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Assessing real-time sun-protection decisions using audio diaries: Feasibility and outcomes

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Keywords

cancer; oncology; melanoma; qualitative; decision-making

Introduction

The incidence of melanoma is rising, and sun exposure is the predominant modifiable cause. [1] Sun protection, including sunscreen, protective clothing, hats, and shade-seeking, is essential for first-degree relatives (FDRs, i.e., biological parents, siblings, or children) of melanoma survivors, who are twice as likely to develop melanoma as the general population but practice sun protection inconsistently. [2, 3]

Attitudes and beliefs about sun protection have been examined as predictors of sun protection behaviors, yet people may make different decisions about whether and how to engage in sun protection depending on the time and context. [4, 5] Understanding real-time sun-protection decision-making may be instrumental to improving sun protection consistency in at-risk populations, but to date it has not been examined. Real-time audio diaries (i.e., free-response voice recordings rather than recorded answers to closed-ended questions) could provide a unique strategy to measure nuances of sun-protection decision-making. We developed an interactive voice response system (IVRS) that delivered a survey concerning sun-protection decision-making using participant cell phones. ([6], Hay et al., In Prep, Shuk and Holland et al., In Prep) Other ecological momentary assessment diary methods include paper and pencil, handheld electronic devices, voice-activated recorders, and web or telephone-based systems; use of personal cell phones eliminates concerns about retrospective data entry and the expense and risk of data loss associated with data collection devices. [7, 8] The current study examined the feasibility and outcomes of audio diaries assessed within the IVRS to capture qualitative narratives describing context and decision-making for sun protection.¹

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¹The IVRS also delivered closed-ended survey questions concerning sun-protection decision-making; these findings will be published elsewhere (Hay et al., In Preparation, 2015).

Methods

Participants (melanoma FDRs, English-fluent, over age 18, with expected sun exposure of at least 1 hour each morning and afternoon throughout a prior 14-day summer interval) were recruited in clinic or by phone. They were referred by post-surgical melanoma patients at a large metropolitan comprehensive cancer center. Fifty-nine participants were accrued from 420 referred FDRs. Participants received \$50 for their time and effort on the study. See Hay et al., In Preparation, 2015 for a full description of the study design.

Study staff trained participants in the IVRS in how to use the keypad to answer questions presented by the IVRS, and also provided the following specific instructions on responding with the open-ended assessment: “The IVR will ask you to share your story of sun exposure and sun protection decision-making in your own words for that morning or afternoon by speaking directly into your telephone.” Throughout a 14-day study period between May and October, participants received twice-daily automated phone calls (at 12:30 pm, 5 pm) asking participants about the morning or afternoon immediately preceding the call. To minimize potential bias from initiation of self-reporting, participants could not influence call timing. [9] During each call, a voice recording first asked participants a series of closed-ended questions regarding sun protection behavior and decision-making for the morning or afternoon immediately preceding, and then asked participants to “*describe in your own words your use of sun protection, if any, during the time period you have just reported on.*” Participants had 120 seconds to speak. Audio diaries were digitally recorded and manually transcribed for analysis.

We examined audio diary adherence rates and used a targeted, deductive form of thematic content analysis using ATLAS.ti to identify decision-making factors (facilitators and barriers) to sun protection.[10] After first reading a sample of 10 transcripts each, two coders met with a supervising data analyst and collaboratively established thematic domains to guide data analysis. These included: (1) decision factors;² (2) emotional responses; and (3) additional context. The two coders next individually reviewed the transcripts and created codes, i.e., words or phrases denoting a specific aspect of a pre-set thematic domain. For example, “regret” was a code created under the domain of “emotional responses.” These two coders then met to resolve differences and assign final codes to each audio diary. No limit was placed on the number of codes that could be applied to a given audio diary transcript; all that were deemed relevant were included.

Results

The sample ($N=59$) included 21 males and 36 females.³ They were average age 49 (range 18–82) and 97% white. Seventy-three percent had a college degree. Most (68%) had one family member with melanoma.

Participants recorded 1,154 total (70%) of the 1,652 possible entries, averaging 20 entries per participant out of 28 possible (range = 1 to 28 per participant). Reasons for not

²I.e. those not examined in the closed-ended survey.

³Two participants lacked gender data.

completing an entry were not solicited. Ten participants (17%) had perfect diary adherence. Nearly half the sample (44%) completed at least 25 entries. Twenty-eight entries extended beyond the 120-second limit and were interrupted by the IVRS before the participant had finished speaking. See Table 1 for full transcripts from two participants.

Regarding content, 37 codes were identified across the three domains. Twenty-three of these were decision factors (10 facilitators, e.g., sunscreen in makeup, and 13 barriers, e.g., preoccupation); nine were context factors (e.g., priority-setting), and five were emotional responses (e.g., regret). See Table 2 for the top two codes in each domain by frequency and illustrative verbatim participant entries.

Discussion

We found high audio-diary adherence, with most participants following through to record audio diaries twice daily. Interestingly, some real-time sun protection decisions seemed to diverge from individuals' stated beliefs about sun protection. For example, for the participant who said, "I should have used some sunscreen, but I was just in too much of a rush," the belief that applying sunscreen is a worthwhile health behavior conflicts with the realities of being rushed. Real-time audio diaries have the potential to elicit conflict in decision-making, emotions, and situations unanticipated by researchers and therefore to promote clinical discussions with more nuance. A next step is to compare the qualitative findings of our study with the static quantitative results elicited from the same participants by the closed-ended questions.

The emotional responses expressed—particularly regret caused by inadequate sun protection—could suggest an opportunity to capitalize on motivation for behavioral change via interventions. Such emotional responses may be more difficult to elicit retrospectively. Understanding how emotional responses and other contextual cues factor into sun protection behavior is an important area for future research.

Study limitations include the small sample size, uncertain generalizability and the possibility that audio diary responses were biased by responding to closed-ended questions immediately prior to diary collection. However, our findings provide additional, granular context for sun-protection decision-making by melanoma FDRs, a complex process involving both routine and conscious choices, priority-setting, critical thinking, and emotional factors. We demonstrate that audio diaries are a viable method for investigating real-time sun-protection decision-making, and likely decision-making about other health behaviors as well.

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Key Points

1. Melanoma incidence is rising. The primary modifiable risk factor is sun exposure.
2. Among first-degree relatives of melanoma patients, who are at increased melanoma risk, sun protection adherence is inconsistent.
3. Real-time audio diaries have not been used to evaluate sun-protection decision-making.
4. We determined that utilizing real-time audio diaries to evaluate sun-protection decision-making is feasible.
5. Future sun protection research should explore interactions between static decision factors (e.g., beliefs) and real-time decision factors that audio diaries can capture.

Table 1

Audio diary transcript examples

Participant	Transcript	Codes applied	
A	I was in and out of the sun all day. I put sunblock on for the face¹ in the morning and I didn't do it for the rest of the day. Now without a hat and that's it.	1	Priority setting
B	Yes, I didn't wear a hat today, so that made me unhappy with my effort to stay out of the sun.¹ The reason I didn't wear a hat was because I forgot mine. We were going to watch a parade, and the only one in the car was a man's baseball cap, and since I wasn't at work I was more concerned about how I looked, and I couldn't wear a baseball cap.² But I did wear a long-sleeved shirt and long pants and we did try to stick to the shady side of the street. But because of the way the parade was set up, that was difficult, so I could have done a better job. Okay, bye.	1 2	Emotional response: regret Barrier to hat use: concerned with appearance

Table II

Full list of codes and selected examples.

Code (number of participants)	Quote
Decision factors: sun protection facilitators	
<i>Sunscreen use</i>	
Makeup/ moisturizer (13)	“Today it was raining, so there was no reason to put sunscreen on. ... However, my moisturizer, which I use on my face, did contain sunscreen.”
Routine (12)	“It was... cloudy and raining. I put my sunscreen on today as usual...”
Physical sun intensity (2)	
Family history of skin cancer (1)	
Spray bottle (1)	
<i>Hat use</i>	
Routine (5)	
Family history of skin cancer (1)	
<i>Shade seeking</i>	
Not wearing sunscreen (5)	
Routine (2)	
Family history of skin cancer (1)	
Decision factors: sun protection barriers	
Sunscreen use	
Perceived laziness (4)	“I felt I could have used sunscreen this morning but I was basically too lazy.”
Preoccupation (4)	“I should have used some sunscreen, but I was just in too much of a rush...although I had adequate time...”
Dislike of smell/feel (3)	
Inertia (2)	
Outside before morning routine (2)	
Sweat (2)	
Disbelief in efficacy (1)	
Desire for vitamin D (1)	
Inconvenience with makeup (1)	
<i>Hat use</i>	
Fit (1)	
Availability (1)	
Concern with appearance (1)	
<i>Shade seeking</i>	
Sun feels good (1)	
Additional decision-making context	
Priority setting (21)	“I ended up spending [a] longer period of time doing errands, so I had to... cover my face with hands to avoid the sun.”

Code (number of participants)	Quote
Reapplied sunscreen (19)	“Although I was in the pool for a while I still used sun block. As soon as I came out of the pool I...reapplied it.”
Perceived utility of sun protection in prevention of UV exposure or skin cancer (11)	
Critical thinking about sun protection (5)	
Weather changed (3)	
Altered behavior due to insufficient sun protection (1)	
Used alternative sun protection measures (1)	
Plans changed (1)	
Prioritized protecting child (1)	
Emotional response	
Regret (15)	“I rushed out of the house today and did not have time to apply sunscreen and regret that.”
Satisfaction (11)	“I was wearing shorts and a T-shirt but did use sunscreen ... and managed to stay out of the sun...The sun was pretty strong today. But I feel good about sun protection.”
Intention to change (5)	
Pain (1)	
Worry (1)	