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Mobile for Health (mHealth) in Developing Countries: Application of 4 Ps of Social Marketing

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Abstract. Mobile technology is emerging as the first extensive form of electronic communication which is culturally and socially feasible and appropriate for strengthening health system. As a public health intervention, the world of mobile is just beginning. The essay analyses the role of mobile technology for public health by using 4 Ps of marketing mix-products and services, price, place, and promotion from social marketing perspective and also show how it helps for democratizing public health programs in the developing world.

Keywords. mHealth, Social marketing, 4Ps of marketing mix, Developing countries, Public health

1. Introduction

Like the television in the 1950s and the internet in the 1990s, mobile telephony has emerged as one of the defining communication technologies of our time.⁵ It has been said that the diffusion of mobile telephony has been the fastest for any information and communication technology in human history.²² There are now more than 5.3 billion cell phone users around the globe, and 90 % of the world's population is covered by a commercial wireless signal. Since 2000, the number of mobile phone users across the world has tripled than fixed land line. Only 1.97 billion people use the internet world wide and 1.6 billion have TV sets while 1.2 billion uses personal computers. Interestingly nearly 70 % of mobile subscribers live in low-and middle income developing countries.³

Mobile phones are becoming prolific in society, both in industrialized and non-industrialized countries. Today it is not unusual to find mobile phones even among the rural peasants in Africa, Asia, and Latin America. Evidence from selected studies carried out by the United Nations Conference on Trade and Development (UNCTAD) shows that mobile phones have become the most important mode of telecommunication in developing countries.⁴³ For the vast majority of the low-income populations mobile telephony is the sole tool connecting them to the information society. It has continued to be the only ICT use sector, where developing countries are quickly catching up. The benefits of mobile phones might be proportionally greater in resource-constrained settings, e.g., the poor and rural populations.^{11, 12, 36} This is particularly true of extreme

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poverty that results from isolation.³⁸ Second, these benefits still do pertain, even for those who are not mobile phone owners and only access mobiles through the sharing of mobile phones or mobile phone kiosks.^{1,10} Alan Moore states³¹ that in the future, mobile technologies will play the roles of life enablers, life simplifiers, and life navigators for people. In this world, the language of search, proximity, recommendation, links, discovery, and the currency of information become the essence of new approaches to addressing issues of equity, civic engagement, poverty, health, and harnessing our collective intelligence to improve the public's health and well-being. The rapid expansion of mobile technologies within health service delivery and public health systems has created a range of new opportunities to deliver new forms of interactive health services to patients, clinicians, and caregiver's alike.³⁰ Organizations around the world are beginning to implement mobile technology into their health behavior interventions and are seeing rising success (see for example^{21, 23, 46, 47}).

Throughout the world, there has been a mounting interest within the health sector to take advantage of the overall improvements in telecommunications and the rapid uptake of mobile communication technologies. However, as a public health application, the world of mobile is just beginning in the developing countries, consistent with eHealth trends in general; higher-income countries show more mHealth activity than do lower-income countries.^{5, 38, 45} Now there is more urgency to strengthen the public health issues because countries are working towards achieving the Millennium Development Goals (MDGs). Three MDGs out of eight are related to public health. According to WHO⁴⁸ governments are expressing interest in mHealth as a complementary strategy for strengthening health systems and achieving the health-related MDGs in low and middle income countries.

Mobile communication technology has been emerging as an effective means of bringing healthcare services to developing-country citizens. With low-cost handsets and the penetration of mobile phone networks globally, tens of millions of citizens that never had regular access to a fixed-line telephone or computer now use mobile devices as daily tools for communication and data transfer.⁴⁶ The constantly connected consumer is an advantage for public health professionals. This article reviews the opportunities that mobile technology provides from a social marketing framework.

2. The Social Nature of Mobile

Technological change is not an independent factor that impacts on society from external, but technology and society are mutually constitutive. Despite the protestations from some quarters that mobile technologies are encouraging greater social isolation, the reverse appears to be true. Ling²⁹ has reviewed the literature regarding the effects of mobile communication on social systems and social interactions and concludes that mobile devices may have their strength in maintaining "strong-tie" relationships that are initially formed in face-to-face interactions. Other social media, including instant messaging (IM), mobile or micro blogging (Twitter), social networking sites (Facebook, My Space), e-mail, or landline telephones, favor broader but more superficial relationships. The social nature of mobile, and indeed all new media, also demands from us a new way of thinking about people formerly known as the audience.³⁷ One of the key features of the mobile channel is that it allows for two-way conversation among many. Free dialog among the people is very vital for participatory development and conscientisation.¹⁶ Hence, understanding and participating in these interactive

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conversations are vital to successful marketing efforts, whether they are occurring in the public, private, or nonprofit sector.

3. Why mHealth for Developing Countries?

The causes of rural poverty are complex and multidimensional. Rural poverty accounts for nearly 63 % of poverty worldwide, reaching 90 % in some countries of Asia and Africa. Three of every four poor people in developing countries live in rural areas, i.e., 2.1 billion living on less than \$2 a day and 880 million on less than \$1 a day. More than 800 million people go to bed hungry every day, including 300 million children.¹⁹ Health challenges present arguably the most significant barrier to sustainable global development especially the conditions are worst in the developing world. For example a child born in a developing country is over 33 times more likely to die within the first five years of life than a child born in an industrialised country. Every minute, at least one woman dies from complications related to pregnancy or childbirth. And for every woman who dies in childbirth, approximately 20 more suffer injury, infection, or disease—nearly 10 million each year. An estimated 2.5 million people were newly infected with Human Immunodeficiency Virus (HIV) in 2007. Communicable, and entirely avoidable, diseases such as Tuberculosis (TB) and malaria continue to claim lives due to preventable factors such as lack of access to proper drugs, medical treatment and most important relevant basic information and knowledge at an appropriate time.⁴⁴ According to the World Health Organization (WHO), among 57 countries, mostly in the developing world, there is a critical shortfall in healthcare workers, representing a total deficit of 2.4 million healthcare workers worldwide. WHO Health experts note that within the next 15 years, policymakers and health providers in the developing world will be forced to turn their focus to prevention and early detection rather than late-stage treatment of non-communicable diseases, such as diabetes and cancer, as well as to the health needs of an aging population.⁵⁰ This gap creates an inevitable interventional role for mobile technology for public health.

3.1. Shift from Communicable to Chronic Disease

Over the next 10 years the cost of diabetes, heart disease, and stroke will take a tremendous toll on the national incomes of developing world. According to WHO, diabetes, heart disease, and stroke together will cost about \$555.7 billion in lost national income in China, \$303.2 billion in the Russian Federation; \$336.6 billion in India; and \$49.2 billion in Brazil. Even beyond these countries the cost will be significant. The cost of these diseases for Tanzania in the same period is estimated to be \$2.5 billion.⁴⁹

3.2. Role of mHealth

A full 64% of all mobile phone users can now be found in the developing world. Furthermore, estimates show that by 2012, half of all individuals in remote areas of the world will have mobile phones. This growing ubiquity of mobile phones is a central element in the promise of mobile technologies for health.⁴³

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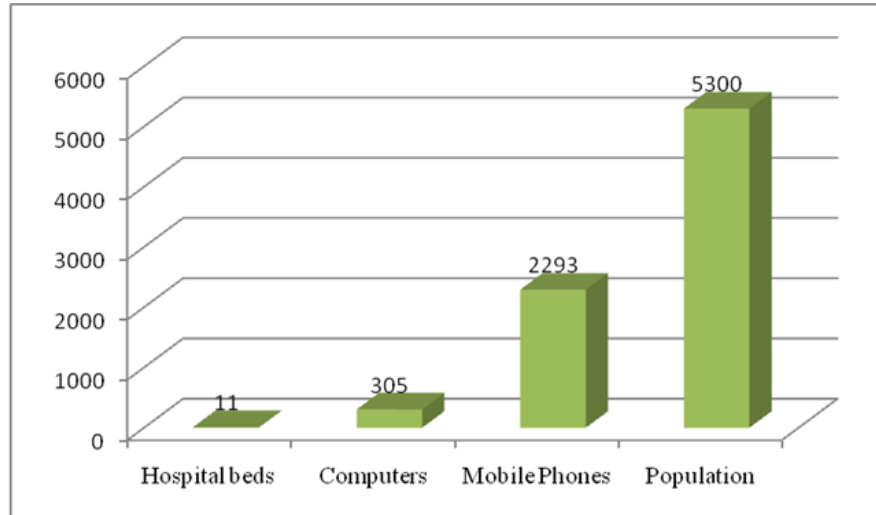


Figure 1. Technology and health-related statistics for developing countries [millions] ⁴⁶

4. mHealth and Social Marketing

Mobile for health (mHealth) broadly encompasses the use of mobile telecommunication and multimedia technologies in health care delivery systems. A definition used at the 2010 mHealth Summit of the Foundation for the National Institutes of Health (FNIH) was “the delivery of healthcare services via mobile communication devices”.^{20,42} Overall, the opportunity offered by mobile technology could tremendously enhance and change the public health sector by using social marketing perspective. An early definition of social marketing described it as using marketing principles to influence the acceptability of social ideas²⁵. Contemporary writers define it as a method to influence the voluntary behavior of target audiences.^{2,13,24} The commonly adopted definition of social marketing is the systematic application of marketing, along with other concepts and techniques, to achieve specific behavioural goals for a social good. Although not a panacea, “health marketing has the potential of reaching the largest possible group of people at the least cost with the most effective, consumer satisfying program,” if practitioners thoroughly understand its concepts and limitations and have mastered its skills.²⁷ This section provides illustrations of how mobile applications are being used to address each of the 4 Ps of the marketing mix-products and services, price, place, and promotion to enhance and influence behaviour change in the public health initiatives in the developing world as a guide.

4.1. Products and Services

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Contemporary public-health interventions have often given primary emphasis to the role of individuals and their behaviors.^{25,27,47} Mobiles have a lot of potential to enhance current intervention and prevention services. Phones are useful in behavior change campaigns, and are frequently utilized in conjunction with websites and social networking programs to monitor behavior and provide feedback for individuals. Mobile phones are rapidly becoming adjuncts or features of behavior change products and services. The empirical evidences from all over the developing world show greater success.^{32, 36, 38}

Case-1- “SIMpill Solution for TB”

Reminders to take daily medication are an effective means to ensure drug regime adherence, which is critical for diseases like TB, where 99% of those infected can be cured with proper medication compliance. The SIMpill solution is designed to help ensure compliance. SIMpill works by equipping a pill bottle with a Subscriber Identity Module (SIM) card and transmitter. When the pill bottle is opened, a Short Message Service (SMS) message is sent to a designated healthcare worker. If the pill bottle is not opened when expected, the patient gets a text message reminder to take the medication. If the patient then fails to comply, the health worker is prompted to call or visit to encourage the taking of medication. A 2007 pilot in South Africa to test the system's efficacy yielded impressive results. The pilot showed that with SIMpill, 90% of patients complied with their medication regime, compared to the typical 22 % to 60% compliance rate without the system. The solution is now available worldwide.³³ In their study of access to and perceptions of mobile phone use to promote adherence to HIV medication and safe sexual behavior in Peru, Curioso and Kurth⁹ found that cell phones are effective tools for supporting medication adherence and HIV transmission risk reduction in people living with HIV. The most successful mHealth initiatives to date have been built on one of the less technically complex and widely used applications, SMS, which has been the prime communication medium for service delivery of health behavior change interventions.^{7,15,17}

4.2. Price

Economists and marketers view price not just as costs, but as incentive opportunities as well.^{14,18} One of the commercial benefits of cell phones has been the development of a marketplace for downloading ringtones, wallpapers, videos, music, and in some areas of the world, mobile banking. The financial piece of the price variable for social marketers has yet to be explored to our knowledge, yet other psychological prices have been explicitly addressed. Especially in the area of sexual behavior and sexually transmitted diseases, where confidentiality and stigma can keep many people away from information and service providers, mobile phone applications are quite prevalent.²⁶

Case-2 “Freedom HIV/AIDS Project”

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Communicating information in an engaging, fun way is a critical ingredient of success in mHealth programs. The Freedom HIV/AIDS games—launched in India in December 2005—have effectively enhanced HIV/AIDS awareness by applying this principle. The games are tailored to target users from different social and demographic groups and run on more than 100 types of mobile phones, from the most basic to the most sophisticated. ZMQ Software Systems, the maker of the games, believes the “Play-and-Learn method [the games employ]...makes learning not only exciting and engaging but helps in the enhancement and retention of knowledge.” This belief has been confirmed by the games’ popularity: by March 2006, only four months after the launch date, more than ten million games had been downloaded, many by mobile phone subscribers in small cities and towns, the most vulnerable populations.⁵¹ The project provides an insight that mobile mediated social marketing initiatives are feasible and culturally appropriate ways to provide sexual information and education to the target group.^{26, 37}

4.3. Place

One asset of mobile phones is the ability to “place-shift” multiple tasks, meaning that live, recorded, or stored media can be listened to on the device through the internet or an alternative data network. Additionally, Global Positioning System (GPS) can now be installed in phones, allowing for the creation of locator applications. As well as now, with 3G, there are possibilities of remote treatment and diagnosis of patients through mobile phones. In one of the earliest applications of the latter, a mobile phone service in South Africa began in 2007 to provide HIV testing station locations through the use of SMS. By sending an SMS with the term *HIV* followed by the name of their town or postal code, South Africans can receive the location of the two nearest traveling HIV testing units.³⁵ Likewise a Mumbai-based medical equipment company Maestros Mediline Systems rolled out an Electrocardiography (ECG) application along with Vodafone for BlackBerry Handsets. Mumbai’s Nanavati Hospital has already adopted the system whereby doctors will be able to remotely access patients ECG and heart performance reports.³² Mobiles, and their corresponding infrastructure, also provide the platform for a new level of connectedness both between individuals and between individuals and institutions. This connectedness, and the information-sharing that it entails, provides for a range of functioning’s that simply were not possible before, or that were possible, but with high to very high transaction costs.²⁰

4.4. Promotion

Connectivity and promotional opportunities are the two basic features of mobile phone. Perhaps the most obvious strengths of the mobile health revolution are that the devices allow for consistent back-and-forth and one-to-one communication it will also allow to access internet by many people from their phone. Also, health information can be provided on demand to individuals whenever they desire access. The Mayo Clinic In Touch Program (<http://www.mayoclinic.com/health/intouch/AM00070>) provides a Symptom Checker for subscribers to quickly assess their severity, a First-Aid Guide with detailed tips on treating and responding to medical emergencies, an Emergency Room Finder to locate nearby urgent care medical facilities, Health Alerts, Healthy

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Living Tips, and the ability to watch medical news videos. Similarly a Delhi based mDhil Health Info Services, sends daily healthcare advice and information on diseases from polio to HIV to users via cellphone since 2009. mDhil's reach is growing exponentially in last September, 2010 the service counted more than 2, 50,000 paid users.⁴¹ In other exemplary work, the BBC World Service Trust ⁴ has used an integrated communication campaign featuring ring tones to promote the use of condoms in India. However, promotions (communications) need to work with the other 3Ps in an integrated way across individual, organization and policy levels to increase the likelihood that a high percentage of people in our priority audience engage in healthier and socially beneficial behaviors.²⁸

5. Way Forward

The above examples of mobile phone for public health offer health professionals and organizations a unique opportunity to enhance and expand relationships with their stakeholders (whether they are called patients, audiences, users or clients). mHealth is the youngest in the various m-services now available. They are more than a communication device—they can become marketing tools that address all elements of the marketing mix when strategically considered in the context of how people use them. Cell phones are an always-on, two-way communication channel, a signal or cue for action, a resource of instant access to health information, a tool for social support and the development of social capital, a production tool, a way to engage audiences, and a data collection and feedback device.²⁶ It is projected that by the year 2014 public and private healthcare providers could save between \$1.96 billion to \$5.83 billion in healthcare costs worldwide by utilizing mHealth technologies for health monitoring. Furthermore mHealth technology market is also expected to grow 25% annually, from current \$1.5 billion to \$4.6 billion by 2014.⁸

This paper has shown, mHealth projects are operating in a wide variety of developing countries and providing demonstrable impacts but still its reach is limited. The mHealth field offers opportunities for players across multiple sectors, from governments to businesses to NGOs. By taking a strategic approach, each of these players can advance their organizational objectives while contributing to improved health outcomes on a massive scale. **(a)Operators-** combine mHealth with delivery of other mServices; leverage handset manufacturer relationships; be pro-active in developing joint solutions; enhance mHealth infrastructure. **(b)Funders-** funders can set aside funds to enable independent researchers to conduct rigorous evaluations of mHealth programs; ensure project sustainability. Partner with national governments once the initial pilot phase has been completed. By ensuring that mHealth projects are integrated into government health programs, funders gain long-term sustainability and greater health impacts for their projects. **(c)Policymakers-** provide incentives and tax rebates to telecom providers for provision of mHealth services; Public-Private partnership and collaboration with the line departments like Information Technology (IT) and Health Ministries is also vital; a free mobile phone pilot initiative for poor and most targeted people for mHealth could be an innovative and relevant idea for developing countries. This has been initiated a decade ago in US under welfare program with 68 minutes of talk time each month! Nearly 1.4 million Americans benefit from the program.^{34, 40}

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Thus, health is considered as a universal human aspiration and a basic human right. The development of society, rich or poor, can be measured by the quality of its population's health, how fairly health is distributed across the social spectrum, and the degree of protection provided from disadvantage due to ill-health. In this context the paper show vital potential of mHealth for strengthening public health programs in the developing world if it is applied with more professional and systematic manner (as discussed above) will be helpful for democratizing public health in a true sense!

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