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KNOWLEDGE ON EFFECT OF EXERCISE ON HIV INFECTED PERSONS' HEALTH AMONG MEDICAL STUDENTS IN KAKAMEGA COUNTY, KENYA

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Abstract:
Contributions of sports on health continue to expand due to ever ongoing research. Conclusive studies validate significant benefits of physical activity in many health conditions**.** Despite the recognition and knowledge of the beneficial effects of exercise on persons living with HIV and AIDS in the developed world, there are few published studies on knowledge of effect of exercise on HIV infected persons in developing countries. This study is designed to determine whether health science students in Kenya have basic knowledge on the effect of exercise on HIV infected persons. Simple random sampling was employed in selected institutions in Kenya that offer health science programmes. The study, a descriptive survey by design used a researcher designed questionnaire on knowledge of effects of exercise on HIV infected persons for data collection. The questionnaire was administered to student in all year groups in Nursing and Midwifery, Medical Laboratory Sciences, Human Nutrition and Dietetics. Results showed a positive response of medical students towards significance of exercise towards improved physiological and psychosocial aspects of HIV/AIDS management. It recommended exercise specific content in the curriculum of medical students to empower them in prescribing exercise as an alternative to the management of HIV/ AIDS conditions and need to design cost effective exercise programes to enable the low social economic status people access fitness.

Keywords: HIV/AIDS, exercise, health promotion

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1. Introduction

AIDS is caused by the human immunodeficiency virus (HIV). The virus destroys the body's defense mechanism to fight against infections. People living with HIV/AIDS suffer from stress, which is the collective physiological and emotional responses, any stimulus that disturbs an individual homeostasis or equilibrium. Stressors could be any psychological or physiological events or conditions that produce stress. Through guided physical activity, the HIV/ AIDS patients can substantially reduce their feelings of stress that may help their immune system to function better and cope more effectively with HIV and secondary infections. Good nutrition for good health and to build strong immunity and immune - supportive therapy can also boost immune capacity.

Studies have shown that exercise brings about both short and long term psychological enhancement and mental wellbeing (Morgan & Goldston, 1987). This would be appropriate for the HIV/AIDS patients because they tend to suffer from stress as a result of stigma. The international society of sports psychology (1992) has summarized a number of psychological benefits of physical activity including, improvement in self-confidence and awareness, relief of tension, positive changes in mood, relief of feelings of depressions and anxiety, increased mental well-being, favourable influence on premenstrual tension, increased energy, development of positive coping strategies in daily activities and reduction in various stress indices.

Basic exercise is important for everyone, regardless of the physical condition. In addition to toning muscles and improving strength, exercise can greatly improve the immune system and help manage stress, which is especially beneficial for those living with HIV. Increased muscle mass or lean muscle mass is beneficial because it is a metabolically active tissue as opposed to fat. In early stages of HIV infection, loss of muscle mass occurs even before any apparent weight loss. Increasing muscle mass may help increase long-term survival with HIV (Gore & Withers, 1990).

2. Related Studies

LaPerriere (1994) studied the effects of aerobic exercise on lymphocyte subpopulations. Fourteen healthy but sedentary males, 18-40 years of age were randomly assigned to either an aerobic exercise training or control condition. The aerobic exercise training resulted in a significant decrease in sub-maximal heart rate from 176 to 150 beats per minute to a fixed work rate of 150 watts. This training effect was accompanied by increases in the resting level of the following lymphocyte subpopulations: CD2 (1717 vs 2183 mm3, CD4 (942 vs 1280 mm3, CD45RA+CD4+ (312 vs 595 mm3, CD8 (655 vs 816mm3, and CD20 (162 vs 244 mm3) cell counts**.** These findings indicate that several lymphocyte subpopulations are increased following a 10-week program of aerobic exercise training.

A study by Mustafa, Macera, Thompson, Jackson, Selassie, and Dean (1999) observed that when HIV patients incorporated a regular exercise programme into their lifestyle, their blood count increased. The study established that exercise may have a positive effect on the immune system by increasing T4 Helper Cells, T8 Killer Cells, and Natural Killer Cells. The study concluded that immune enhancement may be due to the reduced stress levels, regular sleep patterns, increased appetite and energy levels and improved self-image of people who exercise.

Studies by Ciccolo, Esbelle, Jowers and Bartholomew (2004) on the benefits of exercise training for quality of life in HIV/AIDS in the Post-HAART era showed that exercise has consistently been listed as one of the most popular self-care therapies. It was noted that although the results are generally positive, there are clear limitations to this work. The existing studies have utilized small samples and experienced high rates of attrition. In addition, majority of the studies were conducted prior to the widespread use of HAART, which limits the ability to generalize these data.

Study on the effects of age and viral serology on cd T-cell numbers and exercise responsiveness in humans by Mira, Bigley, Spielmann, LaVoy, Morrison, Kunz, and Simpson (2013) found that older subjects had lower numbers and proportions of T-cells than younger ones, while CMV was associated with increased numbers and proportions of T-cells in younger but not older population. Exercise evoked a 2-fold increase in circulating T-cell numbers. The magnitude of this response was 3-times greater in younger compared to older subjects, and 1.6-times greater in younger CMV-infected people compared to younger non CMV-infected. The study concluded that T-cell numbers and exercise responsiveness decreases with age and may contribute to impaired immune surveillance after acute physical stress.

Webel, Barkley, Longenecker, Mittelsteadt, Gripshover and Salata, (2015) studied a cross-sectional description of age and gender differences in exercise patterns in adults living with HIV. The subjects (N=5,102) completed a 7-day exercise diary documenting daily exercise duration, frequency, and intensity. Women exercised an average of 2.4 hours per week compared to men, who exercised 3.5 hours per week. This relationship was particularly evident during middle adulthood for women than men. The findings further confirmed that people living with HIV exercised regularly but at less than recommended levels. Webel et al (2015) would give credence to the present study since it showed involvement of people living with HIV/AIDS involvement in exercise.

A study by Catherine, Dufour, Maria, Marquine, Fazeli, Brook, Ellis, Grant and Moore (2013) to find out if physical exercise is associated with less neurocognitive impairment (NCI) among HIV-infected adults revealed that lower rates of global NCI were observed among the exercise group (15.7%) as compared to those in the no exercise group (31.0%). The findings suggested that HIV infected adults who exercise are approximately half as likely to show NCI as compared to those who do not thus supporting that exercise has a psychosocial benefit to persons living with HIV/AIDS.

Arey and Beal (2002) carried out a study on the role of exercise in the prevention and treatment of wasting in Acquired Immune Deficiency Syndrome (AIDS). The study

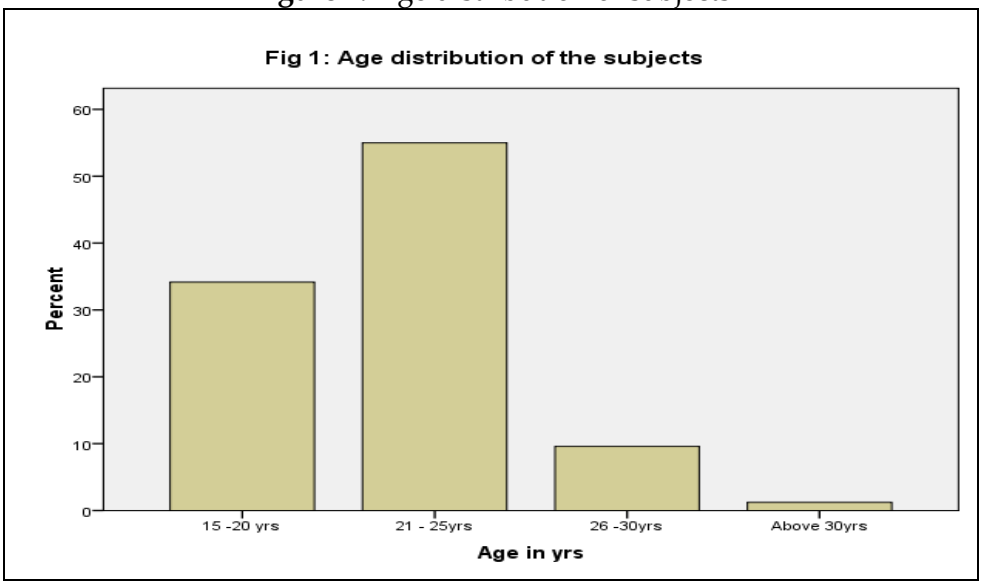
noted that loss of BCM is associated with the increased risk of morbidity and mortality. It was postulated that building up lean tissue might forestall the development of wasting or help to restore LBM after wasting has occurred. In a complementary finding, Macallan et al. (1995) have implicated reduced physical activity as a principal component of rapid weight loss.

A study about Change in CD4+ cell enumeration following aerobic exercise in HIV-1 disease: possible mechanisms and practical applications by LaPerriere , Klimas , Fletcher, Perry, Ironson, Pern and Schneiderman, (1997) emphasized on effects of exercise on the enumeration of CD4+ cells in HIV/AIDS. Evidence from the study supported the stress management role of exercise as a means to explain the buffering of these suppressive stressor effects, thereby facilitating a return of the CD4+ cell count to more normal levels. Therefore, the observed elevation in the number of CD4+ cells actually represents a normalization of CD4+ cells.

3. Methodology

This study was a descriptive survey involving 312 (Males =27.1%; females 78.3%) medical students from various medical training colleges who volunteered to participate in the study. The study involved participants responding to a Likert scale questionnaire with items on how exercise improve physical fitness, boosts helper cells, reduce stress levels, reduce insomnia, enhance appetite and improve self-image. Responses comprised of 62.1% nursing students, while clinical officers were 37.9% of the subjects. The study involved 37.9% first year students, 27.9% second year, 34.2% third year and 34.2 % fourth year students across the medical faculties. The age of the respondents ranged from 18 – 37. Age distribution showed below 20 years of age were 39.2%, 21-25 years were 50.0 %, 26-30 years were 9.6%, while 1.2% were 30 years and above. This is shown on figure 1.

Figure 1: Age distribution of subjects



4. Results

Many subjects showed high level of knowledge on the effect of exercise on selected health variables. For instance, 95.4% of the subjects knew that exercise improves muscle tone while 91.3 % of the subjects reported that exercise increases muscle hypertrophy. On the contrary, 45.1% of the subjects did not know that exercise boosts the count of T_4 helper cells and T_8 killer cells. On the psychosocial aspects, 73.8% and 77.1% respectively admitted they knew that exercise reduces stress levels and improves sleep patterns. On nutrition and perception elements, 76.7% of the subjects indicated that exercise enhances appetite while 85% of the subjects agreed that exercise can help improve self-image. A larger percentage of the respondents (44.6%) also reported that exercise improves quality of sleep. This is summarized in table 1.

Table1: Showing effect of exercise on selected health variables

Item	SA (%)	A (%)	UD %)	D (%)	SD (%)
Improves Muscle tone	74.6	20.8	2.5	1.7	0.4
Increases Muscle Hypertrophy	49.2	42.1	4.6	3.8	0.4
Boosts T_4 Helper Cells, T_8 Killer Cells,	22.1	32.5	32.5	7.1	5.8
Reduces stress levels	32.1	41.7	18.3	5.8	2.1
Reduces insomnia (Improves sleep)	34.6	42.5	12.9	8.8	1.2
Enhances appetite	30.0	46.7	16.7	4.6	2.1
Improves Self image	44.6	40.4	8.8	5.0	1.2

Key: SA- Strongly Agree, A- Agree, UD- Undecided, D – Disagree, SD- Strongly Disagree

5. Discussion

Exercise enhances muscle mass due to increased numbers of myofibrils and the areas of cross section hence increased hypertrophy and toning. This helps to counter the muscle wasting common in HIV patients. The findings in this study are supported by Brian et al (2002) and Macallan et al. (1995) who reported reduced physical activity as a principal component of rapid weight loss. Having knowledge about the positive effect on the immune system by increasing T4 Helper Cells, T8 Killer Cells, and Natural Killer Cells was confirmed and supported by Mustafa, et al (1999) where positive results were observed between exercise and immunity.

The effect of exercise on immune enhancement due to reduced stress levels was further supported by Perry (1997) where effects of exercise on the enumeration of CD4+ cells in HIV/AIDS was reported. The study explains the role of exercise in stress management as a means of buffering suppressive stressor effects, thereby facilitating a return of the CD4+ cell count to more normal levels. These findings are supported by Dufour et al (2013) where lower rates of global Neuro Cognitive Impairment (NCI) were observed among the exercise group (15.7 %) as compared to those in the no exercise group (31.0%). Findings on relationship between immunity and exercise among people living with HIV/AIDS have shown positive correlation thus needs to exercise as a way of managing this condition.

Study on the effects of age and viral serology on CD T-cell numbers and exercise responsiveness in humans by Mira et al (2013) found that older subjects had lower numbers and proportions of T-cells than younger ones. Additionally, CMV was associated with increased numbers and proportions of T-cells in younger but not older population. Exercise evoked a 2-fold increase in circulating T-cell numbers. The magnitude of this response was 3-times greater in younger compared to older subjects, and 1.6-times greater in younger CMV-infected people compared to younger non CMV-infected. The study concluded that T-cell numbers and exercise responsiveness decreases with age and may contribute to impaired immune surveillance after acute physical stress. These findings give more credence to need for medical practitioners to understand the significance of exercise as an essential element in the management of HIV/AIDS.

The findings by Mustafa et al (1999) also affirm that exercise improves regular sleep patterns, increased appetite and energy levels. Increased energy levels can be explained by increased mitochondria during hyperplasia and hypertrophy which constitute metabolic sites. Body mass increase is typically resistant training achieved by overload principle. Knowledge in physical fitness training is critical in making medical practitioners who handle patients aware of the importance of these developments so as to advice patients on how exercise can enhance their body image as shown in the present study.

6. Conclusion and Recommendations

The findings from this study suggest that knowledge about the role of exercise on HIV patients among health care practitioners is adequate. However, there is need for continued awareness since there are new discoveries in the discipline of exercise thus need to keep updating medical practitioners and persons living with HIV/AIDS on the beneficial aspect of physical activity on management of this condition. Comparatively, it has been observed that knowledge on specific benefits and modes of exercise is inadequate for accurate exercise prescription among sections of the medical profession. This calls for exercise specific content within the training curriculum of health care professionals who will be required to prescribe exercise to patients during their professional duties.

Further research needs to be carried out to establish easier ways in which persons living with HIV/AIDS may benefit from exercise activities with minimal expense since payment to exercise venues may be prohibitive to low social economic status populations.

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