A Digital Communication Intervention to Support Older Adults and Care-partners Transitioning Home After Major Surgery: Protocol for a Qualitative Research Study

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Abstract

Background: Older adults (age 65 years and over) account for approximately 30% of inpatient procedures performed in the US. After major surgery, older adults are at high risk of a slow return to previous functional status, loss of independence, and complications, such as delirium. With the development and refinement of Enhanced Recovery After Surgery (ERAS) protocols, older patients often return home much earlier than historically anticipated. This puts a larger burden on care-partners, close family or friends who partner with the patient and help guide them through recovery. If these patients and their care-partners are not fully prepared for the operation and recovery, poor long-term outcomes may result.

Objective: The goal of this study is to improve and streamline recovery for patients 65 years and older by exploring the communication needs of patients and their care-partners. Information from this study will be used to inform an intervention developed to address these needs as well as define processes to implement this intervention across surgical clinics.

Methods: This study has two aims. First, we will define patient and care-partner needs and perspectives related to a digital health innovation. To achieve this aim, we will recruit dyads of patients (ages 65+) who underwent elective major surgery 30-90 days prior and their respective care-partners (ages 18+). Participants will undergo individual qualitative interviews and complete individual surveys to obtain demographic data, characterize their perceptions of the surgical experience, identify intervention targets, and assess for the type of intervention modality that would be most useful. Next, we will explore clinician perspectives, tools and strategies to develop a blueprint for a digital intervention. To achieve this aim, we will recruit clinicians (e.g. geriatricians, surgeons, and nurses) who will participate in focus groups that will assess current obstacles affecting surgical outcomes among older patients, and review current assessments and tools used in their clinical practice. We will use these clinician and patient perspectives to inform the development of a digital intervention strategy to support older patients and their care-partners after surgery.

Results: This study has been approved by the Massachusetts General Hospital and Harvard Institutional Review Boards. Study completion anticipated by Fall 2024.

Conclusions: Information from this study will be leveraged to develop a scalable digital health option for older patients undergoing major surgery and their care-partners. Through this work we will improve our understanding of patient recovery needs and how to improve communication with surgical teams. The ultimate goal of this work is to decrease the overall burden on patients, their care-partners, and healthcare providers to achieve shared understanding while meeting personal recovery needs through real-time assessment.

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Cover Letter

Date here: June 19, 2024

To the editors of JMIR Research Protocols,

Thank you for considering our work, “A Digital Communication Intervention to Support Older Adults and Care-partners Transitioning Home After Major Surgery: Protocol for a Qualitative Research Study,” for peer review and publication. All authors have read and complied with author guidelines.

With the aging US population, it will become increasingly important to address shortcomings in transitions of care for postoperative patients over the age of 65 and their care-partners. This qualitative research study protocol hopes to collect the viewpoints of patients, care-partners, and clinicians involved to evaluate the current landscape of peri- and postoperative care, understand challenges during recovery and their solutions, and obtain opinions on our proposed digital intervention. We hypothesize that a digital health option will decrease overall burden on all parties involved while improving postsurgical recovery for patients and their care-partners.

This publication is not duplicative and is not published, accepted, or currently submitted for review elsewhere. It is funded by NIH AHRQ grant #R01HS029454. We thank the editors and reviewers for their time.

Sincerely,
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Title: A Digital Communication Intervention to Support Older Adults and Care-partners Transitioning Home After Major Surgery: Protocol for a Qualitative Research Study

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Results: This study has been approved by the Massachusetts General Hospital and Harvard Institutional Review Boards. Study completion anticipated by Fall 2024.

Conclusions: Information from this study will be leveraged to develop a scalable digital health option for older patients undergoing major surgery and their care-partners. Through this work we will improve our understanding of patient recovery needs and how to improve communication with surgical teams. The ultimate goal of this work is to decrease the overall burden on patients, their care-partners, and healthcare providers to achieve shared understanding while meeting personal recovery needs through real-time assessment.

Key words: mHealth; geriatric; surgery; care partner; qualitative study; digital intervention; intervention development

Introduction

Background

Older adults, age 65 years and over, account for over 30% of the population of inpatients undergoing operations in the United States. [1] Older adults and care-partners begin their interaction with the surgical system typically as outpatients in an episodic fashion as they prepare for elective surgery. After surgery, the time spent in the hospital after many operations has shortened dramatically with the use of Enhanced Recovery After Surgery (ERAS) protocols. [2] Being prepared and informed prior to transitioning home is an important process that can improve patient and care-partner's confidence during their hospital stay and beyond. Unfortunately, communication during surgical discharge is often inadequate. Up to 80% of patients do not recall information provided, 71% of nurses say they do not have enough time to meet patient engagement and education needs, and 50% of patients recall information that is incorrect. [3,4] Once home, older patients often depend on care-partners, close family or friends who partner with the patient and help guide them through recovery, and who often take on this role with little or no training by the surgical care team.

This transition to home earlier in their recovery can be difficult on the older adult patient. Delirium, [5,6] functional decline, [7] and loss of independence [8,9] occur frequently in this patient population in the early postoperative period. These changes to a patient's baseline function as well as sleep disturbance and medical burdens lead to anxiety and strain on patients and care-partners, who are helping patients with activities of daily living during their recovery. [10] These compounded effects impact transitions home and contribute to adverse outcomes including mental health challenges, need for hospital readmission, and loss of independence. [11] There is a critical need to address gaps in care quality to improve outcomes of older adults recovering from major surgery at home and support their care-partners.

One possible and scalable way to address these gaps is through technology. It is a common misconception that most of the older population is resistant to technology; about 61% of adults age 65+ **years** owned a smartphone in 2021 and many more own a computer/laptop (90%) and use the internet (75%). [12,13] Our current work strives to lay the groundwork for the development of a future digital health intervention to improve the outcomes of older adults and their care-partners transitioning home by addressing unmet communication needs [14] and focusing on the postsurgical period. We hypothesize that this qualitative work will yield critical information from all participants interviewed (patients, care-partners, clinicians) to create a useful digital health tool that will address communication gaps and improve care coordination, thereby improving patient quality of life and

reducing caregiver burden after surgery.

Objectives

The overall goal of this study is to identify and understand the obstacles older adults and their care-partners face while recovering at home after major surgery and to receive input from clinicians involved in their care regarding current geriatric conditions, assessments, and potential interventions. These findings will inform a future digital intervention that addresses shortcomings in current systems of care and is designed for older adults undergoing elective surgery along with their care-partners.

Methods

Study design:

We will conduct an exploratory qualitative analysis to investigate communication needs of patients, care-partners, and clinicians and the potential role of a digital health tool to address these needs. We will conduct interviews with adults (ages 65+ **years**) who have undergone major surgery as well as their identified care-partners (through a separate 1:1 interview) to understand unmet needs and challenges they encountered during recovery. We will explore how they responded to these obstacles, and the types of intervention they anticipate would be the most helpful. Subsequently, we will seek additional input from key clinical stakeholders, specifically geriatricians, surgeons, and nurses to explore the assessment tools and approaches that they feel would support the needs of older patients and their care-partners during postoperative recovery and specifically how a digital tool could facilitate that support. A hybrid deductive-inductive approach will be undertaken to identify relevant themes. [15] Results will be used to inform future development of a digital solution to support these patients after surgery and their care-partners.

Inclusion and exclusion criteria:

Patients and care-partners semi-structured interviews
We will consider for inclusion surgical clinic patients from an urban academic medical center and community surgical center who underwent surgery in the following specialties: Colorectal, Orthopedic, and Thoracic Surgery. To be included, patients must also be 65 years or older, have undergone recent (within 90 days) elective major surgery, and must be English-speaking. As for their care partners, they will be 18 years or older and be English speakers. Patients and their respective care-partners will need to be both recruited (a dyad) to be included in the study. Exclusion criteria include cognitive impairment causing inability to perform teach back for consent to interview as outlined in prior NIH-funded studies. **[16]** If one half of the dyad does not complete the requirements of the study, the other half's information and data will not be included in the study analysis.

Clinician Focus Groups
We will include English-speaking healthcare workers within the clinician focus groups. These participants will be derived from the following populations nationwide: geriatricians, surgeons, anesthesiologists, APP, PT/OT, SW/CM, and nurses with experience with older adults recovering from surgery. Exclusion criteria include having less than one year of clinical experience, having no/limited experience with the older adult surgical patient population, and practicing outside of the United States.

Recruitment and sampling:

Patients and care partners semi-structured interviews
Older adults presenting to the Massachusetts General Hospital (MGH) or North Shore Medical

Center Surgical clinics (both part of the Mass General Brigham integrated health system) and their care-partners meeting eligibility criteria will be recruited. The research team will query the operative list from the Colorectal, Thoracic, and Orthopedic Surgery patient population.

Eligible patients will be approached by the research fellow, who will review the study purpose, eligibility criteria and informed consent documents using standard processes. Purposive sampling will ensure a diverse group of older surgical patients, with inclusion of patients aged 80 years or older to capture patients across an age spectrum. [17] In addition, the team will partner with the MGH Community Access, Recruitment and Engagement Center to recruit patients from minority communities and those with low socioeconomic status (i.e., education less than high school diploma) thus ensuring evaluation of recovery needs among a diverse patient population.

We expect to recruit five patients and their care-partners from each of the three specialties, with a total of 30 interviews to reach saturation. [18]

Clinician Focus Groups
Recruitment: Among clinicians currently practicing in the United States, we will recruit a nationally representative sample of clinician participants by email in which we outline the study purpose and attach the consent form for participation in focus groups. We will leverage personal contacts in nursing, surgery, and geriatrics as well as national professional society meetings (such as American Society of Colon and Rectal Surgeons, American Geriatrics Society, and American College of Surgeons) to obtain email addresses and optimize recruitment. Once participants are identified, we will schedule focus groups aligned by specialty to optimize group dynamics and encourage psychological safety as described in similar studies. We will plan to recruit eight clinicians per group to account for non-attendance. We will conduct interviews and focus groups until thematic saturation is reached, with an initial estimate of 24 participants across four focus groups needed based on past studies and practical limitations of available clinicians. [19,20] Focus groups of around six members have been described as optimal for meaningful discussion. [21]

Ethical Considerations

Ethical approval was obtained from the Harvard T.H. Chan School of Public Health Institutional Review Board #IRB23-0790. Survey information is collected and saved securely on REDCap. Informed consent is obtained prior to starting the interviews. Participants are informed of any intent to record prior to the start of the recording. Recordings are then transcribed, de-identified, and then uploaded to a secure server. For each patient and care-partner who completes both the survey and interview, they will receive $20 for their efforts. Concerted efforts are made to purposefully recruit patients from varying socio-demographic, cultural, and ethnic backgrounds to obtain diverse perspectives from patients across surgical subspecialties.

Interviews

Patients and care-partners semi-structured interviews
Prior to the qualitative interview, we will send out an electronic survey via email through REDCap to both the patient and designated care-partner; each participant will answer demographic and quality of life questions (the latter is based on the World Health Organization Quality of Life [WHOQOL-BREF] questionnaire). [22,23] The care-partner will answer additional questions based on the Zarit Burden Interview. [24,25] These survey emails take 15 minutes or less to complete. The WHOQOL-BREF questionnaire is scored based on a predefined scoring system that is then calculated into

domain scores, which range from 0 to 100, with a higher score representing a better health state. Each question on the Zarit Burden Interview is scored based on the Likert scale, with a higher composite number representing a greater burden to the care-partner. Both questionnaires are highly validated tools that have been used for decades. [23,25]

During the virtual or phone qualitative interview, we will 1) characterize patients' and care-partners' perceptions of the surgical experience and how they cope with its challenges; 2) identify appropriate intervention targets (geriatric 5 Ms of mind, mobility, medications, what matters most and multicomplexity); 3) assess patients' and care-partners' preferences for the structure/mode of delivery (potential for video or a combination of these), timing of the intervention, and number of sessions; 4) review potential module content and the resources used, and 5) assess patients' and care-partners' perception about their usefulness.

Clinician Focus Groups

Prior to the qualitative interview, clinicians will fill out an electronic survey via REDCap that will capture demographic data. During the virtual focus groups, we will: 1) evaluate geriatric conditions affecting outcomes from major surgery among older adults, 2) discuss geriatric assessments performed to evaluate these needs, 3) rate assessments and tools, and 4) discuss procedures for intervention delivery.

Virtual interviews will be conducted using HIPAA-compliant video conference software (e.g. Microsoft Teams [Version 24004.1304.2655.7488]). We will use audio and video to record the interviews and transcribe them.

Analysis

Interviews will be coded using a multi-step approach. [26,27] First, two members of the research team will create an apriori codebook drawing codes directly from the interview guide. Apriori themes will include (1) pre-surgery experiences (2) clinical care team communication (3) post-surgical challenges (4) description and use of the application. A set of two transcripts will be coded using this codebook. At least two members of the research team will then meet to discuss and resolve discrepancies and update the codebook accordingly. Next, at least two members of the research team will inductively code two additional transcripts to identify additional themes not included in the apriori codebook. Based on this open coding, inductive codes will be added to the codebook. All transcripts will be coded against this codebook. All coding will be conducted in the NVivo 20 software. At least two members of the research team will code all transcripts, meeting periodically to discuss discrepancies and ensure consensus is reached. NVivo software's coding comparison feature will be utilized to compare coding and identify any major discrepancies that emerge in the coding process. We will compare each researchers' coding across all transcripts and resolve discrepancies on a regular basis until all coding is complete. [28]

Clinician, patient and care-partner interviews and focus groups will guide intervention development. Our research team will meet weekly to discuss the analytic plan and intervention development.

Results

This study is funded by the AHRQ grant #R01HS029454. The study was approved by the institutional review board of the Massachusetts General Hospital and Harvard. Recruitment began in December 2023 for the patient and care-partner interviews. As of June 2024, over half of the

proposed patient-care-partner interviews have been performed, de-identified, and transcribed. A proposed codebook has been developed and the coding process is still in the beginning stages. Clinicians are currently being recruited and no focus groups have been performed yet.

Discussion

The overall goals of this qualitative study are to identify and understand the obstacles older adults, care-partners, and clinicians face when transitioning home after major surgery and to use this understanding to inform a potential intervention that will address the needs of these groups during this critical time. This protocol will outline stakeholder perspectives on clinically important geriatrics conditions, assessments, and interventions to meet the currently unmet needs of this growing patient population. The results of these semi-structured interviews and focus groups will inform the development of a digital health intervention, to improve quality of life for patients and reduce care-giver burden during surgical recovery by addressing communication gaps and current shortcomings in care coordination.

Given the increasing use of internet and mobile-based technologies for delivering healthcare during and following the COVID pandemic, [12] it is imperative that clinicians and surgical systems leverage digital health applications to improve transitions of care, particularly for vulnerable populations including older adults. [29] For example, if participants identify physical and neurocognitive decline after major surgery as a challenge for patients, the digital intervention we develop could use personalized, timely assessments to identify and address these findings to optimize care for older adults transitioning home after surgery. [30] If participants note challenges with coordinating access to care after surgery (e.g., presenting to the emergency room versus the surgical clinic for wound concerns), we can develop tailored communication to improve care coordination through the intervention. In addition, timely anticipatory guidance based on participant feedback can ensure patients and care-partners prepare their home and obtain supplies helpful during their recovery. By designing the intervention with input from both academic and community surgical practices, we propose to develop an intervention that is acceptable, usable, and based on best evidence. This design process should ensure that the resulting tool will be readily adopted by a wider audience.

Despite the burgeoning use of technology to facilitate remote health monitoring, older adults are sometimes excluded from the benefits that these technologies provide. [31] Lack of access to healthcare-related technology is a barrier to adoption and is influenced greatly by both exposure and cost. [32] The social and professional environment and personal preferences of older adults may not inspire or influence them to follow and adopt this technology as readily as their younger counterparts. It is often the role of the younger care-partner or family member to learn and then teach older adults how to use newer technologies. If the older adult does not have access to this information (by owning the necessary technology or having the baseline skills required of digital literacy such as using a computer or smartphone, etc.) or someone to teach them (a care-partner who has this knowledge or access to newer technologies), then the patient will often resort to a more traditional/antiquated alternative. These new technologies can also be cost-prohibitive, especially for older adults who have limited resources. Buying the latest gadget or health monitor may not be in their budget. [33]

Another obstacle is that digital health options are often designed for young populations with excellent vision and manual dexterity in addition to advanced digital literacy. [34] It is not uncommon for older adults to require large and bolded text on their phones because of the loss of visual acuity. In addition to small text, many electronic applications have inappropriately colored or

contrasted text that older adults have trouble reading. [35] In addition, these devices and applications may have functions that may rely on a preexisting familiarity with the technology's functionality unfamiliar to older adults not fully immersed in the digital ecosystem.

This qualitative study will strive to consider all these diverse factors. If an interview participant does not have internet access or knowledge of videoconferencing, then a phone interview will be conducted. It will gauge patient and care-partner challenges and their current solutions. It will identify the resources they had (before and after surgery) and those they wished they had. It will assess current effective and unproductive modes of communication. Most importantly, it will gauge their direct sentiments about a digital health option that could potentially address the shortcomings identified in their interview answers. This protocol will ensure that any digital health option generated in the future will take into account older adult perspectives as well as those of their care-partners and clinicians. This will minimize waste, ensure the tools developed are designed within the targeted audience's physiological and biopsychosocial restrictions, and increase the probability of adoption and utility. Importantly, this study will also explore how digital technologies can be used by the adjacent care-partner to support an older adult during recovery. Care-partners may have differing needs from the patient and different degrees of engagement with digital technology. This study may ultimately identify opportunities for novel digital health capabilities through technology that links patient-care-partner dyad and healthcare team.

There are several strengths to this study. This is one of the first studies to evaluate communication barriers of the older adult population undergoing major surgery and explore how a digital intervention might improve transitions home after surgery. It will also consider the care-partner perspective, who may be of the same generation (oftentimes spouses or close relatives). The study will include diverse clinician perspectives, particularly those professionals who interact with older patients frequently. This information can then be leveraged to develop a prototype digital health intervention that is useful and acceptable using a human-centered design approach. The application will then undergo refinement to further improve acceptability. Smartphone-based education and remote self- monitoring is a scalable solution that can improve outcomes in this growing high-risk patient population. This protocol outlines the foundational development of a future digital health solution to support the needs of older adults undergoing major surgery as well as the needs of their care-partners. The findings from this work can be scaled and spread to increase the value of care provided for a variety of health conditions and will drive future efforts to improve transitions home after major surgery, particularly for current and future generations of older adults—by the end of this decade a fifth of Americans will be older than the age of 65. [36]

Limitations of this study include potential limits in generalizability based on our recruitment of patients from the geographic Northeast in the United States. To overcome this limitation, we will intentionally recruit a diverse patient population. Another limitation of this study is that all patients and care-partners will be English-speaking. Future work will need to address this shortcoming with multi-lingual qualitative interviewers to culturally adapt content of the planned intervention. We will include patients from three major surgical specialties that service a large older adult patient population. Although this study is US-based, it reflects the same concerns being addressed in countries globally that are looking to adopt digital health technology. Our findings may have generalizability to other countries that are comparable in terms of economic development and digital technology adoption. We will also strive to include the perspective of patients and care-partners with low income and those below the poverty threshold and reflect on the particular limitations encountered by these groups. It will be important to note the possibility that benefits derived from future interventions based on this work may deepen the digital divide which already exists, as it can leave behind those who for financial, health, or geographic reasons cannot benefit from more real-

time assessment. [37,38] Possible solutions proposed have been for governments to subsidize basic or newer technologies [39] to facilitate adoption and to be purposeful when building new or reinforcing internet infrastructures with a focus on marginalized populations. [40]

Conclusion

This qualitative research protocol will improve our understanding of the obstacles older adults and their care-partners face while recovering at home after major surgery. The described approach will yield critical data to inform the development of a digital health intervention that is tailored to all those involved in the care of the older adult surgical population with particular focus on care-partners that are often provided limited support from the surgical care team. These findings will inform a future digital intervention that addresses shortcomings in current systems of care and will be designed to support older adults undergoing major surgery, their care-partners, and clinician team members.

Acknowledgement: This work has been funded by NIH AHRQ grant #R01HS029454.

Data Availability: The data sets generated during and/or analyzed during this study are available from the corresponding author on reasonable request.

Conflicts of Interest: None declared.

Abbreviations:

ERAS: Enhanced Recovery After Surgery

MGH: Massachusetts General Hospital

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JMIR RESEARCH PROTOCOLS REVISIONS

Note to the editors:
Thank you for the insightful comments that have made this manuscript much stronger. We hope that the following changes to the manuscript will address all the items below. Please let us know if there are additional questions or changes to make. Once again, thank you for your consideration.

Common formatting / editorial problems (see also Instructions for Authors!):
***Please address those items below which the editor has indicated with XX.

A. (XX) all in-text references must be numbers in square brackets like this [1], [1-3], or [1,3]. Do not use the author-year system. Do not use round brackets. Do not use superscript.
The formatting changes have been corrected.

L. (XX) End your introduction with a clear statement of what the aim of this paper or study is, or what the hypotheses* are.
Clear hypothesis statement has been added to the end of the introduction.

M. (XX) Consider starting your discussion with a short summary of what the (anticipated/hypothesized) main finding(s) of this study was/were/would be.
- For the Discussion, consider relevant content that could guide and formulate the content for this section (similar to a full manuscript), such as Principal Findings, Comparison to Prior Work, Strengths and Limitations, and perhaps Future Directions. A dissemination plan might also be included (unique to JMIR Research Protocol manuscripts).
- Please note that for the Discussion and Conclusion sections, these should not simply be a repetition of the aims/protocol of the manuscript.
- Ensure that all statements in the Discussion/Conclusions appropriately match the possible conclusions that can be drawn, i.e. ensure that conclusions can potentially be drawn based on the methodology and findings of the study. This applies to the Abstract and the manuscript text.
The discussion has been reformatted according to the recommendations above.

W. (XX) Minimize, if appropriate, author-invented abbreviations and acronyms. In general:
- Ensure all acronyms/abbreviations are defined on first usage in text. If the abbreviation was only used once, do not include the abbreviated form (use the fully defined form).
- Also include all acronyms in a section on Abbreviations. In the Abbreviations section, please list all abbreviations used in the manuscript in alphabetical order. Do not capitalize every word of the definition unless they are proper nouns. See author instructions as needed.
Abbreviations have been reviewed and a few have been removed from the list. The current list should be accurate.

AC. (XX) Please provide ethics board review statement (including ethics review board name and, if available, case/application number) in the Methods under a subsection, Ethics Approval. Alternatively, the subsection header can be Ethical Considerations, for instance, when no application for an ethics review board assessment was submitted (or has not yet been submitted but there are plans to do so in the case of a protocol). In this case, Ethical Considerations should include

statements that briefly summarize the authors' rationale for not seeking an ethics review board assessment, accompanied by a citation of relevant institutional, regional, or local policies. More information: https://support.jmir.org/hc/en-us/articles/360048970851--for-authors-Institutional-Research-Board-Research-Ethics-Board-and-Informed-Consent-
“Ethical Considerations” paragraph has been added to the manuscript under the Methods section.

AD. (XX) If not already added, please include a section on Data Availability. Please add these data sharing statements after the Acknowledgements. -- We encourage authors to ensure that their data sets are either deposited in publicly available repositories (where available and appropriate) or presented in the main manuscript or additional supporting files whenever possible. For example, these can be added as a URL to a repository and a URL to code used, attached as a Multimedia Appendix, or submitted/published separately in JMIR Data (https://data.jmir.org/). A Data Availability statement should still be provided even if access is restricted. In this case, a reason should be provided and possible steps for requesting access could be provided. For example statements which may be applicable to your data type(s) and study design, visit: https://support.jmir.org/hc/en-us/articles/360030832631-What-is-your-data-sharing-policy-
“Data Availability” section has been added after the Acknowledgements

Further Editorial Comments:
-Missing units, years. See: (ages 65+), (ages 18+), proof in the abstract and through-out the full text
Units have been added in the appropriate locations

-In the abstract, what is your research design? This has been modified.
-In the abstract, what are your data analysis methods? This has been modified.
-Citations are to be in square brackets and not superscript. See: https://support.jmir.org/hc/en-us/articles/115001333067-How-should-references-be-formatted-Which-journal-style-should-I-choose-when-using-EndNote-or-other-reference-management-software
This has been formatted accordingly.

-Do you have quantitive data to add to the Intro to help quantify the magnitude of the problem? The “how much” direct/indirect cost data of the problem
We added percentages detailing the current inadequacy of the surgical discharge process, particularly when it comes to releasing the patient with the necessary understanding and information to set them up for success in their recovery.

-Add the hypothesis to the end of the Intro
Hypothesis has been added to the end of the introduction.

-Missing an Ethics section and IRB number. Add a separate “Ethical considerations” subsection in the Methods section, consisting of each of the following points (if and where applicable):
1. Statement regarding human subject research ethics review, exemptions, and approvals. This is necessary even if the study is clearly observations of public behaviors or secondary analyses of research data
2. Informed consent descriptions or waiver language for studies identified as humans subject research. This also applies to secondary analyses of research data (there should still be consent for the primary data collection), where it should be stated that the original informed consent (or the IRB) allows the secondary analysis without additional consent
3. Privacy and confidentiality protection description for human subjects research; e.g., a statement that study data are anonymous or de-identified; otherwise, a brief description of the protections in place

4. Compensation type and amount for human subjects research
5. Please make sure that no identification of individual participants/users in any images of the manuscript or supplementary material is possible; if including such images is unavoidable, please include a statement that consent has been granted from identifiable individuals, and also upload the relevant consent forms/written communications in the "Other files" field during resubmission"
"Ethical Considerations" paragraph was added to the Methods section addressing most of the above points where appropriate for this protocol.

-What research design? and qualitative methodology? See: We will conduct a qualitative analysis to explore communication needs of patients, care-partners, and clinicians and the potential role of a digital health tool to address these needs.
We have updated the Methods section to more clearly describe our approach to data collection and analysis and added a relevant citation.

-Do you use any particular theory or theoretical framework for your research to inform the interpretations and conclusions?
For this initial, exploratory qualitative study we will not use a specific framework to analyze our interpretations of the interview data but instead will use the coding approach we describe in the methods to better understand the challenges care partners and patients face after surgery, identify resources that would be useful to people in this situation, and explore initial responses to the use of the application. We will use a framework to guide future work when we seek to implement the digital health intervention.

-Do you have any specific inclusion criteria with regard to the sociodemographics of the participant? Why or why not, as some cultural and ethnic backgrounds are known to have a higher incidence or prevalence for certain types of cancers over others. See: Colorectal, Orthopedic, and Thoracic Surgery.
The protocol seeks to recruit a diverse cohort to include representative participants from diverse culture, ethnic and sociodemographic backgrounds.

-Missing citation for teach back. See: to perform teach back for consent to interview
Added appropriate missing citation (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7156054/)

-What is the exclusion criteria for the Clinician Focus Groups recruitment? What are their qualifications? Years of experience? Does this consist of clinical/field work or education/research? Etc.
Exclusion criteria has now been included in the manuscript.

-Missing citation. See: Purposive sampling will ensure a diverse group of older surgical patients, with inclusion of patients aged 80 years or older to capture patients across an age spectrum.
The appropriate citation has been added. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4012002/)

-Missing citation. Saturation at what point? Explain. See: We expect to recruit five patients and their care-partners from each of the three specialties, with a total of 30 interviews to reach saturation.
Following published literature on reaching sampling saturation in qualitative data, we will aim to recruit a total of 30 participants from each of the three specialities. We have included a relevant citation that describes the process of seeking saturation in the sampling phase of qualitative work. (https://www.sciencedirect.com/science/article/pii/S0277953621008558)

-What nation? See: We will recruit a nationally representative sample of clinician participants by

email in which we outline the study purpose and attach the consent form for participation in focus groups.
We will recruit clinicians currently practicing in the United States (added to the manuscript).

-Such as? See: national professional society meetings
The specific society meetings have been added.

-For the various questionnaires/scales/measures used, detail (i) how it is administered and time it takes to complete, (ii) items it measures, (iii) how it is scored with cut off points, (iv) validity and reliability information. See: World Health Organization Quality of Life-BREF questionnaire, etc.
The appropriate details for each tool has been added to the manuscript.

-How? Missing citation. See: For the interviews, we will develop a standardized coding manual
We have revised the qualitative methods section to better describe the approach that we will take to coding the interviews and have included relevant citations for this approach.

-What version/release/model info. See: NVIVO software
NVIVO 20 is the version we will use for the coding process.
NVivo qualitative data analysis. Version 20 [software]. Lumivero 2024. Available from: https://help-nv.qsrinternational.com/20/mac/Content/welcome.htm

-Missing citation. See: To ensure coding consistency, the two coders will separately code 20% of interviews with a goal of inter-rater reliability Kappa of 80%.
We have revised this sentence to better reflect the consensus process we will undertake. A Kappa coefficient is not generally very relevant to qualitative research; rather, a robust comparison and consensus method will be used to ensure that our codebook reflects our data and that researchers reach agreement on all steps in the coding process. We now include relevant citations that describe this common approach in qualitative research.

-For more information on what goes in the Results section. See: https://support.jmir.org/hc/en-us/articles/115000520391-What-should-I-put-into-the-results-section-of-a-protocol-or-proposal
The Results section has been revised to include the criteria detailed in the associated link.

Please structure your Discussion section as follows:
1. First paragraph of the discussion should be a brief summary of the main study findings relative to the stated objectives/aims/hypotheses from the last paragraph of the introduction
2. Following, a more detailed discussion of those findings, including interpretations, implications, and comparisons to existing literature
3. Next, please include the paragraph(s) on limitations
4. The last paragraph(s) should be conclusions that don’t just summarize the findings, but speak to the broader implications of them
The Discussion section has been restructured to reflect the above recommendations.

-Missing a Conclusions section with content
A “Conclusions” section has been added.

-Missing a Data Availability Statement
A “Data Availability” section has been added after the Acknowledgements.

-Abbreviations must be in alphabetical order
Abbreviations have been reviewed and reformatted.

Addressing formatting issues (marked above with XX, if any) and any remaining comments from the peer reviewer(s)/editor during the revisions period speeds up the production process in the event of acceptance.

Please upload a revised version with tracked changes (or highlighted sections of text where changes were made) as a supplementary file, in addition to providing a clean version under "Revised Ms". See https://jmir.zendesk.com/hc/en-us/articles/115001400448 for details on how to respond to reviewer comments and upload a revised manuscript. Supplying a version of the manuscript with tracked changes facilitates the review process.

Supplementary Files

Untitled.
URL: http://asset.jmir.pub/assets/7d88b8af16909175c7d8bbc6e57e1ab5.docx

Multimedia Appendixes

NIH review document.
URL: http://asset.jmir.pub/assets/e4146d905fd3410a97ac1679c9d8aa54.pdf

Questions to be asked during the patient qualitative interview.
URL: http://asset.jmir.pub/assets/9c4cdefd1ee2fb194a6f8fe6cce7cf73.docx

Questions to be asked during the care-partner qualitative interview.
URL: http://asset.jmir.pub/assets/72d23bb920e038cc741532ad2f5b0dcd.docx

Questions to be asked during the clinician focus group interview sessions.
URL: http://asset.jmir.pub/assets/1affb556f3a8d679854e39bf6189594c.docx