Impact of Innovative Nurse - Led Therapy on Biopsychological Determinants of Children with Cancer in Selected Hospital- A Pilot Study

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Abstract:

Objectives: To evaluate the effectiveness of Innovative Nurse-Led Therapies namely Digital storytelling and laughter therapy on the level of pain, fatigue, and anxiety in children with hematological cancer since nurses are on the forefront to assess, care and intervene children with cancer facing multidimensional issues in order to adapt positively to the disease. **Methodology:** A True experimental pretest post test control group design was adapted for this study with a sample of 15 children attending the pediatric oncology unit for treatment of hematological cancers were included. The data collection was done using the standardized tools for pain, fatigue, and anxiety in pre and post test along with demographic and clinical variables during the pretest phase. Descriptive and Inferential statistics was used to analyze the collected data. **Results:** The children 60-80% of hematological cancer were between 5-7 years of age irregularly attending school, admitted more than thrice to the unit for therapy. The DST had marked effect on level of pain and anxiety among children in interventional group1. The Laughter therapy showed statistically significant changes in post test in level of pain and anxiety in children in interventional group 2. **Conclusion:** It was revealed that almost all children admitted with hematological cancer had level of pain, fatigue and anxiety in a moderate to severe on pretest assessment which had reduced after DST and laughter therapy interventions

Keywords: Children, Hematological cancer, Digital storytelling (DST), Laughter therapy, pain, fatigue, and anxiety

Introduction:

Hematological cancers are cancers that affect the blood cells, bone marrow, and lymph nodes. Depending on the type of cel involved, they are categorized as leukemia, lymphoma, or myeloma. These three forms of cancer are linked by the immune system, and a condition that affects one usually also affects the others. Childhood cancer is more pronounced in children ages 0 to 4 years and adolescent's ages 15 to 19 years; lymphoma occurring more commonly in adolescents. In children, two forms of hematological cancers they are acute lymphoblastic leukemia (ALL) and acute myelogenous leukemia (AML). The most prevalent type of pediatric cancer is ALL, which has an annual incidence of three to four cases per one Lakh population people. (Marilyn JH and David W, 2015).

Ionizing radiation exposure, cancer-causing medications, radioactive substances, immunosuppressive treatments, and infections like the Epstein-Barr virus are among the known risk factors. Most children with hematological cancers are expected to survive into adulthood with access to contemporary cancer treatments; with a 5-year survival rates for those diagnosed before age 20 exceeding 80%. (Siegel RL, Miller KD, Jemal A., 2020). More than half of newly diagnosed instances of childhood cancer are lymphomas and leukemias. Despite significant improvements that have brought in the medical field, the overall survival rate from 10% to around 90% today, the survival rate is still substantially lower for many uncommon tumors.

Indian Cancer Society (2022) stated that each year, globally childhood cancer has been often diagnosed

in close to 3 Lakh children. Every year, there are around 50,000 new cases of pediatric cancer in India. According to national cancer registry programme (NRCP) 13,32,207 cancer cases were reported in India from 2012 to 2019, which represents 7.9% of all cancer cases and with 11.5 million Disability Adjusted Life Years, cancer ranks ninth among all causes of death in children aged 5 to 14 years. (DALY). With numerous survivors being added to the population each year, a survival rate of 70% to 80% is thought to exist. In terms of males aged 0 to 14 years, Chennai (35.5) and Delhi (30.7) had the highest Age Adjusted Rate per Million (AARpm) for lymphoma followed by registries from Chennai (24.5).

Disruptions in daily/role functioning, physical side effects of treatment, confusion about the disease and its treatment, and worries of mortality are among the stressful aspects of cancer for children (Rodriguez EM., et al. 2012 1997). Near the time of diagnosis and early in the course of treatment, these stresses are linked to increased pain, fatigue, emotional discomfort, anxiety, and depression in children. Therefore, it is crucial to comprehend the biopsychological determinants of children's health in order to influence psychosocial interventions and help them to develop more adaptable coping mechanisms (Kazak et al., 2016).

Children with cancer typically report experiencing pain throughout their cancer journey, from diagnosis through death or into survivorship. Pain is a common and disturbing cancer symptom. Cancer-related pain can have a variety of etiologies, such as pain from the cancer itself, medical interventions and treatments such as chemotherapy and radiation therapy, and procedural variables such as postoperative discomfort, venipuncture, and lumbar puncture (Tutelman PR, et al. 2018).

According to a longitudinal observational survey, the majority of children between the ages of 1 and 18 years reported having clinically severe pain at least once, and 30% said they had it at least half the time and no medication was given in 33.6% of the children with pain ratings below 4. There is a correlation between pain intensity and interference with daily life: the more pain, the more interference in daily life (Julia DHP, et al 2020).

A subjective sensation of tiredness, depletion, and lack of energy is known as fatigue which affects the daily functioning and which is unrelated to previous activity (Stone PC, Minton O. 2008). Anorexia, pain, dyspnea, nausea/vomiting, diarrhea, anxiety, melancholy, or fear were all significantly linked with fatigue and in 50% of children had fatigue due to the side effects from pain or dyspnea medication. Hence there is a need for greater responsiveness to identify the causes and factors associated with fatigue and efficient treatments should be given to the children with fatigue (Ullrich CK., 2010).

24% of survivors had an at-risk/clinically high anxiety score after three months without therapy. Children with cancer were more likely to experience anxiety during off-therapy and they had elevated anxiety one month after diagnosis (p=0.02), dysfunctional family dynamics (p=0.01), and decreased reliance on social support and coping (p=0.01) were were linked to an increased incidence of emotional discomfort (Alicia SKB., 2016).

During the first year of treatment, anxiety was found to be associated with the treatment, procedures, and pain in children with ALL. Priority should be given to reducing anxiety associated to procedures in younger children and improving nausea control in older children and those undergoing more intense therapy (Dupuis LL, 2016).

International surveys showed that children with cancer frequently engage in a variety of psychosocial therapy, ranging from 31% to 84% of them uses such therapies to manage the distressing cancer symptoms and cancer treatments. To buffer stressors occurring due to disease, Integrative mind-body therapies are frequently used in the treatment of cancer. Research studies have proven the efficacy of innovative nurse led therapy on biopsychosocial issues of children with hematological cancers. The interventions are led by a trained nurse helps the survivors overcome their fatigue and improve Quality of life (Qol) (Escriva Boulley G, et al. 2018).

Christina R. (2020) reported that children who received the distraction techniques (Soap Bubble Therapy, Music Therapy, Art Therapy, Reality Virtual Therapy and Toy Therapy) significant

reduction (F-54.11, p<0.001) in pain, low level of anxiety (F-123.69 p<0.001) and distress (F-68.89; p<0.01). Hsiao H-J, et al. (2018) reported the effectiveness of psychological therapies in reducing distress in children with acute myeloid leukemia aged 3 to 11 years, who underwent lumbar puncture (LP) and bone marrow aspiration (BMA). The child who received psychosocial treatment for BMA and LP was compared with patients who did not receive psychosocial treatment. Psychosocial intervention or cognitive behavioral intervention focused on the development of Personal coping strategies such as distraction, storytelling, breathing exercise, and guided imagery. The mean distress score was significantly lower than the mean score of children without intervention (0.65 vs. 4.81, p<0.002).

Digital Story Telling (DST) is an emerging therapy for children with cancer, Wilson DK., et al. (2016).Cho E, Dietrich MS, Friedman DL, et al. (2023) reported that the digital storytelling or legacy intervention is an readily accessible intervention that showed small effect on the adaptive coping such as disengagement and primary-control coping strategies among children with recurring or intractable cancers. Compared to controls, children who participated in the intervention performed better academically and emotionally. Parents stated that digital story helped their children to express their emotions and feel better emotionally. It also reportedly helped parents and children to communicate better and served as a coping mechanism for the them. Laughter Therapy is an easy and useful intervention, Sabori Z, Khayatan F, Ghanavat M. (2019) reported the impact of laughter yoga training on hopelessness and loneliness among children suffering from leukemia. The laughter yoga had significant impact in the reduction of sense of hopelessness and loneliness. Laughter Yoga exercises significantly found to be effective in decreasing the frustration and loneliness. Sadeghi Z, Mikaeili N, Atadokht A. (2021) reported that the use of laughter therapy is effective in reducing anxiety and hopelessness.

Nurses working in Pediatric oncology units frequently look after children who have hard times in adjusting to their treatment regimens. As nurses, it is the prime responsibility to look out solutions that can help children to deal and cope with their problems, whether they are dealing with chronic pain, fatigue, social isolation, a lack of communication skills, fear, or anxiety. Nurse led therapies gain momentum in the current era for all kinds of illnesses. Nurses are on the forefront to assess, care and intervene children with cancer facing multidimensional issues in order to adapt positively to the disease. Hence the researcher felt the need to assess the biopsychological determinants of the children with cancer and to evaluate the effectiveness of Innovative Nurse - Led Therapy on biopsychological determinants among children with hematological cancer.

Statement of the problem:

A Pilot Study to Evaluate the Effectiveness of Innovative Nurse-Led Therapy on Biopsychological Determinants of Children with Cancer in Selected Hospital, Coimbatore, Tamil Nadu, India

Objectives:

1. To assess the pretest and posttest level of pain, fatigue, and anxiety among children with hematological cancer in interventional group 1, 2 and control group
2. To evaluate the effectiveness of digital storytelling among children with cancer in interventional group 1
3. To evaluate the effectiveness of laughter therapy among children with cancer in interventional group 2
4. To correlate the relationship between the level of pain, fatigue and anxiety of the children with cancer.

Hypotheses:

H_1- There will be a significant difference between the pre and posttest level of pain, fatigue and anxiety among children with hematological cancer in Interventional group 1, 2 and control group
H_2- There will be a significant difference between the DST and Laughter therapy among children in Interventional group 1 and 2

Materials & Methods:

The quantitative evaluative research approach was adopted for the present study. In view of the nature of the problem and to accomplish the objectives of the study, the researcher adopted True experimental

pretest and posttest control group design. The research design is represented in the table 1 as follows:

Table 1: Research Design

Groups	Pretest	Interventions	Posttest
Interventional Group 1	O_1	X_1	O_2
Interventional Group 2	O_1	X_2	O_2
Control group	O_1	-	O_2

The study was carried out in Pediatric Oncology Unit, in a private multispeciality hospital, Coimbatore, Tamil Nadu. The target population includes children with hematological cancer between the age group of 5-12 years. The sample size consists of 15children and 5 children in each group were randomly assigned to the Control and interventional group 1 and 2. The tools such as demographic data sheet was developed by the researcher and standardized tools were used. The tool was validated by the experts from Medical, Nursing and Mental health departments.

Ethical clearance was obtained from the Institutional Review Board; Prior written permission was obtained from the administrators of the selected hospital, and informed consent and assent was obtained from the parent and children respectively. The data collection was done over a period of three weeks children were alternatively assigned to each group (Digital storytelling, Laughter Therapy and Control group). The researcher developed a rapport and obtained informed consent from the caregivers and assent from the children. Pre-assessment was done using the Demographic & Clinical Profile, Wong-Baker Faces Pain Rating Scale (WBFPRS) was used to assess the pain, child's fatigue was assessed by Childhood fatigue scale (CFS), and the State -Trait Anxiety Inventory for Children State (STAIC-S) was used to measure anxiety.

Innovative Nurse – led therapy includes digital storytelling and laughter therapy which was provided to the children with cancer in interventional group 1 and 2 respectively. These interventions helped the child to cope with pain, fatigue, and anxiety. The intervention was provided for 30 minutes daily for 6 days. The data were analyzed using descriptive and inferential statistics and presented in table and figures. The demographic variables, and clinical variable data were analyzed by using frequency, percentage distribution, paired 't' test was used to compare the pretest and posttest mean scores on the effectiveness of digital storytelling and laughter therapy on biopsychological determinants of children with cancer in the interventional groups. Pearson correlation coefficient was used to find out the relationship between pain, fatigue, and anxiety.

Results and interpretation:

Section A: Description of Demographic and Clinical variables of children with cancer in three groups

Table 2 Frequency and Percentage distribution of Demographic variables of children with cancer (N-15)

Sl. No.	Demographic variables	Interventional Group 1 (n-5)		Interventional Group 2 (n-5)		Control group (n-5)	
		f	%	f	%	f	%
1.	**Age (Years)**						
	5-7	4	80	3	60	5	100

	8-10	0	0	2	40	0	0
	11-13	1	20	0	0	0	0
2.	**Gender**						
	Male	4	80	1	20	1	20
	Female	1	20	4	80	4	80
3.	**No. of siblings**						
	No	2	40	5	100	2	40
	One	3	60	0	0	1	20
	Two	0	0	0	0	2	40
4.	**Birth order**						
	First	4	80	4	80	3	60
	Second	1	20	1	20	1	20
	Third	0	0	0	0	1	20
5.	**Type of School**						
	Government	0	0	0	0	0	0
	Govt. aided	2	40	1	20	0	0
	Private	3	60	4	80	5	100
4.	**Education of child**						
	Primary	5	100	5	100	5	100
	Higher primary	0	0	0	0	0	0
5.	**Regularity**						
	Irregular	5	100	5	100	5	100
	Regular	0	0	0	0	0	0
6.	**Type of residence**						
	Rural	1	20	2	40	1	20
	Urban	4	80	3	60	4	80
7.	**Educational status of**						

	parents						
	Illiterate	1	20	1	20	0	0
	Educated	4	80	4	80	5	100
8.	**Occupation of Mother**						
	House Wife	4	80	5	100	4	80
	Govt. employee	0	0	0	0	0	0
	Private employee	1	20	0	0	1	20
	Business	0	0	0	0	0	0
9.	**Occupation of Father**						
	Unemployed	1	20	0	0	0	0
	Govt. employee	0	0	0	0	0	0
	Private employee	3	60	2	40	4	80
	Business	1	20	3	60	1	20
10.	**Family income (Rs.)/Month**						
	< 5000	0	0	0	0	0	0
	5001-10000	0	0	0	0	0	0
	10001- 20000	4	80	2	40	0	0
	< 20000	1	20	3	60	5	100

Table 2 shows, in the age group 80% of the research participants in the interventional group 1 were between 5-7 years and 60% in interventional group 2 and 100% in control group. In relation to gender 80% belongs to male in interventional group 1 and 80% were female in interventional group 2 and control group respectively.

The majority of the research participants in interventional group1, 2 and control group were first born. Most of the research participants in interventional group 1, 2 and control group were studying in private schools while 100% of the research participants in interventional group 1,2 and control group were attending the school irregularly and residing in urban region. In view of education and occupation of parents majority of the mothers were educated but were homemakers. The fathers were found to be private employees and earning more than rupees 20,000 per month.

Table 3. Frequency and Percentage distribution of Clinical variables of children with Cancer (N-15)

Sl. No.	Clinical variables	Interventional Group-1 (n-5)		Interventional Group-2 (n-5)		Control group (n-5)	
		f	%	f	%	f	%
1.	**Age of Onset (Years)**						
	< 1	4	80	1	20	2	40
	1-3	1	20	4	80	3	60
2.	**Type of cancer**						
	Leukemia	5	100	5	100	5	100
	Lymphoma	0	0	0	0	0	0
3.	**Stage of cancer**						
	First	3	60	2	40	1	20
	Second	2	40	3	60	4	80
4.	**Duration of illness (Years)**						
	< 1	4	80	2	40	4	80
	1	1	20	3	60	0	0
	2	0	0	0	0	1	20
5.	**Previous Hospitalization**						
	No	1	20	0	0	0	0
	Yes	4	80	5	100	5	100
6.	**No. of Re-admission**						
	1	0	0	1	20	0	0
	3	1	20	0	0	0	0
	>3.	4	80	4	80	5	100

7.	Duration of hospitalization						
	< 1month	5	100	5	100	4	80
	1-3 months	0	0	0	0	1	20

Table 3 shows the frequency and percentage distribution of clinical variables of children with cancer. Age of onset of illness, in the interventional group 1 was 80% while in interventional group 2 and control were between 1-3years. All the research participants were diagnosed with leukemia and found 60% of interventional group 1were in first stage of cancer and majority of interventional group 2 and control group were in second stage of cancer.

In relation to the duration of illness, 80% of research participants were having less than 1 year and 60%of interventional group 2 were in 1year.With regard to previous hospitalization and readmission most of the children got admitted more than 3 times and found that the duration of hospitalization less than one month.

Section B: Effectiveness of Innovative Nurse Led Therapy on Biopsychological Determinants of Children with Cancer

Table 4. Frequency & Percentage of Pre and post test scores of pain among children with cancer in three groups (N-15)

Pain	Interventional Group1 (n-5)				Interventional Group-2 (n-5)				Control group (n-5)			
	Pre test		Post test		Pre test		Post test		Pre test		Post test	
	f	%	f	%	f	%	f	%	f	%	f	%
Mild	0	0	3	60	0	0	1	20	0	0	1	20
Moderate	2	40	2	40	2	40	4	80	2	40	1	20
Severe	2	40	0	0	3	60	0	0	2	40	2	40
Worst	1	20	0	0	0	0	0	0	1	20	1	20

Table 4 shows the Pre and post test scores of pains among children with cancer in three groups. The Wong Baker faces pain scale was used to assess the pain scale was used to assess the pain among children in pre and posttest. It was found in interventional group 1, 40% were found to be in moderate and severe pain during pretest and in posttest 40%were in moderate pain and 60% were having mild pain after the intervention. The Digital Storytelling (DST) had an effect in reducing the level of pain from moderate to mild whereas in control group, the research participants received hospital routine care hence no significant changes found in reducing level of pain.

In interventional group 2, 60% of research participants were in severe pain and 40% in moderate pain in pretest. After the intervention 80% had moderate level of pain and 20% had significantly mild level of pain. Laughter Therapy (LT) had an impact on reducing the level of pain from severe to moderate and to mild level of pain whereas in control group, the research participants received hospital routine care hence no significant changes found in reducing level of pain.

In control group, 40% of research participants had severe and moderate level of pain and 20% suffered with worst level of pain, whereas in post

test 40% suffered with severe pain and 20% were having mild, moderate and worst level of pain

respectively.

Table 5. Frequency & Percentage of Pre and post test scores of Childhood fatigue among children with cancer in three groups (N-15)

Fatigue	Interventional Group1 (n-5)				Interventional Group-2 (n-5)				Control group (n-5)			
	Pre test		Post test		Pre test		Post test		Pre test		Post test	
	f	%	f	%	f	%	f	%	f	%	f	%
Lesser	3	60	4	80	2	40	2	40	3	60	3	60
Higher	2	40	1	20	3	60	3	60	2	40	2	40

Table 5 shows that the pre and posttest scores of childhood fatigue among children with cancer in three groups. The Childhood Fatigue Scale was used to assess the level of fatigue in pretest and posttest. In pretest 40% were having high fatigue and 60% were having less fatigue whereas in post test of interventional group-1 20% were having higher fatigue and 80% were having lower fatigue.

In interventional group 2, 60% were found to have high level of fatigue in pretest and post-test and 40% were in low level of fatigue in both pretest and posttest. In control group 40% had high level of fatigue in pretest and post test and 60% had low level of fatigue in pre and post test.

Table 6. Frequency & Percentage of Pre and post test scores of Anxiety among children with cancer in three groups (N-15)

Anxiety	Interventional Group1 (n-5)				Interventional Group-2 (n-5)				Control group (n-5)			
	Pre test		Post test		Pre test		Post test		Pre test		Post test	
	f	%	f	%	f	%	f	%	f	%	f	%
No Anxiety	1	20	1	20	0	0	1	20	0	0	0	0
Mild	4	80	4	80	5	100	4	80	5	100	5	100
Moderate	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 shows the Pre and post test scores of anxiety among children with cancer in three groups. The STAIC-S scale to assess anxiety for children was used. In the Interventional group 1, the 20% research participants showed no anxiety in pre and post test while 80% showed mild anxiety, and 20% had no anxiety. The DST had an effect of sustaining the stress level to mild without any increase during the therapy. In the Interventional

group 2, 100% research participants showed mild level of anxiety in pre-test whereas in post test, 80% showed mild anxiety and 20% showed moderate anxiety also. The control group presented with 100% mild anxiety in pre and posttest. Hence the stated Hypothesis (H_1) There will be a significant difference between the pre and posttest level of pain, fatigue and anxiety among children with hematological cancer in Interventional group 1, 2 and control group was accepted.

Table 7. Mean and SD of pre and post test scores of biopsychological determinants of children with cancer in Interventional group 1 (n-5)

Biopsychological determinants	Pre test		Post test		t-value	df	Level of Significance
	Mean	SD	Mean	SD			
Pain	7.6	1.67	7.2	1.09	1.000	4	0.37 (NS)
Fatigue	52.2	4.38	53.4	6.65	-0.605	4	0.58 (NS)
Anxiety	31.8	1.64	33.6	3.05	-2.092	4	0.11 (NS)

Table 7 shows the Mean (M) and Standard Deviation (SD) of pre and post test scores of biopsychological determinants of children with cancer in Interventional group 1. Regarding the Pain, the Mean and SD of pre test pain score is 7.6±1.67 and in post test it was 7.2±1.09, the t-value is 1.000 (p-0.37). With respect to the Fatigue, the Mean and SD of pre test Childhood fatigue score is 52.2±4.38 and in post test it was 53.4±6.65, the t-value is -0.605 (p-0.58). Regarding the Anxiety, the Mean and SD of pre test anxiety score is 31.8±1.64 and in post test it was 33.6±3.05, the t-value is -2.092 (p-0.11), which found to be non significant.

Table 8. Mean and SD of pre and post test scores of biopsychological determinants of children with cancer in Interventional group 2 (n-5)

Biopsychological determinants	Pre test		Post test		t-value	df	Level of Significance
	Mean	SD	Mean	SD			
Pain	7.2	1.09	5.6	0.89	4.000	4	0.02*
Fatigue	51.8	5.54	51.2	5.63	1.500	4	0.21 (NS)
Anxiety	33.4	1.82	36.8	3.27	-2.915	4	0.04*

Table 8 shows the Mean (M) and Standard Deviation (SD) of pre and post test scores of biopsychological determinants of children with cancer in Interventional group 2. Regarding the Pain, the Mean and SD of pre test pain score is 7.2±1.09 and in post test it was 5.6±0..89, the t-value is 4.000 (p<0.02). With respect to the Fatigue, the Mean and SD of pre test Childhood fatigue score is 51.8±5.54 and in post test it was 51.2±5.63, the t-value is 1.500 (p-0.21). Regarding the Anxiety, the Mean and SD of pre test anxiety score is 33.4±1.82 and in the post test it was 36.8±3.27, the t-value is -2.915 (p<0.04), which found to be significant. Hence the stated Hypothesis (H$_2$) There will be a significant difference between the DST and Laughter therapy among children in Interventional group 1 and 2 was accepted.

Section C: Relationship between the Biopsychological Determinants of children with cancer in three groups

Table 9. Correlation between the Biopsychological Determinants of children in Interventional group 1 (n-5)

Biopsychological Determinants	Pain	Fatigue	Anxiety
Interventional group 1	1	-0.400 (p-0.51)	0.082 (p-0.89)
	-0.400 (p-0.51)	1	-0.722 (p-0.17)
	0.082 (p-0.89)	-0.722 (p-0.17)	1
	0.730 (p-0.16)	-0.698 (p-0.19)	0.684 (p-0.2)

The above tables 9, shows the relationship between the biopsychological determinants of children in Interventional group 1. The finding revealed that there was significant positive correlation between the biopsychological determinants such as Pain, and Anxiety of the children in the Interventional group 1.

Table 10. Correlation between the biopsychological determinants of children in Interventional group 2 (n-5)

Biopsychological Determinants	Pain	Fatigue	Anxiety
Interventional group-2	1	-0.050 (p-0.94)	-0.198 (p-0.75)
	-0.050 (p-0.94)	1	-0.308 (p-0.61)
	0.198 (p-0.75)	-0.308 (p-0.61)	1
	0.201(p0.75)	-0.167 (p-0.79)	0.134 (p-0.83)

Table 10 shows the relationship between the biopsychological determinants of children in Interventional group-2. The finding revealed that there is no significant positive correlation between the biopsychological determinants such as Pain, Fatigue and Anxiety of the children in the Interventional group 2.

Table 11. Correlation between the biopsychological determinants of children in Control group (n-5)

Biopsychological Determinants	Pain	Fatigue	Anxiety
Control group	1	-0.951 (P>0.01)*	-0.705 (p-0.18)
	-0.951 (P>0.01)*	1	-0.797 (p-0.11)
	-0.705 (p-0.18)	-0.797 (p-0.11)	1
	0.517(p0.37)	-0.721(p-0.17)	0.851 (p-0.07)

*Level of Significance at P>0.01

Table 11 shows the relationship between the biopsychological determinants of children in Control Group. The finding revealed that there is no positive correlation between the biopsychological determinants such as Fatigue and Anxiety of the children in the Interventional group-2 whereas a significant negative correlation (r-0.951, p-0.01) found between the Pain and Fatigue among children with cancer in the control group.

Discussion:

The findings of this study affirmed the usability of digital storytelling and laughter therapy as a innovative nurse led intervention for children with hematological cancers between age 5-12 years .The study threw light on biopsychological parameters like pain, fatigue and anxiety which markedly reduced following the DST and laughter therapy. DST has been a traditional way of storytelling since ages to relax children during bedtime and now that DST is a novel form of viewing stories in smart devices to let children distract pain, relax and reduce anxiety, and to combat fatigue. While laughter therapy on other hand brings joy, happiness and let the endorphins clod the consciousness so as to relief pain by distraction, bring down anxiety, initiate activity levels and improve coping through gradual progress .Overall, the data recommends the advantage using the innovative nurse led therapies in such population where disease is loaded with the challenge of stress both for the child and the caregiver and very less evidence available in recent research for practice. Further studies with more children to validate this approach and gain additional understanding of the therapies and its use in children with hematological cancer can lead to improved care healthcare for this unique population.

Conclusion:

It was revealed that almost all children admitted with hematological cancer had level of pain, anxiety, fatigue in a moderate to severe on pretest assessment which had reduced after DST and laughter therapy interventions. The impact of the innovative nurse led therapies ought to be therapeutic and when attempted along with medication and surgery could lead to improved coping and quality of life in these children.

Therapeutic as well as experimental benefits are available in nurse led therapies research that is consistent with nursing's commitment to knowledge, training and comprehensive care.

Data Availability statement:

The study collected data from the children with hematological cancer admitted in hospital at Coimbatore, Tamil Nadu, India, and the literature data from google scholar, PubMed, scienceDirect to interpret the result. This is the new study conducted by the authors. The corresponding authors were notified to provide data from this work.

Conflicts of Interest statement:

Authors collectively produce this work where they all agree with the work done, issues faced during the project and findings. No conflict of interest declared by the authors. Citations and references are mentioned as per the used information.

Ethical and Consent Statement:

This work is a draft from the corresponding author's PhD (Nursing) Degree Project, as a preliminary requirement before the submission of the thesis. Ethical clearance obtained from the Institution and from the hospital in which the study was conducted. Informed consent obtained from the caregivers of the study participants. Authors of the work unanimously consent to make this publication available to all interested people for reading, teaching, and learning.

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