

The Relationship between Physical Exercise and HIV AIDS, A Systematic Review

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ABSTRACT

There are various factors which escalates HIV related deaths. Most of them could be expressed by hypokinetic conditions. It is difficult to get a single research which does not support physical exercise for HIV patients. There are lots of researches published on the relationship between Physical exercise and HIV AIDS; however, there is a gap in indicating the specific benefits of exercise as well as the specific training to be used to better manage HIV related complications. Studies which are under the PubMed search engine and organizational reports, published from the year 1998 to 2014 used. 38 papers which are more related with the issue reviewed. The effect of physical exercise in the management of hypokinetic disease, immunity, body weight, fatigue and Psychological status were thoroughly discussed. Moreover, The Exercise tolerance of People living with HIV AIDS is determined. The role and intensity of Resistance, Aerobic and Resistive aerobic exercise for HIV management is decidedly addressed. Above all, Data based comparison focused on the association between aerobic exercise and HIV AIDS is made. The constellation of studies on the area approved that physical exercise plays a vital role for the management of HIV related complications. Nevertheless, the specific mode and dose of physical exercise is yet to be determined.

Key Words: Physical Exercise, HIV AIDS, HIV management

1. Introduction

Following the clinical identification of HIV AIDS in 1981,¹ our world had been giving due attention to save human beings from the virus. Prevention and treatment of the disease were a great concern especially in the first stage of the disease detection. HIV-infected children and adults are now expected to live longer, but at equivalently, they are at risk for developing health complications.¹⁴ Increasing the quality of life of HIV infected patients is becoming a prior issue in the beginning of the new millennia. Physical exercise and nutrition are the two areas which had been given substantial attention. Greater physical activity were associated with greater quality of life, independent of HIV-related mortality risk.⁸ Physical activity can have significant, and even life-saving, effects as subordinate prevention of disease.¹⁸ More specifically, Moderate physical activity can slow HIV disease progression.²²

So far many researches had been conducted about one or more physical exercise and HIV related complications. However, regular physical exercise should be further studied as a possible nonpharmacological approach to be used to treat HIV residual disease and non-AIDS-defining illnesses in ART-treated HIV-infected individuals.⁷ Targeted exercise programs to raise physical activity and increase speed and power should be evaluated as interventions to improve Quality of Life during ART.⁸

This study is aimed to **indicate** the relationship between physical exercise and HIV AIDS. It is done by examining the integration between HIV related complications and Physical exercise as well as by scrutinizing the role of aerobic exercise on the prevention and management of HIV related complications. Additionally, the state of immunity with physically active HIV patients will be evaluated.

Research questions

This systematic review answers the following queries.

What is the role of physical exercise for HIV management?

What is the relationship between physical exercise and HIV related complications?

What can aerobic exercise do for HIV associated problems?

What would be the state of immunity after HIV patients engaged in physical exercise?

The State of Lipid and Physical Exercise in HIV patients

Lifestyle alterations such as diet and exercise and switching ART appear to be of limited value in reducing Visceral adipose tissue (VAT). Metformin has shown some benefit in reducing VAT but at the expense of accelerating peripheral fat loss, and the thiazolidinediones have no effect on VAT. Similarly, testosterone does not appear to reduce VAT.³ After Describing that antiretroviral therapy could have a direct impact in increasing visceral adiposities, Moyle and his friends put

their own nearly-doping solutions, which includes testosterone injection as a means of fat reduction. Surprisingly, they raised an important issue in their summary. According to them, the prevention and management of visceral adiposity remains a considerable challenge in clinical practices.²¹

In their guideline, the European AIDS Clinical Society suggests exercise and diet in addition to quitting smoking as lifestyle intervention. They further recommend a healthy food, exercise and maintaining normal body weight to decrease dyslipidaemia. Intra-abdominal fat accumulation is best managed by exercise and diet.¹⁹ Treatment of HIV dyslipidemia should include lifestyle adjustments such as a low-fat diet, augmented exercise, reduced alcohol intake and smoking termination.³¹ After Assessing Leisure Time Physical Activity participant HIV victims, Florindo and his colleagues verified that Physical activity contributed towards averting fat accumulation in HIV/AIDS subjects.¹³

Exercise training and metformin significantly improves biochemical and cardiovascular parameters more than metformin alone in HIV-infected patients with fat redistribution and hyperinsulinemia. Collective treatment was safe, well tolerated and can be a useful approach to decrease cardiovascular risk in this population.⁹ In contrary to this, Birk and his colleagues concluded that long-term exercise training cannot correct lipid profile abnormality, particularly hypertriglyceridemia, common to individuals with advanced HIV-1 infection.¹

In general, Physical activity hinders the development of fat redistribution syndromes.⁴ Exercise training may decrease trunk fat mass in PLWHA with fat redistribution.²⁹ Body weight, BMI and subcutaneous fat decreased by using Physical exercise.³⁵

Aerobic Exercise and HIV related complications

After completing 12 weeks of training with two children subjects, Miller concluded that progressive resistance exercise training is safe and feasible for children with HIV infection. His training mainly relied on aerobic type.²⁰ Progressive resistive exercise or a combination of progressive resistive exercise and aerobic exercise is proven to be safe and could be beneficial for adults living with HIV/AIDS.²⁴ Both Progressive resistive and aerobic exercises increased body weight, arm and thigh circumference. They are shown to improve submaximal heart rate and duration of exercise.²⁷

Moderate intensity aerobic exercise is an effective complementary therapy in lowering blood pressure and increasing CD4 cell count in PLWHA.¹¹ Tai Chi and Aerobic Exercise improve physiologic parameters, functional outcomes, and Quality Of Life.¹⁵ Accomplishing constant or interval aerobic exercise, or a combination of constant aerobic exercise and progressive resistive workout for at least 20 min, at least 3 times per week for 4 weeks could be beneficial and appears to be harmless for adults living with HIV/AIDS.²⁴ Largely, exercise can improve the muscle and aerobic fitness of HIV-infected patients without negative effect on their immunological function.¹²

According to O'Brien and his colleagues, Aerobic exercise is safe and beneficial for adults living with HIV. In their well-structured review type research which encompasses studies of three recent decades, they put their findings as follows. performing constant or interval aerobic exercise, or a combination of constant aerobic exercise and progressive

resistive exercise for at least 20 minutes, three times per week for five weeks (minimally) appears to be benign and may lead to significant improvements in selected outcomes of cardiopulmonary fitness, body composition, and psychological status (depression-dejection symptoms).²⁶ Moderate-intensity aerobic and resistance training can improve Functional aerobic capacity and most importantly, iteradicates Functional aerobic impairment.¹⁶

Exercise Tolerance and Fatigue in PLWHA

In a study which was conducted on male victims, HIV patients showed resting cardiac dysfunction, altered cardiac responses to exercise and depressed exercise tolerance. Exercise stroke volume kinetics and muscle oxygenation were reduced in HIV patients, especially in those with resting diastolic dysfunction.³⁶ Highly Active HAART users perform less vigorous exercise than Both HIV negative and HIV positive non-drug users. However, Injection drug use and viral load are not related with vigorous activity.³⁴ Recombinant human growth hormone rhGH treatment may enable patients with wasting to perform activities of daily living that would be exhausting without rhGH treatment.¹⁰

Six weeks of combined moderate-intensity aerobic and resistance training can advance Functional aerobic capacity and eliminate Functional aerobic impairment in those with HIV. Results suggest that the functional limitations common in HIV-infected individuals are due in part to detraining that is rescindable through moderate exercise.¹⁶

HIV-positive older adults to viewed fatigue as an indirect indicator of their overall health status and immune functioning. This may explain why many of the coping strategies they used could be considered approaches to improving their overall health status as a means to increasing their energy levels.³⁶ HIV-related fatigue has a high incidence and is strongly linked with psychological factors such as depression and anxiety. A validated instrument should be used to measure intensity and significances of fatigue in HIV-infected persons. In the case of fatigue, clinicians should not only search for physical mechanisms, but should question depression and anxiety in detail. According to Jong and his friends, Treatment of HIV-related fatigue is important in the care for HIV-infected patients and needs a multidisciplinary approach.¹⁷ Supervised aerobic training is theverified mode of exercise to safely reduce fatigue for PLWHA.³⁵

Maintainace of Bone Mineral Density and Muscle Mass in PLWHA

Osteopenia/Osteoporosis could be a complication for HIV patients. A study conducted in Slovenia comes up with solid evidence concerning the prevalence of osteoporosis in HIV infected male population. What makes the study credible is it represents 72% of the national HIV infected males. The prevalence of decreased bone mineral density (BMD) was remarkably higher than the national prevalence among men of similar age. There was no association between reduced bone mineral density and any specific ART. But, lack of ART was confirmed as an independent forecaster of osteopenia/osteoporosis. As a recommendation, Targeted screening and early treatment present a sensibletactic for preventing reduced bone mineral density in HIV-infected patients, but correcting vitamin D(3) levels could also be an important component.³⁷

Resistance exercise training, which is more easily handy than Supplementation and Hormone therapy, holds promise in counteracting the process of HIV-related muscle wasting, as it has been successfully used to enhance lean tissue mass in healthy and clinical

populations.⁵ Progressive Resistance Training improves functional status in patients with HIV wasting, both by increasing strength and Lean Body Mass.³⁰

Physical Exercise and Immunity

Studies on this area comes up with three conflicting conclusions. A change, no change and no magnified change are the three destinations of studies conducted in the past 17 years. According to a study which is conducted earlier, Programs of moderate training can be sustained without any large change in CD4+ count or CD4+/CD8+ ratio.³² Similarly, physical exercise doesn't show an effect on immunological function.¹²

Ezema and his colleagues come up with different conclusion. In their finding they assured that moderate intensity physical exercise increases CD4 levels of PLWHA.¹¹ Their result is consistent with the findings of Yenehun and his colleagues. In their study which was conducted in Dire Dawa (Ethiopia), Yenehun and his partners measured CD4 and CD8 levels before and after treatment. They concluded that increasing duration, frequency, modality and intensity of floor aerobics exercise might have valuable effects on immunity induction in people with HIV/AIDS.³⁸ Similarly, it is advised to escalate physical activity level as it has beneficial effects on viral load in HIV-infected individuals. A significant inverse relationship was found between physical activity and viral load.²

Psychological Status, after Physical Exercise

After performing aerobic exercise both interval and constant, for five weeks (3 days per week), the psychological status of subjects improved. They showed decreased depression-dejection indications.²⁶ In another study which has control group (non-exercise group), exercise participants showed reductions in depressive symptoms on all indices, and total depressive symptoms scores were strongly correlated.²³ Physically active participants had greater life satisfaction scores and healthier body composition as compared to their sedentary partners. Hence, health professionals shall encourage the promotion of a physically active lifestyle for HIV-positive individuals.²⁸

Reviewer's Conclusion

Following a thorough evaluation of studies published from 1998 to 2014, the following conclusions were made.

- Physical exercise helps to control HIV related fat accumulation. The type and intensity of exercise to be performed for fat reduction is similar with the non-infected partners.
- Aerobic exercise which is a safe exercise for HIV patients, helps to lower blood pressure, increases immunity and quality of life. It improves functional aerobic capacity and eliminates functional aerobic impairment. However, further research is needed to better understand if more unique intensity is needed for HIV patients than HIV free individuals.
- HIV patients have lesser exercise tolerance and greater fatigue due to physiological and psychological factors respectively. Aerobic exercise and psychotherapy are suggested to reverse those conditions.

- Bone mineral density is shown to be decreased in HIV patients. It results in osteoporosis and osteopenia. Physical exercise, particularly resistance exercise is helpful to maintain bone mass. Such exercise assists to prevent HIV related muscle wastage too.
- According to some studies, CD4 and CD8 level of HIV patients showed no change after physical exercise. Some more studies concluded that CD4 and CD8 in particular and immunity in general could be improved through physical exercise. As no study concluded with negative consequence of physical exercise for immunity, it is advisable to perform regular physical activity.
- Despite the aforementioned importance of physical exercise for the management of HIV related complications, the actual dose and mode of physical exercise for PLWHA is yet to be determined.

Disclosure

There is no conflict of interest in this work.

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