Original Article

Effectiveness of group play therapy based on choice theory on executive functions of children and adolescents with cancer

***Reza Shamabadi[1]; Masoud Nosratabadi[2]; Seyed Mohsen Asgharinekah[3];
Abdollah Banihashem[4]**

[1]Ph.D. student in educational psychology, Department of Educational and Counseling Psychology, Faculty of Education and Psychology, Ferdowsi University of Mashhad, Mashhad, Iran.
[2]Ph.D. in health psychology, Department of Psychology, Faculty of Psychology, University of Tehran, Tehran, Iran.
[3]Associate professor, Department of Educational and Counseling Psychology, Faculty of Education and Psychology, Ferdowsi University of Mashhad, Mashhad, Iran.
[4]Professor, Department of Internal Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Abstract

Introduction: The effects of some problems such as cancer in childhood and adolescence remain throughout the lives. This study aimed to assess the effectiveness of group play therapy based on the choice theory on executive functions in children and adolescents with cancer.

Materials and Methods: This study was conducted on 30 cancer patients aged 9-18 years who admitted to Dr. Sheikh Hospital in Mashhad, Iran in 2020. They divided randomly into two experimental group (n= 15) and control group (n= 15). The experimental group received eight sixty-minute sessions of group play therapy based on choice theory, and the control group used the game room. Both groups fulfilled the Executive Functional Behavior Rating Questionnaire (BRIEF). The data were analyzed using ANOVA mix model using SPSS software version 24.

Results: The findings showed that the intervention has significant effects on shift, emotion control, initiate ($P= 0.001$), and monitoring ($P= 0.04$) due to the interactive effect of time and grouping, which shows the effectiveness. Their Partial Eta Squared (η) were 0.42, 0.46, 0.62 and 0.13, respectively, and the inhibition ($P= 0.59$), working memory ($P= 0.59$), plan ($P= 0.59$), and organize ($P= 0.29$) did not have significant change.

Conclusion: According to the findings, group play therapy based on the choice theory can be used as an effective intervention to improve shift, emotional control, initiate and monitoring in children and adolescents with cancer.

Keywords: Cancer, Play therapy, Reality therapy

*Corresponding Author:
Department of Educational and Counseling Psychology, Faculty of Education and Psychology, Ferdowsi University of Mashhad, Mashhad, Iran.
rshamabadi@um.ac.ir

Introduction

The impact of childhood problems and issues will be felt throughout a person's life. Some issues and problems of childhood and adolescence, especially emotional issues, can cause mental health problems in adulthood, such as depression, substance abuse, and even suicide (1). One of these issues and problems that can have a long-term impact on a person's physical, mental and social life is cancer and its complications in childhood and adolescence (2). Cancer in childhood and adolescence causes relatively persistent physical and psychological problems such as pain, migraine, fatigue, dizziness, sleep problems, cardiovascular problems, mental disorders, mental function problems, neurological dysfunction, behavioral problems, drug-induced attention deficit, conflict with siblings, social exclusion, antisocial behaviors, anxiety, depression, which may be due to cancer itself or complications from treatments for the disease (1,3). Therefore, in addition to cancer treatment, its problems and complications need to be followed up and treated because, despite the treatment of cancer, its side effects continue throughout a person's life. One of the most important psychological concepts is executive functions. Studies on cognitive impairments in the field of executive function have shown that regardless of the type of cancer, people with cancer face problems in this area. On the other hand, studies on the quality of life of people with cancer have shown that about 15% of problems and the limitations of these people's lives are due to factors related to executive function (4,5). Executive functions are the cognitive skills needed to regulate thinking, feeling, and behavior to achieve a goal (6). Due to the outnumbered complications of cancer patients, various treatment methods are used to improve the living conditions of these people (7). In cancer treatment courses, due to psychological problems, the need for a psychologist in the treatment team is felt (8); among the treatments for psychological complications are cognitive-behavioral therapies and play therapy. Research has shown that cognitive-behavioral therapy and play therapy improve executive functions (9). One of the new approaches arising from the cognitive-behavioral approach is reality therapy. Reality therapy is similar to the rational, emotional behavior therapy of Ellis, one of the leaders in cognitive-behavioral approaches. In fact, therapy based on choice theory is called reality therapy. The choice theory was developed by William Glaser on the development of internal control versus external control and on basic needs, responsibility, quality world, perceptual world, real world, and demands (10,11). Previous studies on play therapy, games, and play-based activities have been specific to the same treatment period and based on improving executive functions with quick-return techniques for the same session and treatment period. However, in the reality therapy method, the person learns techniques that can be used throughout his/her life to manage different situations better. Also, the present protocol offers these methods in the form of the game (9,12,13), considering that play therapy based on choice theory has not been performed on children and adolescents with cancer in Iran. Therefore, this study evaluates the effectiveness of group play therapy based on choice theory on the executive functions of children and adolescents with cancer.

Materials and Methods

The present study was an experimental study conducted on cancer patients aged 9 to 18 years. Initially, the names and files of all children and adolescents aged 9 to 18 years with leukemia diagnosis who referred to Dr. Sheikh Hospital in Mashhad city- Iran in past one to two years were reviewed.

The inclusion criteria included functional reports lower than severe (score 172 in the Executive Functional Behavior Rating Questionnaire), the opinion of the pediatrician in terms of medical treatment and its side effects, and the satisfaction of the participant and his/her parents to participate and cooperate in the study. The exclusion criteria included unwillingness to continue the research process, absence in 20% of the treatment sessions, children and adolescents who have such problems in terms of executive functions, and not attending the meetings.

The sample size was calculated using G-power in the analysis of the mix-model and the effect size of 0.25 and the correlation between the evaluations at the level of 0.6 using 0.05 alpha

and test power of 0.80%. So, the sample size of at least 28 (30 people) (14,15). Due to the sensitivity of the participants, 34 people were considered so after dropping, the minimum 30 cases were calculated. The samples were selected among 360 patients. The assignment of participants performed by "which hand" game (from which the first five people go to the control group, the following five people go to the intervention group, and so on until random placement occurs for all people). The assignment was done in two groups of 17 people, and according to the exclusion criteria 4 cases (two cases from each group) were removed.

Research instruments

A) Behavior Rating Inventory of Executive Function: The main version of the Behavior Rating Inventory of Executive Function (16) has 86 items that assess behaviors related to executive functions in children aged 6-11 years. This questionnaire has four versions: preschool version (for children 2-5 years with a report form for parents and teachers), main version (for ages 6-11 with separate forms for parents and teachers), and self-report version (suitable for adolescents 11-18-years old), adult version (for ages 18-90-year old with separate forms of self-report and interviewer) (17). The scoring of the items is based on the Likert scale varies from 1 (for option never) to 3 (for option often). This questionnaire has two indexes of behavioral regulation and metacognition, including scales of inhibiting, shift, and emotional control, and the metacognition index includes scales of the initiate, working memory, plan/organize and monitoring. Its minimum and maximum scores

are 86 and 258, respectively. According to the BRIEF questionnaire, the maximum scores in inhibit components are 45, shift 36, emotional control 27, working memory and monitor 33, working memory 21, plan/organize 42, and minimum test scores in inhibit 15, shift 12, emotional control. 9, working memory and monitor 11, organize and monitor 7, plan/organize 14. The higher the average score above 65, the greater the problems with that component.

A score of 50 indicates the existence of problems, and a score above 65 indicates a defect in the field is assessed. The validity of the test for both parent and teacher forms ranged from 0.80 to 0.98, and the reliability of this questionnaire for behavior regulation index, metacognition index, and the whole questionnaire, has been reported to be 0.84, 0.88, and 0.86, respectively (16,17). The original version of this questionnaire has been translated and standardized into Persian by Zarei et al. The internal consistency of the BRIEF questionnaire was calculated using Cronbach's alpha coefficient for the behavior regulation index, metacognition index, and the whole questionnaire was 0.83, 0.84, and 0.88, respectively (18).

Group sessions were held in 8 sixty-minute sessions by the clinical child and adolescent psychologist (male) and assistant psychologist (female) and the control group used only the game room and other services of the game room and did not participate in the group. The treatment plan is taken from previous studies in play therapy based on choice theory and cognitive-behavior therapy (9,10), which are shown in Table 1.

Table 1. Summary of the structure of group therapy sessions

Session	The goal pursued in each session	Content and activities of each session	Activities between sessions
First	Familiarity with each other, communication, descriptions of group meetings, self-assessment	Introduction and acquaintance of therapists with the participants and vice versa and group and individual games	Thinking about the limitations of the hospital and the course of the illness at home and listing them
Second	Basic Needs Training	Teach basic needs and color them and categorize constraints or demands in them	Coloring needs
Third	Training the reality therapy process to achieve the desires (trying to achieve the desires)	Choose an imaginary way to achieve the desires.	Add to imaginary wish papers

Fourth	Training the reality therapy process to achieve the desires (trying to achieve the desires)	WDEOP process using Lee game	Use this process to achieve realistic desires
Fifth	Training the reality therapy process to achieve the desires (trying to achieve the desires)	An allegorical representation of a sick elephant and a wise ant	Modify the use of this process to achieve the actual demands
sixth	Qualitative world education	Back to painting needs to better paint them as well as knowing the most important desires	Identify an important demand according to the quality world education and prepare an action plan for this demand
Seventh	Behavior Machine Training	Influence your body and mind by focusing on effective thinking and acting	Emphasis on using this allegory to motivate oneself to use the reality therapy process
Eighth	Summarize the content of the previous seven sessions with the help of participants	Summarizing previous sessions, preparing children for the end of the group	Closing of the group

This research was carried out with the approval of the ethics committee of the University of Social Welfare and Rehabilitation Sciences (IR.USWR.REC.1397.172). In the initial session (individual interview and completing the questionnaire), the researcher explained the purpose of the study and the method of work to the participants. After consciously signing the consent form, they were told that at any research stage, it is possible to discount participating in the study without paying any charge. Participants were also assured of the confidentiality of the data collected.

Results

The descriptive findings indicate that the mean age of the study participants was 12.20 years and the standard deviation was 2.51. The number of girls was 8 (26.7%), and the number of boys was 22 (73.3%), and the type of cancer was leukemia and the duration of the disease was one to two years.

Table 2 shows the pre-test and post-test scores in each group separately. As can be seen, the mean pre-test scores of the inhibit variable in the intervention group were 16.6. In the control group, 18.46, the Shift variable was 18.67 in the intervention group and 19.93. The emotional control variable was 18.66 in the intervention group and 19.33 in the control group, the initiate 13.8 in the intervention group, and 12 in the control group.

The working memory is 17.42 in the intervention group and 19.40 in the control group. The plan variable is 17.53 in the intervention group and 18.04 in the control group, the organize in the intervention group is 13.13 and 15.80 in the control group, and the mean of the monitor is 16.60 in the intervention group and 19.26 in the control group.

Table 2. Descriptive indicators of research variables

Variable	Experimental group		Control group	
	Pre-test	Post-test	Pre-test	Post-test
Inhibit	16.6 ± 4.11	14.26 ± 3.34	18.46 ± 1.45	15.66 ± 1.39
Shift	18.67 ± 2.95	14.69 ± 2.43	19.93 ± 1.98	19.40 ± 1.76
Emotional control	18.66 ± 4.15	14.13 ± 2.87	19.33 ± 1.29	19.26 ± 2.78
Initiate	13.80 ± 2.62	10.33 ± 2.49	12.00 ± 1.06	13.80 ± 1.78
Working memory	17.42 ± 4.41	15.30 ± 3.99	19.40 ± 2.26	19.13 ± 2.44
Plan	17.53 ± 4.05	13.40 ± 3.01	18.04 ± 2.55	14.46 ± 2.29
Organize	13.13 ± 2.58	10.26 ± 2.81	15.80 ± 1.14	14.73 ± 2.21
Monitor	16.60 ± 3.66	14.33 ± 3.26	19.26 ± 1.70	18.45 ± 2.22

To analyze the main variables, the mixed-model ANOVA method was used. Before and after evaluations as time index (as a factor of within-group variance) and control intervention grouping caused the sample to be divided into two separate categories as a between-group variance.

At first, the assumptions of mixed-model analysis were examined, one of which is the normality of the data. According to the normality test, some of the variables are not normal, but according to the mixed-model analysis, which is a robust test against the abnormality of the data, the test results remain valid, so given that the majority of variables are normal and a few are abnormal the mixed-model

can be run. Other assumptions are the KMO test, which is examined by Mauchly's test. The default is not spherical because this assumption is required for models higher than 2 in 2, such as 3 in 2 or 3 in 3 and above, so there is no need for this setup. In the following, the variables were examined separately. These findings are listed in Table 3. The variables of shift, emotion control, and initiate (*P*= 0.001) and monitor show significant changes (*P*= 0.04). Due to the interactive effect of time and grouping has shown that the effectiveness of the intervention for these variables and Eta Squared (η) was 0.42, 0.46, 0.62, and 0.13, respectively, and inhibit variables (*P*= 0.59), working memory (*P*= 0.59), plan (*P*= 0.58), and organize (*P*= 0.29) did not show significant changes (*P*< 0.05).

Table 3. Examining the variables

Two-by-two interaction (time in grouping)	Inhibit	Shift	Emotional control	Initiate	Working memory	Plan	Organize	Monitor
Statistics	0.29	21	24	46	2.5	0.30	5.2	4.4
Significance level	0.59	0.001	0.001	0.001	0.12	0.58	0.29	0.04
Eta Squared (η)	0.01	0.42	0.62	0.62	0.08	0.01	0.15	0.13

Discussion

This study evaluated the effectiveness of the reality therapy method (choice theory) in the form of group play-based activities on executive functions. The shift, emotion control, initiate, and monitoring of significant changes due to the interactive effect of time and group has shown the effectiveness of the intervention for these variables. On the other hand, inhibit, working memory, plan and organize did not show significant changes.

Shahriari et al. aimed to evaluate the effectiveness of child-centered play therapy on internalized and externalized behavioral problems in children with cerebral palsy. They found that the intervention had a positive effect on emotion regulation, especially anger and aggression, which is consistent with the present study. However, the assessment tool was a list of children's behavior that differed from the present study (13). In addition, children with developmental coordination disorders were found to have problems with perceptual and functional motor games on plan and organizing,

which contradicted the present study (12). This can be attributed to the current group therapy being more activity-based. In addition, cognitive, conversational, and theoretical skills training was more selective than playful, and the treatment and skills were set in the form of play, which is different in this respect, as well as the tool, which was the Conners' Parent Rating Scale (CPRS).

In another study by Lipskaya-Velikovsky et al. to investigate the effect of activity-based interventions on the mental health of patients, these interventions had a positive effect on mobility (19). This study used the choice theory and reality therapy that is an approach that focuses on activity, acting as a fundamental principle and is also in line with the present study in terms of tools.

In Gilboa and Helmer's study, which aimed to investigate the impact of self-management interventions on attention and executive functions, it has been reported that self-management interventions can improve initiation and monitoring, which is consistent

with the present study (20). Managing an individual is consistent with the above intervention method. Due to the limitations of this study, such as physical and medical allergies (occasional pain, chemotherapy, and medications led to absence in some sessions), lack of appropriate support and cooperation. Cancer patients and parents of participants with psychological problems cause participants to be absent and unaccompanied in meetings. It is suggested that other studies be conducted more carefully to examine whether the positive impact on functions is due to the techniques learned from reality therapy or group games. It seems that if these effects persist in the long run, it can be said that the effects are due to the techniques learned, and if the effects disappear, it can be said that these positive effects were due to games. It is also suggested that future studies compare the effectiveness of one protocol with the studies reviewed in the discussion and the current protocol to identify differences and see if the techniques of Learned reality therapy are different from other play therapy protocols or not.

Conclusion

It seems that play therapy and reality therapy intervention, especially the protocol of the present study, the reality therapy approach in the form of game-based activities, is a helpful way to improve behavioral executive functions in children and adolescents with cancer.

Acknowledgments

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