

The changing role of communication technology in reproductive health

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Summary

This thesis focused on identifying the association between ownership of communication technologies and reproductive health attitudes and behaviour, with particular attention to the impact of mobile phone connectivity in recent years. The regional focus of this thesis is Sub-Saharan Africa, as it remains the region with the highest prevalence of maternal mortality, with 33 countries showing more than 300 maternal deaths per 100,000 live births. WHO estimates that 25 percent of all these maternal deaths could be averted if women wishing to avoid pregnancies could access modern contraceptives. Moreover, Estimates of People living with HIV (PLWH) aware of their status is estimated at 65 percent in the region, 25 percent of Sub-Saharan women are estimated to have unmet need for contraception, and maternal healthcare in the region remains inaccessible to a large number of women, especially adolescents.

The strive for a better, more accessible, and equal reproductive health is embedded in UN Sustainable Development Goals (SDGs). Under SDG 3, targets 3.7 and 5.6 aim, by 2030, to ensure universal access to sexual and reproductive healthcare services. With target 3.3, the international community commits to end the AIDS pandemic worldwide. Given the relevance of reproductive healthcare among the SDGs, both national and international actors have been directing their efforts to improve access, information, and education around reproductive health and sexually transmittable diseases (STIs). However, inequality in access remains high, with alarming downward trends in the effectiveness of pro-poor access policies in some countries, while the largest majority of new HIV infections continue to happen in Sub-Saharan Africa.

Fertility and sexual health knowledge have been found to be low among women in the region, and misconceptions about contraceptives and their side-effects are still limiting their use, together with cultural

norms and partners' pressure that force women to adopt them covertly, or not adopt them at all. Similarly, misconceptions and fear of stigma remain the most important barriers to HIV testing in Sub-Saharan Africa.

The aim of this study is to look comprehensively at the role of communication technologies on reproductive health outcomes, acknowledging their role in shaping behaviour and attitudes among the general public. It has been proved that better health communication can increase awareness and foster better access to reproductive health care or prevent the spread of sexually transmissible infections (STIs) Besides caregiver-to-patient and parent-to-child communication, media like TV or radio, or active communication technologies, like mobile phones, have acted as enablers or alternative sources of information, especially for younger people

In particular, this dissertation provides innovative evidence of the causal relationship existing between mobile phones and reproductive health, a topic still understudied in the literature. Essential to this analysis is the understanding of the pathways through which communication technology, especially modern technology, could affect reproductive health attitudes, knowledge, and behaviour. Mobile phones can serve as knowledge platforms for patients and practitioners, while they also enable active communication between people, bridging otherwise distant social networks and fostering discussion around "difficult" topics (such as sexually transmissible diseases and family planning)

The guiding research question of this work has been:

- How and through which channels have communication technologies been influencing reproductive health attitudes, knowledge, and behaviour in Sub-Saharan Africa in recent years?

According to the WHO, sexual and reproductive health has five major components: maternal and newborn health; family planning; prevention of unsafe abortion; management of reproductive tract infections (RTIs) and sexually transmitted infections (STIs), including HIV/AIDS; and promotion of sexual health. Therefore, in order to comprehensively investigate the effects of communication technology on reproductive health, outcomes proxying for its different components need to be considered.

Throughout its chapters, this dissertation has answered to the following sub-questions:

- What are the determinants of access to reproductive health-care among vulnerable groups?
- What are the effects of old versus new communication technologies on reproductive health behaviour?
- What role does mobile phone connectivity play for reproductive health knowledge and HIV testing knowledge and uptake?
- How is mobile phone ownership shaping HIV-related public stigma?

This dissertation exploits recent survey data from the Demographic and Health Surveys as its principal data source. Multi-country analysis is conducted in three of the four analytical chapters, while the last one (i.e. Chapter V) focuses on Ghana alone. Individual-level data from women and men is combined with geolocalised community-level information from an array of different sources, among which are included: cell tower locations from OpenCellid, HIV prevalence from Africa HIV Prevalence Geospatial Estimates, lightning flash rates obtained from NASA's Global Hydrology Resource Center, and several others.

The dissertation is composed of an introductory chapter, four main chapters, and a concluding chapter. The chapters are summarised as follows:

Chapter I introduces the study. It provides the theoretical underpinnings upon which the dissertation is based, clarifies the research questions, and details the content of the other chapters. It starts by providing an overview of reproductive health and HIV in Sub-Saharan Africa. It later explains the status of the literature on the role played by communication technology in shaping reproductive health attitudes and behaviour. While the role of TV and radio in promoting better reproductive health behaviour has been studied extensively in the past, showing their ability to reduce gender stereotyping through the display of empowered female figures and to spread awareness, mobile phones have been receiving attention by researchers only in recent years.

The development of mobile technology in Sub-Saharan Africa in the past two decades has been nothing short of impressive. At the end of 2019, 477 million people in the region (or 45 percent of the population) were subscribed to mobile services. Smartphone penetration is also rising and is estimated to have reached 50 percent of total subscriptions in 2020. Mobile phone access has been described as an engine of economic development, while it also improves learning ability and foster inclusive human development. Researchers have also been studying the impact of mobile phones in public health. Through communication, mobile phones make it for powerful knowledge-sharing tools among and between health-workers and patients. It is, therefore, relevant to understand if mobile phones' ability of creating *bridging* structures between members of a social network and of serving a knowledge platform has had an impact on the way individuals deal with reproductive healthcare. At the same time, the dissertation looks at the evolution of communication technology

association with reproductive health in the past decade in Sub-Saharan Africa.

Chapter II represents a first analysis of reproductive health access in Sub-Saharan Africa for married adolescent women, one of the most vulnerable and yet less studied group. Adolescent mothers typically lack access to skilled antenatal and postnatal care, making them more vulnerable to high-risk pregnancies, unsafe abortions, and maternal mortality and morbidity. Yet, comprehensive evidence on the determinants of maternal healthcare utilization of married adolescents from Sub-Saharan African countries is sparse. In this chapter, multi-country evidence on the determinants of maternal health care utilisation is analysed from 13 countries among those with highest prevalence of adolescent marriage. Maternal health care is proxied by access to full antenatal care, safe delivery, and any form of postnatal check. The selected determinants which relevance is tested are related to women and household socio-economic characteristics, decision-making power, and exposure to media (television, radio, or newspaper).

The study's results show that married adolescents who had a greater likelihood of utilizing full antenatal care, safe delivery, and postnatal care were wealthy, had access to media, and were knowledgeable about HIV-MTCT. Better educated adolescents were also more likely to use antenatal care and safe delivery facilities, while those who had greater autonomy in the making of decisions over the spending of income and visits to kin and friends were more likely to utilize full antenatal care than less autonomous women. Determinants identified through this multi-country study hold the potential to shape maternal healthcare interventions in developing contexts with high child and teenage marriage rates by focusing limited resources in tackling the right issues associated with lower healthcare access. The study also provides the first evidence of this dissertation of the role played by reproductive health knowledge and exposure to communication

technology in fostering better reproductive health and prompts future analysis on this relationship.

Chapter III investigates whether traditional communication technologies (i.e. TV and radio) affect women's reproductive health behaviour differently from mobile phones. Exposure to reproductive health campaigns and, more generally, to mainstream media has been found in the past to be a positive predictor of women health. However, evidence on which type of communication technology is more effective in fostering better reproductive health choices is sparse. This chapter aims at identifying the different effects of ownership of TV or radio and of cell phones on contraceptive use and maternal health access in recent times in 12 Sub-Saharan African countries. Additionally, the study investigates the mediating role of decision-making to identify the empowering role of communication technologies.

A key finding from this study is that, while the role of television and radio appears to have diminished in recent years, mobile phones have become a key tool for empowerment and behavioural change among Sub-Saharan African women. It also finds out that mobile-phone ownership is associated with the empowerment of women to ultimately increase modern contraceptive use, a correlation that is not shared by TV or radio ownership. On the other hand, decision-making power doesn't seem to be a relevant mediating factor of safe delivery or full antenatal care access for any communication technology.

These results can inform policymakers and practitioners when designing effective health communication policies that make adequate use of old and new media conveyers and it helps understand the role played by mobile phones in health in developing countries.

Chapter IV focuses on the causal effects of mobile connectivity on reproductive health. In particular, it investigates the role played by mobile phones in shaping HIV testing knowledge and attitudes.

Estimates of number of People Living with HIV (PLWH) aware of their status in Sub-Saharan Africa range between 45 and 65 percent. Mobile phone-based awareness raising campaigns have been used to increase HIV testing uptake with positive results. However, the potential of mobile connectivity might go beyond participation in targeted campaigns, as some evidence has shown. This chapter makes use of geolocated information on cell-towers to build a dataset of access to mobile network for over 350,000 women in 28 Sub-Saharan African countries.

Results show that mobile connectivity has a statistically significant and positive impact on the knowledge of HIV testing facilities and having been tested for HIV. Results are consistent in all models and at both individual and community level. The study also finds evidence that the impact of mobile phone connectivity on HIV testing knowledge and behaviour might be driven by improved knowledge of HIV, STIs, and contraceptive methods. Moreover, the positive effects of mobile technology are even greater when considering phone ownership as the explanatory variable instead of mobile connectivity.

This study adds to recent literature on the impact of mobile-based HIV prevention, while performing for the first time a large-scale analysis of positive spillovers of mobile connectivity on HIV testing.

Chapter V presents evidence from Ghana, one of the most impressive examples of mobile technology development in Africa, on the positive effects of mobile technology towards reducing prejudice against people living with HIV (PLWH). HIV prevalence levels in Western Africa are generally low compared to other regions, but Ghana acknowledges that stigma against PLWH remains an issue in the country and is working to reduce it through stronger awareness raising. Fighting stigma through mobile-based approaches represents a new and cost-effective tool for governments in developing countries. However, little research has been done on the potential that mobile-enabled social contact and knowledge-sharing has in reducing HIV

prejudice and disclosure concerns in the absence of specifically designed awareness raising campaigns.

This chapter sheds a light on the role played by mobile ownership on HIV public stigma at community level. Based on empirical analysis, the study identifies a positive impact of mobile phone ownership on HIV public stigma prevalence. The identified impact is robust to multiple specifications, while estimates are consistent at both community- and individual-level. While other studies have focused on the effects of mobile-phone based stigma-reducing campaigns, this study is the first on the role of mobile phone ownership on HIV stigma in Ghana. Its findings add to recent literature on the positive effects of mobile phone ownership in reducing other forms of stigma as, for example, prejudice towards people suffering from mental health problems. Results can also help shape the future of Ghana's (and Sub-Saharan Africa's) health communication policies aimed at reducing discrimination against PLWH.

Chapter VI concludes the manuscript by providing a general overlook of main findings and a list of policy recommendations and suggestions for future research. It highlights how this study provides evidence of the evolving role of communication technologies in reproductive health communication in Sub-Saharan Africa. It shows the potential of mobile phone coverage to change reproductive health behaviour in Sub-Saharan Africa, a region where reproductive healthcare has still much to achieve. Throughout, the dissertation demonstrates that mobile phone technology has become a key element in shaping attitudes towards maternal health and contraceptive use, replacing TV and radio as the go-to communication technology. Similarly, it has been positively increasing HIV testing uptake and reducing prejudice towards people living with HIV. The channels through which these changes in attitudes and behaviour happen are increased knowledge and decision-making power, although the dissertation also hypothesizes that mobile phone technology may also be creating open

binding structures within social networks, thereby exposing individuals to marginalised groups.

The development of mobile technology in the past few decades has been impressive. Sub-Saharan African countries, guided by South Africa, Kenya, and Nigeria, have been at the forefront of this expansion. Now mobile phones permeate almost every area of Sub-Saharan Africa, and it is therefore relevant that policies adapt to these changes and capitalise on such an expansion. M-Health, mobile networks, and mobile-based awareness campaigns represent the future of health, and the evidence that has been collected here shows how reproductive health is not exempt from the benefit of the new technologies. Reproductive health communication that is responsive to modern technological advancements can finally bridge the information gap that prevents many men, women, and children from becoming knowledgeable of their condition or taking the necessary steps toward a better reproductive health.