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Acceptability, Language, and Structure of Text Message-Based Behavioral Interventions for High-Risk Adolescent Females: A Qualitative Study

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A B S T R A C T

Purpose: To elucidate key elements surrounding acceptability/feasibility, language, and structure of a text message-based preventive intervention for high-risk adolescent females.
Methods: We recruited high-risk 13- to 17-year-old females screening positive for past-year peer violence and depressive symptoms, during emergency department visits for any chief complaint. Participants completed semistructured interviews exploring preferences around text message preventive interventions. Interviews were conducted by trained interviewers, audio-recorded, and transcribed verbatim. A coding structure was iteratively developed using thematic and content analysis. Each transcript was double coded. NVivo 10 was used to facilitate analysis.
Results: Saturation was reached after 20 interviews (mean age 15.4; 55% white; 40% Hispanic; 85% with cell phone access). (1) *Acceptability/feasibility themes*: A text-message intervention was felt to support and enhance existing coping strategies. Participants had a few concerns about privacy and cost. Peer endorsement may increase uptake. (2) *Language themes*: Messages should be simple and positive. Tone should be conversational but not slang filled. (3) *Structural themes*: Messages may be automated but must be individually tailored on a daily basis. Both predetermined (automatic) and as-needed messages are requested. Dose and timing of content should be varied according to participants' needs. Multimedia may be helpful but is not necessary.
Conclusions: High-risk adolescent females seeking emergency department care are enthusiastic about a text message-based preventive intervention. Incorporating thematic results on language and structure can inform development of future text messaging interventions for adolescent girls. Concerns about cost and privacy may be able to be addressed through the process of recruitment and introduction to the intervention.

IMPLICATIONS AND CONTRIBUTION

This study presents novel information on high-risk adolescent females' perspectives on a potential text message-based preventive intervention. Personalized schedule, dose, and content are of paramount importance. Teens desired peer endorsement and a conversational tone. These findings can assist future mHealth researchers in designing acceptable and feasible text-message interventions.

Mobile health, or "mHealth," defined by the National Institutes for Health as "the use of mobile and wireless devices to improve health outcomes, healthcare services and health research," can consist of text messaging, phone-based applications, medical devices, or telemedicine [1]. Using mHealth to deliver preventive interventions may circumvent some limitations of traditional, face-to-face intervention formats [2]. For instance, mHealth can be delivered at the time and place of the participant's choosing; it

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does not rely on local availability of professionals; and it can be easily upscaled [3,4]. For high-risk populations, who have high rates of mobile phone ownership but low accessibility to traditional health care, mHealth may be a particularly promising format for delivering preventive care [5].

The emergency department (ED) is potentially an important location to implement mHealth behavioral interventions, particularly for adolescents and young adults. The ED is the primary source of care for many teens with high-risk behaviors, including peer violence [6], and provides an important opportunity to initiate preventive interventions [7]. There are numerous limitations to providing such interventions in real time, including lack of time and resources on the part of ED staff, poor accessibility, and availability of community resources and low rates of follow-through with treatment referrals [8,9]. The vast majority of teens presenting to the ED, however, use mobile phones [10,11], and more than 95% of teen ED patients using mobile phones report that they use text messaging [11,12]. Text message-based behavioral interventions have been shown to be acceptable, valid, and reliable with adolescents for a variety of sensitive topics [4,13].

Two ED-based feasibility studies of text message-based behavioral interventions among adults demonstrate that texting may be useful in monitoring risky behaviors in high-risk populations [14,15]. However, both studies had high rates of nonresponse to text messages. For a novel mHealth intervention to be effective, it must have a strong theoretical underpinning in both its content and delivery mechanism [16]. Behavioral theory and related in-depth formative development work have determined the success of most traditional behavioral interventions [17]. To our knowledge, no text message-based studies have been conducted to date with adolescents in the ED, who are potentially more receptive to such a modality than adults [18,19], and no formative research has been conducted exploring ED patients' preferences for and concerns about a text message-based intervention's content, structure, and tone.

We conducted a formative qualitative study exploring necessary elements of a text message-based preventive intervention for a high-risk population of ED patients: adolescent females with a past year history of peer violence. The study focused exclusively on females because of the unique circumstances surrounding female peer violence [20], the relative lack of interventions for this gender [21], and the higher frequency of texting in this gender [18]. The study's goal was to use patients' own feedback to optimize acceptability, language, and structure of a text message-based intervention, using the techniques of thematic and content analysis.

Methods

Study design, setting, and population

Participants were recruited for this qualitative intervention development study from the pediatric ED of an urban academic hospital in the Northeast, which serves over 50,000 pediatric patients per year. The patient population is diverse, with 40% publicly insured, 40% Hispanic, and 50% white. During a convenience sample of shifts from July 2012 to April 2013, patients presenting to the ED for any chief complaint were screened for participation using a brief confidential iPad survey. Screening inclusion criteria were 13- to 17-year-old female, English speaking, and parent present. Exclusion criteria for screening were acute suicidality, psychotic symptoms, sexual assault, or child abuse; in police custody; medically unstable; unable to comprehend the consent/assent process; or previously completed the study.

Patients were eligible for interviews if they reported past year peer violence (a modified Conflict Tactics Scale (CTS)-2 score $\geq$1 [22], representing at least one episode of peer violence victimization or perpetration in the past year) [23], and depressive symptoms (a Patient Health Questionnaire-2 [PHQ-2] score $\geq$3, the threshold for "moderate depressive symptoms" in adolescents) [24]. We used a modified version of CTS-2 to reflect peer rather than partner violence, per other studies of youth peer violence; questions asked about both victimization and perpetration from peer, nondating partners over the past 12 months (e.g., "I pushed, shoved, or slapped someone" and "Someone pushed, shoved, or slapped me") [23,25]. The PHQ-2 uses the first two questions of the PHQ-9: "Over the past two weeks how often have you been bothered by any of the following problems: (1) little interest or pleasure in doing things and (2) feeling down, depressed, or hopeless" [24] and has been well validated in adolescents [26,27].

If eligible, participants and their parents were asked to complete an assent/consent process. Interviews were conducted at a time and place of the participant's choice. Participants were compensated $20 for the interview and up to $10 for travel to an interview site. Institutional Review Board approval for the study and a Certificate of Confidentiality from the National Institute of Mental Health were obtained.

Interview protocol

Each one-on-one interview was conducted using a semi-structured interview guide. Interviews were facilitated by either the principal investigator or a research assistant, both of whom were trained in qualitative interview facilitation. The interviews lasted approximately 60–90 minutes. The majority of interviews (n = 16) were conducted face to face in a private research office; the remainder of the interviews was conducted via telephone (n = 3) or in a private room in the library (n = 1). No parents were present for interviews. All interviews were audio recorded and transcribed verbatim.

Semistructured interview guide

The overarching goal of the interviews was to provide formative data regarding high-risk adolescents' current coping strategies and key elements of a text message-based preventive intervention. The interview guide was developed by emergency physicians with expertise in technology-based ED preventive interventions (M.L.R., R.C., M.J.M., and E.K.C.), a child and adolescent psychologist (A.S.), and a psychologist with expertise in behavioral health and qualitative methodology (K.M.). In order to elicit accurate information about potentially sensitive topics, the interviews began with an "ice breaker" section, regarding participants' general text messaging habits. It then explored participants' experiences and means of coping with violence. Next, a potential intervention was described to participants. Interviewers asked participants both for their general impressions of, and specific feedback regarding, intervention structure (e.g., schedule, number of messages, etc.) and possible concerns about the intervention, such as privacy and participant burden. Finally, participants were shown potential text-message intervention content; discussions of potential intervention content are not included in this analysis.