

programs have attempted to deliver novel health information to promote health-related behavior change; and fewer still have been aimed at the adolescents, and then only in limited clinical settings. Given its broad availability, the flexibility and adaptability of its platform and its popularity with adolescents, text messaging would seem to have great potential as a means of providing relevant health care education to adolescents [11].

We collaborated with the adolescent patients of our mobile health clinic to develop a TMI to disseminate health information relevant to adolescents. Our goals were to increase their knowledge of relevant health issues and support change in health-related behaviors. A pilot study of this program demonstrated that a TMI was both feasible and engaging for an underserved adolescent population. For this study, we offered enrollment in our TMI to all adolescents seen at every clinic site. We hypothesized that our participants would report significant improvement in perceived knowledge and self-reported health-related behaviors. These results would support the view that TMI can be an effective tool for disseminating information and increasing participants' knowledge about adolescent-relevant healthcare issues, and this in turn can effectively support positive change in participants' health-related behaviors.

Methods

Intervention

A multidisciplinary team of mobile health clinic providers (a physician, nurse practitioner, licensed clinical social worker, and a registered dietitian) compiled a list of 15 adolescent-relevant health topics based upon a review of the visit diagnoses most frequently encountered in our clinic. The topics chosen were: Abdominal Pain,

Asthma, Birth Control, Depression and Anxiety, Fitness, Headaches, Mental Health, Nutrition, Relationships, Sexually Transmitted Infections (STIs), Stress, Substance Abuse, Tobacco Cessation and Weight Management. Educational messages for each topic were

Tobacco Cessation (n=10)	2.46 ± 0.16	3.88 ± 0.25	.005 *
Stress (n=8)	2.38 ± 0.35	3.05 ± 0.14	.017 *
Birth Control (n=7)	2.70 ± 0.54	4.07 ± 0.31	.016 *
Depression/Anxiety (n=7)	n/a		
Nutrition (n=6)	1.86 ± 0.22	3.0 ± 0	n/a
STIs (n=4)	2.54 ± 0.25	3.50 ± 0	0.066
Self Esteem (n=4)	n/a		
Abdominal Pain (n=3)	2.19 ± 0.28	3.89 ± 0	0.109
Headache (n=3)	2.26 ± 0.45	3.96 ± 0.06	0.109

Significance threshold: $p < 0.05$ (indicated by *).

Discussion

Text messaging has become a favored method of communication for adolescents from a wide range of ethnic and socioeconomic backgrounds, and virtually all adolescents possess text messaging-enabled devices and texting data plans.³⁻⁵ Given this, text messaging would seem to be a logical choice for connecting with and providing health interventions for adolescents. In this study, adolescents completing our TMI had improved post-intervention scores for perceived knowledge and self-reported behavior change for all topics, with significant improvement in for the majority of topics included in analysis. These findings support the utility of TMIs for disseminating health-related information, with the goal of supporting improved wellness.

While our results are encouraging, there are certain limitations to this study. Study participation was voluntary, and thus our participants may have been more receptive to TMI than the general adolescent population. Our clinic population is uninsured and primarily Latino; given this demographic makeup, our results may be less applicable to other groups of adolescents. While our results show significant pre-post changes for almost all topics, the power of the results for several topics is limited by small sample sizes.

To generate the most effective educational messages for adolescents, it is essential to involve the adolescents themselves in the development of their interventions. Previous work has demonstrated that acknowledging adolescents as experts on their issues and enlisting them in active evaluation and development of clinical programs results in more relevant content and optimized delivery. Furthermore, interventions that have been refined based on feedback from adolescents have improved patient engagement. We involved adolescents in each step of the pilot intervention development process. We did note that adolescents commented very positively on aspects of the intervention suggested by their peers (e.g., the question-and-answer format, the text message length, etc.), and this suggests that adolescents should play a prominent role in the development of future projects.

The most important next steps in TMI development are, broadly: 1) to refine the structure and delivery of TMI, and 2) to develop methods to better assess their true utility as interventions to promote behavior change. We have continued to refine our TMI program (e.g., standardizing pre-/post questionnaires, automating questionnaire completion and data tabulation) and will continue to make this intervention available to all patients of the Teen Health Van. In future interventions, it would be optimal to expand TMIs to utilize two-way communication between patients and health providers, with individual questions serving as springboards to prompt participants to reach out to clinic medical staff with any personal questions or concerns.

Conclusion

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