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## Effectiveness of origami on stress and anxiety of hospitalized children

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### Abstract

A quantitative research study with post-test only control group design was conducted at Paediatric Medicine, Nephro, and Hemat Onco departments of St. John's Medical College Hospital. 50 children were selected between the age group of 6-12 years through purposive sampling technique. At first the data were collected from the control group to avoid contamination. Three sessions of Origami for 3 days were conducted for children in experimental group. Each session was conducted for 30 minutes per child. The children were taught to make colorful animal, fish, fortune teller, frog etc. For the control and experimental group, the stress and anxiety were assessed after 3 days using the tools. The findings of the study reveal that Experimental group had significant reduction in the stress and anxiety in comparison to control group at  $p < 0.001$ . Hence providing Origami to hospitalized children is effective in reducing Stress and anxiety.

**Keywords:** Effectiveness, origami, stress, anxiety, hospitalization, children

### 1. Introduction

Hospitalization is a process of planning that requires the child to stay in the hospital in order to undergo treatment and medication. Nevertheless, hospitalization remains a major problem and causes anxiety and fear in children and makes the children leave their loved ones, familiar places, and stop regular activities of life, and play<sup>[1]</sup>.

Pediatric patients visit primary healthcare providers in ambulatory settings, at an average of 31 times from birth to age of 18 for general wellness visits. Children commonly report feeling afraid or anxious as they anticipate and engage in healthcare settings with medical professionals. Most concerning, up to 20% of the population reports feeling "white coat syndrome" when coming into contact with medical doctors, due to this change in atmosphere and stranger anxiety<sup>[8]</sup>.

According to Hockenberry, Wilson and Winkelstein, the main thing that can cause stress on the process of hospitalization is the separation of parents, loss of control, and fear of bodily injury and pain. In addition to stress, hospitalization also causes fear and anxiety in children aged 4 - 6 years<sup>[15]</sup>.

Florence Nightingale, the founder of modern nursing, emphasized the important aspect of play for hospitalized children. Florence Erikson was one of the first nurses to conduct a study of play interventions for hospitalized children. In her study she found that the children were friendly and cooperative when they were exposed to play activities in the hospital<sup>[7]</sup>.

A child's integral task is to play. Play promotes healing and helps the child to cope with stressful situations. Similarly, some of the great thinkers like "Aristotle and Plato" have reflected on the fundamental needs of play in a child's life<sup>[3]</sup>.

One form of play therapy is Origami. Origami (ori meaning "folding" and gami meaning "paper") is the traditional Japanese art of paper folding. Thus, children do not need to struggle to do origami. It gives a child platform to express their feelings, unwanted thoughts, increase their intellectual skills and adapt to the new environment which will ultimately bring speedy recovery and cooperate with procedures provided in the hospital. Nurses may use play as healthcare strategy for hospitalized children<sup>[3]</sup>.

### 2. Materials and Methods

Research Approach: Quantitative Research Approach

Research Design: Quasi Experimental (post-test only control group) design

Sampling technique: Purposive sampling technique Sample size: 50 (25 in each group)

Setting of study: Paediatric Medicine, Nephro, Hemat Onco Department of St. John’s Medical College Hospital (SJMCH).

**Tool used for data collection:** Following tools were used for the data collection

**Section A:** Demographic data: It consists of 7 items related to demographic data of participants.

**Section B:** Children Stress assessment scale: The scale comprises of 3 categories with 20 items. 1) Illness and its negative consequences with 6 items 2) Hospitalization with 11 items 3) Procedures with 3 items.

**Section C:** Children anxiety assessment check list: The scale comprises of 3 categories with 20 items. 1) Child’s reaction during hospitalization with 6 items 2) Reaction during procedures with 10 items 3)

Reaction related to bodily injury and pain with 4 items.

**The procedure of data collection**

Formal administrative permission was obtained from the concerned authority and ethical clearance from Institutional Ethics Committee to conduct the study. Written consent and assent were obtained from the parents and children above 7 years respectively. An interview schedule was conducted to elicit the baseline variables. At first, the data were collected from the control group to avoid contamination. Three sessions of Origami were conducted for experimental group for 3 days for each child. Each session was conducted for 30 minutes per child. The children were taught to make colorful toys, animals, boat, butterfly, fish, fortune teller, frog etc. For the control and experimental group, the stress and anxiety were assessed after 3 days using the stress assessment scale and an anxiety assessment checklist.

**3. Results and Discussion**

Section I: Distribution of baseline variables of both experimental and control groups.

**Table 1a:** Frequency, percentage, Chi-Square, a p-value of baseline variables in Experimental and Control groups according to Age, Gender, Birth order, Type of the family, Previous hospitalization, Caretaker during hospitalization, Diagnosis

Sl. No	Experimental Group (n=25)				Control Group (n=25)			
	Variables	F	%	F	%	Chi Square	P value	
1.	<b>Age in Years</b>							
	6-9	11	44.0	10	40	0.082	0.774 (NS)	
	9-12	14	56.0	15	60			
2.	<b>Gender</b>							
	Male	18	72.0	14	56.0	1.38	0.239 (NS)	
	Female	7	28.0	11	44.0			
3	<b>Birth Order</b>							
	First	15	60.0	17	68.0	0.50	0.837 (NS)	
	Second	7	28.0	6	24.0			
	Third	3	12.0	2	8.0			
4.	<b>Type of the Family</b>							
	Joint	16	64.0	8	32.0	5.12	0.024 (S)	
	Nuclear	9	36.0	17	68.0			
5.	<b>Previous hospitalization</b>							
	Yes	20	80.0	20	80.0	.00	1.00 (NS)	
	No	5	20.0	5	20.0			
6.	<b>Caretaker during hospitalization</b>							
	Father	3	12.0	6	24.0	1.43	0.725 (NS)	
	Mother	21	84.0	18	72.0			
	Others	1	4.0	1	4.0			
7.	<b>Diagnosis</b>							
	Fever	4	16.0	3	12.0	4.09	0.730 (NS)	
	Neurological	1	4.0	1	4.0			
	Respiratory	2	8.0	4	16.0			
	Urinary	9	36.0	11	44.0			
	Hemato Onco	4	16.0	4	16.0			
	GI	2	8.0	2	8.0			
	Musculoskeletal	3	12.0	0	0			

Table 1a shows that in both experimental 56.0% (14) and control groups 60% (15) of children belong to the age group of 9-12 years. Most of the children in the experimental group 72.0% (18), and the control group were male 56.0% (14). The majority of the children in the experimental 60.0% (15) and the control group 68.0% (17) were from the first birth order respectively. 64.0% (16) of children from the experimental group belong to the joint family whereas 68% (17) of children in the control group belong to the nuclear family. 50 children 80% (20) of the children had previous hospitalization in both groups. Most of the caretakers during

hospitalization were mothers in the experimental 84.0% (21), control group 72.9% (18). In both the experimental 36.0% (9) and the control group, 44% (11) children were diagnosed with urinary system disorder. Therefore, it is concluded that there is no significant difference between experimental and control group in their baseline variables. Hence the groups are comparable except type of family.

**Section II:** Comparison of stress among hospitalized children between experimental and control group.

**Table 2:** Max. Score, Range, Mean, Mean %, and Mean diff, SD, t value, Independent,, t'' test to compare the stress between Experimental and Control group

Group	Max Score	Range	Mean	Mean%	Mean Diff	SD	't' value	'P' value
Experimental group	60	11-37	20.76	34.6		5.73		<0.000*
Control group	60	7-44	29.48	49.13	-8.72	7.83	4.49	

\*- Significant at  $p < 0.001$  level

Table 2 Illustrates that the mean stress score of the control group (29.48) is higher than the experimental group (20.76). The difference was tested using the Independent,, t'' test and the value of ,,t'' was 4.49 which is significant at a  $p < 0.001$  level. Hence the research hypothesis (H1) is accepted.

Therefore, it can be said that Origami is an effective method of reducing stress among hospitalized children.

**Section III:** Comparison of anxiety among hospitalized children between the experimental and control group

**Table 3:** Max. Score, Range, Mean, Mean %, Mean diff, SD, t value, Independent t-test to compare the anxiety between experimental and control groups.

Group	Max score	Range	Mean	Mean%	Mean diff	SD	't' value	'P' Value
Experimental group	20	1-11	6.12	30.6	-2	2.48	-3.27	<0.002*
Control group	20	5-12	8.12	40.6		1.76		

\*- Significant at  $p < 0.001$  level

Table 3 Illustrates that the mean anxiety score of the control group (8.12) is higher than the experimental group (6.12). The difference was tested using the Independent ,,t'' Test and the value of ,,t'' was -3.27 which is significant at a

$p < 0.001$  level. Hence the research hypothesis (H2) is accepted; therefore, it can be said that Origami is an effective method of reducing anxiety among hospitalized children.

**Table 4:** Mean, Mean%, SD, r value, and p-value for correlation of stress and anxiety in the experimental and control group.

Group	Variables	Mean	Mean%	SD	'r' value	'p' value
Experimental group	Stress	20.76	34.5	5.73	0.239	0.251
	Anxiety	6.12	30.6	2.48		
Control group	Stress	29.48	49.13	7.83	0.264	0.202
	Anxiety	8.12	40.6	1.76		

Table 4 shows that there is a weak positive correlation between stress and anxiety of children in the Experimental and Control group.

control group ( $p = 0.202$ ) respectively. Since  $p > 0.05$  the research hypothesis H3 is rejected.

Correlation between stress and anxiety is not statistically significant at  $p < 0.001$  level using Pearson Correlation coefficient, r value of experimental (0.239) and control group (0.264) p value in experimental group ( $p = 0.251$ ) &

**Section V:** Association of stress among hospitalized children in Experimental and control groups with selected baseline variables.

**Table 5:** F, Mean, SD, Test of significance, a p-value of Stress score of Children with selected baseline variables such as Age, Gender, Birth Order, Type of the Family, Previous hospitalization, Caretaker during Hospitalization, and Diagnosis in the experimental and control group

Sl. No	Experimental Group (n=25)						Control Group (n=25)				
	Variables	F	Mean	SD	Test of Sig	'P' Value	F	Mean	SD	Test of Sig	'p' value
1.	<b>Age in Years</b>				-0.094	0.926				0.21#	0.832
	6-9	11	20.64	4.27			10	29.90	10.19		
	9-12	14	20.86	6.82			15	29.20	6.19		
2.	<b>Gender</b>				-1.14	0.263				1.09#	0.283
	Male	18	19.94	6.39			14	31.00	9.29		
	Female	7	22.86	2.91			11	27.55	5.27		
3.	<b>Birth Order</b>				0.628	0.54				0.67\$	0.51 (NS)
	First	15	20.40	5.73			17	28.24	8.12		
	Second	7	22.57	6.80			6	32.50	7.55		
	Third	3	18.33	2.02			2	31.00	5.65		
4.	<b>Type of the Family</b>				-0.225	0.82				1.16#	0.25 (NS)
	Joint	16	20.56	6.29			8	32.13	7.01		
	Nuclear	9	21.11	4.91			17	28.24	8.09		
5.	<b>Previous hospitalization</b>				-0.97	0.33				.86#	0.39 (NS)
	Yes	20	20.20	4.85			20	28.80	7.89		
	No	5	23.00	8.80			5	32.20	7.82		
6.	<b>Caretaker during hospitalization</b>				0.11	0.89				0.01\$	0.98 (NS)
							6	29.33	7.17		
	Father	3	19.33	3.21			18	29.44	8.45		
	Mother	21	20.90	6.16			1	31.00			
	Others	1	22.00								

7.	Diagnosis				0.67	0.67				0.60\$	0.69 (NS)
	Fever	4	22.25	7.89			3	32.33	10.4		
	Neurological	1	26.00	3.53			1	37.00	11.87		
	Respiratory	2	19.50	4.21			4	24.25	12		
	Urinary	9	19.33	8.42			11	29.18	6.39		
	HematoOnco	4	20.25	1.41			4	30.75	1.41		
	GI	2	21.00								
	Musculo skeletal	3	18.67	6.65			2	31.00			

**NS-Non-significant**

Table 5 shows that there is no significant association between stress among hospitalized children in both experimental and control groups with selected baseline variables such as age, gender, birth order, type of family, Previous Hospitalization, Caretaker during hospitalization,

Diagnosis at 0.05 level of significance.

**Section VI: Association of anxiety among hospitalized children in Experimental and Control group with selected baseline variables.**

**Table 6:** F, Mean, SD, Test of significance, a p-value of Anxiety score of Children with selected baseline variables such as Age, Gender, Birth Order, Type of the Family, Previous Hospitalization, Caretaker during Hospitalization, and Diagnosis in the experimental and control group.

Sl. No	Experimental Group (n=25)						Control Group (n=25)					
	Variables	F	Mean	SD	Test of Sig	'P' Value	F	Mean	SD	Test of Sig	'P' Value	
1.	<b>Age in Years</b>											
	6-9	11	7.18	2.67	2.00	0.057	10	7.90	1.52	0.501#	0.621 (NS)	
	9-12	14	5.29	2.05			15	8.27	1.94			
2.	<b>Gender</b>											
	Male	18	6.50	2.59	1.23	0.228	14	8.29	2.05	-0.522#	0.60 (NS)	
	Female	7	5.14	2.03			11	7.91	1.37			
3.	<b>Birth Order</b>											
	First	15	6.60	2.50	0.736	0.49	17	7.76	1.52	1.71\$	0.20 (NS)	
	Second	7	5.57	2.69			6	8.50	1.97			
	Third	3	5.00	2.00			2	10.0	2.82			
4.	<b>Type of the Family</b>											
	Joint	16	5.44	2.47	-1.92	0.06	8	7.50	1.30	-1.21#	0.23 (NS)	
	Nuclear	9	0.33	2.12			17	8.41	1.90			
5.	<b>Previous hospitalization</b>											
	Yes	20	5.90	2.33	-0.88	0.38	20	7.90	1.77	-1.26#	0.21 (NS)	
	No	5	7.00	3.16			5	9.00	1.58			
6.	<b>Caretaker during hospitalization</b>											
	Father	3	4.67	3.51	0.56	0.57	6	8.50	2.16	0.33\$	0.72 (NS)	
	Mother	21	6.33	2.41			18	8.06	1.69			
	Others	1	6.00				1	7.00				
7.	<b>Diagnosis</b>											
	Fever	4	8.00	0.81	0.83	0.55	3	8.00	1.73	0.75\$	0.59 (NS)	
	Neurological	1	9.00	2.82			1	8.00	2.16			
	Respiratory	2	6.00	3.37			4	9.00	1.80			
	Urinary	9	5.89	1.70			11	7.45	1.73			
	Hemat Onco	4	5.25	1.41			4	8.50	0.70			
	GI	2	6.00	1.52								
	Musculo skeletal	3	4.67				2	9.50				

**NS-Non-significant**

Table 6 shows that there is no significant association between anxiety among hospitalized children in both experimental and control group with selected baseline variables such as age, gender, birth order, and type of family, Previous Hospitalization, Caretaker during hospitalization, and Diagnosis at 0.05 level of significance.

**Discussion**

**Discussions related to the description of baseline variables of hospitalized children in both experimental and control groups**

Pediatric patients visit primary healthcare providers in ambulatory settings, an average of 31 times from birth to the

age of 18 for general wellness visits [8]. The present study included 50 children between the age group of 6-12 years of whom 25 in experimental 25 in the control group. Out of these children, most of them were from the age group of 9-12 years, (60%) in the control group (56%) in the experimental group.

This finding had a similarity with a study conducted in Wardha in which majority of the children were in the age group of 9-12 yrs. 16 (53%).

Regarding the gender the study shows that majority of the children (72%) in experimental group, and (56%) in control group were male.

Coinciding with a study done in Haryana wherein 50% of the children were male. Yet another study done in

Maharashtra reveals that male children constituted more than half of the sample showed that is 17(56%).

Considering the birth order out of 50 children, (68%) in the control group, (60%) in the experimental group belong to the first birth order. There is a similar study which is consistent with the results of the present study where majority of the children 15 (50%) belong to the first birth order.

Out of 50 children (68%) in control group, (64%) in the experimental group belonged to the nuclear family. Study done in Chennai where maximum number of the children were from nuclear family 13(65%).

Present study shows that maximum percentage (80%) of the children had previous hospitalization in both the group which is also supported by a study done in Karnataka where 28(93.3%) children had previous hospitalization. With respect to the care takers, present study shows that (84%) of the care takers of children were mothers.

There are similar findings in a study done in China in 2005 which shows that 54 (52.4%) of caretakers were mothers. In relation to the diagnosis of the children maximum number of 11(44%) of children were diagnosed with urinary system disorder.

#### **Discussions related to comparison of the stress among hospitalized children between experimental and control group**

In the present study Origami was used as a method to reduce the anxiety in hospitalized children. Present study reveals that the average stress score is less in experimental group (20.76) than in control group (29.48). The obtained t value is -4.49 and  $p < 0.001$ . Hence the research hypothesis H1 is accepted, thus it can be said that Origami is an effective method in reducing stress among hospitalized children.

The finding of the present study is supported by a study done in Nepal in 2018 on 46 children who were selected by using total population enumeration sampling technique. Level of stress was assessed using self-developed, semi structured observation checklist and questionnaire pre-tested research tool, which revealed that Pre-test mean was  $30.17 \pm 3.46$  Post-test mean was  $26.30 \pm 5.04$ . The total mean Score before and after intervention was significantly different at  $p < 0.001$  Thus, the researcher concluded that the play therapy is effective in reducing stress in children undergoing surgery [12].

#### **Discussions related to comparison of the anxiety among hospitalized children between experimental and control group.**

The present study depicts that the mean anxiety score in the experimental group is (6.12), Control Group is (8.12) and there is a significant difference between the experimental and control groups ( $p = 0.002$ ) with test statistics  $t = -3.279$  in terms of anxiety after the intervention, in this regard, the anxiety of the children is reduced following the implementation of Origami. Hence the research hypothesis H2 is accepted; thus, it can be said that Origami is an effective method in reducing anxiety among hospitalized children.

These findings were similar to the study done in Chennai to assess the effectiveness of Origami in 40 hospitalized children who were selected by purposive sampling technique, which reveals that the pre-test mean of experimental group was (33.2) and control group was

(31.75) respectively. The post-test mean of experimental group was 28.9 and control group was 30.9. The difference was statistically significant ( $p < 0.05$ ) Thus, the intervention was effective in reducing anxiety among hospitalized children [8].

Another similar study done among hospitalized school age children in Masonic hospital aged between 6-12 years also revealed that there was statistically significant difference, because the calculated value (14.125) was higher than the table 64 value (2.05),  $df=58$ , at  $p < 0.05$ . From the result of the study, it was concluded, administering Origami among hospitalized children was very effective in reducing the level of anxiety [26].

A study done in Greater Noida, Uttar Pradesh revealed similar findings with the present study where the post-test mean score of experimental group was (28.9) and that of control group was (30.9). The t test value was 6.61,  $df=38$ , table value of 2.02 and  $p < 0.05$  Thus, it was statistically significant, and the study concluded that administering Origami among hospitalized children was found to be an effective method in reducing the level of hospitalized Anxiety [28].

Another study which is consistent with the findings of the present study that there was significant difference of the total score of anxiety before and after play therapy (before play therapy: origami and puzzle were 20.2 and 20.7) and (after play therapy: origami and puzzle were 14.9 and 12.7). The total score rates were decreased of 5.27 in origami therapy and of 8.0 in puzzle therapy with p-value of 0.000. Thus, the study concluded that administering Origami and puzzle reduces the anxiety in hospitalized children [27].

From all these studies it was evident that play therapy, in particular Origami, is an effective method, and can be used to relieve stress and anxiety of hospitalized children.

#### **Discussions related to the correlation between stress and anxiety among hospitalized children in experimental and control group**

The findings of the present study reveals that there is a weak positive correlation between stress and anxiety in both experimental and control group respectively, r value of experimental group 65 (0.239) and control group (0.264) and p value in experimental group is ( $p = 0.251$ ) & control groups is ( $p = 0.202$ ). Though there is a weak positive correlation yet the (p value  $> 0.05$ ) hence the research hypothesis H3 is rejected.

These findings were supported by a study done in UK which showed that pain and distress are positively correlated with and without distraction at all the phases of painful medical procedures in children and was found to be statistically significant at  $p < 0.001$  level. Thus, the study indicated that as the pain increases distress also increases and vice versa [31].

#### **Discussions related to association of stress among hospitalized children in experimental and control group with selected baseline variables**

The influence of baseline variables on children's stress reveals new information to the study. The present study findings depicted that in experimental and control group there was no statistically significant association between stress score with selected baseline variables age, gender, type of family, previous hospitalization, caretakers during hospitalization, and diagnosis.

These findings similar to the study done in Chennai where the findings of the study showed, the following baseline variables- age, gender, type of family, previous hospitalization, caretakers during hospitalization, diagnosis had no significant association with stress <sup>[8]</sup>.

#### **Discussions related to the association of anxiety among hospitalized children in the experimental and control groups with selected baseline variables**

The present study findings depicted that in experimental and control groups, there was no statistically significant association between anxiety score with selected baseline variables such as age, gender, type of family, previous hospitalization, caretakers during hospitalization, and diagnosis.

These findings were similar to a study conducted in Chennai to determine the association of age, sex, birth order, type of family, previous hospitalization, care taker during hospitalization, diagnosis of anxiety which was found to be statistically non-significant at ( $p < 0.05$ ) level of significance <sup>[8]</sup>.

#### **4. Conclusion**

From the result of the study, it was concluded that administering Origami gives a child platform to express their feelings, reduces stress and anxiety, unwanted thoughts, increase their intellectual skills and adapt to the new environment which will ultimately bring speedy recovery and cooperate with procedures provided in the hospital. Nurses may use play as healthcare strategy for hospitalized children <sup>[3]</sup>.

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