

ABSTRACT

Background: Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) is still a challenging issue for the medical fraternity. There have been continuous efforts among the fraternity to take control of or to cure the disease, but yet to be completely successful. Further, HIV positive individuals also face a variety of challenges regarding health, quality of life and cognitive functioning to be on par with the mainstream. The current approaches towards addressing the issues are largely at physiological levels. While there are some attempts towards a wholesome approach for addressing the issues, there is a need to explore more options from an integrated approach, especially from an integrated yogic perspective.

Aim: To determine the effect of yoga on immune parameters, quality of life and cognitive functions of HIV positive individuals.

Literary review: Traditional literature has ample information on immune system and its maintenance. *Ojas* is understood to be a key factor in determining the strength of the immune system. HIV/AIDS has symptoms similar to that of a condition called *ojas-k aya*, which refers to the depletion of *ojas*. To address the issue a wholesome approach is recommended which starts right from food which is the basic raw material for the production of *ojas*. Yogic practices emphasizing on enhancement of five layers of existence, called the *pa cako as*, is a promising wholesome approach both in preventing and combating HIV/AIDS.

Literature survey: HIV/AIDS is still a challenge. There is ample scope for a wholesome approach towards addressing the challenges faced by HIV positive individuals, in which yoga is a key component. With specific reference to children/adolescents, not much research is

carried out on determining the effect of yoga on immune parameters, quality of life and cognitive functions.

Methods: The research was carried out in two centers, which were rehabilitation centers (RCs) for HIV positive children/adolescents. Although the aim of the two studies was the same, the study designs were different owing to the number of participants available and other practical considerations. Study one was a randomized controlled pre-post study with 73 participants and four months' yoga intervention. Study two was a single group pre-post study with 22 participants and six months' yoga intervention.

Immune parameters (CD4 cell counts, CD4/CD8 ratio and viral load) were noted/determined from the medical records maintained by the rehabilitation centers (RCs). The quality of life was assessed using PedsQL questionnaires. The depression was assessed using the Children's Depression Inventory. The cognitive functions were assessed using six letter cancellation test (SLCT), digit span forward backward test (DSFB), symbol digit modalities test (SDMT) and Stroop test (ST). Assessments were carried out at the beginning and end of the intervention.

Results: In study one, overall there was no significant difference between the yoga group and the control group on any of the parameters viz., immune parameters, quality of life or cognitive functions. Overall, the control group performed relatively better. In study two, there were significant improvements in almost all parameters considered in the research after yoga intervention.

Discussion: There were contradicting post-pre differences in the results of the two studies. The differences are attributed to the differences in various factors, which were both a part of the study like disturbance in sleep schedules and 'participants:teacher' ratio as well as extraneous factors at the study centers, mainly the food. Further, it can be understood through

antiretroviral therapy (ART) status based sub-group analysis, in study one, that while ART group fared well in immune parameters, the non-ART group fared well in quality of life and cognitive parameters. In study two, through sub-group analysis divided based on viral load, it could be understood that yoga seems to work better in cases where the viral loads were higher, i.e., yoga seems to prioritize addressing the issues when the problems are more serious.

Conclusion:The current research had two studies. The studies gave majorly opposite results for the parameters considered in the study viz., immune functions, quality of life and cognitive functions. In the first study, overall, in the yoga group the CD4 cell counts and the CD4/CD8 ratio reduced ($p>0.05$); the health-related quality of life and fatigue-related quality of life scores reduced significantly ($p<0.05$); the depression scores increased ($p>0.05$). However, overall, the cognitive functioning scores improved ($p>0.05$). A sub-group analysis by further dividing the yoga and control groups based on ART status shows that with respect to immune parameters and CDI, while in the yoga group, the non-ART sub-group performed better, in the control group, the on-ART sub-group performed better. Similarly with respect to the quality of life, in the yoga group, the on-ART sub-group performed better and in the control group, the non-ART sub-group performed better. With respect to cognitive functions, overall non-ART sub-groups performed better both in yoga and control groups. In the second study, the immune parameters improved, indicated by increases in CD4 cell count ($p<0.05$) and CD4/CD8 ratio ($p>0.05$) and a decrease in viral load ($p<0.05$). The health-related quality of life and the fatigue-related quality of life improved significantly ($p<0.05$). The depression scores increased ($p<0.05$). Overall, the cognitive functions improved ($p>0.05$)

The differences in the results between the two studies are attributed to the duration of intervention, 'participants:teacher' ratio and other confounding parameters viz., sleep and food which could not be controlled, or could not be realized in time. Thus, from the current

research on children/adolescents with HIV+, it can be understood that yoga practice should be given in a small group to be effective and a more wholesome approach with emphasis to improve sleep/rest and food conducive to yoga is required for the yoga intervention to be effective.

Keywords:HIV/AIDS, children/adolescents, yoga,immune system, quality of life, cognitive functions.