

Effects of naturopathy and yoga intervention on CD4 count of the individuals receiving antiretroviral therapy-report from a human immunodeficiency virus sanatorium, Pune

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ABSTRACT

Background: Human immunodeficiency virus (HIV) infection is one of the most debilitating conditions which have affected nearly 32 million people across the globe. Antiretroviral therapy (ART) is the standard care given to the HIV positive individuals. But the patient adherence to ART is found to be very less as per previous studies. Complementary and alternative medicine is becoming a pillar in the rehabilitative efforts for many living with HIV/AIDS.

Aim: To evaluate the effect of naturopathy and yoga intervention on CD4 counts of HIV patients.

Methods: Ninety-six patients prediagnosed as HIV positive were enrolled after obtaining written consent and treated with naturopathy and yoga interventions like hydrotherapy, diet therapy, mud therapy, counseling, etc., for various durations at National Institute of Naturopathy Sanatorium. They were grouped into four groups (G1: 1–7 days, G2: 8–15 days, G3: 16–30 days, G4: >30 days) based on duration of stay. CD4 count of each individual was recorded pre- and post-stay.

Results: All analyses were conducted using R package version 3.01. Dependent sample *t*-tests were conducted to examine the significance at 95% confidence interval. Of the 96 patients, male patients constitute 55.2% and female patients 44.8% with mean age 34.74 received 1–180 days (mean 28.75, standard deviation: 14.16) treatment. Significant increase in the CD4 count was observed in two out of the four groups (G2: $P = 0.052$, and G4: $P = 0.00038$, respectively).

Conclusion: An increasing trend in the CD4 count was observed that was proportional to the length of the stay of participants at the HIV sanatorium. This indicates the possibility of lifestyle changes can bring positive outcomes in people living with HIV/AIDS when used as an adjuvant with ART care. The lack of control group is a major limitation of this study. No attempt was made to study the subjective changes in the quality of life, viral load, etc., However, larger controlled studies are warranted for conclusive results.


Key words: Antiretroviral therapy adherence; complementary and alternative medicine; human immunodeficiency virus care; human immunodeficiency virus sanatorium; lifestyle medicine; naturopathic medicine

INTRODUCTION

Human immunodeficiency virus (HIV) is a hazardous entity to human beings where 34.3 million people in

the world are suffering from HIV as per epidemiological reports.^[1] In India, there are 2.5 million people living with HIV and AIDS (PLWHA).^[2] Antiretroviral therapy (ART) is the standard treatment given to the PLWHA based on their stage of infection expressed in terms of CD4 Count.^[2,3] But the adherence to ART and the life expectancy or improvement in quality of life in PLWHA is affected due to the negative lifestyle such as improper diet, addictions, sedentary lifestyle as well as behavioral attitudes like anxiety, phobia etc., The life expectancy can be improved by altering the lifestyle and behavioral changes in the PLWHA.^[1]

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Complementary and alternative medicine has a role to play in the rehabilitative efforts for many living with HIV/AIDS.^[4] Naturopathy can be defined as a drugless, noninvasive, rational and evidence-based system of medicine imparting treatments with natural elements based on the theories of vitality, toxemia and the self-healing capacity of the body, as well as the principles of healthy living.^[5] HIV sanatorium, a residential facility in Pune, (providing free integrative healthcare, accommodation, diet, and vocational training) for HIV-positive individuals^[6] provides specialized asymptomatic clinical care which includes naturopathy and yoga interventions along with counseling and education on HIV transmission and risk-reduction behaviors. It also provides routine clinical monitoring and assessment, nutritional assessment and counseling, promotion of good personal and household hygiene. Earlier study from this sanatorium indicates that the recommending naturopathic treatment modalities and yoga practices along with lifestyle changes and counseling may have a positive impact on the health outcomes of HIV-positive individuals.^[6] The normal CD4 count of a healthy adult/adolescent ranges from 500 cells/mm³ to 1200 cells/mm³. In AIDS, the count of CD4+ lymphocytes falls below 200/mm³.^[7] The defect in the immune system is characterized by a loss of lymphocytes (lymphopenia) as a result of selective deficiency of CD4+ T-cells. As a result of their CD4+ T-cell deficiency, AIDS patients have major defects in their cell-mediated immune responses.^[8] According to Centres of Disease Control and Prevention definition, a patient has AIDS if he/she is infected with HIV and has either or one of the defining illness.

- A CD4+ T-cell count below 200 cells/ μ L
- A CD4+ T-cell percentage of total lymphocytes of <15%.^[9]

This study is an attempt to understand the effect of naturopathy and yoga interventions, a nonpharmacological approach on the CD4 count of the PLWHA staying at National Institute of Naturopathy (NIN) HIV sanatorium.

METHODS

Study location

The residential sanatorium is located in a hill station, Panchagani, Maharashtra State, India, intending to provide healthy and hygienic environment to the inhabitants.

Eligibility criteria and recruitment

Advertisements were made through the local newspapers and awareness programs conducted by NIN about the sanatorium and lifestyle interventions. Patients who enrolled themselves for the treatment at the sanatorium were subjected for the initial screening of systemic complications

as well as infections, after the initial screening at NIN's outpatient department at Pune, they were sent to the HIV sanatorium for the lifestyle interventions. Patients suffering from both HIV 1 and HIV 2 were allowed to enroll in the study. CD4 count were estimated using Alere Dextrine™ an immunochromatographic test at the day of admission and at the time of discharge of all the 96 patients stayed at this sanatorium in between 2011 May and 2014 June for different durations were collected and recorded using Microsoft Excel software after obtaining written consent. The participants were grouped into four groups' viz. G1, G2, G3, and G4, according to the number of days treatment received [Table 1]. The study was approved by NIN's Institutional Ethics Committee (IEC) through NIN/DIMR/IEC/2011-12/12.

This study was aimed at observing the utilization and feasibility of the government facility (sanatorium) by HIV positive individuals. Since most of the sanatorium participants were referred from local integrated counseling and testing centers, it was difficult to implement a matched controlled group. This study also aimed at understanding the impact of the length of stay on the participants' HIV status indicators (CD4+ count). Therefore, normalization of data was not sought for and rather the duration of stay was the main category used to segregate the participants.

Intervention

The enrolled participants have been initially elaborated about the naturopathy interventions and yoga therapies which they will undergo during their stay at the sanatorium. The patients were allowed to continue their ART drugs as per the prescription from the ART centers. The interventions given to the individuals who opted to stay at the sanatorium are as follows.

Counseling

Counseling is a key element of naturopathic treatment as it endows individuals to take greater control of their own health, happiness, and life path. Based on naturopathic principle the role of a doctor does not end at treating the patient, it accentuate doctor as a teacher (docere) who

Table 1: Summary of the patients' sex, age, and number of days treated

Variables	n=96
Age	Mean: 34.74, SD: 14.16
Sex	
Male	53
Female	43
Days treated	
1-7 days (G1)	21
8-15 days (G2)	28
16-30 days (G3)	23
>30 days (G4)	24

SD = Standard deviation

educate the patients, involve them in healing process and emphasize the importance of the doctor-patient relationship.^[10] Counseling was an integral part of the intervention plan to educate the patients about HIV transmission, principles of naturopathy treatment and how it influence the body functions.

Yoga

Yoga therapy which is a mind body intervention was provided to the inhabitants daily for 1-h, twice a day. Yoga practices have shown to reduce fear, anxiety,^[11] stress and depression which also enhances overall well-being.^[12] It includes loosening exercises, asanas (postures), pranayama (breathing techniques) such as nadishuddi,^[13] bhramari,^[14] kapalbhati,^[15] and deep relaxation techniques. These techniques were not specifically standardized for PLWHA, but this was included in the treatment plan owing to the general effects of yoga in building physical and emotional wellbeing. In addition, morning and evening walk is also followed as routine, aimed to provide mild sunbath and air bath.

Naturopathy treatments

Hydrotherapy, a naturopathic modality stimulates the body's natural healing mechanisms, which regulates the circulation of blood and lymph.^[10] This includes techniques like water packs, mud packs, spinal baths, hip bath, hot foot and arm bath. Water used in various temperatures enhances blood flow, which is thought to help in eliminating algogenic chemicals, and facilitate muscle relaxation.^[16]

Forehead pack

A cotton cloth made wet in cold water (18–24° C) is applied to the forehead after the hair and scalp have been thoroughly wet with cold water. This pack was given along with abdominal pack for 45 min once in a day. This helps in relieving chronic nasal catarrh, common cold as well as the rheumatic affections of the head.^[17]

Abdominal pack

Two cotton clothes 2–2 ½ m long and ½ m wide should be dipped in cold water (18–24° C) and wrapped around the abdomen after wringing out the excess water. After wrapping this, wrap a dry flannel or blanket of 1 m long and ½ m wide around the cotton cloth^[18] for 45 min once in a day. This helps in regulating blood circulation in abdominal organs and improves the function of them.^[19]

Spinal bath

Hyperthermic water bath, a hydrotherapy modality, which is the application of water, both topical and whole-body

in 40°C for 30 min.^[20,21] This has shown to increase the CD8+ lymphocyte and natural killer cell count. This has been attributed to the increase in somatotropin production.^[20] Neutral spinal bath (34–35° C) is given for 15 min in a spinal bath tub, which is designed in such a way that the entire length of the spine from the nape of the neck to the lowest portion of the spine is immersed inside the water. The applications of water to the spine can influence all the spinal ganglia which are related to the sensory, heat, vasomotor, and secretory centers.^[22]

Hip bath/sitz bath

The sitz bath/hip bath (partial immersion bath of the pelvic region) is given in a specially constructed tub. The tub or basin was filled with enough water of temperature 55° F–65° F to cover the buttocks and hips so that the water reaches the level of the navel.^[23] Patients were asked to sit in the tub for 20 min.

Hot foot bath

It is given in small tub in which hot water (40–45° C) where the patient has to dip the legs up to the calf muscle in water and the patient is covered with a blanket to prevent the heat loss. This is given for 20 min once in a day before sleep. Warm foot bath has shown significant effects in relieving fatigue and insomnia symptoms^[24] This bath was provided intending to relieve stress and ensure good sleep.

Mud pack to abdomen

Immunocorrective effects of mud therapy have been demonstrated in a clinical-immunological study.^[25] Mud pack was prepared with the clay which was grinded, sieved, mixed with cold water, and it was made with a consistency like soft dough. This mud was spread on a strip of cloth with the dimensions 20 cm × 10 cm × 2.5 cm. The pack was applied on the lower abdomen (from the navel to the pubis).^[25] The treatment was given for 20 min.

Raw juice therapy

The raw juice therapy was followed as a regular routine in which 200 ml of wheatgrass juice was served in empty stomach. Wheat grass is known for its high chlorophyll content which is homologous with the hemoglobin structure.^[26] This property of wheatgrass can help in blood building of the immune compromised individuals, and also it will help in alleviating the anemia which is prevalent in HIV individuals.

Diet therapy

There is a mutually aggravating relationship between malnutrition and infection.^[27] This signifies the need of

a good diet rich in immune enhancers such as protein, vitamins, and minerals for the PLWHA. Other than the juice therapy the patients were provided with short vegetarian meals which include fresh vegetable salads, fruits, fruit juices, dry fruits, sprouts, coconut milk, dry chapatti with cooked vegetables, and soups which are rich sources of proteins, vitamins and minerals.

Sun bath

Vitamin D which regulates calcium absorption and homeostasis^[28] in the body may come both from dietary sources and from synthesis in the skin triggered by sun exposure, or more specifically ultraviolet B (UVB) irradiation. UVB sunlight exposure, rather than diet, has been reported as the main source for the majority of the population.^[29] Participants were advised to take sun bath morning between 7.30 and 8.30 am and evening at 5.00–6.00 pm for 20 min, as a part of their daily routine. This could help in improving the immune status of the participants.

Statistical analysis

Analysis was done using software R package version 3.01 (Department of Statistics, University of Auckland, New Zealand). Dependent sample *t*-tests were conducted to examine the significance at 95% confidence interval.

RESULTS

The data of 96 patients infected with HIV1/HIV2 subtypes were analyzed. All the patients under the study were adhering to ART. Of the total 96 participants ($n = 96$), 53 are male patients constituting 55.2% of total patients. The female participants numbered 43 constituting 44.8% of total patients. The age of patients varied from 6 to 75 years with mean age 34.74 and standard deviation 14.6. The patients received the same treatment for varying number of days varying from 1 to 180 days with mean 28.75 days. The details are summarized in Table 1.

Dependent sample *t*-test was performed to find the significance at 0.05 level of significance. The following results were inferred in all the four groups. Statistically significant changes were observed in two out of the four groups [Table 2].

Of the four groups, G4 was the most significant group ($P = 0.00038$) when compared with the other

Table 2: Summary of the patients' CD4 count

Variable	<i>P</i>
CD4 count difference (DoD-DoA*)	
G1	0.174
G2	0.052
G3	0.44
G4	0.00038

*DoA = Day of admission, DoD = Day of discharge

groups [Figure 1]. Patients did not report any adverse events.

DISCUSSION

Naturopathy is a system of medicine which uses in body's innate capacity to cure diseases. Naturopathy treats the human body as a complete unit. The ultimate aim of naturopathic medicine is to promote the inherent power within the human body and to accelerate self-healing capacity.^[30] To our knowledge, no other study has been conducted to see the effect of naturopathic intervention and yoga as a complete lifestyle modification program in HIV patients. The results obtained indicate that naturopathy and yoga interventions when taken for 30 days or more can enhance CD4 counts in PLWHA. Besides the changes in the CD4, the patients expressed positive attitude following the lifestyle interventions which they conveyed during the consultations. This study suggests when naturopathy and yoga interventions are given along with ART provides a positive impact in the HIV care. The results suggest that yoga and naturopathy-based lifestyle intervention can possibly be introduced in pre-ART-HIV positive patients. However, the efficacy of this intervention in alleviating the severity of disease has to be studied. We can also observe a trend in the subjects studied above that the number of days treated is directly proportional to the increase in CD4 count [Figure 2].

Hence, it can be also concluded that lifestyle modification can be a key factor for positive outcomes in HIV patients when practiced for a longer time and is one of the major areas which should be reckoned while treating HIV-positive individuals. Health homes like HIV Sanatorium can contribute markedly in providing a better quality of life with the minimal usage of drugs. However, this study is based on the observations of the subjects who stayed at the sanatorium. Only the change in CD4 count has been studied. No attempt was made to study the subjective changes in the quality of life, viral load, etc., Of four groups, only two groups (G2 and G4) have shown statistically significant

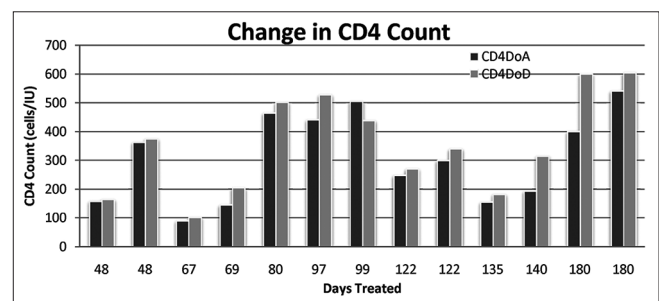


Figure 1: CD4 count of individual patients who received treatment more than 40 days. For all the patients, the CD4 count has positively changed signifying the effect of treatment received. DoA - Day of admission, DoD - Day of discharge

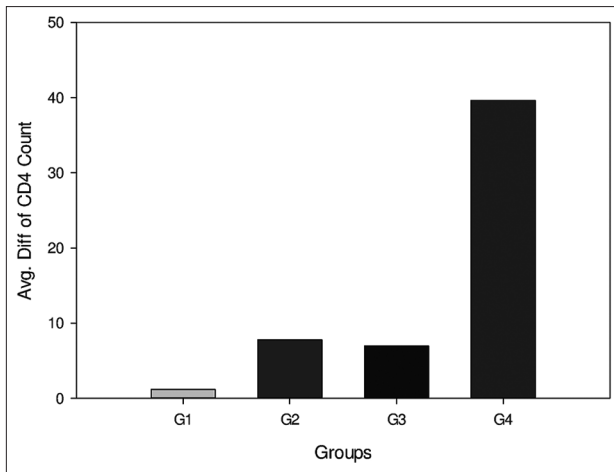


Figure 2: Average change in CD4 count in the patients grouped according to number of day's treatment received. The graph shows a positive trend which signifies that the longer duration of treatment is helpful in increasing the CD4 count of patients

change. The nonsignificance in other groups (G1 and G3) may be due to the baseline difference in age, stage of disease, etc., which is another weakness of this study. Future studies should include all these parameters for warranting better results. It is also essential to study the other factors like biological mechanisms of naturopathy and yoga interventions to understand its efficacy. We feel the future HIV research should be routed in such a way that AYUSH systems play a major role in HIV care. This is by conceiving the facts like, versatile patient attrition and failure to initiate ART care like costs associated with the treatment, fear of side effects, long-term harm to the body and perceived burden of being on life-long treatment.^[31]

CONCLUSION

Human immunodeficiency virus is a life-threatening disorder affecting millions across the globe. It imparts a lot of physical and psychological burden to the individuals affected. Naturopathy and yogic lifestyle intervention when provided to the HIV positive individuals along with the ART care for different durations up to 180 days has shown a significant increase in the CD4 count. This indicates that naturopathy and yoga can be recommended as a strong adjuvant in the treatment of HIV-positive individuals. Further large-scale studies are needed in this direction to bestow better care.

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REFERENCES

- Sabin CA. Do people with HIV infection have a normal life expectancy in the era of combination antiretroviral therapy? *BMC Med* 2013;11:251.
- National AIDS Control Organization. Available from: http://www.naco.gov.in/NACO/Quick_Links/HIV_Data/. [Last accessed on 2014 Jun 06].
- Colledge NR, Walker BR, Ralston SH. *Davidson's Principles and Practice of Medicine*. Edinburgh London, New York; Churchill Livingstone, Elsevier: 2010.
- Mulkins AL, Ibáñez-Carrasco F, Boyack D, Verhoef MJ. The living well lab: A community-based HIV/AIDS research initiative. *J Complement Integr Med* 2014;11:213-22.
- Joseph B. Definition of Naturopathy and Fasting, National Institute of Naturopathy. Available from: <http://www.punenin.org/attach/definitionNaturopathy and Fasting.pdf>. [Last accessed on 2014 Aug 20].
- Arankalle DV, Joseph B. Naturopathy lifestyle intervention: A new dimension in HIV care. *J Altern Complement Med* 2013;19:480-1.
- Chakraborty P. *A Text Book of Microbiology*. Kolkata, India; New Central Book Agency (P) Ltd.; 2010. p. 592-606.
- Singh V. *Text Book of Virology*. Lucknow, U.P, India: LBDC Publishers; 2010.
- Definition of AIDS. Available from: http://www.en.wikipedia.org/wiki/AIDS-defining_clinical_condition. [Last accessed on 2015 Mar 02].
- Fleming SA, Gutknecht NC. Naturopathy and the primary care practice. *Prim Care* 2010;37:119-36.
- Telles S, Naveen KV, Dash M. Yoga reduces symptoms of distress in tsunami survivors in the Andaman Islands. *Evid Based Complement Alternat Med* 2007;4:503-9.
- Woodyard C. Exploring the therapeutic effects of yoga and its ability to increase quality of life. *Int J Yoga* 2011;4:49-54.
- Saraswathi SS. *Asana Bandha Pranayama Mudra Banda*. 4th ed. Bihar, India: Yoga Publication Trust; 2008. p. 387-8.
- Saraswathi SS. *Asana Bandha Pranayama Mudra Banda*. 4th ed. Bihar, India: Yoga Publication Trust; 2008. p. 399.
- Saraswathi SS. *Asana Bandha Pranayama Mudra Banda*. 4th ed. Bihar, India: Yoga Publication Trust; 2008. p. 410-1.
- Gabrielsen A, Videbaek R, Johansen LB, Warberg J, Christensen NJ, Pump B, *et al.* Forearm vascular and neuroendocrine responses to graded water immersion in humans. *Acta Physiol Scand* 2000;169:87-94.
- Kellogg JH. *Rational Hydrotherapy*. 3rd ed. Pune, India: National Institute of Naturopathy; 2005. p. 839.
- Nature Cure Treatment. 2nd ed. Bangalore, India: Institute of Naturopathy and Yogic Sciences; 1994. p. 4.
- Chandrasekhar T. *Nature Cure for Obesity*. 1st ed. Pune, India: Nisargopachar Gramsudar Trust; 2010. p. 106.
- Blazicková S, Rovenský J, Koska J, Vigas M. Effect of hyperthermic water bath on parameters of cellular immunity. *Int J Clin Pharmacol Res* 2000;20:41-6.
- Jurcovicová J, Vigas M, Palát M, Jezová D, Klimes I. Effect of endogenous GH secretion during hyperthermic bath on glucose metabolism and insulin release in man. *Endocrinol Exp* 1980;14:221-6.
- Kellogg JH. *Rational Hydrotherapy*. 3rd ed. Pune, India: National Institute of Naturopathy; 2005. p. 72.
- Mamidi P, Gupta K. Efficacy of certain yogic and naturopathic procedures in premature ejaculation: A pilot study. *Int J Yoga* 2013;6:118-22.
- Yang HL, Chen XP, Lee KC, Fang FF, Chao YF. The effects of warm-water footbath on relieving fatigue and insomnia of the gynecologic cancer patients on chemotherapy. *Cancer Nurs* 2010;33:454-60.
- Musaev AV, Imamverdieva SS, Kerimbeili US. Pelotherapy of patients with diabetic polyneuropathy: A clinical-immunological study. *Zh Nevrol Psikhiatr Im S S Korsakova* 2008;108:17-23.
- Padalia A, Drabu S, Raheja I, Gupta A, Dhamija M. Multitude potential of wheatgrass juice (Green Blood): An overview. *Chronic Young Sci* 2010;1:23-28.

27. Chandra RK, Kumari S. Nutrition and immunity: An overview. *J Nutr* 1994;124 8 Suppl: 1433S-5.
28. NOS (National Osteoporosis Society). Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management; 2013. Available from: <http://www.nos.org.uk/document.doc?id=1352>. [Last accessed on 2015 Mar 14].
29. Calvo MS, Whiting SJ, Barton CN. Vitamin D intake: A global perspective of current status. *J Nutr* 2005;135:310-6.
30. Nair PM, Nanda A. Naturopathic medicine in India. *Focus Altern Complement Ther* 2014;19:140-7.
31. Musheke M, Bond V, Merten S. Self-care practices and experiences of people living with HIV not receiving antiretroviral therapy in an urban community of Lusaka, Zambia: Implications for HIV treatment programmes. *AIDS Res Ther* 2013;10:12.

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