FWU Journal of Social Sciences, Winter 2019, Vol.13, No.3, 57-64

Therapeutic outcomes of 3D- GIT game among depressive cancer patients

Sehrish Khan
COMSATS University, Abbottabad Campus

Farhana Kazmi
Hazara University, Mansehra

Rukhsana Y. Maroof
Higher Education Department, Peshawar

Cancer among children may produce depressive symptoms which affect the will power of children against the disease. Conventional psychotherapy is difficult to conduct with these children along with the prolonged physical treatment. Hence researchers designed special video games to use with these children. 3D-GIT(Three dimensional graphic imagery therapy)is a game designed for children diagnosed with cancer. The game reduces the depressive symptoms in these children. The objective of this study was to check the effectiveness of 3D-GIT game in reducing depression. It was hypothesized that patients who play 3D-GIT game will show less depressive symptoms on post-test as compared to patients who do not play this game. A sample of 60 indoor children aged 6-12 years receiving treatment for cancer (first stage)was pre-tested on CES-DC scale. After that, 30 patients played the video game twice a week for a month while the other 30 patients did not play any game. Both the groups were re-tested by using the same scale. Results indicated that 3D-GIT game reduced the depression of children suffering from cancer (pretest=50.7, posttest= 44.93), while patients in control group showed an increase in depression (pretest=47.36, post-test=50.16). Thus these results supported the hypothesis of the current study and it can be concluded that GIT game can be used as a treatment of depression among children who are under medical treatment for cancer .

***Keywords*:** 3D-GIT, depression, CES-DC, children with cancer

To be diagnosed with cancer is the major traumatic situation for the patient and the intimate relations. Over the past few years, innovations in cancer care have improved dramatically and survival with this illness becomes possible, almost 75% - 80% cancer patients become 5-year survivors (Mackey, Jemal, & Partin, 2006). For children, physical health and psychological development are interrelated. So, both aspects must be considered when promoting health of the child. According to

Correspondence concerning this article should be addressed to Dr. Rukhsana Y. Maroof, Professor of Psychology at Govt. Girls' College Hayatabad No. 1, (an institution of Higher Education Department), Khyber Pakhtunkhwa, Peshawar, Email: rukhsanamaroof@gmail.com

Contribution of Authors:

1. Sehrish Khan : Selected topic, proposed study, collected data, wrote article
2. Dr. Farhana Kazmi: Data analysis
3. Dr. Rukhsana Y. Maroof: Editing of the whole article/ proof reading/grammatical accuracy

National cancer institute of United States of America (2011) chronic illness has adverse physical and psychological impact on the child's health.

In Asian countries cancer is the major health threat (Mackey, Jemal, & Partin, 2006). The ratio of patients suffering from cancer is increasing greatly. As estimated, annually 3000 cancer cases are reported only in the Lahore district (Akhtar, 2007). Even after the advancement in the treatment facilities, most people do not seek out medical assistance because of the fear of new treatment techniques and the folktales that are circulated by the people. For example biopsy is crucial for the cancer diagnosis but the most common misconception is that it will cause suspected tumor (Ansari et al., 2011). So, because of unnecessary delays, lack of awareness and illiteracy, most of the people do not recognize the importance of routine checkups. Unfortunately, unless medical treatment is started early, the disease may progress to an advanced stage where the cure is almost impossible, challenging and requires more expenditures.

The Pediatric Cancer Foundation Canada stated that children and adults with the history of psychological disturbances face greater difficulty in managing and coping with depression and anxiety (Beaupre, 2012). Cancer may make strong negative stigma (Holland, 2002). Fears and psychological disturbances make the symptoms more complicated. Each type and stage of cancer come up with new challenges and future insecurities (Dankert et al., 2003).

Untreated depression can be the cause behind psychological disturbances in the cancer patients and can also be linked with physiological complications. Cancer patients can be diagnosed with depression due to several cancer-related therapeutic consequences, i.e. denial of adjuvant cytotoxic treatment, elongated hospital stays, and poorer compliance to recommended treatment schedules (Pinquart & Duberstein, 2010). Three meta-analyses showed that almost 19% to 34% of those patients who die due to having cancer have depressive symptoms (Chida, Hamer, Wardle, & Steptoe, 2008).

The role of playful activities for young cancer patients is vital for the development of optimism-related coping strategies (Artilheiro, Almeida, & Chacon, 2011). As cancer can be accompanied with physical and psychological restrictions that confine the growth of tumor, games not only aid in child development but are also helpful in making the child forget the pain of treatment procedures (Prieto et al., 2002; Jesus, Borges, Pedro, & Nascimento, 2010; Cheung, 2006).

The applied use of games is beneficial for the improvement of the well-being of people especially patients with chronic illness (Pallavicini, Ferrari, & Mantovani, 2018). Currently, games are developed as a supportive tool for the treatment of several mental disorders. For example, games are used for psychoeducation in the management of enduring diseases, as a physical therapy for anxiety and as psychological well-being therapy interventions (Ceranoglu, 2010; Geurts et al., 2011).

A number of studies have suggested that video games are helpful in the treatment of depression and depressive symptoms. These studies have pointed out that the focus of the video games is on the cognitive errors that cause depressive symptoms in adults (Sajjad, Abdullah, Sharif, & Mohsin, 2014). Another piece of research that was published in the Journal of Medical Internet Research claims that games aid in reducing severe depressive symptoms *(*Anguera, Gunning & Arean, 2016).

Video games are useful for the people to overcome depressive symptoms, particularly if a game does have notifications or reminders to play every day. A study was conducted on 160 students of 21 years of age by the researchers from University of California. The selected students reported mild depressive symptoms. Six games were given to the participants each lasting for three minutes. Results revealed that playing these games helped in controlling depression. Each game consisted of neurological training that helped in improving cognitive dysfunctioning that was the cause of depression (Hindustan Times, 2017)

The 3D-GIT (graphic imagery therapy) is a game that has been designed for use with children having a tumor and depression. The concept behind the 3D-GIT game is that the child has to fight with an enemy in order to win the game. This enemy has a vital part in the game, and its presence in the game is a must. The enemy character is to generate feelings of hatred, and encourage children to fight against their enemy, i.e. the tumor. The most important aspect is the designs of the character i.e an ugly yellow colored 3D enemy figure who has full face (Ribeiro, Coutinho, Araújo, & Souza, 2009).

Recent researches have proved that GIT is a therapeutic procedure that is helpful to utilize one's own imagination in order to create association between mind and the body and obtain the desired outcomes. Ackerman demonstrated that GIT is beneficial for reducing anxiety in children (Ackerman & Turkoski, 2000).

The present research was conducted to determine the positive effects of the 3D-GIT game on depressive cancer children. The aim was to introduce this new treatment strategy among patients once its effectiveness is established.

Method

Objective

The objective of this study was to check the positive effects of 3D-GIT game among depressive cancer children.

Hypothesis

Children with cancer who play GIT game will show improvement in depressive symptoms as compared to the children with cancer who do not play any game.

Sample

A sample of 60 (N=60) depressive children with cancer who met the inclusion criteria was selected through purposive sampling technique from Inor Hospital Abbottabad, Shaukat Khanum Memorial Cancer Hospital Lahore, Combined Military Hospital Islamabad, and Shifa International Hospital, Islamabad. The participants were divided into two groups, i.e. 3D-GIT group (n=30) and control group (n=30). Participants were included in the study according to the inclusion and exclusion criteria given below.

Inclusion criteria

Patients who showed symptoms of mild to moderate depression (assessed by CES-DC and reported cases by clinical psychologists). Aged 6-12 years Both boys and girls Provided consent of parents and doctors In the initial stages of cancer of any type Attended at least primary education Had access to computer and smart phone.

Exclusion criteria

- A clinician assessed that the depression was too severe to make a self-help resource a viable option

- A clinician assessed the children to be at high risk of self-harm or suicide
- Intellectual disability or physical limitations that prevented the patient to use the computer program
- Had another major mental health disorder where the primary focus was not depression
- Was having treatment with cognitive behavioral therapy, interpersonal therapy, or antidepressants (during past three months).

Instruments

Center for Epidemiological Studies Depression Scale for Children (CES-DC)

CES-DC was developed by Weissman, Orvaschel and and Padian (1980). It is a 20 items depression inventory used with children and and adolescents. Items 4, 8, 12, and 16 are scored reversely. High score on scale shows high level of depression.

Graphical Imagery Therapy (GIT) Games

Graphical imagery therapy is a visual therapy in the form of a 3D game. This 3D game is meant to facilitate cancer patients (especially children fighting against their brain tumor) by enhancing positive mental attitudes. This therapy has cognitive behavioral effects on children by helping them to recover from their psychological illnesses (Sajjad, Abdullah, Sana, and Mohsin, 2012).

Procedure

The study was conducted inside the cancer hospitals under controlled environment. Both groups were pre-tested by using CES-DC. Then a group of 30 cancer patients had to play a therapy embedded game (GIT) for one month (four- times a week) whereas rest of 30 patients (control group) did not play any video game. Then the participants were re-tested on CES-DC. The results were analyzed and compared by using SPSS (it is not an experimental study, rather quasi experimental design was used so inclusion and exclusion criteria are given. However, only in-door patients were selected (who were staying in the hospitals), consequently all were provided with the same environment. As just stage one of cancer was the focus of researcher, hence severity of symptoms was also the same. That is why almost all the variables were controlled).These patients were given a brief description about the game, its effects, and how to play it. They were asked to take part in a trial session for 5 minutes. Those who were willing to continue, they kept playing the game for 40 minutes for two days a week. Those children, who were not willing, could drop the experiment. According to Divine (2014), the amount of time one plays is also something to consider. About an hour a day is good; however, by spending too much time in playing games, persons can lose the benefits of playing. Considering 20/20/20 rule (i.e after every 20 minutes of staring at the screen, look away for 20 seconds at an object that is 20 feet away), the players played game for 20 minutes and then took rest for two minutes and then again played the game for another 20 minutes. This helped in avoiding eye strain if they were not feeling comfortable with computer screen. The players played the game from a distance of 30 cm and on horizontal angle - mostly recommended for laptops as stated by Divine (2014). During the session, if the participant was unable to continue the game because of any health issue, he/she was allowed to withdraw temporarily and the session was planned on any other time.

Results

Table 1

Alpha Reliability of the Study Variables in experimental and control groups (N = 60)

Scale	*n*	*M*	*SD*	*α*	Range		Skewness
					Potential	Actual	
Pre-GIT CES-DC	30	48.23	10.88	.86	29-76	20-80	.696
Post GIT CES-DC	30	45.73	11.12	.84	26-64	20-80	.159
Pre-Cont. CES-DC	30	47.40	10.38	.83	34-80	20-80	1.32
Post Cont. CES-DC	30	50.16	10.65	.85	30-77	20-80	.383

Note. GIT = graphic imagery therapy

Table- 1 shows that CES-DC does have reliability coefficient alpha of .86 and .83 in pre-test of GIT, and control group respectively while it has reliability coefficient alpha of .84 and .85 in posttest of the two groups respectively. This shows satisfactory to high alpha coefficients. Reliability coefficients lie between acceptable ranges. Overall, study variables have good and acceptable reliability coefficients.

Table 2

Mean Difference between GIT group and Control Group on Variable of Depression (30)

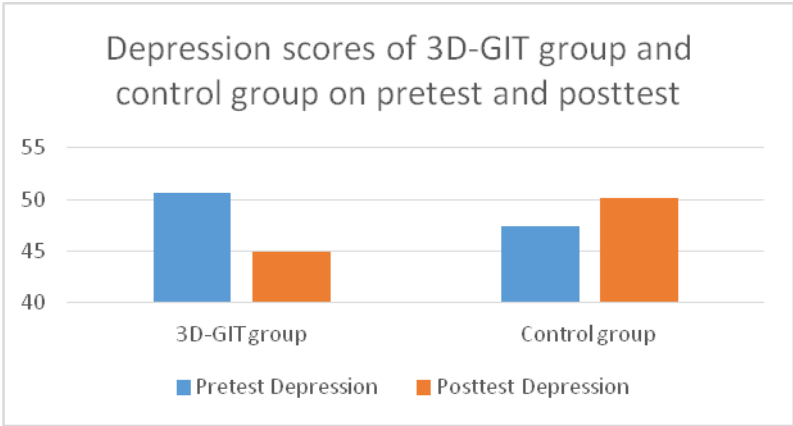
Variable	Pretest		Posttest		*t(29)*	*P*	95% CI		Cohen's d
	M	*SD*	*M*	*SD*			*LL*	*UL*	
GIT	50.7	10.23	44.93	13.59	2.08	.046	.109	11.42	0.47
Control	47.36	10.39	50.16	10.65	2.093	.045	-5.53	-.064	1.2

Note. GIT = Graphic Imagery Therapy.*p < .05.

There is a significant difference in pre and post-test results of both groups. The GIT group shows a decrease in depression scores while in control group scores increased. Results reveal that GIT game was effective in reducing the depression as compared to the control group which consisted of participants who did not play any game.

Figure 1

Bar graph of depression score on pretest and postest of control group and 3D-GIT group



The above line graph shows a slight increase of depression in posttest of control group while depression in 3D-GIT group is lesser on posttest.

Discussion

As indicated by studies that child cancer patients are at an increased risk of suffering from emotional problems (Kwak et al., 2013), the primary aim of conducting the current study was to examine the effect of game GIT on child- cancer patients. The researcher was interested to examine the impact of this game for the purpose of treatment that can be helpful in reducing depression that often accompanies cancer.

The hypothesis of the study was confirmed as results made it clear that the patients who played the GIT game showed a fewer depressive symptoms as compared to the control group patients. Results also showed significant difference in pre-test of GIT (50.7)and post-test of GIT (44.93) that showed a decrease in the level of depression, whereas in control group scores of pre-tests (47.36) and post-test (50.16) showed an increase in depression over the month studied. As stated by Cheung that GIT increases the benefits of psychotherapeutic process and chances of recovery from depression increase over a short period of time, in USAGIT is used widely by the parents and mental health professionals as a tool to increase the effectiveness of the treatment plan and boost psychological health (Cheung, 2006). Results from the previous studies supported the current work, (Li et al., 2011). After one month patients from the experimental group showed significantly fewer depressive symptoms in comparison with control group patients.

For reducing the symptoms of depression and anxiety, Sajjad and her colleagues (2014) have explained the role of 3D-GIT. By applying 3D-GIT game on tumor patients, they proved its effectiveness in treatment of anxiety and depression caused by the chronic illness of cancer.

Limitations

Present research is a significant addition in the field of psychology as it highlighted the use of video games for psychotherapeutic purposes. However the study has some limitations too. Sample size was small and sample collection areas were limited. (As all the study subjects were taken from among those who got admitted in the hospitals so all were provided with the same environment. In addition, stage one of cancer was the focus of study so severity of symptoms in the patients was also same. Therefore almost all the variables were controlled as mentioned earlier).

Recommendations

1. There is a need to continue to explore the impacts of 3D GIT games on depressive child-patients with other chronic physical diseases e-g. HIV.
2. This game has been developed and tested in Pakistan. The future studies can test and validate these games at an international level.
3. This research may serve as a base line for making other therapy- embedded games in order to develop life coping skills among young generation e-g for drug users.

Conclusion

The study compared therapeutic outcomes of 3D-GIT game among child-cancer patients. It was concluded that this game is effective in reducing depressive symptoms among cancer patients.

References

Ackweman. C. J., & Turkoski, B. (2000). Using guided imagery to reduce pain and anxiety. *Home Healthcare Nurse, 18*(8). 524-530. doi:10.1097/00004045-200009000-00010

Akhtar, F. (2007). Cancer Registration in Pakistan: Contemporary State of Affairs. *Asian Pacific Journal of Cancer Prevention, 8* (3), 452-456. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/18159986

Anguera, J. A., Gunning, F. M., & Arean, P. A. (2016). Improving late life depression and cognitive control through the use of therapeutic video game technology*:* A proof-of-concept randomized trial. *Depression and Anxiety*, *34* (6), 508-517. doi:10.1002/da.22588

Ansari, T. Z., Zaidi, A. A., Parekh, A., Iqbal, O., Masood, N., Mateen, A., & Fatima, T. (2011). Factors influencing the opinion of individuals in determining tumor spread after biopsy. *BMC Research Notes, 4*(1), 548.doi: 10.1186/1756-0500-4-548

Artilheiro, A. P. S., Almeida, F. A., & Chacon, J. M. F. (2011). Use of therapeutic play in preparing preschool children for outpatient chemotherapy. *Acta Paul Enferm, 24*(5), 611-616. doi: 10.1590/s0103-21002011000500003

Beaupre, R. (2012). Psychological aspects of coping with cancer. Retrieved from http://cpancf.com/articles_files/PsychologicalCopingCancer.asp

Ceranoglu, T. A. (2010). Video games in psychotherapy. *General Psychology, 14*(2), 141–146. doi: 10.1037/a0019439

Cheung, M. (2006). *Therapeutic games and guided imagery: tools for mental health and school professionals working with children, adolescents, and their families.* Chicago: Lyceum Books, Incorporated. ISBN: 0925065943

Chida, Y., Hamer, M., Wardle, J., & Steptoe, A. (2008). Do stress-related psychosocial factors contribute to cancer incidence and survival? *Nature Clinical Practice Oncology, 5*(8), 466– 475. doi:10.1038/ncponc1134

Dankert, A., Duran, G., Engst-Hastreiter, U., Keller, M., Waadt, S., Henrich, G., & Herschbach, P. (2003). Fear of progression in patients with cancer, diabetes mellitus, and chronic arthritis. *Rehabilitation, 42*(3), 155–163. doi: 10.1055/s-2003-40094

Eller, L. S. (1999). Guided imagery interventions for symptom management. *Annual Review of Nursing Research, 17*(1), 57-84. doi: 10.1891/0739-6686.17.1. 57

Geurts, L., Vanden, A. V., Husson, J., Windey, F., Van Overveldt, M., Annema, J., & Desmet, S. (2011). Digital games for physical therapy. *Proceedings of the Fifth International Conference on Tangible, Embedded, and Embodied interaction - TEI '11.*New York: ACM Press. doi:10.1145/1935701.1935725

Hindustan times, (2017). Video games may be a viable treatment for depression, finds study. Retrieved from https://www.hindustantimes.com/health-and-fitness/video-games-may-be-a-viable-treatment-for-depression-finds-study/story-nbvDSagqKQXPD2oyyZvEZJ.html

Holland, J. C. (2002). History of psychosocial oncology: Overcoming attitudinal and conceptual barriers. *Psychosomatic Medicine, 64*, 206–221. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/11914437

Jesus, I. Q. Borges, A. L. V., Pedro, I. C. S., & Nascimento, L. C. (2010). Opinion of adults escorting children on an outpatient chemotherapy service about a "Chemo-teca" in a municipality of Sao Paulo. *Acta Paul Enferm, 23*(2), 175-80. Retrieved from: http://www.scielo.br/pdf/ape/v23n2/en_04.pdf

Kwak, M., Zebrack, B. J., Meeske, K. A., Embry, L., Aguilar, C., Block, R., … Cole, S. (2013). Prevalence and predictors of post-traumatic stress symptoms in adolescent and young adult cancer survivors: a 1-year follow-up study. *Psycho oncology*, *22*(8), 1798–1806.doi: 10.1002/pon.3217

Li, H. C. W., Chung, O. K. J., & Chiu, S. Y. (2010). The impact of cancer on children's physical, emotional, and psychosocial wellbeing. *Cancer Nursing, 33*(1), 47-54. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/19926977

Li, W. H., Chung, J. O., & Ho, E. K. (2011). The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalized with cancer. *Journal of Clinical Nursing,15*, 2135-43doi: 10.1111/j.1365-2702.2011.03733.x

Mackay, J., Jemal, A., Lee, N., Parkin, (2006). *The Cancer Atlas*. USA: Atlanta,American Cancer Society.

National cancer institute. (2011). Surveillance, Epidemiology and End Results (SEER). Retrieved from: http://seer.cancer.gov

Pallavicini, F., Ferrari, A., Mantovani, F. (2018). Video games for well-Being: A systematic review on the application of computer games for cognitive and emotional training in the adult population. *Frontiers in Psychology, 6*, 62-72. Retrieved from https://doi.org/10.3389/fpsyg.2018.02127

Pinquart, M., & Duberstein, P. R. (2010). Depression and cancer mortality: A meta-analysis. *Psychological Medicine,40*, 1797-1810. Retrieved from http://dx.doi.org/10.1017/S0033291709992285

Prieto, J. M., Blanch, J., Atala, J., Carreras, E., Rovira, M., Cirera, E.,. . .Gasto, C. (2002), Psychiatric morbidity and impact on hospital length of stay among hematologic cancer patients receiving stem-cell transplantation. *Journal of Clinical Oncology*; *20*(7), 1907–1917. doi:10.1200/jco.2002.07.101

Ribeiro, C. A., Coutinho, R. M., Araújo T. F., & Souza, V. S. (2009). A world of procedures and worries: experience of children with a Port-a-Cath. *Acta Paul Enferm, 22*, 935-941. Retrieved from http://www.scielo.br/pdf/ape/v22nspe/en_17

Sajjad, S., Abdullah, H. A., Sharif, M., & Mohsin, S. (2014). Psychotherapy through video game to target illness related problematic behavior of children with brain tumor, *Current Medical Image Reviews, 10*, 62-72. Retrieved from https://www.ingentaconnect.com/content/ben/cmir/2014/00000010/00000001/art00008?crawler=true

Sajjad, S., Mohsin, S., Sana. F., & Abdullah, H. A. (2012). Evolving enemy avatar through categorization technique in computer game for healing*. International Journal of Information and Education Technology*, *2*(4), 338-40. doi: 10.7763/IJIET.2012.V2.146

Satin, J. R., Linden, W., & Phillips, M. J. (2009). Depression as a predictor of disease progression and mortality in cancer patients: *a meta-analysis. Cancer*, *115*(22), 5349–5361. doi:10.1002/cncr.24561

Weissman, M.M., Orvaschel, H., & Padian, N. (1980). Children's symptom and social functioning self-report scales: Comparison of mothers' and children's reports. *Journal of Nervous Mental Disorders, 168*(12), 736-740.

Wolfe, I., & McKee, M. (2014). *European Child Health Services and Systems. Lessons without borders: European Observatory on Health Systems and Policies*. doi:10.1111/j.1365-2648.1243.22220.14

Received: Feb 12, 2019
Revisions Received: Aug 30, 2019