HIP | FAMILY PLANNING HIGH IMPACT PRACTICES

Digital Health for Social and Behavior Change:
New technologies, new ways to reach people

Digital Health for SBC

What is the promising high impact practice in family planning for social and behavior change?

Use digital technologies to support, maintain, and adopt healthy sexual and reproductive behaviors.

Background

Using digital technologies—such as mobile phones, computers, or tablets—to convey information and messages as part of an evidence-based multichannel social and behavior change (SBC) strategy may contribute to promoting, adopting, and maintaining healthy sexual and reproductive behavior. This brief summarizes the current state of evidence in this rapidly changing field. (A companion brief reviews digital applications aimed at supporting providers and health systems.)

In Jakarta, Indonesia, a mother of one who wants to delay her next pregnancy navigates a new mobile health application for family planning.
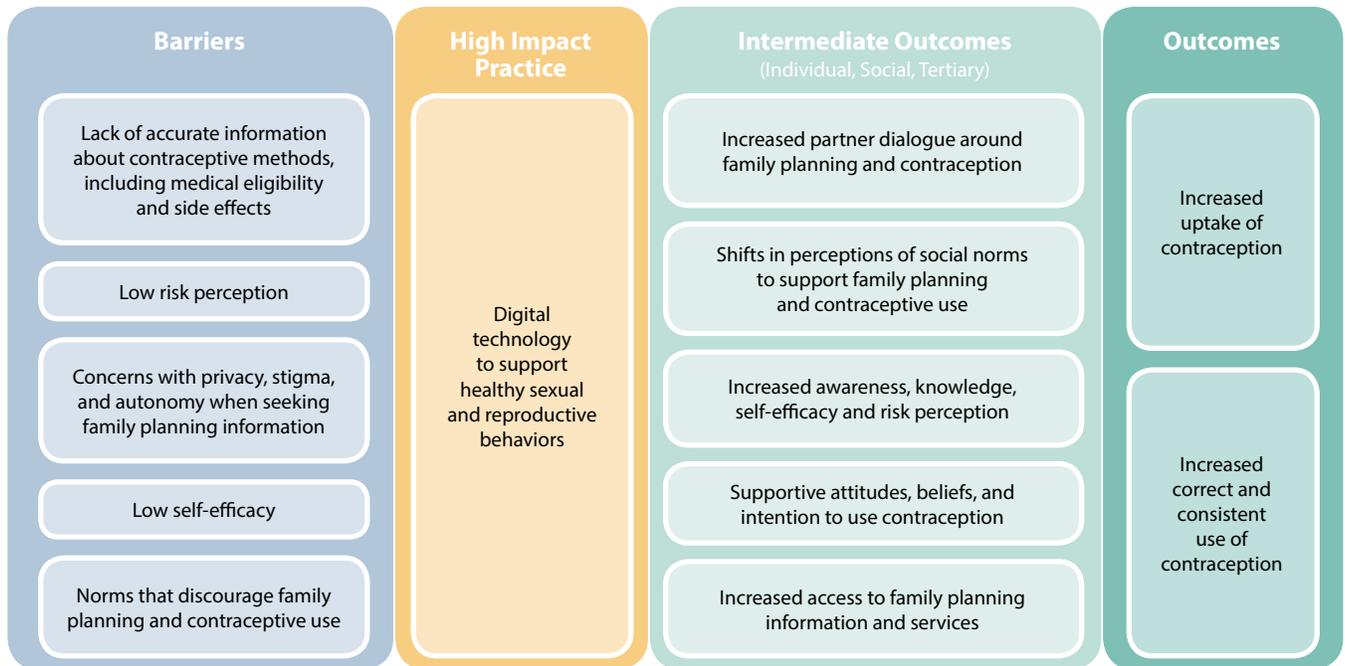© 2016 Radha Rajan, Courtesy of Photoshare

People in developed and developing countries are spending more time on digital devices.[1-5] Smartphone ownership and Internet use are increasing rapidly among adults in most emerging and developing economies, where nearly half the adult population reports owning a smartphone or using the Internet at least occasionally.[6] Digital technologies have the potential to provide accurate information to individuals when and where they need it. Making information available through digital applications may also reduce the time and cost related to seeking or receiving information through more traditional sources, such as print or interpersonal communication.[7,8]

Use of digital technologies to support healthy sexual and reproductive behaviors is one of several **promising** "high impact practices in family planning" (HIPs) identified by a technical advisory group of international experts. A promising practice has limited evidence, with more information needed to fully document implementation experience and impact. The advisory group recommends that these interventions be promoted widely, provided they are implemented within the context of research and are carefully evaluated in terms of both impact and process.[9] For more information about HIPs, see www.fphighimpactpractices.org/overview.

Which challenges can digital applications for users address?

As of this publication, 11 studies aimed at using digital technology to improve sexual and reproductive health outcomes were identified. Five of the studies evaluated the impact of digital technology on behavior change (contraceptive uptake) and the

Social and Behavior Change   **Promising Practice**

Figure 1. Theory of Change

Barriers	High Impact Practice	Intermediate Outcomes (Individual, Social, Tertiary)	Outcomes
Lack of accurate information about contraceptive methods, including medical eligibility and side effects	Digital technology to support healthy sexual and reproductive behaviors	Increased partner dialogue around family planning and contraception	Increased uptake of contraception
Low risk perception		Shifts in perceptions of social norms to support family planning and contraceptive use	
Concerns with privacy, stigma, and autonomy when seeking family planning information		Increased awareness, knowledge, self-efficacy and risk perception	Increased correct and consistent use of contraception
Low self-efficacy		Supportive attitudes, beliefs, and intention to use contraception	
Norms that discourage family planning and contraceptive use		Increased access to family planning information and services	

other six focused on intermediate outcomes, such as knowledge and self-efficacy (see Figure 1). It should be noted that the evidence varied in both study and intervention design. The studies also varied in size, target population, population reached, and objectives.

Digital technologies for clients contribute to improving sexual and reproductive health knowledge; influencing attitudes, beliefs, and expectations; and increasing self-efficacy in support of healthy reproductive behaviors. In many settings, individuals lack a basic understanding about sex, reproduction, and their risk for unwanted pregnancy as well as information about contraceptive methods, all of which are important for perceiving a need for, and using, contraception.[10,11] Five out of the six studies that examined changes in sexual and reproductive health knowledge after exposure to digital health applications found a positive effect, including improved knowledge of contraceptive options; fertility awareness; and knowledge of the menstrual cycle, side effects of contraception, and locations of health facilities or where to get condoms.[12-17] Five studies demonstrated a positive impact on attitudes and beliefs around contraception including dispelling myths and misconceptions about methods and use, easing concerns about the safety and risks of contraceptive methods, increasing perceptions around ease of use, and increasing positive attitudes around condom use.[12,13,18-20] Four out of the six studies that assessed self-efficacy—including on clients' ability to discuss family planning with their partner or health care provider and their perceived ability to effectively use condoms and other contraceptive methods—showed positive outcomes associated with the intervention.[13,14,16,18-20]

Digital technologies for clients may contribute to shifting norms and increasing social support for healthy reproductive behaviors. Though not a direct aim of the study, the SMS-based intervention implemented in Mozambique showed impact on perceived social norms.[13] After participating in the intervention, male and female youth said they viewed contraceptive use as a way to increase educational opportunities and expressed increased acceptability for a woman to use a contraceptive method other than condoms, suggesting a possible impact on social gender norms among participants.[13]

Digital technologies may offer more options to reach young people. Young people especially are using digital technologies at rapidly increasing rates.[6,7,10] Digital technology has the potential to provide accurate information to individuals when and where they want it and, with careful attention paid to design, may offer the added benefit of confidentiality, privacy, and anonymity—issues that are critically important to young people.[7,21,22]

What is the evidence that digital technologies are high impact?

Men and women with sufficient exposure to digital health programming may be more likely to use modern contraceptives than those unexposed.

Table 1 on page 4 summarizes studies that examined the effects of digital health programming on modern contraceptive use. Three of the five studies that tracked changes in contraceptive behavior documented significant increases in modern contraceptive use, at least in the short term.[12,13,18,19,23] A fourth study in Mozambique also found increase in use of particular methods, but these trends were not aggregated for all modern method use.[13] As a result, the effect of digital health interventions on overall contraceptive use is unclear. Of the five studies, only the program in India found no significant change in contraceptive use among participants interviewed at follow-up.[12]

A newlywed college student in Jakarta, Indonesia, uses a mobile app for family planning to learn about contraceptive methods that may help delay her first pregnancy until she finishes her degree and secures employment. 2016 Radha Rajan, Courtesy of Photoshare.

From the three studies with positive results, the intervention in Cambodia was implemented as an added component to clinic-based services for women seeking post-abortion care, while the other two studies—implemented in Nigeria—were not connected to another health intervention.[18,19,23] All three studies used a combination of interactive voice response (IVR) and short message service (SMS), although the intervention in Cambodia used SMS only as an opt-in reminder service.[18,19,23] To reach participants with sexual and reproductive health information, two of the studies used a "push" system (where clients are given the opportunity to opt-in or sign up for the service with no further interactivity between the user and the service) and one used a combination "push" and "pull" system (where users have autonomy over seeking out additional information).[18,19,23] The study in India that did not show statistically significant positive impact on modern contraceptive uptake was a standalone, SMS-based "push" intervention.[12] The study in Mozambique with mixed results related to contraceptive uptake was an embedded, SMS-based combination "push" and "pull" intervention, and the only study to specifically target youth and young people.[13]

Challenges reported from studies with statistically insignificant findings included problems with the technology itself—network failure, platform adaptability, or extended periods of short-code failure—which were likely barriers to achieving optimal impact.[12,18] It should also be noted that findings from three qualitative studies suggested positive effects on contraceptive use, uptake, and continuation associated with the intervention.[14,17,22] For example, qualitative findings from an assessment of an SMS-based intervention in Kenya showed nearly two-thirds of clients (n=67) aged 19 years or younger (n=103) reported positive changes in family planning use when asked about how the intervention affected their use of family planning, including using dual protection and uptake of modern methods such as intrauterine devices and contraceptive pills.[17]

Table 1. Studies Examining the Effect of Digital Technologies on Contraceptive Use

Country	Participant Description	Intervention	Summary Result
Cambodia[23]	Women (n=249 intervention, n=251 control) receiving postabortion services; the majority were aged 25 years or older and married. Interviews at 4 and 12 months.	In addition to standard of care, intervention participants received six automated IVR messages every 2 weeks for the first three months following abortion with a basic reminder about contraceptive use and the option to receive phone support from a counselor to discuss their chosen contraceptive method. Participants in the intervention group who chose oral contraceptives or injectables could also opt to receive reminder messages (e.g., when to receive a new injection) via SMS.	Women in the intervention group were more likely than those in the control group to report contraceptive use at 4 months (64% versus 46%, respectively; relative risk: 1.39). At 12 months, differences in contraceptive use were no longer statistically significant. There was no significant difference between the groups in repeat pregnancies or abortions at 4 or 12 months.
India[12]	Men and women ages 19 to 86 who used the Life Tools SMS platform (n=305 baseline, n=117 endline); 72% of participants were men and the majority were married. Endline interviews were conducted two weeks after service completion.	Participants were sent a series of 65 SMS messages covering a range of topics around sexual and reproductive health (e.g., the menstrual cycle, family planning options) over a 16-week period.	No significant change in contraceptive use among participants interviewed at follow-up was observed.
Mozambique[13]	Men and women ages 18 to 24 in the Matola and Inhambane City districts (n=895 baseline, n=504 endline). At endline, the majority of participants were ages 20-24, about half were women, and over 70% of all participants had never been married. Endline interviews were conducted after three months of receiving the SMS messages.	SMS-based story messages (fictional narratives, based on behavior change theory, following a young person's decision to use family planning) were sent three times a week for eight weeks followed by information on contraception three times a week for four weeks. Participants also had access to a menu of frequently asked sexual and reproductive health questions.	Contraceptive use data were not aggregated. However, the study reported increases in particular methods within certain populations. For example, there were significant increases in current use of combined oral pills for female youth without children and the partners of male youth with and without children.

Country	Participant Description	Intervention	Summary Result
Nigeria[18]	Women ages 18 to 35 in Kaduna city (n=221 intervention, n=344 control). Study participants were an average age of 27 years, and 58% of study participants were married. Post-study surveys were conducted at an average of six weeks after the pre-study survey.	Participants opted to receive a series of 17 prerecorded IVR calls daily or twice a week, which included a drama segment (fictional stories related to using family planning methods) followed by an interactive component where participants could choose to listen to additional information and answer call-related quizzes. After each "regular" call, participants received SMS-based reminder messages about the key message from the previous call.	Modern contraceptive use among the intervention group increased significantly (from 23% to 37%) while contraceptive use in the control group remained nearly the same (at about 21%).
Nigeria[19]	Men (n=652) and women (n=670) in Kaduna city. The average age was 33 years for men and 29 years for women; 99% of men and women in the study were married. Post-study surveys were conducted after participants completed all 17 IVR calls.	A series of 17 prerecorded IVR calls were sent every 2 days and included a drama segment (following a fictional couple making choices about family planning) followed by an interactive component where participants could choose to listen to additional information and answer call-related quizzes. Three "quiz calls" were also sent during the intervention. One day after each "regular" call, an SMS "challenge" text was sent with a discussion prompt for the participants to practice new skills with his or her partner.	Modern method use increased significantly from 36% to 50% among women and from 35% to 41% among men. Women with high exposure* were twice as likely to use a modern method as women with low exposure. For men, high exposure increased the odds of using a modern method by 36%.

* Level of exposure was determined using a combined index score (for men, 0–49 with a mean of 14.1; for women, 0–48 with a mean of 15.2) based on length of exposure to each component of the digital health tool (drama series, personal story, sample dialogue, and SMS challenge).

How to do it: Tips from implementation experience

SBC-focused digital health applications should be linked with other SBC approaches (e.g., interpersonal communication, community group engagement, mass media) and/or investments in service delivery improvement for greater impact. As with other SBC interventions, the target audience should be deeply engaged in the development of digital health applications—first, to determine that a digital health application is an appropriate solution to actual and perceived needs and second, to inform the content and the delivery mechanism (examples can be found in the mHealth Planning Guide from K4Health). Programs can and should collect data prior to designing the intervention—through existing literature and research and through primary data collection with intended users (referred to here as "end-users" of the digital health technology)—and should continue to engage end-users throughout the design process to incorporate their feedback.

Engage with end-users early in the design process to decide on the most appropriate type of technology to use and how best to use it. For example, if the target audience predominantly owns basic-feature phones,

then the intervention may focus on using SMS or IVR to either "push" content (e.g., a service where you sign up to receive prerecorded voice messages once a week), allow end-users to "pull" content (e.g., a service where you send a message to a short code to request information about a specific topic), or some combination. If the target audience owns smartphones, tablets, or computers, then the intervention may focus on building a website or using social media sites like Facebook or Twitter. It is generally recommended to use technologies with which end-users are already familiar, rather than introducing new types of technologies that require a significant learning curve. The target audience's preferences should also be considered during recruitment. For example, a smartphone application-based intervention recruited participants through both NGO outreach and through social media advertising (Facebook) to broadly reach women in Kenya who might have found the application useful.[16]

Determine end-user preferences for format (e.g., text or audio), language, and frequency and dose of messaging. These preferences are likely to differ based on geographic location, age, and sex, and related design considerations can impact the success of an intervention. Different formats have different advantages and appeal to different target audiences. Interventions using SMS, IVR, hotlines, and online repositories of frequently asked questions are often appreciated for their anonymity and privacy, allowing participants to access the content they need, when they need it—attributes that are particularly attractive to young people. There are also growing experiences with using social media to engage end-users, particularly young people, to increase knowledge, challenge social norms, and foster positive reproductive behaviors. When "pushing" content directly to individuals, programs must ask potential end-users about the frequency and timing of messages. Formative research conducted for a digital health SBC intervention in Malawi identified different preferences among end-users, even within a similar geographic location; thus, programs may need to make decisions based on majority response or other contextual factors (such as available budget).[24] Alternatively, some programs, such as an IVR and SMS program in Nigeria, allowed end-users to select the frequency and timing of messages as part of registration.[18]

Consider how best to protect individual privacy. While mobile phones can increase an individual's sense of privacy—for example, offering access to contraceptive information without having to visit a clinic or provider— they may also expose individuals to real or perceived risks that must be considered during the design of any digital health intervention. If individuals are sharing or borrowing phones, which may be more frequent among young people and women, then they should be asked about their comfort with receiving or accessing potentially sensitive information via different modalities. "Pulled" SMS or IVR content may pose little risk if the messages or call logs are deleted, but if "pushed," messages could risk arriving on the phone when in someone else's possession. Facebook or WhatsApp allow for some privacy, through "closed" or "secret" groups, while also offering more interactivity through live chat sessions, but could similarly be viewed on the phone's history and expose the individual to risk.

Understand end-users' literacy levels and comfort with text-based content. IVR, hotlines, or image-based content such as graphic stories may be more appropriate for low-literacy individuals than SMS or other text-based content. However, the sheer number of SMS interventions shown to be acceptable to a broad range of end-users, including women, young people, and those living in rural areas, implies that SMS can be appropriate for many audiences. Therefore, these preferences cannot be predicted and must be informed by research with the intended end-users.

Test content with potential end-users for comprehension and appropriateness and test the platform for usability. It is very important to ensure that end-users understand and interpret digital content in the intended ways. An SMS-based program in India originally piloted simple, fact-based messages but client feedback led the project to revise the content and include a narrative structure with engaging characters and more detailed content.[12] During usability testing of a menu-based SMS family planning intervention in Kenya and Tanzania, implementers

determined that more than three or four SMS messages sent at once could arrive out of order and be confusing to some end-users.[17,22] Therefore, the program limited content to no more than four SMS per keyword selected.[17,22]

Budget accurately, including initial and recurring costs, and project costs at scale. Though actual costs vary substantially across countries and contexts, cost categories that must be budgeted can include: research, technology development (e.g., software, programming, server), hardware, data (SMS, airtime, data time), staff, and promotion. Different digital health applications can have different ratios of initial and recurring costs, which becomes important when projecting costs at scale. For example, costs for SMS-based programs that are free to the end-user can quickly become significant as the application scales (more users means more text messages, which must be paid for), while the price per user of an application decreases with scale (most costs are one-time development fees with low recurring costs).

Weigh the desire to reach end-users, including those most economically marginalized, against budget requirements for implementing digital health applications over the long term. Most SBC-focused digital health applications being implemented in low- and middle-income countries are offered free to the end-user and are funded by donors. While many program evaluations and research data demonstrate that these users highly appreciate receiving free health content, there may be opportunities to offset program costs by charging users to access digital health content. One program providing maternal, newborn, and child health information to pregnant and new mothers and gatekeepers in Bangladesh offered three tiers of pricing—free, reduced, or full price—but the mechanism for screening and categorizing users appears to have been cumbersome and algorithms were not consistently used, resulting in incorrect classification of clients.[25] Some programs have explored other models for financial sustainability, most notably by getting mobile network operators to offer SMS and/or airtime free of charge. One organization has had success in demonstrating the value of offering free SMS, airtime, and mobile data in terms of customer satisfaction and retention when the content is made available exclusively on one mobile network operator in a country.[26] While this has resulted in long-term support in Madagascar and more recent replications of this model in many more countries in sub-Saharan Africa, some governments and stakeholders are not comfortable with content being free to only certain subscribers.[26] For programs focused on reaching the most vulnerable populations, it is likely that content will need to remain free or heavily subsidized for the user, and thus other innovative financial models must continue to be explored.

Use digital health applications' built-in feature to support robust monitoring and evaluation. Like all health interventions, monitoring and evaluation should be planned for from the start as part of program design and should be linked to the program's logic model. What is unique to digital health technologies is the ability to rapidly collect monitoring and evaluation data through various techniques, including through routine system data as well as through other quantitative and qualitative approaches such as surveys deployed via the digital platform. The ability to garner near real-time process monitoring information enables rapid design and implementation improvements. In addition, if designed well, evaluations of digital health interventions can determine their effectiveness, including value for money, as well as impact, though these evaluations may or may not be conducted using only digital data collection methodologies. Implementers may find the World Health Organization's guide, *Monitoring and Evaluating Digital Health Interventions: A Practical Guide to Conducting Research and Assessment*, to be a useful resource.

Priority Research Questions

- Does the use of digital applications (e.g., SMS, IVR, social media) positively impact contraceptive behavior change and social norms? Which platforms (e.g., SMS, IVR, social media) are most effective?
- What is the cost, reach, and potential for sustainability of using digital health applications in different contexts?

Tools and Resources

mHealth for Behavior Change Communication Brief: Why mHealth Messaging? describes the importance of, and different channels for, mHealth messaging, as well as step-by-step guidance for creating an mHealth messaging program.
https://www.measureevaluation.org/resources/publications/fs-15-149

Gender and Information Communication Technology (ICT) Survey Toolkit provides resources for gender and information and communication technology landscape assessments and instructs users on how to interpret the findings and apply the learnings to their project and program portfolios.
https://www.usaid.gov/sites/default/files/documents/15396/Gender_and_ICT_Toolkit.pdf

A Practical Guide for Engaging with Mobile Network Operators and mHealth for RMNCH provides key motivators, challenges, and recommendations for mHealth service providers (e.g., developers and implementers) to strategically partner with mobile network operators. http://www.who.int/reproductivehealth/publications/mhealth/mobile-operators-mhealth/en/

Global Digital Health Network forum provides leadership in digital health (mHealth, eHealth, and information and communication technologies) and offers a collaborative gathering space where members can share perspectives, resources, and practical guidance related to implementation across a range of technical areas.
https://www.mhealthworkinggroup.org/

Former Digital Health HIP brief entitled: *mHealth: Mobile technology to strengthen family planning programs.* This brief synthesized the evidence and offered tips for implementation as of 2013. https://www.popline.org/sites/default/files/mHealth.pdf

For more information about HIPs, please contact the HIP team at USAID at fphip@k4health.org.

References

A complete list of references used in the preparation of this brief can be found at:

http://www.fphighimpactpractices.org/briefs/digital-health-sbc/

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