Research Article

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EFFECTIVENESS OF SPIRULINA SUPPLEMENT AND SELECTED YOGASANAS ON QUALITY OF LIFE OF CHILDREN WITH HIV INFECTION

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Received on: 11/06/16 Revised on: 24/07/16 Accepted on: 08/08/16

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DOI: 10.7897/2277-4343.074182

ABSTRACT

The present study was aimed to evaluate the effectiveness of spirulina supplement and selected yogasanas on quality of life of children with HIV infection. Two hundred children with HIV infection aged between 5 and 18 years belong to both sexes participated in the study hundred children were chosen for both experimental and control groups. Commercially available and ISO certified spirulina food supplement was used in the study. Selected yogasnas such as tadasana (standing pose), trikonasana (triangle pose), padmasana (lotus pose), vajrasana, yogamudra and shavasana (corpse pose) were practiced by the participants under supervision of experts. The domains of quality of life scores also showed a significant change in all comparisons of pretest and posttests of experimental group with the control group and between the experimental and control group of both parent reported scores and self reported scores except the self reported psychosocial summary scores in post test II. The interventions that the spirulina supplement and selected yogasanas would have had a significant impact on the physiological parameters and the quality of life of children with HIV infection/AIDS.

Key Words: Yoga, Quality of life, Spirulina, HIV infection.

INTRODUCTION

Quality of life is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. One of the major aspects of quality of life is health physical health or mental health, its perceptions and their correlates including health risks and condition, functional status, social support and socioeconomic status. The HIV/AIDS epidemic decimated populations widely all over the world. When it affects the children it causes challenges related to the prevention of the infection, chronicity of the disease, need for more manpower and resources and increasing number of orphans and vulnerable children (WHO). Pediatric AIDS suspected in a child presenting with at least 2 major signs associated with two minor signs in the absence of known causes of immune suppression, such as cancer, malnutrition or other recognized etiologies. The major signs included weight loss or abnormally slow growth, chronic diarrhea of more than one month duration, prolonged fever of more than one month duration. The minor signs included generalized lymphadenopathy, oro-pharyngeal candidiasis, repeated common infections, persistent cough, generalized dermatitis, confirmed maternal HIV infection (WHO).

The mortality of children because of AIDS globally in the year 2004 was 320,000. The rate has been reduced to 260,000 in the year 2009.[1] The progression of HIV infection in children is very aggressive and many children die during their young age.[2] In India the estimated number of children under 15 years is 4%. A collaborative study on the growth patterns of HIV infected (184) and uninfected (1403) children. The study revealed that during infancy period the uninfected grows 1.6% faster in height and 6.2% heavier in weight than infected children. After 2 years the growth velocity also found high among uninfected children. By 10 years the mean difference found in height was 7.5 cm and in weight was 7 kg. It was also had a significant association with socio economic status and severity of illness. The study highlighted the adverse effects on physical health as they enter into the adolescent period.[3]

The quality of life assessment studies among the children with HIV infection showed that their physical, psychosocial and school functioning was affected.[4-6] People living with AIDS and cancer experience stress, stress influences the number of immune cells and cytokine dysregulation. The practice of yoga, meditation, muscle relaxation, hypnosis was shown the effect of reducing the psychological and physiological effect of stress in cancers and HIV infection. A project on the impact of yoga intervention among school children residing in the region affected by the second lebonon war aimed to reduce their war provoked tension among children aged between 8-12 years participated in the program. The results showed that there was a statistically significant improvement in their mood, concentration, and ability to function under pressure.

A study among 208 school children between 13-16 years to investigate the effect of cyclic meditation and supine rest using six letter cancellation task and their scores on SLCT was found more after the yoga techniques greatly after cyclic meditation CM. The same investigators in a separate study using Digit letter substitution task (DLST) among the same age group both CM and supine rest was found efficient in the performance of the task.[7] A systematic review and found evidently that the positive status makes them at risk for physical disabilities in general and specific, school performance due to neurological problems. The review also revealed that they are prone for psychiatric and mental Health problems and recommended the need for a longitudinal study to recognize the developing brain

of children and adolescents prenatally infected and the environmental influences on variation in access to ART especially in resource constrained countries.[8] A cross-sectional study was conducted among 940 School aged HIV children. They found that about 50% of infected children had some physical limitations mainly on energy demanding activities and their behavior problems were found significant with the chronicity of illness, social and economic limitations of the environment. They also suggested the need for comprehensive interventions to maximize their potentials as they grow. Earlier studies need for alternative or complimentary medicine for management of HIV.[14] The present study was aimed to evaluate the effectiveness of spirulina supplement and selected yogasanas on quality of life of children with HIV infection.

MATERIALS AND METHODS

Participants

Two hundred children with HIV infection aged between 5 and 18 years belong to both sexes participated in the study hundred children were chosen for both experimental and control group from Vocational Training and Rehabilitation centre and Russ foundation at Dindigul district for the experimental group and control group respectively. A written permission was obtained from the authorities of the organizations after submitting a copy of research proposal, ethical clearance (ethical clearance from sacred heart nursing college, Madurai (UT:SHNC:Ph D (N): 2012 dated 22.11.1012), information materials on the benefits of the proposed interventions, an informed consent provided information regarding the purpose of selecting the children for the study, nature of the study, to the parents / guardian and from the children the same particulars explanation was provided and obtained consent they were assured regarding maintenance of anonymity and confidentiality of the information throughout the study.

Inclusion and exclusion criteria

Children aged between 5 to 18 years, Available during the study period, Residing in Dindigul Districts., able to understand Tamil or English were included. Children who are in the severe stage of illness CD4 cell count less than 200 were excluded.

Research methodology

On the day of pretest assessment the nongovernment organizations were visited. The parents / guardian and children were gathered in a meeting hall and rapport was developed with them. The field coordinators of NGO cooperated to collect the demographic profile through structured interview. The quality of life of the children was assessed using pediatric quality of life inventory (pedsQL^{TM}), A modular and multidimensional five point likert scale of children aged 5-18 years. Separate scales for young children (5-7 years), children (8-12 years) and teens (13-18 years) comprised of 23 items pertaining to physical functioning-8 items, emotional functioning– 5, social functioning – 5items and school functioning 5 items.

On the same day a commercially available and ISO certified spirulina food supplement 2gram per day in capsule form as 400mg capsules to be consumed three capsules at 8am and two capsules at 8pm and they were instructed to consume before food and lemon juice if possible to enhance the absorption and palatability of spirulina. A sealed container with 150 capsules for 30 days duration was distributed for each child. The same day the yogasanas such as tadasana (standing pose), trikonasana (triangle pose), padmasana (lotus pose), vajrasana, yogamudra and shavasana (corpse pose) were demonstrated by the researcher with a child model, it was observed that almost all six asanas chosen were already taught in their schools as part of physical exercises but not much familiar with the names the and they were able to re demonstrate it without any difficulties. An individual pamphlet on the yoga poses and steps were distributed to the parent or guardian and to the field coordinators, for one week they were performing under direct observation of the field co-coordinators. Further, they were instructed to maintain a daily record of spirulina intake and the performance of yogasanas. After 1st week later the pretest assessment were done at Russ Foundation with the co – operation of the field co-ordinators the demographic profile, Quality of life were assessed for 100 children. Post test I,II,III on 30th day 60th day & 90th day using the same instruments, and spirulina supplement was distributed and performance of yogasana were observed and their physiologic parameters life were assessed. During their visit to the centre food arrangement and the transport fare was provided. The interventions are administered along with the regular medications which may be antimicrobials or antifungal or antituberculous therapy or if the child is on antiretroviral therapy as prescribed by the physician based on the norms stated by national Aids control organization.

Statistics

ANOVA for repeated was carried out for the comparison of means between the experimental and control group for the domains of quality of life unpaired test was used for the comparison of means between experimental and control group was carried out between the domains of quality of life. The analysis and plotting of diagrams and graphs were done using SPSS software version 22. Probability value less than 0.05 was considered as significant.

RESULTS

The comparison of Physical functioning mean scores by Self report in the Control group (F=79.39, P =0.002) and in the Experimental group (F=155.26, P=0.002), the mean Emotional functioning scores in the Control group (F=36.02, P=0.001 and Experimental group (F=120.95, P=0.003), the mean Social functioning scores by Self report in the Control group (F=32.19, P =0.004) and Experimental group (F=66.19, P=0.001) and School functioning in the Control group (F=53.53, P=0.001 and Experimental group (F=171.22, P=0.003) were found significant at 0.05 level of confidence by using Repeated measures ANOVA (Table 1).

The comparison of Physical functioning by Parents report in the Control group (F=75.44, P =0.001) and Experimental group (F=132.36, P=0.002), the parent report of Emotional functioning of the Control group (F=50.76, P=0.001 and Experimental group (F=118.66, P=0.002). The comparison of Social functioning by Parents report in the Control group (F=49.76, P =0.001) and Experimental group (F=96.25, P=0.001) and School functioning in the Control group (F=53.53, P=0.001) and Experimental group (F=171.22, P=0.001) were found significant using Repeated measures ANOVA (Table 2).The psychosocial health summary scores as perceived by the parents and self in the control (F= 81.6, P= 0.004) and experimental group (F= 64.61, P= 0.003) were found significant (Table 3).

Comparison of children's self report on physical health summary scores between the control and experimental groups(unpaired 't' test) showed significant improvement in the pretest and post test I,II,III (Figure 1). Comparison of children's self report on psychosocial health summary scores between the control and experimental groups (unpaired 't' test)

showed significant change in the pretest and post test I,II,III (Figure 2). Comparison of parent or guardian's report on physical functioning scores of the children between the control and experimental groups(unpaired 't' test) showed significant changes in the pretest and post test I,II,III (Figure 3). When the scores of parent perceived psychosocial health summary scores showed a significance change in pretest and post test II and III (Figure 4).

Table 1: Quality of life domains (self report) of control group and experimental group of pre test and post test I,II,III

S.No	Parameter	Group	Mean ± SE	Significance Repeated measure ANOVA	
				Control group	Experimental group
1	Physical functioning	Con–Pretest	416.25±10	F= 79.39(3 df) P=0.000 (<0.05)S	F= 155.26 (3 df) P=0.000 (<0.05)S
		Con–1stPost test	434.5±9.9		
		Con-2ndPost	492±9.8		
		Con-3rdPost	541±10.2		
		Exp- Pretest	494.5±16.3		
		Exp-1stPost test	516.5±15.3		
		EXP-2ndPost	582.5±13.3		
		EXP-3rdPost	657.5±10.3		
2	Emotional functioning	Con–Pretest	298.75±7.2	F=36.02 (3 df) P=0.003 (<0.05)S	F= 120.95 (3df) P=0.001 (<0.05)S
		Con–1stPost test	328.25±7.3		
		Con-2ndPost	344.5±7.1		
		Con-3rdPost	359±6.8		
		Exp- Pretest	314.5±10.5		
		Exp-1stPost test	329±9.87		
		EXP-2ndPost	370±8.4		
		EXP-3rdPost	416±6.3	N=100	N=100
3	Social functioning	Con–Pretest	304.25±6.3	F=32.19 (3df) P=0.004 (<0.05) S	F=66.19 (3 df) P=0.001 (<0.05) S
		Con–1stPost test	328±6.4		
		Con-2ndPost	338.75±6.3		
		Con-3rdPost	364.75±6.2		
		Exp- Pretest	336±11.1		
		Exp-1stPost test	346.25±10.4		
		EXP-2ndPost	382±9.2		
		EXP-3rdPost	420.25±7.3		
4	School functioning	Con–Pretest	269.5±6.8	F=53.53 (3 df) P=0.002 (<0.05) S	F=171.22 (3df) P=0.003 (<0.05) S
		Con–1stPost test	290.25±6.2		
		Con-2ndPost	315.75±6.6		
		Con-3rdPost	344.25±6.5		
		Exp- Pretest	300.75±10.4		
		Exp-1stPost test	322.25±9.7		
		EXP-2ndPost	375.25±8.6		
		EXP-3rdPost	420.5±9.8	N=100	N=100

Table 2: Quality of life domains (parents report) of control group and experimental group of Pre - test and Post - test

S. No	Parameter	Group	Mean ± SE	Significance Repeated measure ANOVA	
				Control group	Experimental group
1	Physical functioning	Con–Pretest	414.5±11.3	F= 75.44(3df) P=0.0001 (<0.05)S	F=132.36 (3 df) P=0.002 (<0.05)S
		Con–1stPost test	453±9.5		
		Con-2ndPost	494±9.6		
		Con-3rdPost	536±10.1		
		Exp- Pretest	495.25±16.9		
		Exp-1stPost test	521±15.9		
		EXP-2ndPost	582±13.2		
		EXP-3rdPost	644±11		
2	Emotional Functioning	Con–Pretest	286.75±7.6	F=50.75 (3df) P=0.03 (<0.05) S	F= 118.66(3 df) P=0.000 (<0.05) S
		Con–1stPost test	321.25±7.2		
		Con-2ndPost	341.75±6.9		
		Con-3rdPost	359.25±6.6		
		Exp- Pretest	320±10		
		Exp-1stPost test	335.25±9.4		
		EXP-2ndPost	367.25±8.1		
		EXP-3rdPost	416.25±6.42	N=100	N=100

3	Social functioning	Con–Pretest	304.25±6.2	F=49.76 (3 df) P=0.003(<0.05) S	F=96.25 (3df) P=0.000 (<0.05) S
		Con–1st Post test	328±6.4		
		Con-2nd Post	346.25±5.6		
		Con-3rd Post	364.75±6.2		
		Exp- Pretest	336±11.1		
		Exp-1st Post test	347.25±10.4		
		EXP-2nd Post	382.5±9.04		
		EXP-3rd Post	420.25±7.38		
4	School functioning	Con–Pretest	269.5±6.8	F=53.53 (3 df) P=0.0001 (<0.05)S	F=171.22 (3 df) P=0.0001 (<0.05)S
		Con–1st Post test	290.28±6.2		
		Con-2nd Post	315.75±6.6		
		Con-3rd Post	344.25±6.5		
		Exp- Pretest	300.75±10.3		
		Exp-1st Post test	322.25±9.7		
		EXP-2nd Post	375.25±8.6		
		EXP-3rd Post	420.5±5.	N=100	N=100

Table 3: Psycho social health summary scores of parent and self report of control group and experimental group in pre test and post test I,II and III

S. No	Domain	Group	Mean ± SE	Significance Repeated measure ANOVA	
				Control group	Experimental group
1	Physical functioning by parents	Con–Pretest	860.5±17.1	F= 81.6(3df) P=0.004 (<0.05) S	F=176.19 (3 df) P=0.001(<0.05)
		Con–1st Post Test	939.5±15.6		
		Con-2nd Post	1003.75±15.5		
		Con-3rd Post	1068.25±16.2		
		Exp- Pretest	956.75±27.1		
		Exp-1st Post Test	1004.75±25.6		
		EXP-2nd Post	1125±22.3		
		EXP-3rd Post	1257±16.8		
2	Psychosocial functioning by self	Con–Pretest	872.5±16.4	F= 64.61(3 df) P=0.001 (<0.05) S	F=161.81 (3df) P=0.003 (<0.05) S
		Con–1st Post Test	946.5±15.4		
		Con-2nd Post	999±15.7		
		Con-3rd Post	1068±16.6		
		Exp- Pretest	951.25±28.1		
		Exp-1st Post Test	998.5±26.2		
		EXP-2nd Post	1127.25±23.2		
		EXP-3rd Post	1256.75±16.8	N=100	N=100

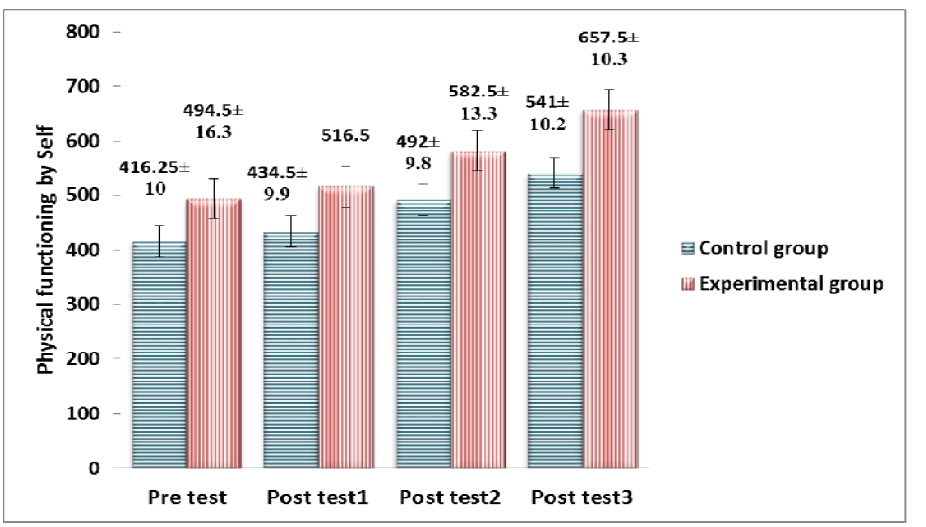

Figure 1: Comparison of the Physical functioning by self with Mean ± SE between control group & experimental group of pretest & post test I, II, III

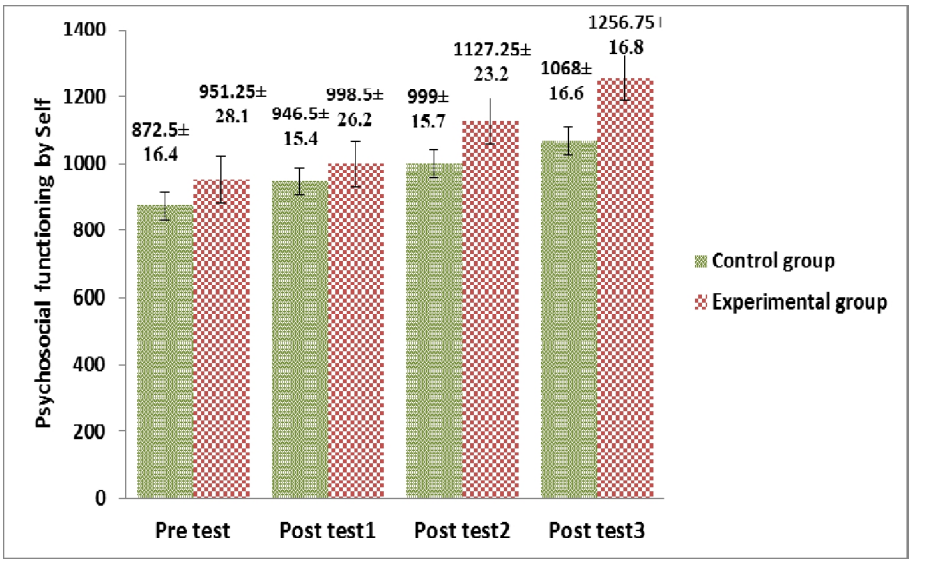

Figure 2: Comparison of the Psychosocial functioning by self with Mean ± SE between control group & experimental group of pretest & post test I,II,III

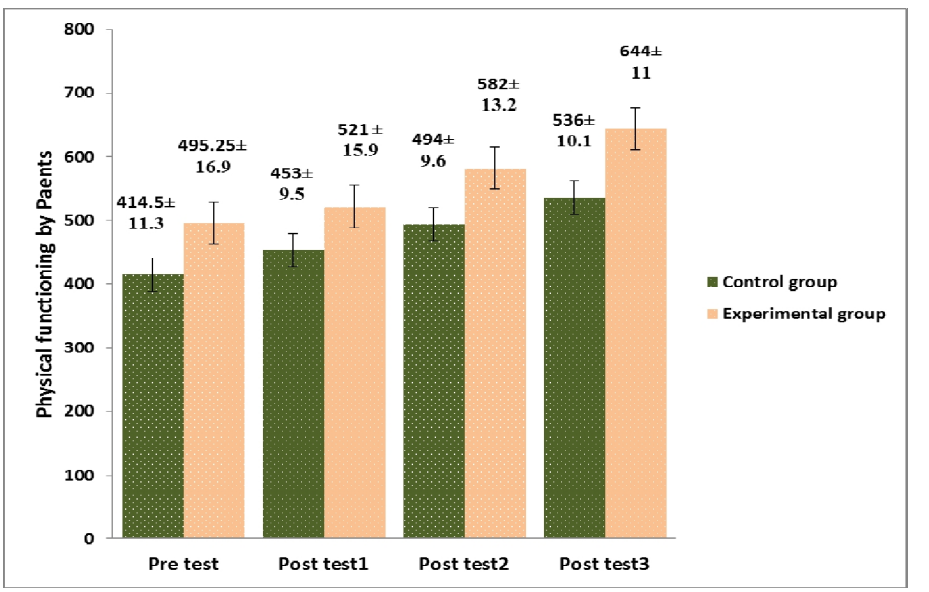

Figure 3: Comparison of the Physical functioning by parents with Mean ± SE between control group & experimental group of pretest & post test I, II, III

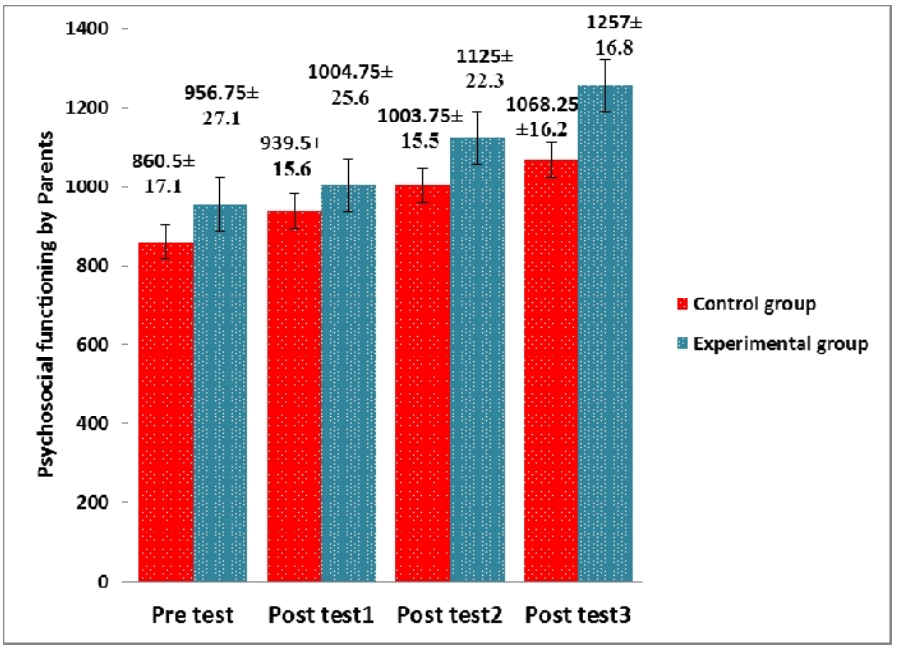

Figure 4: Comparison of the Psychosocial functioning by parents with Mean ± SE between control group & experimental group of pretest & post test I, II, III.

DISCUSSION

Children with HIV infection had significantly reduced scores on physical, psychosocial and school functioning and limitation on social ability.[4] Even though the survival was prolonged by ART there are at risk of impaired psychosocial functioning as their lower scores on total competence in youth (11-18 years) self report.[9] In contrast a quality of life study conducted among Indian children revealed that they have a better psychosocial and school functioning scores than children with cystic fibrosis [5] HIV children with normal CD4 count and undetectable viral load had school (51%) and dropout (28.6%),[10] they have compromised executive function and information processing,[11] 81% systematic review reported some form of cognitive delay.[12] Children aged between 9-16 years in a study reported two third of the youth had met the criteria for at least one psychiatric disorder based on their youth versions of diagnostic interview schedule for children (DISC – IV). The predisposing factors for the development of psychiatric illness identified were biological, psychological and social factors for the development of depression anxiety disruptive disorders and hyperactive disorders.[13] The children between 5 – 11 years showed significantly lower scores in health perception physical resilience physical function and social role functioning.

A comparative study on the prevalence of HIV and the type of food consumption found that Africa In Africa 1/10 but a tribal group called Kanimba in Chad 2-4/100 & 10 and chad habituated to consume 3-13g / day and the study concluded that the regular consumption of algae helps to prevent and to suppress the viral load among the infected. When the physical, emotional, social and school functioning scores were compared with means of the control group and experimental group were significant with improvement in the scores of both the parent and self reports of the children. The total psychosocial health summary scores of children and parent report were compared within the means of control group and experimental group were also shown significant improvement.

In this present study the analysis of scores of physiological parameters of Weight, Height, Hemoglobin, and CD4 counts of control group assessments were compared with the respective assessments of experimental groups (unpaired t test). The hemoglobin value was found significantly changing between the control and experimental group. Whereas there was no significant change found in the CD4 counts in pre test, post I, II, and post test III. Similarly the scores of physical healthy summary and psychosocial the health summary scores of control group pretest, post I , II, III were compared with the respective experimental group (unpaired t test) and found significant change in both self reports and parent reports. six month practice of yogasanas and pranayama significantly elevated the CD4counts compared to the control group yoga intervention among aged 8-16 years children with hemoglobin reduced their bleeding episodes referrals to hemoglobin clinics and school absence. Therapeutic yoga for 5 sessions on Quality of life of children with cancer positively affected their gross motor functioning. A randomized control trial among HIV positive two ambition adolescents group received 10 week yoga program & peer supported showed a short term well being physically and emotionally than the group received only peer support. An integrated yoga program including asana, pranayama for months significant reduced & improvement in perceived stress quality of life among adult HIV patients.[13]

Only very few studies were addressing the quality of life of children and interventions to improve it. Though the yoga practice was originated from India, the studies on the efficacy of yoga on HIV/AIDS were very limited. Similarly the studies on food supplements for HIV children were shown to have a limited scope hence supplementing spirulina on human participants was not addressed in many health problems especially in children with HIV infection. So this present is undertaken by a nurse to recognize the potential effect of spirulina supplement and yogasanas among children with HIV infection.

CONCLUSION

The present study showed a significant change in the comparison of physiological parameters such as weight, height, haemoglobin of pretest and posttests of experimental group with the control group and between the experimental and control group except CD4 count. The domains of quality of life scores also showed a significant change in all comparisons of pretest and posttests of experimental group with the control group and between the experimental and control group of both parent reported scores and self reported scores except the self reported psychosocial summary scores in post test II. The present study supports effectiveness of Spirulina supplement and selected yogasanas on the physiological parameters and the quality of life of children with HIV infection/AIDS.

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Cite this article as:

Prabhavathi S, Nalini Jeyavanth Santha, Gowri Sethu. Effectiveness of spirulina supplement and selected yogasanas on quality of life of children with HIV infection. Int. J. Res. Ayurveda Pharm. Jul - Aug 2016;7(Suppl 3):187-193 http://dx.doi.org/10.7897/2277-4343.074182

Source of support: Nil, Conflict of interest: None Declared