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Pilot results of an online intervention targeting health promoting behaviors among young adult cancer survivors

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Introduction

Whereas the incidence of childhood cancer has increased, mortality has decreased [1], with 80% surviving long-term [1]. These survivors are at higher risk for health problems and early mortality [2]. Unfortunately, young adult survivors of childhood cancer are at risk for using alcohol, tobacco, and other drugs and for low physical activity and obesity [3]. Therefore, modifiable risk factors should be a focus for prevention interventions among this susceptible, high-risk population [4].

This group shows interest in programs targeting health behavior change [5]; however, they have several barriers to intervention (e.g., limited time/ resources) [5]. Technology-based (e.g., web-based or app-based) interventions, which have broad reach, may be appropriate for this group [6]. Unfortunately, engaging individuals in technology-based programs is a challenge [7]. One solution may be novel incentive structures. One way to provide incentives that are potentially sustainable is to model the incentives structure after popular programs already in existence; for example, Groupon® or LivingSocial® are websites that offer ‘daily deals’ among local businesses. They are growing in profit at high rates and in consumer spending [8].

Thus, we examined the feasibility and acceptability of a healthy lifestyle intervention targeting physical activity, alcohol use, and tobacco use among a small sample of young adult survivors of childhood cancers that included a novel incentive structure.

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Conflict of interest

The authors declare no conflict of interest.

Methods

Procedures and participants

The Emory University Institutional Review Board approved this study. A one-arm pretest posttest pilot trial was conducted to test the feasibility (i.e., adherence and retention) and acceptability (i.e., intervention satisfaction, and relevance) of a 6-week beta program targeting health promotion behaviors among young adult cancer survivors. In 2012, young adult (aged 18–34 years) survivors of childhood cancers (i.e., diagnosed before age 18 years) were recruited from the medical records of a cancer center in the Southeastern USA to complete a mail-based survey. Of the 191 packets sent, 106 (55.5%) were completed. For the current trial study, we identified 47 participants living within 30 miles of Atlanta (an eligibility criteria related to the incentive structure used); 24 (51.1%) individuals consented.

Intervention

This newly developed Web-based intervention was based on semistructured interviews among 26 young adult cancer survivors conducted in 2012 regarding health promotion behaviors and needed resources. The intervention involved 12 modules delivered via email bi-weekly over the 6-week period, with contacts on Mondays and Thursdays. Upon logging in, participants completed a timeline follow-back reporting the number of minutes exercised, drinks consumed, and cigarettes smoked each day for the past 3 to 4 days. Participants were routed to the landing page, which included tailored graphical depictions of their daily exercise, drinking, and smoking to date, along with health-related textual and video messaging targeting this population. The messages were based on the Theory of Reasoned Action [9], which posits that behavior is the direct result of intention, which is, in turn, a function of the individual's attitude toward the behavior and his/her subjective norms about the behavior. The modules focused on mental health and coping, increasing physical activity, reducing alcohol consumption, and reducing cigarette consumption. These messages were targeted for this population rather than tailored. In addition, intervention participants were offered deals for healthy goods and services (e.g., massage therapy sessions, wall climbing entries, and health food discounts), the Atlanta metropolitan area each time they completed the health behavior check-in, regardless of what they reported.

Measures

Participants completed assessments at baseline (week 0), end-of-treatment (EOT; week 6), and 6-week follow-up (FU; week 12), receiving a \$20 gift card for completing each assessment.

Participants reported sociodemographics and cancer-related factors (i.e., cancer diagnosis and date of diagnosis). They also reported the number of days they exercised in the past 7 days (moderate aerobic, vigorous aerobic, and strength training), number of days they consumed alcoholic drinks and five or more drinks on one occasion (binge drinking) in the past 30 days, and number of days of smoking in the past 30 days (measures adopted from the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System). Participants indicated their level of confidence in and importance of increasing physical activity, decreasing alcohol consumption, and quitting or refraining from starting

smoking on a 10-point scale (0 = 'not at all' to 10 = 'extremely'). At EOT, they completed process evaluation questions (Table 2).

Data analysis

Participant characteristics and process evaluation assessments were summarized using descriptive statistics. Matched pairs *t*-tests were conducted to examine differences in health behaviors and related psychosocial factors from baseline (week 0) to EOT (week 6) and 6-week FU (week 12). SPSS 21.0 (IBM Statistics, Armonk, NY, USA) was used for all data analysis. Statistical significance was set at $\alpha = .05$.

Results

Participants were on average 23.38 (standard deviation (SD) = 3.910) years old. Of the 24 participants, 17 were women; $n = 21$ White ($n = 1$ Hispanic); $n = 3$ Black; 8 married or living with a partner; 8 employed full-time; and 8 attending college. In terms of cancer diagnosis, our sample was diagnosed with the following: Hodgkin's lymphoma ($n = 7$), acute lymphoblastic leukemia ($n = 7$); acute myelogenous leukemia ($n = 1$), osteosarcoma ($n = 3$); thyroid cancer ($n = 3$), glioblastoma ($n = 1$); and Wilms' tumor ($n = 1$). Average time since diagnosis was 10.71 (SD = 6.22) years. Table 1 indicates that the only significant difference in health behavior over time was regarding baseline versus EOT binge drinking ($p = .03$), such that EOT binge drinking was significantly reduced on average ($p = .03$).

Adherence (i.e., completion of the check-in assessment) over the 12-module period was 91.7%, 87.5%, 83.3%, 83.3%, 75.0%, 79.2%, 79.2%, 75.0%, 75.0%, 70.8%, 66.7%, and 66.7%, respectively, for an average of 77.8%. Retention rates at EOT and at FU assessments were 95.8% ($n = 23/24$) and 79.2% ($n = 19/24$), respectively. Table 2 presents process evaluation data and information regarding participants' preferences for future intervention strategies. Overall, 85.7% were satisfied with the intervention, and 81.0% reported that they would recommend the intervention to friends.

Discussion

Although we were largely unable to document changes in health behaviors from pretest to posttest, the study aims were to test the feasibility and acceptability of this intervention approach and provide data regarding the elements that were most acceptable to inform subsequent intervention development. In terms of feasibility, we successfully recruited over 50% of participants who met eligibility for the current study and maintain high adherence and retention.

In terms of acceptability, a vast majority of participants were satisfied with the program and indicated that they would recommend the program. Moreover, they showed great receptivity to the tracking and graphical depiction of health behaviors over time. The messaging in this intervention was not particularly well-received. Given the effectiveness of more sophisticated tailored messaging [10], making the messaging specific to the needs of individual young adult cancer survivors would likely enhance message relevance. Additionally, our Web-based infrastructure was not sophisticated enough for nondrinkers or

nonsmokers to opt out of the drinking and smoking self-reports or modules. Making this possible may also increase their engagement and satisfaction with the content.

Participants had favorable impressions of deals to local vendors, and a majority reported learning about a new business as a result of the program, with an average of over nine deals earned per participant and intentions of using more than one on average, compared with the 19% of Groupon users that have ever purchased a Groupon [8]. Thus, this indicates that using a commercial approach such as this could provide a ‘win-win’ for cancer survivors who may want to engage in a program like this and by providing businesses with a way to increase their visibility to a specific group of people who may be interested in health-related goods and services.

The information provided by participants regarding preferences for elements included in the subsequent intervention indicated receptivity to having information specific to cancer survivors related to these health behaviors, as well as having the intervention allow them to connect with one another to provide peer support. Thus, the integration of the functionality of the current intervention with some functional assets similar to social media and a user-friendly portal for communicating medical history for cancer survivors such as SurvivorLink (cancersurvivorlink.org) may provide a comprehensive intervention tool for this population. Future research might examine this possibility. In practice, it is important to determine how to best integrate technology-based strategies to support clinical providers in their efforts to treat and engage young adult cancer survivors in preventive behaviors.

Study limitations include small sample size, limited generalizability, and lack of a control group. However, this study provides preliminary data suggesting that an online intervention targeting factors important to young adult cancer survivors and using an incentive strategy modeled after many current ‘deal of the day’ programs is feasible and acceptable. Additional research is needed to better understand how to most successfully communicate with young adult cancer survivors and promote healthy behaviors among this population. Moreover, the potential to integrate multifunctionality into such a Web-based program might be particularly effective in increasing user engagement and promoting healthy behaviors. Despite these limitations, this study adds to the literature because the intervention was informed by interviews with young adult cancer survivors, addressed health risks behaviors in this population, used a novel incentive strategy, and demonstrated feasibility and acceptability in this population.

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References

1. American Cancer Society. Cancer Facts & Figures 2013. American Cancer Society; Atlanta: 2013.
2. Mertens AC, Liu Q, Neglia JP, et al. Cause-specific late mortality among 5-year survivors of childhood cancer: the Childhood Cancer Survivor Study. *J Natl Cancer Inst.* 2008; 100(19):1368–1379. [PubMed: 18812549]

3. Bauld C, Toumbourou JW, Anderson V, Coffey C, Olsson CA. Health-risk behaviours among adolescent survivors of childhood cancer. *Pediatr Blood Cancer*. 2005; 45(5):706–715. [PubMed: 16007604]
4. Emmons K, Li FP, Whitton J, et al. Predictors of smoking initiation and cessation among childhood cancer survivors: a report from the childhood cancer survivor study. *J Clin Oncol*. 2002; 20(6): 1608–1616. [PubMed: 11896111]
5. Rabin C, Sympson N, Marrow K, Pinto B. Behavioral and psychosocial program needs of young adult cancer survivors. *Qual Health Res*. 2011; 21(6):796–806. [PubMed: 20705863]
6. Rabin C, Sympson N, Marrow K, Pinto B. Intervention format and delivery preferences among young adult cancer survivors. *Int J Behav Med*. 2013; 20(2):304–310. [PubMed: 22328444]
7. Eysenbach G. Issues in evaluating health websites in an Internet-based randomized controlled trial. *J Med Internet Res*. 2002; 4(3):E17. [PubMed: 12554548]
8. Novack, J. [accessed 09/01/2013] Good news for Groupon, LivingSocial Daily Deal addicts, *Forbes*. 2012. Available from: <http://www.forbes.com/sites/janetnovack/2011/11/29/good-news-for-groupon-livingsocial-daily-deal-addicts/>
9. Fishbein, M.; Ajzen, I. *Belief, Attitude, Intention, and Behaviour: An Introduction to Theory and Research*. Addison-Wesley; Reading, MA: 1975.
10. Kreuter MW, Wray RJ. Tailored and targeted health communication: strategies for enhancing information relevance. *Am J Health Behav*. 2003; 27(Suppl 3):S227–S232. [PubMed: 14672383]

Key points

- Intervention strategies are needed to promote healthy behaviors among young adult survivors of childhood cancers.
- Technology-based interventions, including the one presented here, show potential for this subpopulation.
- Health behavior monitoring, messaging targeting this subgroup, and functionality allowing individuals to store and share their information with other survivors and healthcare providers is a promising approach.
- More research is needed to develop effective multifaceted programs integrating components that address the needs of young adult cancer survivors.
- Clinicians should also examine ways to engage their patients in survivorship using resources currently available.

Participant characteristics and bivariate analyses comparing health behaviors and related psychosocial factors from baseline to EOT and to FU, $n = 24$

Table 1

Variable	Baseline <i>M</i> (SD)	EOT <i>M</i> (SD)	<i>p</i>	FU <i>M</i> (SD)	<i>p</i>
Health Behaviors					
Days of moderate cardio exercise (SD)	2.57 (2.29)	2.61 (1.85)	.90	2.68 (2.16)	.62
Days of vigorous cardio exercise (SD)	1.74 (2.30)	1.74 (1.68)	.99	1.74 (1.66)	.21
Days of strength training (SD)	1.00 (1.71)	1.39 (1.97)	.35	1.21 (1.48)	.99
Days of drinking (SD)	5.00 (5.92)	5.55 (7.40)	.51	5.42 (7.24)	.59
Days of binge drinking (SD)	1.64 (3.51)	0.91 (2.35)	.03	1.37 (2.03)	.86
Days of smoking (SD)	2.55 (8.11)	1.95 (6.54)	.46	1.32 (5.74)	.25
Psychosocial Factors					
Importance of increasing PA (SD)	7.65 (2.01)	7.48 (2.25)	.69	7.05 (2.78)	.12
Confidence in increasing PA (SD)	7.43 (1.88)	7.09 (2.54)	.54	7.58 (2.34)	.93
Importance of decreasing drinking (SD)	3.50 (3.64)	2.95 (3.75)	.49	1.32 (2.47)	.06
Confidence in decreasing drinking (SD)	7.32 (3.63)	6.86 (4.36)	.50	5.95 (4.30)	.13
Importance of quitting/not starting smoking (SD)	6.05 (4.81)	6.00 (4.81)	.96	5.63 (4.98)	.76
Confidence in quitting/not starting smoking (SD)	7.86 (3.96)	6.68 (4.71)	.15	6.32 (4.96)	.28

EOT, end-of-treatment; FU, follow-up; SD, standard deviation.

^a *p*-values indicated matched-pair *t*-test results.

^b Retention rates were 95.8% ($n = 23/24$) at EOT and 79.2% ($n = 19/24$) at FU.

^c Averages at each time point are presented across all participants that provided data at that assessment.

Table 2

Process evaluation outcomes at EOT examining reaction to intervention content and to content to be included in a future intervention targeting cancer survivors

Variable	Mean (SD) or N (%)
Participant assessments	
How helpful was it to track your own physical activity, alcohol use, and smoking over time?	2.27 (1.08)
How helpful was it to see a graph of your physical activity, alcohol use, and smoking over the course of the program?	2.36 (1.05)
* Would you recommend keeping this in the program?	19 (86.4)
* Would you recommend keeping these messages in the program?	14 (63.6)
How did you feel about the length of the program?	
Too short	1 (4.8)
About right	20 (95.2)
Too long	0 (0.0)
How did you feel about the frequency of the check-ins?	
Too few	0 (0.0)
About right	16 (76.2)
Too many	5 (23.8)
* Overall, were you satisfied with the program?	18 (85.7)
* Would you recommend participating in this program to your friends?	17 (81.0)
Deals	
Number of deals earned (SD)	9.41 (4.92)
Number of deals redeemed (SD)	0.23 (0.87)
Number of deals planned to be used in the future (SD)	1.36 (2.82)
Participants who learned about a new business (%)	13 (59.1)
Participants who told someone about a business providing deal (%)	11 (50.0)
Recommend keeping deals in the program	21 (95.5)
How helpful would it be to include information specific to cancer survivors regarding:	
Physical activity	3.05 (1.02)
Nutrition	3.05 (1.16)
Alcohol use	2.43 (1.29)
Marijuana use	2.29 (1.35)
Tobacco use	2.45 (1.43)
Resources for substance use	2.33 (1.43)
Resources for mental health and coping	2.48 (1.36)
How helpful would it be to be able to:	
Connect with other cancer survivors my age to talk about challenges during and after treatment	2.67 (1.53)
Connect with other cancer survivors my age to talk about engaging in positive health behaviors	2.57 (1.54)
Store my cancer survivorship plan and other medical information so that it is kept in an accessible place	2.95 (1.07)
Share my cancer survivorship plan and other medical information with other healthcare providers	2.95 (1.17)

EOT, end-of-treatment; SD, standard deviation.

^aScale items are on a scale of 0 to 4 with higher ratings indicating more favorable attitudes.

^b 21 of the 23 participants at EOT completed the process evaluation assessments.

* Percent reporting 'yes'.

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