiveness of the programme. Eighty-one percent (81%) of the participants responded via text messages with an average number of eight responses(104). Lower parental education was associated with low response rate (Incidence Rate Ratio (IRR) 1.22, 95% CI 1.03–1.46)(104). Within three months of the intervention, knowledge increased by 11% points (95% CI = 7, 15) and the interactive intervention by 24% points (95% CI = 19, 28), from a control baseline of 26%(104). Both unidirectional (odds ratio [OR] = 0.14; 95% CI = 0.03, 0.71) and interactive interventions (OR = 0.15; 95% CI = 0.03, 0.86) lowered odds of self-reported pregnancy for sexually active participants. Generally, the intervention was effective as participant's SRHR knowledge was increased after assessment in the short term (three months) and the long term (one year) after the intervention(100). Details of the maintenance of the project were however not reported in the evaluation study(100,101). It is noted that because the study population was limited to only females, and the study area was urban, the results on effectiveness cannot be generalized.

m4youth - Ethiopia

Using a mixed method, pre-post study design, the m4youth was evaluated after 13 months intervention period(91). The programme had 10,500 information requests to the central

server: comprising STI/HIV 15%, contraception 21%, unsafe abortion 8%, healthy versus abusive relationship 12%, where to find services 7%, sexuality and frequently asked questions 37% being the information requested(91). During the intervention period, the recorded number of condoms obtained from the university's youth-friendly facility was 33.3%, knowledge on condom source - 5.4%, and use of condom during intercourse increased - 5.9%(88,89), whereas misconception about contraception decreased by 0.5%(91). These differences were however not statistically significant.

Also, young people felt empowered to report GBV during the programme implementation; 26 issues were reported at the university's gender office, as against nil reported in the preceding years(91). The programme implementation was powered by the Integrated Family Health Program in collaboration with John Snow, Inc and supported by United States Agency for International Development (USAID) and this contributed to the success of implementing the programme(87,88,89). In the qualitative interviews, a student recounted how the m4youth programme has provided an opportunity to access the right SRH information:

> *"We often argue among ourselves on the ways of HIV and STI transmissions. We usually debate without end. Now, we refer m4Youth for the right information". Male student FGD participant*(92).

Table 4. Summary of evaluation results of interventions using modern media to enhance young peoples' SRHR in sub-Saharan Africa

Study (Authors, year, country)	Aim of study	Intervention evaluated & Target group	Method of evaluation	Assessment of intervention				
				Reach	Effectiveness or Efficacy	Adoption	Implementation	Maintenance
L'Engle K, Plourde K.F, Zan T 2017 Tanzania (93)	Evaluate the feasibility, reach, and potential behavioral impact of providing family planning information via SMS to the general public in Tanzania	m4RH (age group 10 to 24 years)	Quantitative (Observational, analysis of electronic data log and SMS questions)	In 2012, 25,000 m4RH users were registered over a 6-month period. Users in 98% of the country's districts. As at October 2016, m4RH reached more than 500,000 users in Tanzania; the system assessed more than 4.5 million times.	Unique opportunity for young people to access SRHR information confidentially. Questions asked by young people are as follows: family planning - 36%, emergency contraception - 35%, condoms - 31% and implants - 24%.	High level of satisfaction among users: message easy to understand and use. A 10-step model developed to guide the expansion of the project in content, reach and target populations. An aspect of the model is to ensure adaptation maintains key fidelity.	Stakeholder meetings and continuous outreach during the pilot provided opportunities to link m4RH to other mHealth activities in the country. After the pilot study, the programme was expanded to cover other SRHR issues such as the side effect of contraceptives.	Tanzania Capacity and Communication Project (TCCP), operated by Johns Hopkins University (JHU) integrated m4RH into its national family planning campaign called "Jiamini!"- meaning "be confident"(100) Horizontal scale up in other countries like Rwanda following successful implementation.
Vahdat H.L, L 'Engle K. Plourdeb K. F, Magaria L, Olawo A 2013 Kenya	To evaluate the acceptability, information access, and potential behavioural impact of providing contraception information	m4RH (age group 10 to 24 years)	Quantitative - Automatic logging of all m4RH system queries; demographic and behaviour change questions sent via SMS	4817 users accessed m4RH during the pilot period (from January 2010 to June 2011), in Kenya; 22% were ≤19 years old. Condom and natural family	Young people queried 2.3 different contraceptive methods. The programme provided an opportunity for young people to access information. E.g. For ≤19 year	Respondents liked the simple language and confidentiality of the intervention.	Successful implementation due to the involvement of many organizations in its development, deployment and promotion and also to help address any implementation	Within the Division of Reproductive Health of the Ministry of Public Health and Sanitation of Kenya, a task force for mHealth was formed to help identify a plan to

(101)	via SMS to young people in Kenya.		to all users who accessed m4RH during the pilot period; and in-depth telephone interviews with a subset of m4RH users.	planning information was accessed most frequently, although users queried all other methods.	old: condoms - 28%, natural family planning, - 24.9%, clinic locations - 22.6%, other contraceptives (12.5%-21.4%). 103 adolescents reported change in their contraceptive use after having access to the m4RH system.		challenge.	sustain m4RH after PROGRESS funding ends.
Ofomata U and Groves A, 2009, Nigeria (103)(9)	To document and distribute lessons learned during the process of initiating, planning, and implementation and monitoring of the project	Learning about Living (age 14 to 30 years)	Mixed methods (quantitative and qualitative), 14 months after evaluation, N=9000 young people	93% from urban and sub-urban settings, 79% male. 60,000 questions received by SMS, multiple use of service-49%. By January 2009, the pilot project had reached almost 9,000 young people.	Schools are effectively using the intervention. Intervention builds accurate knowledge and skills in SRHR and life skills of young people are being improved. Average knowledge levels increased by an extra 10%-20% for girls used the intervention compared to those who did not (significance not reported).	User satisfaction 76%, 24% free, 12% prompt response, 7% easy access and avail-ability, 24% educative HIV and SRH	Project implementation was based on collaboration across multiple sectors within government and the private sector. Effective institutional assessment to identify schools with adequate infrastructure such as computers to support easy programme implementation. Innovative measure adopted in schools with less infrastructure	Not described in the report
Rokicki S, Fink G 2017	Assessed the reach and effectiveness of mHealth	Text message intervention on	Quantitative Study conducted among girls,	756 participants reached with the programme. An overall high	Program significantly increased SRHR knowledge.	The intervention was well received by the Ghana Health Service,	Participants were sent multiple choice questions via SMS every	Not described in the report

Ghana (104)	in reaching adolescent subpopulations who may be at higher risk of poor SRH outcomes	adolescent SRHR (14 to 24 years)	aged 14–24years in 22 secondary schools in Accra, Ghana. Secondary data analysis from a randomized control trial.	response: 81% responded via text message to ≥ one quiz question; average responses of 8. Proportional distribution of reach across subgroups	Higher programme engagement associated with higher knowledge scores: 3 months (linear slope estimate 0.11, 95%CI 0.08 to 0.14); 15 months (linear slope estimate 0.07, 95%CI 0.02 to 0.13)	Ghana Education Service, and as well as the participants.	week for 12 weeks. Participants who responded correctly won free airtime credit. Participants interviewed at baseline, after the project implementation and a follow up a year later.	
Nigatu T. 2017 Ethiopia (91)	To generate evidence on the feasibility and acceptability of delivering SRH messages through SMS and evaluate its complementary with peer education	m4youth (16 to 25 years)	Mixed method (quantitative and qualitative techniques), pre-& post study design. Baseline – 384 students; 20 in-depth interviews. Duration of implementation – 13 months	17,000 university students expected to be reached. 10,500 information requests were sent to the central server. Information requested: STI/HIV 15%, Contraception 21%, Unsafe abortion 8%, Healthy and abusive relationship 12%, services 7%, sexuality and FAQs 37%	Number of condoms taken - increased by 33.3%. Misconception about contraception – decreased by 0.5%; Knowledge of source of condom – increased by 5.4%; Having a sexual partner – decreased by 2.3%, use of condom during last sexual contact – increased by 5.9%. The differences were however not statistically significant	The programme was well adapted by both students and peer educators	Implemented over 13 months. Contents were in English and Oromiffa languages.	Not described in the report

N=number of interventions; SRH=sexual reproductive health; STI=sexually transmitted infections; HIV=Human Immunodeficiency Virus; FAQs=frequently asked questions

Chapter 4: Discussion

Modern technology provides unique opportunities to communicate in diverse ways and to leapfrog over several bottle-necks in promoting young peoples' SRHR. It is therefore necessary to synthesize the data on the use of modern media in promoting young peoples' SRHR to support health professionals and young people themselves to leverage technology for improved SRHR outcomes. This scoping review was conducted to assess the use of modern media in expanding young peoples' access to SRHR services in SSA. This section discusses the main findings and make further recommendations to different stakeholders to enhance Ghanaian youth's access to SRHR information and services using modern media.

In summary, the review found that young people are increasingly gaining access to and using modern media for various functions including accessing SRHR information and services. This is however not without various challenges which prevent certain groups of young people from accessing modern media. Some of these challenges include lack of electricity and internet connection, costs associated with using mobile devices and restrictions on the use of devices in schools(73,75). The review also found and documented some preferences of current and potential users of modern media for SRHR including preference for privacy and confidentiality of web-based platforms. Furthermore, the review found that different modern media interventions are being used to promote young peoples' SRHR n various SSA countries, including m4RH programme in Kenya and Tanzania, the m4youth in Ethiopia, the YMK (You Must Know) mobile application in Ghana and the Ma3looma (information) project in Egypt. Finally, the results from evaluations of interventions using modern media showed high level of reach and effectiveness. Among those with documented evidence, some of the interventions had good adoption and strategies to ensure the maintenance of the interventions.

4.1 Access to, and preference for modern media as a source of SRHR information and services in SSA

The proliferation of internet and modern media technology in the SSA region provided a platform to expand access to healthcare. With more than ten-fold increase in the coverage of internet in SSA as at 2014, coupled with declining cost of using mobile phones (60,61,62), there is a unique opportunity to improve access to SRHR using modern media(75). Findings show that the majority of young people use modern media as a source of SRHR information. Information sought for via the internet includes pregnancy, contraception and STIs. This shows that important health information to improve adolescent health behaviors could be channeled through these avenues.

The use of modern media is however not universal among all subgroups of young people. It has been noted that young males in SSA have relatively higher opportunities to access modern media platforms compared to young females(57). This is largely due to the sociocultural and traditional obligations of young girls at home, as well as the perceived obligations for parent to protect their daughters from accessing information(82). Also, young people in rural areas have less access to modern media compared to those in urban areas, due to challenges such as low electricity coverage and poor internet connectivity(73,75). Usability of digital media also differs between in-school and out-of-school youth and this could relate to the different levels of accessibility, school policies and restrictions on the use of mobile phones and other possible sources of SRHR information. Whilst the results indicate that in-school youth have more access to modern media, out-of-school youth preferred it more as a source of SRHR information and services(79). This conversely relates to the internet being readily available and accessible to out-of-school youth than any other source of SRHR information(79). In Ghana for instance, students in

public schools are not allowed to use mobile phones while in school, and this could limit the access and preference for mhealth interventions among this sub-group(9). However, the Government of Ghana is recognizing the increased advantage of ICT to the youth, and is providing attention and investment to ICT training in schools.

The expansion and access to modern media for SRHR also depends on the preferences of young people and end users of these programmes. With the availability of other sources of SRHR information, the introduction of modern media must meet the needs and preferences of young people. As explained by the UGT model, individuals use modern media to satisfy a curious gap based on their needs and preferences(60,62). Findings from this review shows that perceptions of accessibility, confidentiality, anonymity and non-punitive nature of accessing information via the internet are some characteristics of modern media that can expand the usage among young people in particular. In SSA settings where young people find it difficult to discuss sexuality topics with their parents, guardians and health providers(91), the use of modern media could serve as a confidential means for disseminating information as well as creating an opportunity for peer-to-peer discussions and providing feedback on SRHR. The Facebook platform by NAYA in Kenya for instance provided a discussion platform for young people to exchange ideas and also learn from counsellors(57).

User friendliness and ease of use were also key reasons behind young people's preferences for modern media for SRHR(52,73). Some young people therefore preferred texting on SMS to popular social media platforms (such as Google plus, Instagram and WhatsApp). Not all interventions were designed to run on the basic features of phones. This meant that young people who did not have access to phones with high functionalities and software were unable to access certain interventions. For example some participants cannot use Facebook or Twitter and therefore preferred simple functionalities such as SMS(57). This suggests the need for programme implementers to explore these preferences and take them into account in programme design to ensure sustainability.

One significant finding was that certain sub-groups of young people have limited choices to access confidential independent SRHR information and services through modern media. For example, the marginalized and disabled young people are more limited and deprived in accessing information using modern media(87). All the interventions reviewed did not include special features for use by disabled young people; for example the visually impaired and hearing impaired young people. Implementers must take into consideration the needs of such groups of young people to design features applicable to them during intervention planning, so they are not left behind.

4.2 Some interventions/programmes young people use to access SRHR information and services in SSA.

With the growing use of mobile phones and expanding internet connectivity in the SSA region, some international organizations, civil societies and donors in collaboration with governments are creating opportunities for young people to assess SRHR information using modern media. This review identified some modern media programmes and interventions in SSA, aimed at expanding access to SRHR among young people. This includes the YMK (Ghana), m4Youth (Ethiopia), Ma3looma (Egypt) and Apprendre à Vivre (Senegal). These prgrammes used different functionalities to address various SRHR issues among young people. The functionalities included SMS as in most of the programmes, emails e.g. Apprendre à Vivre (Senegal), website e.g Ma3looma (Egypt), Facebook page e.g Ma3looma and NAYA and other social media platforms such as Twitter. Findings also show that the programmes targeted different sub-groups and most were designed in response to the

rising SRHR challenges among young people. m4youth in Ethiopia, was for instance designed in response to increasing vulnerability of university students to unsafe abortion, STIs and HIV with the aim of improving students' knowledge of SRH whiles encouraging healthy behaviours(92). These initiatives provide insights to support future implementations and possible expansion of the use of digital media for SRHR.
Although this review focused on programmes designed for use by young people, it was found that some programmes were used by health providers and parents/guardians to support service delivery to young people. One of such applications was the ADH-Mapp, developed in Ghana to help improve service providers' knowledge and skills in adolescent health services as well as facilitate compliance to service standards, guidelines and protocols on adolescent health service delivery(27). With a general low availability of human resource for health in SSA and other LMICs, health providers are overburdened by the current health demands and therefore have challenges sticking to guidelines and protocols to deliver SRHR services to young people. The ADH-Mapp helps health providers to collect the appropriate information, education and communication materials to assist in service delivery. A handy feature of this application is the platform for interaction between young people and health providers.

The development and rolling out of modern media programmes for SRHR is however not without challenges. Evidence of these challenges are important roadmaps for future implementation and scale-up of modern media interventions. A major challenge identified in this review was financial constraints among young people. Most young people are not economically empowered to deal with the cost associated with the use of modern media; they cannot afford the cost of smart phones, cannot pay to recharge their phones or acquire mobile data for internet usage(45,69). In the NAYA programme in Kenya, some users could not afford smart phones and therefore could not access the programme's Facebook platform, thereby resorting to only the SMS and missing out on some important aspects of the programme(57). The m4youth programme in Ethiopia for instance was free, and this was cited as a reason for its high acceptability among young people. Another major challenge was the lack of internet connectivity and general network problems. Despite the growing use of mobile phones in SSA, internet connectivity is still low. In the m4youth programme in Ethiopia, users were not able to access short codes for more than eight weeks due to network failure and sometimes students could not get feedback on their queries, leaving them with no option than to abandon the programme(91). If SSA is to grasp the full opportunity that comes with mobile phone telecommunication and its related applications, connectivity issues in all parts of countries would need to be addressed.

4.3 Evaluated interventions using modern media

The growing possibility of using modern media for SRHR also means that, evidence of acceptability, implementation challenges and ways to maintain the projects is necessary. Using the RE-AIM model, this review identified evaluated interventions to provide evidenced-based lessons for future implementations. Most of the evaluation studies used qualitative interviews to assess the views of the users on usage and perceived effectiveness whereas other evaluations quantitatively assessed changes in SRHR knowledge and behaviour between the baseline and end-line. Use of self-reported experiences in sources of information for SRHR and outcomes could result in recall and social desirability bias.

Reach - The evaluated modern media interventions showed a high level of reach among young people. Most of the interventions however did not clearly report on the target population intended to or actually reached. The Learning about Living programme in Nigeria for instance reached about 9,000 young people and received over 60,000 questions with almost half of the users being multiple users but the total population expected to be

reached was not described(103). It was however mentioned that the number reached exceeded the programme goals. Similarly, the m4RH in Tanzania also did not state the number of young people intended to reach but reported about 500,000 users as at 2016 with more than 4.5 million queries(59). The m4youth in Ethiopia, expected to reach 17,000 university students, had about 10,500 information requests during the 13 months of implementation, although the information requested does not clarify the actual number of students reached(91,92).

Young people assessed the programmes for various SRHR issues including sexuality, contraceptives, family planning, condom use and GBV. These findings indicate huge potential in reaching a vast majority of young people with a wide range of SRHR information in SSA using modern media. However, some of these programmes failed to show by proportion the number of young people reached in comparison to the target population. The evaluation reports also did not show differences between subgroups of young people, with the exception of m4RH in Tanzania which reported that 22% of the total population of young people were 19 years or less, and the evaluation of an SMS intervention for SRHR in Ghana also reported comparable reach of the intervention among all subgroups of young people.

Effectiveness - The interventions also demonstrated a good level of effectiveness as reported in the evaluations. The interventions helped to improve the knowledge of young people on SRHR issues and in some instances, knowledge levels increased by 10%-20% as in the case of Learning for Living in Nigeria(103) and by 11 percentage points according to text message intervention study in Ghana(104). The m4youth programme in Ethiopia reported an improvement in the number of condoms taken (33.3%), knowledge on condom source (5.4%), and use of condom during intercourse (5.9%) and a 0.5% reduction in the misconception about contraception.

Although these evaluations failed to assess the comparative effectiveness among different functionalities, this finding shows that all modern media functionalities could effectively improve knowledge of young people about SRHR. Some of these findings were not significant whiles some did not report on the significance of the comparative evaluation, making the applicability of their findings questionable. This suggests the need for more rigorous evaluation methodologies to be applied to evaluate these programmes and interventions whiles looking at how effectiveness differ between various functionalities.

Adoption - The utilization of modern media interventions by decision-makers, implementers and the willingness of users (young people) to initiate or accept the intervention are very important in scaling up such interventions for use in the general population. User satisfaction is important to enhance smooth implementation of interventions and programmes.

Some of the programmes are reported to have high level of satisfaction among users. For instance the Learning for Living programme in Nigeria, and m4RH in both Kenya and Tanzania. The level of satisfaction was however tied to the ability of the programme to meet their desired needs; for example to ensure a high level of privacy of use as in the case of m4RH in Tanzania. The m4RH programme also has been successfully adopted and scaled up in Uganda and Rwanda after successful implementation in Tanzania and Kenya.

A key feature of this programme was the design of an evidence-based model to guide the adoption in other similar context(93). This 10-step adoption model could guide similar interventions in the sub-region to reflect on important issues to address and enhance

programme acceptability(93). Aspects of the model include contents of the programme, target audience, delivery format, the stakeholders to be involved, priority health issues to be addressed as well as plan for monitoring and evaluation of the intervention(93).

Implementation - Despite the demonstrated effectiveness of health interventions, many interventions are not scaled up at the national level. This partly stems from the lack of documentation of the implementation process to provide evidence of best practices that could be emulated for successful scale up. Findings from this review also shows that the collaboration between partner organizations were instrumental in the successful implementation of interventions. These partners play various roles including funding support to ensure programme sustainability. The m4RH for instance engaged many stakeholders in continuous outreach to appropriately link the intervention with existing mhealth programmes in the respective countries to enhance programme acceptability(93).

Another key implementation strategy was an effective assessment of implementing institutions or sites. This enabled implementers of the m4RH programme for instance, to assess which institutions to deliver the implementation and in which situations innovative ideas would be helpful(90,99). Proper evaluation and documentation of these implementation strategies as well as costs associated with these interventions will serve as important roadmaps and provide insight into the cost effectiveness of these interventions and programmes.

Maintenance - Maintenance, constitute a very vital part of programme implementation. After successful implementation, many projects fail to be inculcated into routine practice by governments and stakeholders, leading to waste of resources(70). Safeguarding the sustainability and security of modern media interventions is crucial, especially in limited resource settings like SSA where resource management is of utmost importance(70).

According to the RE-AIM model, a key strategy to ensure project maintenance is to build on existing infrastructure where possible, for programme delivery(67). This might have contributed to the successful implementation and scale up of the m4RH programme. Findings show that the m4RH programme involved existing institutions and ensured that the programme get inculcated into existing mhealth programmes in the respective countries. In Tanzania for instance, the programme was integrated into the national family planning campaign called "Jiamini!" ("be confident") by the Tanzania Capacity and Communication Project (TCCP)(100). This means that after the implementation phase, the resources could be retained and reused as part of the existing programme. Similarly in Kenya, there was a strong government involvement, leading to the setting up of mhealth taskforce to facilitate the sustainability of the intervention even after the funding was exhausted(100).

Programmes with long implementation duration that fades away gradually are more likely to be sustained(67). Compared to the m4youth, for instance, the m4RH had a longer duration of implementation in the respective countries, allowing for prolonged exposure and also for making the appropriate modification to the programme to achieve the desired results. These strategies could be the guiding principles for future digital media interventions in the SSA region.

Strengths and Weaknesses of the review

The UGT and the RE-AIM model were used to guide the thesis writing. UGT was useful in bringing out young people's access to and preferences for using modern media as a source of SRHR information as well as ensuring their SRHR needs that are gratified by using modern media. The RE-AIM model was useful in assessing interventions for evidence and

impact on young peoples' SRHR. The UGT had no clear cut dimensions outlined, and it was difficult to draw a relationship between the various dimensions to examine how they are connected to each other. Another major limitation of the UGT is the inability to detect the actual need which is gratified by the use of modern media, as young people could give different reasons for the use of modern media other than the actual reason behind their use of it(106).

The programme reports and evaluation studies used in this review also had some weaknesses. Some interventions were not extensively reported in accordance with all dimensions of the RE-AIM, thus information was not available for example on adoption and maintenance of some interventions. The use of self-report and qualitative methods of evaluation could also amount to social desirability bias and affect the validity of the study findings. Some methods of evaluation used in some of the studies did not also allow to control for other external factors that could have led to increased knowledge on SRHR other outcomes other than the intervention.

Chapter 5: Conclusion and recommendations

Conclusion

The current population of young people in the world are the largest ever in history - over 1.8 billion between ages 10 to 24 years. As this phase of life is characterised by rapid physical development and changes, young people are curious, vulnerable and explore their sexuality thus engaging in risky behaviours which might have an effect on their health. Socio-cultural, economic and religious factors all play a role in influencing the choices and sexual behaviours of these individual. Access to age-appropriate information as well as services on SRHR is one way to equip young people to know about their SRHR and make responsible choices.

Generally, it was revealed that young people in SSA use modern media to access SRHR information. With the proliferation of modern media in the sub region, young people have increased access to using this medium for various functions and purposes including seeking health information and services. However, access to modern media technology is not the same for all subgroups of young persons. Young people in urban areas have relatively more access to modern media compared to those in rural, older adolescents have more access compared to younger, boys have more access than girls, as well as the disabled and marginalized young people have relatively limited access. In-school and out-of-school youths have unequal access and preference for modern media use for SRHR. Therefore, it is important for intervention planners to consider how their choice of a particular modern media platform could reach out to all subgroups of young people without excluding some.

The review also suggests that preference of modern media as a source of SRHR information was based on the fact that such media ensures privacy and confidentiality, are user-friendly, and can be retrieved at a later time for referencing. Challenges associated with the use of modern media for SRHR purposes by young people include costs and financial constraints, infrastructure challenges such as poor network connectivity and electricity supply, restricted access from parents and guardians, as well as restrictive policies on the usage of phones and mobile devices at school. These factors should be considered during the planning of interventions to make them more accessible to young people.

Findings of this review shows how modern media is being used in SSA to reach and impact on young people's SRHR. With interventions such as m4RH, m4youth, YMK, Learning about Living and the Ma3looma programmes already implemented in various countries in SSA. Results have shown that these interventions could help bridge the knowledge gap and increase young people's access to SRHR information and services. Evaluation studies conducted at the end of some interventions indicated the effectiveness of modern media programmes in increasing knowledge of young people on SRHR. Although some of these findings were statistically non-significant, they suggest generally that modern media approach could provide an opportunity to reach young people with SRHR information and services.

The findings of this review brings out information on the use and preference of modern media for young people's SRHR information and services in SSA. It also provides insights into the challenges associated with the use of modern media in the SSA setting. Evidenced-based evaluations on the implementations and effectiveness have also been reported. These insights will be critical in determining policy directions and guiding current and future strategies aimed at improving access to SRHR information among young people in Ghana.

Recommendations

Based on the findings and discussion of the study, the following recommendations are highlighted for the action of various stakeholders and intervention planners for young peoples' SRHR improvement in Ghana using modern media.

Ministry of Health

1. The MOH should put in place interventions and strategies to improve the use of modern media for SRHR. Planning of these interventions should actively involve parents and guardians as they play a critical role in permitting or restricting young people's access to modern media technology.

2. The Research and Development department of the ministry should explore more on the access and preferences of young people in order to inform the design of interventions that best suits various groups of young people to enhance usability.

Ministry of Education

3. The MOE should reconsider the policies and restrictions on the use of mobile phones by providing other acceptable alternatives such as computer laboratories for young people to access SRHR information whiles in school.

Intervention planners and implementers

4. Intervention planners should make available reports and evaluations on implemented interventions to other key stakeholders in order to improve evidence based knowledge, and to help scale up implementation.
5. Rigorous methodological evaluation assessments should be applied to determine which functionalities are most effective in reaching young people as there are a wide variety of functionalities already in use.
6. Programme developers should pay attention to young people who are likely to be disadvantaged due to disability, socio-cultural and geographic factors.
7. Intervention planners should provide opportunity for young people to give feedback or report on negative influences and attacks over modern media platforms to ensure their safety.

Further research

8. Research should be conducted using appropriate and rigorous methodologies to evaluate modern media interventions for young people's SRHR information and services.
9. These research should also examine the cost implications of the use of modern media and its effect on adaptability and sustainability.

10. Further research should also be conducted on how the use of modern media for young people's SRHR promotion can cater for the needs of marginalised populations such the disabled.

Appendices 1: The map of Ghana with the 16 regions

Source: GHStudents webpage(107).

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