Recruiting 9126 Primary Care Patients by Telephone: Characteristics of Participants Reached on Landlines, Basic Cell Phones, and Smartphones

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Abstract

In primary care, collecting information about patient health behaviors between appointments can be advantageous. Physicians and researchers who embrace phone-based technology may find valuable ways to monitor patient-reported outcome measures of health (PROM). However, the level of phone technology sophistication should be tailored to the phone use of the population of interest. Despite the growing use of telephones as a means to gather PROM, little is known about phone use among primary care patients. As part of an ongoing study, the authors recruited primary care patients (N=9126) for a health behavior screening study by calling them on the primary contact number listed in their medical record. The current study evaluated the frequency with which individuals were reached on landlines, basic cell phones, and smartphones, and examined participant characteristics. The majority of participants (63%) used landlines as their primary contact. Of the 37% using cell phones on the recruitment call, most (71%) were using smartphones. Landline users were significantly older than cell phone users (61.4 vs. 46.2 years; $P=.001$). Cell phone use did not differ significantly between participants with a college education and those without (37% vs. 38%; $P=.82$); however, smartphone use did differ (61% vs. 77%; $P=.01$). The majority of participants sampled used landlines as their primary telephone contact. Researchers designing phone-based PROM studies for primary care may have the broadest intervention reach using interactive voice response telephone technology, as patients could report health outcomes from any type of phone, including landlines. (*Population Health Management* 2016;19:212–215)

Background

COLLECTING PATIENT-REPORTED OUTCOME measures of health (PROM) is becoming increasingly popular in clinical and research settings.¹ PROM is used to monitor medical symptoms such as pain,² to facilitate chronic disease management including cardiovascular disease, cancer, chronic lung disease, and depression,³ and to promote health behavior change.⁴ Participants can report PROM-related health behaviors or physiological measurements (eg, blood glucose levels) in person at a clinic, on paper, or electronically using interactive voice response (IVR) telephone technology, computers, or smartphones.^{5,6} PROM information reported to a patient's provider can be clinically useful and may help facilitate health behavior modification and

disease management.⁷ In addition, PROM data can be of great importance to research and has been used to determine eligibility for clinical trials, to strengthen communication with patients during clinical trials, and to determine treatment effectiveness.^{8,9}

In primary care, electronic PROM with health behaviors are advantageous because they can provide instant access to data, may reduce data entry errors and limit out-of-range responses, and provide real-time reports of patient symptoms.^{8,10} IVR telephone technology has been widely adapted in health care settings for collecting PROM data and delivering highly specific brief interventions and advice on health topics. For example, IVR has been used to monitor health behaviors such as smoking,¹¹ diet,¹² alcohol use,¹³ HIV risk behaviors,¹⁴ treatment compliance for chronic

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conditions¹⁵ such as asthma and diabetes,¹⁶ and medication refill compliance.¹⁷ Further, therapeutic IVR (TIVR) has been found to decrease pain and improve coping among pain management patients,¹⁸ and to promote weight loss.^{19,20} The David et al²⁰ weight loss study found that women who used a human coach did not differ from the women who used the IVR system. PROM using smartphone applications also has gained popularity in recent years and has been used for weight loss management²¹ and to promote physical activity.²²

Although PROM is becoming popular for health monitoring in primary care, little is known about primary care patients' phone use. To the study team's knowledge, the only study on phone use among primary care patients examined cell phone use among urban African American parents recruited from pediatric primary care centers.²³ There have been no examinations of primary phone use among patients from a primary care setting. Further, phone use surveys have generally focused on cell phone use, and little is known about landline use. It is necessary to understand primary phone use characteristics among primary care patients in order to design PROM phone interventions that have the broadest reach to potential participants.

In the study team's current ongoing IVR health behavior intervention trial, primary care patients were recruited by calling the primary phone number listed in their medical record. The purpose of the current study was to examine the frequency with which primary care patients were reached on landlines, basic cell phones, and smartphones, and the characteristics of those participants.

Methods

Setting and subjects

As part of a randomized trial of IVR-delivered screening and brief intervention for heavy drinking, patients were recruited from 8 primary care practice sites in northern Vermont. All patients with upcoming, non-acute appointments were sent a passive consent letter 2 weeks prior to their appointment that allowed them to confidentially opt out of the research. Three days prior to the appointment, a research assistant (RA) called the primary contact phone number listed in the medical record to invite patients to complete a brief IVR-based health screen. RAs administered a brief demographic survey before transferring participants to the IVR health screen. Patients who reported on the health screen drinking 4[5] or more drinks in one day for females[males] in the past year were invited to participate in the IVR brief intervention. RAs made up to 3 call attempts (evening, afternoon, and morning) for each patient.

Measures

Participants reported the following demographic information before completing the IVR health screen: (1) marital status, (2) race, (3) ethnicity, (4) age, (5) education (with response options: did not attend high school, some high school, high school diploma or GED, some college, associates or other 2-year degree, bachelor's degree, master's degree, or PhD/MD), and (6) type of phone being used for the call (with response options of basic cell phone, smartphone, or landline). The IVR health screen used 6 items to assess pain, smoking, alcohol use, physical activity, weight, and mood.

FIG. 1. Participant flow.

Data analysis

Data analysis was conducted using SPSS Version 21 (SPSS IBM, Armonk, New York).²⁴ Descriptive statistics, *t* tests, and chi-square tests of independence were run to examine participant characteristics and phone use at the time of the recruitment call. A 2-tailed *t* test was used to compare whether participants reached on cell phones were significantly younger than individuals reached on landlines. A chi-square test of independence was used to compare whether participants who had acquired a college education were more likely to be using a cell phone for the call than those with less than a college education. A chi-square test also was used to determine whether it would be more likely to reach college-educated participants on cell phones or smartphones versus those with less than college education.

Results

Figure 1 presents the flow of participants through the study. RAs attempted to contact 23,922 patients by phone and reached 14,680 (61%). Of those reached, 9126 (62%) agreed to participate in the health screen.

Demographics

Demographic characteristics of the sample are presented in Table 1. Most participants (63%, $n=5709$) reported that the recruitment call reached them on landlines. Of the 3417 who reported using cell phones, 71% were using smartphones and 29% were using basic cell phones.

The mean age for participants reached on landlines (61.4 years) was significantly higher than the mean age for participants reached on cell phones (46.2 years; $t_{9116}=50.60$, $P=.001$). The percentage of participants with a college education who were reached on cell phones did not differ significantly when compared to participants with less than a college education (38% vs. 37%; $X^2_1=0.05$, $P=.82$). The majority of individuals from both educational groups reported they were using smartphones; however, participants with a college education were more likely to be on a smartphone (77% vs. 61%; $X^2_1=94.42$, $P=.01$).

Discussion

PROM can be collected using telephone technology to assess health behavior; however, the level of technological sophistication should be targeted toward the phone use

TABLE 1. BASELINE CHARACTERISTICS OF SCREENED SUBJECTS (N=9126)

<i>Characteristic</i>	<i>Subjects</i>	<i>Landline Users (63%)</i>	<i>Cell Phone Users (37%)</i>	<i>P value</i>
Mean age, years (range)	55.7 (18–100)	61.4	46.2	.001
Marital status, % married	64%	71%	29%	.001
Sex, % Female	57%	65%	35%	.001
Race, % White, Non-Hispanic	93%	63%	37%	.001
Education				
Less than college education	36%	63%	37%	.82
College education	64%	62%	38%	.82

Note: *P* value = *P* value of chi-square or *t* tests.

characteristics of the population of interest. The current study evaluated the frequency with which primary care patients were reached on landlines, basic cell phones, and smartphones when their primary contact number listed in their medical record was called to recruit them for a primary care-based IVR health screening study. The majority of participants were using landlines for the call, indicating that most still relied on landlines as a formal and primary means of contact. Several factors may have contributed to the high rate of landline use. First, the sample was comprised of mostly middle-aged and senior participants, which may have contributed to higher landline use.²⁵ In this regard, older individuals also may have been with their primary care physician for a longer time and may have provided contact information for their medical record at a time before cell phones were widely used. This also may speak to the need to update medical record contact information periodically. In addition, patients who had upcoming primary care appointments were recruited, and older patients may have been oversampled because they make more frequent use of medical services.²⁶

Surprisingly, cell phone use did not differ significantly between those with lower and higher education attainment. Further, of the participants who listed cell phones as their primary contact, the majority were using smartphones. The findings indicate that a substantial minority of primary care patients may be available to participate in mobile smartphone-based PROM. In this regard, the inclusion of mobile phone numbers in phone-based research has been shown to result in a more representative sample.²⁷

IVR may be particularly suited to participants who are more likely to use landlines because IVR can be accessed from any type of phone. In contrast, smartphone-based PROM may be well suited for technologically savvy groups such as college students. Findings from the current study may help researchers and clinical staff to strategically design phone-based PROM in a way that maximizes study reach.

It should be noted, however, that although IVR is the most conveniently accessible technology for PROM reporting today, as technology continues to progress and smartphone and other wireless devices are widely adopted, IVR may not remain the only conveniently accessible technology for PROM reporting in the future.²⁸ In this regard, IVR may even be eclipsed by other technology such as texting and smartphone applications. Thus, although studies using IVR-based PROM likely will facilitate the widest intervention reach today, continued research into more high-

tech options for PROM monitoring is needed and likely will facilitate transition to high-tech PROM as such technology is more universally adopted.

This study had several limitations. First, although a systematic sample of all patients who had upcoming non-acute appointments was used, a substantial minority of individuals could not be reached over the phone or opted out of the research process before being contacted. Thus, although the sample may be representative of people who agreed to participate in a primary care-based health screening study, the findings may not generalize to all primary care patients. Also, although the sample was representative of the racial and ethnic distribution of northern Vermont, the sample lacked racial/ethnic diversity and therefore can only be generalized to similar primary care clinics.

In addition, information was not collected on cell phone ownership; therefore, participants could only be categorized based on whether they were using a landline or cell phone for the recruitment call and as their primary phone contact in their medical record. In the study medical record system, patients can supply an alternate phone number; however, the study team was unable to tell what type of phone number it was because the medical record labeled it as “alternate contact.” Thus, it could not be determined whether participants with landlines had access to cell phones. Although this was a hindrance to the current study, the use of electronic medical records has become customary and has gained support under the US federal government’s Meaningful Use Agenda for Electronic Medical Records.²⁹ The Meaningful Use program provides financial incentives to medical practices and facilities to create and use certified medical record technology in order to improve patient health care and outcomes. As medical records progress under this program, it is likely that recording of patient demographic data and contact information will expand to phone type, e-mail, and text. Thus, in the near future it is possible that this will be less of a hindrance to research and clinical care.

Conclusions

The majority of primary care patients recruited to participate in this health screening study were using landlines as their primary contact method. Researchers designing phone-based PROM studies today may have the broadest intervention reach by using IVR-based monitoring so that patients can participate using any type of phone, including landlines.

Author Disclosure Statement

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