

A Study on the Affected Children's Coping Strategies and Psychological Adjustments Following a Natural Disaster in Sri Lanka

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Abstract— Children who experience catastrophic disasters and events show a wide range of trauma reactions. In the absence of effective coping, for traumatic events may affect psychological development of children. The objectives of this study were to examine the tsunami affected the children and adolescents, efforts in coping strategies mobilized to manage with posttraumatic stress after seven years of the tsunami 2004, to assess the psychological adjustment and to examine changes in different coping styles after the psychological intervention. A quasi-experimental, two-group design with a pre-test and post-test was conducted to determine success of the intervention in children. Data were collected from 80 children and adolescents being affected by the tsunami, with n=40 in the experimental group (EG) and n=40 in the control group (CG) using standardized test, the Childhood Post-traumatic Stress Reaction Index (CPTS-RI) and Child Coping Questionnaire (CCQ). To facilitate psychological well-being, psychological intervention was implemented three months including twenty sessions. Children were presented mild posttraumatic stress. Pre-test results (prior to intervention) proved both groups of children had relationship between posttraumatic stress and coping strategies. Two ways ANOVA with three measurement times showed that EG children's coping styles were decreased and changed the negative coping in contrast to the CG. The Amos' model predictive analysis also showed EG children were not required efforts to cope with posttraumatic stress in compared to the CG. Problem-focused and support- seeking coping scales, long-term and stabilization effects were failed, this means both groups need more help in psychosocial support and to solve their problems. The findings suggested that psychological intervention need to be implemented in long-term for the both group children's well-being.

Keywords—: *natural disaster; coping strategies; psychological intervention*

I. INTRODUCTION

Millions of people have been directly affected by the natural disasters and the proportion of child survivors is especially troubling since children generally exhibit more severe distress after the disasters than adults. Research studies proved that many children presented significant levels of emotional distress, psychosomatic symptoms, anxiety depression, social relationship issues, difficulties with education etc. However some children have worries and bad memories that gradually disappear with the support from caregivers and communities (Norris, 2002). Children may experience with worries, stress reactions, and PTSD. Worries can interfere with child's ability to pay attention and concentration on their school activities (Yule et.al, 2000).

A tsunami is a kind of natural disaster, wave mainly generated by an undersea earthquake that flows on to the land and causes massive destruction. The Indian Ocean tsunami on 26 December 2004 was one of the most severe disasters of the last several decades. Tsunami waves struck 12 countries in South East Asia. Among the affected countries Indonesia, Sri Lanka and Thailand were the hardest hit which caused widespread destruction, a large number of life lives lost, and number of individuals displaced. However, at least five million people affected South Asian countries. The number of death

recorded in Sri Lanka exceeds 40, 000 and number of missing exceeds 15,000 including children and adolescents. The number of separated children is 995 from both parents and 5000 children have lost one parent, either mother or father and the Tsunami has caused internal displacement and disrupted family relationships. Most of the displaced children lived initially at welfare centres. Ministry of Women and Empowerment and Social Welfare, 2005)

Children who used ineffective coping preferences such as social withdrawal, self-criticism and blaming others showed significant levels of PTSD (Russoniello et al., 2002). Many research findings have shown that in the absence of effective coping, the meaning and impact of traumatic events may continue to play a role in the personality and psychological development of children (Huzziff & Ronan, 1999). Coping is also a reaction to stress. In Lazarus' view (1991) distress is an emotional reaction whereas coping always involves efforts to deal with stress. Children with multiple losses and greater environmental chaos are in greater need of intervention (Russoniello et al., 2002). Several community studies have also found that children and adolescents with more negative coping strategies on dealing with stress show higher levels of PTSD symptoms in response to natural disasters (La Greca et al., 1996; Vernberg, La Greca, Silverman, & Prinstein, 1996). For negative adjustment, infrequent support seeking and increased intrusion and arousal were the best predictors. Mental health program of survivors of natural disasters should focus on promoting active coping strategies such as support seeking, strengthening of support networks, and management of posttraumatic stress to facilitate adjustment (Tang, 2006). Understanding the coping strategies that have helped or delayed adjustment is important in direct intervention to work with children. After math of the 2004 tsunami, children and adolescents were re traumatized several times due to undersea earthquake happened in several areas in Indian Ocean. Therefore, the present study focused to examine the nature of children and adolescents' long-term traumatic experiences and their coping strategies after seven years of the tsunami in 2004. The objectives of the study were to examine the tsunami affected children and adolescents efforts in coping strategies mobilized to manage with posttraumatic stress Disorder (PTSD). To assess the psychological well-being or adjustment and to examine changes in different coping styles after the psychological intervention.

II. METHOD

Quasi experimental pre-post two groups design and purposive sampling techniques were employed for this study. Eighty tsunami affected children who were affected by the tsunami were selected; escaped from tidal waves, injured, other family members' lost, died or injured and loss of house and other house holdings things. Children were already had posttraumatic stress mild to moderate level and received the medical treatments by the psychiatrics. Children were selected to the psychological intervention study after seven years of the tsunami. Two groups pre-test and post-test quasi experimental design is particularly appropriate for the present study. Because it gives the opportunity to study an intervention applied to tsunami-affected children. Quasi-experimental studies can use both pre intervention and post intervention measurements as well as non-randomly selected groups. Lack of randomization considers the ethical standpoint when selecting sample (e.g., tsunami affected sample all children [experimental and control]) need treatment, therefore, randomization is impractical. Present study was also focused on small sample size (EG, n =40, CG, n=40) and sample children were not selected randomly for the group and study was conducted in Matara district schools in Southern Province in Sri Lanka.

RESEARCH QUESTIONS AND HYPOTHESES OF THE STUDY

Question 1: What are the coping patterns, which coping strategies change throughout the intervention, and relationship between PTSD and coping strategies in EG compare to the CG?

Question 2: What can be predicted in intervention period with PTSD and coping differences in EG compare to the CG?

Hypothesis 1: Tsunami affected children and adolescents have significant coping ability, the intervention helped to change/decrease the effort of coping, and have significant relationship with PTSD and coping in EG in compare to the CG.

Hypothesis 2: There are predictive differences having significant in between PTSD and Coping measurement points in EG compare to the CG.

PROCEDURE AND DATA GATHERING

Instruments:

The Childhood Post-traumatic Stress Reaction Index (CPTS-RI): The scale is considered the most widely used instrument for diagnosing PTSD in children (McNally, 1998). It is a 20 –item self-report measure of PTSD symptoms. It establishes the existence of 17 PTSD symptoms and 3 associated symptoms in children, as this scale would be appropriate to identify those children and adolescents who have experienced tsunami traumas (Criterion A stress factor), for example, Is the tsunami something that would upset or bother, most children of your age?, Do you get scared or upset when you think about the tsunami?, Do thoughts about the tsunami come back to you even when you do not want them to?’. In addition, to identifying symptoms of PTSD, the CPTS- RI can be further broken down into three symptom clusters: re-experiencing, numbing or avoidance, and hyperarousal. Criterion B, Re-experiencing the event (questions 2, 3, 4, 5, 17, and 19) ; Criterion C numbing or avoidance:(questions 7,8, 9 10,and 16); and Criterion D hyperarousal (questions 6, 11,12,14,15,and 20) The alpha reliability presented in Dissanayake, (2008) study in Sri Lanka in tsunami context was also ($\alpha=.80$) and split-half reliability was ($\alpha = .72$). The present study alpha reliability using current sample was found to be ($\alpha = .84$).

The Child Coping Questionnaire (CCQ): The CCQ is a 25-items self-report inventory was developed by Dissanayake (2006). The current study used this test with the permission given by Dissanayake, in order to examine children and adolescent’s coping strategies mobilized to deal with tsunami disaster related posttraumatic stress. This measure was constructed to examine the strengths and weaknesses of children in dealing with the negative impact of the tsunami. It assesses the extent to which they have used various coping strategies to deal with the PTSD caused by the tsunami. The CCQ is designed to be situation specific. To the current study the coping questionnaire was used “tsunami” specific. In current research the sample reports which coping strategies they used when tsunami related reminders were brought into mind. For example, “I try to forget it or I wish I could change what has happened”. The children were also asked to grade the extent to which they mobilized each coping strategy on a 5-point Likert-type scale (1=Never, 2= Sometimes, 3=Often, 4=Most of the time, 5=Always) (Dissanayake, 2006). Items are designed to assess thoughts over the past two weeks from the date of administering the test.

Eighteen coping strategies are included in the inventory and these strategies generated twenty-five statements. Many items from the Kid Cope test (which is a brief coping scale for children) were incorporated to this measurement after validating them to meet the local cultural context. In addition to those items, several other items were also included into this measurement because the items were adapted from Kid Cope, They did not represent enough coping strategies to examine coping after a traumatic event. On the other hand, since the purpose of the measure was to examine coping among

Sri Lankan children after experiencing a traumatic event, it was important to include items that are specifically relevant to the Sri Lankan cultural context (e.g., Turning to religion). These all coping strategies are grouped into four subscales in the CCQ. These are labelled as effortful disengagement, emotion- focused, problem- focused, and support seeking subscales. The current study alpha reliability was established ($\alpha=.72$)

INTERVENTION PLAN AND PARTICIPANTS

Painting therapy, General counseling, and Safe Place exercises under the cognitive treatment methods were included with mixed treatment approach for the tsunami affected children those who have received medication for PTSD from psychiatrics. In this study PTSD was measured with CPTS-RI and children were presented mild PTSD level. Twenty painting therapy sessions were conducted to EG group with using different, painting therapeutic techniques such as Mess painting and draw clients' thought and feelings, Spontaneous painting, Breath and painting motion, Painting with topic, Mandela painting, Dialogical and Fantasy tour painting with music. These painting methods help sample children's to resolving the emotional conflict and trauma; mess painting for trauma healing in insight of the cognition; mandala painting for develop of the attention span and concentration and reduce the anxiety. Dialogical painting develops empathy and commination; paint with music increases the relaxation of the subjects. Breath and painting motion enabled to release emotions and feelings of trauma of children, music with painting is ideal for traumatic memories reduction, and also cause negative emotion reduction (Witruk, 2008). Further, painting therapy is an insight oriented strategy. "Painting is used as a vehicle for communication for the purpose of developing insight and for resolving emotional conflicts (Bush, 1995, p.2). Many authors assert that art therapy is a valuable treatment in the area of sexual abuse trauma (Backos, 1999; Pifalo 2002; Powel, & Faherty, 1990) and trauma resulting from war and natural disasters (Howie, Burch, Conrad, & Shambaugh, 2002 to name a few.

On the other hand it helped to clients' reduction or removal of social and emotional disorders, somatic complaints and improvement of the coping strategies concerning conflicts Bush, 1995; Schottenloher, 2003). Children and adolescents can get relaxation of tensions, strength of coping and dealing with conflict, exoneration from frustrating life events. In addition to those painting were helped encouragements of the ability to create relationships, communication-improvement of social competence, improvement of concentration ability and persistence, and sensual motor abilities (Witruk, 2008).

In this study, each intervention session including painting therapy conducted with general counseling using Carl Rogers person centered counseling and Albert Ellis Rational Emotive Behavioral therapy. And imagination of a safe place exercise also implemented and this treatment method helped to client cope with the difficult situation, because of that becoming calm and getting energy are very fast. Further it form new cognition and it causes to control emotions and regulate the traumatic behavior (Reddemann, 2001). This study conducted with trained professional counselors and with the researcher. Two sessions were conducted within a week and session duration took two hours per a day. Tsunami affected children had PTSD, male and female children age between 12-16 years were selected to the study. Permission was received for their participation from their cares to the study and assured of anonymity and confidentiality with children. The intervention program was held as eight small groups.

Posttest 1: This test one was scheduled at each school after the three months of intervention program (at the end of 20 sessions). The same protocols for administration of the questionnaires for the pre-test were followed by the post-tests. A total of 40 participants from the EG and 40 participants from the CG.

Posttest 2: The test was administered three months following the intervention program. It was also conducted on experimental and control groups on the same day and same protocols for the pre-test were followed for the second post-test.

The Control Group: Waitlist group not received specific psychological therapeutic treatment program during the pre, post 1 and 2 of this study. However, considering ethical aspects, they were provided with painting therapy and safe place exercises, general counseling as done by the EG, after all measurements were completed.

DATA ANALYSIS METHODS

In this study mainly quantitative data analysis techniques were used. The data gathered from the two groups of children and adolescents were analyzed using mean, standard deviations, Spearman correlation. The two-way ANOVAs were computed three measurement times for the children's intervention. In addition to that effect sizes and power test were analyzed to discern three measurements time and groups differences. Children coping and PTSD association were analyzed with predictive model with Amos 17.

The specific hypotheses related with main research questions were considered verifying children intervention results. Each hypothesis focused on four main criteria: 1) general training effect pre, post1, and post 2), 2) short term effect (pre and post1), 3) long-term effect (pre and post 2), and 4) stabilization effect (post 1 and post2) respectfully. Factor 1 is Group factor (double-staged: EG and CG), Factor 2 is time factor (three staged: 3 measuring dates) thus, the following effects can be investigated:

- main effect of the time; labelled as "time" in the results tables, differences between pre, post1 and post 2.
- main effect of the group; labelled as "group" in the results tables, differences between EG and CG.
- interaction effect of the time and the group factor; labelled as "g x t" in the results tables; interaction between measurement dates and groups. With interaction between (g x t) effect is an intervention effect.

For the hypothesis acceptance three criteria were considered in the present study to determine the relevant effects due to intervention:

- the conventional (or adjusted) α -bound of 5% concerning the interaction between EG and CG and also the group effect with coping
- the effect size ($d'=30$: medium effect for ANOVA (Bortz & Döring, 2002))
- the test power ($1 - \beta = .60$: medium power)

If 2 out of 3 criteria's were fulfilled this study decided to accept the hypothesis.

III. RESULT (FINDINGS) AND DISCUSSION

Tsunami affected children were measured with four coping sub scales; Effortful disengagement, emotional-focused, problem-focused and support-seeking coping with 80 tsunami affected children. Each group consisted of 40 tsunami affected children and adolescents. Overall four sub scales items' were measured three times. According to the Figure1, intervention result showed that EG has decreased their coping effort after the three month interventions. Children's coping results indicated the mean value in pre-test in EG ($M= 3.00, SD =.37$), after 3 months intervention ($M= 2.49, SD=.61$) and 3 months follow- up ($M= 2.51, SD=.66$). In contrast to the CG in pre-test ($M= 2.86, SD= .42$) followed by the post-test 1 ($M= 2.82, SD =.48$), and post-test 2 ($M=2.77, SD =.69$) respectively. Besides that, t-test was proved equality in both groups' pre values and it was not significant ($t(78) = 1.51, p = .135$).

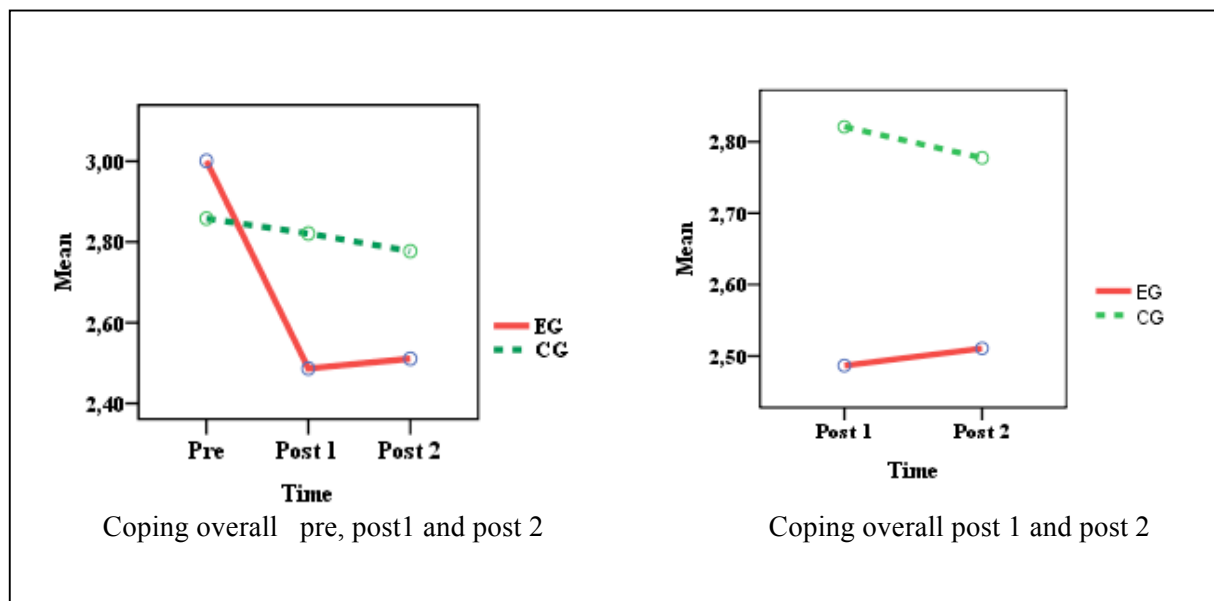


Figure 1. Coping overall in two groups and three measurement times pre, post1 and post 2

As presented Figure 1, the two way ANOVA with repeated measures general results of coping have shown significant changes in treatment group compared to the CG. This results proved that time factor as well (pre-post 1 and post 2) and interaction between group (EG and CG) (group x time) ($F(1.95, 140.13)= 8.91, p<.001, d' =.56, 1-\beta =.96$) and ($F(1.95, 140.13) = 5.65, p= .005, d'=.43, 1-\beta =.83$). The ANOVA, results, power and effect test have been proved that EG has changed the coping strategies in contrast to the CG accordingly, hypothesis was accepted. According to Table 1 three sub scales of coping strategies; effortful disengagement, emotional focused and support seeking scales results highlighted that overall group effect and measurement time were significant. It is proved that EG children coping strategies in general have been changed due to the intervention in compared to the CG and hypothesis were confirmed. The Problem-focused coping was not significant changes in within groups (see Table 3).

Table 1. Coping overall and 4 subscales general results

	EG			CG			General (pre-post1-post 2)				
	Pre	Post1	Post2	Pre	Post1	Post2	F	p	d'	Power	
Coping overall (Hyp 1.1)							Group	2.74	.102	0.22	0.37
Mean	3.00	2.49	2.51	2.86	2.82	2.77	Time	8.91	.000	0.56	0.96
SD	0.37	0.61	0.66	0.42	0.48	0.69	g x t	5.65	.005	0.43	0.83
Effortful disengagement (Hyp 1.2)							Group	1.72	.193	0.14	0.23
Mean	3.14	2.40	2.57	2.93	2.77	2.84	Time	11.25	.000	0.61	0.99
SD	0.67	0.68	0.73	0.52	0.69	0.91	g x t	5.01	.009	0.38	0.77
Emotional- focused (Hyp 1.3)							Group	0.33	.571	-0.03	0.03
Mean	2.84	2.47	2.41	2.66	2.61	2.63	Time	5.37	.006	0.43	0.81
SD	0.39	0.62	0.67	0.49	0.52	0.68	g x t	3.92	.023	0.34	0.64
Problem-focused (Hyp 1.4)							Group	0.14	.714	-0.9	0.01
Mean	3.45	2.69	2.72	3.07	3.10	2.90	Time	4.30	.015	0.36	0.70
SD	0.95	1.27	1.15	1.07	1.07	1.06	g x t	3.11	.049	0.28	0.52
Support-seeking (Hyp 1.5)							Group	1.87	.176	0.15	0.25
Mean	3.33	2.81	3.07	3.25	3.33	3.14	Time	2.16	.122	0.19	0.33
SD	0.64	0.95	0.94	0.67	0.76	0.87	g x t	3.79	.026	0.31	0.62

Table 2. Coping overall and 4 subscales short-term, long-term, and stabilization results

		Short-term (Pre -Post 1)				Long-term (Pre-Post 2)				Stabilization (Post 1- Post 2)			
		F	p	d'	Power	F	p	d'	Power	F	p	d'	Power
Coping overall (Hyp. 5.2-5.4)	Group	1.26	.265	0.11	0.16	0.	-	-	-	6.25	.015**	0.36	0.72
Mean	Time	15.16	.000**	0.57	0.97	12.	.001**	0.51	0.93	0.02	.901	-	0.00
SD	g x t	11.34	.001**	0.50	0.92	6.24	.015**	0.36	0.72	0.19	.662	-	0.02
												0.07	
Effortful disengagement (Hyp 5.6-5.8)	Group	0.63	.431	0.03	0.07	0.06	.803	0.13	0.01	5.23	.025*	0.32	0.64
Mean	Time	24.03	.000**	0.67	1.00	9.64	.003**	0.44	0.88	1.50	.224	0.12	0.19
SD	g x t	10.27	.002**	0.46	0.89	4.84	.031	0.30	0.61	0.37	.543	-	0.04
												0.02	
Emotional-focused coping (Hyp.5.10-5.12)	Group	0.04	.838	0.15	0.01	0.03	.872	0.17	0.00	2.08	.154	0.18	0.28
Mean	Time	8.51	.005**	0.45	0.83	8.74	.004**	0.45	0.84	0.07	.800	-	0.01
SD	g x t	5.33	.024*	0.34	0.65	6.92	.011**	0.40	0.76	0.23	.800	0.14	0.02
												0.06	
Problem-focused coping (Hyp.5.14-5.16)	Group	0.00	.964	0.23	0.00	0.36	.550	0.02	0.04	1.78	.187	0.15	0.23
Mean	Time	5.11	.027*	0.33	0.63	6.83	.011**	0.39	0.75	0.27	.603	-	0.03

												0.04	
SD	g x t	5.90	.018**	0.36	0.69	2.66	.107	0.21	0.36	0.56	.458	-	0.06
Support-seeking coping (Hyp. 5.18-5.20)	Group	2.70	.104	0.20	0.36	0.00	.965	-	0.00	3.57	.630	0.25	0.48
Mean	Time	4.63	.034	0.29	0.59	2.51	.117	0.19	0.34	0.64	.800	0.03	0.07
SD	g x t	8.71	.004**	0.42	0.84	0.34	.561	-	0.04	3.63	.600	0.25	0.48
												0.03	

Note: Alpha adjustment significant $\alpha^* \leq .02$ (**); tendency $\alpha^* \leq .03$ (*).

Table 3. Coping hypotheses verification (1.1-1.20)

	Hypothesis True	Hypothesis False
Coping overall		
<i>General 1.1</i>	×	
<i>Short-term 1.2</i>	×	
<i>Long-term 1.3</i>	×	
<i>Stabilization 1.4</i>	×	
Effortful disengagement		
<i>General 1.5</i>	×	
<i>Short-term 1.6</i>	×	
<i>Long-term 1.7</i>	×	
<i>Stabilization 1.8</i>	×	
Emotional -focused		
<i>General 1.9</i>	×	
<i>Short-term 1.10</i>	×	
<i>Long-term 1.11</i>	×	
<i>Stabilization 5.12</i>		×
Problem -focused		
<i>General 1.13</i>		×
<i>Short-term 1.14</i>	×	
<i>Long-term 1.15</i>		×
<i>Stabilization 1.16</i>		×
Support- seeking		
<i>General 1.17</i>	×	
<i>Short-term 1.18</i>	×	
<i>Long-term 1.19</i>		×
<i>Stabilization 1.20</i>		×

According to table 2, and 3 overall coping and all sub scale analysis in two way ANOVA and hypotheses verification presented. Effortful disengagement coping items which stay away from the tsunami reminders; avoidance (e.g., sea, television program on tsunami; trying not to think of the tsunami); denial (e.g., saying that myself it has not really happened); Numbing of Emotions (e.g., something to do like play); distraction (e.g., watch television or read to forget tsunami) and mental disengagements have been changed in EG in contrast to the CG. After the intervention, EG children were less likely to think of the tsunami, less daydreaming, less likely to watch television to forget the tsunami experiences.

According to the table 2, the emotional- focused coping efforts were less in after the twenty sessions of intervention to compare to the pre-test findings in EG. For instance; less likely to blame themselves not able to help others; less likely to try and see the good side of things; less likely to yell, scream, get mad and less likely wish the problem never happened. Although, stabilization effect both groups have not differed because of that both group pushed to further effort of the coping with their problems.

Problem-focused coping; thinking of a solution to get over the problem; try to sort it out by doing something, these items revealing that EG has changed the effort of coping due to the intervention. Long-term and stabilization effects could not achieved any changes. The stabilization effect was not found differences between both groups.

Support-seeking coping items: advice from someone about what to do and turning to engage religious activities (e.g., going to the temple or church, chant stanzas, pray for God's help or help from Dhamma) coping factors are changed in EG within general and short-term effects in EG contrast to the CG. But there was no any effect with long-term and stabilization measurement times in EG children, therefore, between groups effect not stabilized the intervention changes in particularly in EG.

All together these findings are lined up with previous intervention findings which observed that a significant proportion of children report PTSD symptoms after catastrophic disaster. In a study after Hurricane Floyd, (Russoniello et al., 2002) found after five weeks behavioral medicine intervention reduced the PTSD symptoms and changed the coping preferences as well. Those less effort of coping strategies findings were, in respect to the hurricane and flood, less tried to see good side of things (cognitive restructuring), less blaming others (blaming others); less likely to try and fix the problem by doing something or talking to someone about it (problem solving); less to yell, scream, get mad (emotional regulation); less wish the problem never happened or that they could do something about it (wishful thinking); less feel better spending time with family (social support). The present study was not focused on each coping item changes but it determined with specific subscales and those above coping items were belonged to the all four subscales (see Table 2 hypotheses verification).

In this study research question 1, was to measure relationship between PTSD and coping strategies during the intervention in EG compared to the CG. The correlations results were calculated in three measurement time's pre, post 1 and 2 tests within EG and CG. Each measurement time correlated with PTSD and four subscales scales of coping within the EG in comparison to the CG. Increases in PTSD symptoms were significantly correlated with the effortful disengagement coping scale pretest in EG ($r = .35, p = .025$) and CG ($r = .43, p = .006$). The subscale's coping items are included avoidance, denial (say to myself that it has not happened), numbing of emotions, mental disengagement (daydream about thing other than this), and distraction (do something like play, watch or read a book to forget it). Tsunami-affected whole sample children and adolescents have significant relationship between PTSD and effortful disengagement coping prior to the intervention (pretest).

Emotional-focused coping included items; like emotional regulation (try to calm myself down), social withdrawal (try to stay away from others), self-blame, blaming others, wishful thinking (wish that it never happened), humor, resignation and helplessness (do nothing because the problem could not be sorted out), acceptance and cognitive restructuring; these items correlated results of these items associated significantly. For the PTSD, in EG ($r = .68, p < .001$), and CG ($r = .38, p = .014$). That means both groups coping efforts were significantly associated with posttraumatic stress before the intervention.

Despite that problem-focused coping; (try to sort it out by doing something about it); obtaining information (try to think of a solution to get over the problem) in EG had significant tendency ($r = .27, p = .092$), but in control group revealed the significant differences ($r = .48, p = .002$). The support-seeking scale included social support (try to get advice from someone about what to do) turning to religion (engage in religious activities, such as going to the temple/ chant stanzas, pray for God's help) were not reached the significance with PTSD in pre intervention in both groups EG ($r = .36, p = .024$) and CG ($r = .28, p = .081$). In accordance with the present study, prior to the intervention

correlation results verified that problem-focused and support-seeking coping were the least associated with posttraumatic stress.

After the intervention of three months correlation results presented that, PTSD posttest 1 also correlated above 4 subscales of coping in EG, effortful disengagement coping ($r = .34, p = .045$), emotional-focused coping ($r = .38, p = .016$), problem-focused coping ($r = .21, p = .192$) support seeking coping ($r = .36, p = .024$). Except problem-focused coping others subscales could reach the significant relationships in EG after the intervention. This was in contrast to CG, all four scales reached the significant relationships; effortful disengagement coping ($r = .43, p = .006$), emotional-focused coping ($r = .44, p = .004$), problem-focused coping ($r = .39, p = .014$), support-seeking coping ($r = .28, p = .08$), that means CG had effort to cope with posttraumatic stress. In particular, the problem-focused coping scale is significant that means tsunami-affected children who were in waitlist group for treatment, try to solve their psychological problems and practicing the religious activities of coping.

Follow-up period measures findings revealed that (PTSD posttest 2 correlated with coping posttest 2 all coping subscales) effortful disengagement coping in EG ($r = .59, p < .001$), CG ($r = .65, p < .001$), emotional-focused coping in EG ($r = .53, p = .001$) in CG ($r = .71, p < .001$), problem-focused coping in EG ($r = .48, p = .002$), and CG ($r = .42, p = .006$) as well as in support-seeking coping in EG ($r = .27, p = .09$) and CG ($r = .59, p < .001$) found significant relationships with PTSD and coping in both groups.

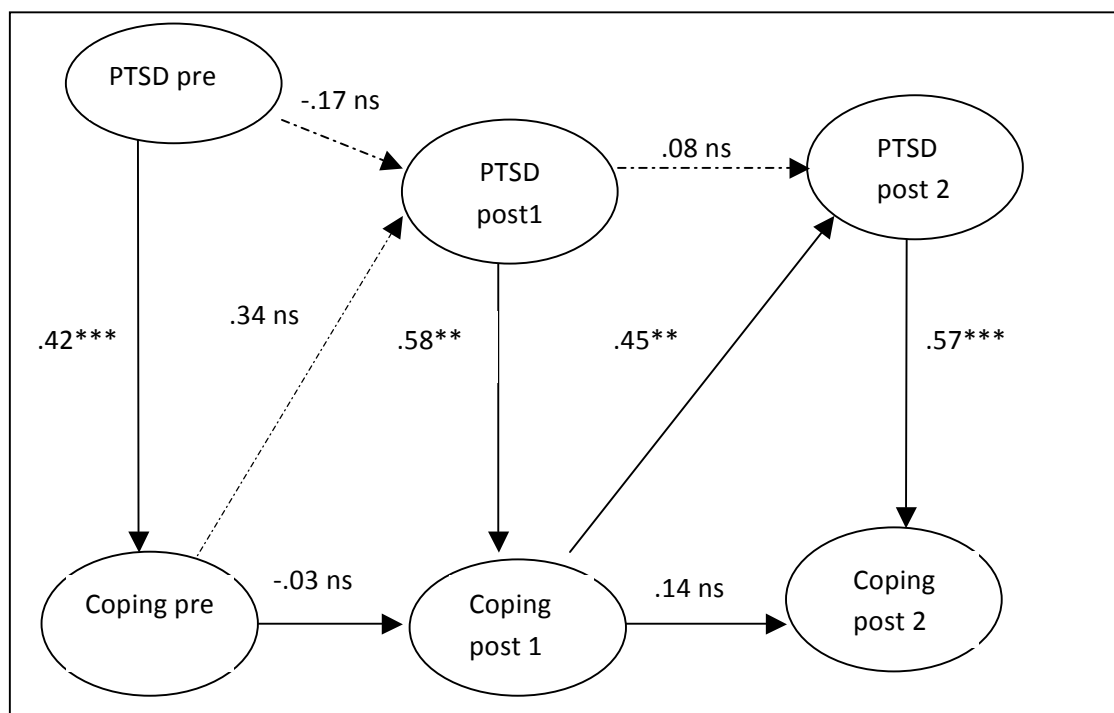
These results lined with previous findings by Dissanayake (2006; 2008) social withdrawal, cognitive restructuring, wishful thinking, problem-focused thinking, mental disengagement denial, and ventilation of emotions, emotional regulation, seeking advice, avoidance and religious coping strategies were related to the PTSD significantly. Similarly, Knight and Sullivan (2001) reported that emotional regulation and wishful thinking were significantly associated with PTSD after Tornado exposure. Russonelo et al., (2002) too found sample of children after Hurricane Floyd and it reported that emotional regulation, social withdrawal, self-criticism and problem solving were strongly related to the symptoms of PTSD. The present study to similar in above studies but problem solving was least associated with PTSD in EG contrast with CG in pre intervention. This is lined with the findings of Dissanayake, (2008) that are observed in a sample of children after 11 months of the tsunami in Sri Lanka. Dissanayake, (2008) study further proved that support-seeking coping with cultural context in Sri Lanka which turned to religious coping and was high in affected children, but seemingly present study, pre intervention findings proved that support-seeking coping related only with PTSD in EG but least in control group exposed tendency coping.

Previous research findings further showed the role of children's coping efforts in post disaster functioning extended. Research has shown that children's coping efforts are positively associated with their PTSD symptoms (La Greca et al., 1996; Vernberg et al., 1996). Social support has been found to be predictive of children's PTSD symptoms (La Greca et al., 1996; Vernberg et al., 1996). In particular, negative coping strategies (e.g., blame and anger) have been found to have unique contributions to initial PTSD symptomatology (La Greca et al., 1996; Vernberg et al., 1996). Similarly, other several community studies have found that children and adolescents with more negative coping strategies dealing with stress, showed higher levels of PTSD symptoms in response to natural disaster (La Greca et al., 1996). The present study is lined up with above studies, for instance, emotional-focused coping (e.g., blaming others, self-blame) and support-seeking coping subscales were associated with PTSD.

During the intervention in EG children emotional-focused, effortful disengagement and support-seeking coping subscales were associated with PTSD. Except problem-focused scale was not found

significantly that means they were not trying to solve problems during the intervention. Although, in CG's children and adolescents corroborated in all four subscales; effortful disengagement; emotional-focused; problem- focused; support -seeking coping strategies association with PTSD. The EG children PTSD and coping relationship is line in intervention study by Russoniello et al., (2002).

The present study research question 2, was measured PTSD and Coping predictive relationships with in three measurement times (pre-post 1 and post 2) during the intervention. Coping prediction in EG presented during the intervention found no significance and the interesting fact was that PTSD variable inter relationship presented non-significance (PTSD pre-post1-post 2; coping pre-post1-post2) (see Figure 2). Coping post-test 1 predicted PTSD (coping post1 –PTSD post 2) ($\beta = .45$, $p < .01$). As shown in the Figure 2, control group children's predictive results showed differently, that means, PTSD pre-test predicted significantly with coping pre- test. Each variable has significant interrelationship in three measurements points (e.g., coping pre- post 1- post 2 and PTSD pre- post 1- post 2). Further prediction was failed in (coping pre-test –PTSD post 1; coping post 1 –PTSD post 2). Except those interesting factors, that both groups prediction further illustrated significantly between PTSD pre and coping pre; PTSD post 1 and coping post 1; PTSD post 2 with coping post 2 (see Figures 2 and 3).

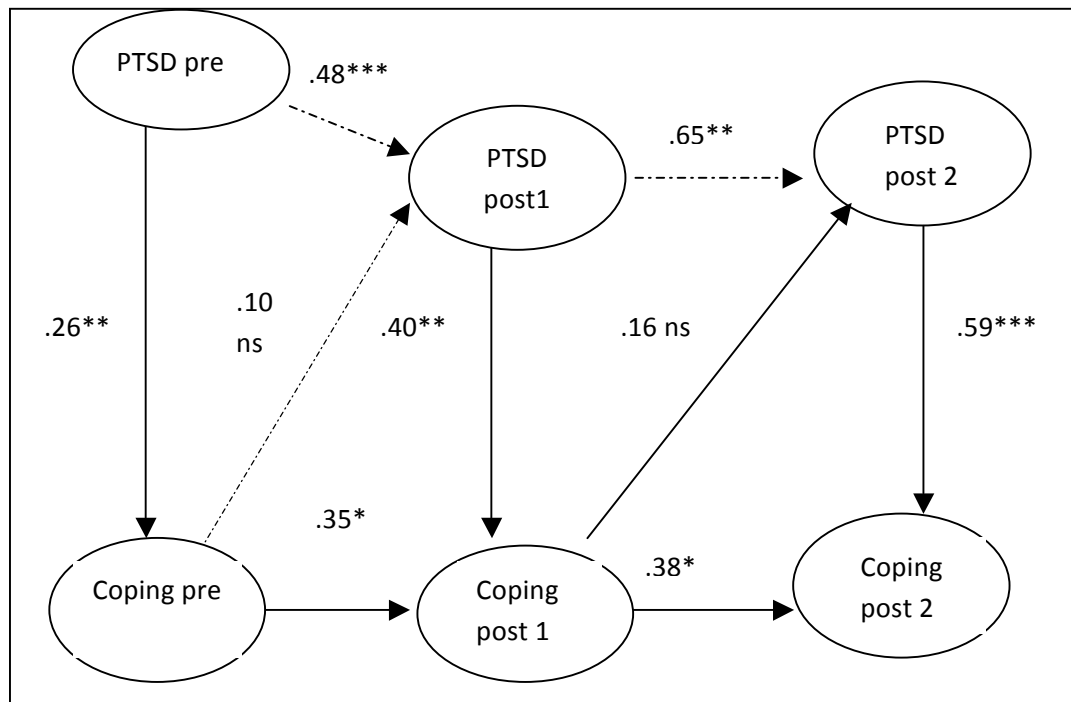


Note: $p < .001^{***}$ $p < .01^{**}$ $p < .05^*$ ns = non-significance

Figure 2. PTSD and coping predictive relationship in experimental group.

Using Amos 17, the specified model was tested to see whether it fits to the data. The results revealed in EG goodness of fit of the model to the data. The results were extremely interesting. As presented in Figure 2, the results demonstrated that there was a significant matching between the data and model ($\chi^2 = 4.186$, $df = 6$, $p = .651$, $CMIN/df = .698$, $RMR = .022$, $GFI = .966$, $AGFI = .882$, $NFI = .933$, $RFI = .832$, $IFI = 1.032$, $TLI = 1.096$, $CFI = 1.000$, $RMSEA = .000$, $NCP = .000$). In CG results presented goodness of fit of the model to the data. As presented in Figure 3, the results demonstrated that there was a significant matching between the data and model. ($\chi^2 = 8.919$, $df = 6$, $p = .178$, $CMIN/df = 1.486$,

RMR=.021, GFI=.935, AGFI=.774, NFI=.912, RFI= .780, IFI=969, TLI= .916, CFI=966, RMSEA=.112, NCP=2.919). Because the statistic criterion is reached the expected values (e.g., $CMIN/df \leq 2.5$, $GFI \geq .9$, $AGFI \geq .9$, $NFI \geq .9$, $CFI \geq .9$, $RMSEA \leq .05$). Accordingly, coping predicted the PTSD in both groups' model data fits and results and hypothesis 3 and 4 were confirmed.



Note: $p < .001$ *** $p < .01$ ** $p < .05$ * ns = non-significance

Figure 3. PTSD and coping predictive relationship in control group.

The EG children have received treatment methods and it is proved that they are not required further coping mechanism during intervention. In relation to the Figure 2, most interesting fact was that during three months treatment time, PTSD and coping association were not found in EG (e.g., PTSD pre-test has predicted PTSD post 1 ($\beta = -.17$, $p = ns$), coping pre-test predicted PTSD post 1 ($\beta = .34$, $p = ns$). Priority to the intervention, PTSD pre-test predicted coping pre-test, those findings revealed highly significant relationship ($\beta = .42$, $p < .001$).

The control group as presented Figure 3, both variables: PTSD predicted coping in pre-test ($\beta = .26$, $p < .01$) and PTSD pre and PTSD post 1 prediction found significant relationship ($\beta = .48$, $p < .001$), but between coping pre predicted PTSD post 1 found no significant. Accordingly, hypothesis (4) can be accepted that during the intervention period both groups' coping and PTSD predictive relationship showed different patterns.

During the three months intervention, an EG children were not required effort of coping with PTSD in contrast to the CG. However, children of the both groups' and adolescents' pre-test findings corroborated that PTSD had predicted coping, in relation to this consistent with previous study (e.g., Huzziff & Ronan, 1999). Consequently, after the intervention, in EG was not predicted consecutive interaction with each variable (e.g., PTSD pre-PTSD post 1- PTSD post 2 and coping pre-post 1 and post 2), Interesting finding was that CG encountered the consecutive interaction in relationship. Despite that the predictive further showed in follow-up measurement point in both groups. Accordingly, results suggested that in CG children initial coping was one of the largest predictive factors for children's coping over time in contrast the EG group's children.

This study concludes psychological intervention contributed to enhances balance emotions, particularly, imagination of a safe place exercise contributed to the decrease of the tsunami related fear because of forming new cognition and it supports to control the emotions and regulate the behaviour (Reddemann, 2001). Breath and pointing motion enabled to release emotions and feelings of trauma of children, music with painting is ideal for traumatic memories reduction, and also cause negative emotion reduction (Witruk, 2008). Accordingly, it can be agreed with previous studies that the present study has also fulfilled the research aims and hypotheses.

VI. CONCLUSION

In this psychological intervention study was effective to increase successful regulation of emotions and decrease the negative coping strategies significantly in EG children in compared to the CG children. For instance, less likely to think of the tsunami, less daydreaming, , less likely to blame themselves, less likely to yell, scream, thinking of a solution to get over the problem; try to sort it out by doing something and increase to think of the positive side of it. During the intervention which this study implemented painting therapy, cognitive techniques under the safe place exercises and counselling contributed to the support for the tsunami-affected children.

But prior to the intervention (pre-test) results proved both group children had significant relationship between posttraumatic stress and coping strategies. During the intervention, problem-focused and support- seeking coping scales corroborated only in general and short-term effects in EG in compared to the CG. Long-term and stabilization effects were failed, that means in both groups need more help in social support and to solve their problems. As suggestion in this study parents, or care givers needs to be received counselling and psycho-education, for how to interact with affected children and awareness programs should implement for the schools administrates and teachers. It is required further psychological counselling training for school counsellors and this type of intervention has to be continued in all tsunami -affected areas in the North and East parts of in Sri Lanka.

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