



RESEARCH ARTICLE

Getting health information to internally displaced youth in Afghanistan: can mobile phone technology bridge the gap?

[version 1; peer review: 2 approved with reservations]

Results from a cross-sectional, formative study

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Abstract

Background: Afghanistan ranks among the most disadvantaged globally for many key reproductive, maternal, newborn and child health (RMNCH) indicators, despite important gains in the past decade. Youth (15 to 24 years) are a key audience for RMNCH information as they enter adulthood, marry and begin families; however, reaching Afghan youth with health information is challenging. Internally displaced persons (IDPs), including youth, experience additional challenges to obtaining health-related information and services. This study measured current and preferred RMNCH information channels to explore the feasibility of using mobile phone technology to provide RMNCH information to IDP youth in Afghanistan.

Methods: We conducted a sub-group analysis of survey data from a mixed-methods, cross-sectional, formative assessment to understand current access to RMNCH information. The target population for this analysis includes 15-25-year-old male and female IDP youth from three Afghan Provinces. Survey data were collected using a structured questionnaire administered through face-to-face interviews. Data were analyzed descriptively.

Results: A total of 450 IDP youth were surveyed in the three provinces (225 male and 225 female). Access to RMNCH information outside of health facilities was limited. Mobile phone ownership was nearly universal among male participants, yet considerably lower among females; nearly all participants without personal phones reported access to phones when needed. Although few participants

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Any reports and responses or comments on the

spontaneously mentioned mobile phones as a preferred source of RMNCH information, most male and female respondents reported they would be very or somewhat likely to use a free, mobile-phone-based system to access such information if offered.

Conclusions: Given widespread access and considerable interest voiced by participants, mobile phones may be a viable way to reach IDP youth with important RMNCH health information in this fragile setting. Interventions should be designed and pilot-tested to identify the most appropriate platforms and information content and to further document feasibility and acceptability.

Keywords

Afghanistan, adolescents, mobile phone, information and communications technology for health, family planning, maternal health, child health, social and behavior change communication

article can be found at the end of the article.

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Introduction

Despite improvements over the past two decades in reproductive, maternal, newborn and child health (RMNCH), Afghanistan continues to rank among the most disadvantaged countries globally for many health indicators^{1,2}. Child mortality (45 per 1,000 live births) and maternal mortality (1,291 per 100,000) remain high, with higher rates in rural settings compared to urban³. Though some newborn and child health statistics have improved, immunization and nutrition indicators lag behind other countries regionally and vary markedly across the country³⁻⁵. Total fertility rate (TFR) among Afghan women is also high at 5.3 children per woman, and age at first birth is low with 12% of girls ages 15-19 years initiating childbearing³. Modern contraceptive method use has stagnated over the last decade, with only 20% of married women reporting modern method use³.

Afghanistan has a “youth bulge”, with more than half its population younger than 19 years; youth aged 15 to 24 years comprise 22.2% of the population⁶. As these youth enter adulthood, marry, and begin their families, they constitute a key target for RMNCH interventions aimed to improve health and reduce maternal and child mortality. They are also an important audience for health-related information, particularly around RMNCH. However, reaching Afghan youth with needed RMNCH information is challenging, as multiple barriers limit young peoples’ access to formal health services^{7,8}.

Internally displaced persons (IDPs), including youth, experience additional challenges to obtaining essential health-related information and services. Years of armed conflict, natural disasters and widespread poverty have led to large-scale migration both within and from Afghanistan⁹⁻¹¹. As of 2017, nearly 1.3 million of the estimated 35.5 million people in Afghanistan were internally displaced^{9,10}. Factors that contribute to internal displacement also reduce health service access. A 2018 United Nations Refugee Agency (UNHCR) report documented that up to 42% of Afghan IDPs are unable to access health care; those in urban areas have slightly better access than those in rural settings¹². Key reasons for limited health care access were high cost and perceived low quality of services¹².

More information is needed on alternative ways to reach displaced youth with health information, particularly in fragile settings. Several programs have succeeded in reaching various audiences with health information through platforms that use mobile phone technology across multiple global contexts¹³⁻¹⁷. The exponential growth of mobile phone technology has created opportunities to connect people with information at a scale previously unfathomable and Afghanistan is no exception. Mobile phone coverage is increasing within Afghanistan, both in numbers of users and use among target populations, including women and youth. In 2014, Afghanistan had an estimated 12 million mobile phone subscribers, and a 2017 estimate reported subscriptions at 23.2 million^{18,19}. A 2012 survey of Afghan women revealed that 80% had mobile phone access: 48% of women owned a mobile device and 32% could borrow one when needed²⁰.

To optimize exposure to RMNCH-related information and programming to create demand for health services, a greater

understanding is needed of current exposure to and preferences for information channels and content among critical target audiences, such as IDP youth. The objective of this study was to measure current and preferred RMNCH information channels, content and media preferences, and to explore the feasibility of using mobile phone technology to reach IDP youth in Afghanistan with RMNCH information.

Methods

Study background

We conducted a sub-group analysis of survey data collected in a mixed-methods, cross-sectional, formative assessment. The assessment was designed to gather information from youth and adult men to inform programming targeting RMNCH health outcomes. For these analyses, we include data collected on female and male IDP youth, ages 15 to 25 years²¹. IDP youth were recruited from households located in areas with large IDP populations in Kandahar, Nangarhar, and Takhar Provinces, selected based on their geographic and ethnic diversity. Survey data were collected between March and July 2017 using a structured questionnaire, available as *Extended data*²², administered through face-to-face interviews conducted by trained research assistants. Data used for these analyses include participant background information, household possession of media devices (i.e. television, radio and mobile phones), exposure to health information from various channels, desires for various types of health information and through which channels of communication, as well as likelihood to use a free mobile phone-based system to receive health information, measured on a 5-point Likert-type scale.

Areas with large IDP populations were selected based on guidance from UNHCR, the Ministry of Refugees and Repatriation, and the Danish and the Norwegian Refugee Committees, who have pre-existing relationships with IDP communities and their internal leaders. Households in these communities were sampled using random walk technique to reduce sampling bias²³. Household selection was continued in each area until reaching the requisite sample size.

Recruitment

For the survey, 150 IDP youth (75 male and 75 female) were recruited from each province, resulting in 450 IDP youth across the three study provinces. Once a household was selected, the study manager met with the head of household, presented the study, and requested permission to present the study to the young men and women in the house (using sex-matched study staff in deference to cultural norms). If interested in participation, interviewers provided completed the process of informed consent and completed the questionnaire in a private setting in the home. Verbal informed consent was obtained from eligible youth interested in study participation and a structured questionnaire was then administered by sex-matched data collectors in a private setting within the house. A waiver of written documentation of parental permission for youth ages 15 to 17 years was granted by the ethics review committees given that head of household permission was obtained prior to recruiting the youth.

Equal samples of male and female youth were selected to examine differences by sex. Samples sizes were calculated based on

the ability to detect a minimum of a 20 percentage point difference from a baseline of 40% in various indicators for each sub-population, assuming 90% power and an alpha of 0.05; further details on sample size calculations and sampling are available in the project report²¹. Data were analyzed descriptively and stratified by province and sex, reporting proportions or measures of central tendency (mean and range). Complete case analysis was conducted with numbers of missing for each variable reported in tables.

Ethical approval

The study was reviewed and approved by the Protection of Human Subjects Committee of FHI 360 (# 844213) and the Afghanistan Ministry of Public Health Institutional Review Board (#355310) prior to implementation.

Results

Demographic information

The 450 IDP youth ages 15–25 years surveyed in Kandahar, Nangarhar, and Takhar Provinces included 225 young men and 225 young women. Just over half of female IDP youth were married, compared to 39% of their male counterparts (Table 1). Nearly all participants were born in Afghanistan. One-third of male and nearly half of female IDP youth reported currently living in their birth province. About two-thirds of male IDPs had any formal education, compared to just under one-fifth of female IDP youth and varied markedly by province. De-identified demographic data, alongside all other raw responses, are available as *Underlying data*²².

Media access and exposure

Reported household radio and television ownership differed by province, but were similar by sex, with about half reporting

a radio and one-quarter reporting a television in their households (Table 2). Mobile phone ownership and access differed considerably by sex and province. Nearly all male IDPs (94.0% to 98.7%) reported mobile phone ownership. Phone ownership was considerably lower among female respondents overall and lowest in Nangarhar. Having a smartphone in the household and reporting prior internet use were generally low, but lower for females than males.

Few IDP youth reported any exposure to print media or television, except for Kandahar for the latter (Table 3). Just over half of male IDP youth reported at least weekly radio exposure, compared to approximately one-quarter of female IDP youth, varying by province.

Few study participants recalled exposure to health-related information communicated through any channel in the 30 days prior to the survey (Table 4). Among those who recalled health-related information, immunization, family planning, hygiene and nutrition were the most frequently reported topics, though responses differed considerably by sex and channel. Few male and no female youth reported receiving health-related information by internet.

Health information and preferred information sources

Nearly all IDP youth indicated a desire for more health information; health maintenance (e.g., exercise, nutrition) ranked highest among desired topics (Table 5). Other areas prioritized by male youth included smoking cessation (32.0%), accident prevention, and newborn care (18.2% each). Female youth prioritized depression and mental health issues (29.3%), stress reduction (24.9%), newborn care (22.2%) and family nutrition (22.7%); these topics were mentioned most frequently in

Table 1. Background characteristics of study participants, by sex and province, among IDP youth in Afghanistan, 2017.

Media	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Age in years (mean)	20.3	21.6	20.1 ¹	22.1	22.7 ¹	21.6
Married	24.0	21.6	26.7	64.5	66.7	70.7
Highest level of education						
None	28.0	90.5	28.0	97.4	52.0	57.3
Primary	10.7	2.7	16.0	1.3	25.3	18.7
Secondary	14.7	1.4	14.7	1.3	13.3	8.0
Higher	45.3	5.4	40.0	0.0	6.7	16.0
Vocational	1.3	0.0	1.3	0.0	2.7	0.0
Able to read a full sentence	60.0	5.4	50.7	0.0	17.3	9.3
Born in Afghanistan	94.7	96.0	85.3	89.5	93.3	92.0
Living in province of birth	62.7	56.8	16.0	51.3	21.3	37.3
Received health care from medical provider in prior 6 months	46.7	50.0	36.0	77.6	28.0	46.7

¹ missing

Table 2. Access to media channels in household, by sex and province, among IDP youth in Afghanistan, 2017.

Media	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Radio in household	68.0	60.8	68.0	59.2	21.3	18.7
Television in household	49.3	50.0	18.7	14.5	14.7	12.0
Basic mobile phone in household	80.0	35.1	70.7	31.6	89.3	94.7
Smartphone in household	49.3	8.1	16.0	10.5	9.3	17.3
Personally owns mobile phone	98.7	55.4	94.7	38.2	98.7	56.0
Able to use a mobile phone (own phone or one that belongs to another)	100.0	100.0	98.7	97.4	98.7	81.3
Ever accessed the internet	18.7	5.4	6.7	0.0	1.3	2.7

Table 3. Reported exposure to different media, by sex and province, among IDP youth in Afghanistan, 2017.

Media channel	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Print (newspaper or magazine)						
None	69.3	94.6	81.3	97.4	92.0	100.0
Daily	1.3	0.0	2.7	0.0	1.3	0.0
Weekly	16.0	1.4	5.3	4.3	1.3	0.0
Less than weekly	13.3	4.1	10.7	1.3	5.3	0.0
Radio						
None	41.3	43.2	12.0	65.8	77.3	85.3
Daily	28.0	51.4	64.0	6.6	12.0	6.7
Weekly	28.0	2.7	22.7	14.5	9.3	5.3
Less than weekly	2.7	2.7	1.3	13.2	1.3	2.7
Television						
None	46.7	48.7	78.7	79.0	85.3	85.3
Daily	41.3	47.3	16.0	10.5	8.0	13.3
Weekly	12.0	4.1	4.0	7.9	6.7	1.3
Less than weekly	0.0	0.0	1.3	2.6	0.0	0.0

Kandahar. Important RMNCH topics including antenatal care, breastfeeding and birth spacing/family planning were lower priorities for both sexes, varying across provinces.

When asked about preferred RMNCH-related information channels, nearly all youth across provinces strongly preferred health care providers, with home visits by community health workers (CHWs) a distant second (Table 6). Although few male IDP youth spontaneously mentioned mobile phones as a way to access

RMNCH information, 16.4% of female IDPs were interested in having such information provided through a telephone hotline number, most markedly in Kandahar.

Mobile phones as a source of health information

IDP youth were asked how likely they would be to use a free mobile phone-based system to receive RMNCH information. Nearly all respondents, regardless of sex or province, said they would be somewhat or very interested in such a system (Figure 1).

Table 4. Types of health information received in prior 30 days, by medium and topic, among those with reported receiving any health information by each channel and by sex, IDP youth in Afghanistan, 2017.

Health Topic ¹	Radio		Television		Internet	
	Male (n=59) %	Female (n=29) %	Male (n=46) %	Female (n=26) %	Male (n=27) %	Female (n=0) %
Immunization	72.9	69.0	67.4	53.9	44.4	--
Influenza	30.5	41.4	30.4	38.5	29.6	--
Family planning	22.0	6.9	50.0	26.9	22.2	--
Hygiene	37.3	37.9	65.2	19.2	44.4	--
Nutrition	25.4	20.7	52.2	15.4	44.4	--
High blood pressure	11.9	20.7	13.0	11.5	33.3	--
Smoking prevention	10.2	13.8	15.2	23.1	25.9	--

¹More than one response possible, percentages do not add to 100.**Table 5. Type of health information participants would like, by sex and province, among IDP youth in Afghanistan, 2017.**

Message content ¹	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Health maintenance	49.3	52.7	53.3	39.5	58.7	73.3
Smoking cessation	42.7	18.9	22.7	11.8	30.7	1.3
Accident prevention	18.7	21.6	20.0	34.2	16.0	1.3
Stress reduction	28.0	46.0	5.3	19.7	17.3	9.3
Depression or other mental health issues	25.3	70.3	10.7	9.2	13.3	9.3
Antenatal care	9.3	10.8	4.0	2.6	30.7	10.7
Care during labor and delivery	10.7	12.2	9.3	14.5	21.3	14.7
Newborn care	20.0	24.3	14.7	10.5	20.0	32.0
Breastfeeding	13.3	89.5	8.0	10.5	6.7	0.0
Family nutrition	10.7	44.6	32.0	4.0	6.7	20.0
Birth spacing/FP methods	1.3	13.5	4.0	7.9	6.7	25.3

¹More than one response possible, percentages do not add to 100.

Participants were further asked if the phone-based system should deliver information through recorded messages or if they would prefer to speak with a live person. Except for males in Kandahar who were evenly split on the options, most respondents stated a preference for speaking with a live person rather than hearing a recorded message (Table 7).

Discussion

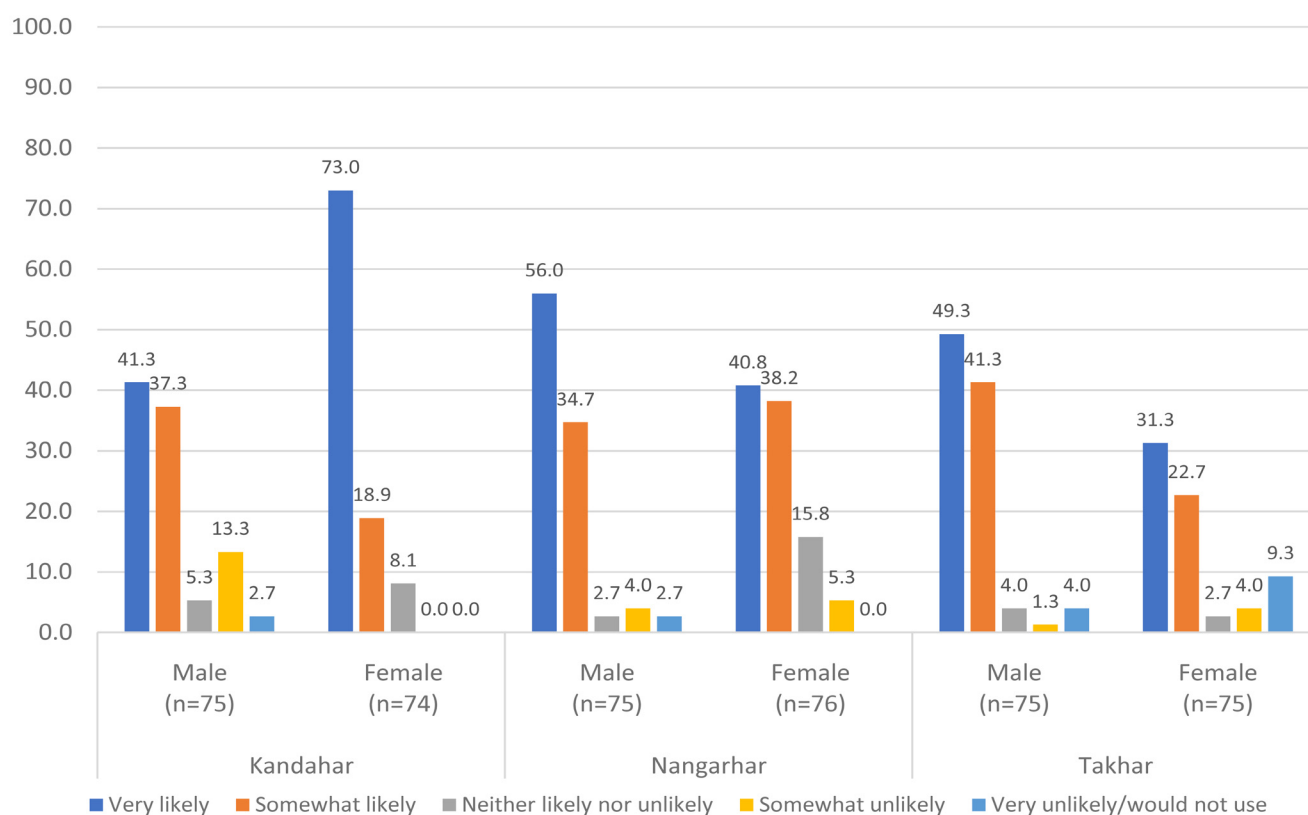
This study adds to limited information on the potential of using mobile phone technology to disseminate health-related information in fragile settings like Afghanistan. To our knowledge, this study is among the first to explore this topic among IDP youth.

Providing accurate, concise RMNCH information is important to young men and women and a key step to improving uptake of RMNCH interventions. Such information has been traditionally delivered through health providers, or lay persons trained as CHWs, consistent with findings in this study. Limited access to health providers in many low- and middle-income countries, including Afghanistan, also limits their ability to communicate RMNCH information. Even when services are available, costs and perceived low quality can impede health service uptake¹². Women in Afghanistan have the added challenge of needing permission and money for payment from male relatives to obtain health services³. These barriers can intensify for IDPs, particularly the recently-displaced, who are

Table 6. Preferred sources of RMNCH information, by sex and province among IDP youth in Afghanistan, 2017.

Channel ¹	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Health care provider	81.3	50.0	76.0	59.5	68.0	81.3
Home visit by CHW	29.3	21.5	26.7	38.2	40.0	28.0
Printed information	0.0	1.4	1.3	1.3	5.3	0.0
Television	12.0	6.8	13.3	4.0	6.7	6.7
Radio	12.0	17.6	14.7	5.3	5.3	1.3
Mobile phone voice call	4.0	9.5	1.3	2.6	5.3	6.7
Telephone hotline to call	0.0	24.3	0.0	14.5	0.0	10.7

¹More than one response possible, percentages do not add to 100.

**Figure 1.** Likelihood of use of free mobile-phone based information on reproductive health among IDP youth, by sex and province, Afghanistan, 2017 (n=450).

unfamiliar with health facilities in their new location and may fear discrimination based on IDP status²⁴.

CHWs are an important health information source, particularly in more remote settings; findings from this study reflect the value participants place on CHWs as a RMNCH information

channel. However, persistent challenges such as competing demands and high turn-over among CHWs can limit their effectiveness to reach youth in some settings²⁵. Moreover, for youth displaced to urban settings, CHWs are not a viable channel as the Afghan urban health system does not have a formal CHW cadre²⁵.

Table 7. Preferred way to receive health information through a mobile phone-based system, by sex and province, IDP youth Afghanistan 2017.

Media	Kandahar		Nangarhar		Takhar	
	Men (n=75) %	Women (n=74) %	Men (n=75) %	Women (n=76) %	Men (n=75) %	Women (n=75) %
Hear a recorded message	52.0	12.2	16.0	1.3	12.0	17.3
Speak with a live person	48.0	82.4	80.0	90.8	85.3	73.3
Don't know	0.0	5.4	4.0	7.9	2.7	9.3

Mass media campaigns are another health information strategy with some evidence for increasing health service use, though the evidence is weak, and effectiveness for changing health behaviors is not well documented^{26–28}. Regardless of documented effectiveness, use of media like print media, radio and television require reasonable access among the targeted audience. Our findings suggest that low literacy precludes using print media, and RMNCH information delivered through radio and television would miss large numbers of IDP youth. Youth in Kandahar were more likely to report television use, likely reflecting the more urban setting for this province, and perhaps greater access and acculturation to this communication channel²⁹. Though we did not measure duration of displacement, anecdotal information indicated some participants had been resettled for five years or more, potentially resulting in differential norms around media use and health care access compare to those more recently displaced.

It is notable that some young men reported a need for RMNCH-related information, in some cases exceeding the number of women, for topics such as antenatal care. We posit this difference may reflect limited reliable information sources accessible to young men coupled with their awareness of becoming the primary health decision-maker upon marriage³. Just under half of youth were already married; thus, these topics are germane to this population. Programming specifically targeting male IDP youth, are worthy of further investigation.

Although few participants spontaneously listed mobile phones as a preferred health information channel, most reported being likely to use a free mobile phone-based intervention. Given known low literacy levels in Afghanistan, options for a mobile phone information system are limited to voice delivery, either through pre-recorded messages or speaking with a live person, the latter strongly preferred by youth in this study^{20,30}. With high reported mobile phone access among participants, such a system seems potentially feasible and likely accessible to more IDP youth than other communication channels.

Designing and implementing a mobile phone-based RMNCH information program will need to consider potential challenges to reaching female youth. Although mobile phone access among women in Afghanistan is high and growing, interventions will need to consider social norms that require women to seek permission to use phones and privacy concerns when phones are shared within families²⁰.

Geography, ethnic diversity, limited transportation infrastructure and insecurity make conducting population-based research in Afghanistan challenging. Although this study provides useful information on health information sources and preferences of IDP youth from three provinces, several limitations require interpreting findings with caution. An important limitation was how internal displacement was defined. Age and sex criteria were recorded from participants; however, IDP categorization was broad, including participants who resided in areas typically inhabited by IDPs. Reasons for displacement and length of time in current residence were not collected, meaning this sample of IDP youth may be quite heterogeneous by displacement characteristics. Next, although efforts were made through use of a random-walk method to reduce sampling bias, this sample of IDP youth constitutes a non-probability sample;³¹ the extent to which findings from this survey reflect the broader population of IDP youth in these provinces is unknown. Information collected on exposure to media and health-related information was gathered through self-report and subject to problems with recall.

Although findings from this study should be considered exploratory, we believe that mobile phone-based programming, if appropriately marketed, presents a promising channel to reach IDP youth. Further research is needed to understand the most cost-effective mobile phone platforms to use, as well as how to refine content for various RMNCH topics to target specific sub-populations. We recommend that mobile phone-based RMNCH programming be developed and tested specifically for youth, with purposive inclusion of IDP populations in multiple settings to ensure cultural congruence and acceptability. The resulting interventions should be rigorously tested for cost-effectiveness to help guide national policy for youth programming amidst budgetary limitations and increasing insecurity.

Data availability

Underlying data

Harvard Dataverse. Databases for Formative Assessment of Knowledge, Attitudes, and Preferred Media for Reproductive Health Engagement among Selected Groups of Youth and Men in Afghanistan. <https://doi.org/10.7910/DVN/QULMNN>²².

Underlying data are available in file “IDPYouthRMNCHMediaKAP-Sani_30APR19.tab”

Extended data

Harvard Dataverse. Databases for Formative Assessment of Knowledge, Attitudes, and Preferred Media for Reproductive Health Engagement among Selected Groups of Youth and Men in Afghanistan. <https://doi.org/10.7910/DVN/QULMNN²²>.

The data collection instrument is attached to the final study report (file “AfghaM Male Youth Report_Final26MAR19.pdf”) as ANNEXE 2: IDP YOUTH MNCH COMMUNICATIONS SURVEY QUANTITATIVE COMPONENT.

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

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Nichole Stetten

College of Public Health and Health Professions, University of Florida, Gainesville, FL, USA

This study highlights the need for reproductive, maternal, newborn and child health (RMNCH) interventions in Afghanistan. There is a need for RMNCH interventions to be targeted towards youth, aged 15 to 25 years old, which make up more than half of the Afghani population. Internally displaced persons (IDPs) within this population have even greater barriers to access maternal and child health care. Due to IDPs being a unique population and harder to reach, mobile technology could be used to bridge the access gap in health care. The study aimed to measure the current and preferred RMNCH information channels with an emphasis on exploring the feasibility of using mobile phone technology to reach the IDP youth population.

The results of this study are important to the field especially as it covers a hard to reach population. Other strengths of the study are its large sample size over three provinces, with almost equal male and female participants within each province. Additionally, the methods show great cultural competency, which is crucial when conducting a research study within a community.

Current recommendations to the authors are listed below:

- Brief mention of where the survey data comes from is needed and the purpose of the overall project should be added. Looking at the references within this section, the data seems to come from the United States Agency for International Development (USAID)-funded Helping Mothers and Children Thrive in Afghanistan (HEMAYAT) project. Further explanation of this project would strengthen the paper and deepen understanding.
- Formative research is primarily used for developing intervention strategies, materials and instruments. Commonly formative research approaches are developed using a theoretical framework. Methods should be expanded to include how this formative approach was developed.
- The random walk technique used for sampling should be explained in further detail, including why this method was chosen over other methods. How does this method reduce

bias?

- In the methods the authors state that they were specifically targeting youth and adult men, but when looking in the recruitment section it appears, they are targeting men and women equally.
- Looking at the demographics of the study it looks as if there are significant differences in men in the Takhar province than the other two. While women were similar in demographics across the three provinces, men in the Takhar province had lower levels of educational attainment and low levels of literacy. This difference should be noted within the paper. Noting these differences not only with demographics but in the other sections of the analysis is important as certain provinces may have different wants/needs. If these populations are significantly different from each other then they may also have different needs within an intervention.
- The authors conclude that an RMNCH intervention is “potentially feasible” and “likely accessible to more IDP youth” than other forms of communication. The results appear to show low feasibility for this type of intervention, due to low literacy rates, smart phones being owned and controlled predominantly by males, and overall preferred sources of RMNCH coming directly from health care providers. Although many IDP youth own mobile phones there would be many barriers to overcome to implement a successful mobile intervention. A majority of participants reported being “likely to use a free mobile phone-based intervention,” this high rate of “intention to use” does not always translate into a behavior change. Actual feasibility conclusions should be drawn from a pilot study using an RMNCH intervention.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: PhD in Public Health - Behavioral Science and Community Health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 21 Oct 2019

Lisa Dulli, FHI 360, Durham, USA

Thank you for your thoughtful and detailed review. We've tried to address each concern separately below (reviewer comments in italics, responses in normal text):

This study highlights the need for reproductive, maternal, newborn and child health (RMNCH) interventions in Afghanistan. There is a need for RMNCH interventions to be targeted towards youth, aged 15 to 25 years old, which make up more than half of the Afghani population. Internally displaced persons (IDPs) within this population have even greater barriers to access maternal and child health care. Due to IDPs being a unique population and harder to reach, mobile technology could be used to bridge the access gap in health care. The study aimed to measure the current and preferred RMNCH information channels with an emphasis on exploring the feasibility of using mobile phone technology to reach the IDP youth population.

The results of this study are important to the field especially as it covers a hard to reach population. Other strengths of the study are its large sample size over three provinces, with almost equal male and female participants within each province. Additionally, the methods show great cultural competency, which is crucial when conducting a research study within a community.

Current recommendations to the authors are listed below:

- *Brief mention of where the survey data comes from is needed and the purpose of the overall project should be added. Looking at the references within this section, the data seems to come from the United States Agency for International Development (USAID)-funded Helping Mothers and Children Thrive in Afghanistan (HEMAYAT) project. Further explanation of this project would strengthen the paper and deepen understanding.*

Information on the project is added to the first sentence of the methods section with new content in italicized font on pp. 2-3:

*"We conducted a sub-group analysis of survey data collected in a mixed-methods, cross-sectional, formative assessment to inform programming for the United States Agency for International Development-funded Helping Mothers and Children Thrive in Afghanistan project."*²¹

The assessment was designed to gather information from youth 15-25 years and adult men > 25 years of age to identify health information and service gaps related to RMNCH outcomes and inform content and channel selection to segments of these populations, including IDPs, for targeted programming. For these analyses, we include data from a convenience sample of female and male IDP youth, ages 15 to 25 years. Youth who self-identified as IDP were recruited from households located in areas with large IDP populations in Kandahar, Nangarhar, and Takhar Provinces, selected based on their geographic and ethnic diversity. Survey data were collected March-July 2017 using a structured questionnaire administered through face-to-face interviews conducted by trained research assistants. Data used for

these analyses include participant background information, household possession of media devices (i.e. television, radio and mobile phones), exposure to health information from various channels, desires for various types of health information and *preferred* channels of communication, as well as likelihood to use a free mobile phone-based system to receive health information."

- *Formative research is primarily used for developing intervention strategies, materials and instruments. Commonly formative research approaches are developed using a theoretical framework. Methods should be expanded to include how this formative approach was developed.*

While we agree that formative research can be driven by theory, it can also be driven by empirical evidence (or both) or practical need in the absence of empirical evidence. In this case, the project had a number of predetermined objectives (based on project design) and this assessment was used to identify gaps that needed to be addressed for those objectives in order to target interventions to improve health outcomes. We have added this content on pp. 2-3:

"We conducted a sub-group analysis of survey data collected in a mixed-methods, cross-sectional, formative assessment to inform programming for the United States Agency for International Development-funded Helping Mothers and Children Thrive in Afghanistan project. The assessment was designed to gather information from youth 15-25 years and adult men > 25 years of age to identify health information and service gaps related to RMNCH outcomes and inform content and channel selection to segments of these populations, including IDPs, for targeted programming."

- *The random walk technique used for sampling should be explained in further detail, including why this method was chosen over other methods. How does this method reduce bias?*

The method was selected as an attempt to reduce sampling bias as compared to simple convenience sampling, although we acknowledge that it does not necessarily do so to a measurable extent; thus, we describe and treat these data as a convenience sample. Community mapping to generate a true probability sample is a time-intensive and costly endeavor, one that the project was unable to afford. Therefore, the option to enroll a convenience sample was chosen. However, random-walk sampling can help to reduce (though we do not know to what extent) sampling bias introduced by a non-random sampling method. Reference is given to the primary source that describes the method and we have provided further details on p. 3:

"Households in these communities were sampled using a random walk technique.²² The approach used for this random-walk sample involved selecting a central community landmark, such as a mosque, then selecting one house at random to be the starting point. From there households were approached at regular intervals (e.g. every 3rd) Household selection continued in each area until reaching the requisite sample size."

< >In the methods the authors state that they were specifically targeting youth and adult men, but when looking in the recruitment section it appears, they are targeting men and women equally. Looking at the demographics of the study it looks as if there are significant differences in men in the Takhar province than the other two. While women were similar in

demographics across the three provinces, men in the Takhar province had lower levels of educational attainment and low levels of literacy. This difference should be noted within the paper. Noting these differences not only with demographics but in the other sections of the analysis is important as certain provinces may have different wants/needs. If these populations are significantly different from each other then they may also have different needs within an intervention. *The authors conclude that an RMNCH intervention is “potentially feasible” and “likely accessible to more IDP youth” than other forms of communication. The results appear to show low feasibility for this type of intervention, due to low literacy rates, smart phones being owned and controlled predominantly by males, and overall preferred sources of RMNCH coming directly from health care providers. Although many IDP youth own mobile phones there would be many barriers to overcome to implement a successful mobile intervention. A majority of participants reported being “likely to use a free mobile phone-based intervention,” this high rate of “intention to use” does not always translate into a behavior change. Actual feasibility conclusions should be drawn from a pilot study using an RMNCH intervention.*

We appreciate the reviewer’s comments; however, as noted in the discussion, if the intervention used voice messaging (either through live persons or voice recordings) then the literacy challenge would be addressed. Smartphones would not be needed for either a voice- or a text-based intervention, and we hope we have not given the impression that they would be required.

We agree that face-to-face client-provider interactions are ideal based on the preferred source of health information for most participants; however, access to such interactions is limited, for multiple reasons, which is why alternative, complementary strategies are required.

In terms of self-reported likelihood to use a hypothetical intervention, we absolutely agree. We’ve revised the text in the last paragraph to more explicitly support the need for documenting the actual feasibility of the approach on p. 9:

“Although findings from this study are exploratory, we believe that mobile phone-based programming, if appropriately marketed, presents a promising channel to reach IDP youth. Further research is needed to more thoroughly document feasibility, as well as to understand the most cost-effective mobile phone platforms to use. It will also be important to refine content for various RMNCH topics and channel selection to target specific segments of these sub-populations. We recommend that mobile phone-based RMNCH programming be developed and tested specifically for youth, with purposive inclusion of IDP populations in multiple settings to ensure cultural congruence and acceptability. The resulting interventions should be rigorously tested for cost-effectiveness to help guide national policy for youth programming amidst budgetary limitations and increasing insecurity.”

Competing Interests: No competing interests were disclosed.

Reviewer Report 02 July 2019

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George C. Patton

Department of Paediatrics, University of Melbourne, Melbourne, Victoria, Australia

This cross-sectional survey reports on a topic and youth group that has had very little attention in the literature. Certainly I've seen no similar report and as the authors rightly conclude, displaced youth in places like Afghanistan have been little studied. This population also poses quite a few challenges in surveys of this kind, as the authors again point out.

The paper is generally well-written and the tables/figure are straightforward and clear. Inevitably there are methodological limitations, many of which the authors to flag. Some remained significant.

1. The sampling methods are not clear enough. Given the relatively small numbers, I am assuming this is not aspiring to be a representative sample of the target population. However, it isn't clear how these participants were selected. No details are given of response rates, including characteristics of non-responders. These details are important.
2. One problem in interpreting the findings is the definition of internally displaced. The authors do mention this in the discussion as a limitation but it seems that these groups are actually young people living in areas where there are high levels of internal displacement? I was clear if they were displaced themselves – if not perhaps the title of the paper should be changed?
3. It would be very good if the authors could elaborate on reasons for internal displacement of youth in Afghanistan. I'm assuming that conflict and unrest is one factor but there are a range of others that are very significant: marriage in girls; employment in boys; and there may be a range of other reasons as well e.g. access to education. This is important for the reader to understand.
4. The conclusion that the authors draw is that there would be scope for communicating with males and to a lesser extent females through mobile phones to provide health information. Given youth preferences, this would ideally be a system with a real person at the other end of the phone line. Could the authors provide some examples of where this has been rolled out, ideally with information on coverage and costings, with some discussion as to whether this might be affordable and scalable in the context of Afghanistan?
5. The researchers seemed quite dismissive of mass media strategies for providing information to youth. Yet there are some very good examples of using mass media and low and middle income countries to provide information on sexual and reproductive health. It would be good if the authors could go back and re-examine this literature as mass media do provide an alternative platform for delivery of information at scale – the costs of doing so are likely to be quite a lot lower than individualised manning of telephone lines.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

No

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Developmental Epidemiology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 21 Oct 2019

Lisa Dulli, FHI 360, Durham, USA

We thank the reviewer for his constructive feedback on this manuscript and submit the revised version along with responses to critiques. Reviewer input is in italicized font and we provide our response and the relevant changes after each critique.

This cross-sectional survey reports on a topic and youth group that has had very little attention in the literature. Certainly, I've seen no similar report and as the authors rightly conclude, displaced youth in places like Afghanistan have been little studied. This population also poses quite a few challenges in surveys of this kind, as the authors again point out. The paper is generally well-written and the tables/figure are straightforward and clear. Inevitably there are methodological limitations, many of which the authors to flag. Some remained significant.

1) The sampling methods are not clear enough. Given the relatively small numbers, I am assuming this is not aspiring to be a representative sample of the target population. However, it isn't clear how these participants were selected. No details are given of response rates, including characteristics of non-responders. These details are important.

This is not a representative sample, as noted in the limitations of the original manuscript. We have provided additional details on sampling strategy on pp. 2-3 (italicized text below): "We conducted a sub-group analysis of survey data collected in a mixed-methods, cross-sectional, formative assessment to *inform programming for the United States Agency for International Development-funded Helping Mothers and Children Thrive in Afghanistan project*.²¹ The assessment was designed to gather information from youth 15-25 years and adult men > 25 years of age to *identify health information and service gaps related to RMNCH outcomes and inform content and channel selection to segments of these populations, including IDPs, for targeted programming*. For these analyses, we include data from a convenience sample of female and male IDP youth, ages 15 to 25 years. Youth who self-identified as IDP were recruited from households located in areas with large IDP populations in Kandahar, Nangarhar, and Takhar Provinces, selected based on their geographic and ethnic diversity. Survey data were collected March-July 2017 using a structured questionnaire administered through face-to-face interviews conducted by trained research assistants. Data used for these analyses include participant background information, household possession of media devices (i.e. television, radio and mobile phones), exposure to health information from various channels, desires for various types of health information and preferred channels of communication, as well as likelihood to use a free mobile phone-based system to receive health information.

Geographic areas were selected based on guidance from UNHCR, the Ministry of Refugees and Repatriation, and the Danish and the Norwegian Refugee Committees, who have pre-existing relationships with IDP communities and their leaders. Households in these communities were sampled using a random walk technique.²² Household selection continued in each area until reaching the requisite sample size. Verbal informed consent was obtained from eligible youth interested in participating then a structured questionnaire was administered by sex-matched data collectors in a private setting within the house." and response rates on p. 4:

"A total of 462 IDP youth were recruited to participate in the survey. *Ten of the 462 declined participation (2.2%); one person consented, but refused to answer the remaining survey questions and data from one further participant was dropped because of incomplete interview, leaving 450 total study participants in Kandahar, Nangarhar, and Takhar Provinces including 225 male and 225 female youth. Characteristics of non-responders are not available as once a person declined to participate, no further information was recorded.*"

2) *One problem in interpreting the findings is the definition of internally displaced. The authors do mention this in the discussion as a limitation, but it seems that these groups are actually young people living in areas where there are high levels of internal displacement? I was clear if they were displaced themselves – if not perhaps the title of the paper should be changed?*

Although we did not collect additional information on displacement characteristics, eligibility was constrained to youth who self-identified as IDPs. Data collectors asked the youth if they were internally displaced before proceeding to the informed consent process. This information has been added to the manuscript on p. 3:

"For these analyses, we include data from a convenience sample of female and male IDP youth, ages 15 to 25 years. Youth who self-identified as IDP were recruited from households located in areas with large IDP populations in Kandahar, Nangarhar, and Takhar Provinces,

selected based on their geographic and ethnic diversity.”

3) It would be very good if the authors could elaborate on reasons for internal displacement of youth in Afghanistan. I'm assuming that conflict and unrest is one factor but there are a range of others that are very significant: marriage in girls; employment in boys; and there may be a range of other reasons as well e.g. access to education. This is important for the reader to understand.

As noted by UNESCO, “Guiding Principles on Internal Displacement set by of Office for the United Nations High Commissioner for Refugees (UNHCR) holds internally displaced persons to be “persons or groups of persons who have been forced to flee, or leave, their homes or places of habitual residence as a result of armed conflict, internal strife, and habitual violations of human rights, as well as natural or man-made disasters involving one or more of these elements, and who have not crossed an internationally recognised state border.” (<http://www.unesco.org/new/en/social-and-human-sciences/themes/international-migration/glossary/displaced-person-displacement/>). However, it could certainly be argued that the line between forced and unforced migration can be blurry.

We noted in the discussion section, a limitation of the study is that we did not collect information from participants on reasons for displacement. We do, however, report in the second paragraph of the background section, main drivers for internal displacement (forced migration) in Afghanistan, which include conflict, natural disasters and poverty, as documented through other research; youth move with their families as the family unit tends to stay intact in situations resulting in displacement. We did not explore reasons for voluntary migration in detail.

Please see the text on p. 1:

“Years of armed conflict, natural disasters like drought and flooding, and widespread poverty have led to large-scale migration of intact family units both within and from Afghanistan.⁹⁻¹¹”

4) The conclusion that the authors draw is that there would be scope for communicating with males, and to a lesser extent, females through mobile phones to provide health information. Given youth preferences, this would ideally be a system with a real person at the other end of the phone line. Could the authors provide some examples of where this has been rolled out, ideally with information on coverage and costings, with some discussion as to whether this might be affordable and scalable in the context of Afghanistan?

To date, there is no published evidence on the use of mobile phones for health promotion interventions in Afghanistan. Based on a search of the current literature, only one study has been published on the topic from Afghanistan - a descriptive study exploring women's perceptions around using mobile phones to promote maternal and child health. There is very little in the published literature on the effectiveness of health promotion programs that employ voice messaging or live interactive phone calls in LMIC, and even less on costs. Many programs are currently being implemented, but the evidence lags behind. A number of protocols examining similar interventions have been published, but studies have not yet been completed. Of note, the HEMAYAT project, which led this formative research, is currently piloting a voice messaging intervention to promote RMNCH among pregnant and

postpartum women. However, as with many of these interventions, the work is still underway. These limitations in the current literature are noted on p. 8:

“There is limited reported evidence on the use of messaging strategies for mobile phones other than SMS, and to date, there is no published evidence on the use of mobile phones in health promotion interventions in Afghanistan.¹⁴ Authors of a 2017 systematic literature review on mHealth strategies in low- and middle-income countries found that most intervention strategies used SMS-based messaging, though a few incorporated social media apps, such as Facebook, and one program in Papua New Guinea employed the use of voice messages and an interactive information hotline to promote youth-friendly sexual and reproductive health information for young people ages 15 to 24.¹⁴ Although studies and project reports have documented successful implementation of mobile health strategies, SMS messaging predominately, a 2019 review notes a number of important barriers, including telecommunications infrastructures, costs, literacy and language barriers, among others, that will require careful consideration, planning and assessment as future interventions are developed and evaluated.³⁰”

5) The researchers seemed quite dismissive of mass media strategies for providing information to youth. Yet there are some very good examples of using mass media and low- and middle-income countries to provide information on sexual and reproductive health. It would be good if the authors could go back and re-examine this literature as mass media do provide an alternative platform for delivery of information at scale – the costs of doing so are likely to be quite a lot lower than individualised manning of telephone lines.

Our aim was not to be dismissive of mass media, but rather it was to place our findings in the context of what is known about reaching youth with health information in this particular setting. There are indeed examples of mass media to influence health-related knowledge and attitudes, and to a lesser extent, health-related behaviors in other countries. We have revised our summary on p. 8 to read

“Mass media campaigns are another health information strategy with some evidence for increasing health-related knowledge and attitudes, and to a lesser extent, health-related behaviors. service use, though the evidence is weak, and effectiveness for changing health behaviors is not well documented.”

However, our findings indicate that access to traditional mass media channels (e.g. radio and television) is limited among our study participants and varies considerably across provinces. In Takhar, for example, fewer than one in four of men and women had access to either radio or television, thus limiting their potential effectiveness, hence the need to identify other communication channels.

Competing Interests: No competing interests were disclosed.