Chapter V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS
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Summary

Diabetes is a silent killer. Silently its complications are developed due to continue elevation of blood glucose, which damages the blood vessels, heart, kidney, nervous system and even the eyes. The associated classical symptoms are frequent urination, excess hunger, weight loss, thirst, fatigue, weakness etcetera. Moreover, the Insulin Dependent Diabetes Mellitus (IDDM) patients are prone to ketoacidosis whereas Non-Insulin Dependent Diabetes Mellitus (NIDDM) is associated with infection or stress ketosis.

Although modern medical system has brought a real breakthrough for management of this disorder, still its cure is far reach. Many research studies, therefore, suggested holistic approach in addition to modern medical treatment. Further, no study could report the status of health related physical fitness of the patients who are taking modern medicines as a treatment. This study, therefore, has been undertaken in this piece of research.

60 male patients (n=60), who are suffering from diabetes mellitus, volunteered as subjects. Their age ranged from 40 to 65 years for this study. The purpose sampling technique was employed to pool the subjects. All the subjects were taking anti-diabetic drugs and diet as suggested by their physician / diabetologist. In fact almost all the patients were very much conscious about their diabetic diet. Since all the patients
attended this study from their respective homes, therefore diet phase was not controlled. The subjects were equated into three groups, control group, yogic practices group and aerobic exercises group. All the subjects were pre-tested with three variables, as presented in the main body of this report, and then respective training was imparted to each group for a period of 12 weeks. All the variables were then post-tested followed by a 6-week follow-up period. Final testing was then employed like pre-test.

ANCOVA followed by Bonferroni tests revealed that –

Separate training of aerobics and yoga showed significant improvement in overall aspects of health related physical fitness of diabetics.

In case of biochemical variable of diabetes patients, the results were similar as stated above. However, so far as cardiac function related variables are concerned, yogic practices intervention alone was found superior to other groups. This suggests that the diabetics who have associated heart complaints should restrict to yogic exercises only and try to avoid aerobics.

The above findings indicate that all the hypotheses, as formulated in this study, have been retained statistically.
Conclusions

Within limitations, this study concludes that –

Although aerobic exercises and yogic practices have their separate influence for enriching health related physical fitness of the diabetes patients. Further, the experimental treatment helped to reduce the lipid profiles and uric acid at the normal range and re-established the cardiovascular risk ratio and enhanced biochemical variables.

During detraining (follow-up), almost all the variables could not remain in the normal range among the practitioners of aerobic exercises. Yogic practices alone proved significantly better in tackling the variables related to heart functions.

The results of the current study may be due to the fact that working mechanism of yogic practices and aerobics is complementary to each other. Physiologically, exercises help to spend more energy in burning glucose and improve the functioning ability of circulatory system so that every cell receives nutrition and sends out accumulated waste products. Burning glucose also helps the diabetics. Perhaps, such exercises helped improve insulin sensitivity, therefore, functional ability of all the organs might have regained and associated problems on lipid profiles including uric acid content in serum have been controlled. This principle might have worked among the diabetics participated in aerobic exercises and therefore, favourable results were seen. However, it is to be noted that aerobic exercises produce fatigue in generating lactic acid in blood almost all the selected variables of diabetes patients. In case of yogic practices intervention the subjects got similar benefits like aerobics except some
variables associated with heart functions. In fact, yogic practices contribute better than aerobics in resting heart rate, pulse rate, blood pressure and cardiovascular risk ratio. The reason may be of complementary nature of aerobics and yoga. In fact, yogic practices provide static stretching to the muscle spindle and pumps out all possible impurities as well as toxicities from muscle cells. Therefore, muscles feel fresh, recharge and ready to work further with new energy. This produces physiological relaxation in removing excess lactic acid from blood and perhaps micro-circulation in cardiac muscles might have opens up and, thus, recharging heart to function afresh.

The above result indicates that the hypothesis-“H₁: The separate training programmes of yoga (Indian traditional exercises) plus anti-diabetic drugs and aerobics plus anti-diabetic drugs would be effective in improving the health related physical fitness and associated selected variables of the subjects suffering from diabetes mellitus,” as formulated in this study has been statistically sustained.

The result firmly indicates that the combined stimulus i.e., aerobic exercises and yogic practices was found better in controlling almost all the affective variables of diabetics as compared to other interventions (i.e., aerobic exercises and yogic practices as separate stimuli). Appearance of such result seems to be apparent because the separate stimulus might have produced an added advantage. In fact, in one hand the aerobic exercises were essentially helpful to improve metabolic activity and to burn blood glucose in diabetics, however, on the other hand, production of excess lactic acid in blood and toxicity in muscle cells create problems that can be tackled by yogic practices.
Further, the result of controlled subjects revealed that the use of anti-diabetic drugs conventionally found useful to control the intensity of suffering in diabetes. This indicates that the hypothesis—“H₂: The existed conventional medical treatment procedure (i.e., anti-diabetic drugs) would also improve the health related physical fitness and associated selected variables of the subjects suffering from diabetes mellitus” has been sustained.

**Recommendations**

This study recommends the following:

Aerobic exercises are good for the patients suffering from diabetes mellitus, but those who developed associated complication related to heart and other vital organs should avoid aerobics, but must practice yoga.

In this piece of research only traditional yogic practices have been included and therefore the patients must take care about its stage-wise practices systematically under the supervision of a professionally qualified yoga teacher.

Of course, while participating in any of the training programme as suggested in this piece of research, the diabetics must take prior advice from a consulting physician and / or diabetologist.
Contribution to the Knowledge

This study contributed a new theory about usefulness of Indian traditional exercises in improving health related physical fitness of diabetes patients. This indicates the usefulness of yogic practices and aerobic exercises towards the improvement of human immunity power with special reference to diabetes. Evolving this knowledge is new to the paradigm of knowledge related to medical as well as physical education and allied sciences. This piece of research could add a quantum of knowledge for prevention and rehabilitation of suffering patients from diabetes mellitus by using an alternative as well as in-expensive exercise technique accessible to common people.