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Supplementation effect on Body Weight and BMI of HIV-positive/AIDS patients

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Abstract: This is the first preliminary study in the Free State Province of South Africa to have examined the possible effect of a locally produced nutritional supplement on the body weight and Body Mass Index (BMI) of HIV-positive/AIDS patients. The parameters were determined according to standard procedures in 35 HIV-positive/AIDS patients at baseline and in 28 patients at the end of the study. Twenty-four (68.8%) of the 35 patients examined at baseline had BMI within normal range while the median body weight was 57. Twenty-eight patients completed the study. The results showed that 19 (67.9%) had a BMI within the normal range after supplementation for three months. The body weight showed a slight but insignificant decline ($p>0.05$) at the end of the study. In general, BMI produced a trend towards an improvement. Further studies are recommended.

Key words: Supplementation, nutritional, HIV/AIDS, body weight, body mass index

INTRODUCTION

To understand the relationship between HIV infection and nutritional status, one must consider the effect of the infection on the body size and composition. In populations in which malnutrition is endemic (as it is in Africa), body size and composition changes are associated with protein-energy malnutrition (Babamento and Kotler, 1997; Oguntibeju *et al*., 2003). Weight loss and body composition changes are said typically to follow two patterns in people living with HIV/AIDS. This includes slow and progressive weight loss resulting from anorexia and gastrointestinal disturbances and rapid, episodic weight loss following secondary infections. It has been observed that even relatively small losses in weight (5%) have been associated with decreased survival in individuals with AIDS (Macallan, 1999).

Research has shown that in the early period of HIV infection, weight gain or maintenance might be achieved through nutrition intervention and this has helped to reduce the consequences of wasting in people living with HIV/AIDS (Friis and Michaelsen, 1998). In the developing world, where the majority of people living with HIV cannot afford antiretroviral therapy, good nutrition combined with mineral and vitamin supplementation could be a good source of therapy. Malnutrition is known to favour opportunistic infections and contributes to wasting (Niyongabo *et al*., 1997) making supplementation an important aspect in the management of people living with HIV/AIDS. Nutritional intervention may help to strengthen the immune system and reduce the severity and impact of opportunistic infections in people living with HIV/AIDS (Woznicki and D'Alessandro, 1997).

The aim of this study was to examine the possible effect of a locally produced nutritional supplement (Africa's Solution) on the body weight and body mass index of HIV-positive/AIDS patients.

MATERIALS AND METHODS

Thirty-five patients (volunteers living with HIV/AIDS) were recruited from the African community of Bloemfontein, South Africa according to specific inclusion criteria. The study population consisted of males and females within the age group of 18-65 years. Ethical approval was obtained from the Faculty of Health Sciences, University of the Free State, South Africa. Seven of the patients died and only 28 completed the study. The study was carried out at Tsepo Home-base care and Medi Inn Clinic, Bloemfontein between April and September 2003. At baseline and the end of the study, the body weight and Body Mass Index (BMI) were determined. Body weight in this study was measured by means of an electronic load cell scale to the nearest 0.1 kg with patients dressed in light clothing and height (without shoes) to the nearest 0.1 cm using a metal tape fitted to the wall. The BMI was calculated from body weight and height values in meters squared. For the measurements, the patients presented themselves in minimal clothing to allow measurements to be done accurately and efficiently. Two persons were involved with the measurement: the measurer and the recorder. This was done to ensure

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accuracy of site location, correct sequence of measurement sites and accurate reading. The recorder repeats the value as it is being recorded in order to enable the measurer to do an immediate check. The measurement was done twice at each site on each subject and the average value was taken. Throughout the marking and measurement session, each subject stood relaxed, with arms comfortably by the side and with feet together. However, a few measurements required the subjects to place their feet apart. During the measuring period, the measurer was able to move around the subject easily and also to manipulate the equipment. Measurements were done according to standard procedures (Lee and Nieman, 1996; Laquatra, 2004). Patients received 7.5 mL of test supplement twice daily for three months under adequate supervision after baseline measurements. The measurements were repeated at the end of the study. For ethical reason a control group was not included.

Components of the supplement: The contents of the supplement include the following extract of hypoxis (500 mg), grape fruit seed extract (4 mg), sitosterol and sitosterolin (28 mg), beta-carotene (1 mg), vitamin E (12.5 mg), vitamin B_6 (7.5 mg), vitamin B_1 (3.75 mg), vitamin B_2 (10 mg), vitamin B_{12} (3 μg), nicotinamide (5 mg), vitamin C (50 mg), olive green leaf extract (35 mg), folic acid (325 μg) and natural anti-oxidant (biocydin) (52 mg).

Statistical analysis: Continuous variables were described by using standard variation, median, percentiles and t-test. Significance was put at $p<0.05$.

RESULTS

Of the 35 patients examined at baseline, 8 (22.9%) had a BMI of less than 18.5 kg m^{-2} (reference value), 24 (68.6%) had a BMI within the range of 18.5-24.9 (reference range), while 3 (8.6%) of the respondents had a BMI greater than 25 kg m^{-2} (reference value). Of the 28 patients examined at the end of the study, 7 (25%) had a BMI of less than 18.5 kg m^{-2}, 19 (67.9%) had a BMI within the range of 18.5-24.9 kg m^{-2} and 2 (7.1%) had a BMI greater than or equal to 25 kg m^{-2}. The median body weight at baseline was 57 and decline insignificantly ($p>0.05$) to 56.5 at the end of the study. The median BMI of the studied population fell within the accepted or reference range of 20 kg m^{-2} and less than 25 kg m^{-2} (Laquatra, 2004). At baseline, the median BMI was 20.4 kg m^{-2} (within a normal range). (Table 1a) It showed a slight positive trend towards an insignificant ($p>0.05$) increase to 20.7 kg m^{-2} following supplementation (Table 1b).

Table 1a: Weight and BMI values of HIV-positive/AIDS patients before supplementation

Parameters	SD	Median	25 percentile	75 percentile
Weight	8.2	57.0	49.0	60.0
BMI	3.3	20.4	18.7	23.2

Table 1b: Weight and BMI values of HIV-positive/AIDS patients after supplementation

Parameters	SD	Median	25 percentile	75 percentile
Weight	7.4	56.5	50.0	60.0
BMI	3.4	20.7	18.8	23.2

DISCUSSION

Present aim was to address the hypothesis that HIV-positive/AIDS patients whose diets were supplemented with additional vitamins, anti-inflammatory substances and minerals would on the average be more likely to benefit from nutritional indices (body weight and body mass index and improved survival. As we were interested in potentially simple applicable intervention, trial of oral supplementation was considered. The results suggest that supplementation for three months did not demonstrate significant effects on the body weight and BMI of HIV-positive/AIDS patients. However, the BMI showed a trend towards improvement at the end of supplementation. It is envisaged that this positive trend towards improvement on the body mass index could have important benefits on clinical outcomes if supplementation is sustained for a longer period and with larger sample size. The finding of the current study agrees with the trend reported by Parisien *et al.* (1993) for the body weight of HIV-positive/AIDS patients. Also, studies have shown that weight loss and decrease in body weight have been indicated as signs of a deterioration of nutritional status in HIV-positive/AIDS patients (Macallan, 1999; Myers, 1997; Dannhauser *et al*., 1999). In a study, McCorkindale (1990) reported that seven patients at an advanced stage of HIV infection showed insignificant decline in body weight. His patients were on an antiretroviral drug (AZT) for five months. This trend of change underscores the different but yet unclear mechanisms involved in the wasting process in HIV infection. In the current study, the patients examined were not on antiretroviral therapy, but the supplement showed a similar result pattern to patients on anti-retroviral therapy (insignificant decline in body weight) suggesting that the supplement has the potential to demonstrate clinical benefit if given over a longer period. Other factors may explain the reason for the current result with reference to the body weight. Firstly, patients with HIV infection/AIDS may be hypermetabolic; therefore the anticipated weight gain is an overestimation because

energy needs and expected weight gain are calculated on the basis of normal metabolic states (Melchoir *et al*., 1991). Secondly, HIV infection disrupts the normal lipid and protein metabolism, which causes nutrients to be used inefficiently and wasted. For example, increased lipogenesis by the liver increases the thermogenesis of food (Hellerstein *et al*., 1993). The decline in weight of the patients by the end of nutrient supplementation was not significant. We are tempted to believe that the supplement probably has a positive but not visible effect on the weight of the patients. In other words, since the patients were not on antiretroviral therapy, weight reduction should have been more prominent than observed.

The fact that the BMI was preserved in the patients suggests that the wasting process was curtailed in the presence of the supplement. It is believed that the wasting process would have been more aggressive in the absence of the supplement because during active phases of infection, individuals with HIV/AIDS lose BMI rapidly. Although a greater percentage of patients (68.6%) had a BMI within a range of 18.5-24.9, 22.9% of the patients had a BMI of less than 18.5, therefore for those patients with a lower BMI, reduced body fat may have contributed. It is expected that as the HIV infection/disease progresses, wasting may become more pronounced, which in most cases is reflected in the amount of fat loss or lean body mass. In this study, instead of the wasting continuing significantly, as would have been indicated by a significant decline in both the body weight and BMI, it was relatively curtailed. It is possible that certain factors such as malabsorption, non-compliance, short duration and drug-nutrient interactions contributed to the non-significant effect of the supplement on the two anthropometric indicators measured (Pronsky *et al*., 2001).

In a population in which antiretroviral therapy is not readily available, the findings that nutritional supplementation for three months more or less maintained the BMI lends hope for a relatively inexpensive treatment to improve the quality of life and the general well-being of HIV-positive patients.

CONCLUSIONS

Oral supplementation for three months with a locally produced nutritional supplement (Africa's Solution) showed no significant effects on the body weight and body mass index of HIV-positive/AIDS patients. However, the BMI produced a trend towards an improvement. Supplementation for longer period is recommended.

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