Toward Understanding Drivers of Patient Engagement With Digital Mental Health Interventions – Part I

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Institutional Review Board
Intervention/Interaction Detailed Protocol

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1. Background and Significance

Digital mental health interventions (DMHIs), delivered via the internet and/or mobile apps, have the potential to remove many of the barriers that plague in-person behavioral health interventions. They can be widely disseminated at minimal marginal cost, do not require transportation or daytime appointments, and promote patient autonomy. Reviews and meta-analyses suggest that DMHIs are effective in controlled research settings.[1-3] But, in routine care implementations, effectiveness is limited by insufficient engagement.[4,5] Only 20-50% of patients engage at the recommended frequency and/or complete the full course of treatment.[4,6,7] The strongest hypothesis to date is that achieving reliable engagement with DMHIs requires adding human support.[8,9] But strategies for adding human support are widely varied—from less scalable options like weekly phone calls with a clinician to more scalable options such as asynchronous communication with a health coach—and little is known about the impact of the more scalable strategies. A less explored, even more scalable strategy for improving engagement is automated motivational messaging (AMM). While AMM has been effective in some trials,[10,11] little is known about what content or delivery characteristics drive its impact. Understanding whether fully automatized intervention components can improve engagement without human support, and what drives patient engagement in either condition will be essential. This study applies a patient-centered approach to developing the look, feel and written content for a set of AMMs that could be used to enhance patient engagement with DMHIs.

2. Specific Aims and Objectives

This study aims to systematically employ patient feedback to develop a set of automated motivational messages aimed at enhancing engagement with digital mental health interventions.

This study is a precursor to a subsequent full-scale clinical trial that will test the impact of digitally delivering these messages on patient engagement with a digital mental health intervention.

3. General Description of Study Design

This is an in situ user-centered design study for the automated motivational push messaging we are developing. Users will download an example DMHI (IntelliCare) use it for three weeks. In tandem, they will receive automated motivational push messages from the set that we have in development on a randomized schedule. That is, each day they will be randomized to either receive an automated motivational push message (60% likelihood) or not receive an automated motivational message (40% likelihood). On days when they receive a push message, they will then be promoted to complete a brief survey on their reaction to the push message. They will also be asked to complete weekly symptom ratings. At the end of three weeks, they will be asked to complete a qualitative interview to provide further feedback on messages under development.

The primary outcome in this study is user ratings from the brief surveys provided after push notification delivery. We will also, however, look at user feedback on messages under development in the qualitative interview as well as whether receiving a message makes users more likely to engage with the DMHI (IntelliCare) during the three hours following message delivery.

4. Subject Selection

We will enroll up to 40 patients with clinically significant anxiety and/or depression. Inclusion criteria will be: (i) Age 18+; (ii) Patient Health Questionare-8 (PHQ-8) score ≥10 and/or Generalized Anxiety Disorder-7 (GAD-7) score ≥8; (iii) owns a smartphone; (iv) fluent in English; and (v) have a MGB primary care provider. Exclusion criteria will include: (i) diagnosis of bipolar disorder, any psychotic disorder, or a current substance use disorder per patient's report or medical record; (ii) acute and/or unstable medical problem that may interfere with participation (e.g., scheduled for surgery in the next two months).

Thus, enrollment will be open to all English-speaking, adult, MGB primary care patients with clinically significant depression and/or anxiety and no current or past serious mental illness or acute medical illness that may interfere with participation. Potential subjects who do not speak English will be excluded from the study due to the fact that not all of the validated assessments used are available in languages aside from English. Additional eligibility criteria will be added as needed after recruitment of N=10 participants to ensure adequate representation of racial minorities and men (who are historically underrepresented in studies on depression and anxiety disorders).

Subjects will be recruited from the Mass General Brigham Clinical Trials website/Rally and RPDR patients who have not opted out of Research Invitations. We will send IRB-approved recruitment letters by mail and Patient Gateway messages. We will also recruit from ongoing studies across the MGB system being conducted by colleagues with IRB approval to offer current participants opportunities to participate in other ongoing research. An IRB-approved telephone script will be utilized by the study research assistant to pre-screen subjects prior to scheduling.

5. Subject Enrollment

An IRB-approved telephone script will be utilized to pre-screen subjects prior to scheduling.

Once a potential subject has been pre-screened, the study research assistant will review the consent form verbally with eligible subjects. Eligible subjects will be given an opportunity to ask questions by phone. Potential subjects are not required to sign the consent on-the-spot, they are able to carefully read the document and discuss the research with their family, friends and/or physician and develop questions to ask the research staff. Once they have read the consent document and their questions are answered by a qualified member of the study staff, if they agree to participate in the research, they will be provided a copy of the consent form via REDCap to sign.

Consented subjects will be scheduled for a study enrollment call via phone or Zoom based on the participants' preference. During this call, participants will be guided through the download process for the study intervention app (Intellicare) and the push notification delivery/survey app (MyDataHelps and/or Catalyst by MetricWire) on their personal smartphone. Participants will be randomized each day over the next three weeks to either receive a push notification from the pool of notifications being tested (60% probability) or not (40% probability). Daily randomization will be done using the R package randomizeR.

6. Study Procedures

User-centered, participatory design consists of iterative qualitative feedback meetings with patients (i.e., participants). Up to 40 participants will be recruited for this study. After screening (by phone), eligible participants will be invited to participate in the study. After consent, but prior to enrollment, study staff will check diagnoses in participants' EPIC chart to ensure that participants do not meet exclusion criteria.

The first step in study participation will be for participants to complete an enrollment call and an enrollment survey in REDCap. The enrollment survey will include a demographic questionnaire, the Technology Adoption Propensity Scale, symptom surveys and a brief enrollment survey on messaging preferences. The enrollment call will be conducted via phone or Zoom (per the participant's preference) with study staff. The call will entail walking users through downloading the study intervention app (IntelliCare) and the push notification delivery/survey app (MyDataHelps and/or Catalyst by MetricWire) on their personal smartphone. Participants will be told that IntelliCare is most effective when used on a daily basis and be asked to respond to surveys attached to push notifications by tapping on the push notification. Participants will then be randomized each day to either receive a push notification from the pool of notifications being tested (60% probability) or no notification (40% probability). On days when a push notification is received, they will have the opportunity to respond to a brief survey in the MyDataHelps and/or Catalyst by MetricWire app on their reactions to the notification. Participants will earn $2 for each push notification survey they complete. At the end of week 1 and week 2, participants will be prompted to complete a depression severity self-report measure (PHQ-8) and an anxiety severity self-report measure (GAD-7) and will earn $5 each week these are completed.

Three weeks later, participants will be invited to engage in a study visit, either in lab or remotely via Zoom, based on current COVID-19 prevention guidelines and the participant's preference. Study visits will last up to 90 minutes and will involve meeting with one or two members of the study team.

In the study visit, participants will be given the opportunity to ask any questions they have about digital mental health interventions and/or the goal of the automated motivational messaging being developed. They will then be asked to complete a brief self-report questionnaire including the PHQ-8, GAD-7 and a repeat administration of the enrollment survey (to evaluate whether answers have changed). The remainder of the meeting will consist of a qualitative interview focused on generating subject feedback on design and content considerations in development of automated motivational messages. Subjects will be asked to offer additional feedback related to messages received over the preceding 3 weeks and be presented with low-fidelity prototypes of additional messages not delivered in the preceding 3 weeks with open-ended questioning used to generate feedback.

Participants will be paid $50 for participation in the study visit. All meetings with participants will be audio recorded and recordings will be immediately transferred onto Partners secure servers and deleted from the recording device. All recording devices will be stored in the PI's lab in a locked file cabinet.

The primary outcome in this study is user ratings on message likeability and message motivation from the brief surveys provided after push notification delivery. We will also, however, look at user feedback on messages under development in the qualitative interview as well as whether receiving a message makes users more likely to engage with the DMHI (IntelliCare) during the three hours following message delivery.

The intervention offered as part of this study is only intended to facilitate user-centered design and will be presented as such. It will not be considered part of the participant's treatment plan nor will it be presented as an alternative to other treatment. Neither participation in this study nor engagement with the intervention app prohibit participants from engaging with other treatments for depression and/or anxiety. This study does not involve ongoing assessment of clinical symptoms because this is not an outcome consistent with study aims. If at any point, a participant expresses that participation in the study may be adversely impacting his or her mental health, study staff will make it clear to the participant that he or she can choose to withdraw at any time. Participants can be removed from the study at any time at their own request.

7. Risks and Discomforts

Foreseeable risks that might exist are described in the following four categories: (a) risks associated with the intervention; (b) risks associated with study visits; (c) risks associated with potential loss of confidentiality; and (d) risks of worsening mental or emotional state.

(a)Risks associated with the intervention: Technology-enabled mental health intervention programs have not been shown to cause any harm. The clinical risks of the intervention used in this study are very low. The digital mental health intervention being used in this study (IntelliCare) has been studied previously with no serious adverse events and potential for clinical benefit. The IntelliCare suite is already in public use. Participants may continue with or begin any other treatments they choose for anxiety and/or depression while they are engaging in the app-based intervention.

(b)Risks associated with study visits: Subjects may experience fatigue from the study visits, and potential discomfort from the nature of questions. Some of the questions asked in the qualitative

interview may be unsettling, but most will not be. Subjects may refuse to answer any questions that they do not want to answer. Additionally, subjects are allowed to take breaks throughout the study visit at their request. Risks involving the compromise of privacy and confidentiality during study visits will be minimized through the utilization of the PI's laboratory space, where there are private rooms for study visits and infrastructure in place to ensure the proper adherence to IRB-approved protocol such as the use of password protected computers and locked storage space.

(c) Risks associated with potential loss of confidentiality. As with all studies, potential loss of confidentiality is also a risk. Risks in this study are minimized by using secure online data collection tools –REDCap, the MyDataHelps and Catalyst by MetricWire are HIPAA compliant. The IntelliCare app can be used anonymously with participants labeled by a study ID number only. Additionally, questionnaire data collected has been limited to only those measures essential for addressing primary aims of this project. Still, there is some possibility that others may see the app open on the participant's smartphone. There is also the possibility that databases may be hacked. Confidentiality may be broken by research staff to ensure the patient's safety if there is an imminent threat to self or others. All of these potential losses of confidentiality will be disclosed in the consent documents.

(d)Risks of worsening mental or emotional state: It is not believed that the risk of these depressive, anxious, suicidal, or other adverse outcomes are increased as a function of being enrolled in this study. However, due to the common course of depression and anxiety, it is expected that there will be exacerbations in symptoms of some participants over the course of the study. Subjects may pursue all treatment services they otherwise would alongside participating in this study.

While there is no point in which we are assessing current suicidality, several procedures are in place to protect participants who convey suicidality in the course of their participation. Language in participants' free-form responses to questions in the intervention app (IntelliCare) are continuously monitored by the IntelliCare system. If any words related to death, suicidality or means of suicidality (e.g., gun, pills) are mentioned, the participant will receive an automated message indicating the following "*IntelliCare is NOT an emergency service. If you do not feel safe and need immediate police or medical assistance, call 9-1-1 or go directly to your nearest emergency room."* Additionally, the study PI (or covering clinician) would receive an alert and call the participant. Additionally, if at any time, a subject communicates any imminent safety risk, they will be assessed by the PI (a licensed psychologist) or a covering clinician and referred for immediate care if it is clinically determined.

8. Benefits

There may be no immediate benefits to you from participation in this research study; however, results may allow researchers to design effective ways to better engage patients with digital mental health interventions. Subjects engaged in this type of participatory design research, sometimes report a sense of accomplishment from participation.

9. Statistical Analysis

The primary aims of this study are qualitative and descriptive consistent with user-centered design standards. Descriptive data will be collected on the following: average likability ratings for messages sent, average motivation ratings for messages sent, percentage of the time users

engaged with the intervention app (IntelliCare) within three hours of receiving a message. Daily randomization of message delivery is being applied to mirror message frequency delivery to what we intend to use in the clinical trial not to infer causality.

Data from qualitative interviews will be analyzed using a rapid qualitative analysis approach.[12] Final decisions on messaging will be made in consultation with my mentorship team with the goal of producing 10-15 messages in each "bucket" (i.e., targeting attitude, self-efficacy and habit strength respectively) to avoid delivering redundant messages in the clinical trial.

10. Monitoring and Quality Assurance

As the proposed study involves no more than minimal risk to subjects, there is no formal Data Safety Monitoring Board established for this study. The PI will review safety data in real time to address any concerning adverse events and discuss these with her mentor, Dr. Burdick. Dr. Burdick has served as an active member of three IRBs over the past 15 years and will ensure that all AEs are appropriately reported and followed up.

The principal investigator will oversee the data collection and will ensure that any adverse events are recorded and properly reported. We do not anticipate frequent problems given that this is a minimal risk protocol; however, we will closely monitor data collected in the event of any unanticipated problems. In the event of any unanticipated problems and adverse events we will report to the PHRC: 1) during the conduct of the study, 2) after study completion, or 3) after subject withdrawal or completion. Reports are to be submitted within 5 working days/7 calendar days of the date the investigator first becomes aware of the problem, as outlined in Partners System-wide policy.

Self-report data will be collected in REDCap and the HIPAA-compliant MyDataHelps and/or Catalyst by MetricWire app. Additionally, de-identified participant engagement data will be collected automatically via the IntelliCare app. Assurance of data validity and integrity will be monitored closely by the PI. Similarly, audio recordings of subject interviews will be uploaded onto the research drive (and deleted from the recording device) the day the interview is conducted. The principal investigator will work closely with the rest of the study team to ensure the study is in adherence to the IRB-approved protocol.

11. Privacy and Confidentiality

- ☒ Study procedures will be conducted in a private setting
- ☒ Only data and/or specimens necessary for the conduct of the study will be collected
- ☒ Data collected (paper and/or electronic) will be maintained in a secure location with appropriate protections such as password protection, encryption, physical security measures (locked files/areas)
- ☐ Specimens collected will be maintained in a secure location with appropriate protections (e.g. locked storage spaces, laboratory areas)
- ☒ Data and specimens will only be shared with individuals who are members of the IRB-approved research team or approved for sharing as described in this IRB protocol
- ☒ Data and/or specimens requiring transportation from one location or electronic space to another will be transported only in a secure manner (e.g. encrypted files, password protection, using chain-of-custody procedures, etc.)

- ☒ All electronic communication with participants will comply with Mass General Brigham secure communication policies
- ☒ Identifiers will be coded or removed as soon as feasible and access to files linking identifiers with coded data or specimens will be limited to the minimal necessary members of the research team required to conduct the research
- ☒ All staff are trained on and will follow the Mass General Brigham policies and procedures for maintaining appropriate confidentiality of research data and specimens
- ☒ The PI will ensure that all staff implement and follow any Research Information Service Office (RISO) requirements for this research
- ☒ Additional privacy and/or confidentiality protections

Risks in this study are minimized by using secure online data collection tools – REDCap, the MyDataHelps and Catalyst by MetricWire apps are HIPAA compliant. The IntelliCare app can be used anonymously with participants labeled by a study ID number only. Additionally, questionnaire data collected has been limited to only those measures essential for addressing primary aims of this project. Finally, risks involving the compromise of privacy and confidentiality during study visits will be minimized through the utilization of the PI's laboratory space, where there are private rooms for study visits and infrastructure in place to ensure the proper adherence to IRB-approved protocol such as the use of password protected computers and locked storage space.

12. References

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