

HIV and AIDS: Its Implication for Physiotherapy Practice and Exercise Prescription

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ABSTRACT This paper was a narrative review of evidence-based physiotherapy and its implication for practice. This review reveals that there is a dearth of evidence of the efficacy of physiotherapy in the management of persons living with HIV and AIDS. Exercise prescription in cardiopulmonary therapy was found to be seldom utilised in the care of people with HIV and AIDS in out-patient physiotherapy. The emphasis of care was found to be more on routine chest physiotherapy which included (occasional) suctioning, counseling and health education. Evidence of the efficacy of physiotherapy in the management of people with HIV and AIDS is therefore not conclusive. Physiotherapy for people living with AIDS should be based on evidences which should include medical, physical and psychosocial benefits. It is recommended that the efficacy of physiotherapy intervention be qualitatively and quantitatively evaluated and inclusion of physiotherapy- specific AIDS care was also suggested in the under graduate curriculum.

INTRODUCTION

HIV poses serious risk to the health of millions around the globe. Despite the decades of research, no cure or vaccine has been found to prevent this disease and the resultant morbidity and mortality. Exercise has been shown to improve strength, cardiovascular function, and physiological status in general population. Safe exercise might improve outcome of adults living with HIV (Bopp et al. 2003; O'Brien et al. 2004; O'Brien et al. 2009). HIV destroys the immune system cells and the body becomes unable to resist other infections by even low-grade pathogens, giving rise to opportunistic infections. Due to weakened defence mechanisms, symptoms appear alone or severally. According to Loewenson and Whiteside (1997), these include chronic fatigue or weakness, diarrhoea, minor skin infections, respiratory problems, sustained weight loss, persistent swelling of the lymph nodes, deterioration of the central nervous system (CNS) which constitutes the cluster of the conditions known as AIDS related complex (ARC). As the weakening of the immune system continues, more severe diseases manifest themselves. This invariably degenerates into serious bouts of illness, which significantly interfere with work and social life. Once the disease starts interfering with the patient's functions, return to sustained normal health never occurs (Loewenson and Whiteside 1997). Some of the complications associated with AIDS require physiotherapy intervention (Dike 1993).

Projections from the World Health Organisation (WHO) in early 1992 on the expanded dimensions of HIV/AIDS indicated that in the sub-Saharan Africa, more than six million adults would be affected with HIV, while the population of paediatric cases continue to rise rapidly (Webb 1997). With such alarming projections, the physiotherapists should anticipate that a greater proportion of their workload would be HIV/AIDS related. Pneumocystis carinii pneumonia (PCP), previously rare type of pneumonia is the most common respiratory complication of HIV infection (McClure 1993; Hills 1998). PCP is a major life threatening illness in patients with AIDS which causes progressive severe hypoxemia and breathlessness. Dike (1993) reported that respiratory care for person with HIV and AIDS was the area of the greatest perceived risk within the physiotherapy profession due to high prevalence of respiratory complications. Despite the recognition of AIDS about two decades ago, the roles of physiotherapists was not apparent until the early 1990s (McClure 1993). According to McClure, many still perceive the physiotherapist's role to lie primarily in the treatment of respiratory disorders; this multi-system disorder affects patients who may require physiotherapy for a wide range of problems due to respiratory, neurological, musculoskeletal and pain syndromes as well as general decline in fitness and functions. Physiotherapists living or working in areas with a low prev-

alence of HIV infection might exhibit low level of knowledge of HIV/AIDS. This would have impact on clinical practice and the care for HIV and AIDS patients. However, many physiotherapists are already treating people who are HIV positive in a number of settings; from maternity wards to outpatient departments. Better-informed persons have more favourable attitude towards HIV and AIDS patients and their care (Klimes et al. 1989; Amosun et al. 1997; Smith et al. 1998; Useh et al. 2003). According to Okoli and King (1993) there is very little literature on the role of physiotherapists in HIV and AIDS care. As a result it is very difficult to assess what sort of education if any, physiotherapists will require in relation to HIV and AIDS. They further stressed that another implication of lack of literature is that some physiotherapists may not recognise what they have to offer people with HIV and AIDS. It is essential that we (physiotherapists) have some knowledge of the virus to have some confidence and safety in treating patients and to avoid inappropriate reactions which, are unfortunately still seen even in hospital settings (McClure 1993).

Physiotherapy intervention in AIDS patients depends on the condition the patient presents with (Lang 1993). Mumba (2005) opined that treatment should be directed to mild impairment and mild to moderate activity limitations and participation restrictions. In physiotherapy the treatment of HIV/AIDS patients is often directed towards neurological disorders (Coates 1990; Amosun et al. 1995), musculoskeletal conditions (Spence et al. 1990), and other secondary complications in order to improve the quality of life (Amosun et al. 1995; Useh et al. 2003). Physiotherapy in the management of people with AIDS has been extensively reported (McClure 1993; Dike 1993; Sheen and Green 1997) with a dearth on evidence of physiotherapy utilisation observed. Further research is therefore suggested on treatment outcome and patient's compliance to therapy.

One of the four patterns of disease in people with AIDS is the pulmonary pattern. This consists of dyspnoea, hypoxemia, chest pain and diffuse pulmonary infiltrate on chest X-ray. Measures of outcome or the consequences of disease, its treatment or care are based on patients' own perspective (patient- based) and can be used to supplement the medical model of disease with the social model of health and ability.

Their use helps to answer the question whether treatment leads to a life worth living in social and psychological as well as physical terms by providing a more patient led baseline against which the effect of intervention can be evaluated (Bowling 2005). Despite the high level of prevalence of HIV and AIDS within the sub Saharan Africa, with common respiratory related complications, there is little evidence on the efficacy of physiotherapy on the management of person living with HIV and AIDS. This paper attempts to review the prevalence of HIV/AIDS within the sub-Saharan Africa, pathophysiology of HIV/AIDS the evidence based physiotherapy and its implication to physiotherapy practice.

METHODOLOGY

Literature Search

Cochrane Library produced no result on 'Evidence based physiotherapy on HIV and AIDS' despite revealing 4655 records for HIV and AIDS.

This review was therefore based on a detailed structured search of six computerized databases in addition to searching other sources (published, unpublished, either in press or in progress) that documented physiotherapy and HIV and AIDS. This was done to maximize the probability of including all relevant studies regardless of language or publication status. Several strategies were combined; Medline and HealthStar literature search engines were used following thesaurus search terms (medical subject heading –MeSH for Medline): HIV and AIDS physiotherapy and evidence- based practice. The methodological search terms applied were "Comparative studies", "Evaluation studies", "Follow-up Studies", "Longitudinal Studies", "Meta-analysis", "prospective- Studies", "retrospective Studies" and "reviews". The EBSCO CD-ROM database was searched for the period 1978 to 2006. Secondly, a free text search was conducted on the following databases: Google scholar, Popline, HealthStar, Medline, Cab Health and Embase to identify relevant literature. Results of the two searches were combined and then supplemented by iterative reviews of reference lists attached to articles. Only ten articles and one mini thesis documented the role of physiotherapy in HIV and AIDS.

Selection of Studies

The studies that were selected for more detailed review specifically dealt with HIV and AIDS and physiotherapy.

Method of Synthesis of Studies

Information derived from the obtained studies was reviewed around broad themes.

- (i) Physiotherapy and CD4 count
- (ii) HIV sub types and physiotherapy
- (iii) Pathophysiology of HIV and AIDS
- (iv) Symptoms of HIV and AIDS and categorisation
- (v) Cardiopulmonary and HIV/AIDS
- (vi) Exercise prescription and HIV/AIDS

RESULTS AND DISCUSSION

The results and discussion of the review shall be discussed around the broad themes.

Physiotherapy and CD4 Count

Over the past three decades, clinical decision making and outcome of treatment of respiratory conditions resulting from the management of the complications of AIDS is difficult to evaluate and predict. Respiratory conditions such as tuberculosis, pneumonia and bronchiectasis are now widely reported as a complication of AIDS (Coates 1990; McClure 1993; Hills 1998). The recovery of patients from these complications is dependent on so many factors. Exercise has been found to increase the number of CD4 (CD known as cluster designation) cells, improve immunity, and improve better physical and emotional status in patients with AIDS (La Pierriere et al. 1997; O'Brien et al. 2009). According to La Pierriere et al. (1997), the exercise prescription phase in the pulmonary rehabilitation following respiratory associated condition of the patients with AIDS is almost obliterated due to the following reasons: 1) the patients are too weak to comply, 2) the patient (condition) is never stable to go through this stage, 3) The emotional and psychological state of the patient would not allow for introduction of rehabilitation exercise and, 4) Poor medical state of the patient, 5) The patient might not live long enough to partake in this phase of treatment, 6) The therapists' belief that all HIV infected individuals

eventually develops AIDS and die. This was corroborated by the findings of Amosun et al. (1995) who reported that 46% of people with AIDS died within the period of their study. Despite this it is important that the quality of life of the person living with HIV and AIDS is enhanced through a well designed pulmonary rehabilitation programme (Sewell et al. 2006).

HIV and AIDS Prevalence, Subtypes and Pattern of Infection in Africa

HIV/AIDS has already taken a terrible human toll, laying claim to millions of lives, inflicting pain and grief, causing fear and uncertainty and threatening economic devastation (Strategic Plan 2000). According to the strategic plan report, recent estimates suggest that of all people living with HIV in the world, 6 out of every 10 men, 8 out every 10 women, and 9 out every 10 children are in Sub-Saharan Africa. According to UNAIDS report (2000), about 25000000 people are infected with HIV and AIDS in sub-Saharan Africa. A breakdown of the data showed HIV prevalence of over 10% in adults 15-49 years of age in 16 countries by the end of 1999. Botswana has the highest infection rate of 35.8% followed by Swaziland with 25.2%, Zimbabwe (25%), Lesotho (23.5%), Zambia and South Africa (19.9%) each and 13.9% for Kenya. The primary pattern of infection appears to be a southwards movement of the virus from the central African AIDS belt (Uganda, Kenya, Rwanda, Burundi and Tanzania) towards and through southern Africa. The regional picture hides many intra-country variation in HIV prevalence, which corresponds to urban/rural status (Webb 1997). Webb also reveals that the analysis of the patterns of HIV-1 infection amongst antenatal clinic attendees in Zambia and Botswana, for example demonstrates the extent of this variation. With 500 new HIV infections per day in Zambia and an estimated HIV prevalence rate of 10-15 percent in rural areas and 25-30 per cent in the urban area. Zambia is at the heart of the African AIDS belt. A similar spatial distribution, that is, a rural urban differentiation found in neighbouring Malawi, with estimated rates of 12.3 per cent and 30.5 per cent respectively. The viral subtypes differ in the continent, but there are more similarities than differences in HIV's behaviour in Africa. Theories about the impact of viral differences on ease of infection are focusing on

the strain of HIV-1 known as subtype C, one of the 11 subtypes, labelled A to K. West Africa has mostly A and a combination A/G virus. HIV-2, a distinctly different type of the virus, is also endemic to West Africa. Southern Africa (Zimbabwe inclusive) had little HIV-1 until 1990s, subtype C accounts for most of the infections. It is argued that AIDS related diseases and possibly disease progression itself differed in Africa too (Webb 1997; Cohen 2000).

Pathophysiology of HIV and AIDS

The pathophysiology of HIV and AIDS has been extensively discussed (LaPerriere et al. 1997; Webb 1997). The Human Immunodeficiency Virus (HIV), which causes AIDS, is of two types: HIV-1 (which was initially called Lymphadenopathy Associated Virus LAV), and HIV-2. The HIV-2 is more prevalent in some parts of West Africa with lower pathogenesis and longer period between initial infection and onset of AIDS (Quinn et al. 1986; Jeffries 1988). The virus HIV compromises the body's immune system in such a way that it renders the body incapable of defending itself against opportunistic infections and cancer (Najera and Herrera 1988). The virus once within the blood stream, targets the CD4 T-lymphocyte cells, which constitute a vital component in the immune system as they coordinate antibody production and all immune responses (Webb 1997). In general, HIV can only infect cells, which have special 'receptors' known as CD4 antigen. On making contact with a CD4 antigen – carrying cells known as T-helper / inducer cell (CD4+) defined by monoclonal antibodies T4 and Leu3 (LaPerriere et al. 1991; LaPerriere et al. 1997).

T4 or CD4 + lymphocytes and macrophages (which carry the appropriate receptor on their surface and on to which the surface protein of the virus attach themselves), HIV sheds its lipid coat and injects its RNA into the human cell. Once the virus has entered the target cells to convert its single stranded viral RNA to double stranded viral DNA with the aid of reverse transcriptase an enzyme carried by retroviruses. The viral DNA is then integrated into the host cells genetic material and because the HIV becomes part of the human cell's genetic material, infection of the cell is irreversible and the permanent infection is thereby established (Jeffries 1988).

Although, the victim's body immune system produces antibodies to the virus, it does not seem to be capable of inactivating the virus. The loss of the immunity however, is selective and affects primarily the part of the immune system involved in the defence against infections, thus, people with AIDS develop certain infections but can resist other more common infections (WHO 1989). LaPerriere et al. (1997) in their report reiterated the central role of CD4+ cell in the immunologic deterioration. According to LaPerriere and others, CD4+ remains the most acceptable marker of the disease progression and it is routinely used as an indicator of the effectiveness of clinical trials. The dynamic nature of HIV/AIDS as a chronic progressive disease was also highlighted. They stressed that the very different immunologic and clinical manifestations depended upon where the individual is in the continuum of the disease spectrum. It is important to evaluate the position of the patient within this continuum, before effective physiotherapy can be provided.

Symptoms of HIV and AIDS and Categorisation

A few of the symptoms following HIV/AIDS that are of specific interest to the practice of physiotherapy were reviewed. Clinical manifestations of HIV infections included those due to opportunistic disease and illnesses directly caused by HIV itself. La Perriere et al. (1997) reported three dissimilar categories for the purpose of investigating the relationship between exercise and CD4+ cell count in HIV/AIDS. These categories were asymptomatic, early symptom pre AIDS, and AIDS. These classifications would be of tremendous value to the therapist, since this might influence the outcome of the CD4+ cell count following exercise regimen.

Cardiopulmonary and HIV/AIDS

According to Hills (1998), the severity and extent of the presenting cardiopulmonary problems amongst patients with HIV and AIDS depends on the type of defect from which the patient suffers. The most frequently affected site of immuno-suppressed or deficient state is the respiratory tract, with sinusitis and pulmonary infections often recurrent and persistent. The result is that the physiotherapist is often faced with a patient who has multiple, complex problems presenting separately or concurrently. This

complexity is highlighted by the acquired immune deficiency syndrome (AIDS) patients, who, as the immune deficiency increases (reflected by decreasing CD4 lymphocytes cell number), shows progressive and fairly unpredictable presentations of increasingly severe infections covering all body systems. This type of presentation is usually an enormous challenge to the physiotherapist which might affect both short term and the long-term goals.

Exercise Prescription and HIV/ AIDS

Nieman (1997) recommended that exercise prescription for all HIV-infected individuals be made on an individual basis with appropriate initial screening. The exercise prescription should emphasise both cardio respiratory and musculoskeletal training components. Other authors revealed that supervised aerobic training, ranging from 10 weeks to 1 year, has demonstrated the ability to improve and maintain cardiopulmonary fitness in individuals through the spectrum of HIV-1 disease (O'Brien et al. 2004; Ramirez-Marrero et al. 2004; Robinson et al. 2007). The therapists should therefore be aware of the CD4 + cell counts prior to exercise therapy, since this provides the therapist with the probable prognosis of the therapy. Psychological advantages of aerobic exercise training for HIV infected individuals comprising mainly decreases in anxiety and depressive mood states, and increase in active coping behaviours were also reported (LaPerriere et al. 1997; Terry et al. 1999). In the course of the cardio pulmonary rehabilitation of patients with HIV and AIDS, emphasis should be on the following; stage of the disease, frequency of the exercise programme and the duration and mode of the exercise programme.

Implication for Cardiopulmonary Practice

Expectedly, cardiopulmonary physiotherapy (Cp) in HIV/AIDS must be different from non-HIV/AIDS cases. Cp in HIV/AIDS requires special investigation. Respiratory and related conditions that presents in our hospital wards are now more of a complication of the HIV/AIDS. Cardiopulmonary physiotherapy practice and education must therefore shift to embrace the recent trend of Cp related HIV/AIDS complication in our hospital wards. Pulmonary rehabilitation should include health education and coun-

selling, detailed exercise therapy, HIV/AIDS infections and the response of exercises to CD4+. This inclusion will demonstrate the dynamism and shift of practice towards meeting the needs of its clientele (which might be unique to the African situation).

Anecdotal evidence within the clinical situation reveals the following:

- 1) Frustration and decreased zeal in patient care on the part of therapists because patients die few days after referrals for physiotherapy
- 2) Lack of professional satisfaction because most of the patients were hardly discharged home to continue with pulmonary rehabilitation programme, an important component of rehabilitation (Sewell et al. Morgan 2006).

CONCLUSION

The overall effect of physiotherapy on HIV and AIDS can not be confirmed because on the relatively few studies that had investigated the effect of evidence based physiotherapy on HIV and AIDS. In this review two studies were found to report clinical significance in the effect of exercises and CD4 count, while others reported statistical significance between viral load and the effect of exercises and cardiopulmonary parameters. The review of literature on exercises and HIV and AIDS reveals that there was no conclusive evidence on the use of physiotherapy in the management of persons with HIV and AIDS. Nonetheless, physiotherapists in all spheres of clinical practice require an enormous amount of professional (physiotherapy) specific HIV and AIDS education for effective clinical practice. The cardiopulmonary physiotherapy should include pulmonary rehabilitation programme adapted for patients with HIV and AIDS.

REFERENCES

- Amosun SL, Gatsi LT, Mawere JH 1995. Neurological manifestations in AIDS: Implications for rehabilitation. *South Africa Journal of Physiotherapy*, 51: 45-47.
- Amosun SL, Shabodein R, Marais M, Nicholas LJ 1997. AIDS and sexuality education in the physiotherapy curriculum. *South Africa Journal of Physiotherapy*, 53: 11-14.
- Bopp CM, Phillips KD, Fulk LJ, Hand GA 2003. Clinical implications of therapeutic exercise in HIV/AIDS. *Journal of the Association of Nurses in AIDS Care*, 14: 73-78.

- Bowling A 2005. Measuring health outcomes from the patient's perspective. In: A Bowling, S Ebrahim (Eds.): *Handbook of Health and Research Methods: Investigation, Measurement and Analysis*. Glasgow: Open University Press, pp. 428-444.
- Coates R 1990. HIV infection and AIDS: A guide for physiotherapists. *Australian Journal of Physiotherapy*, 36:17-21.
- Cohen J 2000. Is AIDS in Africa a distinct disease? *Science*, 288: 2153-2156.
- Dike L 1993. Physiotherapists' perceptions of risk of HIV transmission in clinical practice. *Physiotherapy*, 79: 178-185.
- Hills D 1998. Immunosuppression or deficiency. In: JA Pryor, BA Webber (Eds.): *Physiotherapy for Respiratory and Cardiac Problems*. 2nd Edition. Edinburgh: Churchill Livingstone, pp. 485-492.
- Jefferies D 1988. Explaining the nature of the virus that causes AIDS. *AIDS Action*, 3: 2-3.
- Klimes I, Catalan I, Bond A, Day A 1989. Knowledge and attitude of healthcare staff about HIV infection in a health district with low HIV prevalence. *AIDS CARE*, 1: 313-317.
- Lang C 1993. Community physiotherapy for people with HIV/AIDS. *Physiotherapy*, 79: 163-167.
- La Perriere A, Fletcher MA, Antoni MH, Klimas N, Ironson G, Schneiderman N 1991. Aerobic exercise training in an AIDS risk group. *International Journal of Sports Medicine*, 12: S53-S57.
- La Perriere A, Klimas N, Fletcher MA, Ironson G, Perna F, Schneiderman N 1997. Change in CD4+ cell enumeration following aerobic exercise training in HIV-1 disease: Possible mechanisms and practical applications. *International Journal of Sports Medicine*, 18: S56-S61.
- Loewenson R, Whiteside A 1997. Social and Economic Issues of HIV/AIDS in Southern Africa. *A Review of Current Research*. SAFAIDS.
- McClure J 1993. The role of physiotherapy in HIV and AIDS. *Physiotherapy*, 79: 388-393.
- Mumba M 2005. Physical Disabilities Amongst Adults with HIV/AIDS Being Managed by the Makeni Home-based Cares in Lusaka Zambia (online), Mini Theses. From < http://www.uwc.ac.za/library/theses/Mumba_m.pdf > (Retrieved March 15, 2007).
- Najera R, Herrera MI 1988. Biology of the Virus. *World Health*, March, P.10.
- Nieman DC 1997. Exercise immunology: Practical applications. *International Journal of Sports Medicine*, 18: S91-S100.
- O' Brien K, Nixon S, Tynan A, Glazier RH 2004. Effectiveness of aerobic exercise in adults living with HIV/AIDS: Systematic review. *Medicine and Science in Sports and Exercise*, 36: 1659-1666.
- O' Brien K, Nixon S, Glazier R, Tynan AM 2009. Aerobic Exercise Interventions for Adults Living with HIV/AIDS. *Cochrane Database of Systematic Reviews*. Issue 2, Art. No.: CD001796. DOI:10.1002/14651858. CD001796.pub2.
- Quinn TC, Mann JM, Pist P 1986. The epidemiology of AIDS in Africa. *Science*, 234-255.
- Ramirez-Marrero FA, Smith BA, Melendez-Brau N, Santana-Bagur JL 2004. Physical and leisure activity, body composition, and life satisfaction in HIV-Positive Hispanics in Puerto Rico. *Journal of Association of Nurses in AIDS Care*, 15: 68-77.
- Robinson PF, Quinn LT, Rimmer JH 2007. Effects of high intensity and resistance exercise on HIV metabolic abnormalities: A pilot study. *Biological Research for Nursing*, 8: 177-185.
- Sewell L, Singh SJ, Williams J E A, Collier R, Morgan M 2006. How Long Should Outpatient Pulmonary Rehabilitation Be? A Randomised Controlled Trial of Four-Weeks Versus Seven-Weeks. From < <http://thorax.bmjournals.com/cgi/content/abstract/thx.2005.048173v1> > (Retrieved March 26, 2007).
- Sheen D, Green A 1997. Are you positive? AIDS, attitudes and physiotherapy. *Physiotherapy*, 83: 190-196.
- Spence DW, Galantino ML, Mossberg KA, Zimmerman SO 1990. Progressive resistance exercise: Effect on muscle function and anthropometry of select AIDS population. *Archives of Physical Medicine and Rehabilitation*, 71: 644-648.
- Smith AMA, De Visser R, Akande A, Rosental D, Moore S 1998. Australian and South African undergraduates' knowledge, attitudes, and behaviours. *Archives of Sexual Behavior*, 27: 279-295.
- Strategic Plan 2000. HIV/AIDS/STD Strategic Plan for South Africa 2000-2005. From < <http://www.gov.za/documents/2000/aidsplan2000.pdf> >
- Terry L, Sprinz E, Ribeiro JP 1999. Moderate and high intensity exercise training in HIV-1 seropositive individuals: A randomised trial. *International Journal of Sports Medicine*, 20: 142-146.
- UNAIDS 2000. *UNAIDS Report on the Global HIV/AIDS Epidemics*. June.
- Useh U, Akinpelu AO, Makinde GB 2003. HIV/AIDS Pandemic: Comparative knowledge and roles of physiotherapists in two African countries. *Physiotherapy*, 89: 720-727.
- Webb D 1997. *HIV and AIDS in Africa*. London: Pluto Press, pp. 1-28.
- World Health Organisation 1989. Youth and AIDS. *WHO Report*, pp.3-4.