



Formative evaluation of a proposed mHealth program for childhood illness management in a resource-limited setting in Peru

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ABSTRACT

Objective. To conduct a formative evaluation of a proposed mobile health (mHealth) program designed to educate caregivers about management of common childhood illnesses.

Methods. A cluster-randomized sample ($n = 220$) of mothers in Cono Norte, Arequipa, Peru with at least one child under five completed an iPad-based survey. This descriptive study examined trends in mobile phone ownership and feasibility of and interest in mHealth across sociodemographic categories. Fisher's exact tests were used to evaluate associations. Univariate logistic regression models were fitted to calculate odds ratios and 95% confidence intervals.

Results. Of 220 participants, 82.3% and 95.0% reported mobile phone ownership and access, respectively. Ownership was significantly associated with educational level ($P = 0.031$); however, even among mothers with the lowest education, ownership approached 80%. Educational level and age, respectively, were associated with the ability to open ($P < 0.001$; $P < 0.001$), read ($P < 0.001$; $P < 0.001$), write ($P < 0.001$; $P < 0.001$), and send ($P = 0.006$; $P = 0.047$) text messages. Over 85% of mothers were interested in using their mobile phones to receive health advice for their child and to seek help during illness. Regression analyses revealed that ability to use a mobile phone was positively associated with the mother's intention to participate in the mHealth program.

Conclusions. The study findings confirm widespread access to mobile phones and sufficient ability to utilize text messaging within this population of caregivers. In addition to access and feasibility, high levels of interest in using mobile phones for health-related purposes suggest the potential value associated with an mHealth program designed to improve childhood illness management in this community.

Key words

Cell phones; child health; health education; text messaging; information technology; Peru.

The widespread global uptake of mobile communication devices offers an

unprecedented opportunity to use these technologies to improve public health.

Mobile health (mHealth) incorporates mobile devices into the promotion and delivery of health services and information and is recognized as a promising approach to tackling intractable global health challenges (1, 2). With nearly 7 billion mobile phone subscribers worldwide, over 75% in the developing world, mHealth can help overcome major health

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barriers, such as shortages of healthcare workers, inadequate disease surveillance, and poor adherence to evidence-based treatments, especially among geographically remote and underserved populations (3–6). By leveraging the power of mobile technologies, mHealth has the potential to extend the reach of healthcare services and ultimately improve health outcomes (1, 2, 7). As ownership of mobile phones has increased throughout the developing world, diverse mHealth interventions have been designed to support a range of services, including education and awareness, remote data collection and monitoring, communication and training for healthcare workers, disease and epidemic surveillance, and diagnostic and treatment support (2, 6, 8–11).

While the targets for reduction in child mortality put forth in the Millennium Development Goals may not be fully achieved, accelerated progress in improving maternal and child health remains a global priority. A recent report reveals that preventable, and often treatable, diseases are still the leading causes of death in children under five worldwide (12). This is largely because communities in the developing world commonly lack the resources, healthcare personnel, and knowledge to prevent and treat such diseases. In 2010, the United Nations announced the Global Strategy for Women's and Children's Health as a road map to improving the health of the most vulnerable and hardest-to-reach women and children in the developing world by 2015 (13). The plan calls for a focus on promoting and delivering integrated packages of essential interventions, such as vaccines and oral rehydration therapy, in innovative ways that can increase efficiency and impact. mHealth is identified in this strategy as a revolutionary tool in achieving needed progress (13). Prior studies have demonstrated the potential of mHealth in the area of maternal and child health, especially in remote and resource-limited communities, but this evidence base is nascent (14–17).

One important mechanism through which mHealth can influence behavior is by enabling individuals to make more informed decisions for health. Recent studies show that mHealth initiatives that disseminate health information through Short Message Service (SMS) platforms can elicit healthier behaviors and improve patient outcomes (18–21).

As the most widely adopted form of mobile communication worldwide, text messaging allows health promotion programs to reach otherwise underserved populations, connecting patients and health care workers both synchronously and asynchronously (8, 22). A review of mHealth initiatives to enhance child survival in low- and middle-income countries show that text messaging interventions have been effective in improving adherence to medication, uptake of health services, caregiver education, and healthcare provider compliance with protocols (23).

Despite this promise, more evidence is needed. Both formative and post-implementation evaluations of mHealth programs are lacking, making it difficult to transform pilot projects into scalable and sustainable initiatives (2, 4, 19, 24). If mHealth programs are not formally evaluated for feasibility and acceptability, repeated failure of pilot initiatives may undermine the public's trust and confidence in future programs (7, 25). A proposed framework for the implementation and evaluation of mHealth programs emphasizes the need to assess physical access to mobile devices, feasibility of mobile device use, relevance of proposed program content, and a variety of other socio-cultural factors in the target population (26). The success of mHealth programs hinges on the ability to design an intervention with a user-focused approach, which involves identifying health needs of the target community and addressing barriers or challenges that would prevent the initiative from serving those needs (27). In this context, the goal of the present study was to conduct a formative evaluation of a proposed mHealth program designed to support caregivers of young children in a low-resource setting in providing care for common childhood illness. Relationships were assessed between sociodemographic characteristics and patterns of mobile phone access, feasibility of mobile phone use, and interest in using mobile phones for health-related purposes to inform the development of an mHealth intervention.

MATERIALS AND METHODS

This descriptive study surveyed a cluster-randomized sample of 220 mothers with young children about their ownership and access to mobile phones, their

ability to utilize a mobile phone, and their attitudes toward using them to send and receive health-related information. The Institutional Review Boards at the University of Pennsylvania and the Universidad Peruana Cayetano Heredia approved this study. All study participants provided informed consent before completing the survey and data were de-identified for analysis.

Study setting

Study participants were recruited from households in the Cono Norte region of Arequipa, Peru in August and September 2012. Cono Norte is a peri-urban community of approximately 30 000 people on the outskirts of Arequipa and was targeted for this proposed mHealth intervention based on prior work in the community by one of the authors (HM). Due to lack of infrastructure in this recently developed portion of the city, many households in Cono Norte lack access to potable water and sewage services. Study participants were recruited from the service area of the Ciudad de Dios Centro de Salud (health center), which has a population of about 16 000.

Study participants

Survey participants included women between the ages of 18 and 44 with at least one child under the age of 5. Mothers were eligible for study participation if they were resident in the household and were able to provide informed consent. Household residency was defined as sleeping in the home at least one night per week on a regular basis.

Sample size and sampling procedure

Within the health center catchment area, a complete listing of manzanas (blocks) in each of 14 sectors was created using regional maps obtained from the Municipalidad de Yura (the local municipal government). The number of households on each block, as indicated on the map, was recorded. Using a random number generator and interval sampling, 124 of the 507 manzanas in the sampling frame were randomly selected for door-to-door recruitment. All households on sampled blocks were approached; eligible women were invited to participate in the survey and informed

consent was obtained. If no one was home when the interviewers visited or an eligible woman was absent, interviewers returned on another day to attempt to complete the interview. Eligible women who consented to participation were surveyed in their homes using an iPad-based survey tool. Where multiple women were eligible in a household, each woman was given the opportunity to participate.

Survey instrument

The survey instrument was adapted from a Spanish-language survey used by one of the authors (EG) to evaluate the feasibility of an mHealth program for chronic illness treatment adherence in a different setting. The current survey collected basic demographic data in addition to information on mobile phone access. To assess access among mothers who reported not owning a mobile phone, respondents were asked if they used another individual's device.

Mothers who reported having access to mobile phones were asked to evaluate the feasibility of using them in this context on 5-point Likert scales. Mothers rated ease of opening, reading, writing and sending text messages, as well as their frequency of sending and receiving them. The survey also explored the acceptability of

using mobile phones to send and receive health-related information. For example, mothers were asked if they were interested in using mobile phones to ask questions about health, to solicit help when someone was sick, to receive health advice for their child, or to set appointment or medication reminders.

Data analysis

Descriptive statistics and frequencies were used to assess mobile phone ownership and the distribution of relevant sociodemographic and mobile phone usage measures. Fisher's exact tests were used to assess whether significant differences existed between sociodemographic categories for mobile phone ownership, feasibility of mobile phone use and interest in using mobile phones for health-related purposes. Univariate logistic regression models were used to evaluate potential predictors of participation in the mHealth program. Analyses were conducted using Stata version 13.1 (StataCorp, College Station, Texas, USA).

RESULTS

Sample characteristics

From the 1 847 households in the sampling frame, 220 individuals consented

to participate in the study. Approximately 43.4% (802) of households no longer existed, were uninhabited, could not be approached for safety reasons, or were unavailable. In another 743 (40.2%), there were no mothers with children under five. Only 82 (4.4%) households had an eligible mother who either refused or was not available to participate. Study participants were an average of 27.8 years old (range: 18–46; standard deviation, SD: 6.4), with only 30.9% over 30 years (see Table 1). The mean number of children per mother was 2.0 (range: 1–8; SD: 1.2), and on average, mothers had 1.2 children under the age of five (range: 1–4; SD: 0.4). Participants were fairly well educated, with 71.4% having completed at least some secondary education and 10.5% at least some technical or university education. Two mothers reported being illiterate; however, these were collapsed into the primary education category due to the small sample size.

Mobile phone ownership & access

Of the 220 participants, 181 (82.3%) reported owning a mobile phone. Mobile phone ownership did not vary by age, labor status, relationship status, or household head status (see Table 2). At least 75% of mothers in each sociodemographic

TABLE 1. Characteristics of sample (n = 220) of mothers from Cono Norte, Peru, 2012

	Overall sample characteristics		Mothers with mobile phone access	
	No.	(%) ^a	No.	(%) ^b
Age (years)				
< 25	93	(42.3)	88	(94.6)
26–30	59	(26.8)	56	(94.9)
31–35	37	(16.8)	36	(97.3)
≥ 36	31	(14.1)	29	(93.5)
Education				
Illiterate/Primary	40	(18.2)	37	(92.5)
Secondary	157	(71.4)	149	(94.9)
Technical/University	23	(10.5)	23	(100.0)
Labor status				
Housewife	160	(72.7)	152	(95.0)
Independent	42	(19.1)	40	(95.2)
Other	18	(8.2)	17	(94.4)
Civil status				
Married	33	(15.0)	32	(97.0)
Relationship	171	(77.7)	162	(94.7)
Single	16	(7.3)	15	(93.8)
Head of household				
No	171	(77.7)	164	(95.9)
Yes	49	(22.3)	45	(91.8)
Total	220	(100)	209	(95.0)

Data source: prepared by authors from study results.

^aPercentage of total sample.

^bPercentage calculated on the basis of of sociodemographic category total.

TABLE 2. Mobile phone ownership and feasibility of mobile phone use among sample (overall $n = 220$; n with access to mobile phones = 209^a) of mothers from Cono Norte, Peru, 2012^b

	Own mobile phone		Open SMS		Send SMS		Write SMS		Read SMS	
	No.	(%)	No.	(%) ^a	No.	(%) ^a	No.	(%) ^a	No.	(%) ^a
Total	181	(82.3)	167	(79.9)	165	(78.9)	163	(78.0)	188	(90.0)
Age (years)	$P^c = 0.798$		$P^c < 0.001$		$P^c < 0.001$		$P^c < 0.001$		$P^c = 0.047$	
< 25	74	(79.6)	80	(90.9)	79	(89.8)	81	(92.1)	83	(94.3)
26–30	50	(84.8)	50	(89.3)	50	(89.3)	46	(83.6)	52	(92.9)
31–35	30	(81.1)	21	(58.3)	23	(63.9)	24	(66.7)	30	(83.3)
≥ 36	27	(87.1)	16	(55.2)	13	(44.8)	12	(41.4)	23	(79.3)
Education	$P^c = 0.031$		$P^c < 0.001$		$P^c < 0.001$		$P^c < 0.001$		$P^c = 0.006$	
Illiterate/Primary	31	(77.5)	16	(43.2)	17	(46.0)	15	(40.6)	28	(75.7)
Secondary	127	(80.9)	128	(85.9)	125	(83.9)	125	(84.5)	137	(92.0)
Technical/University	23	(100.0)	23	(100.0)	23	(100.0)	23	(100.0)	23	(100.0)
Labor status	$P = 0.439$		$P = 0.770$		$P = 0.056$		$P^c = 0.051$		$P = 0.333$	
Housewife	128	(80.0)	120	(79.0)	117	(77.0)	116	(76.8)	134	(88.2)
Independent	37	(88.1)	32	(80.0)	31	(77.5)	30	(75.0)	37	(92.5)
Other	16	(88.9)	14	(88.2)	17	(100.0)	17	(100.0)	17	(100.0)
Civil status	$P = 0.589$		$P = 0.636$		$P = 0.527$		$P = 0.148$		$P = 0.196$	
Married	27	(81.8)	24	(75.0)	23	(71.9)	21	(65.6)	26	(81.3)
Relationship	139	(81.3)	130	(80.3)	129	(79.6)	129	(80.1)	148	(91.4)
Single	15	(93.8)	13	(86.7)	13	(86.7)	13	(86.7)	14	(93.3)
Head of household	$P = 0.296$		$P = 0.999$		$P = 0.307$		$P = 0.101$		$P = 0.170$	
No	138	(80.7)	131	(79.9)	132	(80.5)	132	(81.0)	150	(91.5)
Yes	43	(87.8)	36	(80.0)	33	(73.3)	31	(68.9)	38	(84.4)

Data source: Table prepared by authors from study results.

^aPercentage calculated with denominator of 209 mothers with access to mobile phones.

^b P -values calculated on the basis of Fisher's exact test of association.

^c $P < 0.05$.

category owned a phone. A statistically significant relationship (P -value: 0.031) was observed between mobile phone ownership and educational level, with 77.5% of mothers in the lowest education category owning mobile phones as compared to 100% of mothers in the highest (see Table 2). No statistically significant relationships were detected between mobile phone ownership and age (P -value: 0.798), labor status (P -value: 0.439), civil status (P -value: 0.589) or household head status (P -value: 0.296).

Of the 39 mothers who did not own a mobile phone, 28 reported having access to another individual's device. In all, 209 (95.0%) mothers had regular access to their own or another's mobile phone.

Feasibility of mobile phone use

Of the 209 mothers with access to a mobile phone, 79.9% felt comfortable opening text messages, 78.0% were able to write messages, and 78.9% felt at ease sending them. A substantial majority of mothers (90.0%) agreed that it is easy to read text messages. Table 2 reveals

substantial variation across age groups within each feasibility category (opening, sending, writing and reading messages), with younger mothers generally more comfortable than older mothers with each skill. In addition, mothers with higher levels of education were more comfortable with text messaging skills. Feasibility of text messaging did not vary significantly across other sociodemographic categories (see Table 2).

About one-third of mothers reported sending a text message once per week; another third sent a message more than three times per week or daily. Text messages were less commonly received: only 16.7% received a message more than three times per week or daily. About half of respondents reported receiving messages either 2 to 3 times per week (14.4%) or once per week (36.4%). While only 1.4% of mothers never sent text messages, almost 23% never received them.

Acceptability of mHealth

Of the 220 participants, 191 (86.8%) were interested in the idea of receiving

advice about child health by mobile phone and 190 (86.4%) in using phones to seek help when a household member was sick (see Table 3). Half reported interest in asking health questions of providers via mobile phones. While interest in child health issues was strong, less than half of the women (44.6%) wanted to receive general health information by text. Respondents also expressed less interest in receiving reminders about appointments (27.3%) or medications (25.5%). There were no statistically significant associations between sociodemographic variables and categories of mHealth interest (see Table 3).

Participants were asked about their attitudes toward and intention to use a proposed mHealth program. Over 92% of mothers agreed or strongly agreed with the statement: "I will definitely use this [mHealth] service." Only 4.5% of mothers responded to this statement with uncertainty and 2.7% disagreed or strongly disagreed. No significant associations were detected between intention to participate and either mobile phone access ($P = 0.170$) or ownership ($P = 0.408$). However,

TABLE 3. Interest in utilizing mobile phones for health-related purposes among mothers (n = 220) in Cono Norte, Peru, 2012^a

	Child health advice		Help for sick person		General health questions		General health advice		Appointment reminders		Medication reminders	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total	191	(86.8)	190	(86.4)	112	(50.9)	98	(44.6)	60	(27.3)	56	(25.5)
Age (years)	<i>P</i> = 0.152		<i>P</i> = 0.277		<i>P</i> = 0.528		<i>P</i> = 0.599		<i>P</i> = 0.271		<i>P</i> = 0.721	
< 25	76	(81.7)	79	(85.0)	50	(53.8)	46	(49.5)	26	(28.0)	25	(26.9)
26–30	55	(93.2)	53	(89.8)	32	(54.2)	23	(39.0)	11	(18.6)	12	(20.3)
31–35	34	(91.9)	29	(78.4)	15	(40.5)	15	(40.5)	12	(32.4)	11	(29.7)
≥ 36	26	(83.9)	29	(93.6)	15	(48.4)	14	(45.2)	11	(35.5)	8	(25.8)
Education	<i>P</i> = 0.726		<i>P</i> = 0.061		<i>P</i> = 0.149		<i>P</i> = 0.565		<i>P</i> ^b = 0.027		<i>P</i> = 0.171	
Illiterate/Primary	36	(90.0)	38	(95.0)	21	(52.5)	17	(42.5)	16	(40.0)	15	(37.5)
Secondary	134	(85.4)	130	(82.8)	75	(47.8)	73	(46.5)	42	(26.8)	36	(22.9)
Technical/University	21	(91.3)	22	(95.7)	16	(70.0)	8	(34.8)	2	(8.7)	5	(21.7)
Labor status	<i>P</i> = 0.149		<i>P</i> = 0.999		<i>P</i> = 0.602		<i>P</i> = 0.806		<i>P</i> = 0.791		<i>P</i> = 0.207	
Housewife	135	(84.4)	138	(86.3)	78	(48.8)	71	(44.4)	43	(26.9)	36	(22.5)
Independent	38	(90.5)	36	(85.7)	24	(57.1)	20	(47.6)	13	(31.0)	15	(35.7)
Other	18	(100.0)	16	(88.9)	10	(55.6)	7	(38.9)	4	(22.2)	5	(27.8)
Civil status	<i>P</i> = 0.999		<i>P</i> = 0.247		<i>P</i> = 0.832		<i>P</i> = 0.554		<i>P</i> = 0.078		<i>P</i> = 0.999	
Married	29	(87.9)	29	(87.9)	18	(54.6)	15	(45.5)	14	(42.4)	8	(24.2)
Relationship	148	(86.6)	145	(84.8)	85	(49.7)	78	(45.6)	41	(24.0)	44	(25.7)
Single	14	(87.5)	16	(100.0)	9	(56.3)	5	(31.3)	5	(31.3)	4	(25.0)
Head of household	<i>P</i> = 0.235		<i>P</i> = 0.999		<i>P</i> = 0.257		<i>P</i> = 0.626		<i>P</i> = 0.999		<i>P</i> = 0.062	
No	151	(88.3)	147	(86.0)	91	(53.2)	78	(45.6)	47	(27.5)	38	(22.2)
Yes	40	(81.6)	43	(87.8)	21	(42.9)	20	(40.8)	13	(26.5)	18	(36.7)

Data source: table prepared by authors from study results.

^a *P*-values calculated on the basis of Fisher's exact test of association.

^b *P* < 0.05.

univariate logistic regression models showed that intention to participate in the mHealth program was positively associated with mobile phone usage skills, specifically, opening (Odds ratio, OR: 3.3, 95% confidence interval (CI): 1.08, 10.14), reading (OR: 2.7, 95% CI: 0.68, 10.51), writing (OR: 4.1, 95% CI: 1.36, 12.41) and sending (OR: 5.9, 95% CI: 1.92, 18.02) text messages.

When asked about potential program costs, 74.1% of respondents agreed or strongly agreed with the statement, "The [mHealth] service should be free." This agreement was not associated with age, educational level or civil status, but was positively associated with labor status (*P* = 0.018) and household head status (*P* = 0.015). Mothers who reported being housewives and household heads were more likely prefer a free program.

Only 2.3% of mothers strongly agreed with the statement, "I am afraid about my privacy," while 56.4% agreed, and 41.4% were not sure, disagreed, or strongly disagreed. Privacy fears were not associated with educational level, civil status or household head status, but were associated with age (*P* = 0.034) and

labor status (*P* = 0.039). Younger women were more likely to report privacy concerns, as were women who work in the home.

DISCUSSION

This study explored the feasibility and acceptability of using mobile phones for health among caregivers of young children in a resource-poor setting in Peru. In this formative evaluation, mobile phones were found to be widely available, confirming that this would be a feasible channel for sharing health information with caregivers in this community. The finding of 80 to 90% ownership/access is consistent with studies in India (75%), Uganda (93%) and Bangladesh (80%) (28–30). These results also suggest that mobile phone ownership is not associated with most sociodemographic characteristics, thus confirming that an mHealth program would have a wide reach in this setting. Although device ownership did vary by educational level, access among the least-educated group was still high enough to ensure near-full participation.

Most women in this study were confident in their ability to use text messaging. The results were within the range of usage feasibility found in other studies: in an evaluation of an mHealth program designed to improve management of malaria among young children in rural Kenya, nearly all (99%) caregivers were able to open and read text messages; a study of an informational maternal and child health text-messaging program in rural India observed lower facility with reading (69%) and sending (53%) messages (31, 32). In contrast to most other formative assessments reviewed, this study examined patterns of feasibility as they relate to sociodemographic characteristics, and identified that text messaging skills vary across age and educational level. Older mothers reported less comfort with text messaging as compared to younger women, especially with sending and writing messages. Those with lower education also reported difficulty with text messaging; however, differences in feasibility based on educational level were not as prominent for the ability to read text messages as compared to other text messaging skills.

Although two-way communication is seen as an important opportunity in mHealth programs built on the SMS platform, this evaluation suggests that it may not be the best approach in this community. Since caregivers were found to be most comfortable with opening and reading text messages, a one-way text messaging program would ensure that older caregivers and those with lower education could participate fully.

An end-user approach must thoroughly consider the needs and interests of the community. This assessment demonstrated that caregivers are motivated to utilize mobile phones to share and receive child health information, consistent with other results from Argentina in a study of pregnant women with high mobile phone ownership rates (33). Evaluations in other settings have shown that participants appreciate the option to make voice calls, but are also supportive of and willing to use text messaging (28, 34). Mothers in this study also responded positively to the idea of using their mobile phones to seek help for someone who is sick, confirming that the ability to request assistance from a healthcare provider by either voice or text message would be an attractive feature of an mHealth program. While some mothers may not be able to fully engage in two-way communication, it is nevertheless important to take advantage of this opportunity, given substantial interest among caregivers and high feasibility for the majority of mothers. Thus, one logical design might be a program that incorporates both one- and two-way messaging. In the future, it may also be possible for healthcare providers to access exchanges generated within the mHealth system during appointments; however, the main advantage of this proposed program is its ability to reach participants regardless of their access to care. This study is one of the first to explore how interest in mHealth programs is related to sociodemographic characteristics. The absence of association between any area of mHealth interest and either mobile phone ownership or sociodemographic indicators suggests that no significant disparities exist in the acceptability of

mHealth programs among caregivers in this community.

This evaluation highlights potential challenges that must be considered in the development of an mHealth program for this community. Although there is a paucity of evidence on perceptions of mHealth program cost in formative evaluation literature, it was not surprising that the majority of mothers in this low-income community believed that the program should be offered for free. Given that funding would be needed to sustain the mHealth program, support from the government healthcare system could help avoid direct fees to end-users. Another potential barrier that must be addressed during the development phase is concern about privacy, which has been documented in other research (2, 21). Mothers were largely split on this concern, but it seems likely that education on mHealth security features would be sufficient to ensure widespread uptake of the program. Sidney et al. (2011) found that while privacy concerns regarding use of mobile phones to enhance treatment adherence were expressed, they did not seem to be significant deterrents of mHealth participation (35).

This study had several limitations. The sample size was small, which constrained the ability to fully evaluate sociodemographic disparities in aspects of mHealth feasibility and acceptability. The population was drawn from a resource-poor, peri-urban setting in Peru, which may not be fully representative of other low-resource settings across the country or in the developing world, or of communities in either urban or rural areas. However, Cono Norte is similar to other Peruvian peri-urban communities in that individuals who settle on the outskirts tend to be more disadvantaged than those living closer to the urban center, and therefore, generalizing these findings to other peri-urban areas may be appropriate. Mothers who agreed to participate in the survey may not be representative of the community. It is also important to note that perceptions and intentions may not always translate into actual behaviors. While mothers in this sample revealed strong intentions to use this mHealth program, they may

respond differently during actual project implementation. Nevertheless, this evaluation contributes to a growing body of formative research on mHealth and provides contextual accounts of ownership, usage and interest that will inform the development of this program.

With evidence that mHealth interventions can remove barriers to healthcare and health-promoting behaviors at home in remote areas of the developing world, the dissemination and scale-up of evidence-based mHealth programs is a critical next step. This study recognizes the promise of mHealth applications in the area of maternal and child health and the importance of evaluating context prior to program implementation. The study established the accessibility and widespread use of mobile phones among mothers in this community, coupled with substantial interest in learning about child health and using mobile phones to communicate with healthcare providers. For this underserved population in the middle-income country of Peru, it represents the potential to turn mobile phones, already present in daily life, into tools to improve their families' health. Mobile phones are well-suited to serve as communication channels for information about management of childhood illnesses, and to help mothers and other caregivers successfully care for sick children at home.

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RESUMEN**Evaluación formativa de un programa de salud móvil propuesto para el manejo de las enfermedades de la infancia en un entorno del Perú con recursos limitados**

Objetivo. Llevar a cabo una evaluación formativa de un programa de salud móvil (mSalud) diseñado para educar a los cuidadores acerca del manejo de las enfermedades comunes de la infancia.

Métodos. Una muestra aleatorizada por conglomerados ($n = 220$) de madres de Cono Norte, Arequipa (Perú), que como mínimo tenían un hijo menor de cinco años, completaron una encuesta mediante iPad. Este estudio descriptivo analizó las tendencias en cuanto a la posesión de un teléfono móvil, y la viabilidad y el interés de un programa de mSalud en las diferentes categorías sociodemográficas. Se emplearon pruebas exactas de Fisher para evaluar las asociaciones. Se ajustaron modelos de regresión logística de una sola variable para calcular las razones de posibilidades y los intervalos de confianza de 95%.

Resultados. De las 220 participantes, un 95% tenían acceso a un teléfono móvil, de su propiedad (82,3%) o no. La posesión de un teléfono móvil se asoció significativamente con el nivel educativo ($P = 0,031$); sin embargo, incluso entre las madres con un nivel de formación inferior, un 80% tenían teléfono móvil. El nivel educativo y la edad, respectivamente, se asociaron con la capacidad para abrir ($P < 0,001$; $P < 0,001$), leer ($P < 0,001$; $P < 0,001$), escribir ($P < 0,001$; $P < 0,001$) y enviar ($P = 0,006$; $P = 0,047$) mensajes de texto. Más de 85% de las madres estaban interesadas en el uso de sus teléfonos móviles para recibir asesoramiento en temas de salud para su hijo y buscar ayuda en caso de enfermedad. Los análisis de regresión revelaron que la capacidad de usar el teléfono móvil se asociaba positivamente con la intención de la madre de participar en el programa de mSalud.

Conclusiones. Los resultados del estudio confirman la generalización del acceso a los teléfonos móviles y de la habilidad suficiente para el envío de mensajes de texto en esta población de cuidadoras. Además del acceso y la viabilidad, los elevados niveles de interés en el uso de los teléfonos móviles para las finalidades relacionadas con la salud indican el valor potencial de un programa de mSalud diseñado para mejorar el manejo de las enfermedades de la infancia en esta comunidad.

Palabras clave

Teléfonos celulares; salud del niño; educación en salud; mensaje de texto; tecnología de la información; Perú.