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Clinical Research of the Effect of Video Games in Relieving Depression in Adolescent Leukemia Patients

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Abstract Goal: to observe if video games have a positive effect on the remission of depression in pediatric leukemia. **Method:** In a year 70 children and teenagers with leukemia were given a questionnaire about their video game affairs and were evaluated with PHQ - 9 depression scale. Experimental group was set for those with interest for electronic games, who were served with additional video games besides conventional disease nursing and psychological care. Control group was set for those without interest for electronic games who were served with no video games. Two weeks later subjects of both groups were evaluated with PHQ - 9 depression scale again and result was compared. **Result:** Subjects in experimental group showed less depressed than those in control group ($p<0.01$). **Conclusion:** Proper application of video games have a positive effect on the remission of depression in pediatric leukemia. More care and support are required in the psychological management for pediatric leukemia.

Key word: Video games, Pediatric leukemia, Depression

Leukemia has been the most common malignant disease in children and teenagers. With the improvement of treatment, better clinical outcome has been achieved while the mental health of these patients is interfered due to long term hospitalization or side effect of chemotherapy[1]. It is reported that most pediatric leukemia patients exhibit different levels of fear, as well as depression and anxiety, which have a negative impact on the patients' life quality and treatment efficiency. [2-3] In China more attention is paid in the treatment and nursing of physiological maladies while mental management and nursing is lacking. Video game is welcomed by many children and teenagers as a way to release pressure and tension. It is supposed that video games can benefit those with pediatric leukemia, who are hospitalized in boring wards all day long. Few studies have been published about the impact of video games in pediatric leukemia. Thus we designed and conducted this trial within a year, during which 70 subjects with pediatric leukemia were enrolled , grouped, interfered and evaluated. Now we report research details as follows: **Enrollment and method**

1.1 Subjects enrolled

Subjects were enrolled from May, 2016 to February, 2017. Inclusion criteria is set as: diagnosed with acute leukemia, age 12-18 years old, unlimited gender. Exclusion criteria is set as:

psychiatric history , unwillingness to join in this trial. A total of 70 subjects were enrolled with mean age of 15.5 years old, 35 subjects in experimental group(33 males + 2 females) and 35 subjects in control group(3 males + 32 females).

1.2 Intervention

The trial is conducted in Southwest hospital, Chongqing. Each subject was well informed about trial details and volunteered to join in this trial. After judged as eligible by their doctor, each subject was given a "Video game questionnaire for children and teenagers with leukemia" and a "PHQ - 9 depression scale". The video game questionnaire mainly includes: interest for video games before hospitalization, main kinds of the video games they liked, frequency they played video games, the effect of video games on their health and the desire for free video games afforded by hospital. Based on the result of video game questionnaire, 35 subjects were enrolled in experimental group and 35 subjects were enrolled in control group. Subjects in experimental group were served with additional video games besides conventional disease nursing and psychological care. Video game service is conducted as follows: For subjects who had their own digital equipments, we afforded the help to download video games(Wifi was not available in wards). For subjects who didn't have their own digital equipments, we afforded iPad with video games downloaded. Types of video games are set as developmental games and strategy games like Angry Birds and Sokoban. Subjects were informed to play video games when they felt boring or depressed. To avoid excessive video game play, subjects were asked to play video games under the supervision of their parents and medical staffs. Play time is limited in 40-50 minutes once and no more than 4 times one day[4-5].Subjects in control group received no video games. Two weeks later, subjects in both groups were evaluated with PHQ - 9 depression scale again and result was analyzed statistically.

1.3 Evaluate method

Emotion change was evaluated with Patient Health Questionnaire, 9-items Depression scale, PHQ-9. PHQ-9 consists of 9 items, each item is scored with 0～3, 27 score in total. PHQ-9 >5 is judged depressed. Scoring details: 0～4 not depressed, 5～9 slight depressed, 10～14 moderate depressed, 15～19 moderate-severe depressed, 20～27 severe depressed. The higher the score is, the more severe the depression will be [6].

1.4 Statistical analysis

Collecting rate was 100%. SPSS18.0 was used to perform statistical analysis. Paired t test was used compare the difference of score before and after intervention in each group. Independent-samples t test was used to compare the score change before and after intervention between two groups. Statistical difference is defined as $P<0.01$.

2. Result

All the 70 subjects surveyed expressed their desire for wireless network and entertainment service in wards. PHQ-9 score before and after intervention in both groups is shown in table 1. PHQ-9 score after intervention in both groups was significant lower than intervention before. The score change(remission degree) after intervention in each group is shown in table 2. The decrease degree of PHQ-9 in experimental group is significantly lower than those in control group($P<0.01$).

Table 1 Comparison of PHQ-9 score before and after intervention in eachgroup (x±s)

	Before	After	p
Exp	10.89 ± 3.92	2.00±1.31	<0.01
Con	10.34±3.51	6.51±2.53	<0.01

Table 1 Comparison of PHQ-9 score decrease(remission degree) after intervention in each group ($\bar{x}$±s))

Group	n	score decrease
Exp	35	8.89±3.03
Con	35	3.49±1.22
P value		<0.01

3.Discussion

Pediatric leukemia patients are a special group who are in the youth rebellious period. They are fragile and suffer more than peers. Under the co-effect of disability to play and learn and side effect from chemotherapy, they are prone to be depressed, anxious and solitary. Depression is a common psychological problem in pediatric leukemia. In our research the mean PHQ-9 score in these patients is 10.0, indicating most pediatric patients are depressed in different levels, which is consistent with what have been reported [1,2,][7]. Some researches have revealed that negative emotion can greatly affect the life quality of acute leukemia patients and treatments are often interrupted accompanied with adverse events like suicide [8]. Therefore timely and proper mental intervention is essential for pediatric leukemia patients to release their negative emotion, improve life quality and prognosis, increase confidence for cure of disease [9]and compliance [10]. We take video games as an intervention for pediatric leukemia patients and prove its positive effect in remission of depression compared with control group. We suppose that playing games distributes the attention of subjects by obtaining a sense of achievement when they finish goals in games [4]. With our result video games can be taken as a convenient and effective way to buffer pediatric leukemia patients' sorrow and depression.

4.Conclusion

Video games have been treated as electronic heroin by a part of teachers and patients while its' positive effect should not be ignored. Restrained play of video games can avoid the generation of addiction. Proper kind of video games and playing time can effectively reduce study pressure and negative emotion. More support and attention are needed in mental management for pediatric leukemia patients especially for medical staffs. Video games characterized with disease

knowledge and treatment process are better for pediatric leukemia patients to understand their health condition. Moreover, the sets of entertainment corner and wireless network are necessary in hospital, especially for wards hospitalized with pediatric patients.

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