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The Effectiveness of Health Promoting Lifestyle Education on Distress Tolerance and Life Expectancy in Adolescences with Cancer

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ABSTRACT

Background and Aim: Cancer in adolescence can have a long-term impact on the physical, mental and social life of people in adulthood. As a result, the present research was conducted with the aim of determining the effectiveness of health promoting lifestyle education on distress tolerance and life expectancy in adolescences with cancer. **Methods:** The current research was semi-experimental with a pre-test and post-test design along with the control group. The research population was adolescences with cancer that referred to the Shahid Beheshti Hospital of Babol city in the winter season of 2022 year. The research sample was 30 people who were selected by the purposive sampling method, after checking the inclusion criteria and were replaced with the lottery in two equal groups, randomly. The experimental group was educated 8 sessions of 90 minute with the health promoting lifestyle method and during this period the control group was not trained. The research tools were included the demographic information form, Simmons and Gaher distress tolerance scale (2005) and Snyder et al life expectancy scale (1991). Data were analyzed by multivariate analysis of covariance in SPSS-19 software at a significance level of 0.05. **Results:** The findings showed that 8 sessions of health promoting lifestyle education increased distress tolerance and life expectancy in adolescences with cancer (P<0.001). **Conclusion:** The results of this study indicated the effectiveness of health promoting lifestyle education on increasing distress tolerance and life expectancy in adolescences with cancer. As a result, counselors and psychologists can use the mentioned method to improve the psychological characteristics of different groups, especially adolescences with cancer.

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Introduction

Adolescence is one of the most sensitive periods of life, which is accompanied by extensive physical, psychological, social and emotional changes and transformations, and any disease, including cancer, during this period causes a lot of tension and anxiety in this group (Joh et al., 2021). Adolescent cancer refers to getting cancer between the ages of 15 and 19 years and every year about five thousand teenagers are diagnosed with cancer in the United States and about 600 teenagers die from cancer. Cancer is the cause of about five percent of deaths and the fourth cause of death in teenagers after accidents, suicide and murder (Ahmadi et al., 2019). Adolescents are one of the most dangerous groups involved in chronic diseases such as cancer, and in Iran, cancer is the cause of 13% of adolescent deaths and the third cause of their mortality (Ghamari et al., 2020). Cancer in adolescence has long-term consequences on various dimensions of life in adulthood, and the problems caused by cancer may be caused by cancer itself or its side effects (Tonorzos et al., 2022). Advances in medical science have transformed cancer from a fatal disease to a chronic disease with a high survival rate, but this disease still has many negative, stressful, and traumatic psychological consequences (Shin et al., 2019).

One of the negative consequences of cancer is the loss of distress tolerance (Fedhil et al., 2023). It means the ability of a person to tolerate unpleasant and stressful internal states and annoying physiological situations or the capacity and ability to experience and stand against unpleasant and annoying states and situations (Cunningham et al., 2020). This construct refers to the perceived capacity to tolerate negative or disturbing emotional states and the behavioral manifestation of tolerating distressing internal states caused by stressful factors (Mattingly et al., 2022). Distress tolerance has a multidimensional nature and includes the ability to tolerate emotional distress, evaluation and capacity to accept the emotional state, the way of emotion regulation and efforts to relieve distress, and the amount of attracting attention through negative emotions (Billingsley and Steinman, 2021). People with low distress tolerance usually find emotions intolerable, avoid accepting them and try hard to prevent them, and cannot cope with disturbances and psychological distress (Willocks, 2019). People with high distress tolerance are able to give adaptive and adaptive responses to distress-provoking situations. On the other hand, people with low distress tolerance engage in behavioral disorder to deal with such situations and seek to relieve their emotional pain by performing some destructive behaviors such as drug use (Woznar et al., 2023).

Another negative consequence of cancer is the decrease in life expectancy (Botta et al., 2019), which as a statistical indicator means the average life span of people in a society (Rodrigues et al., 2022). Life expectancy as a cognitive factor can help people achieve success (Paixao et al., 2020). This structure indicates the ability and perceptive ability to create different paths and methods to achieve goals, needs and desires (McNamara et al., 2023). Life expectancy is a process during which people determine their goals, develop solutions and strategies to achieve them, create the necessary motivation to implement the goals, and maintain this motivation along the way (Vanden Hoot et al., 2019). . Life expectancy can act as a coping strategy against stressful life events and increases vitality, resilience and flexibility (Roggins et al., 2022).

There are many methods to improve psychological characteristics, one of which is the health-enhancing lifestyle education method (Kornat-Thoma et al., 2017). A health-promoting lifestyle is a self-initiated and self-perceived pattern of maintaining and promoting health and protecting the individual from injury and disease (Davis et al., 2022). According to the World Health Organization report, 60% of deaths in the world and 80% of deaths in developing countries are due to unhealthy lifestyles. Lifestyle is a combination of behavioral patterns and individual habits in life, and health-promoting lifestyle is a multidimensional approach about individual beliefs, perceptions, and voluntary behaviors in the field of maintaining and promoting health (Zhang et al., 2023). Health-promoting lifestyle education is an activity aimed at individual and social empowerment in the field of providing, maintaining and promoting health with six components of interpersonal relationships, nutrition, physical activity, stress management, health responsibility and spiritual growth and self-actualization (Chen et al., 2018). Therefore, in this method, the client learns to improve

interpersonal relationships, control emotions and thoughts in interpersonal relationships, eat healthy, exercise regularly, regularly and scientifically, avoid unhealthy behaviors, protect against accidents, cope with stress, independence and adaptability. (Tong et al., 2023).

In the following, the results of the most important research related to the current research are reported. For example, the results of Mataleh Asgari and Dashtbozorgi (2022) showed that health-oriented lifestyle education reduced the health concerns and blood pressure of the elderly with high blood pressure, but it did not have a significant effect on their distress tolerance (Asgari & Dashtbozorgi, 2022). Welle and Graf (2011) concluded that health-oriented lifestyle habits had a positive and significant correlation with high stress tolerance in students (Welle & Graf, 2011). In another study, Geravand and Sabzian (2023) reported that the health-promoting lifestyle had a negative and significant effect on the psychological distress of undergraduate students (Geravand & Sabzian, 2023). Mohammadi et al. (2021) concluded that health-promoting lifestyle had a positive and significant effect on distress tolerance in patients with chronic musculoskeletal pain (Mohammadi et al., 2021). The results of Limpens et al.'s research (2022) showed that leading a health-oriented lifestyle increases life expectancy in people without heart failure (Limpens et al., 2022). Lee et al. (2018) also reported that a health-oriented lifestyle increases life expectancy in adults (Lee et al., 2018). In another study, Sahragerd et al. (2019) reported that Islamic lifestyle education increased the happiness and life expectancy of housewives (Sahragerd et al., 2019). Oraki et al. (2019) concluded that self-care empowerment training increased the life expectancy, happiness, and quality of life of the elderly in a nursing home (Oraki et al., 2019).

Considering the high and increasing statistics of cancer in teenagers and the many psychological problems that this group is facing (especially in the field of decreased distress tolerance and life expectancy), the necessity of intervention in this group is determined. Studies indicate that one of the best methods of intervention in patient groups is the use of health-promoting lifestyle education. Another important point is that few researches have been conducted on health-enhancing lifestyle education, no research was found on its effectiveness on teenagers with cancer, and the results of researches on their effectiveness are different. Therefore, conducting this study can help to summarize and make a decision about the effectiveness of health-promoting lifestyle education on distress tolerance and life expectancy in teenagers with cancer, and be a guide for therapists and clinical psychologists in using the mentioned educational method. According to the topics raised and the role of cancer in adolescence and its long-term impact on the physical, mental and social life of people in adulthood, the present study was conducted with the aim of determining the effectiveness of health-promoting lifestyle education on distress tolerance and life expectancy in adolescents with cancer.

Method

The current study was a quasi-experimental design with a pre-test and post-test with a control group. The research population was adolescents with cancer who referred to Shahid Beheshti Hospital in Babol in the winter season of 2022. The sample of the study was 30 people who were selected with the purposeful sampling method, after checking the criteria for entering the study, and were replaced randomly with the help of lottery in two equal groups. The criteria for entering the study include: Willingness to participate in the research and signing the consent form by them and their parents, being 12-18 years old, suffering from cancer, no psycho-physical disorders, no history of receiving health-enhancing lifestyle training and no use of psychiatric drugs such as anti-anxiety, anti-depressant, etc. Exit criteria include: Refusal to continue cooperation, absent more than two sessions and relapse of the disease.

Materials

1. Distress Tolerance Scale: The Distress Tolerance Scale was designed by Simmons and Gaher (2005) with 15 items. For each item, there are five options including I totally agree (score one), I agree (score two), I have no opinion (score three), I disagree (score four) and I totally disagree (score five) and the examinee must mark one of the options. The distress tolerance scale score is calculated with the total score of the items and the range of scores is 15-75, and a higher score indicates greater distress tolerance. The construct validity of the tool was investigated with the exploratory factor analysis method and the results indicated the existence of four factors of tolerance of emotional distress, absorption by negative emotions, mental estimation of distress and adjustment of efforts to relieve anxiety. Reliability with Cronbach's alpha method was reported as 0.72,

0.82, 0.78 and 0.70 for the four mentioned factors and 0.82 for the whole scale (Simmons & Gaher, 2005). In Iran, Hassannejad et al. (2022) reported the reliability of distress tolerance scale with Cronbach's alpha method of 0.85 (Hassannejad et al., 2022). In the present study, the reliability value of distress tolerance scale was obtained with Cronbach's alpha method of 0.89.

2. Life expectancy scale: The life expectancy scale was designed by Snyder et al. (1991) with 12 items, four of which, including items 1, 5, 6, and 10, are not included in the scoring. For each item, there are four options including completely false (score one), false (score two), true (score three) and completely true (score four) and the examinee must mark one of the options. The score of the life expectancy scale is calculated with the total score of the items and the range of scores is 8-32, and a higher score indicates a higher life expectancy. The divergent validity of the instrument was calculated as -0.44 with the Beck Depression Inventory, and the reliability was reported as 0.70 and 0.74 with Cronbach's alpha and retest methods, respectively (Snyder et al., 1991). In Iran, Heidari et al. (2021) reported the reliability of the life expectancy scale with Cronbach's alpha method of 0.88 (Heidari et al., 2021). In the present study, the reliability value of the life expectancy scale was obtained with Cronbach's alpha method of 0.93.

3. Health-promoting lifestyle training: In this research, Edalat et al.'s (2023) package was used for health-promoting lifestyle training, and the goals and contents of its sessions are presented in Table 1.

Table 1. Objectives and contents of health promoting lifestyle training sessions

Session	Objectives	Content
1	Communication and brief introduction of the intervention method	Creating communication and introducing people to each other, stating the goals of the meetings and completing the commitment letter by the patients, examining the dimensions of the patients' daily lifestyle, explaining the dimensions of the lifestyle that improves physical and mental health and receiving feedback.
2	Nutrition training and meal plan presentation	Summarizing the previous session by patients, explaining the principles of proper nutrition related to cancer, presenting a healthy nutrition plan and receiving feedback
3	Sports training and sports program presentation	Summarizing the previous meetings by the members, discussing exercise and its physical and psychological benefits, learning about the appropriate exercise methods for patients, presenting a suitable exercise program and introducing some books and receiving feedback.
4	Learning to recognize sleep and improve it	Summarizing previous sessions by members, discussing sleep and examining sleep disorders related to cancer, tips on proper sleep, and receiving feedback.
5	Teaching social skills	Summarizing previous meetings by members, defining social skills and its impact on health-promoting lifestyles, recognizing social skills, providing tips for improving communication and receiving feedback.
6	Teaching stress coping skills	Summarizing the previous meetings by the members, getting familiar with stressful factors and their impact on health-promoting lifestyle, knowing the methods of coping with stress and how to apply them in life and receiving feedback.
7	Teaching the role of values in lifestyle	Summarizing the previous meetings by the members, explaining the values and its role in the health-promoting lifestyle, teaching spiritual coping methods (trust, hope, patience, forgiveness, gratitude, etc.) and receiving feedback.
8	Review, summarize and practice the skills of the previous sessions	Summarizing the previous sessions by the members, explaining the role of the new lifestyle and how it continues in life by the therapist, and examining the patients' opinions about the experiences of the new lifestyle and how to apply it in real life.

Implementation

To conduct this study, first coordinated with hospital officials and families of teenagers with cancer and sampling continued until the sample size reached 30 people. Then, the samples were replaced by a simple random method in two groups of 15 people including

experimental (lifestyle training to promote health) and control groups. The experimental group was trained in 8 90-minute sessions with the health-promoting lifestyle method, and during this time, the control group was not trained, and the research tools introduced above were completed by the samples in the pre-test and post-test stages. After collecting the data, the distress tolerance scale of Simmons and Gaher (2005) and the life expectancy scale of Snyder et al. (1991) were analyzed by multivariate covariance analysis method in SPSS-19 software at a significance level of 0.05.

Results

In terms of demographic findings, in both experimental and control groups, most teenagers with cancer were boys (60% in the experimental group and 53.33% in the control group). Most of the participants were 12-14 years old (66.67% in the experimental group and 73.33% in the control group). The disease duration of most of them was 1-2 years (46.67% in the experimental group and 53.33% in the control group). The mean and standard deviation of pre-test and post-test distress tolerance and life expectancy of teenagers with cancer are presented in Table 2.

Table 2. Mean and standard deviation of pre-test and post-test distress tolerance and life expectancy in teenagers with cancer

Variable	Stage	Experimental Group Mean (SD)	Control Group Mean (SD)
Distress tolerance	Pre-test	(4/23) 35/46	(4/18) 37/01
	Post-test	(4/88) 43/12	(4/23) 37/69
Hope	Pre-test	(2/14) 13/86	(2/22) 13/55
	Post-test	(2/29) 17/23	(2/09) 13/47

As seen in Table 2, the average distress tolerance and life expectancy of the experimental group showed a greater increase from the pre-test to the post-test stage than the control group.

The assumptions of multivariate covariance analysis showed that according to the Kolmogorov-Smirnov test, the assumption of normality of distress tolerance and life expectancy from the pre-test to the post-test of the groups was confirmed due to a significance greater than 0.05. Based on the Levene's test, the assumption of homogeneity of variances of distress tolerance and life expectancy was confirmed due to a significance greater than 0.05, and based on the Mbox test, the assumption of homogeneity of covariances was confirmed due to a significance greater than 0.05. Multivariate tests to determine the effectiveness of health promoting lifestyle education on distress tolerance and life expectancy of teenagers with cancer were presented in Table 3.

Table 3. Multivariate tests to determine the effectiveness of health promoting lifestyle education on distress tolerance and life expectancy in teenagers with cancer

Test	Value	F	Sig.	Eta^2
Pillai's trace	1/35	17/98	0/001	0/73
Wilks' Lambda	0/17	17/98	0/001	0/73
Hotteling's trace	2/46	17/98	0/001	0/73
Roy's largest root	2/46	17/98	0/001	0/73

As can be seen in Table 3, health promoting lifestyle education at least caused a significant change in one of the variables of distress tolerance and life expectancy in adolescents with cancer ($P<0.001$). Univariate covariance analysis to determine the effectiveness of health promoting lifestyle education on each of the variables of distress tolerance and life expectancy of teenagers with cancer was presented in Table 4.

Table 4. Univariate covariance analysis to determine the effectiveness of health promoting lifestyle education on each of the variables of distress tolerance and life expectancy in teenagers with cancer

Variable	Source	SS	F	Sig.	Eta2
Distress tolerance	Group	342/08	15/67	0/001	0/71
Hope	Group	195/60	24/31	0/001	0/82

As can be seen in Table 4, health promotion lifestyle education significantly changed both variables of distress tolerance and life expectancy in adolescents with cancer (P<0.001). According to the mean values, the use of 8 health-enhancing lifestyle training sessions increased distress tolerance and life expectancy in teenagers with cancer. According to the eta square, 71% improvement in stress tolerance and 82% improvement in life expectancy was the result of health promoting lifestyle training.

Conclusion

The present study was conducted with the aim of determining the effectiveness of health promoting lifestyle education on distress tolerance and life expectancy in teenagers with cancer.

The findings indicated that health promotion lifestyle training increased distress tolerance in teenagers with cancer. This finding was inconsistent with the findings of Asgari and Dasht bozorgi (2022) and consistent with the findings of Welle and Graf (Welle & Graf, 2011), Garavand and Sabzian (2023), and Mohammadi et al. (Mohammadi et al., 2021). In explaining the disparity between the current research and the research of Asgari and Dashtbozorgi (2022), we can point to the difference in the research community. The current research was conducted on teenagers with cancer, but their research was conducted on elderly people with high blood pressure. Compared to the elderly, teenagers have more hope to improve their psychological characteristics, and for this reason, they attend training sessions with more motivation and enthusiasm and apply the learned strategies in life much better than the elderly. Therefore, it can be expected that health promotion lifestyle education increases the distress tolerance of teenagers with cancer, but does not have a significant effect on the distress tolerance of the elderly with hypertension. In explaining the effectiveness of health-promoting lifestyle training on increasing distress tolerance in teenagers with cancer, it can be concluded that health-promoting lifestyle training with proper nutrition and adequate exercise plays an important role in improving health and quality of life. Nutrition, exercise and its training, along with the training of psychological aspects of lifestyle such as stress management, social relations and responsibility towards health, play a very important and deep role in promoting health. Health-promoting lifestyle education plays an important role in disease prevention, control and management, and includes all factors related to health-oriented life, including nutrition, exercise, sleep, stress management, etc. The mentioned method has a multidimensional approach to the perceptions and voluntary actions of the individual, which leads to the continuation and strengthening of the level of health and self-actualization, and improves the level of health, well-being, accepting issues, increasing the feeling of satisfaction, personal persuasion, and self-actualization. People under health promotion lifestyle training are successful in choosing a good diet and exercise program and keeping this program consistent, and they use health instructions and recommendations related to their disease (cancer) in their daily life. Through improving health and quality of life, these factors can play an important and effective role in improving and increasing distress tolerance in teenagers with cancer.

Other findings indicated that health promotion lifestyle education increased life expectancy in adolescents with cancer, which is consistent with the findings of Limpens et al. (Limpens et al., 2022), Lee et al. (Lee et al., 2018), It was Sahragerd et al. (Sahragerd et al., 2018) and Oraki et al. (2019). In explaining the effectiveness of health-promoting lifestyle training on increasing life expectancy in teenagers with cancer, it can be concluded that health-promoting lifestyle training is one of the effective methods for maintaining, controlling and improving health. Lifestyle adjustment is one of the main foundations of women's health management programs and can provide the basis for improving the quality of life and physical and mental health throughout the years of life. In addition, this method improves the

mental and psychological conditions of patients by involving people with cancer in self-care behaviors, attracting social support and improving psychological symptoms. Physical and psychological trainings in health promoting lifestyle intervention play an important role in learning methods of coping with psychological pressures and life problems, and these trainings empower cancer sufferers to be able to deal with the problems and psychological pressures of life better or deal with them better. Therefore, health-enhancing lifestyle education by maintaining, controlling and improving health, health management and self-care behaviors through improving health and quality of life can play an important and effective role in improving and increasing life expectancy in teenagers with cancer.

The most important limitations of this research included not following up the results in the long term, using a targeted non-random sampling method, difficulty in selecting samples to participate in the research, and using self-report tools to collect data. Therefore, it is suggested to check the stability of the results in the long term through follow-up periods, to use random sampling methods due to less sampling error, and to use interviews to collect data. The effectiveness of health-enhancing lifestyle education on the psychological characteristics of other vulnerable groups, including those with diabetes, should be investigated. Another research proposal is to compare the effectiveness of health-promoting lifestyle education with other educational methods, including positive mindfulness education, acceptance and commitment-based mindfulness education, adolescent-centered mindfulness education, adolescent-centered compassion education, etc.

In sum, the results of this study indicated the effectiveness of health-promoting lifestyle education on increasing distress tolerance and life expectancy in teenagers with cancer. These results have practical implications for cancer society professionals, officials and planners and therapists, counselors and clinical psychologists who deal with vulnerable groups such as cancer patients. Therefore, experts, officials and planners of the cancer association can design and implement programs in their educational policies to use the health-promoting lifestyle education method to improve the psychological and health-related characteristics of cancer patients. Counselors and psychologists can use the mentioned method to improve the psychological characteristics of different groups, especially teenagers with cancer.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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