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Original article

A Depression Prevention Intervention for Adolescents in the Emergency Department

Megan L. Ranney, M.D., M.P.H. [a,*], Joshua R. Freeman, M.P.H. [a,1], Gerianne Connell [a], Anthony Spirito, Ph.D. [b], Edward Boyer, M.D., Ph.D. [c], Maureen Walton, Ph.D. [d], Kate Morrow Guthrie, Ph.D. [b], and Rebecca M. Cunningham, M.D. [d]

[a] *Department of Emergency Medicine, Emergency Digital Health Innovation Program, Alpert Medical School, Brown University, Providence, Rhode Island*
[b] *Department of Psychiatry and Human Behavior, Alpert Medical School, Brown University, Providence, Rhode Island*
[c] *Department of Emergency Medicine, University of Massachusetts Worcester, North Worcester, Massachusetts*
[d] *Department of Psychiatry, Addiction Center, Injury Center, University of Michigan, Ann Arbor, Michigan*

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A B S T R A C T

Purpose: To evaluate acceptability and feasibility of a theoretically based two-part (brief in-person + 8-week automated text message) depression prevention program, "intervention for DepressiOn and Violence prevention in the Emergency department" (iDOVE), for high-risk adolescents.
Methods: English-speaking emergency department (ED) patients (age 13–17, any chief complaint) were sequentially approached for consent on a convenience sample of shifts and screened for inclusion based on current depressive symptoms and past-year violence. After consent, baseline assessments were obtained; all participants were enrolled in the two-part intervention (brief in-ED + 8-week two-way text messaging). At 8 weeks, quantitative and qualitative follow-up assessments were obtained. Measures included feasibility, acceptability, and preliminary data on efficacy. Qualitative data were transcribed verbatim, double coded, and interpreted using thematic analysis. Quantitative results were analyzed descriptively and with paired *t* tests.
Results: As planned, 16 participants (eight each gender) were recruited (75% of those who were eligible; 66% nonwhite, 63% low income, mean age 15.4). The intervention had high feasibility and acceptability: 93.8% completed 8-week follow-up; 80% of daily text messages received responses; 31% of participants requested ≥1 "on-demand" text message. In-person and text message portions were rated as good/excellent by 87%. Qualitatively, participants articulated: (1) iDOVE was welcome and helpful, if unexpected in the ED; (2) the daily text message mood assessment was "most important"; (3) content was "uplifting"; and (4) balancing intervention "relatability" and automation was challenging. Participants' mean ΔBDI-2 (Beck Depression Inventory) from baseline to 8-week follow-up was −4.9, ($p = .02$).
Conclusions: This automated preventive text message intervention is acceptable and feasible. Qualitative data emphasize the importance of creating positive, relevant, and interactive digital health tools for adolescents.

IMPLICATIONS AND CONTRIBUTION

iDOVE, a brief in-person and 8-week automated text message depression prevention intervention for high-risk adolescents, had high participant retention, text message use, and satisfaction. Participants' biggest concern was balancing accessibility and privacy with "relatability." This study supports implementing text message mental health interventions for adolescents and provides suggestions for future interventions.

* Address correspondence to: Megan L. Ranney, M.D., M.P.H., Department of Emergency Medicine, Alpert Medical School, Brown University, 55 Claverick St., Providence, RI 02903.
E-mail address: mranney@lifespan.org (M.L. Ranney).
[1] Present address: Department of Epidemiology, School of Public Health and Health Sciences, University of Massachusetts, 415 Arnold House, 715 North Pleasant Street, Amherst, MA 01003-9304. jrfreeman@umass.edu.

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Psychiatric disorders are the fastest growing reason for adolescent emergency department (ED) visits [1]. Adolescent ED patients with nonpsychiatric chief complaints are likely to report psychiatric disorders, such as depression and anxiety, as well as related risk factors such as violence exposure [2–4]. Indeed, depression and peer violence have a bidirectional relationship in adolescents, with reinforcing negative effects on emotional and behavioral regulation [5]. Multisession cognitive behavioral therapy (CBT) for co-occurring depression and violence may effectively reduce adolescents' depressive symptoms [6]. However, at-risk adolescents have difficulty accessing mental health services [3,7], compelling them to rely on EDs for care. EDs are therefore increasingly encouraged to perform mental health screening and referrals [8].

Adolescents articulate interest in text message–based mental health interventions [9,10]. Publicly available text message services are frequently used by adolescents during mental health crises although to our knowledge, no scholarly literature describes its use or effectiveness [11]. Text-messaging is an acceptable, reliable, and valid intervention method for adolescents on numerous topics [12]. Text message preventive interventions are feasible among adult ED patients [13]. Advantages of a text message mental health intervention may include obviation of barriers to accessing mental health interventions, such as transportation and stigma [8]. Automated programs also inherently offer high fidelity. Limitations to text message interventions, such as patient concerns about confidentiality [14], may also exist.

In this study, we describe a pilot study of iDOVE, "intervention for Depression and Violence prevention in the ED." iDOVE is an ED-based, brief in-person and longitudinal text message depression preventive intervention for high-risk teens seen in the ED for any reason. To our knowledge, no acceptable, feasible, and efficacious technology-based mental health interventions exist for high-risk adolescents. This pilot study's objective was to use mixed methods (quantitative and qualitative) to assess acceptability and feasibility and to inform intervention refinement and future mobile interventions. Secondary outcomes are preliminary efficacy at 8 weeks after enrollment.

Methods

Study setting and recruitment

From June 2014 to October 2014, we recruited 16 adolescents (age 13–17; eight of each gender) from a large urban pediatric ED located in the northeast United States. All adolescents presenting to the ED during a convenience sample of shifts were prescreened for eligibility. Adolescents were excluded a priori if they did not speak English; had a chief complaint of suicidality, psychosis, sexual assault, or child abuse; were in police or child protective services' custody; were unable to assent due to severity of illness or developmental disabilities; or if no parent was present. All other adolescents were approached for verbal consent/assent for a brief screen on a tablet computer, determining eligibility for the larger study. Adolescents were eligible for the study if they were at high risk for depression, defined as mild-to-moderate depressive symptoms (Patient Health Questionnaire-9 score 5–19) [15], and a past-year history of physical peer violence (modified Conflict Tactics Scale second ed. [CTS-2] score $\geq$1) [16,17]. In addition, adolescents had to have a text message–capable phone.

Eligible participants assented, and parents provided written consent, for the intervention and longitudinal follow-up. Enrolled participants completed a baseline survey in the ED, and a follow-up survey and semi-structured interview 8 weeks after enrollment.

Participants were incentivized using a small gift (e.g., gum) for the screening survey, $25 for the baseline survey, $10 per month for text messaging costs, and $40 for the 8-week follow-up survey and interview. This reimbursement is on par with that used in other ED-based studies of adolescents [17,18].

All study materials and recruitment procedures were approved by the hospital institutional review board.

Intervention structure and content

The intervention had two parts: a brief, in-person in-ED session and an 8-week automated text messaging intervention. Both components were developed and refined from motivational interviewing and CBT, existing in-person and text message preventive interventions [6,12,17,19], and participant feedback during a formative development phase [9,10,14].

The in-ED session was a 15–20-minute scripted, PowerPoint-guided session delivered by a trained research assistant (RA; Table 1, Figure 1) [10] covering: (1) basic CBT concepts [e.g., connecting thoughts, behavior, and mood]; (2) motivational enhancement for intervention engagement [e.g., personalized feedback about mood and frequency of fights]; and (3) introduction to the text message component. The RA underwent structured training in intervention theory and methods before recruitment. In-ED interventions were audio recorded. Fidelity of intervention delivery was assessed by M.L.R., based on intervention audio recordings, using a 56-point adherence scale based on the Cognitive Therapy Rating Scale and Motivational Interviewing Treatment Integrity Code [20].

The text message portion (programmed by Reify Health, Boston, Massachusetts) was structured to progressively enhance participants' ability and motivation to identify feelings, modify thoughts and behavior, and engage positive social support (Table 1). Based on formative work [9,10], three text message content streams were created: for low-violence girls, low-violence boys, and high-violence adolescents of both genders. The streams had similar basic content but differed slightly in types of behavioral activation activities, types of stressors, and language. "High violence" was defined as a modified CTS-2 score higher than the mean score in the study's formative phase. At enrollment, participants were assigned to the appropriate message stream and chose a time of day for message delivery.

Each day, participants received: (1) an automatically delivered "mood" query and (2) an intervention message, pretailored to mood (defaulting to "negative mood" message if no response received within two hours; Table 1). Participants could also request as needed text messages using keywords STRESSED, ANGRY, SAD.

For ethical reasons, the text message system sent automatic replies to unexpected text message responses, reminding participants of the lack of real-time monitoring and providing crisis hotline phone numbers. The RA checked text message responses daily.

Measures

All surveys were completed using REDCap [21]. At the close of the intervention, a semi-structured qualitative interview was conducted in-person or over the phone.