

Information and Communications Technology in Sexual and reproductive health care for Adolescents

A Bolivian Case Study

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Abstract— In Bolivia, health care service is not widely used, particularly preventive and primary health care. Health service is often expensive and in some cases, becomes a source of inequality. A big part of the health problems during adolescence is related to sexual and reproductive health. This research focuses on the use of Information and Communication Technologies (ICT) in the improvement of health care, particularly the use of text messages (SMS, short message service) intended to serve as motivation for behavioral change and improvement of sexual health behavior as part of preventive health. To present our analysis, we will start by a detailed description of the methodology used, followed by the results obtained from the received messages and finally we will show the conclusions up to date. Some characteristics of SMS prove positive for adolescents, like the fact that they are informative, convenient in cost, time and accessible to everybody. In contrast, they also pose some peril, like information gaps that can be used just with commercialization intentions and not to address real needs. The convenience of cost and time was an important consideration during the design of the research since it would be simple to introduce it as a standard policy for the government to improve sexual and reproductive health. The originality of this research is that it is the first research in Bolivia that presents an intervention in proactive messaging as well as providing text-based counseling service, and this research also analyses of the use of SMS in preventive health care with adolescents which intends to reduce the gap for primary and preventive health care services important particularly for the poor.

Keywords-component; ICT in sexual health, sexual and reproductive health; adolescents; SMS; Bolivia

I. BACKGROUND

People in poor countries tend to have less access to health services than those in better-off countries [9]. In Bolivia health care service is not widely used by the population, particularly preventive and primary healthcare [1]. In general, people go to a doctor when they are very sick which in most cases requires a specialist, longer time to cure and more money [1, 2]. Besides,

health care is a source of inequality and in this light [6] the poor suffer more from this disparity because health is expensive. In the private sector, health is *money-costly*, one simple consultation costs around 15% of a minimum salary¹ and if a person wants to go to the public sector where tariffs vary from 0-3% of the minimum salary, this also comprises an average waiting time for being attended of 6 hours², so it is *time-costly*. The implication of this is enormous since this long waiting period means a day without work in a country where most of the people depend on the daily amount of work they put in, to have something to eat on that day.

A big part of the health problems in the adolescence are related to sexual and reproductive health, mainly unwanted pregnancies and HIV/STI infections that demand a multidisciplinary and comprehensive approach [4]. In response to this, the study called “Community-embedded reproductive health care for adolescents (CERCA)” (www.proyectocerca.org) bases its study on the hypothesis that a comprehensive strategy of community embedded interventions will improve the Sexual and Reproductive Health (SRH) and wellbeing of adolescents in target areas³. Project CERCA aims to improve sexual and reproductive health care for adolescents through improved health behaviors such as: search for correct information, communication skills about sexuality, safe sexual relationships and access to health care centers [4]. South Group, which was responsible for coordinating the project in Bolivia wanted to apply ICT in SRH within the adolescents since one of the objectives of the CERCA project was to improve access to information and

¹Informal sector is one of the most important sectors of the Bolivian economy. It employs more people than any other. Although informality reduced in relative terms (in 1996 was 63% and 2006 was 58%), reality shows that it has increased from 1.2 to 1.5 million people and it pays most of the time less than the minimum salary (UDAPE, 2007) [15].

² The patient has to wait around 3 hours for being able to receive a ticket to be attended and around 3 hours to get in the consultation.

³ CERCA Project implemented its research study in Cochabamba, Bolivia; Cuenca, Ecuador; and Managua, Nicaragua

communication skills. Therefore, one of the means of intervention is put to use in Bolivia the sending and receiving text messages through cell phones. Nowadays, a teenager from any income layer has a cell phone; for instance, in Bolivia around 90% of the population has a cell phone as of 2012⁴. The objective of this research is to present the characteristics of text messages and how these may affect in the motivation for behavioral change of the adolescents [3, 5, 10, and 13] as part of preventive health care. This strategy has two forms of SMS. One is to send out information about SRH in a proactive SMS messaging, and the second is to receive and to answer questions about sexual health as text-based counseling service. Both ways intend to reduce the gap in health care service due to money or time costs.

Many research papers have been written on the utility of SMS and the intensive use of this kind of communication by adolescents [3, 5, 7, 8,10,11,12,13 and 14]. Information and Communication Technologies have become part of the life of many people, predominantly teenagers. At the same time lots of information has widely become available through ICT. In Bolivia, SMS are only used to disseminate publicity, mostly from telephone companies. We evidence that in the topic of sexual health care, adolescents in Bolivia do not yet have what is needed for an improvement and change on their health behavior to reduce the high rates of early pregnancies, abortion rates and an increasing rate of HIV/AIDS.

SMS appears to be a good strategy to reduce the gap in access to health care services in preventive and primary health. This research describes the development of one of the intervention strategies that is being applied in Cochabamba (Bolivia) as part of the CERCA Project. To present our analysis, we will start by providing a detailed description of the methodology used, followed by the results of the received messages and finally we will show the conclusions as of today. This type of research is different since it is the first research done in Bolivia that presents and analyses the use of SMS in preventive health care and with adolescents.

Participants found the topic of sexual health important since they had many questions that nobody could answer correctly or even questions that they themselves would not dare to ask face to face or in public. Thus, they found the idea of SMS useful for teens because of different advantages such as information, convenience in cost and time and accessibility.

II. METHODS

A. Study Design

The research methodology of CERCA Project is based on: action research, community based participatory research and intervention-mapping. The intervention design is based on the "Theory of Planned Behavior" and the "Social Cognitive

⁴ ENTEL, TIGO y VIVA, the telephone companies in Bolivia inform that by 2012, there are 9,252.630 cell phone active lines over a population that is 10 million.

Theory". We developed a specific controlled impact study (addressed to different target groups, i.e., adolescents, parents, health providers and local authorities) so that later we can try to have measurable behavior outcomes.

As a part of interventions in high schools, every time we had an information workshop with adolescents we invited them to register their name, school name, cell phone number and email so that we can send them information on sexual health through email or SMS. We also encouraged them to send their questions about sexual health to our cell phone assuring them that a medical doctor or a psychologist would answer their question confidential. To assure confidentiality, the CERCA team asked the adolescents to not sign the SMS question, in order to facilitate anonymity.

Before numerous SMS started to be sent to the entire target group, we first analyzed the survey we took from the control and pilot group⁵. This survey was based on different aspects of sexuality, that is to say, gender, communication, socio-economic aspects, religion and sexual activity. We took into account the adolescent's needs in relation to different aspects of the survey and information we obtained from the four focus groups held during the same period. These two sources of information were taken into account when defining the outgoing SMS. During one and a half years, seven messages were sent (Table I) and this formed the first part of the SMS intervention. The objective of this package of SMS was to motivate change in health behavior in different aspects detailed at the beginning of the study design.

During the same period, we expected to receive SMS messages with different types of questions from the adolescents. To be able to answer the question with a professional approach, a two member support-team was created with a psychologist and pediatrician, both engaged with the CERCA Project and the topics of the workshops at pilot schools. Answers were sent after a reached consensus with the CERCA team, normally within 30 minutes. The objective of this strategy was multiple: 1) to present the characteristics of multiple text messages to motivate behavioral change in the adolescents as part of preventive health; 2) to open an opportunity for adolescents to send their most private questions and to have them answered with the correct information; 3) to establish a window to the adolescent, since SMS constitutes a part of their way of communicating; 4) to establish a way to reduce the gap in health care service due to costs for primary and preventive health care⁶.

⁵ A survey of 63 questions was taken in the 12 pilot schools (in the area of Quintanilla and Sarcobamba; both cities of Cochabamba, Bolivia) and in the 12 control schools (located in different areas of Cochabamba and with similarities to the pilot schools). This survey was taken to 3829 students from 14-18 years old.

⁶ Contraception as well as other medicaments is found in health centers. Unfortunately, public health centers do not have those most of the time, or they only offer condoms but not the other modern methods for adolescents. Pharmacies

TABLE I. TEXT IMAGES BROADCAST. TIME PERIOD: OCTOBER 2011 – FEBRUARY 2013

Text messages broadcast Time period: October 2011 until February 2013	
1	CERCA: Condoms prevents pregnancies and infections. Use them! THERE IS NO EXCUSE 77972345 www.bolivia.cerca.org
2	CERCA: Only you can decide when to have sex. Protect yourself, nobody can rush you, don't be afraid and talk to your partner. www.bolivia.cerca.org
3	CERCA: Medical consultation is confidential and they don't tick you off. Go ahead and check your doubts www.bolivia.cerca.org 77972345
4	CERCA: 3 out of 10 teenagers have been or are pregnant. Don't let it happen to you, use a condom. www.bolivia.cerca.org
5	CERCA: Pleasure lasts one night. HIV/AIDS is for life www.bolivia.cerca.org
6	CERCA: Safe sex is an attitude respecting yourself and your life. Are you in risky situations? blog.cerca.org and www.bolivia.cerca.org
7	CERCA: Are you worried about pregnancy? Also worry about HIV! blog.cerca.org

Each SMS was sent bi-monthly through a SMS system created specifically for this intervention to the whole pilot group that is comprised of 1146 adolescents. It is important to clear up that table I contains complete messages translated verbatim from Spanish. In the real Spanish SMS, we used the SMS language; this means the language with abbreviated words that can fit within 125 characters in order to reach all types of cell phones, the old and the new ones.

B. Data analysis

The SMS with questions from the adolescents were reviewed and coded by the principal investigator and research assistant. From this revision a list of themes that emerged from the data were developed. Quotations most representative of each theme were collaboratively chosen by the CERCA team in Bolivia.

There is no register of gender, age or other personal information as the study intended to keep privacy for participants.

III. RESULTS

After sending each multiple SMS, we received many responses back. Some of the SMS included messages of gratitude and others posed more detailed questions or comments. The CERCA team could confirm that a lot of the

have condoms and other contraceptive methods but cannot administer them without a doctor.

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questions received from the adolescents were done after a multiple SMS was directed to them or after a workshop in their school. Both interventions apparently made them reflect more on their life and moved them to question their attitude and actions. The main themes emerging from the SMS questions are presented in Table II.

3.1 PARTICIPANTS

Among the 1620 students invited to register their cell phone, 1146 numbers were collected (70.74%). These adolescents were interested in being contacted with the multiple SMS messages about sexuality. During the course of the project, more numbers were collected during workshops and added to the system. Conversely, we also removed numbers upon request or when we noticed they ceased to exist.

Within the period of one year and a half, we received in total 507 SMS questions which are approximately 44% of our total cell phone collected numbers. From this 507 SMS questions, we observed that 47% were adolescents who sent only one SMS and 53% were from persons who previously sent another question. Repeated consultations show the level of trust and habit that adolescents gain within time towards SMS system. And this also could mean the success of this strategy within the persons that got the habit to ask their questions through this system. This system bridges the gaps in health care delivery systems for preventive and primary health.

TABLE II. CLASSIFICATION OF SMS THEMES

Theme 1. Sexual Relations	Frequency in Percentage
1. Intercourse: without protection, with probability of pregnancy, use of emergency pill and its effects, question on pregnancy tests and pregnancy symptoms	24.5%
2. First intercourse	5.1%
3. Contraceptive methods, coitus interruptus	5.9%
4. Questions about sexual relations: physical inconvenience, STI	1.7%
5. Abortion	7.2%
Theme 2. Relationships	
6. Problems in the relationships with the partner (s): relations with adults,	16.0%
7. Sexual harassment by someone known	0.8%
Theme 3. Information about sex and sexuality	
8. Doubts on the body changes: size of the penis, amenorrhea, pains, time duration	2.5%
9. Doubts on the use of condoms and contraceptives	19.8%
10. Health centers (costs, schedules)	5.5%
11. Information on STI	3.0%
12. Masturbation	15.2%
13. Concepts	8.9%
Theme 4. Search for Help	
14. Search for Advice: information on health centers, psychologist aid, improve relations with parents, self-esteem	16.9%
15. Pregnant women search for assistance and help	2.5%

If we analyze table II, we can see that 45.2% of the questions received are related to themes of sexual relations/intercourse, doubts on the use of contraceptives and search for advice on health centers or communication with parents/partners (1, 9 and 14). Another 23% is related to problems in relationships and questions on masturbation (6 and 12). This list confirms that current campaigns of health centers

and other organizations have been effective with promoting contraceptives, since the percentages show that adolescents have more questions about more complex issues than about contraceptive use. The interest in many other issues shows the need to have a medical and psychological approach and maybe further assistance in health centers as we can observe in table III. Table III contains some phrases that adolescents wrote to the cell phone project inquiring or seeking for an adviser.

TABLE III. ADOLESCENT PHRASES WRITTEN IN SMS TO CERCA PROJECT

Theme 1. Sexual Relations
1. I'd like to know something, I had sex without a condom but I pulled out before ejaculating, is there any possibility that she might be pregnant?
2. Dear Cerca friends I'd like to ask a question, well I wanna have sex with my boyfriend, what type of protection should I use?
3. Until what month abortion is legal?
Theme 2. Relationships
4. My boyfriend asked me to prove my love and I don't know what to do
5. Do you think that forgiving a guy who's been with you for 4 years but cheated on you is a show of love? He swears he changed, what do you think?
6. Hi I have a question, when you're harassed what do I have to do if the person is very close to my family and I don't want to tell them
7. Well I had sex and after I noticed some bumps on my penis and I don't know which health center to go to
8. Hi good afternoon, I wanna ask a question and I want some advice, what can I do for a guy to stop pressuring me to lose my virginity if he is not my boyfriend?
Theme 3. Information about sex and sexuality
9. I have a question, when a person is 17 years old and has sexual intercourse does his penis grow with time or does it stay the same???
10. Quick question, what are the symptoms of hepatitis B and C
11. Where can I go to get tested for STDs and do I have to pay??
12. Hi my name is Bryan, I have a question when boys masturbate is it cause they haven't had sex, is that bad?
Theme 4. Search for Help
13. Do you guys help teens who are pregnant?
14. When you are 2 months pregnant and don't know what to do??
15. What to do to trust my parents and have them trust in me??

3.2 KEY QUALITIES OF TEXT MESSAGES

SMS messages are very simple to use and are widely accepted by teenagers. During workshops, the CERCA Project team asked the adolescents if they received the SMS that was sent by CERCA and what they thought of it. Adolescents liked the idea of receiving information about sexual health on their phones and they also liked having a direct channel available to send their questions. What is more, adolescents were open the idea of sending their questions through the phone and in this way keeping their identity and questions.

Participants found the topic of sexuality very important since they had many questions that nobody could answer correctly or even questions that they themselves would not dare to ask face to face or in public. Thus, they found the idea of SMS useful for teens because of different advantages such as information, convenience in cost and time and accessibility.

A. Informative

An SMS message is viewed as informative by the adolescents. Teens mentioned that continuously receiving SMS raised awareness about sexual health and increased preventive health care between them. They were learning much more about sexual health and related topics from the SMS which in turn motivated them to seek out assistance in health centers or with professionals. In the survey that was taken before the interventions started (t0), we discovered that only 4 out of 10 knew where the health center near his living area was; only 22% of the adolescents visited a health center for issues related with sexual health the previous year. Adolescents also mentioned that since sex and sexual health are a taboo in Bolivia, they would rather ask their friends about their doubts than go to a health center.

SMS constitute a window to the adolescent world and to the way in which they express and communicate their problems. This is a simple way to contact the regular individual that is healthy and is barely in contact with a health service. It is also a way to make the patient undermine their shame of speaking on sensitive or taboo topics [1].

B. Convenience in cost and time

The CERCA team intervention could confirm that sending SMS is convenient (cost), simple (multiple SMS) and cheap. SMS can be send simultaneously to many persons, in a short period of time, these messages can be tracked and remain confidential. Sending SMS is cheaper than other intervention strategies and has a direct impact on the adolescent due to the fact that texting is part of the life of an everyday teenager. It is also well known that almost all adolescents in all income groups have a cell phone. This goes in contrast to a fixed line, an internet connection, an active email address or even school attendance. Moreover, it is convenient in time because it is available 24/7. Although CERCA team worked only during working hours, -from Monday to Friday, adolescents would text at all hours with their questions and concerns. This channel of communication maintains privacy and yet it is possible to

send multiple SMS for general information and tips to improve health behavior. Therefore, SMS have proven to be viable as a means of preventive health care at a reduced cost.

Participants also mentioned that sending a SMS with a question is cheap, fast and they can do it from anywhere they are. Besides, the teenager has a certain freedom to ask his questions in "his own terms and language", helping to "break the silence" of an adolescent that normally prefers to keep things to himself. Thus, SMS are effective for teenagers that have questions to eliminate the distance barrier and consultation cost for small consultations. Besides, they are not willing to discuss with a health professional in a clinical setting due to costs concerns.

The convenience of cost and time was an important consideration during the design of the research since it would be simple to introduce it as a standard policy for the government to improve sexual and reproductive health.

C. Access to reliable information

Adolescents indicate that they trust more the opinion and answer of a professional regarding their question than something they can find on internet or an answer that a friend can tell. However, the taboo problem, the long waiting before getting into consultation and the fact that it can cost a lot makes them feel uncomfortable to search for a professional. Consequently, teens have to search for other sources of information. Sending their question through SMS eliminates the barrier of shame and taboo, the cost barrier, the waiting time, and creates a trust relation. Teenagers think that SMS is a great tool to get reliable information for preventing early pregnancies, information on ITS/HIV/AIDS, and other topics that were listed on Table II. SMS eliminates the gap between the patient and health centers concerning time or money, and shame to question some sensitive topics. Therefore, we can think that SMS can make preventive health more fair.

Despite the fact that outgoing and incoming SMS are rather anonymous it was shown that the adolescents remember the messages and also appreciate the fact that they could ask questions about anything, any time. It was observed that the two way system created a trust relation which is needed to have confidence and act according to the recommendation. Although it is too soon to confirm, it is expected that this trust relation will have an impact on the behavior, particularly the adolescents who were involved in an interactive SMS dialog.

3.3 CHALLENGES

D. Information gaps

A big disadvantage of SMS perceived in this intervention is the restriction of 125 characters. "125 characters" is the space available to send a SMS and this space includes letters and spaces between letters. It is true that new types of cell phones do not have this restriction anymore but still a lot of people and adolescents have the more outdated type of cell

phones that have this restriction⁷. When developing the study design, the CERCA team could not imagine how difficult it would prove to fit an answer or a tip within 125 characters. Worse, we did not foresee receiving a question from an adolescent by SMS would be so difficult to understand with this restriction of characters. This is mainly due to the fact that professionals require more information to be included in the question in order to visualize the context that the adolescent is living in before preparing a reply. This problem was solved by asking more questions via SMS until we had a clear idea on the question. In cases in which the adolescent would not reply to our question anymore, we called them directly.

We believe that more studies should be made on this restriction of space and how it impacts on adolescents and medical practitioners that put short messages in use for health care reasons. Do both entities understand in full the real inquiry and real advice/answer? Or is this restriction creating more doubts or miscommunications? Is this generating some negative externalities?

E. SMS does not equal medical/psychological consultation

SMS messages do not allow medical or psychological consultation. Another problem that we discovered during this intervention is that adolescents send SMS that require the assistance of a specialist. The way that we solved this is by suggesting in the reply that the problem should be referred to a medical or psychologist professional. Accordingly, we mostly call the cell phone number and explain that it is important that the doctor makes a revision/diagnosis face to face. We also try to make the adolescent understand that there are some problems that need a longer treatment and that the project cannot solve/treat an illness/pain/suffering by sending a short SMS. Consequently, SMS helped to raise awareness and showed the importance of visiting health centers and professionals.

We also could evidence that a lot of adolescents are influenced by the media (TV, internet, other SMS) on the solution of problems by simple phrases or advices [7] as for instance "type 4040 and receive messages for teens", "type 4060 and receive advises on how to find the love of your life". This has a wide impact in people that think they can solve their problems through these SMS; accordingly, this problem merits further studies on how to solve it.

F. Commercialization Vs Real needs

Another problem that we foresee is the set-up of this SMS strategy by other organizations. Since adolescents are avid users of cell phones and text messages, not only public medical institutions will be interested in applying this technique but also private ones. The disadvantage is that the aim can be oriented by commercialization/profit rather than real needs of information and prevention.

⁷ Parents prefer to buy old types of cell phones to the adolescents because they are cheap (in the case of future loss) and less risky to be stolen.

IV. CONCLUSIONS

SMS offer researchers, health promoters and health centers in general a great opportunity to broaden the number of adolescents in health care and improvement of health behaviors for low costs and reduced amount of time spent in intervention. This strategy is an innovative approach to bring preventive health care within reach of adolescents or other patients that are not assisting health centers for several problems like taboo, costs or waiting time. For the first time in Bolivia, the CERCA Research Project has engaged in an intervention strategy that includes Information and Communication Technologies in the area of health and with adolescents with an interactive design of the SMS technology. This research paper is the first one of its kind to examine the characteristics of text messages, the positive aspects and the challenges. It is also the first to analyze the response of teens to SMS about sexual health and preventive health care promoting behavioral change. The use of SMS for health promotion and behavioral change has to be inserted in the agenda of future intervention strategies and studies.

So far it can be confirmed that even with a rather small pilot group, where people were unknown to the system of asking questions about sexual and reproductive health by SMS, the system was a success with over 500 SMS questions.

Also, the variety and the sensitiveness of the question's topics show that there are many questions that need answers from a trusted channel involving professionals.

V. DISCUSSION

The objective of this type of intervention is to motivate a positive behavioral change in health care, particularly sexual health as part of preventive and primary health care. The strategy of a proactive messaging as well as providing text-based counseling service is based on the idea to answer those questions that adolescents would not dare to ask face to face but are concerns to them. CERCA team wanted to provide this service in an affordable way in terms of cost and time.

The results of this research show that this is a very effective way to reach adolescents in topics of prevention and promotion of health. Besides, SMS is a way to lure adolescents to health centers. Moreover, this research shows that SMS is an effective way for health professionals of health centers to reduce the gap for primary and preventive health care services important particularly for the poor.

COMPETING INTEREST

The authors declare that they have no competing interests.

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