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. The progression of HIV infection in children is very aggressive and many children die during their young age. 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.

The quality of life assessment studies among the children with HIV infection showed that their physical, psychosocial and school functioning was affected. 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. 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. 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. 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™). 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-ordinators. 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=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 posttest 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 posttest I, II, III (Figure 3). When the scores of parent perceived psychosocial health summary scores showed a significance change in pretest and posttest II and III (Figure 4).

### Table 1: Quality of life domains (self report) of control group and experimental group of pretest and posttest I, II, III

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameter</th>
<th>Group</th>
<th>Mean ± SE</th>
<th>Significance Repeated measure ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical functioning</td>
<td>Con−Pretest</td>
<td>416.25±10</td>
<td>F= 79.39 (3 df) S= 0.000 (&lt;0.05)</td>
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<tr>
<td></td>
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<td>Con−1st Post</td>
<td>434.3±9.9</td>
<td>P=0.000 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Exp−Pretest</td>
<td>494.5±16.3</td>
<td>F= 155.26 (3 df) S</td>
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<tr>
<td></td>
<td></td>
<td>Exp−1st Post</td>
<td>516.5±15.3</td>
<td>P=0.000 (&lt;0.05) S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXP−2nd Post</td>
<td>582.5±13.3</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>EXP−3rd Post</td>
<td>657.5±10.3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Emotional functioning</td>
<td>Con−Pretest</td>
<td>298.75±7.2</td>
<td>F= 36.02 (3 df) S= 0.003 (&lt;0.05)</td>
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<tr>
<td></td>
<td></td>
<td>Con−1st Post</td>
<td>328.25±7.3</td>
<td>P=0.000 (&lt;0.05) S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exp−Pretest</td>
<td>314.5±10.5</td>
<td>F= 120.95 (3 df) S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exp−1st Post</td>
<td>329.19±8.7</td>
<td>P=0.001 (&lt;0.05) S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXP−2nd Post</td>
<td>370±8.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXP−3rd Post</td>
<td>416±6.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Social functioning</td>
<td>Con−Pretest</td>
<td>304.25±6.3</td>
<td>F= 32.19 (3 df) S= 0.004 (&lt;0.05)</td>
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<td></td>
<td></td>
<td>Con−1st Post</td>
<td>328±6.4</td>
<td>P=0.000 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−2nd Post</td>
<td>338.75±6.3</td>
<td>F= 66.19 (3 df) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−3rd Post</td>
<td>364.75±6.2</td>
<td>P=0.001 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Exp−Pretest</td>
<td>336±11.1</td>
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<td></td>
<td>Exp−1st Post</td>
<td>346.25±10.4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>EXP−2nd Post</td>
<td>382±9.2</td>
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<td></td>
<td>EXP−3rd Post</td>
<td>420.25±7.3</td>
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</tr>
<tr>
<td>4</td>
<td>School functioning</td>
<td>Con−Pretest</td>
<td>269.5±6.8</td>
<td>F= 53.53 (3 df) S= 0.002 (&lt;0.05)</td>
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<td></td>
<td></td>
<td>Con−1st Post</td>
<td>290.25±6.2</td>
<td>P=0.003 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−2nd Post</td>
<td>315.75±6.6</td>
<td>F= 171.22 (3 df) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−3rd Post</td>
<td>344.25±6.5</td>
<td>P=0.003 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Exp−Pretest</td>
<td>300.75±10.4</td>
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<td>Exp−1st Post</td>
<td>322.25±9.7</td>
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<td></td>
<td></td>
<td>EXP−2nd Post</td>
<td>375.25±8.6</td>
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<td></td>
<td>EXP−3rd Post</td>
<td>420.5±9.8</td>
<td>N=100</td>
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</table>

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

<table>
<thead>
<tr>
<th>S. No</th>
<th>Parameter</th>
<th>Group</th>
<th>Mean ± SE</th>
<th>Significance Repeated measure ANOVA</th>
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<tbody>
<tr>
<td>1</td>
<td>Physical functioning</td>
<td>Con−Pretest</td>
<td>414.5±11.3</td>
<td>F= 75.44(3df) S= 0.0001 (&lt;0.05)</td>
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<td></td>
<td></td>
<td>Con−1st Post</td>
<td>453±9.5</td>
<td>P=0.0001 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−2nd Post</td>
<td>494±9.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Con−3rd Post</td>
<td>536±10.1</td>
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<tr>
<td></td>
<td></td>
<td>Exp−Pretest</td>
<td>495.25±16.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exp−1st Post</td>
<td>521±15.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXP−2nd Post</td>
<td>582±13.2</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>EXP−3rd Post</td>
<td>644±11</td>
<td></td>
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<tr>
<td>2</td>
<td>Emotional functioning</td>
<td>Con−Pretest</td>
<td>321.25±7.2</td>
<td>F= 50.75 (3 df) S= 0.03 (&lt;0.05)</td>
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<tr>
<td></td>
<td></td>
<td>Con−1st Post</td>
<td>341.75±6.9</td>
<td>P=0.03 (&lt;0.05) S</td>
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<tr>
<td></td>
<td></td>
<td>Con−2nd Post</td>
<td>359.25±6.6</td>
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<td>Con−3rd Post</td>
<td>320±10</td>
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<td>Exp−Pretest</td>
<td>335.25±9.4</td>
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<td>Exp−1st Post</td>
<td>367.25±8.1</td>
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<td>EXP−3rd Post</td>
<td>416.25±6.42</td>
<td>N=100</td>
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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

<table>
<thead>
<tr>
<th>S. No</th>
<th>Domain</th>
<th>Group</th>
<th>Mean ± SE</th>
<th>Significance Repeated measure ANOVA</th>
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<tr>
<td></td>
<td></td>
<td>Control group</td>
<td>Experimental group</td>
<td></td>
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<tr>
<td>1</td>
<td>Physical functioning by parents</td>
<td>Con–Pretest</td>
<td>860.5±17.1</td>
<td>F=81.6(3df) P=0.004(&lt;0.05)</td>
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<td></td>
<td></td>
<td>Con–1st Post</td>
<td>1003.75±15.5</td>
<td>F=976.19(3df) P=0.001(&lt;0.05)</td>
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<tr>
<td></td>
<td></td>
<td>Con–2nd Post</td>
<td>1068.25±16.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Con–3rd Post</td>
<td>1004.75±25.6</td>
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<tr>
<td></td>
<td></td>
<td>Exp–Pretest</td>
<td>956.75±27.1</td>
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<td>Exp–1st Post</td>
<td>1125.25±22.3</td>
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<td>1257±16.8</td>
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<td></td>
<td></td>
<td>Exp–3rd Post</td>
<td>1256.75±16.8</td>
<td>N=100</td>
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<tr>
<td>2</td>
<td>Psychosocial functioning by self</td>
<td>Con–Pretest</td>
<td>872.5±16.4</td>
<td>F=64.61(3df) P=0.001(&lt;0.05)</td>
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<td></td>
<td>Con–1st Post</td>
<td>946.5±15.4</td>
<td>F=161.81(3df) P=0.003(&lt;0.05)</td>
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<tr>
<td></td>
<td></td>
<td>Con–2nd Post</td>
<td>999.5±15.7</td>
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<td>1068±16.6</td>
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<td>Exp–Pretest</td>
<td>951.25±28.1</td>
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<td>Exp–1st Post</td>
<td>1127.25±23.2</td>
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<td></td>
<td>Exp–2nd Post</td>
<td>1256.75±16.8</td>
<td>N=100</td>
</tr>
</tbody>
</table>

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
DISCUSSION

Children with HIV infection had significantly reduced scores on physical, psychosocial and school functioning and limitation on social ability. 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. 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. HIV children with normal CD4 count and undetectable viral load had school (51%) and dropout (28.6%), they have compromised executive function and information processing. A 81% systematic review reported some form of cognitive delay. 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. 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 Kanima 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 yoga on HIV/AIDS were very limited. Similarly the studies on the efficacy of yoga on HIV/AIDS were very limited. 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 yoga on HIV/AIDS were very limited. Similarly the studies on the efficacy of yoga on HIV/AIDS were very limited.

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 Kanima 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.
CONCLUSION

The present study showed a significant change in the comparison of physiological parameters such as weight, height, haemoglobin of pretest and posttest 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 posttest 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.

REFERENCES


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