Barriers and benefits to using mobile health technology after operation: A qualitative study

Jonathan S. Abelson, MD, MS,a Elinore Kaufman, MD,a Matthew Symer, MD,a Alexander Peters, MD,a Mary Charlson, MD,b and Heather Yeo, MD, MHS,a,c New York, NY

Background. Recently, mobile health technology has emerged as a promising avenue for improving physician-patient communication and patient outcomes. The objective of our study was to determine the public’s perception of barriers and benefits to using mobile health technology technologies to enhance recovery after operation.

Methods. We used the Empire State Poll to ask 2 open-ended questions to 800 participants assessing their perceptions of benefits and barriers to use mobile health technology after operation. All responses were coded independently, and any discrepancies were resolved by consensus. We used grounded theory to allow themes to arise from the codes. Interrater reliability was calculated using Cohen’s Kappa.

Results. Participants identified a range of possible barriers to using mobile health technology apps after operation including: protecting personal health information, technology effectiveness and failure, preference for face-to-face interaction with their surgeon, level of effort required, and ability of the older adults to navigate mobile health technology. Participants identified multiple possible benefits including: better monitoring, improved communication with their surgeon, minimizing follow-up visits, improved convenience, and increased patient knowledge. In the study, 15% of all respondents stated there were no barriers whereas 6% stated there were no benefits.

Conclusion. Participants were receptive to the many potential benefits of this technology to enhance not only their relationships with providers and the convenience of access, but also their health outcomes. We must address participants concerns about data security and their fears of losing a personal relationship with their doctor. (Surgery 2017;[ ]: [ ]).

From the Department of Surgery,a Department of Integrative Medicine,b and Department of Public Health,c Weill Medical College of Cornell University, New York-Presbyterian Hospital, New York, NY

As average hospital duration of stay continues to decrease with improved operative techniques and such as minimally invasive operation and with the use of enhanced recovery protocols, patients are more often spending more of their recovery time at home.1 Therefore, improving postdischarge care and communication are critical to optimizing quality of care in operation. Throughout the past decade, mobile health (mHealth) has emerged as a promising avenue for improving physician-patient communication and patient outcomes and has the potential to be used in the postoperative period.2-6

Patient input is critical for the development and diffusion of any new technology, in particular mHealth, which requires patient compliance for meaningful results. Qualitative studies allow researchers to understand the patient perspective in depth and can help define potential difficulties to using mHealth.7 A few qualitative studies have helped determine the practicality of mHealth in chronic disease management.8,10 The utility of mHealth in operative patients is different from long-term disease management given the time-limited nature of undergoing operation. Therefore, patient perspectives regarding the usefulness of mHealth may be different in such a different patient population.

Qualitative research in operation is gaining popularity, but few studies have focused on the
post-discharge setting,\textsuperscript{11,12} and no study has focused on the public’s perception of using mHealth to facilitate recovery after operation. The objective of our study was to determine the public’s perception of barriers and benefits to using mHealth to enhance recovery after operation.

MATERIALS AND METHODS

Survey development and administration. Data were collected through Cornell University’s Survey Research Institute during their annual Empire State Poll. The Empire State Poll is a telephone survey of adult residents of New York state that includes a core set of questions about community, government, and the economy. In addition to the core questions, Cornell investigators may submit questions to be included in the annual survey. Submitted questions are reviewed by the Survey Research Institute and a pilot of 25 individuals is conducted. Investigators then are given feedback regarding any issues encountered by surveyors when administering these questions and the pilot data is analyzed and questions refined. Based on this feedback, investigators then modify their questions prior to conducting the survey. We submitted 2 open-ended questions using asking respondents’ perceptions of benefits and barriers to use mobile health technologies upon completion of our pilot; these were modified to the following final questions:

1. What are barriers or issues you might see to using a free mobile health app after operation to improve your care?
2. What are benefits you might see to using a free mobile health app after operation to improve your care?

Sampling. The 2016 ESP was administered from February 9, 2016, to April 19, 2016. In the study, 3,220 individuals were contacted to achieve the final sample size of 800 individuals (22% response rate). The average interview length was 18 minutes. Cornell Survey Research Institute used a dual-frame random digit dial sampling of landlines and cell phones as previously described.\textsuperscript{9} The state was divided into 2 regions, upstate and downstate, and sampling was conducted in proportion to population totals.

Analysis. The first 100 responses were independently coded by 3 reviewers (J.S.A., E.K., H.L.Y.). The 3 reviewers then met to develop a codebook based on consensus. The subsequent 700 responses were then independently coded by 2 reviewers (J.S.A., E.K.). A single respondent could be assigned >1 code if their response addressed >1 topic. Any discrepancies were resolved by consensus; any residual discrepancies were resolved by the third reviewer (H.Y.) serving as the deciding vote. We used grounded theory to allow themes to arise from the data.\textsuperscript{13,14} Grounded theory allows researchers to explain beliefs and behaviors of the study population by developing theories and identifying relationships between variables. Whereas sample sizes typically are determined once researchers no longer collect new information, termed “data saturation,” we analyzed all 800 even after reaching “data saturation.” Codes identified by reviewers were grouped into themes by identifying hierarchical relationships between codes.

 Interrater reliability was calculating using Cohen’s Kappa. We collected respondent demographics characteristics from the survey including age, sex, education level, race (White, Black, “Other,” which included Asian, ≥2 races, or “other race”), ethnicity (Hispanic or Non-Hispanic), and income. After completing our thematic analysis, we tabulated the frequency of themes according to demographic subgroups using $\chi^2$ tests. All data were analyzed with Microsoft Excel (Microsoft Corp., Redmond, WA) and STATA (version 13.1, StataCorp, College Station, TX).

RESULTS

In our survey of 800 New York residents, the average age of respondents was 47 years old (±17 years) with an equal distribution of men and women. Most respondents self-identified as White (67%), 18% as Black, and 13% as Hispanic. In the study, 37% of respondents reported annual income <$50,000, and 31% did not complete any education beyond high school. In addition, 79% of all respondents had a smartphone that allowed them to download apps (Table I). Kappa was 0.79.

 Barriers. Participants identified a range of possible barriers to using a free mobile health app after operation including (Table II): protecting personal information, technology effectiveness and failure, preference for face-to-face interaction with their surgeon, level of effort required to use the app, and ability of the elderly to navigate a mobile app (Fig 1). Of all respondents, 15% stated there were no barriers. A greater proportion of men thought there were no barriers compared with women (17% vs 12%, $P = 0.02$). Similarly, a greater proportion of respondents ≥65 years stated there were no barriers (21% vs 13%, $P = 0.02$).

 Protecting personal information. The most common theme that participants discussed
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