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EFFECT OF AEROBIC EXERCISES ON CARDIO VASCULAR FITNESS AND QUALITY OF LIFE IN PEOPLE WITH HIV/AIDS

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ABSTRACT

Background and Objective: HIV infection is one of the chronic illnesses with an uncertain natural disease history. Exercise is well accepted as an adjunct therapy in the management of HIV. This study is intended to ascertain to see the effects of aerobic exercise on cardiovascular fitness and quality of life.

Study Design: Pilot study

Setting: Sneha Sadan HIV Home, Kaikamba.

Outcome Measures: 3 Minute Step Test and MOS – HIV Health Survey

Method: Fifteen HIV infected individuals were given aerobic exercise for 45 minutes, three days per week for three months after obtaining informed consent. Cardiovascular fitness and quality of life were assessed at the beginning and after three months of exercises.

Result: The Mean \pm SD before and after intervention for 3 minute step test is 3.60 ± 0.63 and 4.47 ± 0.74 , for MOS – HIV Health Survey is 54.53 ± 8.44 and 63.80 ± 7.63 with p value equal to 0.001 for both outcome measures.

Conclusion: This study concludes that aerobic exercises are effective for improving cardiovascular fitness and quality of life in HIV infected individuals.

Key Words: HIV, Aerobic Exercise, Cardiovascular Fitness, Quality Of Life

INTRODUCTION

Acquired immune deficiency syndrome (AIDS) is defined as “HIV infected person with CD4+ cell count below 200 cells / microlitre”.¹ AIDS is a collection of symptoms and infections resulting from specific damage to immune system caused by human immunodeficiency virus.² The virus thought to be responsible for transmission of AIDS were identified as human immune deficiency virus. Human immune deficiency virus is a retro virus that infects vital organs of human immune system such as CD4+

T cells and macrophages. It infects primarily mononuclear cells and beta cells. When the virus enters the body, the condition is described as HIV infection. At this stage, the person may appear absolutely normal and may not be aware that this virus is present in the body. But when various opportunistic infections occur as a result of immune deficiency virus, is diagnosed as AIDS.³

New data show global HIV prevalence and the percentage of people living with HIV have leveled off and that the number of new infections has fallen in part as a result of impact of HIV programmes. In 2007, 33.2 million people were estimated to be living with HIV. In

India there are more than 5.1 million individuals infected with HIV. Karnataka, a southern state, is estimated to have HIV prevalence in the adult population of 1.6%, suggesting that there are about 500000 people living with HIV/AIDS in the state.⁴

Transmission of HIV is through sexual intercourse, infected blood and blood products, infected needles and parenteral drug use and transmission from mother to baby. The transmission of HIV virus from mother to child can be prevented by avoiding invasive procedures in the uterus and antiretroviral therapy during the first trimester due to teratogenic effects. Caesarean is more elective than vaginal delivery.⁵

The normal human immune system consists of phagocytes and macrophages and two kinds of lymphocytes called T cells and B cells which protects the body from infection. Whenever any unwanted substance enters the body, macrophage tries to engulf and digest debris and summons helper T cells to the site. Helper T cells identify the enemy and messages go to spleen and lymph nodes to produce more T cells. Activated by helper T cells, killer T cells kill the cells of the body. B cells produce antibodies while suppressor T cells play a vital role in calling of the attack after infection is conquered. AIDS virus kills and invades helper T cells, thereby short-circuiting the entire immune response. AIDS Virus enters the body concealed inside helper T cells from infected host. It arrives as a passenger in blood or semen. Once inside an inactive T cells, virus lies dormant for months. Then when another unrelated infection triggers invaded T cells to divide, AIDS virus also begin to multiply one by one, its clones emerge to infect nearby T cells. Slowly, the body loses the very sentinels that should be alerting the rest of the immune system.⁶⁻⁸

Most commonly recommended treatment regimen in India as per NACO includes: Anti retro viral therapy – start Nevirapine

200mg/twice day for 14 days, If patient tolerates medication, on 15th day onwards regimen is followed (lamivudine and nevirapine), zidovudine is also available as combination therapy.⁹ Body-fat abnormalities are a recognized complication of antiretroviral therapy. These include central fat accumulation, subcutaneous fat atrophy, and the development of lipomas. Dyslipidemia is a well-described independent risk factor that occurs in a high proportion of patients treated with antiretroviral (ARV) medications. Other metabolic abnormalities such as insulin resistance and diabetes may be caused by antiretroviral therapy. Fatigue is another common adverse effect among patients who are starting antiretroviral therapy.¹⁰

Exercise is one key management for people living with HIV infection to address impairment, activity limitation and participation restriction.¹¹ Participation in an exercise program modify the side effects of anti retro viral therapy and quality of life may benefit.¹² Exercise is well accepted as an adjunct therapy in the management of chronic illness and therapeutic exercise among people with HIV has been shown to be both beneficial and safe.¹³

Several studies on aerobic exercise training in HIV positive individuals have demonstrated that it is safe, effective and has a number of beneficial outcomes.^{14,15} Aerobic exercise is the exercise of any activity that uses large muscle group which can be maintained continuously and is rhythmic in nature. In 1948, the WHO defined “Health is not only absence of disease and infirmity but also the presence of physical, psychological and social well being”. Quality of life is an issue becoming very steadily more important in health care practice and health care research.¹⁶ Hence this study aimed to analyze the effectiveness of aerobic exercises on cardiovascular fitness and quality of life in people with HIV/AIDS.

METHODOLOGY

A Pilot Study was undertaken at Sneha Sadan, HIV Home, Kaikamba, Karnataka with 15 HIV infected individuals of both sexes within the age range of 30 - 40 years, showing pulse rate less than 117 in males and less than 127 in females in 3 minute step test. All subjects were willing to participate in the study after signing informed consent. Ethical clearance was obtained from Institutional Review Board. Aerobic exercises session was planned for all the subjects with warm up for 10 minutes which includes stretching of biceps, triceps, pectorals, lateral flexors, quadriceps, hamstrings and calf muscles, aerobic period which includes brisk walking for 20 minutes, intensity was maintained at 12-13 in Rate of Perceived Exertion 15 point scale (Borg Scale), and cool down for 15 minutes. Such aerobic sessions were continued for 3 months on alternate days in the evening. The 3 Minute Step Test and Medical Outcome Study HIV Health Survey were used as outcome measures before and after intervention.

DATA ANALYSIS AND RESULTS

Among the 15 subjects included 9 were males and 6 were females, shown in Figure-1. The pre and post intervention values of 3 Minute Step Test (3MST) and Medical Outcome Study HIV Health Survey (MOSHIVHS) were analysed by Wilcoxon Signed Rank Test using Statistical Package for Social Sciences, Version-17. The Mean \pm SD for 3MST is 3.60 ± 0.63 and 4.47 ± 0.74 for before and after intervention respectively with Wilcoxon z value of 3.417 showing p value equal to 0.001 proves statistically significant improvement in cardiovascular fitness after aerobic exercises for 3 months. The Mean \pm SD for MOSHIVHS is 54.53 ± 8.44 and 63.80 ± 7.63 before and after intervention respectively with p value equal to 0.001 shows significant improvement in quality

of life of the subjects with HIV after aerobic exercises. These details were shown in Table-1.

DISCUSSION

The purpose of this study was to find out the effectiveness of aerobic exercises training on cardiovascular fitness and quality of life in HIV infected individuals. The study demonstrated that exercise program of HIV infected individuals with 3 month duration of aerobic training was efficacious. In this study MOS – HIV Health survey was used as the outcome measure to find the quality of life in HIV infected individuals also used in a study by Baigis et al.¹⁷ 3 minute step test is also used as an outcome measure.

Efficacy of exercise in HIV infected individuals was found in systemic reviews done by Nixon et al¹⁸ and O'Brien et al.¹¹ Participation in an exercise program modify the side effects of anti retro viral therapy and it is one key management to address impairment, activity limitation and participation restriction.¹¹

Aerobic exercise has been shown to stimulate muscle lipoprotein lipase (LPL) activity. LPL hydrolyzes circulating triglyceride-rich particles and facilitates entry of free fatty acids into muscle cells. Efficacy of aerobics was found in a study done by Lox et al¹⁹, which supports our result showing Aerobic exercise intervention improves body composition, strength, cardiopulmonary fitness, and life satisfaction for HIV-infected individuals. According to a study done by Stringer et al²⁰ aerobic exercise training resulted in a substantial improvement in aerobic function and quality of life.

Thrice – weekly participation of aerobics for three months may be sufficient for improving cardiovascular fitness and quality of life. Studies done by Soula fillipas et al¹² supports our results, which prove that aerobics training improves cardiovascular fitness and quality of life in HIV infected individuals. The result of this study led to the inference that there is

improvement in cardiovascular fitness in experimental group. This is encouraging since impaired physical endurance is frequently observed in HIV population (Ciccolo et al)¹³

This study evaluated the effect of exercise on health-related quality of life in HIV infected individuals. Eleven dimensions of health-related quality of life were evaluated. Overall health, which explores general health perceptions and feelings of well being were compared in both the groups. Attempts have made to compare the scores of 3 minute step test and MOS.

This study led to the inference that aerobic exercise training can improve cardiovascular fitness and quality of life in HIV infected individuals. Hence aerobic exercise programs may be suggested as an important component in the management of HIV infected individuals. Further studies could focus on long term benefits of aerobic exercises and any other form of exercises in HIV infected individuals.

CONCLUSION

This study is concluded stating that aerobic exercises training is effective for improving cardiovascular fitness and quality of life in HIV infected individuals.

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Table - 1: Significance testing by Wilcoxon Signed Rank Test for within group observations

Outcome Measure		Mean	Std. Deviation	z	p
3 Minute Step Test	Before	3.60	0.63	3.417	.001
	After	4.47	0.74		
MOS – HIV Health Survey	Before	54.53	8.44	3.357	.001
	After	63.80	7.63		

Figure - 1: Sex distribution of participants in the study

