6.0 STUDY II: EFFECT OF YOGA ON PSYCHOLOGICAL WELLBEING

6.1 INTRODUCTION

Orphan children (OC) are not actively consulted and encouraged to participate in helping to solve the problems they are affected. Moreover, there is a lack of coordination between caregiver organizations, leading to ineffective and inefficient service provision for the vulnerable group (Earnshaw et al., 2009). Africa is most often referenced when discussing the orphan burden whereas Asian countries are caring for 71.5 million orphans (UNICEF, 2011). In Asia, high mortality among young parents from conditions such as malaria, tuberculosis, Acquired Immunodeficiency Syndrome (AIDS), pregnancy complications, violence and accidental deaths, and natural disasters are responsible for the large and increasing number of OC (Hosegood et al., 2007; UNICEF, 2008; World Health Organization, 2011). Similarly, it was reported that OC had significantly higher scores than non-OC on individual items in the Beck Youth Depression Inventory that are regarded as particularly "sensitive" to the possible presence of a depressive disorder, i.e., vegetative symptoms, feelings of hopelessness, and suicidal ideation (Atwine et al., 2005). Furthermore, OC were found to suffer greater psychological distress than non-OC (Makame et al., 2002).

In general, it has been observed that OC are not receiving adequate food or balanced diets. In addition, they had difficulties in accessing health facilities. The condition of education assistance is also limited. OC may generally rely on family and community networks for assistance. Further, OC may rely on non-governmental organizations (NGOs) for the needs.

The death of the last parent has a profound effect on survivors, and therefore, OC are often coping with grief, loss, and awareness that their lives are forever changed (McDaniel & Clark, 2009). Furthermore, in the case of OC with HIV/AIDS, families play central roles in caring, and there are two family resources essential for supporting children, i.e., time and money. However, it is observed that parents have less time for their OC, and these children experience greater health and academic problems (Heymann & Kidman, 2009). Communities are playing an important role in helping OC families by providing adequate childcare and financial support. Unfortunately, while communities commonly offer informal assistance, the value of such support may not be adequate to match the magnitude of the need. Research shows that OC are vulnerable to experiencing multiple traumatic events and suffer poor self-regulation leading to emotional and behavioral difficulties and trauma-related disorders (Eisenberg et al., 2005; Whetten et al., 2011).

First of all, there is a need to consider alternative and potentially empowering approaches to psychological distress in OC. In order to alleviate the burden of mental illness affecting vulnerable children, development of an evidence-based effective and feasible therapeutic intervention is needed. Yoga is a feasible and acceptable activity with self-reported benefits to the child's mental and physical health. The OC with trauma-related distress showed improvements in symptoms after participation in an 8-week yoga program as compared to controls (Culver et al., 2015). Further, when children are orphaned, they are at a higher risk for experiencing the potentially traumatic events due to lack of adequate adult protection (Ahmad et al., 2005). Suryanamaskara training, a part of yoga, enhances selective attention among OC and may be useful for their academic performance (Devi et al., 2015).

Yoga related self-care or self-management strategies are widely accessible, are empowering, and may address the mind–body symptoms of stress related disorders. (Jindani & Khalsa, 2015). Yoga is a feasible and acceptable activity with self-reported benefits to child mental and physical health. A study on effectiveness of three months yoga for OA reported that yoga enhances their executive function and may have potential implications on learning, classroom behavior and in handling the adverse circumstances and stand as a preventive measure for mental health problems (Purohit & Pradhan, 2017). Furthermore, an evidence-based yoga review suggests that certain postures, breathing techniques, concentration and meditation practices helps for effective rehabilitation in orphans (Sharma et al., 2018). As per previous report that children with trauma-related distress shows improvements in symptoms after participation in an 8-week yoga program compared to controls (Culver et al., 2015), it may suggest that regular yoga practice by OA may serve as a useful adjunctive component of trauma-focused treatment to build skills in tolerating and modulating physiologic and affective states that have become deregulated by trauma exposure. Hence, current study explored the effects of yoga-based intervention on psychological wellbeing among orphan children.

6.2 MATERIALS AND METHODS

6.2.1 Subjects

Subjects were orphans staying in residential orphan center. The inclusion criteria for this study were that the participants are of 11 to 14 years of age; meet the criteria of single or no parent or abandoned, capable of comprehending and speak English, show sufficient stability in psychological symptoms. The exclusion criteria were adolescents diagnosed with severe psychiatric ailments, developmental disability or intellectual disability, and physical impairment. The sample consists of 26 Boys and

41 Girls. Mean age of the subjects was 12.42 years (SD=1.03). Participants received no financial return for their participation. Eligible individuals provided written informed consent and completed the baseline assessment. Outcome assessment was conducted individually and performed by research staff blinded to intervention assignment. Following baseline assessments, the subjects were assigned randomly to the yoga intervention or control for 12 weeks. The study was reviewed and approved by the S-VYASA University ethical Committee. The study was conducted in an orphanage good life at Chennai, Tamil Nadu.

6.2.2 Assessment

Short Depression – Happiness Scale (Joseph et al., 2004)

The SDHS was designed to extend existing measures of depression beyond the zero point to measure not only the absence of depression but also the presence of happiness. The SDHS consists of six items, three items measuring happiness (e.g., I felt happy) and three reverse coded items measure depressive states (e.g., I felt my life was meaningless). Participants rate how frequently they feel the way described in the item on a four-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often). When the items are summed, people can score from 0 (depressive state) through 9 (neither unhappy nor happy) to 18 (very happy).

Child and Adolescent Mindfulness Measure (CAMM, Greco, Baer & Smith, 2011)

The 10-item CAMM measure was administered to evaluate the mindfulness. The CAMM evaluates the degree to which adolescents observe internal experiences, act with awareness, and accept internal experiences without judging them. It has a single factor structure. Participant has to indicate how each item reflected their experience using a 5-point scale from 0 (Never true) to 4 (Always true). All items in this scale

described actions contrary to a mindfulness perspective. Therefore, each question was reverse scored and added to create a total score. High scores indicate a high degree of mindfulness. The reliability of the scale demonstrates a good interval consistency of Cronbach's alpha= 0.87, while the validity of the research using CAMM suggests that the measure has good concurrent validity

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)

ERQ which assesses the typical use of emotion suppression (four items, e.g., "I keep my emotions to myself") versus reappraisal (six items, e.g., "When I want to feel less negative emotion, I change the way I'm thinking about the situation"). Each item is rated on a scale from 1 (strongly disagree) to 7 (strongly agree).

The Short Mood and Feelings Questionnaire(SMFQ, Turner et al , 2014)

Children's depression measured by 13 items SMFQ, which focuses on the affective, cognitive and somatic components of depression. SMFQ is a unidimensional scale. The participants rate each statement on 2 (true), 1 (sometimes true), or 0 (not true) scale over the past two weeks. SMFQ correlates highly with the standard measures of depression and discriminates depressed from nondepressed children in general population samples. The scores on each item can then be summed to produce a total score ranging from 0 to 26. Score 11 and above considered as high levels of depressive symptoms.

Positive and Negative Affect Schedule for Children (PANAS-C, Huebner & Dew, 1995)

The PANAS-C is a 10-item yield positive affect (PA) and negative affect (NA). Children rate on a 5-point Likert scale (1 = very slightly or not at all, 5 = extremely) the extent to which they have felt PA (joyful, cheerful, happy, lively, proud) and NA (miserable, mad, afraid, scared, sad). Participants rated the degree to which they

have experienced each particular emotion during the previous two weeks. The measure's total scores range from 5 to 25 for each positive and negative affective state. The PANAS-C differentiate youths with associated clinical disorders apart from youths with non-targeted emotional and behavioral problems. The PANAS-C subscales have shown good internal consistency and modest convergent and discriminant validity

6.2.3 Intervention

List of practices in the Yoga program

Order No.	Intervention components	No. of Rounds	Approx. Time (Total 90 min)	Schedule
1	Yogic Prayer, Session on basic concepts of Yoga and Instructions for the class		10 min	4 days /week (Wednesday, Thursday, Saturday and Sunday)
2	**Preparatory practices:** **a)** Warm up: Jogging, jumping, hopping, forward & backward bending, Side bends, Twisting **b)** Loosening: for toes, ankle, knee, hips, fingers, wrist, elbow and neck **c)** Stretching with Breathing exercises: Hands in and out, hands stretch, Ankle stretch, Hip stretch, Backstretch, Tiger stretch (Spinal ups-	One each	10 min	4 days /week (Wednesday, Thursday, Saturday and Sunday)

	down), Supine straight leg raising, Cycling, Lumber stretch, Rocking and rolling			
3	**Sun salutation** (*Suryanamaskar*)	10-12	10 min	4 days /week (Wednesday, Thursday, Saturday and Sunday)
4	**Asana** (Postures): A. Standing postures a) Half waist rotation posture *(Ardhakati Chakrasana*) b) Foot palm posture *(Padahastasan*) c) Half wheel posture *(Ardha chakrasana*) d) Triangle posture (*Trikonasana*) *e)* Tree posture *(Vrikshana)* f) Eagle posture *(Gasudasana*) B. Sitting postures a) Diamond (*Vajrasana*) b) Rabbit posture (Shasahankasana) c) Sleeping diamond posture (*Suptavajrasana*)	1 each	20 min (around 1 min each posture)	4 days /week (Wednesday, Thursday, Saturday and Sunday)

	d) Camel posture *(Ustrasana)* e) Posterior stretch *(Paschimotasana)* f) Spinal twist posture *(Ardhamatsyendrasana)* g) Cow face posture *(Gomukhasana)* C. Prone posture: a) Cobra posture *(Bhujangasana*) b) Grasshopper posture (*Salabhasana*) c) Bow posture *(Dhanurasana*) d) Shoulder stand (*Sarvangasana)* e) Plough posture (*Halasana*) D. Supine postures a) Fish posture (*Matsyasana*) b) Boat posture (*Naukasana*)			
5	Deep Relaxation Technique (DRT)	1	10 min	4 days /week (Wednesday, Thursday, Saturday and Sunday)
6	***Pranayama (voluntary regulation of breath)***:	1 each	15 min	4 days (Wednesday,

	a) Breathing with forceful exhalation with passive inhalation (*Kapalabhati*-3 types) b) Breathing with rapid inhalation & exhalation *(Bhastrika),* c) Slow & rhythmic alternate nostril breathing (*Nadisodhana*) d) Exhalation, with a honey bee sound (*Bharamari*) e) Ujjai (Hissing in thought while exhaling)			Thursday, Saturday and Sunday)
7	**Concentration Techniques:** a) Eye exercises (*Netra shakti vikasana)* b) Practice to improve collective motivation (*Dhruti shakti vikashaka)* c)Activity to improve intellect (*Dhi shakti vikasaka)* d) *Trataka* e) Palming	1 each	15 min	2 days /week (Wednesday and Saturday)
8	**Yogic games** (games for memory, awareness and creativity)		15 min	2 days /week (Thursday and Sunday)

6.3 RESULTS

The trial profile is shown in Fig. 1. Of 70 recruited participants, data for 67 orphans were available, yoga(n=34) and control(n=33) for final analysis. The reason for dropout is enlisted in the trail profile. All statistical analysis was performed using the computing environment R (version 3.4.0).

Figure 1-**TRIAL PROFILE**

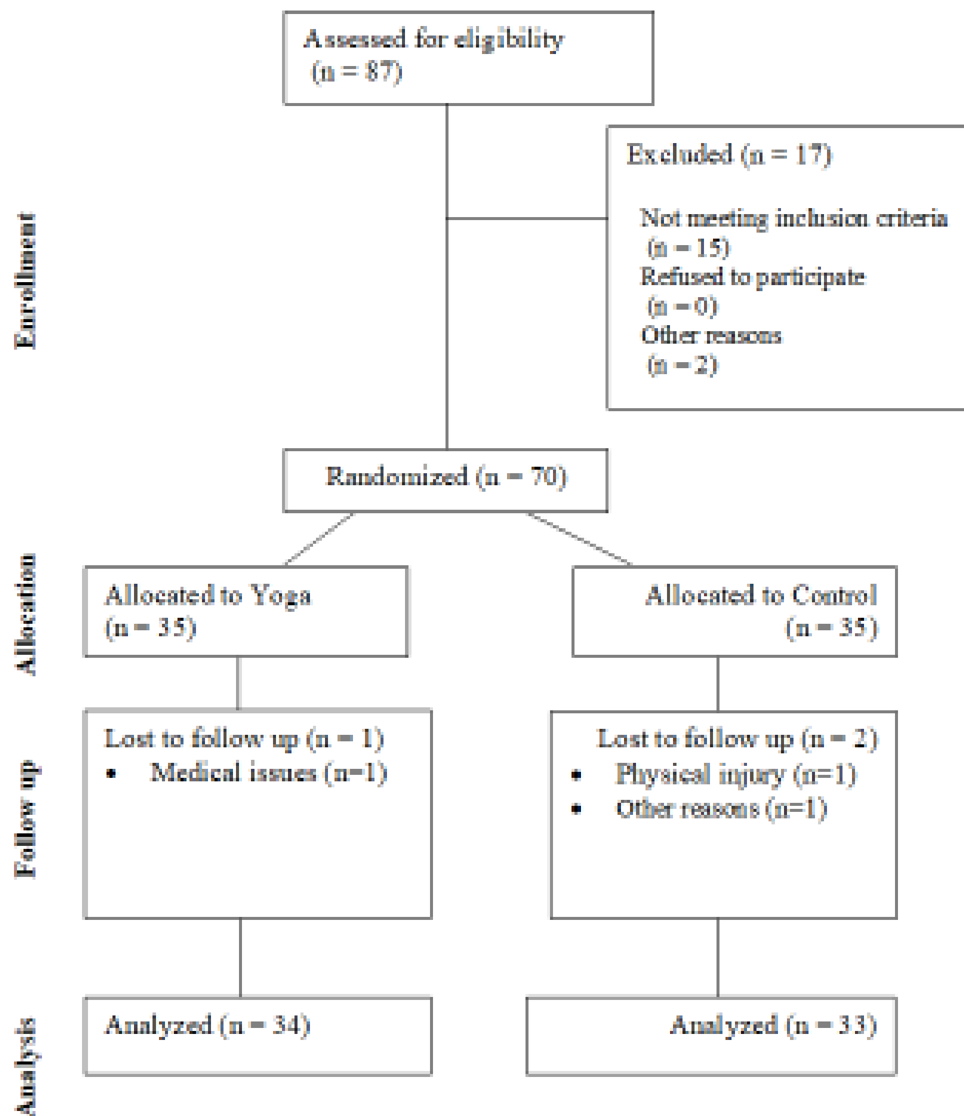

Table 3. **Results of mindfulness in the yoga group and the control group**

Mindfulness	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	20.79(6.197)	25.74(7.53)	-8.25 to -1.66	-3.04	.005	-0.52
Control (n=33)	21.78(5.93)	22.54(4.71)	-2.44 to .92	-.917	.366	-0.16

A paired-samples t-test was used to determine whether there was a statistically significant mean difference between the mindfulness when participants imbibed a yoga way of life compared to a control condition. Data are mean ± standard deviation, unless otherwise stated. Post yoga intervention showed statistically significant differences in mindfulness in yoga ($p < 0.005$ d=0.52), whereas in the control group, did not find significant differences in mindfulness ($p< 0.366$, d=0.16). An independent-samples t-test was run to determine if there were differences in mindfulness between yoga and control group. The mindfulnes was enhanced in yoga than control, a statistically significant difference of $t(67) = -2.27$, $p = .026$.

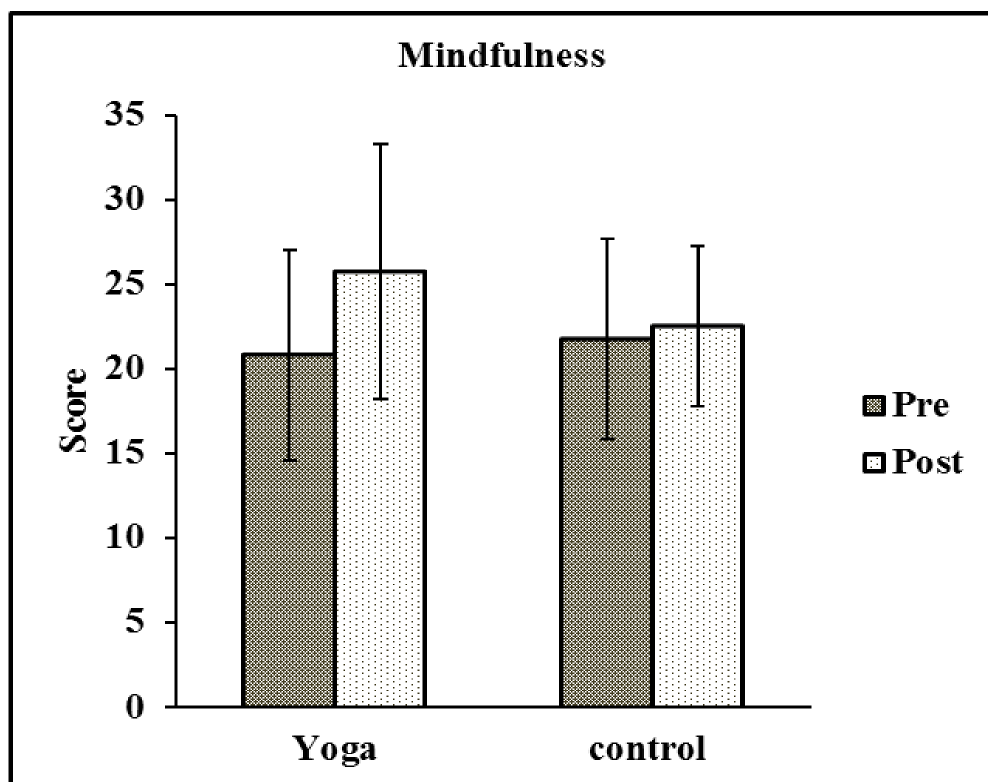

Figure 2. Graphical representation of results of mindfulness in the yoga group and the control group

***Table 4*. Results of happiness in the yoga group and the control group**

Happiness	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	5.41(1.54)	6.47(2.36)	-1.96 to -.16	-2.34	.023	-0.41
Control (n=33)	5.30(1.89)	5.69(1.76)	-1.35 to .56	-.837	.409	-0.14

A paired-samples t-test was done whether there was a statistically significant pre-post difference in happiness following yoga based intervention and to a control condition Following yoga-based intervention a statistically significant improvement in happiness in yoga group ($p < 0.023$ d=0.41), while in the control group, did not find significant differences in happiness ($p< 0.409$, d=0.14). The independent samples t-test was administered to evaluate the differences in happiness between yoga and control group. There was not statistically significant difference of $t(67) = -1.03$, $p = .307$ in happiness between yoga and control conditions

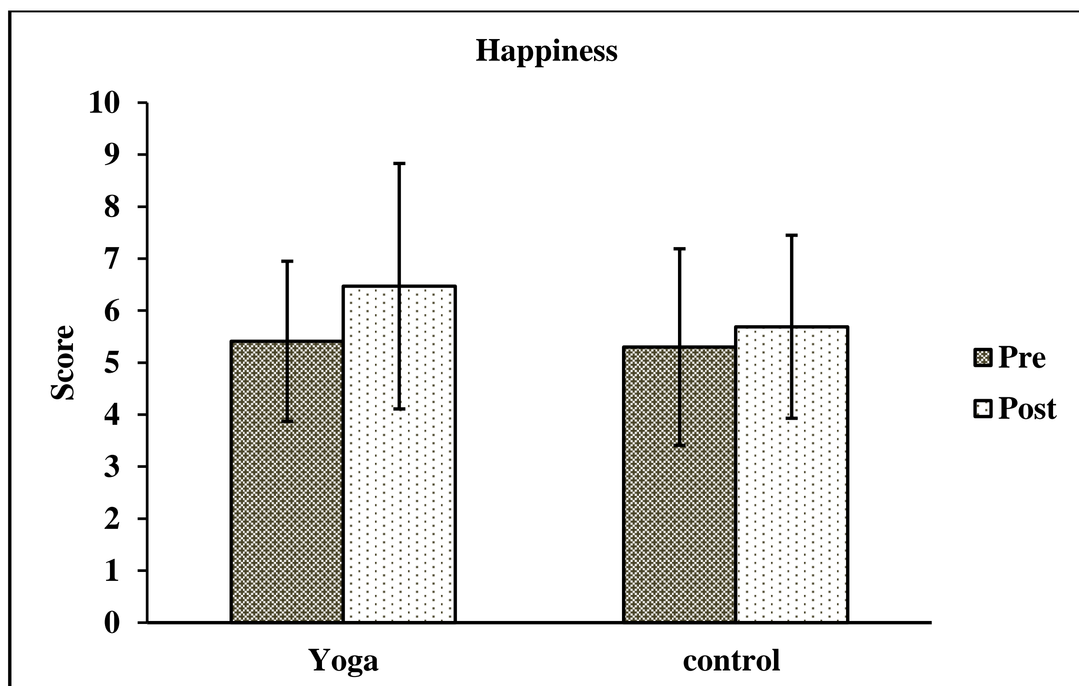

Figure 3. Graphical representation of results of happiness in the yoga group and the control group

Table 5. **Results of depression in the yoga group and the control group**

Depression	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	10.21(4.14)	7.765(3.45)	.97 to 3.912	3.38	.002	0.58
Control (n=33)	9.27(3.59)	9.48(3.10)	-1.69 to 1.27	-.292	.772	-0.05

A paired-samples t-test was administered to evaluate statistically significant mean difference between the depression when participants undergone yoga based intervention compared to a control group. Following yoga intervention there was a statistically significant reduction in depression ($p < 0.002$ d=0.58), whereas in the control group, did not find significant differences in depression ($p < 0.772$, d=0.05). Further, independent-samples t-test was applied to evalaute the differences in depression between yoga and control group. The depression was reduced in yoga than control, a statistically significant difference of $t(67) = 2.58$, $p = .012$.

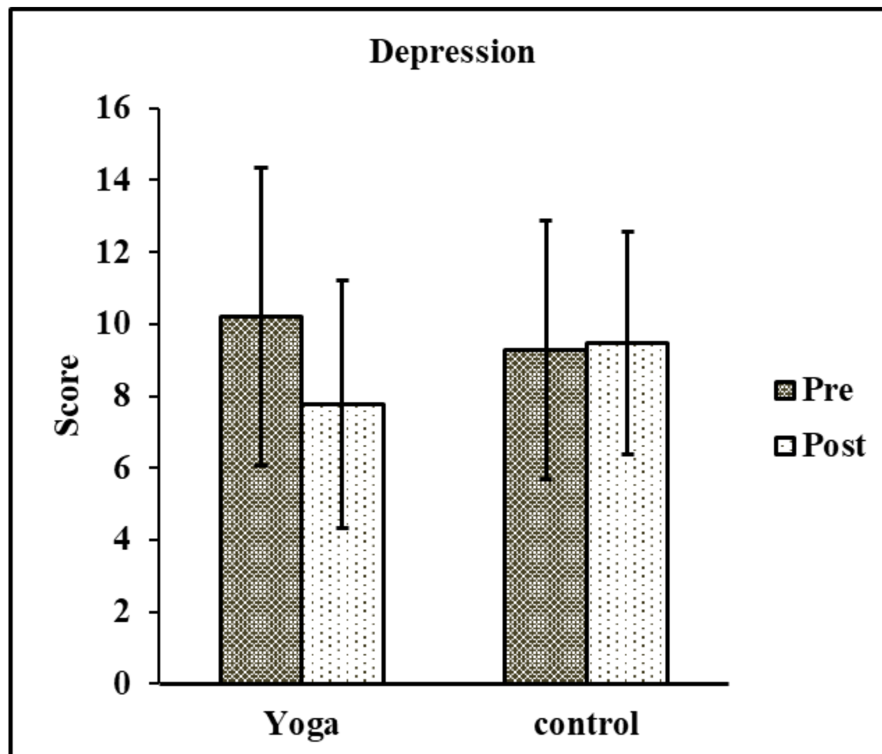

Figure 4. Graphical representation of results of depression in the yoga group and the control group

Table 6. **Results of reappraisal in the yoga group and the control group**

Reappraisal	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	19.50(3.62)	20.82(2.94)	-2.8 to .22	-1.74	.090	-0.29
Control (n=33)	21.06(4.15)	21.54(4.49)	-2.75 to 1.78	-.436	.666	-0.07

A paired-samples t-test was used to determine whether there was a statistically significant mean difference between the reappraisal when participants imbibed a yoga way of life compared to a control condition. Post yoga intervention did not find significant differences in reappraisal in yoga ($p < 0.090$ d=-0.29) and in the control group ($p< 0.666$, d=-0.07). An independent-samples t-test was run to determine if there were differences in reappraisal between yoga and control group. There was no statistical significant difference in reappraisal among yoga and control- $t(67) = -.626$, $p = .533$.

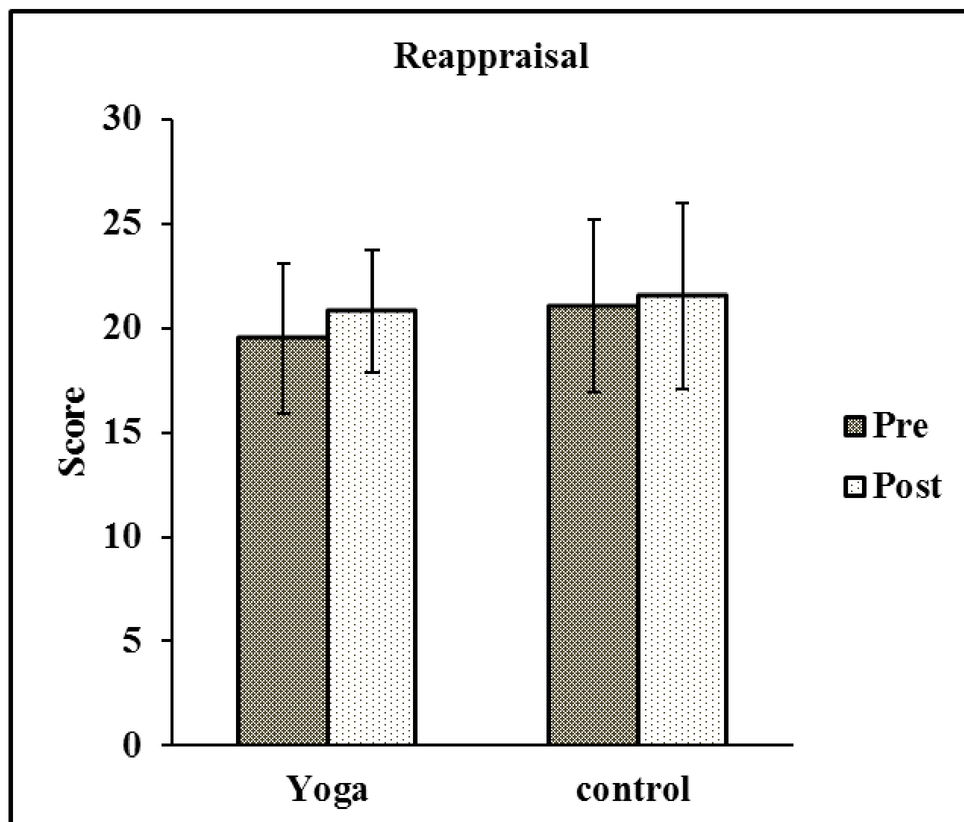

Figure 5. Graphical representation of results of reappraisal in the yoga group and the control group

Table 7. **Results of suppression in the yoga group and the control group**

Suppression	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	13.56(3.09)	11.78(3.37)	.11 to 3.42	2.17	.037	0.37
Control (n=33)	12.91(4.06)	12.54(3.51)	-1.31 to 2.03	.444	.660	0.078

A paired-samples t-test was done whether there was a statistically significant pre-post difference in suppresion following yoga based intervention and to a control condition Following yoga-based intervention a statistically significant reduction in suppression in yoga group ($p < 0.037$, d=0.37), while in the control group, did not find significant differences in suppression ($p< 0.660$, d=0.078). The independent-samples t-test was administered to evaluate the differences in suppression between yoga and control group. There was no statistically significant difference of $t(67) = 1.213$, $p = .229$ in suppression between yoga and control conditions

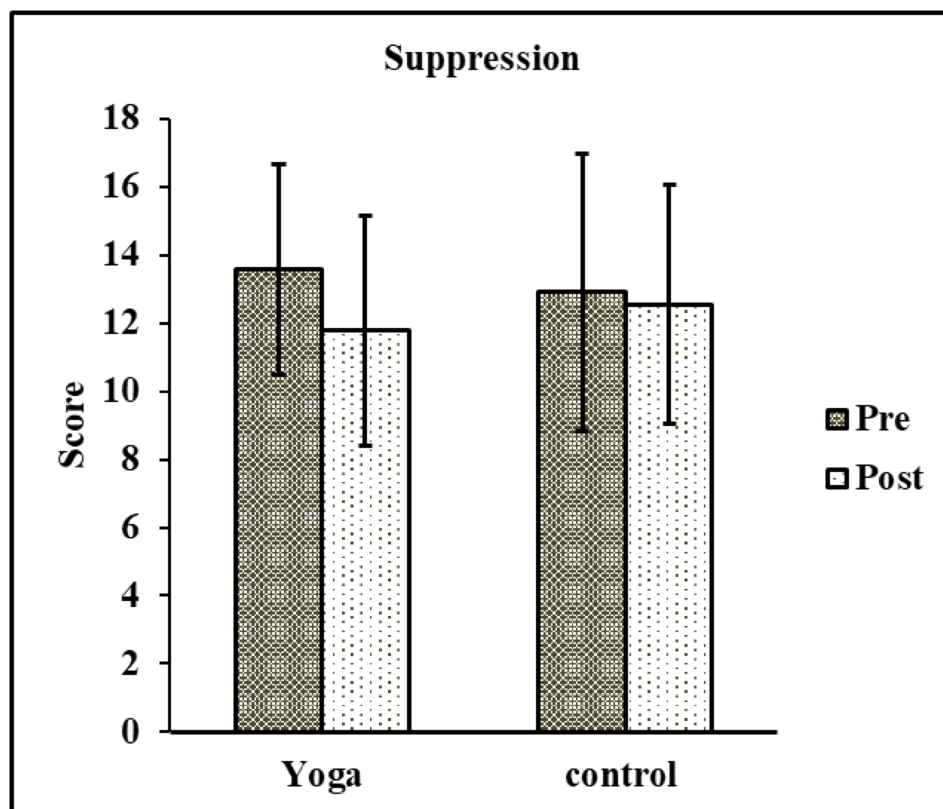

Figure 6. Graphical representation of results of suppression in the yoga group and the control group

Table 8. **Results of positive affect in the yoga group and the control group**

Positive Affect	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	16.74(3.45)	18.32(2.96)	-3.09 to -.078	-2.14	.040	-0.36
Control (n=33)	17.94(3.78)	18.61(3.09)	-2.51 to 1.17	-.738	.466	-0.13

A paired-samples t-test was used to determine whether there was a statistically significant mean difference between the positive affect when participants undergone yoga based intervention compared to a control condition. Post yoga intervention showed statistically significant enhancement in positive affect in yoga ($p < 0.040$ d=-0.36), whereas in the control group, did not find significant differences in positive affect (p< 0.466, d=-0.13). An independent-samples t-test was run to determine if there were differences in postive affect between yoga and control group. There was no statistically significant difference in positive affect $t(67) = -.79$, $p =$ .432. between yoga and control group

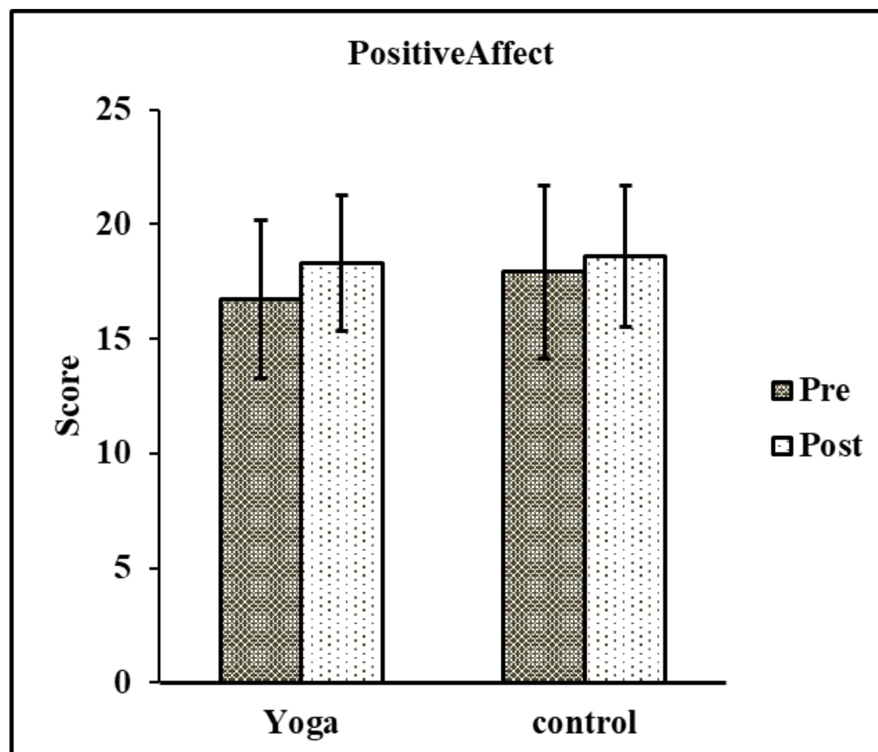

Figure 7. Graphical representation of results of positive affect in the yoga group and the control group

***Table 9*. Results of negative affect in the yoga group and the control group**

Negative Affect	Pre	Post	95% CI	*t*	*p*	*d*
Yoga (n=34)	16.56(3.72)	14.85(2.99)	.082 to 3.33	2.14	.040	0.37
Control (n=33)	15.27(4.24)	15.45(2.59)	-1.65 to 1.28	-.252	.803	-0.04

A paired-samples t-test was done whether there was a statistically significant pre-post difference in negative affect following yoga based intervention and to a control condition Following yoga-based intervention a statistically significant reduction in negative affect in yoga group ($p < 0.040$, d=0.37), while in the control group, did not find significant differences in suppression ($p< 0.808$, d=-0.04). The independent-samples t-test was administered to evaluate the differences in negative affect between yoga and control group. There was no statistically significant difference of $t(67) = 1.75$, $p = .085$ in negative affect between yoga and control conditions.

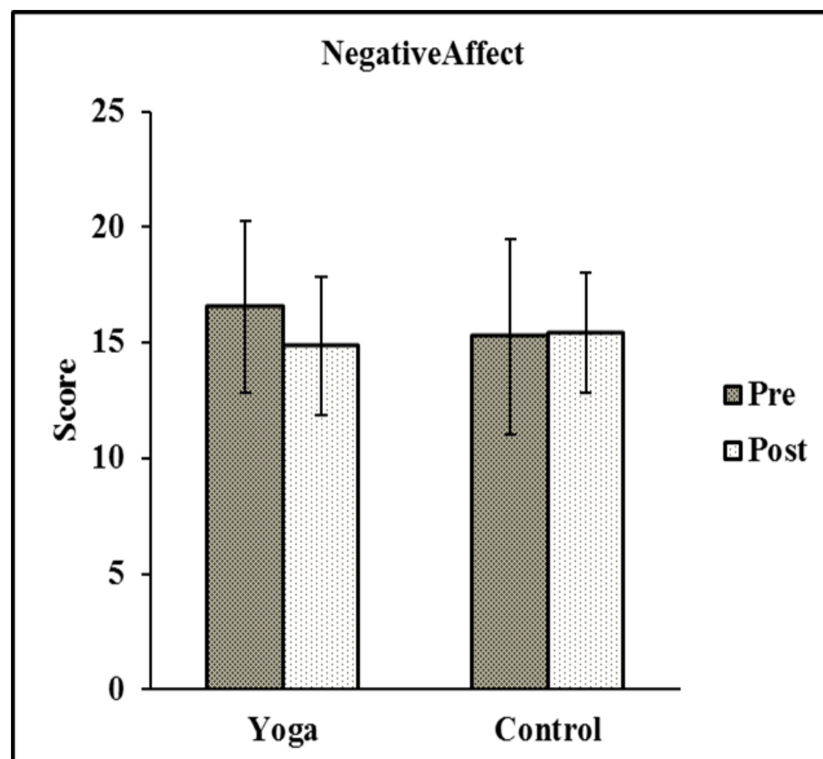

Figure 8. Graphical representation of results of negative affect in the yoga group and the control group.

6.4 DISCUSSION

The study evaluating the add-on effect of yoga on psychological wellbeing among orphan. The participants were recruited from an orphanage providing a standard care for the children. Psychological profile, including mindfulness, depression, positive and negative affect, happiness and emotion regulation were assessed. The findings of the unblinded treatment and blinded outcome assessment study of the 12 weeks period suggest that yoga-based intervention achieved significant enhancement of psychological wellbeing. This study provides preliminary evidence for the feasibility and possible effectiveness of yoga-based intervention to orphan children for emotional and behavioral wellbeing in an orphanage setting.

Our results are in-line with previous studies with regards to the enhancement of psychological wellbeing among children following yoga program (Purohit et al., 2016; Purohit & Pradhan, 2017). The results suggest enhancement of the mindfulness, happiness and positive affect. Further, the reduction in suppression, depression and negative affects following yoga-based program among orphan children. In line with previous research, this study provides support suggesting that yoga may have benefits for enhancing the mindfulness skills in orphan children. As increase in mindfulness skills results in emotional equanimity and increased compassion, non-judgmental acceptance a key factor influences psychological attributes. The development of mindfulness skills can be a mediating variable through which yoga may facilitate emotional and social processes and well-being (Brown & Ryan, 2003). The clinical application of findings is noteworthy, as enhanced happiness and positive affect will be a mediating factor in promoting wellbeing and enhancing psychosocial profile among orphan children. The research found significant reductions in negative affect following a yoga intervention,

suggesting that negative emotional states may be sensitive to yoga-based training. The intervention group's reduction in depression suggest that yoga-based practices were effective in enhancing self-regulatory skills and in reducing arousal and repetitive or worrying thoughts for the orphan children. Analysis of the effects yoga program on orphan children suggests that significantly lower levels of expressive suppression. This finding is consistent with research reported the lowered expressive suppression in children following yoga-based activity (Fung et al., 2016). The reduction in suppression will be effective in reducing problematic involuntary engagement responses to negative emotions.

6.4.1 Possible Mechanism

The components of classical yoga largely include breathing practices, yoga postures, and meditation techniques. Orphan children may benefit from learning these techniques, as yoga may empower them to increase awareness of their emotional condition (Peck, 2005). Further, Yoga has been found to facilitate deep relaxation and greater self-awareness, self-regulation and attention among children (Krusche, 1999; Kuttner et al., 2006). Previous studies have shown the noteworthy decrease in perceived stress levels in adults and children following yoga-based intervention (Telles et al., 2013). The practice of breathing and deep relaxation techniques could decrease stress levels or the perceived stress levels of children in the orphanage. Previous, results suggest that yoga practice significantly increase the practitioners' spiritual wellbeing (Greeson et al., 2011). There are strong correlations amongst spiritual wellbeing and psychological wellbeing constructs. Themes emerged among yoga practitioner suggest that yoga facilitate not only a rapport for social interaction but also a solution for withstanding relationship difficulties and losses. Thus, breathing practices, yoga postures, and meditation techniques can be beneficial in

achieving a tranquil state of mind which in turn provides the awareness and self-regulative response essential in demanding or stressful situations of life.

6.4.2 Strength of the study

The strength of this study is that it conducted a yoga intervention for the relatively unstudied Orphan children. In terms of strengths, this study is a randomized control trial with a control group, and as such represents one of the rigorous trials of a yoga-based program in orphanage settings. Orphan children undergoing emotional and behavioral problems can be benefited by following yoga-based interventions. Further, results demonstrate that implementing yoga interventions in an orphanage setting is feasible. Yoga for orphan children could be an adjunctive and innovative approach to support the children. Yoga as a group activity for orphan children could be an adjunctive and innovative approach to support the emotional wellbeing of the children. Further, disciplinary difficulties can be handled successfully within sessions. The study suggests that it is important to consider not only physical and financial support to orphan children, but also the psychological and social support related aspects is important when planning, developing and implementing the wellbeing programme among orphan children.

6.4.3 Suggestions for future studies

Feedback questionnaires from school teachers can provide a behavior perspective. Further include assessments regarding behavior and academic performance at school helps to understand the effects of the intervention on classroom. Upcoming researchers should include measurement related to stress, social support, loneliness, depression, self-esteem, optimism, and spirituality as research outcomes. Future studies should include long-term follow-up assessments to evaluate whether gains attributable to treatment are maintained over time. Future research should

incorporate non-self-report assessment methods, teacher or caregiver reports and physiological measures to understand the possible mechanism. Forthcoming research may include a qualitative and quantitative component to better capture the hypothesis and understand the core component of the practice that has influenced and possible mechanism. The data qualitative and quantitative can provide a deep understanding on how an intervention influence.

6.4.4 Limitation of the study

The study had a number of limitations, most of them has been highlighted in future research. The major limitation of this study was the lack of objective parameter, all measures were self-report which are subject to expectancy effects. Further, in the yoga-based intervention the participant required active involvement and self-awareness, it is not possible to blind participants to experimental condition, hence expectancy effects cannot be ignored. These benefits may result from physical activity domain of yoga posture, breath regulation through breathing exercises or meditative approaches which enhance cognitive load. Hence, pinning down of the specific elements such as physical postures, breath regulation, and meditation – that give rise to the particular benefits was not understood. Further, lack of active control group needed to understand, because a generic effect of the yoga intervention, such as receiving attention and care from the yoga teachers or the social effects of involving yoga as part of a group may influence the effect.

6.4.5 Conclusion

Our results suggest that the yoga-based intervention shown an enhancement of psychological wellbeing among orphan children. Further rigorous trials are needed to explore the long-term effect and its implication in the objective measures and to explore the underlying mechanisms.