CHAPTER 7

APPRAISAL

This chapter summarizes the current research, presents the conclusions of the work and brings out the implications of the work along with the strengths and weaknesses. Finally, the chapter lists out the scope for future work.

7.1 SUMMARY

The current research aims at determining the effect of yoga on the immune system, quality of life and cognitive functions of HIV seropositive children/adolescents (C/As). The research included two studies at two different HIV/AIDS rehabilitation centers. Although the aim of the two studies were the same, due to practical considerations, the design of the two studies were different. The two studies are separately summarized.

In the first study, there were 73 participants including both males and females, who were randomized into two groups; yoga group and control group. Yoga group had 38 C/As and the control group had 35C/As. The intervention was for 4 months. The C/As in the yoga group woke up an hour earlier than normal and were taught 50-55 minutes of āsanās & prānāyāmās and played yogic games for 50-55 minutes in the afternoon. On the other hand, the control group had their regular sleep during morning hours played 50-55 minutes of football or other physical games during the afternoon.

There were no significant differences between the yoga group and the control group in any of the parameters; viz., the immune parameters, quality of life or the cognitive functions. ART status matched analysis revealed that immaterial of whether the children were in the yoga group or in the control group there were improvements with respect to the immune parameters. With reference to the quality of life and the cognitive functions, more improvement was seen in the control-not-on-ART subgroup and with reference to the

depression, more improvement was seen in the yoga-not-on-ART subgroup. With reference to the cognitive functions, the yoga-not-on-ART sub-group improved the most.

In the second study, there were 22 participants, both males and females. The study was a single group, one-time pre-post study. The duration of the intervention was six months. During the intervention, they were given one hour of yoga practice which included *āsanās* and *prānāayāmās*. There was significant improvement in the immune parameters and quality of life after the yoga intervention. However, the depression among the participants significantly increased andmoved from average to a high-average level. Overall, cognitive functions also improved. An important observation from the study is that the participants having a very high baseline viral load improved more than the ones with lower baseline viral load.

7.2 CONCLUSIONS

7.2.1 Study one:

- There was no significant difference in the immune parameters between the yoga group and the control group. However control-on-ART sub-group performed better.
- There was no significant difference in the quality of life between the yoga group and the control group. However control-not-on-ART sub-group performed better.
- There was no significant difference in the cognitive functions between the yoga group and the control group. However yoga-not-on-ART sub-group performed better.

7.2.2 Study two:

- There was significant improvement in the immune parameters before yoga and after yoga with reference to CD4 counts and viral load, but a non-significant improvement with reference to CD4/CD8 ratio.

- There was significant improvement in the quality of life parameters after yoga intervention.
- Overall there was an improvement in the cognitive functions after yoga intervention.

7.3 STRENGTHS OF THE CURRENT RESEARCH

7.3.1 Study one

- The study was an RCT study with higher subgroup sizes.
- The participants being children/adolescents, apart from basic yogic practices yogic games were a part of the intervention.

7.3.2 Study two

- Owing to the lesser subgroup size, with a student-teacher ratio of 22:1, it was possible to pay better attention to the participants in teaching yoga;

7.4 LIMITATIONS OF THE CURRENT RESEARCH

In the first instance, although it was aimed to give an intervention with an integrated approach of yoga therapy, the study subjects being children/adolescents it was only possible introduce practices to improve *annamayakośa* and *prāṇamayakośa*and not the higher-level practices, those including the practices to improve *manomayakośa,vijñānamayakośa*and most importantly, the *ānandamayakośa*. Secondly, trained psychologist didn't do the assessment of CDI and QOL of the participants. However, all the assessments were done with the supervision of trained psychologist. Thirdly there was no follow-up in either of the studies. Added to these some more the limitations could be listed out for the individual studies as follows:

7.4.1 Study one

- Owing to the larger number of students per teacher/therapist (40:1) it was not possible to pay individual attention to the participants.

7.4.2 Study two

- No control group
- Lesser group size from statistics point of view

7.5 IMPLICATIONS OF THE CURRENT RESEARCH

Through the current research, it can be understood that:

- Yoga improves the immune system, quality of life and immune parameters when better attention is paid by the yoga therapists/teachers. A student to teacher ratio of 20:1 would be preferable.
- Disturbing of sleep hinders the immune parameters, quality of life and cognitive functions of the HIV+ children/adolescents.
- ART treatment combined with a wholesome approach including yoga, better sleep and food compatible with yogic practices seems to help the HIV positive individuals to a great extent.

7.6 SUGGESTIONS FOR FUTURE WORK

- A wholesome approach including practices for enhancing all the layers of existence (the *paṁcakośas*) would be helpful. Although initially it was thought of to include the practices pertaining to all layers of existence, due to practical limitations it was not possible. To implement such a module, the participants are preferred to be adults; to be able to practice higher levels of yoga. Due to the non-availability of participants considering logistic reasons, it was not possible to implement. Future studies could

be carried out considering higher levels of yoga, wherein better results can be expected.

- The study of blood parameters and the gene expression before and after yoga were also initially planned. The blood samples too were taken from the RC1. However, due to the unexpected shut down of the refrigerator where the blood samples were stored at -80 C, it was not possible to do such a study. In future works, it is worth considering the same.
- Conducting studies to estimate the correlation between the frequencies of indulgence in sexual activity to the progression of disease is worth taking up.
- Any future work in the area should preferably have not more than 20 participants per yoga teacher.
- CD4 cell count is considered to be the key marker for indicating the damage of the immune system. All studies consider only the count of the CD4 cells. However, the functional quality of CD4 cells is also important. Hence it is worth studying its impact along with the application of yoga in enhancing the same.