Working Paper

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Using Video and Audio Diaries to Better Understand Study Participant Experiences

A Pilot Study in Feasibility and Acceptability

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About This Working Paper

Recent technological advancements have accelerated the potential for more creative participant-generated data, such as video or audio diaries. Using a small sample of 18 patients from a larger pilot randomized control trial sample (n=60), we explored how video and audio diaries collected during the intervention may help us understand patient experiences during a U.S. pilot randomized control trial. We were also interested to identify the unique value of video data to the pilot trial, and we assessed the diary platform's acceptability and feasibility. The results were mixed, indicating there may be value in eliciting qualitative in-the-moment patient satisfaction and experience to help refine delivery in clinical settings. However, the volume of video diary submissions did not provide as much content as expected, which may have affected the substantive value of qualitative data. Overall, participants found it easy to record their video or audio diary, although comfort and perceived value of being asked to record the diary declined over time, indicating a need to explore acceptability by participant demographics, such as age. Most of the video diary participants did not intuitively use video to its greatest potential, for example to depict visual data relevant to the intervention. Future work should further explore how to maximize the potency of in-the-moment video and audio diaries relative to research topics and questions. Also, more research on methodology should be deployed to help determine where video/audio diaries may offer more or different content compared to retrospective interviews.

RAND Quality Measurement and Improvement Program

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Chapter 1. Introduction

Over the last decade, digital mobile communications have become widely accessible to consumers. Mobile phones and tablets now incorporate powerful communications and video recording capabilities, such that the use of video has become democratized—that is, it is no longer the preserve of high-end professional environments. Although video content had been used in certain types of anthropological, educational, and medical research for decades (Hurtubise et al., 2013; Lenette et al., 2013; Warmington et al., 2011), such as video ethnographies and symptom observations collected by researchers, recent technological advancements have accelerated the potential for more creative forms of data collection, such as participant-generated video methods (Meixner & Spitzner, 2022).

Video diaries are a good illustration of how a traditional approach in health research—written journal diaries date back to the 1930s—can capitalize on the power of digital technology (Keleher & Verrinder, 2003). Until recently, measurement of real-time patient experiences was considered impractical (Stone, 2013). Historically, such data were collected, or rather "reconstructed," well after the fact (Stone, 2013) by asking the participant to record them at certain time intervals or following specific events. But harnessing new digital capabilities with video diaries can offer a helpful source of data, both solicited (prompted by researchers) and unsolicited (at the participant's choice). They can be created in-the-moment, thus reducing the amount of time between an event or an experience and a person's reflections on it—that is, the approach can drastically reduce recall bias (Mendoza et al., 2021). Recorded at the participants' convenience, in the absence of a researcher, video diaries can also reduce the potential for other types of bias, such as social desirability bias, whereby participants give answers that they think the researcher wants to hear (Vesely & Klockner, 2020).

In addition to timeliness and convenience, the use of video as a diary medium offers several unique communication advantages when compared to written or audio content only. Meryn articulated these dimensions, all of which can come across simultaneously as "information in a nutshell" (Meryn, 2009). One aspect is novelty; although video has been used for over a century, as a medium applied in a new context it can appeal to research participants as new and contemporary (Meryn, 2009; Walker & Boyer, 2018). Utility is another important dimension; video can reveal data that are uniquely visual, such as facial expressions, body language, or environmental characteristics (Meryn, 2009). Another vital video element is its emotional value. Video can combine explicit elements (such as a person speaking to camera or a person demonstrating an activity) with more subtle ones (such as choice of video background and soundtrack, or visual framing), which together may appeal to emotions, and increase viewer motivation and receptivity to the message (Meryn, 2009).

So far, video diaries have been used in some areas of health research—for example, to document environmental aspects of lived experience (Bartlett, 2012) and track patient symptoms and self-management after treatment (Saeidzadeh et al., 2021). However, one research domain where video diaries have been significantly underutilized is in the formative (design or pilot) phase of randomized control trials (RCTs) and during their evaluation. Evaluation of participant experience in RCT pilots has been predominantly conducted using in-depth interviews or focus groups, often many months after a participant's exposure to the study. Video diaries would address both the methodological and temporal gaps in approaches to date. Qualitative data are generally important for intervention development, but their timing is also significant. Interviews and focus groups conducted at the end of a pilot study may suffer from significant recall bias and may miss important nuance and technical details that could otherwise help refine intervention design or implementation. When used early in RCT pilots, qualitative data (such as video diaries) can shed light on individual and environmental factors vital to the design and/or success of the trials (Davis et al., 2019). Such information may help explain why certain interventions may not achieve their full potential, and can be especially useful in adapting the design (Flemming et al., 2008) or other components of interventions (Montgomery, 2016; Pallmann et al., 2018). Despite this, qualitative data are poorly and inconsistently utilized in the evaluation of randomized controlled trial pilots (Davis et al., 2019).

Recent advancements in remote audio and visual recordings - with artificial intelligence and machine learning analytics - have facilitated the collection of video and/or written narratives embedded in longer surveys or in combination with survey questions (MLL, 2020). Study participants can respond to single or multiple daily prompts from their smartphone, making this innovative approach potentially feasible for larger scale studies (MLL, 2020). To date, similar technologies have only been employed in small studies outside the United States (Mendoza et al., 2021; Taylor et al., 2020; Zamir et al., 2018). We contribute to the filling of this knowledge gap by describing the lessons learned from gathering mixed (survey and diary) participant feedback in real-time through a smartphone browser-based app during the formative stage of a pilot study in Los Angeles. This approach is based on traditional ecological momentary assessments, but with a heavier focus on open-ended elicitation and qualitative data (Moskowitz & Young, 2006).

1.1. Study Goal

With the Medallia LivingLens® pilot, we sought to evaluate a novel video-elicitation platform embedded in a larger randomized control trial. The pilot aimed to understand patient experiences during the implementation of a randomized control trial titled Behavioral Economics to improve Antihypertensive Therapy Adherence (BETA); the pilot RCT examines the added value of text message reminders and rewards to a basic education on anchoring pill-taking behaviors (Ebinger et al., 2023). In addition, the video diary pilot aimed to understand the acceptability and feasibility of using a novel video diary elicitation platform to collect and

interpret experiential sampling—that is, participant self-report of behaviors, emotions, or experiences as they occur in the natural environment (Stone, 2013). We focused on three research questions:

1. How helpful did participants find the BETA intervention?
2. How did the BETA intervention help participants develop habit formation strategies?
3. What did participants think about the video diary component?

This work represents one of the first evaluations of the feasibility and acceptability of an innovative video diary elicitation platform in the context of a U.S.-based pilot randomized controlled trial. We highlight several unique methodological considerations when using such platforms. Further, results of this study document patient perceptions of the pathways through which intervention components might result in desired or real behavioral change in participants. This study also provides a methodological advancement on the simultaneous use of mixed methods (i.e., survey ratings and novel video diary platforms) to elicit early participant feedback on how to improve the intervention. We also briefly illustrate what changes the research made to the intervention based on these findings.

Chapter 2. Methods

2.1. BETA: The Parent Study

The Behavioral Economics to improve Antihypertensive Therapy Adherence (BETA) study is a text and incentive-based intervention that seeks to support participants in forming healthy pill-taking habits. It does so by: 1) linking medication-taking to a daily routine; 2) increasing information salience through frequent text messages; and 3) providing intermittent rewards for pill-taking according to an anchoring plan—that is, pill-taking coinciding with the time of an existing routine behavior such as eating breakfast (Ebinger et al., 2023). The study was designed as a randomized control trial in a high-volume clinical practice (Smidt Heart Institute, Cedars-Sinai Medical Center, Los Angeles, California) to establish feasibility, acceptability, and preliminary efficacy. Hypertensive patients were randomly assigned in a 1:1:1 ratio to three study groups. The Control group (n=20) was provided education on anchoring pill-taking to a daily routine. The first intervention group (Messages, n=20) received anchoring education and daily text message reminders. The second intervention group (Incentives, n=20) received anchoring education, text messages, and financial incentives for adherence to their anchoring plan. The aim of the pilot trial was to examine two hypotheses: first, the intervention of text messages to help anchoring pill-taking to an existing routine is effective (tested by comparing the pooled [Messages group + Incentives group] vs. the Control group); and second, adding incentives to the text messages is more effective for routinizing pill-taking (testing outcomes in the Incentives group vs. Messages group).

The intervention lasted three months, after which the text messages and incentives were withdrawn. The team followed the participants for six months post-intervention to assess maintenance of habits. Timely medication adherence (that is, whether the medication was taken at the time of the existing routine chosen by the participant) was assessed over the nine-month study period using Monitoring Event Management System (MEMS) caps that captured the date and time of each pill-bottle opening event. Additional details on the study design, participant inclusion and exclusion criteria, and expected results of the pilot RCT are reported elsewhere (Ebinger et al., 2023).

2.1.1. Pilot RCT Sample

The pilot RCT sample included patients 18 years or older who had been prescribed at least one anti-hypertensive medication at the time of enrollment. Participants were required to own or have access to a cellular phone throughout the duration of the intervention, and be willing to receive study text messages.

Research staff used the hospital electronic health record (EHR) system to screen patients for eligibility based on age and antihypertensive treatment. Providers of identified patients then invited potential participants to explore the possibility of being in the study, and research staff contacted those who agreed by phone to screen for initial eligibility and gauge preliminary interest prior to their visit. Upon confirmation of interest, the patient's provider was contacted by study staff at the clinical practice, on the day of the patient's scheduled clinic visit, to introduce the study and to prepare for the visit. The study coordinator then visited the patient at the end of their clinic visit with study information, gauged their eligibility and interest again, and if eligible, consented them to participate.

2.2. A study within a study: Medallia LivingLens® Pilot

Within the RCT, we designed a small pilot study to explore how a novel video-diary elicitation platform (i.e., Medallia LivingLens (MLL)) can help researchers understand patient experiences during the trial. This pilot is the focus of this manuscript. We also aimed to ascertain the feasibility and acceptability of using an innovative video diary elicitation platform within the context of health research and RCTs. MLL facilitated the collection of video and audio diary narratives from a random subsample of RCT participants using an experience sampling approach—an ecologically grounded data collection method that elicits comprehensive data of emotional states experienced at given points during the day (Stone, 2013). Unlike traditional methods that may ask about participants' emotional states retrospectively, the use of prompted video diaries yields in-the-moment narratives about experiences during the study. This is similar to ecological momentary assessments, but with an emphasis on open-ended qualitative elicitation (Moskowitz & Young, 2006). The pilot was conducted within the first three weeks of patient participation in the RCT to mitigate potential confounding between the effect of the main intervention and the effect of the diary prompts on pill-taking behavior.

This data collection method used an event-contingent protocol—that is, it asked respondents to report experience immediately or closely following a one-week period in the RCT (Christensen et al., 2003). All participants in the video diary sample could submit one diary entry per week, limited to five minutes per entry.

2.2.1. MLL Pilot Sample

BETA Study participants were offered optional enrollment in the MLL pilot at the time of recruitment into the primary study on a first-come first-serve basis. There were no incentives offered for enrollment in this pilot. We expected to recruit approximately ten participants per arm for a total of 30 participants, with replacement. During consenting, participants were informed that they would receive a total of three diary prompts—one each week for a period of three weeks—and that they would be asked to record and submit a video diary in response to the prompt, along with any additional information they were willing to share about their experience

with the BETA study. They were also informed that they would receive a short online questionnaire to fill out along with the video diary each week. Because the diary prompts were tailored to their responses to certain survey questions, we did not allow unprompted submissions. For participants who declined to participate in the MLL pilot study, the recruitment team recorded reasons for declining.

Once pilot consenting was completed, participants were added to MLL's diary elicitation platform (Checkmarket®), which was used to develop and manage the general survey and diary workflow over the course of the pilot. This system integrated MLL's platform into the survey workflow, making the video diary and survey administration seamless, and included automatic transcription of video diaries that were utilized in this study. Once transcribed, the videos become searchable, reducing the overall analysis time.

Participants were emailed diary prompts weekly on Thursday or Friday, on the assumption that they might have more time over the weekend to complete this task. If they partially responded to the survey without submitting it, they were sent reminders a day after their last attempt to complete the survey. If they did not respond to the survey, they received two reminders—one three days after the initial invitation and the other two days after the first reminder. Participants who completed their first week's response were sent the subsequent week's diary prompt. Participants who did not respond to the diary within two weeks of receiving an invitation were unenrolled from the pilot. All materials and procedures were approved by the Institutional Review Board at the medical center where the study took place (Pro00057764).

2.2.2. Technical challenges that necessitated modifications to the MLL pilot

Six participants experienced technical challenges including issues with uploading recorded video. In these cases, the study team worked with the platform's technical team to investigate and resolve the issues. The affected participants were re-sent video diary prompts, but only two followed through. Additionally, to account for the delays induced by these technical issues, and for the purposes of consistency, the pilot duration for all participants was extended from the initial three weeks to five weeks post enrollment.

An early assessment identified a low response rate for video recordings among those enrolled in the pilot. At the same time, we noticed a pattern in the reasons for declining to participate in the pilot study (n=23), which included reluctance to be video recorded and a preference for audio recording instead. Preliminary analysis of the video recordings found that, with one exception, video content submitted by participants did not provide information unique to the medium (that is, information we could not otherwise capture with just audio recordings), such as meaningful visual capture of a person's environment, video footage of patient's visual reminders, or where they stored their pills. We therefore decided to modify the design to allow both audio and video recordings for the diaries. In other words, participants could decide to record one or the other, according to their preference. The pilot study was then again offered to all participants, including

participants who had initially declined to participate in the pilot (video) component. As a result of this change, the response rate in week one increased from 26 percent (8 out of 30 who consented for video diary only) to 38 percent (10 out of 26 who consented for audio and/or video diary).

2.2.3. Data Collection

We collected three types of quantitative measures: 1) study arm identifiers and demographics; 2) ratings of experience with the BETA intervention, which served as the basis for the branching logic for the video diary elicitation; and 3) acceptability and feasibility data of the video diaries. See Supplemental Material 1 for the full three-week collection protocols. In addition to these data collected during the intervention, we also collected acceptability and feasibility survey ratings from pilot participants at 3-month follow-up.

Demographics. The demographics included age, gender, and employment status; age and gender were abstracted from the EHR system and the employment status was extracted from the baseline survey. We additionally collected participants' contact information (email) to be able to send them their diaries.

Weekly intervention experience ratings. Participants in the control group received a different prompt than the participants in either of the treatment groups. For example, participants in the treatment group were asked about how helpful the text messages had been in terms of forming a habit to take their blood pressure medication together with an existing routine (week 1); whether they had identified an existing routine to take their blood pressure medication habitually (week 2); and whether they experienced alarm fatigue during the BETA study—that is, exposure to an excessive number of phone alarms and ringtones such that they no longer respond to them (week 3). Participants in the control group were asked how successful they had been at taking their blood pressure medication habitually (week 1); what strategies had helped them to take their blood pressure medication habitually (week 2). In week 3, control participants were not asked any preceding survey question—they were directed straight to their diary elicitation.

Acceptability and feasibility of video diary method. The acceptability of video diaries was assessed through a set of four closed-ended items developed for this study. The questions were asked each week after the participant recorded their video diary: I enjoyed recording my video diary; It was easy to record my video diary; Being asked to record my video diary made me feel that my opinion was valued; and Recording my video diary helped me reflect on how I take my medications. The response categories were strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree.

The video diary elicitations were embedded within the abovementioned brief weekly ratings of intervention experience that used branching logic to first tease out the sentiment of participant experience using ratings, followed by relevant diary prompts to elicit meaningful answers depending on prior ratings. For example, in week 1, intervention participants were asked to first rate "How helpful have these text messages been for you in terms of forming a habit to take your

blood pressure medication together with an existing routine?" using the following answer options: Very helpful, Somewhat helpful, Unhelpful, Not sure. Those who selected "Very helpful" or "Somewhat helpful" received the following prompt: "Please tell us how the text messages have been helping you to take your blood pressure medication habitually, together with an existing routine." Those who said "Unhelpful" or "Not sure" were instead prompted to "Please tell us why you think the text messages have not been helping you to take your blood pressure medication habitually, together with an existing routine."

2.2.4. Data Analysis

Stage 1: Qualitative analysis

Once the pilot study ended, the video diaries were matched with the respective survey data using the participant key. To determine if the video diary content added meaningful and important layers of information uniquely suited to visualization (as opposed to typed or audio-only narratives), the diary entries were reviewed by the lead and third authors for any meaningful visual data relating to the study topic and diary prompts. For example, did participants use video to show their pill boxes, visual reminders, or other location anchors?

Next, the diary transcriptions were exported into an Excel spreadsheet, along with the demographics and survey data for analysis. We conducted content analysis on all diary entries using codes focused on the patient context, habit facilitators, and habit barriers. We applied the same codes to all question responses, as in some cases answers went beyond the scope of the immediate question, and some participants would discuss the same topic repeatedly regardless of each question's focus. Codes were developed primarily inductively (Cho & Lee, 2014) by one person (first author) and verified by another team member (third author). Both authors were trained in qualitative methods in the context of health services research; and both have prior experience with the methodology employed—and the subject matter. In some cases, we developed codes based on the topical focus of the question. For example, many of the comments in response to the question "Please tell us how the text messages have been helping you to take your blood pressure medication habitually, together with an existing routine," were coded under the category code for Help Mechanism, with subcodes focused on perceived helpful aspects, such as "reminder" or "alarm." For broader questions, such as "Please tell us how you have managed to take your blood pressure medication habitually," the codes were grounded in the comments, including themes such as "intrinsic motivation," or "visual reminders."

Stage 2: Analysis of themes by survey answers

We then followed a "convergent" mixed methods approach wherein we examined the diary narratives sorted by categorical survey ratings (Fetters, 2019). For example, participants' ratings of perceived text message helpfulness were juxtaposed with relevant qualitative themes to better understand how qualitative dimensions of experience relate to the ratings. The convergent

approach was chosen to provide a more complete picture of the concept of interest, i.e., experience with text messages during the RCT, from several perspectives. Eliciting only closed-ended ratings would preclude narrative content about dimensions of experience that may not be captured with the survey scales alone. Likewise, only relying on narratives may not offer a sense of breadth that typically comes with quantitative data. These joint displays allowed the authors to iterate and to interpret both types of data relative to each other (Fetters, 2019).

Chapter 3. Results

3.1. Overview

A total of 64 patients from the main BETA study were offered the opportunity to participate in the MLL pilot study, of whom 30 (47 percent) expressed interest and completed the consent form. The pilot study began in April 2022 and ended in October 2022. A total of 18 unique respondents completed diary elicitations: six completed video diaries (6= for week 1, 6= for week 2, and 3= for week 3), and 12 completed the audio diaries (12= for week 1, 5= for week 2, and 3= for week 3).

In what follows, we present results from the combined sample of 18, including narrative comments from both video and audio diaries. Fourteen respondents were in the treatment group (either Messages or Incentives), and four in the Control group, with 56 percent identifying as female. Age ranged from 44 to 89, with a mean of 63.7 years. Nearly 40 percent of participants were employed full time, almost 40 percent were employed part time, and the rest were either not employed or retired. The pilot sample was comparable in terms of demographics with the full RCT sample. Diary entries ranged from seven seconds to four minutes and 37 seconds.

3.2. Intervention helpfulness

A majority of intervention respondents (eleven out of fourteen, 79 percent) said they received daily text messages from the BETA study, with the remaining saying they received text messages sometimes (two out of fourteen, 14 percent) or never (n=1, 7 percent). The person who answered "never" was excluded from the analysis. Figure 1 shows BETA intervention helpfulness ratings. Of those who received text messages during week 1 (n=13), half found them either very helpful (n=4) or somewhat helpful (n=3) in terms of forming a habit to take their blood pressure medication together with an existing routine. A majority of diary narratives suggested that the text messages helped primarily with reminding them to take the medication, as illustrated by this quote: "The messages have helped me to remember to take my blood pressure medication even if I forgot or didn't hear the alarm. So they've been pretty helpful and in reminding me and creating habits." (M, 50, Employed FT) Other diary entries include mentions such as "the reminder text to help me keep on track," "it reminds me to set my alarm," or "the text does make me remember." This indicates that habits may be forming around the receipt of the text messages, rather than the establishment of an anchor.

The other half of respondents either found the daily messages to be unhelpful (n=4, 29 percent) or were unsure about their helpfulness (n=2, 21 percent). Narratives suggest several reasons for these ratings. First, some respondents perceived the text messages to be superfluous because they had pre-existing routines for taking medication for blood pressure or other long-

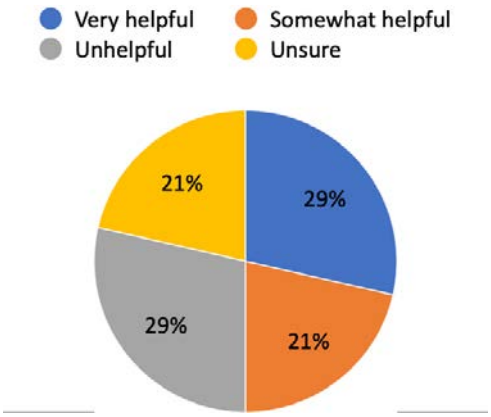
term chronic conditions, as this comment suggests: “The reason I have no benefit from your text messages is because I have a habit that’s daily and solid already. Not that there’s a problem with your messages. It’s just that I do not need them.” (M, 73, Retired) Second, some participants mistakenly expected the text messages to serve as personalized reminders for their own regimens (e.g., taking the pill at a certain time in the morning or in the evening). The text messages were sent out daily at 11am and were meant instead to remind them of the principle of taking their pills with other routines, so as to build a habit. This comment is representative of this issue: “I’m taking the medication twice a day. So they’re coming at 11:00, at which point I’ve already taken my morning medication. And yet it is in significantly 7 hours, 6 hours before I’m going to take my evening medication. So the timing of your prompt isn’t close to when I take the medications, and therefore I need to establish different habits at the appropriate times more than anything else.” (Female, 70, Employed FT)

In week 3, intervention participants were asked if they experienced alarm fatigue—that is, exposure to an excessive number of phone alarms and ringtones such that they no longer respond to them. Eighty percent of respondents (four out of five) said they experienced no fatigue and went on to explain in their diaries why that was the case. The next comment is representative: “Alarm fatigue is not an issue for me. I don’t have a lot of alarms set on my cell phone. I don’t use my cell phone for a lot other than phone messaging and checking my email and texts. So it’s simply not an issue.” (Female, 70, Employed FT)

Figure 1. BETA intervention helpfulness ratings

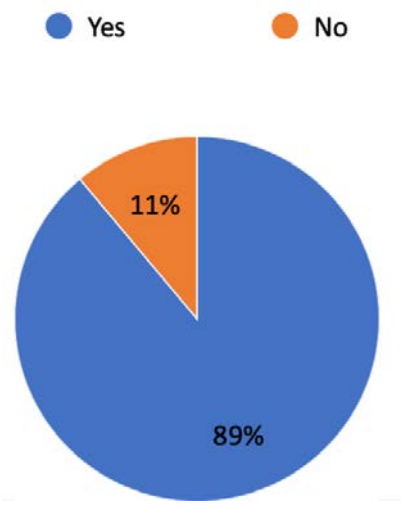
Treatment Participants Week 1

How helpful have these text messages been for you in terms of forming a habit to take your blood pressure medication together
with an existing routine? (n=14)



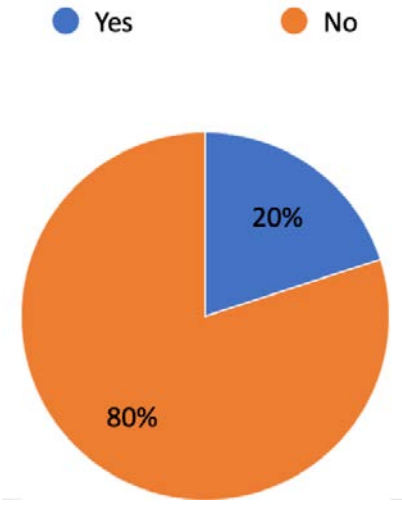
Treatment Participants Week 2

Have you identified an existing routine that is helping you to
take your blood medication habitually? (n=9)



Treatment Participants Week 3

Some people may experience 'alarm fatigue.'
This means that they have been exposed to an excessive number of phone alarms and ringtones such that they no longer respond to them.
Have you experienced 'alarm fatigue' when you received the daily text messages from the
BETA Study? (n=5)



3.3. Strategies for habit formation

During week 2, treatment participants were asked if they had identified an existing routine that is helping them to take their blood pressure medication habitually. Eighty-nine percent (eight out of nine) responded affirmatively and used their diary entries to tell us about some of the strategies they were using to take their medication routinely. Overall, narratives highlighted four strategies: 1) placing their medications in a place tied to a routine behavior, such as bedroom or kitchen counter, 2) storing and sorting their medications in a pillbox; 3) using visual reminders, such as glass of water or water bottle; and 4) setting phone alarms as a reminder. This comment illustrates many of these strategies: "For me, the weekends are a little bit harder to keep to my routine. So I have found that if I move my medication bottle into my bedroom and put it right on my nightstand next to my bed with a glass of water, as well as set my alarm on my phone, I make sure that I take my medication at the exact same time every day, even on the weekends. Prior to that, I always had it on my kitchen table and Monday through Friday was really easy because of work routines. But anyway, I found that that helps me for the weekends." (Female, 53, Employed FT)

These strategies are comparable with the strategies discussed by control group respondents (n=4), when their diary prompt asked them to tell us how they managed to take their blood pressure medication habitually. For example, "I keep the special bottle with my heart meds on the counter of my bathroom so it is immediately visible when I go in in the morning, normally around 7 a.m. If I had otherwise forgotten to take the meds, that is a visual reminder to take them together with my other medications. As the Bible sits on the bathroom counter, all day, it also serves as a visual trigger." (Male, 80, Employed PT)

3.4. Video/audio diary method acceptability ratings

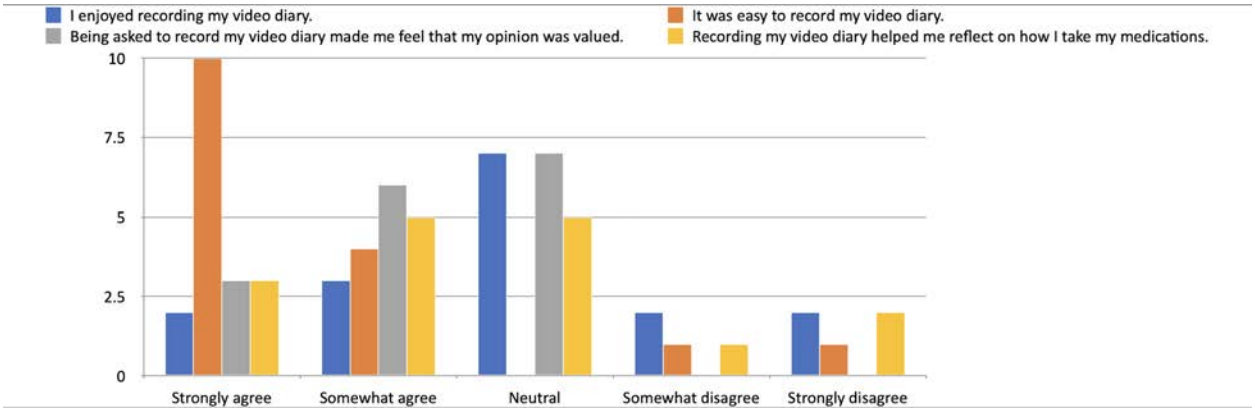
Figure 2 shows weekly satisfaction ratings of the video and audio diary methods, which participants submitted after each diary entry. Overall, participants found it easy to record their video or audio diary (eighty-eight percent or fourteen of sixteen in week 1, eighty-eight percent or eight out of nine in week 2, and one hundred percent or seven of seven in week 3 strongly or somewhat agreed). Across the three weeks, fifty percent or three of six video diary participants were neutral when asked 1) if they enjoyed recording the video diary, 2) if recording the video diary helped them reflect on how they take their medication, and 3) if being asked to record the video diary made them feel that their opinion was valued. However, more than half of video diary participants (four out of six) said it was easy to record the video diary. During the first week, fifty-eight percent or seven out of twelve audio diary participants strongly or somewhat agreed that the diary helped them reflect on how they take their medication, and more than half (seven out of twelve) said it was easy to record the audio diary. In subsequent weeks fewer than half agreed with these statements. During the first week, fifty-eight percent or seven out of twelve somewhat or strongly agreed that being asked to record the audio diary made them feel

that their opinion was valued; however, the proportion declined to less than half in weeks 2 and 3. Forty-two percent or five out of twelve said they enjoyed recording the audio diary in week 1, but this too declined in subsequent weeks. These trends held cumulatively for both video and audio diary participants. For the statement that being asked to record the video diary made them feel that their opinion was valued, ratings declined over the three weeks (fifty-six percent or nine out of sixteen in week 1, thirty-three percent or three out of nine in week 2, and fourteen percent or one out of seven in week 3 strongly or somewhat agreed). The enjoyment of recording the video or audio diary also decreased for both types of participants over the three-week period (thirty-one percent or five out of sixteen in week 1, eleven percent or one out of nine in week 2, and fourteen percent or one out of seven in week 3 strongly or somewhat agreed).

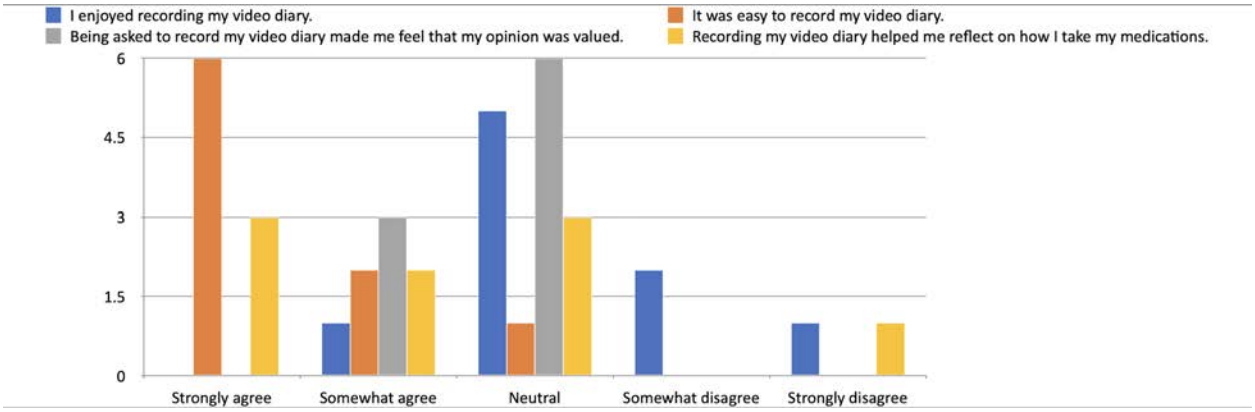
A few diary entries in week 3 help contextualize these acceptability findings. For example, one participant said "I've liked how it's pretty easy to do this. None of them have been very difficult. What I didn't like. I guess there's been a few times where there was a glitch where it didn't go through, but I think those may have been fixed. And it's just good to reflect on the idea that I'm actually following through with the way that I thought it was worth taking my medicine. So that's good." (F, 47, Not employed) Another respondent's only regret was that they did not feel that they had much to say: "It feels like I'm not offering very much. But yeah, I do it anyway. That's my thoughts. Thank you." (Male, 51, Employed, FT).

Figure 2. Video/audio acceptability data at the time of diary submission

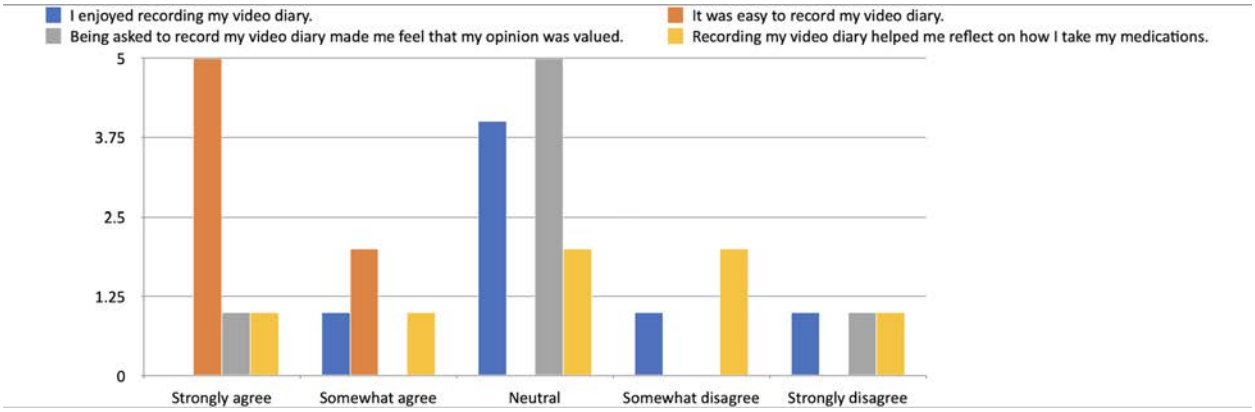
WEEK 1 (N=16)



WEEK 2 (N=9)

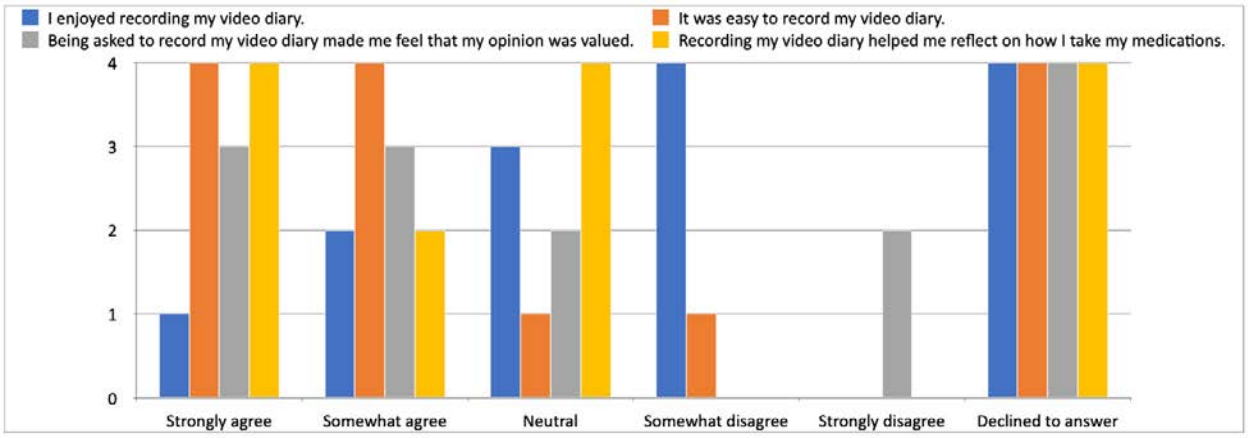


WEEK 3 (N=7)



At three-month follow-up (see Figure 3), the acceptability ratings had declined, likely due to recall bias. Just over half of respondents (fifty-three percent or eight of fifteen) somewhat or strongly agreed it was easy to record their video or audio diary, compared to eighty-eight percent (fourteen of sixteen) in week 1 and one hundred percent (seven of seven) in week 3. Three out of fifteen or twenty percent said they enjoyed recording their video or audio diary (compared to thirty-one percent or five of sixteen in week 1), while almost a third somewhat disagreed with the statement. Six out of fifteen or forty percent strongly or somewhat agreed that being asked to record their video or audio diary made them feel that their opinion was valued and that recording the diary helped them reflect on how they take their medication.

Figure 3. Video/audio diary acceptability data at three-month follow-up (N=14)



Chapter 4. Discussion

The significance of this work is three-fold. First, it represents one of the first evaluations of the feasibility and acceptability of an innovative video diary elicitation platform in the context of a U.S.-based pilot randomized controlled trial. Results from this study suggest the importance of analyzing in-the-moment patient satisfaction and experience with interventions. Feedback retrieved early in the intervention may help to address implementation issues early in the research process, which then can help with delivery in clinical settings. Such feedback may also help contextualize trial results, helping researchers understand why some interventions may succeed or fail. Second, it assesses a methodological advancement on the use of mixed methods and novel video/audio diary platforms to elicit early participant feedback on the intervention, by combining qualitative and quantitative data. Such diary elicitation platforms should, in theory, be more convenient (participants can do it in their own time) and efficient compared to attempting to schedule one-on-one video calls between the research team and the participants. Third, the study also provides first evidence regarding participant satisfaction and experience with a habit-formation intervention for hypertensive patients.

We utilized a convergent mixed-methods design to elicit different dimensions of satisfaction with the BETA intervention, and feasibility and acceptability of the video diary method. The quantitative ratings show that the approach was rated highly overall, and the qualitative data helped contextualize how and why the BETA intervention worked for some patients but not for others. Below we discuss several unique methodological issues that must be considered in the utilization of such platforms.

4.1. Technical considerations for the Medallia LivingLens® platform

At the time of the study, the Medallia LivingLens® suite of applications had recently undergone changes, such as the acquisition of new technical products, which in practical terms meant that the responses to the survey items that branch out to the diary prompt were stored on one platform, while the diary entries themselves were stored on another. In addition, despite significant user tests before survey and diary roll-out, continuous enhancements to the software meant that the video elicitation tool was sensitive to user settings, such as type of browser and camera and microphone permissions on their devices.

These issues necessitated modifications to the study design, such as how participants were instructed to use the platform at enrollment, inclusion of software prompts to enable widget permissions for recording video and audio within the main survey, and resending links to the survey several weeks after enrollment in the study. In a few instances, these glitches discouraged some participants from continuing with the pilot. Future research with such novel platforms

should consider and resolve potential technical issues that may result from platform upgrades, as well as technical requirements at user end.

4.2. Implications for RCTs

The findings of the study suggest there is utility of gathering in-the-moment data about patient experience, which can flag intervention implementation issues early on. For instance, the Week 1 survey questions identified patients who said they had not been receiving their daily text messages, so our team introduced a step to confirm delivery and receipt. The diary entries regarding the perceived helpfulness of the text messages also highlighted specific pathways through which the BETA text message intervention worked to achieve its goals, but also some patients' misunderstanding of the objective of the text messages. For some, the texts were helpful as a "reminder," while for others the texts were redundant due to already existing routines. This level of detail may be more challenging to elicit during qualitative interviews or focus groups conducted weeks or months after an intervention. Identifying such problems early on helped our team better target recruitment for the remainder of the study by focusing on patients who were new to hypertension and long-term medication regimens. In the future, early learned lessons can help others refine recruitment and enrollment protocols to ensure that interventions are administered to adequate samples of participants and participants have a good understanding of the intervention scope. Finally, the fact that the three-month survey data on satisfaction were not particularly informative and had declined compared to the ratings collected during the intervention serves to underscore the importance of in-the-moment participant data. The latter can address recall bias introduced by the time difference between experience with the intervention and the follow-up survey.

4.3. Considerations relating to video data

A key finding in this pilot study is that the volume of video diary submissions did not provide as much content as expected, which may have affected the substantive value of qualitative data. We had a relatively small total sample of respondents (n=18), which was even smaller for the video diaries (n=6). Without specific prompting, the majority of participants in our sample did not intuitively use the video diary to its greatest potential—by, for example, showcasing visual aspects of their environments, such as pill storage, pill location, or visual reminders of pills. This suggests four future considerations. First, other work should evaluate the research benefit of video diaries when participants are specifically guided on how to maximize the potency of the medium, using it to its fullest extent to communicate visual aspects of their study experience. Second, future work should consider offering participants both a video and an audio option. Third, not all topics lend themselves to video diary elicitation, and the medium ought to be deployed thoughtfully relative to research topic and research questions. For example, the decision to use video diaries as a form of data elicitation could be informed by the unique

added value of researchers seeing visual data, such as facial expression, body language, or a participant's environmental context. Also, there is scope for studies designed to assess the methodological benefits of video or audio diaries, compared to retrospective interviewing, for instance. Finally, understanding participant barriers to engaging with video, such as personal comfort or technical knowledge, as well as how this might vary across demographic groups, are important practical considerations. For instance, in this pilot we noted a declining interest in how people valued the video and audio diary options over time, both during the three weeks of the intervention and at the three month follow-up. This suggests that acceptability of the method or the platforms used for such data collection should be further studied.

4.4. Limitations

Several limitations should be noted. First, generalizability of findings is limited because sampling occurred at a single institution in southern California. Thus, perspectives may not be representative of experiences in other urban areas in the United States. Also, the qualitative sample was very small, smaller still for the video component, and not randomized. This limits the opportunity to draw meaningful conclusions. Self-selection bias might have also been an issue, especially as there was no incentive for participation in this pilot. This means that participants who chose to participate in the pilot may be systematically different from those who did not. For example, those who participated may have been keener on technology or had reliable internet access at home. The findings, however, remain valuable due to the novelty of the platform and the depth of perspective offered by the qualitative elicitation.

Chapter 5. Conclusion

This work represents one of the first evaluations of the feasibility and acceptability of an innovative video diary elicitation platform in the context of a U.S.-based randomized controlled trial. Results from this study suggest the importance of analyzing in-the-moment patient satisfaction and experience with interventions. Such early feedback may help to address implementation issues early in the research process, which then can help with delivery in clinical settings. Results also help clarify why the intervention may not have been suitable to some of the participants, suggesting the need for changes in recruitment. In general, participants found it easy to record their video or audio diary, and many also agreed that recording the video or audio diary helped them reflect on how they take their medication. However, most participants did not intuitively use the video diary to its greatest potential. Future work should further explore how to maximize the potency of the medium relative to research topics and questions. Also, more research on methodology should be deployed to help us determine where video/audio diaries may offer more or different content compared to retrospective interviews.

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