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Behavior Change Techniques on Perceived Engagement and Adherence Rates in eHealth Exercise Programs for Young Adult Cancer Survivors

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BEHAVIOR CHANGE TECHNIQUES ON PERCEIVED ENGAGEMENT AND ADHERANCE RATES IN EHEALTH EXERCISE PROGRAMS FOR YOUNG ADULT CANCER SURVIVORS

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A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
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Approved by:

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HEADING 1

INTRODUCTION

According to CDC.gov cancer is the number 1 leading disease that Adolescents and Young Adults (AYA) face today and the survival rate of AYA cancer patients is increasing. Between the years of 1975 and 2010 AYA deathrate decreased from 5.9% to 2.9% largely due to the advancements in treatment, while the 5 year survival rate of AYA is 67% today according to Cancer.gov. Note that we are considering AYA cancer survivors as individuals between the ages of 16 and 39 that are in full remission and not receiving any further medication for the direct purpose of treating the disease.

Exercise plays a considerable part in improving the health of cancer survivors too by supporting a healthy lifestyle and increasing the quality of life (QOL) (Penedo & Dahn, 2005). Exercise can certainly provide all people health benefits yet for cancer survivors, exercise carries a substantial amount of extra benefits including an increased rate of survivorship, decreased cancer related fatigue, and posttraumatic growth (Sabiston & Brunet, 2012). It is important to note that exercise is not a short intervention, but a lifestyle habit that should be adopted for life as the benefits of exercise discontinue within a period of time once the cancer survivor stops exercising (Clark, Wade, Massey, & Dyke, 1975)(Hill, Storandt, & Malley, 1993). For this reason cancer patients should look to establish exercise habits that are sustainable, rather than short term goals. Exercise has become considerably more important in the last decade as high levels of sedentary behavior has increased the risk of cancer incidence and mortalities (Schmid & Leitzmann, 2014) (Ekelund et al, 2019) (Ekelund, 2016) (Lynch et al, 2013). Additionally, the majority of cancer patients and survivors do not meet the physical activity guidelines recommended by international standards (Irwin 2009).

Depending on the age, stage of life, life experience, and many other factors, getting an individual to maintain exercising can be very difficult. Using Behavior Change Techniques can significantly increase the rate of adherence in exercise programs, one study even found that sending behavior change technique text messages correlated with higher self reported adherence to rehabilitation programs (Bennell et al, 2020). Another way to increase adherence is through eHealth interventions, defined as a fully online program with no in-person contact for the purpose of assessing, prescribing, educating, or otherwise improving the patient's physical or mental ability to exercise, as more technology savvy young men and women are moving into the cancer survivor community and the demand for more accessible, easily digestible, and individually tailored information regarding exercise for cancer survivors is increases (Tustin 2010). In today's world there are more than enough online platforms to support the process of prescribing exercise and communicating efficiently with patients electronically, while tracking adherence and progressions effectively.

EHealth services are significant and important because they are much more affordable and accessible to everyone, decreasing the gap of available services and creating more health equality. In order to increase the percentage of cancer survivors meeting the recommended physical activity guidelines, eHealth services must be optimized to reach survivors of all economics statuses as according to bodysmithfitnessaz.com the average cost of a personal training session is $55, and the more advanced trainers that will be able to cater to the needs of cancer survivors will cost more.

For older individuals, there is a significant amount of research to support the need for exercise due to the sedentary lifestyle a majority of westerners live in our modern society(Bouchard 2021). The amount of research available on the benefits of exercise in older

cancer survivor populations is extensive compared to younger cancer survivor populations as well.

To the best of our knowledge a research gap exists on the exercise adherence of AYA cancer survivors, for this reason the objective of this study is to determine the influence of behavior change techniques on the adherence of adolescence and young adult cancer patients through online questionnaires. We hypothesis that the use of BCT with AYA cancer survivors will increase engagement and adherence expressed through questionnaires compared to having no BCT administered at all.

HEADING 2

METHODS

Contact, questionnaire distribution, and all other communication will be performed via email starting with recruitment email/message and then consent form upon acceptance. We will be conducting an experimental trial with the experimental group receiving the questionnaires with behavior change techniques placed within the individual questions, and the control group receiving questionnaires without BCTs with the same questions regard fitness habit development. Questionnaires constructed via SurveyMonkey and will be distributed via email upon voluntary confirmation of participation from participant. The independent variable will be behavior change techniques and the dependent variable will be the responses from the participant regarding belief of future hypothetical engagement and adherence to exercise intervention. By contacting survivorship through SIUC, we will recruit a group of participants to make up the experimental group and control group of up to 20 participants in each group. Exclusion criteria for participants include a diagnosis of any comorbidities or injuries, any recommendations from medical professionals to avoid physical activity, and any psycho-social disorders.

Data Collection and Analysis

Upon contact with potential participant, we will provide an initial and brief exclusion criteria questionnaire. Once the participant is approved for the study we will provide the questionnaire and provide clear instructions for the completion of the questionnaire. By using SurveyMonkey we will limit any obstacles and get the results back directly through the website. Final responses from the experimental group and control group will be gathered, averaged, and compared for statistical significance using an independent t-test.

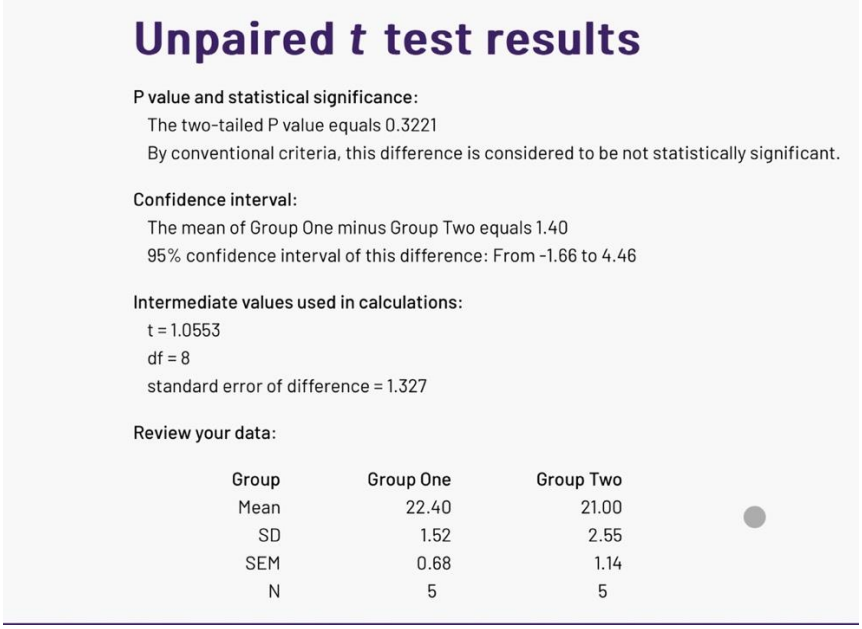
HEADING 3

RESULTS

The study investigated the impact of behavior change techniques on perceived engagement and adherence rates in eHealth exercise programs for young adult cancer survivors. The participants were divided into a control group (n=4) and an experimental group (n=4), with both groups completing separate questionnaires via SurveyMonkey.

Through a mass email to recruit participants we were able to only recruit 8 willing participants, hence the 4 participants each grouped to the control and experimental group. Participant submissions were scored using a key that put numerical significance to the participants submissions.

The data were analyzed using an independent t-test to compare the means between the control and experimental groups. The results revealed difference that is not to be considered statistically significant between the two groups, with the two-tailed p = 0.3221. Please see the graphic below for the rest of the T-Test data.



Unpaired *t* test results

P value and statistical significance:

The two-tailed P value equals 0.3221

By conventional criteria, this difference is considered to be not statistically significant.

Confidence interval:

The mean of Group One minus Group Two equals 1.40

95% confidence interval of this difference: From -1.66 to 4.46

Intermediate values used in calculations:

t = 1.0553

df = 8

standard error of difference = 1.327

Review your data:

Group	Group One	Group Two
Mean	22.40	21.00
SD	1.52	2.55
SEM	0.68	1.14
N	5	5

Figure 1, T-Test Results

HEADING 4

DISCUSSION

The findings of this study provide important observations into the potential impact of behavioral change techniques (BCTs) on the perceived engagement and adherence to ehealth exercise interventions among young adult cancer survivors, despite the statistical insignificance found. While the results did not show statistical significance as seen with the P value at 0.3221, several important considerations and implications can still be drawn from the study.

First, it is crucial to acknowledge the complexity of engagement and adherence behaviors among young adult cancer survivors. Adherence to exercise interventions is influenced by countless factors, including individual motivations, perceived barriers, social support networks, and previous experiences with exercise. The lack of statistical significance may reflect the inherent variability and heterogeneity that comes with simply being human. Furthermore, the small sample size and short questionnaire length may have contributed to the observed non-significant findings. Despite efforts to recruit a sample of young adult cancer survivors to represent the larger population as a whole, the study may have been underpowered to detect small to moderate effects of the intervention on authentic perceived engagement and adherence.

Additionally, being that the questionnaires are so short in length, may not have allowed sufficient time for participants to internalize and fully integrate the BCTs into their responses, thereby limiting the observable impact on engagement and adherence outcomes. It is also important to consider the limitations of the chosen outcome measures and assessment tools. Self-reported measures of perceived engagement and adherence may be subject to certain bias and inaccuracies in reporting. Future studies with more time and resources could benefit from incorporating objective measures of engagement and adherence.

Despite the statistically insignificant findings, the study still offers valuable insights into the challenges and complexities of promoting engagement and adherence to exercise interventions among young adult cancer survivors. The qualitative data and participant feedback collected throughout the study provide rich contextual information that can inform future intervention development and implementation strategies. Understanding the barriers, facilitators, and preferences of young adult cancer survivors regarding perceived exercise participation is critical for designing tailored and effective interventions that address their unique needs and circumstances.

HEADING 5

CONCLUSION

While the statistical analysis did not yield significant differences between groups, the study contributes to the growing body of scientific information on exercise engagement and adherence among young adult cancer survivors. Moving forward, researchers and healthcare providers should continue to explore innovative approaches, refine measurement techniques, and tailor interventions to optimize adherence and promote long-term engagement with exercise interventions in this population. Collaborative efforts across disciplines are needed to develop evidence-based strategies that empower young adult cancer survivors to embrace physical activity as an integral component of their survivorship journey.

REFERENCES

Bennell, K., Nelligan, R. K., Schwartz, S., Kasza, J., Kimp, A., Crofts, S. J., & Hinman, R. S. (2020). Behavior change text messages for home exercise adherence in knee osteoarthritis: randomized trial. *Journal of medical Internet research*, *22*(9), e21749.

Bouchard, D. R. (2021). *Exercise and physical activity for older adults*. Human Kinetics.

Cancer facts & figures 2021. American Cancer Society. (n.d.). Retrieved November 10, 2021, from https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2021.html.

Centers for Disease Control and Prevention. (2021, February 11). *Injuries and violence are leading causes of death*. Centers for Disease Control and Prevention. Retrieved November 10, 2021, from https://www.cdc.gov/injury/wisqars/animated-leading-causes.html.

Clark, B. A., Wade, M. G., Massey, B. H., & Dyke, R. V. (1975). Response of institutionalized geriatric mental patients to a twelve-week program of regular physical activity. *Journal of Gerontology*, *30*(5), 565-573.

Ekelund U, Brown WJ, Steene-Johannessen J, Fagerland MW, Owen N, Powell KE, et al. Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850 060 participants. Br J Sports Med. 2019;53(14):886–94.

Ekelund U, Steene-Johannessen J, Brown WJ, Fagerland MW, Owen N, Powell KE, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time

with mortality? A harmonised meta-analysis of data from more than 1 million men and women. Lancet. 2016;388(10051):1302–10.

Hill, R. D., Storandt, M., & Malley, M. (1993). The impact of long-term exercise training on psychological function in older adults. *Journal of gerontology*, *48*(1), P12-P17.

Irwin, M. L. (2009). Physical activity interventions for cancer survivors. *British journal of sports medicine*, *43*(1), 32-38.

Lynch BM, Dunstan DW, Vallance JK, Owen N. Don't take cancer sitting down: a new survivorship research agenda. Cancer. 2013;119(11):1928–35.

Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry*, *18*(2), 189-193.

Sabiston, C. M., & Brunet, J. (2012). Reviewing the benefits of physical activity during cancer survivorship. *American Journal of Lifestyle Medicine*, *6*(2), 167-177.

Schmid D, Leitzmann MF. Television viewing and time spent sedentary in relation to cancer risk: a meta-analysis. J Natl Cancer Inst. 2014;106(7):dju098.

Tustin, N. (2010). The role of patient satisfaction in online health information seeking. *Journal of health communication*, *15*(1), 3-17.

Webtechs, W. by, & Webtechs. (2021, April 21). *Personal trainer cost 2021 - average prices - bodysmith fitness*. Body Smith Fitness. Retrieved November 10, 2021, from https://bodysmithfitnessaz.com/personal-trainer-cost-2021/.

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