

**BJMHR**

British Journal of Medical and Health Research

Journal home page: www.bjmhr.com

How the Ayurveda can be helpful for HIV-AIDS in children?

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ABSTRACT

AIDS is a syndrome caused by infection with Human Deficiency Virus (HIV), a member of Lentivirus subfamily of retrovirus family. Serotypes HIV-1 is most virulent. The virus is transmitted sexually, vertically, through contaminated blood transfusion, syringes, needles, blades, tattooing, etc. The incubation period is 3 months to five years depending on pre-existing immunosuppressant. The T-helper lymphocytes are major target of viruses because CD4 receptor is present predominantly on it. And hence the progressive immunodeficiency state resulting from T-cell deficiency (T4/ CD4) with viremia with opportunistic infection which leads to malignancy or cachexia. In children the clinical features includes failure to thrive, severe recurrent infections, lymphadenopathy, delayed development, Persistent weight loss, chronic diarrhea, microcephaly, hepatosplenomegaly, chronic Parotid swelling, lymphocytic interstitial pneumonia, recurrent otitis media. Pediatric HIV has been categorized in four types as N, A, B, C. In Allopathy there is no specific treatment yet for HIV infection and immunodeficiency state rather than preventative aspects. However antiretroviral drugs can improve the quality of life and prolong it. Ayurveda provides a number of single, compound herbal, Herbomineral Rasayan drugs contributing unique Rasayan Therapy having diversified actions on different systems of the body like Immunomodulation, Antioxidant. Also several of drugs have its own Adaptogenic effect on Psychological, Neurological, Endocrine systems etc, which also helps in the HIV-AIDS. Scientific studies showed that Ayurvedic preparations were effective in improving immune status and quality of life of the patients having HIV-AIDS.

Keywords: Acquired Immunodeficiency Syndrome, Human Deficiency Virus, CD4 receptor, Immunodeficiency, Antiretroviral drugs, Rasayan, Antioxidant, Adaptogenic.

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Received 26 February 2017, Accepted 03 March 2017

Please cite this article as: Bhoyar B *et al.*, How the Ayurveda can be helpful for HIV-AIDS in children?. British Journal of Medical and Health Research 2017.

INTRODUCTION

Acquired Immunodeficiency Syndrome is a syndrome and caused by infection with Human Deficiency Virus (HIV), a member of Lentivirus subfamily of retrovirus family. Two serotypes HIV-1 & HIV-2 are recognized in which HIV-1 is most virulent. It is a RNA virus with 120nm diameter. The HIV infection in children progresses more rapidly than in adults and upto half of untreated children die within the first 2 years of life¹. On national level 13.5 million patients are having HIV infection. The infection has occurred in a unique pandemic, with America, Europe and Africa being most affected². Maharashtra is the most affected state followed by Tamilnadu, Andhra Pradesh, Karnataka and Manipur. 90% of HIV infection and AIDS cases by the year 2000 A.D. are likely to occur in developing counties and out of which 15-20% are of pediatric AIDS³.

Children are innocent and mostly affected by mother in uterus or through blood derivatives given for treatment of Hemorrhage, Hemophilia, Thalassemia, etc. The risk of vertical transmission of HIV increases by 3-4 folds in maternal vitamin deficiency⁴

Transmission of virus:

1. **Sexually Transmission:** from one partner to other.
2. **Vertical Transmission:** from mother to her fetus in utero (30-35 %), during delivery (60-65%) and during breastfeeding (1-3%).
3. **Contaminated syringes:** Use of syringes or needles of infected persons.
4. Contaminated Blood Transfusion:
5. Sharing of needles, blades by teenagers.
6. Intravenous drug abusers (IVDA) in teenagers.
7. Tattooing from roadside hawkers.
8. Exposer to Aids patients.

Incubation period:

3 months to five years depending on pre-existing immunosuppressant.

Clinical features:

Generalized:

The generalized features of the disease in children include failure to thrive, severe recurrent infections, lymphadenopathy, and persistent weight loss with delayed developmental milestones. The child with vertically infection will be having low birth weight. The persistent weight loss will be >10% of base line and the downward crossing of at least 2 of following percentile on weight for age chart (e .g. 95th, 75th, 50th, 25th, 5th) in a child of ≥ 1 year. The weight of child will be < 5th percentile on weight for height charts on two consecutive

measurements > 30 days. The child will have intermittent or recurrent chronic diarrhea for more than 30 days.

Specific:

The specific features includes Microcephaly, Hepatosplenomegaly, Chronic Diarrhea, Chronic Parotid swelling, Lymphocytic Interstitial Pneumonia, Recurrent Otitis Media, Kaposy Sarcoma, etc.

The patients may be infected by the organisms like Cytomegalovirus, EBV, Herpes simplex, H. influenza (Type-B), Salmonella, Shigella, E. Histolytica.

Children often face other issues with HIV disease, including, family stigma, bullying and medication adherence. As children age into adolescence they may also begin to face issues regarding sex and physical appearance.

Clinical course of vertically acquired infection:

At birth vertically HIV infected infants are asymptomatic although these symptoms appear as rapidly progressive in 80% and slowly progress in 20% infants.

Rapidly progressive: symptoms start with 3-4 months of age. Pneumocystis carinii pneumonia (PCP) is presenting illness in 40%, rest usually present with lymphadenopathy, hepatosplenomegaly, growth failure and encephalopathy or candida infection. Generally child death occurs by 5 years of age. Average survival time is 9-12 months after diagnosis.

Slow progressive symptoms: These children show features at 8 years of age. Generally lymphocytic intestinal pneumonia (LIP) is the chief complaint. It persists less than or up to 2 months with local lymphadenopathy and it carries a better prognosis than PCP.

Pathology:

The Virus enters to the host cells with the help of surface membrane glycoprotein 120 by binding the CD4 receptor. Due to this, virus attached and penetrate to the host cell. The T-helper lymphocytes are major target of viruses because CD4 receptor is present predominantly on it. Progressive immunodeficiency state resulting from T-cell deficiency (T4/ CD4) initially and then combined CD4+ cells are declined associated with viremia. Then CD8 Cytotoxic cell count increases. When CD4+ cell count falls below 20-40 per ml, opportunistic infection may occur and immune system is unable to cooperate. Death may follow due to infection, malignancy or cachexia⁵.

Reversal of helper/ suppressor T-cell ratio (normal being over 1.0). T-cell defect leads to B-cell system defect and increase in IgA, IgG, IgM. Patient fails to form antibody to antigen with which he has recently been immunized. There is abnormal response of lymphocytes to antigens and failure to produce normal amount of Interleukin-2, Interferon, Lymphokines and other circulatory immune complex due to chronic microbial infection.

Diagnosis:

The viral diagnostic testing in infants born to HIV-infected mothers is performed within the first 2 days of life, at 1 to 2 months of age, and also at 4 to 6 months of age. By obtaining two positive virologic tests from two different blood samples, the diagnosis of HIV infection can be made. For children over 18 months, adolescents, or adults, diagnosis is made by testing the blood for the presence of HIV antibody. In the child the detection of anti-HIV IgG for which enzyme linked immunosorbent assay (ELISA) is used for confirmation. The circulatory T-helper cells (CD4) count is reduced and which is below 40 per cu mm. A new test for the detection of virus antigen (P24) is available to test even in newborn. Detection of HIV DNA sequences using polymerase chain reaction (PCR) is diagnostic to detect viral nucleic acid. An HIV infected mother transmit her IgG antibodies to the baby transplacentally, hence children are antibody positive at birth. These antibody remain up to 18 months of age, hence presence of antibody beyond this period is necessary to consider the child infected.

CRITERIA FOR DIAGNOSIS BY WHO:**Major criteria**

1. Weight loss/ abnormally slow growth
2. Chronic diarrhea > 1 month
3. Prolonged / intermittent Pyrexia > 1 month

Minor criteria

1. General Lymphadenopathy
2. Oropharyngeal candidiasis
3. Recurrent common bacterial infection
4. Persistent cough > 1 month
5. General Dermatitis
6. Confirmed HIV infection in mother

Two major or two minor criteria in absence of other known causes of immunodeficiency is diagnostic of AIDS (The Short Text Book of Pediatrics written by Dr Suraj Gupte and published by Jaypee Brothers.). In July 2013, the World Health Organization changed its HIV treatment guideline and recommended universal HIV testing and treatment for all pregnant women. So far, among the 22 countries that are home to approximately 90 percent of babies having HIV through their mothers. Out of these 13 countries have adopted this policy and another six have adopted a less comprehensive but still improved policy⁶.

Pediatric HIV Classification⁷:**Category N:**

Symptomatic child have no sign or symptoms related to HIV infection or who have only one in category.

Category A:

Mildly symptomatic with two or more of conditions but none condition listed in category B & C.

Lymphadenopathy(7.0 5cm at more than 2 sites or bilateral)

Hepatomegaly

Splenomegaly

Dermatitis

Parotitis

Recurent or persistent URTI, Sinusitis, Otitis Media

Category B:

Moderately Symptomatic (with symptoms other than A or C)

Category C:

Severely symptomatic

DISCUSSION:

National Aids Control Programme launched in November 1999, having the aim of decreasing the transmission of sexually transmitted diseases by promoting early detection and treatment in community. Principles for treating HIV are similar in adults and children so, healthcare providers must also consider age-related differences in CD4 cell counts and medication toxicities⁸. The essential plan for an efficient management of an HIV positive patient includes-

Counseling and psychotherapeutic support:

The counseling and psychotherapeutic support are necessary for the older children and adult patients also. The Physicians, nurses and other staff of hospital should behave and treat the patients with dignity, humanity and ethical principles of the profession.

Therapeutic measures:

There is no specific treatment yet for HIV infection and immunodeficiency state developed yet and hence there is no cure of AIDS as of today. However the treatment of HIV infected person with antiretroviral drugs can improve the quality of life of patients and also prolong their life. **Zidovudine (12-22mg/kg/day)** every six hourly intravenous is being tried in HIV with striking benefit in Neuropsychological manifestation. Likewise **Didanosine, Zalcitabine, Starudine, Lamivudine** are available but **Zidovudine** is only officially released. It doesnot cure but slows down its progress.

Prevention of Transmission through injection:

The disease can be prevented by limiting the use of injections and always following safe injecting practices, improving access to sterile injecting equipments, counseling and drug abuse treatment for teenager drug addicts. Counseling and giving realistic advice regarding piercing, tattooing, shaving, etc to the people.

Preventative Measures:

Vertical Transmission:

The use of good quality condoms in sexual practices if one or both partners are HIV positive. Vertical transmission can't be prevented hence carrier woman should avoid pregnancy. The chance of 13-39% transmission is from mother to baby. HIV infected pregnant woman with CD4+ count less than 200 per ml should be given Zedovudine 100 mg five times a day P.O. from 14 weeks of gestation till delivery. 2mg/Kg I.V. in first hour of labor followed by 1mg/kg/Hr till delivery should be given to the mother having HIV infection.

The newborn delivered from HIV infected mother is administered at dose of 2mg/every 6 hrly till 6 weeks of age. The oral polio vaccine should NOT be given to a child when HIV is suspected or confirmed. It is safe, however, to give IPV, or inactivated polio vaccine, to these children. MMR, or measles, mumps, and rubella vaccine, is safe to give to children with HIV, unless they have a severely weakened immune system. DTaP/Td vaccine (diphtheria, tetanus, and pertussis) is safe to give to infants and children with HIV. Hib (Haemophilus influenza type b) and Hep B (hepatitis B) vaccines are safe to give to children with HIV⁹ (Ref. www.childrensnational.org). In the Hepatitis prone area, Hepatitis A vaccine and VZIG (Varicella vaccine) should be administered to the HIV-positive children.

The cure of HIV may not be discovered in near future and hence the attention should be concentrate on to enhance the quality of life of people having HIV-AIDS and to manage the HIV related other symptoms. As per Ayurveda, the line of treatment in pediatric patients can't be uniform as adults due to age factor, age-related differences in CD4 cell counts. In infants and toddlers, the drug selection gets limitation due to the choice of drugs, its palatability and dosages. But in the advanced age group i.e after five years we may administer the various types of ayurvedic formulations along with yogic procedures and dietary plan. Our aim is to enhance the CD4 count or maintain it. In the initial phase of disease where opportunistic infections are absent the Ayurveda medicines gives as adjuvant acts as miracle and even in mild infections, the symptomatic treatment by Ayurveda is of help.

To prolong the survival of HIV positive person, along with routine screening test, cessation of Alcohol and smoking, drug deaddiction is very important. Yogic exercise and simple aerobic exercise has a positive effect on immune system and also increases the CD4 count..

The patients having HIV becomes restless and stressful; hence the relaxation is extremely necessary. Yoga releases the stress¹⁰ and enhances immunity and develops the sense of well being. Yoga changes the mode of living of patients having HIV which will be helpful to eliminate all those factors which cause social problems¹¹. Surya Namaskar in the morning is also beneficial in such a immunosuppressive patients. Yoga also helps to release chronic stress, decreases worries, makes the patient to be social, develops positive attitude in patients, release anxiety, depression and improve the quality of life.

Ayurveda provides a number of single, compound herbal, Herbomineral Rasayan drugs contributing unique Rasayan Therapy having diversified actions on different systems of the body viz. Immunomodulation, Antioxidant action which prevents Bio-oxidation there by checking age related disorders, auto immune disorders, degenerative disorders. The rasayan drugs like Guduchi, Amalaki, Asvagandha, Bala, Tulasi, Haridra, etc¹² and some herbomineral compounds like Chyawanprash, Amalakiprash (Charak Samhita, Uttarardha, Rasayanadyaya¹³) have its own Adaptogenic effect on Psychological, Neurological, Endocrine systems etc, which also helps in the HIV-AIDS. Scientific studies showed that Ayurvedic preparations were effective in improving immune status and quality of life of the patients having HIV-AIDS. They produce most of their effects by primarily acting on the immune system.

Asvagandha, Shatavari, Amalaki, Guduchi enhances the serum IgA and hence useful to prevent the opportunistic infections of gastrointestinal tract and respiratory system in HIV infected children. Guduchi enhances the antibody IgG which has a role in prevention of various autoimmune diseases. Amalaki and milk enhances the antibodies like IgA, IgM, and IgG which are very useful in immune deficiency state.

As suggested by new research, turmeric may play a crucial role in fighting HIV/AIDS, particularly HIV-T-1. In a recent study at the Jawaharlal Nehru Centre for Advanced Scientific Research in Bangalore, India, when scientists 'fed' curcumin to HIV-infected cells in the laboratory, the virus stopped replicating. Several studies have shown that people who have HIV and AIDS are deficient in many antioxidant vitamins and minerals, and it is believed that it is the powerful antioxidant properties of turmeric that combat the disease. Curcumin's antioxidant properties will protect your DNA from the ravages of the virus. It's also antimicrobial, so it will help to prevent the many opportunistic illnesses associated with HIV and AIDS," In a study at Harvard Medical School, research showed that curcumin Dr. Susan Kowalsky, N.D., a Naturopathic Doctor in Norwich, Vermont prevented the reproduction of HIV by blocking a specific gene that activates the virus and causes it to

spread¹⁴ (Ref: Article published on website: info@ayurvedacollege.com the California College of Ayurveda).

Ayurvedic preparations increase the phagocytic activity of macrophages and also it induces the expression of MHC-II antigens. This indicates the enrichment of antigen presenting ability of Ayurvedic Preparations. In vitro, the treatment of mice splenocytes with preparations stimulated the production of IL-2, IFN-Gamma and TNF-Alpha (Tumour necrosing factor) reflecting activation of Th-I type of T-Cell response. Since Th-I type of response has been concerned with the cell mediated immunity. The therapeutic effects of Ayurvedic preparations may be mediated by activation of cellular immune response. In fact, the antimicrobial properties of Ayurvedic preparation have found to be mediated by the immune system.

Ayurvedic Swasthivritta provides various counseling regimen to combat stress related problems there by improving immunity as well as quality of life. Sadvritta, Achar Rasayan¹⁵ etc helps to improve the psychological behavior and releases stress, depression in the patients. Ahar Rasayan helps to improve the functions of immune system.

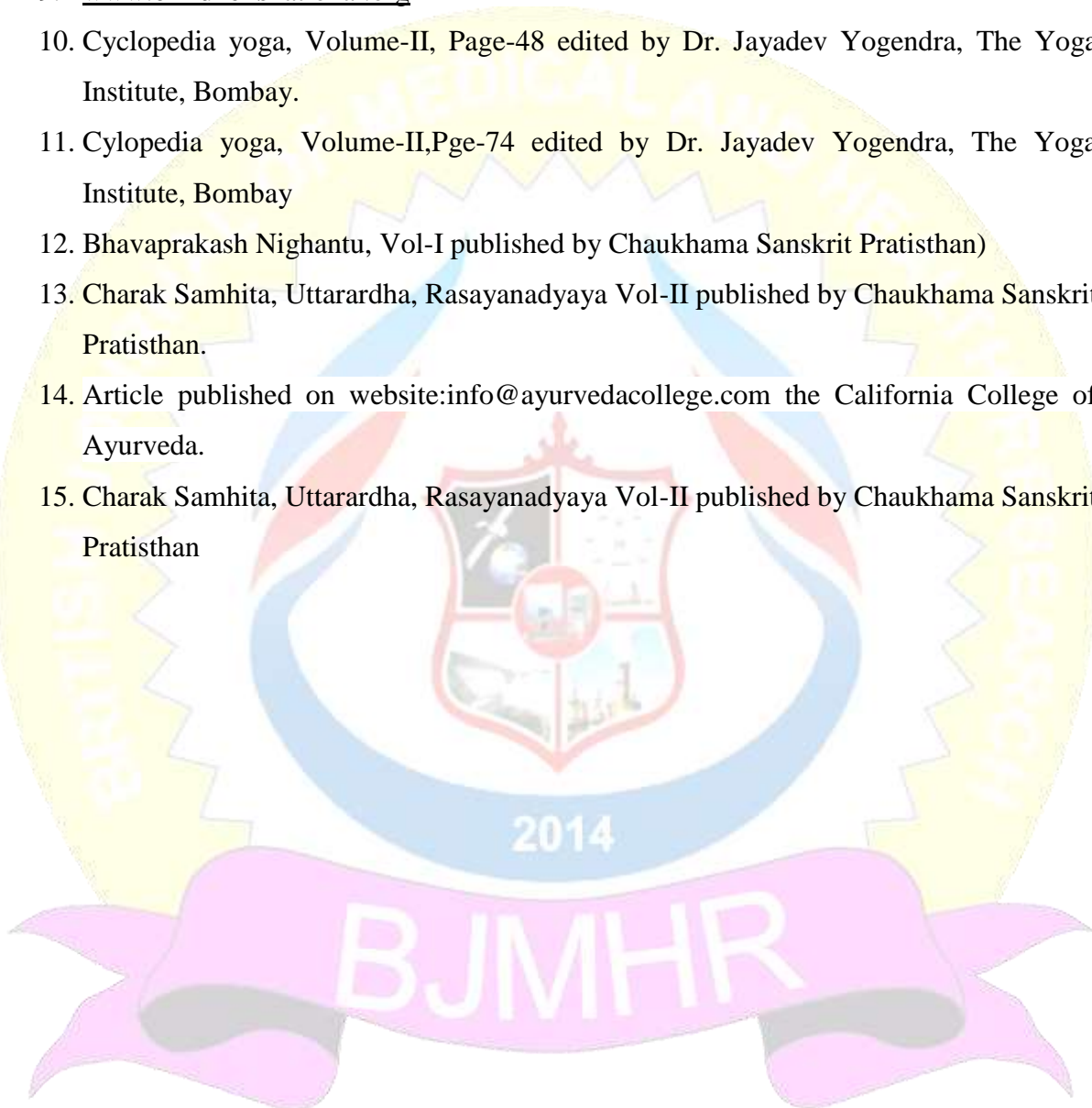
CONCLUSION:

Ayurveda could possibly contribute in this respect by using Rasayan and Balya aushadhi dravyas. The development of immune potentiators with ayurvedic drugs has opened an entirely new chapter in therapeutics. In AIDS the patient loses something essential, the cellular immunity which becomes defenseless against the pathogens and suffers from various clinical manifestations. These clinical manifestations observed in HIV/AIDS patients, are similar to that of **Ojokshay or Balakshaya** mentioned in the various Ayurvedic texts. The early detection of infection in infants and children is very important and if detected the Ayurvedic drugs may be started to enhance the CD4 count to avoid ART treatment. Administering the Rasayan medicaments meant for Ojovardhak & Balavardhak (i.e Immunomodulator, Adaptogenic and Nourishment) will prop up the process of Dhatu poshana and boost Ojus of patient. Thus Ayurvedic Rasayan medicaments leads to improve the vital strength and immunity or Vyadhikshamatva of the patient. This ultimately helps in managing symptoms preventing AIDS, managing stress and improving quality of life.

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