Original Article

Remission game: A psychological support among depressive cancer patients

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Abstract

Trend to use video games in health sector is increasing day by day. Many games are designed to provide psychological support to patients suffering from chronic and progressive diseases. Remission-II game is designed to boost up the treatment process of cancer patients. Current study explored the effect of Remission Game on depressive symptoms of cancer patients. A pretest posttest approach is used to conduct this study on a sample of 60 cancer patients. All the participants were assessed with the help of Center for Epidemiological Studies Depression Scale for Children (CES-DC). Then they were randomly assigned to two equal groups, i-e control group and experimental group. 30 participants of experimental group played Remission-II game for a period of one month while the remaining 30 subjects of control group did not play any game. After a month, both groups were retested on CES-DC scale. Paired sample t-test was applied to compare the pretest and post-test scores of both groups. Results revealed significant difference in pretest and posttest results in experimental group while participants of control group revealed greater depression scores in posttest. Hence it was concluded that Remission game is an effective psychological support that can be used to decrease the depression level of cancer patients. Results of the study can be used to test the Remission game with other types of psychological problems as well.

Key words: Depression, video games, Remission-II, CES-DC, cancer patients.

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Introduction

Cancer is a generic term that is used for the group of illnesses that can affect any body part. It is a chronic illness that has adverse physical and psychological impact on the patient's health (Wolfe & McKee, 2014). Depression is a comorbid mental disorder among cancer patients which impacts the course and treatment of cancer negatively **(**Pasquini & Biondi, 2007). Depressive cancer patients have low scores on quality of life scale which again affects their will power to fight against the disease that is considered a key component of cancer treatment (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007). Even though physical pain is the absolute component of cancer, the emotional pressure due to loss of peers and inability to be

socially active, appeared quite severe. Cancer diagnosis in early childhood is the most traumatic and life-changing state for the child, parents and siblings (Eiser, 2004). This negative effect of depression on treatment of cancer makes it an important issue to be researched and resolved.

As indicated by studies that regardless of the high depression prevalence rate, 25% to 50% of depression cases remain undiagnosed, and dominate over the symptoms surveyed in the assessment of depression, i.e. anorexia, sleeplessness, loss of energy, difficulty in concentration and psychomotor retardation (Pasquini & Biondi, 2007). Most of the patients with chronic illnesses like cancer do not receive appropriate treatment for the cure of mood disorder. A failure to recognize the impact of depressive symptoms on cancer care, uncertainty in diagnosis, and lack of access to applicable mental health services all contribute to depression (Walker & Sharpe, 2014).

Untreated depression is the cause behind psychological disturbances and physiological complications in the cancer patients. Cancer patients are 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 (Prieto et al., 2002). As shown with the help of three meta-analyses that almost 19% to 34% of patients who died at the same time expressed significant depressive symptomatology (Chida, Hamer, Wardle, & Steptoe, 2008; Pinquart & Duberstein, 2010; Satin, Linden & Phillips, 2009).

Regardless of the expansions in the field of medications and presence of highly trained specialists, people still avoid visiting the doctor in case of minor complications. At the same time due to lack of awareness and motivation, patients do not follow the guidelines given by the clinicians that makes the symptoms more complex (Partridge, Kato & DeMichele, 2009).

Correspondingly, therapeutic errors by the specialists seem to be the prominent cause of death in the United States (Kohn, Corrigan & Donaldson, 1999). Video games are the innovative tools that are used to address these obstacles. Previously, games were used just for entertainment purpose, but now this technology is used to provide education and training to the people (Durkin, 2010).

The role of playful activities (development of optimistic coping strategies for treating the illnesses) for young cancer patients is vital (Artilheiro, Almeida & Chacon, 2014). As cancers come up with physical and psychological restrictions that confine the growth, in this kind of situation, games not only aid in child development but also help the patient in forgetting painful treatment procedures (Jesus, Borges, Pedro, & Nascimento, 2010).

Video games are increasingly used as an effective tool for the treatment of physical, psychological, intellectual and behavioral issues. Every game has its own design that is developed for the specific purpose to gain positive outcomes. Previous literature has confirmed that use of computerized interventions is important for the

treatment of depression and establishment of healthy therapeutic and paraprofessional support (Richards & Richardson, 2012).

In 2006, a video game Re-Mission was created by Hope Lab for young cancer patients. It is the very first game that is considered really effective for the medical treatment and positive behavior changes. In this game the player pilot, Roxxi is shown to be traveling in the bodies of the imaginary cancer patients, eliminating the cancer cells, battling with infections, and dealing with aftereffects of cancer and supports in treatment procedures.

Objective behind developing Re-Mission is to change the perception of the patients towards the illness and promote self-care and cancer- related awareness. The game provides an effective learning atmosphere in a deep-rooted extension of social learning theory that is also labeled as "self-modeling" (Dowrick, 1999). The learning model that is utilized in Re-Mission is a new, experimental extension of the self-modeling paradigm (Kehle, Bray, Margiano, Theodore, 2002).

As revealed by the previous researches, the players of Re-Mission have more serious attitude towards the prescribed treatment and have more awareness regarding the disease and self-perception. The cancer types that are shown in the game include; Adult Acute Myeloid leukemia (AML), Brain Tumor, Acute Lymphocytic Leukemia (ALL), Hodgkin's Lymphoma, Lymphoma, Ewing's Sarcoma, Non-Hodgkin's and Osteosarcoma. Game consists of 20 levels that are planned to make the cancer patient aware regarding their illness. Studies have made it clear that it has a strong impact on the biological and behavioral aspects of the cancer patients by psychologically motivating and giving them the sense of empowerment. Dr. Steve Cole, a vice president at Hope Lab gave a totally new concept in this game by connecting positive motivational factors in the human brain circuit. The Flash-based games mimic the therapy procedures in a way that it will be beneficial for the therapeutic procedures. Weapons that are used in the game comprise of chemotherapy, cancer medications and body's immune system.

Re-Mission promotes learning that includes; use of reminders, challenging tasks, instant response for the alternate responses, infinite prospects for self-initiated exercise and practice, motivational significance, and planned transfer of learning across positions and within response classes (Beale, 2005). The style, content and behavioral objectives are developed after extensive research in the U.S. This process included team of young cancer patients, oncologists, physicians, psychologists and oncology nurses (Bradlyn, Kato, Beale, & Cole, 2004). The self-care behaviors that are targeted in Re-Mission were based on the investigation of pediatric oncology nurses and findings of the significance of diverse behaviors (Prensky, 2001).

Re-Mission is developed by keeping in view the aspects given by health practitioners regarding the needs of the cancer patients who are getting cancer treatment (Bradlyn et al., 2004). The appropriateness and reliability of hypothetical game Re-Mission were explored in a previous study to find out the practicability and design of Re-Mission (Kato & Beale, 2006). The contemporary study claims

that Re-Mission is perceived to be the most credible, acceptable and worth playing game for young cancer patients. It is of great significance to examine that to what extent patient needs to be engaged in play to obtain desired outcomes. Re-Mission is considered as authentic source for the psychoeducation of the cancer patients (Ivan, Beale, Marín, Nicole, & Pamela, 2006).

There is no doubt that studies were conducted in the past to investigate the psychological and learning aspects of Remission-II games in cancer patients, however its effectiveness in treatment of depression has not been given attention. Current study is different in this aspect.

Rationale

Current study is unique because of making use of video game to examine its effectiveness in decreasing symptoms of depression in cancer patients. Internationally these games have been tested to speed up the recovery of cancer patients by enhancing their will power against the disease. However to my limited knowledge, the game has never been tested for depression-related problems in these patients. This researcher used this game to help cancer patients to get rid of depression which affects them badly. This new strategy can be used with the patients who keep on avoiding conventional psychotherapy for depression. In addition, it also opens the ways for the future researchers to develop and use video games in health sector.

Objectives

The main objective of current study was to find the psychological impact of Remission-II game among depressive cancer patients.

Hypothesis

It is hypothesized that patients in experimental group will score less on posttest of CES-DC as compared to controlled group.

Methodology

Sample

A total of 60 cancer patients participated in this study. The sample was based on the inclusion and exclusion criteria. Within the inclusion criteria, young (12-19 years) depressive cancer patients diagnosed with mild to moderate symptoms of depression were selected through purposive sampling technique from INOR Abbottabad, Shaukat Khanum Memorial Cancer Hospital Lahore, CMH Islamabad, and Shifa International Hospital Islamabad. The participants were divided into two equal groups: experimental group (n=30) and controlled group (n=30). Those subjects were excluded from the study who (a) were not skillful with computers (b) had other mental health issues (c) were suffering from advanced stage of cancer (d) were illiterate (e) or taking any other psychological treatment.

Instruments

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

CES-DC was developed by Weissmann, Orvaschel, and Padian (1980) and consists of 20 items. Items 4, 8, 12, and 16 are scored reversely. High score on scale shows a high level of depression. The CES-DC exhibits good internal reliability (α = .86) and test-retest reliability (r = .85).

Re-mission Game

The original *Re-Mission* game was released in 2006 as a Microsoft third person based game. In *Re-Mission*, the player controls an RX5-E ("Roxxi") nanobot who is designed to be injected into the human body and fight particular types of cancer and related infections such as non-Hodgkin's lymphoma and leukemia, at a cellular level. The player must also monitor patient's health and report any symptoms back to Dr. West (the in-game doctor and project leader). Each of the 20 levels is designed to inform the patient on a variety of treatments, how they function, and the importance of maintaining strict adherence to those treatments. Various "weapons" are used, such as the chemo blaster, radiation gun, and antibiotic rocket.

Procedure

Classical experimental research design based on true random assignment was used in the study. To conduct this research, only in-door cancer patients (from various hospitals) were approached. The participants were given a comprehensive information regarding aim, process, and benefits of this research. Informed consent was obtained from all participants before experiment. Those who were willing to participate in the research were selected. The study was conducted under controlled environment. All the participants were pre-tested by using CES-DC. After pre-assessment the participants were randomly assigned to two groups. Participants were contacted individually. Then 30 cancer patients played remission-II game for one month (four times a week) and the remaining 30 patients in control group did not play any game. Researcher herself installed the game in smart phones and laptops and provided these devices to the subjects who played the game under the supervision of researcher. After playing the game the participants were re-tested on CES-DC. Results were analyzed and compared by using SPSS- 25.

Results

Data were analyzed by using SPSS-25. Cronbach Alpha reliability coefficient was calculated for CES-DC. Study hypothesis was tested against data. Paired-sample t-test was calculated for both groups. Then the groups were compared for statistical significance.

Table 1: ***Alpha Reliability Coefficient of the CES-DC (N=60)***

Scale	*N*	*M*	*SD*	*α*	Range		Skewness
					Potential	Actual	
Pre-Remission	30	43.83	10.81	.85	20-80	27-68	.696
Post Remission	30	48.66	10.08	.83	20-80	25-62	-.782
Pre-Cont. CES-DC	30	47.40	10.38	.83	20-80	34-80	1.32
Post Cont. CES-DC	30	50.16	10.65	.85	20-80	30-77	.383

Note. CES-DC =Center for Epidemiological Studies Depression Scale for Children.

Table 1 shows CES-DC has reliability coefficient alpha i.e. .85 and .83 in pretest of Remission group and control group respectively while it has reliability coefficient alpha of .83 and .85 in posttest of both groups respectively. This shows satisfactory to high alpha coefficients. Reliability Coefficients lie between acceptable ranges. Overall, study has good and acceptable reliability coefficients.

In pre-tests of Remission-II, and control group the mean value is 43.83, and 47.40 respectively, while in post-test the mean values are 48.66, and 50.16 respectively. These mean values show high reporting rate of CES-DC. Standard deviation in pre-tests of Remission-II, and control group is 10.81, and 10.38 respectively, while in posttests it is 10.08, and 10.68 respectively. These standard deviation values are high which show the variability in responses.

Skewness in pre-tests of Remission-II, and control group is .696, and 1.32 respectively and in posttests the values are -.782, and .383 respectively. Positive value reveals high scores of data while negative value reveals low scores of data. It is suggested that absolute values of skewness, if less than 2 can be considered normally distributed data. Hence further analysis was done.

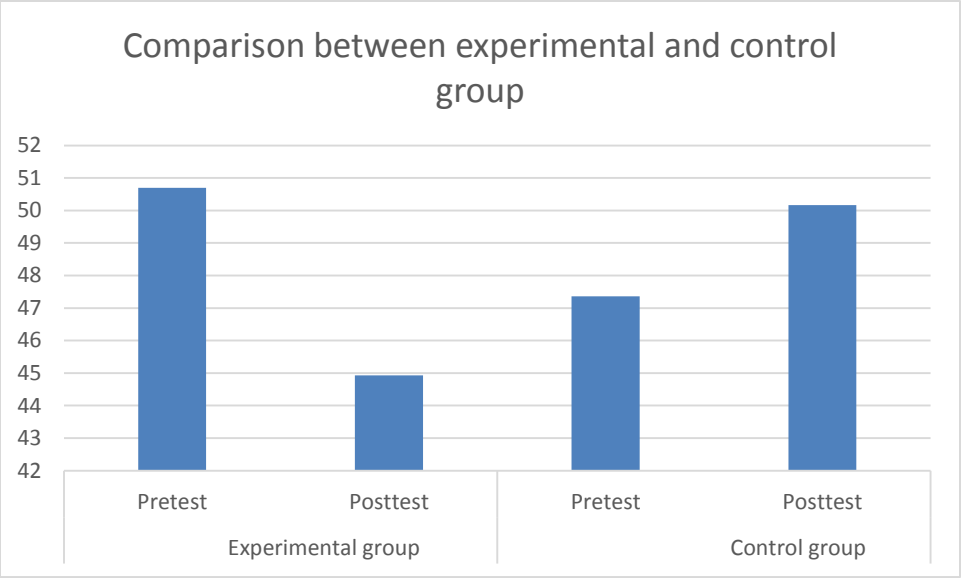
Table 2: Mean Difference between Pre and Post-Depression of Remission group, and control group (30)

	Pretest		Posttest				95%	CI	
Variable	M	SD	M	SD	t(29)	P	LL	UL	Cohen'sd
Remission	50.7	10.23	44.93	13.59	2.08	.05	.02	1.42	0.47
Control	47.36	10.39	50.16	10.65	2.093	.045	- 5.5	-.064	0.2

Table 2 shows that there is a significant difference in pre and post results of remission group. Moreover, Remission group showed a decrease in depression scores while in control group scores have increased. Results showed that Remission game reduced the depression as compared to the control group which did not play

any game (these cancer patients were not exposed to any therapy), as a result their depression went up to a significant level (see Figure 1).

Figure 1



Discussion

Current study explored the effects of remission-II game on depressive symptoms of cancer patients. Comparison was made between experimental and control groups. All the participants were pre-assessed on depression scale of CES-DC. Then participants were randomly assigned to experimental group and control group. Participants in experimental group played remission-II game while participants in control group did not play any game. It was hypothesized that participants in experimental group will score less on posttest of CES-DC. Results of the study supported this hypothesis and it was revealed that there is a significant difference in pretest and posttest scores of experimental groups i-e participants showed a decrease in depressive symptoms after playing Remission-II game. Previous studies supported the results of current study. ‘‘Re-Mission’’ showed significant improvement in adherence to prescribed medicine in comparison with the patients who are solely treated with the help of standard therapy, despite suboptimal use of the interference by most participants (Kato, Cole, Bradlyn, & Pollock, 2008). Playing game also increases the information related to cancer when patients are compared with the control group. Information-seeking behavior combined with videogame therapy results in positive effects (Beale, 2005). Studies revealed the use of therapeutic games as a treatment of depression in cancer patients. GIT game based on cognitive therapy was designed to use with cancer patients as an alternative of face to face therapy (Sajjad, Mohsin, Sana, & Abdullah, 2012). GIT game was tested against control group among depressive cancer patients revealing it

as a best strategy to fight with depressive symptoms of cancer patients (Khan, Kazmi, & Maroof, 2019). Thus previous studies clearly support the results of current work.

Conclusion

This study aimed to compare experimental and control groups of cancer patients. Results of the study supported the stated hypothesis and it was concluded that patients of experimental group showed a decrease in depression as compared to the patients of control group that did not receive any treatment. It was proved that Remission-II game is an effective strategy to use with depressive cancer patients.

Limitations, recommendations, and implications of the study

Current study is a fruitful edition in the field of psychology as it supported the use of video games with cancer patients. However it has certain limitations as well. Results of the study cannot be generalized to adults and advanced stage cancer patients. Study only focused on the depressive symptoms thus ignoring other psychological and behavioral problems of cancer patients. Current study opened the gate of research for future researchers. Future research can be conducted to test Remission-II games among patients who suffer from other chronic physical and psychological diseases.

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