A Randomized Control Trial of Guided-Imagination and Drawing-Storytelling in Children with Cancer.

Kodchakon Piasai, Sasitorn Phumdoung, Wantanee Wiroonpanich , Thirachit Chotsampancharoen*

Abstract: Hospitalized school-age children with cancer are confronted with stressful and life-threatening situations which can cause them unhappiness, tension, and stress. This randomized control trial investigated the effects of guided-imagination and drawing-storytelling on the happiness, relaxation, and salivary cortisol levels among hospitalized school-age children with cancer. Participants were randomly assigned to the experimental group (n=20) or the control group (n=20). The participants in the experimental group received guided-imagination for 30 minutes, followed by 30 minutes of drawing-storytelling, while the participants in the control group received only usual care. The Happiness Face Scale was used for measuring happiness and the Relaxation Scale was used for measuring relaxation. Saliva was also collected for testing cortisol levels. Descriptive and inferential statistics were used to analyze the data.

The results showed that the experimental group receiving guided-imagination and drawing-storytelling had statistically significant increased happiness and relaxation scores over time, compared to the control group. Even though cortisol levels decreased throughout the study, there were no significant differences between the two groups. These results demonstrate that guided-imagination and drawing-storytelling can enhance happiness and relaxation levels but may not decrease salivary cortisol levels. Thus, it is recommended that nurses provide the guided-imagination and drawing-storytelling to pediatric patients to increase their happiness and relaxation.

Pacific Rim Int J Nurs Res 2018; 22(4) 386-400

Keywords: Cancer, Children, Cortisol, Drawing-storytelling, Guided imagination, Happiness, Relaxation

Received 15 May 2017; Accepted 6 March 2018

Introduction

Cancer affects both the physical and emotional aspects of children, including procedures and treatments which cause stressful, life-threatening[1] and long-term hospitalization.[2] Children with cancer also may experience severe suffering from the lifelong damage from cancer and treatments compared to children with other chronic diseases.[3]

The existing interventions that have attempted to help hospitalized children with psychological distresses

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(anxiety, depression, stress, negative emotions)[4-5] are play activities or therapeutic play,[6] and/or psychological preparation.[5] Music intervention has been used for improving psychological distress (stress, distress, depression, anxiety),[7] negative emotions as moods,[8] and physical signs and status (pain, heart rate, respiratory rate).[9] In addition, play activities can decrease the stress of children aged 7-11 years, but cannot decrease stress in younger children (age < 7 years).[10] Moreover, playing computer games can reduce the distress behavior in children who receive an injection.[11] Such studies show some or no benefits[10] from the interventions on psychological and physical status. This reflects that only one intervention might have little effect on psychological and physical status of people.

There are many activities to help children experience good feelings and emotions no matter if those children are healthy or sick. The activities that are most appropriate for children include play, such as playing with play-dough, doing art (painting) and crafts, playground activities, reading stories or tales, playing computer games[12] and listening to music.[13] Another way that makes children happy is imagining a previous fun experience as the imagination can help a person to recall a memory of happiness.[14] Although there are many negative effects of cancer on children, there are rarely recent published studies identifying methods to help children with cancer to feel happy, relaxed, or at least provide the activities that help children with cancer to recover a sense of normalcy in experiencing some happiness, relaxation and relief from stress.

From those interventions that have inconsistencies in the results;[12-14] only providing one intervention may result in limited effects on psychological and physical status. Therefore, a combination of interventions may produce more benefit. Thus, this study attempted to test the effects of guided-imagination and computer drawing-storytelling on happiness, relaxation, and cortisol levels to help school-age children with cancer to experience happiness, relaxation and a reduction in cortisol levels.

Conceptual framework and related literature

Music therapy and therapeutic play were used to guide this study, which was supported by a holistic philosophy (body-mind interaction).[15] The body-mind interaction was used to explain the effects of the interventions (GIM followed by computer drawing-storytelling) on happiness, relaxation, and cortisol levels. When people encounter a deleterious situation, the reactions include stress responses in the brain (hypothalamus and pituitary) and body reactions which involve the hypothalamic-pituitary-adrenal axis (HPA-axis).[16] Stress reaction involves the hypothalamus secreting corticotropin-releasing hormone (CRH), which stimulates the pituitary gland to secrete adrenocorticotropic hormone (ACTH). This in turn stimulates the adrenal cortex to release the cortisol hormone.[16]

The interventions of this study involved using imagination to help children recall a situation that impressed them. Guided-imagination aims to promote a child's ability to use their imagination.[17] Moreover, imagination empowers children to engender the events that have happened in the past as happiness.[18] Furthermore, the imagination stimulates positive moods, for example, happiness and relaxation.[19] Another intervention that is a component of GIM is classical music without lyrics. There are limited reports of music acting to lower stress, but only one study showed that music could reduce stress regarding decreasing cortisol levels.[20] The energy of sound goes to the primary auditory cortex and is processed in the amygdala[21] that causes the pituitary gland to secrete the endorphin hormone which results in signals of positive feelings as happiness and relaxation.[22] Music also activates the interaction of the thalamus with the HPA-axis, and can induce children to relax;[21] especially classical music without lyrics and with a beat of 64-70 beat/min in the levels of sound of 45-50 decibels can cause persons to become more relaxed.[23] Previous studies showed that music can reduce stress,[24] which is reflected by decreasing cortisol levels.[7] Furthermore, music has an effect on the hippocampus which is related

to long-term memories and positive emotions, such as, pleasure and happiness.[25]

Feelings and physical signs are peoples' responses to relaxation. The physical signs are heart rate, respiratory rate, and blood pressure[26] and the physiologic measurement of relaxation includes heart rate, respiratory rate, blood pressure, and oxygen saturation. For oxygen saturation, relaxation through using yoga can help people to reduce their metabolism[27] and reduce oxygen use as well, thus, children who feel relaxed will use less oxygen so more oxygen will be in their blood circulation compared to those who are not feeling relaxed.[27]

Computer drawing-storytelling as therapeutic play has effects on happiness, relaxation, and cortisol levels by distracting children from situations of suffering in a hospital, and provides the experience of enjoyable events, as well as helping children to focus on play activities and feel relaxed.[28] *Playing with storytelling* stimulates creativity and imagination and is a tool for improving happy memories, and helps children to cope with stress or difficult situations, which is reflected by lowering cortisol hormone levels.[29] Furthermore, these processes demonstrate that happiness, relaxation, and lower stress can have positive effects on each other. The conceptual framework of this study, the effects of GIM followed by computer drawing-storytelling, is presented in **Figure 1**. The hypothesis of this study was that school-age children with cancer who received guided-imagination and computer drawing-storytelling would have significantly higher happiness and relaxation scores, and lower cortisol levels than those who received usual care.

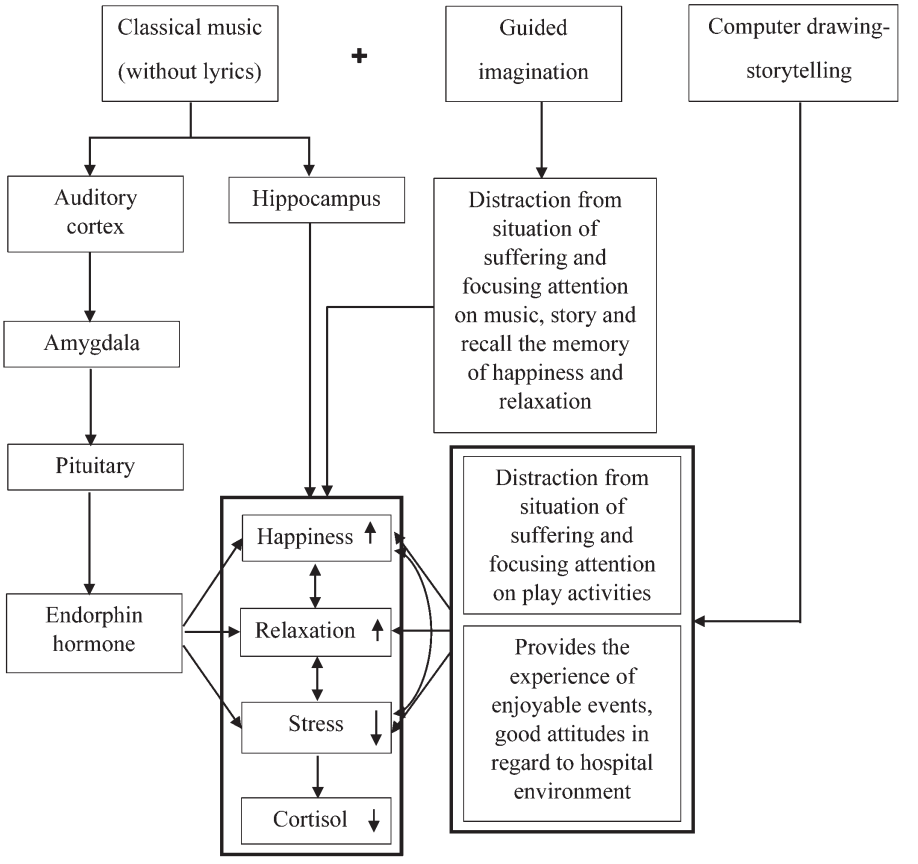

Figure 1 Conceptual framework of the study.

Methods

Design: A randomized control trial RCT.

Sampling: Purposive sampling was used to select the participants. According to the meta-analysis of therapeutic play in children, the effect size for therapeutic play on psychological and physical aspects is 0.80.[30] Therefore, this study used the effect size of 0.80 and power of 0.80 for calculating the sample size by using the Cohen sample size table for the mean comparison.[31] Finally, the sample size was 20 participants for each group, thus the total of both groups were 40 participants. The inclusion criteria were: school-age children aged 6-12 years with cancer, undergoing a supportive or curative treatment course, had been treated with radiotherapy or chemotherapy at least once, and had normal sight, hearing, and speaking. Exclusion criteria were: children with brain cancer as this impacts on the hypothalamus and pituitary gland, and children who received steroid drugs, children with cancer who also had an endocrine disorder, such as Addison's disease which causes decreased levels of cortisol or Cushing's syndrome which causes increased levels of cortisol.[32]

After the parents signed the consent form and the children had signed the assent form, the participants were randomly assigned into either the experimental or control groups. Simple randomization was employed in this study until 20 participants had been obtained in each group. The study was conducted from May to July 2017 in the pediatric ward at a university hospital in the south of Thailand, which is the cancer center for children.

Ethical considerations

This study was approved by the Institutional Review Board, Faculty of Nursing (Code: NREC 0521.1.05/543) and Faculty of Medicine (Code: REC 60-106-19-6), Prince of Songkla University, Thailand. The nurses checked for eligible samples before allowing the primary investigator (PI) to approach them. The PI asked for permission from the participants and their guardians before conducting the study. The decision to participate or not in this study depended on the willingness of participants and their guardians. They could withdraw from this study at any time without any effect on the level of care and treatment that they would normally receive from the hospital.

Instruments:

Demographic characteristics and the illness history of the participants contained age, gender, religion, education, diagnosis, treatment, side effects of treatment, and comorbidity.

The Happiness Face Scale was used to measure the level of happiness which the PI modified from the Faces Scale.[33] The PI asked for permission from the owner of this scale before modifying it. The seven faces on the original Face Scale for measuring happiness have the same eyes, different levels of smile, with no explanations for the emotion of each face (distinguished by using the alphabet from A to G). Thus, the PI modified this Scale by adding details of emotion to the face pictures, such as, adding extra characteristics to the eyes, and to the mouth or smile. Moreover, the PI added an explanation for each face to help children understand the meaning of each face and to make it easier to decide which face picture was close to or similar to their feeling of happiness.

The Happiness Face Scale had a single item question: "What is your feeling of your level of happiness (which means favorite, satisfied, or joyful or comfortable)?." The participants could answer by selecting a face picture that was close to their feeling of happiness from the Happiness Face Scale (**Figure 2**). The rating of happiness scores consists of: most unhappy is 0, very unhappy is 1, a little unhappy is 2, indifferent is 3, a little happy is 4, very happy is 5, and most happy is 6. The lower the scores reflect the lower the happiness while the higher the score the higher the levels of happiness.

Figure 2 Happiness Face Scale.

Relaxation Scale and vital signs representing relaxation (heart rate, respiratory rate, blood pressure, and oxygen saturation) could be used to measure the levels of relaxation.[25] This study used both vital signs representing relaxation and a self-report of relaxation using a Relaxation Scale modified by the PI from the Emotional Literacy Support Assistant (ELSA) relaxation thermometer scale,[34] with permission.

The original relaxation scale does not fully explain the face pictures that represent the feelings of relaxation; in addition, it is difficult to identify the faces and the thermometer scale that represent the feelings of relaxation. Moreover, the higher score represents anger while the lower score represents deeply relaxation which it might not suitable, and the reliability of the instrument was not reported. Therefore, the PI modified the scores by switching and changing the face pictures that represent the feelings of relaxation.

The feeling of relaxation could be measured using one questionnaire by asking the question "What is your feeling of your level of relaxation (which means independence from pressure or stress)?." Participants could select the answer from the picture which was similar to their feeling of relaxation that demonstrated their overall feeling of relaxation from the Relaxation Scale (**Figure 3**).

Figure 3 Relaxation Scale.

The equipment for the assessment of vital signs representing relaxation was the same equipment used on the ward: a sphygmomanometer for measuring blood pressure, a pulse oximeter for measuring pulse rate and oxygen saturation, and a watch for counting respiratory rates. These instruments had been calibrated yearly using a standard and the certificates were still current.

The salivary cortisol levels were measured by Electrochemiluminescent immunoassay (ECLIA). The steps of salivary cortisol assay were: (1) saliva was collected no earlier than 30 minutes after eating or drinking, (2) a synthetic swab was chewed for 2 minutes then it was spat out and put into a saliva tube, (3) specimens were kept in a refrigerator (2-8°C) until 3 specimens per participant had been collected, and (4) specimens were sent to the laboratory for assay. Salivary cortisol is reported in nmol/L.

The content validity of both the Happiness Face Scale and Relaxation Scale had been verified by three experts and the Content Validity Index (CVI) were 0.98 and 0.99 respectively. Moreover, one hour test-retest reliability of the Happiness Face Scale (Cronbach's Alpha = 0.86) and Relaxation Scale (Cronbach's Alpha = 0.82) had been tested in 20 hospitalized school-age children with cancer at a central hospital in southern Thailand by the PI. For the measurement of cortisol levels, the standard test control of the laboratory technique consisted of four tests for calibration and two tests for the control test per 100 tests undertaken by a medical laboratory scientist. In this study a calibration test and control was performed 2 times per 120 tests.

Instrument for Interventions: The instruments for the interventions were a compact disc (CD) for guided-imagination with classical music (GIM) and a computer tablet with a sketch application for drawing. The CD for guided-imagination contained classical music without lyrics (a soft soothing music with 64-70 beats/min) mixed with a guided imagination story. The three stories used were stories that had made children feel happy in the past. The three stories were: "go to the sea," "go to the zoo," and "a walk in the park" in which participants could select one of the three stories to guide their imagination. The GIM and the computer tablet with a sketch application were approved by the three experts.

Intervention procedure

In the experimental group, the participants received GIM for 30 minutes followed by computer drawing-storytelling for 30 minutes by the researcher as well as receiving usual care from the ward. The GIM CD consisted of classical music in conjunction with the woman's voice as suggestion for participants to use their imagination and it was used for 30 minutes with a volume of 45-50 decibels and earphones were used for listening. For the participants in the control group, they received the usual care (the standard care for pediatric patients on the ward consisted of providing any treatments, procedures, and nursing care to children with cancer normally given during hospitalization). The data collection for the experimental group were: pretest (time 1), before starting the intervention at 09.00 a.m.; time 2, immediately after finishing the intervention (GIM and computer drawing-storytelling) at 10.00 a.m.; and time 3, 1 hour after finishing the intervention at 11.00 a.m.. For the control group, data collection was conducted at the same three time points as in the experimental group without any intervention. The recruitment and flow of participants through the study is shown in **Figure 4**.

Data analysis

Information about demographic characteristics and the illness history of the participants were analyzed by using means, standard deviations (SD), frequencies, percentages, chi-squares and *t*-tests. The hypothesis was tested using repeated measures ANOVA (RM-ANOVA). Moreover, as the salivary cortisol levels were not normally distributed, the Friedman test was used to determine the differences at each time point within the group and Wilcoxon Signed-Rank test

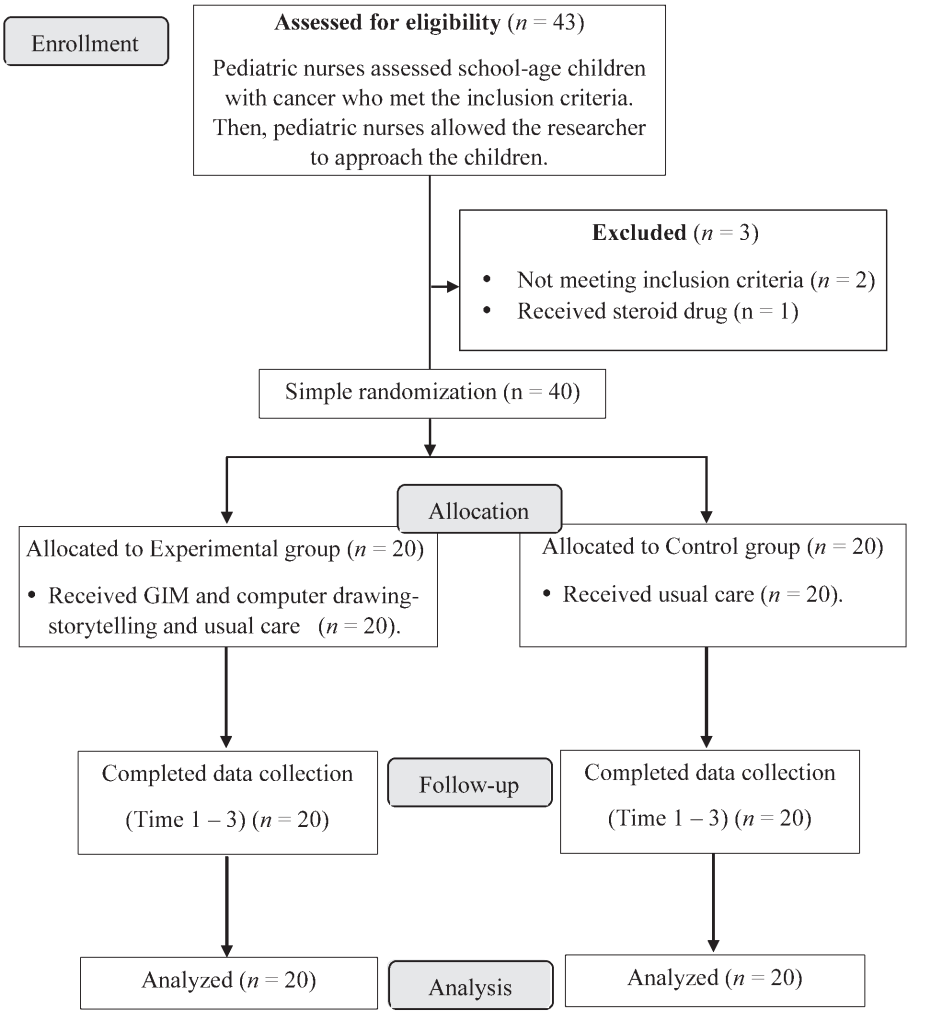

Figure 4 The recruitment and flow of participants through the study.

was used for testing the difference in each data point between the two groups.

Results

Demographic data and the illness history of participants

The mean ages of participants in the experimental and control groups were 9.6 years (*SD*=2.04) and 8.95 years (*SD*=2.31) respectively. Both groups consisted of boys and girls. The religion of the participants were Buddhist and Islamic. Moreover, the education of the participants in both groups was similarly distributed from kindergarten to grade 7. Likewise, in regards to diagnosis and treatment, most participants in both groups had been diagnosed with leukemia and were undergoing chemotherapy. Overall, the characteristics of the participants in both groups were not significantly different as shown in Table 1.

Table 1 Comparison of Demographic Data and the Illness History of Participants in the Experimental and Control Groups.

Characteristics	Experimental group (n = 20)	Control group (n = 20)	t/ χ^2	p-value
Mean age (years, *SD*)	9.6(2.04)	8.95(2.31)	0.945	.351
Gender, n(%)			0.417	.519
Boy	11(55.0)	13(65.0)		
Girl	9(45.0)	7(35.0)		
Religion, n(%)			0.902	.342
Buddhist	11(55.0)	8(40.0)		
Islamic	9(45.0)	12(60.0)		
Education, n(%)			0.902	.342
Kindergarten to grade 3	9(45.0)	12(60.0)		
Grade 4 to 7	11(55.0)	8(40.0)		
Diagnosis, n(%)			0.000	1.000
Leukemia	9(45.0)	9(45.0)		
Other types of cancer	11(55.0)	11(55.0)		
Treatment, n(%)			0.196[a]	.658
Chemotherapy	18(90.0)	16(80.0)		
Other therapies	2(10.0)	4(20.0)		
SE of treatments, n(%)			0.100	0.752
0-1 sign	10(50.0)	11(55.0)		
more than 1 sign	10(50.0)	9(45.0)		
Comorbidity, n(%)			0.000[a]	1.000
No	19(95)	19(95)		
Yes	1(5)	1(5)		

Note. a = Continuity correction Chi-Square; SE = side effect

Effectiveness of GIM and computer drawing-storytelling

The results on RM-ANOVA showed that the participants in the experimental group had a statistically significant difference in the mean scores of happiness and relaxation between two groups and time also had a statistically significant effect on happiness and relaxation (Table 2). The mean scores of happiness and relaxation in the experimental group were statistically significant higher than those in the control group (p < .001) (Table 3) while at pretest (time 1) there was no statistically significant difference between the two groups. Moreover, the vital signs representing relaxation (heart rate, respiratory rate, and systolic and diastolic blood pressures) of the participants in the experimental group also were statistically significantly decreased between the groups. For the time effect only, heart rate, respiratory rate, and diastolic blood pressure were significantly lower than those in the control group while systolic blood pressure was not significant between the time. In addition, for oxygen saturation, there was no significant difference between both group and time (**Table 2**).

In regards to the pairwise comparisons of happiness and relaxation in the experimental group, the results demonstrated a statistically significant higher mean score of happiness and relaxation between time 1 and time 2 (p < .001), time 1 and time 3 (p < .001) however, for time 2 and time 3,

Table 2 RM-ANOVA for Happiness, Relaxation, and Vital Signs Representing Relaxation Between Subjects and Within Subjects (N = 40)

Source	SS	df	MS	*F*	*p*
Happiness					
Between subjects					
Within group (error)	78.00	38	2.05		
Group	83.33	1	83.33	40.60	.000
Within subjects					
time x within group (error)	34.00	76	.45		
Time	32.47	2	16.23	36.29	.000
Group x time	44.87	2	22.43	50.15	.000
Relaxation					
Between subjects					
Within group (error)	74	38	1.96		
Group	70.53	1	70.53	35.98	.000
Within subjects					
time x within group (error)	29.70	76	.39		
Time	27.45	2	13.73	35.12	.000
Group x time	31.52	2	15.76	40.32	.000
Vital signs representing relaxation					
Heart rate					
Between subjects					
Within group (error)	22012.77	38	579.28		
Group	3328.53	1	3328.53	5.75	.022
Within subjects					
time x within group (error)	1523.83	76	20.05		
Time	175.22	2	87.61	4.37	.016
Group x time	1027.62	2	513.81	25.63	.000
Respiratory rate					
Between subjects					
Within group (error)	664.73	38	17.49		
Group	73.63	1	73.63	4.21	.047
Within subjects					
time x within group (error)	121.87	76	1.60		
Time	48.20	2	24.10	15.03	.000
Group x time	67.27	2	33.63	20.98	.000
Systolic blood pressure					
Between subjects					
Within group (error)	6902.50	38	181.65		
Group	1748.03	1	1748.03	9.62	.004
Within subjects					
time x within group (error)	1932.80	76	25.43		
Time	65.22	2	32.61	1.28	.283
Group x time	831.32	2	415.66	16.34	.000

Note. RM-ANOVA = Repeated measures ANOVA

Table 2 RM-ANOVA for Happiness, Relaxation, and Vital Signs Representing Relaxation Between Subjects and Within Subjects (N = 40)(continued)

Source	SS	df	MS	*F*	*p*
Diastolic blood pressure					
Between subjects					
Within group (error)	5934.67	38	156.18		
Group	832.13	1	832.13	5.33	.027
Within subjects					
time x within group (error)	1110.63	76	14.61		
Time	91.02	2	45.51	3.11	.050
Group x time	331.02	2	165.51	11.33	.000
Oxygen saturation					
Between subjects					
Within group (error)	174.27	38	4.59		
Group	8.53	1	8.53	1.86	.181
Within subjects					
time x within group (error)	48.83	55.55	.88		
Time	4.017	1.46	2.75	3.13	.067
Group x time	3.82	1.46	2.61	2.97	.075

Note. RM-ANOVA = Repeated measures ANOVA

Table 3 The Comparison of the Mean Scores of Happiness, Relaxation, and Vital Signs Representing Relaxation Between the Experimental and Control Groups at Time 1, Time 2, and Time 3 (N = 40)

Data point (Time)	Experimental group Mean (SD)	Control group Mean (SD)	t	df	*p*
	Happiness				
1	2.60 (0.68)	2.60 (0.99)	0.000	38	1.000
2	5.20 (0,95)	2,30 (1,22)	8.390	38	0.000
3	4.70 (1.08)	2.60 (0.94)	6.555	38	0.000
	Relaxation				
1	2.85 (0.75)	2.70 (0.73)	0.642	38	0.525
2	5.05 (1.05)	2.45 (1.19)	7.323	38	0.000
3	4.75 (1.02)	2.90 (0.91)	6.048	38	0.000
Vital signs representing relaxation					
	Heart rate				
1	104.85 (14.67)	107.20 (13.69)	-0.524	38	0.603
2	95.65 (15.56)	111.35 (13.38)	-3.421	38	0.002
3	96.65 (15.64)	110.20 (13.06)	-2.975	38	0.005
	Respiratory rate				
1	26.10 (2.71)	25.60 (2.64)	0.590	38	0.558

Table 3 The Comparison of the Mean Scores of Happiness, Relaxation, and Vital Signs Representing Relaxation Between the Experimental and Control Groups at Time 1, Time 2, and Time 3 (N = 40) (continued)

Data point (Time)	Experimental group Mean (SD)	Control group Mean (SD)	t	df	*p*
2	22.80 (2.93)	25.80 (2.67)	-3.385	38	0.002
3	23.90 (2.20)	26.10 (2.55)	-2.921	38	0.006
	Systolic blood pressure				
1	112.70 (9.83)	112.95 (8.58)	-0.086	38	0.932
2	104.95 (9.61)	117.10 (8.39)	-4.260	38	0.000
3	106.80 (9.82)	117.30 (5.99)	-4.083	38	0.000
	Diastolic blood pressure				
1	67.60 (6.90)	68.50 (9.09)	-0.353	38	0.726
2	62.95 (5.81)	68.90 (8.84)	-2.515	38	0.016
3	62.35 (6.91)	71.30 (8.99)	-3.530	38	0.001

there was no statistically significant difference. On the other hand, in the control group in each pair of data points, the findings demonstrated that there were no statistically significant differences among the times.

The results of vital signs representing relaxation in the experimental group showed a statistically significant lower mean score of respiratory rate, systolic and diastolic blood pressure between time 1 and time 2 (respiratory rate $p < .01$; systolic blood pressure $p < .05$), time 1 and time 3 (respiratory rate $p < .05$; diastolic blood pressure $p < .05$), nonetheless, for time 2 and time 3, there was no statistically significant difference. In the control group, there were not statistically significant lower mean scores of the vital signs representing relaxation among the times.

In regards to the salivary cortisol levels, the Friedman test demonstrated that there were statistically significant decreases in the mean ranks of salivary cortisol levels throughout the study in each group. The mean ranks of salivary cortisol levels between the experimental and control groups at time 1 were 2.65 and 2.55 nmol/L ($p < .001$ in both groups), at time 2 were 1.73 and 2.10 nmol/L ($p < .001$ in both groups), and at time 3 were 1.63 and 1.35 nmol/L ($p < .001$ in both groups) respectively. However, for the comparison of the mean ranks between the groups, the Wilcoxon Signed-Rank test demonstrated no statistically significant differences between the two groups at each data point.

Discussion

The results demonstrate that school-age children with cancer who received GIM and computer drawing-storytelling had significantly higher scores for happiness, relaxation, and lower levels of vital signs representing more relaxation, except for oxygen saturation. In addition, time extended the effects of the intervention which was demonstrated by the happiness and relaxation scores being higher 1 hour after finishing the intervention than before receiving the intervention. Furthermore, the participants demonstrated decreasing cortisol levels throughout the study in each group but there were no differences between the two groups.

There are a number of reasons that support these positive study results which include the characteristics and the techniques of GIM and the development of school-age children. The characteristics of GIM consisted of listening to guided-imagination for 30 minutes which was only classical music without lyrics for 10 minutes (first 5 minutes and last 5 minutes). *For classical music without lyrics,* a soft soothing music

with 64-70 beats/min under a volume of 45-50 decibels was used to make the children feel relaxed[23] as these characteristics of classical music can lead school-age children to express the feelings of happiness and relaxation.

Moreover, the GIM techniques included the school-age children being in a reclining position, paying attention to their breathing, and then focusing on the music and story that they were listening to. Both the characteristics and the techniques of GIM caused the participants to feel comfortable or relaxed and happy. For example, three participants felt as if they were half-asleep or in a dreamy state, like they were reliving their past experiences at the sea as they said, "I felt dozy", "I felt like I was back traveling to the sea again", and "I felt comfortable". These statements meant that the participants could recall a situation of happiness and relaxation from the past owing to the GIM.

Furthermore, according to school-age children's development, children in this period have high levels of imagination and their feelings and emotions are changing rapidly. The feelings and emotions of school-age children can change depending on the situation that they are confronted with. According to Piaget's cognitive stages,[35] school-age children's thinking is in the current place and present situation, however they can link their thinking and imagination to previous experiences that made them feel happy. Thus, receiving the activities like GIM and computer drawing-storytelling caused the participants to feel happy and relaxed.

The results of this study, increasing of happiness and relaxation, are consistent with other studies; music has a performance effect on increasing of happiness.[36] In a similar way, a previous study reported that guided progressive relaxation had positive effects on the feeling of relaxation.[37] There was not only the feeling of relaxation but also the vital signs representing relaxation that showed good results. The results of this study were not significant with regards to oxygen saturation levels as the participants of this study did not have respiratory problems, however, previous studies in patients with chronic obstructive pulmonary disease have demonstrated increased oxygen saturation.[37]

For salivary cortisol levels, the mean ranks of the salivary cortisol levels in both groups significantly decreased across the study; however, there were no differences between the two groups. This study used music at the beginning for 5 minutes and again at the end for 5 minutes, in which this was not long enough to lower cortisol levels as one study showed that using music for 2 hours could lower cortisol levels.[38] Also, the decreasing cortisol levels in this study might be due to the decreasing pattern of the secretion of cortisol levels over the day.[39] However, it was supported by the previous studies in that listening to relaxation music for 20 minutes among postoperative patients did not significantly lower cortisol levels[40] which was consistent with this study.

Limitation

This study was not blind for data collection which might cause unconscious bias. Moreover, this study had a small sample size which might not suitable for generalization. Thus, further study should be conducted in other parts of Thailand, such as in the northern, northeastern, and middle part of Thailand to confirm the study results and to find the appropriate guided imagination, especially stories to use in the program due to the influence of different cultural ways or life practices on the results.

Conclusion and Implications for nursing practice

GIM with computer drawing-storytelling can enhance happiness and produce good effects on the vital signs (heart rate, respiratory rate, systolic blood pressure, and diastolic blood pressure, except for oxygen saturation) that represent relaxation. However, the study interventions may not have had an effect on decreasing salivary cortisol levels.

Pediatric nurses can use the GIM and computer drawing-storytelling for promoting happiness and relaxation of children with cancer.

Conflict of interest

None declared.

Acknowledgments

The researchers would like to thank the Graduate School, Prince of Songkla University for the funding of the data collection of the study. We also would like to thank the children who participated in this study and the nurses who helped to screen the children for inclusion in the study.

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การวิจัยแบบทดลองของการส่งเสริมจินตนาการและการวาดรูปและการเล่าเรื่องในเด็กป่วยโรคมะเร็ง

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บทคัดย่อ: เด็กวัยเรียนที่ป่วยด้วยโรคมะเร็งจะเผชิญกับความเครียดและภาวะคุกคามต่อชีวิต ทำให้เด็กไม่มีความสุข เกิดความตึงเครียดและความเครียด การศึกษาแบบทดลองนี้มีวัตถุประสงค์เพื่อศึกษาผลของการส่งเสริมจินตนาการและการวาดรูปและการเล่าเรื่อง ต่อความสุข ความผ่อนคลาย และระดับคอร์ติซอลในเด็กวัยเรียนที่ป่วยด้วยโรคมะเร็งขณะนอนรักษาตัวในโรงพยาบาล กลุ่มตัวอย่างได้รับการสุ่มเข้ากลุ่มทดลอง (20 คน) และกลุ่มควบคุม (20 คน) กลุ่มทดลองได้รับกิจกรรมการส่งเสริมจินตนาการ 30 นาที ตามด้วยการวาดรูปและการเล่าเรื่องอีก 30 นาที ส่วนกลุ่มควบคุมได้รับการรักษาพยาบาลตามปกติ เครื่องมือที่ใช้ในการวัดระดับความสุขคือ Happiness Face Scale และเครื่องมือที่วัดระดับความผ่อนคลายคือ Relaxation Scale รวมทั้งเก็บน้ำลายเพื่อวัดระดับคอร์ติซอล ข้อมูลวิเคราะห์ด้วยสถิติเชิงบรรยายและสถิติอ้างอิง

ผลการศึกษาพบว่ากลุ่มทดลองซึ่งได้รับการส่งเสริมจินตนาการและการวาดรูปและการเล่าเรื่องมีระดับคะแนนความสุข และความผ่อนคลายเพิ่มขึ้นกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ อย่างไรก็ตามถึงแม้ว่าระดับคอร์ติซอลลดลงแต่ไม่มีความแตกต่างระหว่างสองกลุ่ม ผลการศึกษานี้แสดงให้เห็นว่าการส่งเสริมจินตนาการและการวาดรูปและการเล่าเรื่อง สามารถส่งเสริมความสุขและความผ่อนคลายแต่อาจจะไม่สามารถลดระดับคอร์ติซอลได้ ดังนั้นพยาบาลจึงควรใช้การส่งเสริมจินตนาการตามด้วยการวาดรูปและการเล่าเรื่องให้ผู้ป่วยเด็กฟังเพื่อให้ผู้ป่วยเด็กมีความสุขและผ่อนคลาย

Pacific Rim Int J Nurs Res 2018; 22(4) 386-400

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