Using Mobile Technology to Support Family Planning Counseling in the Community

Case Study

Tom Routen, Lucy Fulgence Silas, Marc Mitchell, Jan van Esch, Neal Lesh
D-Tree International
Dar es Salaam
Tanzania
routen@d-tree.org

Jayne Lyons, Rita Badiani
Pathfinder International
Dar es Salaam
Tanzania
JLyons@pathfind.org

Abstract. This paper reports on a mobile phone application designed to support community health workers in providing family planning counseling to their clients. We adapted the Population Council's Balanced Counseling Strategy for local conditions and for community health workers and developed a mobile phone application incorporating the resulting algorithm.

Keywords: Family planning, counselling, CommCare, balanced counselling strategy, mobile phones, software, community health workers

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INTRODUCTION

This paper reports on a project developing mobile-phone based software to support community health workers in providing high quality family planning counseling to their clients. Our objective is to take a best-practice family planning counseling method and encode the provider-client dialogue it prescribes in an interactive application. The community health worker can then use this application in guiding each counseling session along this best-practice path. We believe that this model will prove to be an important addition to the resources available to support efforts in promoting the broadest provision of community based family planning counseling.

Voluntary family planning has profound health, economic, and social benefits for families and communities; protecting the health of women by reducing unwanted or high-risk pregnancies; protecting the health of children by allowing sufficient time between pregnancies, fighting HIV/AIDS through providing information, counseling, and access to male and female condoms; reducing abortions; supporting women's rights and opportunities for education, employment, and full participation in society and protecting the environment by stabilizing population growth. Reducing mistimed, unplanned and higher risk pregnancies is a way of reducing both maternal and infant mortality. Furthering the provision of family planning is a key means by which two of the Millennium Development Goals (a

reduction of under-5 mortality rates by two-thirds and maternal mortality rates by three-quarters by 2015) may be achieved.

Recent decades have seen significant progress in the provision and uptake of family planning in the developing world, but this success is not evenly distributed. It is estimated that 14 million inintended pregnancies are still occurring annually in sub-Saharan Africa alone [3]. It appears to be that the poor are being increasingly left behind in the drive to control fertility [4] even though reducing fertility is a primary way of alleviating poverty. High uptake of family planning services is naturally correlated with local availability of good reproductive health services. The least served appear to be the rural poor, remote from such health facilities, which suggests a central future role for community health workers in further efforts to ameliorate this situation. Uptake of family planning methods is influenced not only by poor knowledge of modern contraceptive methods, but also importantly by cultural beliefs and community opinions [7]. In such a situation, there may be significant benefit in having the counseling on offer from someone who lives within the community he/she serves, and who therefore will be fully cognizant of the nature of local concerns. Finally, community health workers may visit their clients on a regular basis and so be able to address, in a way in which clinics are not, important issues relating to method compliance and continuation.

Family planning counseling is, however, relatively complex and there may be a mismatch between this complexity and the resources available to the community health worker, who typically receive relatively little training. Without good training it can be difficult to judge how much information is required to assist a potential user in choosing a method. Providing too much information can quickly become overwhelming for a client. On the other hand, restricting the information given can impinge on the possibility of informed consent. If the community health worker fails to give client clear and accurate advice about the possible side effects of a chosen method, then the client may later be sufficiently perturbed by the appearance of side effects (such as vaginal bleeding) as to become disenchanted with family planning as such. If there is a need to win over an initially skeptical community for family planning, such experiences may represent difficult setbacks with impacts beyond that of the individual case. In sum, providing high-quality, accurate family planning counseling in the community setting is important, but not easy.

The problem we are trying to solve is therefore: how to help the community health worker manage the complexity of this task and thereby fulfill the important potential mapped out above.

We think it is possible to do so because of the rather specific nature of this counseling task. Despite it being a health-related counseling function, it is unlike other counseling tasks which may draw on the health worker's reserves of empathy and wisdom in human affairs. Famously, it is said that every unhappy family is unhappy in its own way, but, one might say, every woman wanting to avoid pregnancy has the same options before her. Thus, family planning counseling can be designed and constructed as a standard provider-client dialogue which leads the client through the options in a way which ensures desired outcomes such as (1) the client herself takes the decision regarding which method to use (2) the decision is taken after she has been exposed to clear and accurate information regarding the methods available (3) the decision is checked for suitability in the specific individual case. In computing terms, the task admits of an *algorithm*.

Once something admits of an algorithm, of course, there is the prospect of encoding it in software. The idea of this paper is to encode a family planning algorithm in an interactive phone-based application which advises the provider on how to advise the client. The benefits here are that even if the provider's

training is uncertain, the algorithm inexorably takes the dialogue through the right paths, in is an entirely standard and consistent way. As a side-effect of this consistency, the underlying algorithm will naturally become familiar to the community health worker over time (additional training will be a side-effect of use). The algorithm may encode a complex decision procedure, but the existence of the software means that the community health worker must not be burdened with the task of maintaining this complex procedure in memory.

For this work, we took as our starting point one of the most well-known and well-tested family planning counseling algorithms: the Balanced Counseling Strategy.

BALANCED COUNSELLING STRATEGY

The Balanced Counseling Strategy (BCS) is a family planning counseling framework developed and refined over a number of years by the Population Council [6]. It was developed for use in a clinical setting rather than by community health workers. The heart of the BCS is an 11-step algorithm which choreographs a specific dialogue between provider and client, and which is supported by two kinds of materials for each method: a Counseling Card and a Brochure.

The central exchanges of the dialogue focus on the Counseling Cards. Each Card represents a family planning method (and has specific information about that method on the flip side) and are laid out on a flat surface in front of the client and provider. The dialogue proceeds by investigating reasons to "set aside" any the Cards (if the client has already had negative experiences with a method, for example, such method will be set aside). The client is then invited to make a choice from the Cards remaining "on the table". Subsequently, the provider will check certain things with the client to make sure the method chosen is appropriate (for example, checking for contra-indications). If the chosen method is found to be inappropriate, that Card too is set aside and the dialogue iterates back to the choice point. This continues until the client has selected a method which is both acceptable to her/him and suitable given her/his specific situation.

This dialogue therefore has three stages: pre-choice, method-choice and post-choice, as portrayed in Table 1.

Pre-Choice	Method-Choice	Post-Choice
• Establish relationship • Rule out pregnancy • Establish if any methods can be set aside	• Give information on remaining methods • Ask client to choose method most convenient for her/him • Using brochure for chosen method, determine if client has condition which makes method inappropriate	• Inform client regarding chosen method using brochure • Reinforce client's comprehension • Give temporary method if appropriate • Close session

Table 1: Balanced Counseling Strategy stages

It is worth noting here that the individual steps of the algorithm are couched in imperatives such as: "Ask all of the following ..." and "Inform the client ..." and that this is ideal for our purposes. Our

software instructs the provider on how to counsel the client using these straightforward imperatives. The provider responds by informing the software of the response of the client, and the software then produces the next imperative for the provider. The responsibility for seeing to it that the dialogue follows the BCS is thus outsourced, one might say, by the provider to the mobile phone. The screenshots in Figure 1 illustrate how the provider reads the imperatives offered up by the phone and enters client responses.

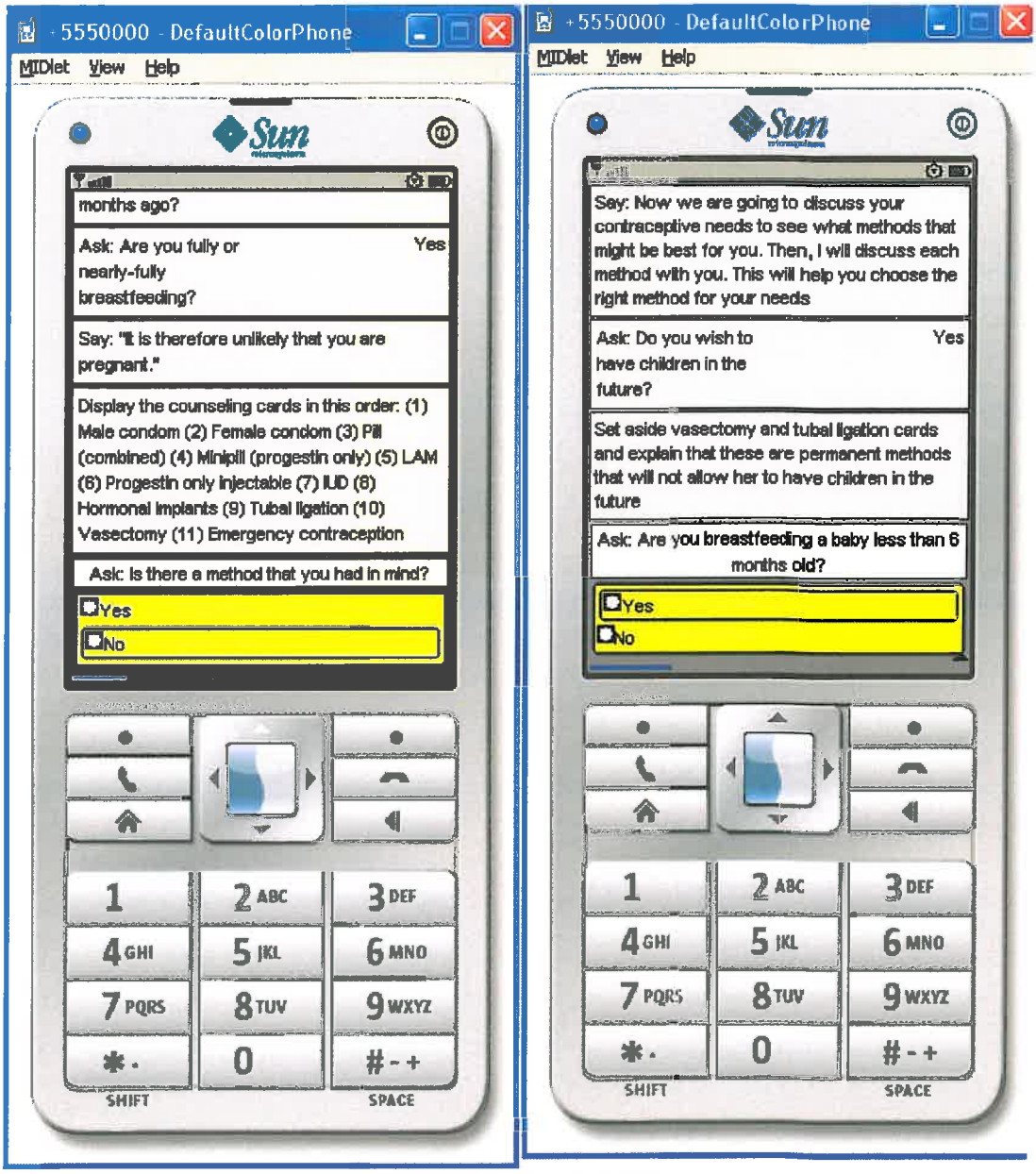

Figure 1. Screenshots from the adapted BCS algorithm

ADAPTING THE BALANCED COUNSELING STRATEGY

Since the BCS was developed for providers at health facilities, we needed to adapt the BCS in two main ways for the community setting. We needed to adapt some questions, and we needed to modify the methods which the algorithm discusses.

The BCS presumes a clinical setting. Not all questions which can be answered there can also be answered remote from such a facility. For example, if a client selects the combined oral contraceptive pill, the algorithm requires that the provider determine whether or not the client suffers from high blood pressure. This may not be known or determinable in the community setting. Most clients will be unaware of any hypertensive condition and the community health worker will not be in a position to adjudicate on this one way or another. Our adapted algorithm therefore requires the community health worker to ask a client who opts for the pill whether or not she knows whether she has high blood pressure and, if she doesn't know, provide the chosen method, but also suggest she go to a clinic to get it checked. We also needed to rephrase certain questions to ensure they are resolvable by community health worker and client. To determine the existence of a contra-indication for hormonal methods, for example, our adapted algorithm instructs the provider to ask the client "have you noticed the palm of your hands, fingernails or eyes becoming yellow?" rather than baldly asking the provider whether the client has experienced jaundice.

The other main adaptation we needed to make was a simple one of limiting the BCS algorithm so that it presents only those contraceptive methods available in our local context, namely from the community health workers (called HBCPs – Home-Based Care Providers) of Pathfinder International in Tanzania, or from the health facilities to which the community health workers may refer clients. Generally, the methods available are male condoms and combined oral contraceptive pills. Spermicides and monthly injectables, for example, are not generally available. Of the remaining methods, i.e. those available from health facilities, the supply situation varies on a week to week basis. Although our adapted algorithm cannot dynamically limit the methods placed "on the table" during the consultation, each HBCP will in fact be aware of methods currently available from local health facilities and will easily be able to use this knowledge to "set aside" from the outset those methods which are currently unavailable.

FAMILY PLANNING APPLICATION

The adapted BCS algorithm, although at the core of the family planning application we are creating, is just a part of it, for the following reason. We said that one of the main advantages of the HBCP role with respect to the issue of family planning is that the HBCP visits clients on a regular basis. We would like to support the HBCP on these important *follow-up* visits too, but to our knowledge the BCS algorithm has no procedures defined for such subsequent, post-counseling interactions. Therefore, we have developed our own, which will also be an important part of the whole application. The resulting overall structure of the family planning application we are developing is shown, in a greatly simplified form, in Figure 2. The adapted BCS algorithm is represented here as the node labeled "Advice".

Figure 2: Simplified outline structure of the Family Planning application

COMMCARE

The family planning application is one of several D-Tree projects whose aim is to support community health workers. The overall term we use for these projects is CommCare, and this term is also used to refer to the integration of the various modules resulting from the projects into a coherent application which supports the community health workers in his/her daily work. Sister projects of the family planning project deal with safe pregnancy, Orphans and Vulnerable Children, care of people living with Aids [5].

All CommCare applications are open source and are built on the open source mobile application framework JavaROSA. This framework is directly supportive of the implementation of algorithms since it interprets a high-level, xml-based specification language called XForms in which it is possible to describe sequences of questions and control logic. CommCare is a general framework [1] which adds functionality on top of JavaROSA concerning, for example, keeping track of clients, supporting community health workers to follow-up on referrals they've recommended, and so forth.

Thus, we implemented the adapted BCS algorithm by encoding it in an XForm and executing the XForm within the CommCare shell. The overall family planning application will include other XForms, for the follow-up decision procedures for example. The application will also make use of general CommCare functionality regarding client and referral tracking.

Implementing the BCS algorithm in an XForm highlighted two requirements not currently covered by the interpretation of XForms by the JavaROSA framework. The first is the ability to construct a question from a dynamically created list of elements (as an essential part of the dialogue which gradually narrows down the family planning options remaining "on the table"). The second is the requirement for a specific kind of iteration within the algorithm (if a contra-indication of a selected method is found to exist, the dialogue should return to the "Method Choice" stage).

The former requirement is readily solvable since the XForms specification contains a construct which would do the job, and we intend to add this construct to the JavaROSA XForm parser. The latter requirement is trickier since the XForm standard does not include the relevant kind of iteration. XForms used as a protocol formalism can broadly accommodate algorithms expressible as decision trees. Many health algorithms are indeed naturally expressed as decision trees and do not require any turning back, which is perhaps why we have successfully executed several projects using XForms without having faced this as an issue. We see two candidate solutions:

1. Add our own custom-extensions to the XForm language to allow for the iteration required, and then extend the XForm parser to satisfy this requirement. The downside of this approach is that will break concordance with the XForm standard. However, we can at least ensure that JavaROSA will still handle all valid XForms that it could handle before this change. We will promote these changes within the OpenROSA consortium, which covers many groups working on mobile data collection and decision support.

2. Work around the difficulties in the specific case of the family planning application. When a chosen method is found to be unsatisfactory the consultation simply ends instead of iterating back. The workaround for this issue is to start a new consultation, once again requiring of the provider only that he/she remain aware of what has been set aside.

CommCare has a standard server-side component called CommCare HQ which receives data of client interactions sent from the phone via GPRS. For most projects, the data promises to help program managers monitor the work of community health workers and obtain a much better and more timely overview of the issues facing the clients served than is the case where the community health workers complete paper forms to convey this information. For the family planning application, there may be additional use in monitoring geographical demand for specific kinds of family planning method and planning community interventions on this basis. This in turn suggests a potential utility in adapting the BCS further so that the data from a counseling session includes not only the method actually chosen, but also any method which the client would have chosen were it available.

CONCLUSION AND FUTURE WORK

To date, we have designed in detail the decision procedure of the CommCare family planning module, and we have adapted and implemented the Balanced Counseling Strategy in a mobile phone application. Despite not being able to implement the algorithm to mirror the BCS structure exactly, the resulting software is convincing in displaying the potential for a standardized application of best practice family planning counseling perhaps even by people with relatively weak training in, or knowledge of, the BCS.

Evidently, this is still a work in progress and many interesting questions will need to be resolved, and we will not of course rely on mere confidence that this is indeed a good approach, but will require that it demonstrate itself to be so. For example, we need to look at whether it will be easy for a client to conduct a phone-guided dialogue, while at the same time relating well with the client. Or does the interaction, from phone, to Cards on the table, to client responses, become fractured in some unforeseen but important way?

We will also need to determine how we will more formally evaluate the idea. One option would be to check the quality of the counseling given by a community health worker using a phone against the gold standard of a well-trained and experienced BCS counselor. We may be able to do this by randomly

repeating counseling sessions, this time with an experienced BCS counselor and see whether the client alters her view about the most appropriate method for her. Another option would be to look at comparing clients of phone-enabled community health workers with a control group of clients receiving family planning counseling from community health workers without the support of the phone software, and testing levels of comprehension of contraceptive options, or levels of satisfaction with the counseling, or levels of provider-client interaction during the sessions. A third possibility might be to design a study to monitor whether the use of the phone-enabled counselors retain clarity regarding the BCS algorithm better or longer than a control group of counselors receiving the same training at the same time, but who then work without the phone software.

We are currently planning the next stages of this project. These will be to implement the whole family planning module (including the follow-up decision procedure), to make modifications to the JavaROSA platform, to test the resulting software in the field with Pathfinder International HBCPs, and to evaluate the whole approach.

One additional very important aspect of future work is also to adapt our algorithm to reflect the new developments in best practice. The BCS has recently been modified and tested to deal with the specific requirements of clients in areas of high HIV prevalence. This new variation of the BCS is called BCS+. Since Tanzania is an area of high HIV prevalence, this is the algorithm we should be deploying to the field and so an additional important task is to modify our software so that it reflects the changes which the BCS+ adds to the BCS algorithm.

Finally, there are numerous details of support with which we can envisage augmenting the family planning module. For example. although currently the HBCPs in the Pathfinder International program have available only combined oral contraceptive pills and male condoms, in other contexts, community health workers sometimes also supply injectables DMPA [2]). Since injectables require adherence to a strict timetable (a re-injection every 90 days), it is easy to imagine augmenting CommCare to give community health workers the ability to record a client's most recent re-injection, and have the software automatically remind her when the next one is due. We could also include reminders for blood pressure checkup and pap smear.

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