Effect of Yoga on the Physiological Aspects of HIV-infected People

A Report Submitted By

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Under the Guidance of

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Towards partial fulfilment of

Master of Science (Yoga Therapy)

M.Sc (Yoga Therapy)

TO

SWAMI VIVEKANANDA YOGA ANUSANDHANA SAMSTHANA(SVYASA)

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

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CERTIFICATE

This is to certify that Nongmaithem Jyoti Devi is submitting this literature review on "Effect of Yoga on the Physiological Aspects of HIV-infected People" in partial fulfilment of the requirement for the Master of Science (Yoga) registered in Swami Vivekananda Yoga Anusandhana Samsthana (S-Vyasa University) Bengaluru and this is a record of the work carried out by her in this institution.

Date: Dr. Kuntal Ghosh

Place:Bengaluru (Guide)

DECLARATION

I, hereby declare that, this study was conducted by me at Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), Bangalore, under the guidance of Dr. Kuntal Ghosh, S-VYASA University Bangalore.

I also declare that the subject matter of my dissertation entitled "Effect of Yoga on the Physiological Aspects of HIV-infected People" has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship or similar titles.

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STANDARD INTERNATIONAL TRANSLITERATION CODE USED TO TRANSLITERATE SANSKRIT WORDS

A = अ	gha = घ	pa = प
ā = आ	ṅa = ङ	pha = फ
ı = इ	ca = च	ba = ब
Ī = ई	cha = छ	bha = भ
ʊ = उ	ja = ज	ma = म
ū = ऊ	jha = झ	ya = य
ṛ = ऋ	ña = ञ	ra = र
ṝ = ॠ	ṭa = ट	la = ल
e = ए	ṭha = ठ	va = व
ai = ऐ	ḍa = ड	a = श
o = ओ	ḍha = ढ	ṣa = ष
au = औ	ṇa = ण	sa = स
am = अं	ta = त	ha = ह
aḥ = अः	tha = थ	l̤a = ळ
ka = क	da = द	kṣa = क्ष
kha = ख	dha = ध	jña = ज्ञ
ga = ग	na = न	

ABSTRACT

Background: Significant numbers of HIV infected individuals suffer from psychological as well as physiological problems such as anxiety,depression, poor quality of life and deviation of BP, pulse rate, breathing rate and weight from their normal values etc leading to decline in CD4counts and poor adherence to ART. Yoga is a well known intervention to reduce all the above problems.

Aim: To see whether one month of integrated yoga intervention has a positive impact on the physiological parameters of patients living with HIV.

Methodology: 40 HIV-infected patients from a HIV rehabilitation centre in Manipur state of India were selected for the study and are divided into two groups, Yoga(n=20) and Control(n=20). However, yoga group drops to 10 due to various reasons faced by the participants. Yoga group performed physical postures (asanas), breathing practices (pranayama) and yoga based relaxation techniques for 60 minutes six days a week for 30 days whereas, the control group continued their daily routine. They had no significant difference in age, socioeconomic status, CD4 counts and ART status between the groups at the baseline. There were no changes in medications of both the groups during the course of study. Paired and independent samples t-tests were used to compare within and between group results.

Results: Paired sample t-test shows decrease in BP-systole and BP-diastole which are not significant statistically and a statistically significant reduction in weight in yoga group. In the same group, there is statistically significant increase in pulse rate and breathing rate. In control group, there is statistically insignificant decrease in BP-systole, Breathing rate and weight. There is significant increase in BP- dystole and insignificant increase in pulse rate all statistically.

Conclusion: One month intense practice of Integrated Yoga leads to significant normalizations in physiological parameters (BP, BR, PR and weight) of the people living with HIV.

Key words: HIV, Yoga, BP, pulse rate, breathing rate, weight, CD4 count.

Contents

1. Introduction

1.1 Definition:

HIV, a retrovirus and member of the lentivirus family, was identified as the cause of AIDS 2 years after the first cases were reported in 1981(Hardy, W. D. (2017))

HIV infection leads to progressive loss of CD41 T cells through their destruction or decreased production. What is mainly being questioned is the mechanism for this loss, and in particular whether HIV-specific CD41 T cells are preferentially affected. It was found that HIV-specific memory CD41 T cells in infected individuals contain more HIV viral DNA than other memory CD41 T cells, at all stages of HIV disease (Douek et al., 2002).

Combination antiretroviral therapy decreases the replication of human immunodeficiency virus type 1 (HIV-1) and improves the longevity of infected persons. Such therapy helps reduce the amount of HIV-1 in genital secretions. Because the sexual transmission of HIV-1 from infected persons to their partners is strongly correlated with concentrations of HIV-1 in blood6 and in the genital tract,7 it has been hypothesized that antiretroviral therapy could reduce sexual transmission of the virus(Cohen,2011).

1.2 Causes of HIV:

In the year of 1980, when AIDS was a mystery, but within a short time much has been learnt regarding its cause. It was established that the causative organism of the mysterical disease was a virus. The causative organism of AIDS belongs to the family of Retrovindae virus (Retro-reverse or backward). (T.B.L. Jaiswal 1992)

Two different types of human immunodeficiency virus (HIV), HIV-1 and HIV-2 affect humans. A good deal of evidence exists claiming that HIV-1 in humans arose from cross-species transmission of an agent in chimpanzees, and HIV-2 from cross-species transmission from sooty mangabees. (Volberding, P, Merle A, Sande, Warner C.Greene 2008,)

HIV transmission from person to person is caused by sexual intercourse, sharing of needles, from mother to foetus.(K.E.Nye, J.M.Parkin 2003)

1.3 Symptoms:

Most people feel fine for the first 5 to 10 years. After a long period of HIV infection without symptoms, however, the time comes when the person becomes ill. The earliest symptoms of HIV disease can include fever, swollen glands and fatigue.

The most common early symptoms of HIV disease are

1. bouts of fever and/or nights sweats

2. shingles which is a painful rash

3. tuberculosis (TB)

4. rashes or other skin conditions

5. thrush, which is an infection of the mouth and the throat.

Many people with HIV experience attacks of diarrhoea. There are many causes of diarrhoea in people with HIV, including bacteria, viruses and parasites that infect the intestines after the immune system has become damaged. Diarrhoea that continues for a long time can become life threatening if large amount of fluid or nutrients are lost.

Most people with HIV disease suffer from skin conditions that can be caused by bacteria, viruses, fungi, parasites and cancers. People can also react to some medications by getting a rash. A rash caused by HIV disease is also common.

HIV-related rashes may show themselves in many different ways. Shingles is a common HIV-related condition. It appears as painful blisters usually on one side of the body only. The condition is due to the same virus that cause chickenpox. It can be a result of a revival or return of the chickenpox virus once the immune system is weakened. (Seth C. Kalichman, 2006)

1.4 Worldwide Prevalence:

Data from the World Health Organization (WHO) and UNAIDS' World Aids Day (2015) show global estimates of HIV continuing to demonstrate a pandemic. Although the number of newly diagnosed HIV is declining in many countries, the number of people living with HIV continue to increase, largely due to improved access to antiretroviral therapy.

Globally, in 2014,there were 36.9 million people living with HIV, 2 million newly diagnosed infections, and 1.2 million deaths due to AIDS-related illnesses(UNAIDS, 2015). The number of new HIV infections has declined by 35% during the past 15 years, and the annual HIV related deaths have decreased by 42% since the peak of pandemic in 2004.

1.5 Prevalence in India:

In 1986, HIV infection was first detected in India among sex workers in Chennai. The first case of AIDS was detected in Mumbai in 1986. [Bharmal, R. N., & Tiwari, R. P. (2007)]

India has the second highest number of HIV-infected persons(5.21 million). In India's population of 1.1 billion, prevalence was 0.93%(2003), 0.92%(2004), 0.91%(2005)(NACO,2006).

Transmission of the disease is through unprotected sex in the southern states of India and injecting drug use in northeastern states of India. [Bharmal, R. N., & Tiwari, R. P. (2007)]

1.6 Morbidity and Mortality:

ILO reported in 2005 that an estimated 28 million workers had been lost to the global labor force due to AIDS-related mortality and morbidity, this number was projected to reach 48 million by 2010 and 74 million by 2015 if the spread of the epidemic is not contained. HIV/AIDS is therefore having a huge impact on human resource capacity through its population growth and life expectancy, and the implications for labor and employment (Lisk, F. (2009)).

In 1987 the global "Safe Motherhood Initiative" was launched by a group of international agencies at an international conference in Nairobi, Kenya, with the ambitious goal of reducing maternal mortality by half by the year 2000. The initiative has contributed much to knowledge maternal morbidity and mortality and ensures health care for women.

In developing countries, pregnancy and childbirth-related complications are the leading cause of disability and one of the leading causes of deaths among women aged 15-44. The World Development Report estimated that the 18% of the burden of the disease for these women is due to maternal causes. An additional 16% of the burden of the disease is due to AIDS and sexually transmitted infections. The most frequent causes of maternal mortality are severe bleeding accounting for 25% of the deaths, indirect causes, such as complications related to anemia, malaria, and heart disease, responsible for 20% of the maternal mortality globally and infection or sepsis, responsible for 25% of the deaths.

Morbidity and mortality can have health effects and psychological costs women, children or other family or household members. In addition, children's schooling, supervision and care may be affected by their mother's morbidity or mortality (Mosley,2000).

1.7 Complementary and Alternative Medicine(CAM):

Complementary and alternative medicine (CAM) is a well known adjunct to conventional medicine across the world. Complementary generally means non-central approach together with conventional medicine whereas alternative refers to a non-mainstream approach replacing conventional medicine. Most people use non-mainstream approaches along with conventional. (Bremner, M., Blake, B., & Stiles, C. (2015))

In most developing countries, traditional health systems are grounded in long-standing cultural and spiritual values. In this, mental, social, spiritual, physical and ecological factors are all taken into account. (Bodeker et al., 2007)

1.8 Conclusion:

Yoga, which includes physical activity, is rapidly gaining in popularity and has many health benefits. Yet healthcare providers are not spontaneous at recognizing yoga for its ability to improve health conditions, and there are few interventions which have been developed that take full advantage of its benefits. It has been shown that yoga interventions have positive results to chronic diseases (overweight, hypertension, high glucose level and high cholesterol) (Yang, K. (2007)).

It has also been shown that among traditional lifestyle modifications yoga is a low-cost simple to administer, non-pharmacological, popular behavioural intervention that can lower blood pressure in pre-hypertensive HIV-infected adults with mild-moderate CVD(cardio vascular diseases) risk factors (Cade, 2010). Moreover, yoga reduces psychological distress and improves in quality of life and shows a significant increase in CD4 counts among the seropositive HIV patients (Rao, R., Deb, U.,(2012) and Rosy Naoroibam, Kashinath G Metri, 2016).

In the next chapter, we will discuss about ojas or immunity and its relation to HIV in the light of Ancient Literature

2. REVIEW OF THE ANCIENT LITERATURE: Concept of ojas in Ayurveda

2.1 Introduction

According to the principles of Ayurveda, ojas is the essential energy of the body which can be equated with the "fluid of life".

The concept of ojas is very subtle and remarkable. Ojas is produced at every stage of digestion and is the finest end product. As such, it is the essence of all the body tissues (dhatus).

According to Sushruta, "ojas is the sap of one's life energy". Sufficient ojas generates vigor, strength, zest for life, and a strong immune system. Deficient ojas causes debility, weariness and eventually disease. It contains prana and it is the link between material and spiritual.

One of many ojas functions is to maintain quantity and quality of dhatus, malas and doshas

2.2 Concept of Ojas:

ओजस्तु तेजो धातूनां शुक्रान्तानां परं स्मृतम्।

ojastu tejo dhātūnāṁ śukrāntānāṁ paraṁ smṛtam|(ah.su.11/37)

Ojas is the Sara (essence of the dhatus) ending with sukra (reproductive tissue).

एतेन गर्भावस्थात्रयेऽपि तदोजस्तिष्ठतित्युच्यते। परं गर्भादौ शुकशोणितसाररुपतय। कललावस्थायं तु

रससाररुपतय अवयवनिश्पत्तौ तु स्वलक्षणयुत्तमेव भवत्योज इत्योजसः। सर्वावस्थाव्यापकत्वेन महत्वमुच्यते॥

etena garbhāvasthātraye'pi tadojastiṣṭhatityucyate| paraṁ garbhādau śukaśoṇitasārarupataya| kalalāvasthāyaṁ tu rasasārarupataya avayavaniśpattau tu svalakṣaṇayuttameva bhavatyoja ityojasaḥ| sarvāvasthāvyāpakatvena mahatvamucyate||(ca.3 p 161)

Ojas sustains the foetus in all the three stages of manifestation and as such its greatness(mahattva) is quite evident.

ओजः प्रसादो धतुनम्।

ojaḥ prasādo dhatunam|(ca.3 p 161)

Ojas is the essence of all the seven dhatus but as it sustains life, it is mentioned separately from dhatus.

तन्महत् ता महामुलास्तच्चौजः परिरक्षता।

परिहर्या विशेषेण मनसो दुःखहेतवः ॥१३॥

तन्महत् ता महामुलास्तच्चौजः परिरक्षता। परिहर्या विशेषेण मनसो दुःखहेतवः ॥१३॥

tanmahat tā mahāmulāstaccaujaḥ parirakṣatā| pariharyā viśeṣeṇa manaso duaḥkhahetavaḥ||13||(ca.su.30/13)

हृद्यं यत् स्याद्यदौजस्यं स्नोतसां यत् प्रसादनम्।

तत्तत् सेव्यं प्रयत्नेन प्रशमो ज्ञानमेव च ॥१४॥

hṛdyaṁ yat syādyadaujasyaṁ snotasāṁ yat prasādanam|

tattat sevyaṁ prayatnena praśamo jñānameva ca||14||(ca.su.30/14)

Those who want to preserve ojas and maintain heart and the vessels attached to it in good condition should avoid such of the factor as it may lead to unhappiness(mental worries). Diets and drugs which are conducive to the heart, ojas and the channels of the circulation should be taken. Tranquility and wisdom should be followed meticulously for this purpose.

2.3 Qualities of Ojas

स्निग्धं सोमात्मकं शुद्वमिल्लोहितपितकम्॥३७॥

strigdhaṁ somātmakaṁ śudbamillohitapitakam||37|| (ah.su.11/37)

ययन्नाशे नियतं नाशो यस्मिस्तिष्ठति तिष्ठति। निष्पद्यन्ते यतो भाचा विधिधा देहसंक्षयाः।३८।

yayannāśe niyataṁ nāśo yasmistiṣṭhati tiṣṭhati। niṣpadyante yato bhācā vighidhā dehasaṅkṣrayāḥ ।38। (ah.su.11/38)

It is viscus (unctuous, greasy), somatmaka (preponderant in ap bhuta or watery principle), clear (transparent), slight reddish yellow in color; by its loss (destruction, absence) the loss of the body (even of life) is sure to happen and by its presence the body (and life) are sure to survive; from it are brought about the different states (condition, activities etc.) concerned with (related to, residing in) the body.

सर्पिर्वर्ण मधुरसं लाजगन्धि प्रजायते ॥७५॥

sarpirvarṇa madhurasaṁ lājagandhi prajāyate।।75।। (ca.su.17/75)

Ojas is one material present in heart, is pure slighty red and yellow in color and its loss leads to death of the person.

Ojas gets formed first in the body of living beings, has the color of ghee, sweet taste and odor of taja (fried puddy). Just like honey is collected by the bee from fruit and flower, similarly Ojas gets formed from the quantity and actions of man.

देहः सावयवस्तेन व्याप्तो भवति देहिनाम्।

तदभावच्चशीर्यन्ते शरीराणि शरीरिणाम्॥२७॥

dehaḥ sāvayavastena vyāpto bhavati dehinām।

tadabhāvaccaśīryante śarīrāṇi śarīriṇām।।27।। (su.su.15/27)

It is further soft and shiny and is possessed of the most efficacious virtue and should be regarded as the most important element (seat) of vitality. The whole body it's in its limbs and members are permeated with ojas and a loss or discrimination in its natural quality leads to the gradual emaciation and ultimate dissolution of organism.

ओजः सोमात्मकं स्निग्धं शुकलं शीतं स्थिरं सरम्।

विविक्तं मृदु मृत्स्नं च प्राणायतनमुत्तमम्॥२६॥

ojaḥ somātmakaṁ snigdhaṁ śukalaṁ śītaṁ sthiraṁ saram।

viviktaṁ mṛdu mṛtsnaṁ ca prāṇāyatanamuttamam||26|| (su.su 15/26)

Ojas (albumen) being of a white color belongs to the class of somatmakan (cooling) substances. It is cooling , oleaginous , and firm (sthira), contributes to the formation and growth of flesh, maintains its intrigity or holds it firm, and is mobile or capable of moving about from one place to another.

रसवातादिमार्गाणं सत्त्वबुद्धीन्द्रियत्मनाम्। प्रधानस्यौजसक्ष्चैव हृदयं स्थानमुच्यते ॥३५॥

rasavātādimārgāṇaṁ sattvabuddhīndriyatmanām । pradhānasyaujasakṣcaiva hṛdayaṁ sthānamucyate||35|| (ca.ch.24/34)

Ojas is moist and unctuous and has a reddish yellowish and whitish hue. It is of two types.

ओजोवुद्धौ हि देहस्य तुष्टिपुष्टिबलोदयः ॥४१॥

ojovuddhau hi dehasya tuṣṭipuṣṭibalodayaḥ||41|| (ah.11/41)

Increase of ojas makes for contentment, nourishment of the body and increase of strength.

गुरु शतिं मृदु क्ष्लक्ष्णं बहलं मधुरं सिथरम्।

छ्रसक्षं पिचिदलं स्निगधमोजो दशलकधशगुणं स्मृतम्॥३१॥

guru śatiṁ mṛdu kṣlakṣṇaṁ bahalaṁ madhuraṁ sitharam।

chrasakṣaṁ picidalaṁ snigadhamojo daśalakadhaśaguṇaṁ smṛtam||31|| (ca.ch.24/31)

The ten attributes of ojas are guru (heaviness), sita (cold), mrdu (softness), slaksna (smoothness), bahala (density), madhura (sweetness), sthira (stability), prasanna (clearness or lei sureness), picchila (sliminess), and snigdha (unctuousness).

Quantity

कि वा ईषदित्यल्पप्रमाणं तेनाष्टबिन्दुकमोज इति दर्शयपि।

एतच्चाष्टबिन्दुकं पर मोजो ज्ञेयस् अर्धाञ्जलिपरिमाणं तु यदोजस्तदप्रधानं तस्मादुद्विविधमिहोजः।

ki vā īṣadityalpapramāṇaṁ tenāṣṭabindukamoja iti darśayapi।

etaccāṣṭabindukaṁ para mojo jñeyas

ardhāñjaliparimāṇaṁ tu yadojastadapradhānaṁ

tasmādudvividhamihojaḥ । (ca.3/160)

Ojas is described as white slightly red and yellow. 'Isat' may also denote "little quantity". In that case it would mean the ojas which is measure of eight bindus. This type of ojas is known as "para"(primary) while in the quantity of half anjali is "apsara or apradhana"(secondary). Thus ojas is of two types mentioned above.

2.4 Heart, seat of Ojas

यद्धि तत् स्पर्शविवज्ञानं धारि तत्तत्र संक्षितम् ॥६ ॥

yaddhi tat sparśavivajñānaṁ dhāri tattatra saṅkṣritam||6||

तत् परस्यौजसः स्थानं तत्र चैतन्यसंग्रहः ।

हृदयं महदर्थक्ष्च तस्मादुक्तं चिकित्सकैः ॥७ ॥

tat parasyaujasaḥ sthānaṁ tatra caitanyasaṅgrahaḥ।

hṛdayaṁ mahadarthakṣca tasmāduktaṁ cikitsakaiaḥ||7||(ca.su/30/7)

The heart is indispensable for all the normal mental and physical activities because the entire sense perception representing animation depend on the heart. Moreover, the heart is the substratum of the ojas par-excellence and it is also the controller of the mind. That is why, the physician have designated the heart as `hrydaya', `mahat' and `artha'.

2.4.1 Types of Ojas

एतेन द्विविधमोजो दर्शयति परमपरं च तत्रर्धाञ्जलिपरिमाणमपर अल्पप्रमणं तु परम् ।

तत्रर्धाञ्ज्लपरिमितस्यौजसो धमन्य एव हृदयक्षितः स्थानम् । त्थ प्रमेहेऽर्धाञ्जलिपरिमितमेवौजः क्षीयते

नाष्टबिन्दुकम् ।

अस्य हि किञ्चित् क्षयेऽपिव मरणं भवति प्रमेहे तु ओजःक्षये जिवत्येव तावत् ॥

etena dvividhamojo darśayati paramaparaṁ ca tatrardhāñjaliparimāṇamapara alpapramaṇaṁ tu param।

tatrardhāñjlaparimitasyaujaso dhamanya eva hṛdayakṣritaḥ sthānam। ttha pramehe'rdhāñjaliparimitamevaujaḥ kṣīyate nāṣṭabindukam।

asya hi kiñcit kṣaye'pieva maraṇaṁ bhavati pramehe tu ojaḥkṣaye jivatyeva tāvat।।

Hrydaya is also the seat of para ojas. Ojas is of two types-para and apara. The former is in very small quantity e.g. Eight drops while the latter also called as slaismika ojas, is in the quantity of half anjali and is located in vessels attached to heart. In prameha apara ojas is depleted and not the para ojas because if the latter is depleted even slighty death occurs while prameha the patient does not die in spite of diminution of ojas.

परस्य क्षेष्ठस्याष्टबिन्दुकस्येत्यर्थः।

parasya kṣreṣṭhasyāṣṭabindukasyetyarthaḥ।

Hrydaya is said to be the seat of para ojas. This para ojas is same as "astabinduka".

इह तु क्षयलक्षणमधञ्जलिमनस्यैव ज्ञेयम अष्टबिन्दुकस्य त्ववयवनाशेऽपि मृत्युर्भवति।

एतच्चौजः सर्वधातुसमुदायरुपं तेन सप्तधतुष्वेवावरुद्धमिति नाष्टमधातुत्वातिप्रसक्तिः।

iha tu kṣayalakṣaṇamadhañjalimanasyaiva jñeyama aṣṭabindukasya tvavayavanāśe'pi mṛtyurbhavati।

etaccaujaḥ sarvadhātusamudāyarupaṁ tena saptadhatuṣvevāvaruddhamiti nāṣṭamadhātutvātiprasaktiḥ।

Here in the context of diminution of ojas, the "ardhanjali".

Type is meant because destruction even of a part of the astabinduka ojas causes death. Ojas is by nature, essence of all dhatus thus it is included in the seven dhatus and is not the eight one as also mentioned by susrutha.

Gangadhara interprets differently. He says that "astabindu" and "ardhanjal", are the same because bindu means karsa and eight karsas are equal to ardhanjali.

2.4.2 Location of ojas in body

हृदयस्थमपि व्यापि देहस्थितिनिबन्धनम्।

hṛdayasthamapi vyāpi dehasthitinibandhanam।(ah.su.11/37)

Meaning:

Ojas is though located in the hrydaya(heart), it pervades all over the body and control(regulates) the working of the body.

ओजः सर्वधातुसारभुतं हृदि स्थितम्।

ojaḥ sarvadhātusārabhutaṁ hṛdi sthitam।(ca.3.136)

Ojas is essence of all the dhatus and is located in heart.

2.5 Functions of Ojas and its importance

तत्र बलेन स्थिरोपचितमांसत सर्वचेष्टास्वप्राति घातः

स्वरवर्णप्रसादो बाह्यानामाभ्यन्तराणां च करणानामात्मकार्यप्रतिपत्तिर्भवति ॥२५॥

tatra balena sthiropacitamāṁsata sarvaceṣṭāsvaprāti ghātaḥ

svaravarṇaprasādo bāhyānāmābhyantarāṇāṁ ca

karaṇānāmātmakāryapratipattirbhavati||25|| (su.su.15/25)

Ojas lends strength and radiance to the body. Being the essence of all the dhatus, its decline in the body leads to a corresponding decline in the ability of the dhatus to support the body, even when they are in balance. It keeps all dhatus steady and nourished. All physical, mental, sensory and motor fonctions are made possible by Ojas. In time of joy and sorrow it is also the source of will power, determination, patience and enthusiasm. It refines speech and complexion, and strengthens immunity. It is the foundation of health and happiness.

येनौजसा वर्तयन्ति प्रिणितः सर्वदेहिनः।

यहते सर्वभुतानाः जिवितं नावतिष्ठते ॥९॥

yenaujasā vartayanti priṇitaḥ sarvadehinaḥ।

yahate sarvabhutānāḥ jivitaṁ nāvatiṣṭhate।।9।। (ca.su.30/9)

यत् सारमादौ गर्भस्य यत्तद्गर्भरसाद्रसः।

संवर्तमानं हृदयं समाविशति यत् पुर ॥१० ॥

yat sāramādau garbhasya yattadgarbharasādrasaḥ।

saṁvartamānaṁ hṛdayaṁ samāviśati yat pura।।10।। (ca.su.30/10)

यस्य नाशात्तु नाशोऽस्ति धारि यद्धदयाक्षितम्।

यच्छरीररसस्नेहः प्रणा यत्र प्रतिष्ठिताः ॥११ ॥

yasya nāśāttu nāśo'sti dhāri yaddhadayākṣritam।

yaccharīrarasasnehaḥ praṇā yatra pratiṣṭhitāḥ।।11।। (ca.su.30/11)

It is the Ojas which keep the whole living being refreshed. There can be no life without Ojas. Ojas marked the beginning of the formation of the embryo. It is the nourishing fluid from the embryo. It enters the heart right at the stage of the latter's initial formation. Loss of ojas decreases the life itself. It sustains the life and is located in the heart. It constitutes the essence of all the tissue elements. The elan vital owes its existence to it. But all this action of ojas manifests itself in different ways, only with the help of this vessel. So this vessel plays an important role in the maintenance of the health.

2.6 Causes of emaciation

व्यायामोऽनशनं चिन्त रुक्षाल्पप्रमिताशनम्।

वातातपौ भयं शाको भुतोपधतक्ष्च ग़्यातव्याः क्ष्यहेतवः ॥७६ ॥

vyāyāmo'naśanaṁ cinta rukṣālpapramitāśanam।

vātātapau bhayaṁ śāko bhutopadhatakṣca ġyātavyāḥ kṣyahetavaḥ।।76।। (ca.17/76)

कफशणितशुक्राणं मलनं चतिवर्तनम्।

कालो भुतोपघातक्ष्च ग़्यातव्याः क्षयहेतवः ॥७७ ॥

kaphaśaṇitaśukrāṇaṁ malanaṁ cativartanam।

kālo bhutopaghātakṣca ġyātavyāḥ kṣayahetavaḥ।।77।। (ca.17/77)

Excess of physical exercise, lack of food (fasting), worry, partaking food which are dry (moisture less) and pramitasana (consuming food of one taste only), exposure to heavy breeze or sunlight, fear, grief, drinking strong wine, keeping awake at night, more elimination of kapha, sont(blood),sukra(semen), and mala (waste products such as urine, faeces) time such asadana and bhutopagata (invasion/assault by bhutas-demons and bacteria, virus etc) these are the causes for the decrease of ojas.

अभिघातात् क्षयात् कोपाच्छोकाद्धयानाच्छमात् क्षुधः ओजोः सङ्क्षीयते ह्योभ्यो धातुग्रहणनिः सतम्।

तेजः समिरितं तस्माद्विस्त्रंसयति देहिनः ॥२८ ॥

abhighātāt kṣayāt kopācchokāddhayānācchamāt kṣudhaḥ ojoḥ saṅkṣīyate hyobhyo dhātugrahaṇaniḥ satam।

tejaḥ samiritaṁ tasmādvistraṁsayati dehinaḥ।।28।। (su.su.15/28)

Anger, worry, fear, sorrow and other psychological excitement; decline in the amount of dhatus, doshas, or malas; excessive fasting or inadequate diet; eating and drinking too many rough, dry and harsh food; overwork, insomnia, excessive secretion of kapha, mala, blood and semen, emaciation due to sickness and external all can lead to decline in ojas.

बिभेति दुर्बलऽभीक्ष्णं ध्यायति व्यथितेन्द्रियः।

दुश्छायो दुर्मन रुक्षः क्षामक्ष्वैवौजसः क्षये ॥७३ ॥

bibheti durbala'bhīkṣṇaṁ dhyāyati vyathitendriyaḥ।

duśchāyo durmana rukṣaḥ kṣāmakṣvaivaujasaḥ kṣaye।।73।। (ca.su.17/73)

हृदि तिष्ठति यच्छुद्धं रक्तमिषत्सपितकम्।

ओजः शरीरे संख्यतं तन्नाशान्ना विनश्यते ॥७४ ॥

hṛdi tiṣṭhati yacchuddhaṁ raktamiṣatsapitakam।

ojaḥ śarīre saṅkhyataṁ tannāśānnā vinaśyate।।74।। (ca.su.17/74)

भ्रमरैः फलपुष्पेभ्यो यथ संभ्रियते मधु ।

तद्वदोजः स्वकर्मभ्यो गुणैः संभ्रियते नुणाम् ॥७५॥

bhramaraiḥ phalapuṣpebhyo yatha sambhriyate madhu।

tadvadojaḥ svakarmabhyo guṇaiḥ sambhriyate nuṇām।।75।। (ca.su.17/75)

रथमं जायते ह्यौजः शरीरेऽस्मिञ्छरीरिणाम् ।

सर्पिवर्णं मधुरसं लजगन्धि प्रजयते ॥७६॥

rathamaṁ jāyate hyaujaḥ śarīre'smiñcharīriṇām।

sarpivarṇaṁ madhurasaṁ lajagandhi prajayate।।76।। (ca.su.17/76)

When ojas becomes decreased the person has fear, anxiety, worry and discomfort in the sense organs, bad shade (complexion), bad mind (feeble mental stamina), dryness and emaciation of the body. Ojas is the (material) present in the heart, is pure, slightly red and yellow in color and its loss leads to death of the person. Ojas gets formed first in the body of living beings, has the color of the ghee, sweet taste and odour of taja (fried paddy). Just like honey is collected by the bee from the fruits and flowers, ojas gets formed similarly from the qualities and action of man.

ओजः क्षीयेत कोपक्षुद्व्यथानशोकक्ष्मादिभिः ॥३९॥

बिभेति दुर्बलोऽभीक्ष्णं ध्यायति व्यथितेन्द्रियः ।

ojaḥ kṣīyeta kopakṣudvathānaśokakṣramādibhiḥ।।39।।

bibheti durbalo'bhīkṣṇaṁ dhyāyati vyathitendriyaḥ। (ah.su.11/39)

दुःच्छयो दुर्मना रुक्षो भवेत्क्षामक्ष्च तत्क्षये ॥४०॥

जीवनीयौषघक्षीररसाद्यास्तत्र भेषजम्।

duḥcchayo durmanā rukṣo bhavetkṣāmakṣca tatkṣaye||40||

jīvanīyauṣaghakṣīrarasādyāstatra bheṣajam| (ah.su.11/40)

Ojas undergoes decrease in quality by anger, hunger (starvation), worry, grief, exertion etc., with such a decrease the person becomes fretful, depilated, worry much again and again (without apparent reason),feels discomfort in the sense organ, develops bad complexion, bad mentation and dryness; the treatment for it is to use the drugs of jivaniya gana milk, meat, juice etc.

हृदि तिष्ठति यच्छुद्धं रक्तमिषत्सपितकम्।

ओजः शरीरे संख्यातं तन्नाशान्ना विनश्यति ॥७४॥

hṛdi tiṣṭhati yacchuddhaṁ rattamiṣatsapitakam|

ojaḥ śarīre saṅkhyātaṁ tannāśānnā vinaśyati||74|| (ca.su.17/74)

When Ojas becomes decreased the person has fear, anxiety, debility, worries, discomfort in the sense organs, bad shade (complexion), bad mind (feeble mental stamina), dryness and emaciation of the body.

2.6 Decrease of ojas (Ojonirodhaja jvara)

ओजो विस्रंसते यस्य पित्तनिलसमुच्छ्रयत्।

स गात्रस्तम्भशीताभयां शयनेप्सुरचेत्चनः ॥४३॥

ojo vistraṁsate yasya pittanilasamucchrayat|

sa gātrastambhaśītābhayāṁ śayanepsuracetcanaḥ||43|| (su.ut.39/43)

अपिजप्रत् स्वपञ् जन्तुस्तन्द्रालुक्ष्च प्रलापवान्।

संहृष्टरोमा स्रस्ताङ्गो मन्दसन्तापवेदनः॥

ओजोनिरोधजं तस्य जानीयात् कुशलो भिषक् ॥४४॥

apijaprat svapañ jantustandrālukṣca pralāpavān।

saṁhṛṣṭaromā srastāṅgo mandasantāpavedanaḥ।।

ojonirodhajaṁ tasya jānīyāt kuśalo bhiṣak।।44।। (su.ut.39/44)

सप्तमे दिवसे प्राप्ते दशमे द्वादशोऽपि वा ॥४५॥

पुनर्घरितरो भुत्वा प्रशमं याति हन्ति वा ॥

saptme divase prāpte daśame dvādaśo'pi vā।।45।।

punargharitaro bhutvā praśamaṁ yāti hanti vā।। (su.ut.39/45)

The patient of fever in whom ojas is decreased by aggravation of pitta and vata, who has rigidity of the body, coldness, desire to sleep always, loss of consciousness, gets into sleep and awake often , has stupor, delirium, horripilations, weakness of the body parts, mild increase of temperature and discomforts such a patient should be understood, by the intelligent physician, as suffering from the ojonirodhaja jvara. This fever increasing greatly on reaching the seventh, tenth or twelfth day either subsides or kills the patient.

बललक्षणं बलक्ष यलक्षणं चात ऊर्ध्वमुपदेक्ष्यमः।

तत्र रसादिनं शुक्रकन्तानां धतुनां यत्परं तेजस्तत

खल्वोजस्तेदेव बलमित्युच्युते स्वशास्त्रसिद्धान्तात्॥२४॥

balalakṣaṇaṁ balakṣa yalakṣaṇaṁ cāta ūrdhvamupadekṣyamaḥ।

tatra rasādinaṁ śuktrakantānāṁ dhatunāṁ yatparaṁ tejastat

khalvojastedeva balamityucyute svaśāstrasiddhāntāt।।24।। (su.su.15/24)

This ojas or strength giving principle serves to impart a firm integrity to the flesh and muscles exercises unbounded control over all acts of vitality, improves the voice and complexion, and helps both the external (operative) and the internal (intellectual) sense organ, in duly performing their natural function.

त्रयो दोषा बलस्योक्तक्त व्यापद्विस्त्रंसनक्षयः।

विशलेषसदौ षसदौ गात्राणां दोषविस्त्रंसनं क्षमः।

अप्राचुर्य क्रियाणां च बलविस्त्रंसलक्षणम् ॥३० ॥

trayo doṣā balasyoktakta vyāpadvistraṁsanakṣayaḥ।

viśaleṣasadau ṣasadau gātrāṇāṁ doṣavistraṁsanaṁ kṣramaḥ।

aprācurya ktriyāṇāṁ ca balavistraṁsalakṣaṇam||30|| (su.su.15/30)

A deranged stated of albumen is marked by three above said properties of dislodgement from its proper said by a change of its natural virtues through contamination and by wasting.

2.7 Maintaining Ojas or Increase of ojas

ओजोवृद्धौ हि देहस्य तुष्टिपुष्टिबलोदयः ॥४१ ॥

ojovṛddhau hi dehasya tuṣṭipuṣṭibalodayaḥ||41|| (ah.su.11/41)

Increase of ojas makes for contentment, nourishment of the body and increase of strength.

दोषधातुमलक्षीणो बलक्षीणोऽपि वा नरः ।स्वयोनिवर्धनं यत्तदन्नपानं प्रकाङ्क्षति ॥३४ ॥

doṣadhātumalakṣīṇo balakṣīṇo'pi vā naraḥ।

svayonivardhanaṁ yattadannapānaṁ prakāṅkṣati||34|| (su.su.15/34)

The person suffering from deficiency of dosa, dhatu, mala or ojas has longing for such food and drinks which increase their source, the wasted person recovers on getting the desired food, nevertheless, if due to wasting of dhatus vayu causes loss of sensation and function and there is extreme debility the case is not amenable to treatment.

2.7.1 Ojas as an essence of dhatus

अत्र यद्यप्योजः सप्तधतुसररुपं तेन धातुग्रहणोनैव् लभ्यते

तथापि प्रणधारणकर्तुत्वेन पृथक् पठितं ये तु शुत्रजन्यमोज इच्छन्ति

तेषामष्टमो धतुरोजः स्यादिति पक्षे तत् खवोजः इति ।

atra yadyapyojaḥ saptadhatusararupaṁ tena dhātugrahaṇonaiv labhyate

tathāpi praṇadhāraṇakartutvena pṛthak paṭhitaṁ ye tu śutrajanyamoja icchanti

teṣāmaṣṭamo dhaturojaḥ syāditi pakṣe tat khavojaḥ iti। (ch.3 p 255)

Those who accept ojas as the product of sukra, their view is objectionable because then the number of the dhatus would be eight, Susrutha has clarified the position.

ओजः शब्दश्च यद्यपि रसेऽपि वर्तते तथाऽपिह सर्वधातुसारनीजोऽभिधीयते

ojaḥ śabdaśaca yadyapi rase'pi vartate tathā'piha sarvadhātusāranījo'bhidhīyate (ch.3 p260)

Though the synonyms with rasa, in present context, that being the essence of all dhatus is meant.

2.8 Affliction of ojas in different stages of intoxication

ओजस्यविहते पुर्वो हृदि च प्रतिबोधिते।

मध्यमो विहतेऽल्पे च विहते तुत्तमो मदः॥३७॥

ojasyavihate purvo hṛdi ca pratibodhite।

madhyamo vihate'lpe ca vihate tuttamo madaḥ।।37।। (ca.chi.24/37)

The first stages of intoxication start when the heart is stimulated but ojas is not affected, the second stages come when ojas is damaged and the third stages come when ojas is damaged severely. Since severely damaged of ojas is not affected by wine made of flour because the properties of depression, roughness and non sliminess are not so aggravated.

Description of Ojas

तेजो यत्सर्वधतुनमोजस्तत् पर्मुच्यते।

मुदु सोमत्मकं शुद्धं रक्तमिषत्सपीतकम्॥२९॥

tejo yatsarvandhatunamojastat parmucyate।

mudu somatmakaṁ śuddhaṁ raktamiṣatsapītakam।।29।। (a.s.19/29)

यत्सारमादौ गर्भस्य यच्च गर्भसाद्रसः।

संवर्तमनं हृदयं समाक्षूयति यत्पुरा॥३०॥

yatsāramādau garbhasya yacca garbhasādrasaḥ।

saṁvartamanaṁ hṛdayaṁ samākṣrayati yatpurā।।30।। (a.s.19/30)

यच्छरीररसः स्नेहः प्रणो यत्र प्रतिष्ठितः।

यस्यानाशान्ननशोऽस्ति प्रिणिता येन देहिनः ॥३१॥

yaccharīrarasaḥ strehaḥ praṇo yatra pratiṣṭhitaḥ।

yasyānāśānnanaśo'sti priṇitā yena dehinaḥ||31|| (a.s.19/31)

हृदयस्थमपि व्यापि तत् परं जीवितास्पदम्।

ओजः क्षीयेत कोक्षुद् नशोध्याक्षूमादिभिः ॥३२॥

hṛdayasthamapi vyāpi tat paraṁ jīvitāspadam।

ojaḥ kṣīyeta kokṣud naśodhyākṣramādibhiḥ||32|| (a.s.19/32)

बिभेति दुर्बलोऽभीक्ष्णं ध्यायति व्यथितेन्द्रियः।

दुच्छायो दुर्मना रुक्षो भवेत् क्षामक्ष्च तत्क्षये ॥३३॥

bibheti durbalo'bhīkṣṇaṁ dhyāyati vyathitendriyaḥ।

ducchāyo durmanā rukṣo bhavet kṣāmakṣca tatkṣaye||33|| (a.s.19/33)

जीवनीयौषधक्षीररसद्यास्तत्र भेषजम्।

ओजोबुद्धौ हि देहस्य तुष्टिपुष्टिबलोदयः ॥३४॥

jīvanīyauṣadhakṣīrarasadyāstatra bheṣajam।

ojobuddhau hi dehasya tuṣṭipuṣṭibalodayaḥ||34|| (a.s.19/34)

The essence of all the dhatus is known as para ojas; is the very best (material), is soft, possesses the quality of water, is pure, slightly reddish with yellowish tinge, it is the first essential element of the embryo, the essence of rasa dhatu of the foetus and gets localized in its heart(of the foetus) very early (earlier formation of the different parts of the body).

It is the chief fluid material of the body on which life depends, by the absence or loss of which there is loss of life and by it the living beings are kept happy.

Even though residing in the heart, it is circulating everywhere and helps the life activities. It is decreased by anger, hunger, worry, grief, physical emotion, and other causes. By such decrease, the person begins to experience fear (of loss of life), debility mind(mental disturbances), dryness and emaciation of the body.The treatment for such condition is the use of rejuvinating drugs, milk,meat,soup and others (which confer strength).

2.9 Conclusion

Being the essence of all the dhatus, the decline of ojas in the body leads to a corresponding decline in the ability of the dhatus to support the body, even when they are in balance. It keeps all dhatus steady and nourished. All physical, mental, sensory and motor fonctions are made possible by Ojas. In time of joy and sorrow it is also the source of will power, determination, patience and enthusiasm. It refines speech and complexion, and strengthens immunity. It is the foundation of health and happiness.

Even though residing in the heart, it is circulating everywhere and helps the life activities. It is decreased by anger, hunger, worry, grief, physical emotion, and other causes. By such decrease, the person begins to experience fear (of loss of life), debility mind(mental disturbances), dryness and emaciation of the body.The treatment for such condition is the use of rejuvinating drugs, milk,meat,soup and others (which confer strength).

Therefore, to ensure healthy, disease free life, we must incline to yogic and ecofriendly life with the necessary diet and exercises to maintain and increase ojas in our body.

3. REVIEW OF SCIENTIFIC LITERATURE

Title	Objective	Subjects	Results	Conclusions
Evaluating a yogic breathing and meditation intervention for individuals living with HIV/AIDS	To assess the effectiveness of a group program aimed at improving well-being among individuals living with HIV/AIDS.	Sixty-two participants were recruited from community HIV/AIDS organizations. Fifteen withdrawals from the study left 47 study participants	A repeated-measures analysis of variance indicated positive changes in well-being on the MHI and the MOS, where the effect was primarily seen immediately following the program and disappeared at later data points	In order to capture the outcomes of this program properly, both qualitative and quantitative measures are needed.
Traditional Indian medicine and homeopathy for HIV/AIDS: a review of the literature.	The purpose of this review was to assess the quality of peer-reviewed, published literature on (TIMH) traditional Indian medicine and homeopathy for HIV/AIDS care and treatment.	206 original articles reviewed, 21 laboratory studies, 17 clinical studies, and 6 previous reviews.	the studies reported positive effects and even "cure" and reversal of HIV infection.	This review exposes a broad gap between the widespread use of TIMH therapies for HIV/AIDS, and the dearth of high-quality data supporting their effectiveness and safety.
The Living Well Lab: a community-based HIV/AIDS research initiative.	To evaluate Complementary and Alternative Medicine (CAM) use and changes in health	Two hundred and seven members enrolled in the Living Well Lab (LWL	Quantitative data demonstrated improvement in mental and physical wellbeing, social support and patient	CAM use may be associated with changes to physical, social and mental wellbeing.

	and quality of life outcomes of (Friends For Life)FFL's HIV+ members.		satisfaction specifically	
Sudarshan Kriya yoga improves quality of life in healthy people living with HIV (PLHIV): results from an open label randomized clinical trial.	To evaluate the improvement of life due to Sudarshan Kriya	61 adult PLHIV with CD4 count more than 400 cells/µl and Karnofsky scale score above 70 were enrolled. Those with cardiac disease, jaundice, tuberculosis, or on antiretroviral therapy/yoga intervention were excluded	An overall 6 per cent improvement of QOL scores was observed in I-SKY group as compared to O-SOC group, after controlling for baseline variables like age, gender, education and occupation (p =0.016); 12 per cent for physical (p =0.004), 11 per cent psychological (p =0.023) and 9 per cent level of independence (p =0.001) domains	A significant improvement in QOL scores was observed for the three health related QOL domains in SKY intervention arm. This low cost strategy improved physical and psychological state of PLHIV calling for upscaling with effective monitoring for sustainability of quality of life.
A significant improvement in QOL scores was observed for the three health related QOL domains in SKY intervention arm. This low cost strategy improved physical and psychological state of PLHIV	To evaluate the effect of naturopathy and yoga intervention on CD4 counts of HIV patients.	96 patients prediagnosed as HIV were enrolled for various durations and are divided into 4 groups(G1:1-7 days, G2:8-15 days,G3:16-30 days,G4:>30 days)based on duration of stay.	Significant increase in the CD4 count was observed in two out of the four groups (G2:P=.052,and G4:P=.00038,respectively).	An increasing trend in the CD4 count was observed that was proportional to the length of the stay of participants at the HIV sanatorium

calling for upscaling with effective monitoring for sustainability of quality of life.				
Yoga lifestyle intervention reduces blood pressure in HIV-infected adults with cardiovascular disease risk factors	To evaluate whether a yoga lifestyle intervention improves Cardiovascular disease(CVD) risk factors,virological or immunological status,or quality(QOL)in HIV-infected adults relative to standard of care treatment in a matched control group.	60 HIV-infected adults with mild–moderate CVD risk.	Resting systolic and diastolic blood pressures improved more (P=0.04) in the yoga group (-5 plus minus 2 and -3 plus minus 1 mmHg, respectively) than in the standard of care group (+1 plus minus 2 and+2plus minus 2 mmHg, respectively).	Among traditional lifestyle modifications, yoga is a low-cost, simple to administer, nonpharmacological, popular behavioural intervention that can lower blood pressure in pre-hypertensive HIV-infected adults with mild–moderate CVD risk factors.

Psycho-Endocrine-Immune Response to Mindfulness-Based Stress Reduction in Individuals Infected with the Human Immunodeficiency Virus: A Quasiexperimental Study	The purpose of this study was to examine the effects of a structured, 8-week, Mindfulness-Based Stress Reduction (MBSR) program on perceived stress, mood, endocrine function, immunity, and functional health outcomes in individuals infected with the human immunodeficiency virus (HIV).	A total of 46 participants enrolled in MBSR; however, only 24 completed the intervention	Natural killer cell activity and number increased significantly in the MBSR group compared to the comparison group. No significant changes or differences were found for psychological, endocrine, or functional health variables.	These results provide tentative evidence that MBSR may assist in improving immunity in individuals infected with HIV.

A Pilot Feasibility and Acceptability Study of Yoga/Meditation on the Quality of Life and Markers of Stress in Persons Living with HIV Who Also Use Crack Cocaine	This pilot study sought to compare the feasibility and acceptability of 60-minute, twice-per-week sessions of YM for 2 months with those of no-contact control and to evaluate the effects of the intervention on QOL (according to the Short Form-36, Perceived Stress Scale [PSS], and Impact of Events Scale [IES]) and salivary cortisol and dehydroepiandrosterone sulfate (DHEA-S) among PLWH who use crack cocaine.	n=12 in yoga group and n=12 in control group	The YM program was acceptable and feasible, with high overall attendance (89%) and individual participation in yoga sessions (83%). YM participants showed modest improvements on QOL. The PSS total score and the IES intrusion score improved significantly 2 months after the intervention, but cortisol and DHEA-S did not change.	This pilot study showed a high level of feasibility and acceptability and modest effects on measures of QOL among PLWH who use crack cocaine. The results suggest utility of YM as a simple, safe, and inexpensive format to improve QOL in a population that has many medical difficulties and extenuating stressors.

Subjective Sleep Quality and hormonal modulation in long-term yoga practitioners	The purpose of the present study has been to examine the effects of long-term yoga practice on Subjective Sleep Quality (SSQ) and on several hormonal parameters of the hypothalamus–pituitary–adrenal (HPA) axis	Twenty-six subjects (16 experimental and 10 controls) were recruited to be part of the study. Experimental subjects were regular yoga practitioners with a minimum of 3 years of practice	The yoga group displayed lower PSQI scores and higher blood cortisol levels than control subjects	long-term yoga practice is associated with significant psycho-biological differences, including better sleep quality as well as a modulatory action on the levels of cortisol
The influence of Hatha yoga as an add-on treatment in major depression on hypothalamic–pituitary–adrenal-axis activity: A randomized trial	The impact of Hatha yoga as add-on treatment to quetiapine fumarate extended release (QXR) or escitalopram (ESC) in depressed patients on hypothalamic–pituitary–	60 inpatients suffering from major depressive disorder (MDD) according to DSM-IV were randomized for a 5 week treatment with Yoga or not (control	A more pronounced down regulation of the HPA axis activity due to yoga could not be detected. The stepwise long term cortisol reduction was seen in both medication	Our results suggest that antidepressant agents down regulate HPA axis function to a greater extent than additional Hatha yoga treatment. Moreover, an early reduction of HPA system hyperactivity

	adrenal (HPA) axis activity was assessed.	group) and with either QXR (300 mg/day) or ESC (10 mg/day)	groups, irrespectively of yoga add-on treatment. In addition, cortisol improvers in week 1 of therapy (reduction in cortisol peak value within the DEX/CRH test) reached significant greater amelioration of depressive symptoms after 5 weeks.	after one week of pharmacological treatment seems to raise the possibility of a favorable treatment response.
Effects of a Yoga Program on Cortisol Rhythm and Mood States in Early Breast Cancer Patients Undergoing Adjuvant Radiotherapy: A Randomized Controlled Trial	This study compares the effects of an integrated yoga program with brief supportive therapy in breast cancer outpatients undergoing adjuvant radiotherapy at a cancer center	Eighty-eight stage II and III breast cancer outpatients are randomly assigned to receive yoga (n = 44) or brief supportive therapy (n =	There is a significant positive correlation between morning salivary cortisol level and anxiety and depression	Yoga might have a role in managing self-reported psychological distress and modulating circadian patterns of stress hormones in early breast cancer patients undergoing

		44) prior to radiotherapy treatment		adjuvant radiotherapy.

Conclusion:

While the use of antiretroviral therapy(ART) has significantly increased the life span of persons living with HIV(PLWH),a high degree of physical and psychological problems persists. Pharmacologic interventions used to improve psychological,immunologic,and behaviour responses including quality of life,are sometimes associated with increased toxicity and adverse effects of the patient.Therefore,to relieve adverse effects of ART and physical,psychological symptoms of HIV some PLWH turn to complementary and alternative medicine(CAM) and Yoga /meditation, a mindfulness-based stress reduction technique,which is a nonpharmacologic intervention.

4. AIMS AND OBJECTIVE

4.1 AIMS

To study the effect of one month integrated yoga intervention on physiological variables in patients living with HIV.

4.2 OBJECTIVES

To study the efficacy of yoga on the following parameters (of people living with HIV):

1. Weight loss
2. Rise in temperature
3. Decrease in BP
4. Heart rate

4.3 HYPOTHESIS

Yoga has positive influence on physiological aspects of the people living with HIV.

4.4 NULL HYPOTHESIS

Yoga does not have positive influence on physiological aspects of the people living with HIV.

5. METHODOLOGY

5.1 Source of the sample

Rural Service Academy (RUSA) a health centre in Manipur for the HIV/AIDS positive people run by the non-governmental organisation (NGO).

5.2 Sample Size

30 HIV infected people in a health centre in Manipur were normally assigned in 2 groups- a) Yoga group (10) b) Control group (20). Yoga group was given loosening practices, breathing practices, yoga postures, pranayama and relaxation techniques for 60 minutes six days a week for 30 days and the control group perform their normal daily activity.

Table 1: Demographic data of subjects:

Variables	**Yoga group**	**Control group**
Gender	Male=9 Female=1	Male=20 Female=0
Age (Mean ± SD)		
Years of education (Mean ± SD)		

5.3 Inclusion

a. HIV/AIDS positive
b. Both the genders
c. Having no previous exposure to yoga

5.4 Exclusion

a. Who have physical disability
b. Active respiratory infections
c. Under psychiatric medication
d. Not willing to participate in the study

5.5 Ethical consideration

Clearance was obtained by Institutional committee of SVYASA University.

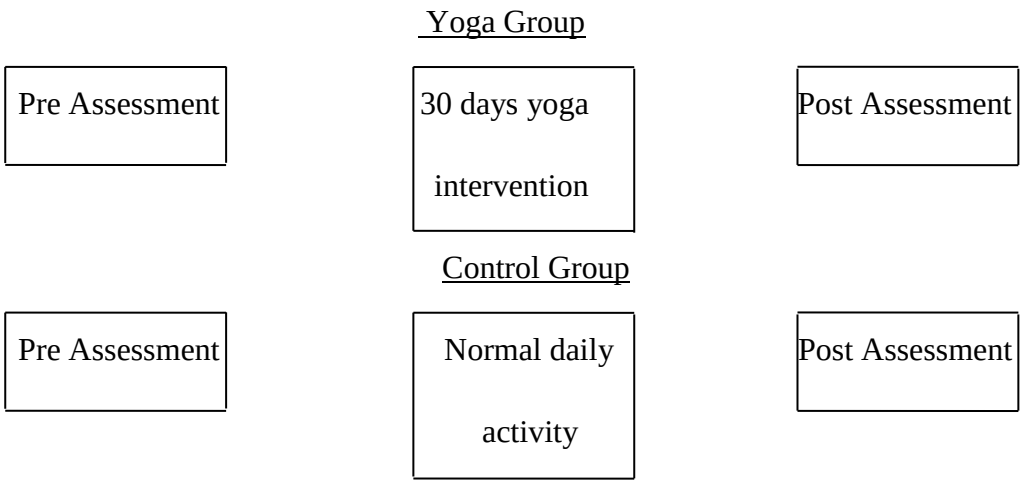
5.6 Consent of the study

a) Informed consent of the respondents was collected

b) The participants in the study were explained in detail about the nature of the study and the voluntary nature of the participant.

c) Confidentiality of each participant was assured as part of the research process.

5.7 Design of the study: Two groups pre-post



6.INTERVENTION

All the subjects in experimental group underwent yoga practice daily one hour, six days a week for one month.

Table 2: List of the practices given to the yoga group

Loosening practices	Joint loosening practices for hands, legs, neck and head	5 minutes
Surya namaskar	12 counts	5 minutes
Breathing practices	Hands in and out breathing, hand stretch breathing, ankle stretch breathing, sectional breathing, tiger breathing and	15 minutes

	bridge posture breathing	
Yogic postures	Tadasana, ardhakaticakrasana, ardhachakrasana, padahastasana, trikonasana, vajrasana, vakrasana, paschimotanasana, sukhasana, baddha konasana, pavana muktasana, suryanamaskar	20 minutes
Relaxation techniques	Deep relaxation technique, quick relaxation technique	5 minutes
Pranayama (yogic breathing)	Nadisuddhi, sitali and bhramari	10 minutes

7. RESULT

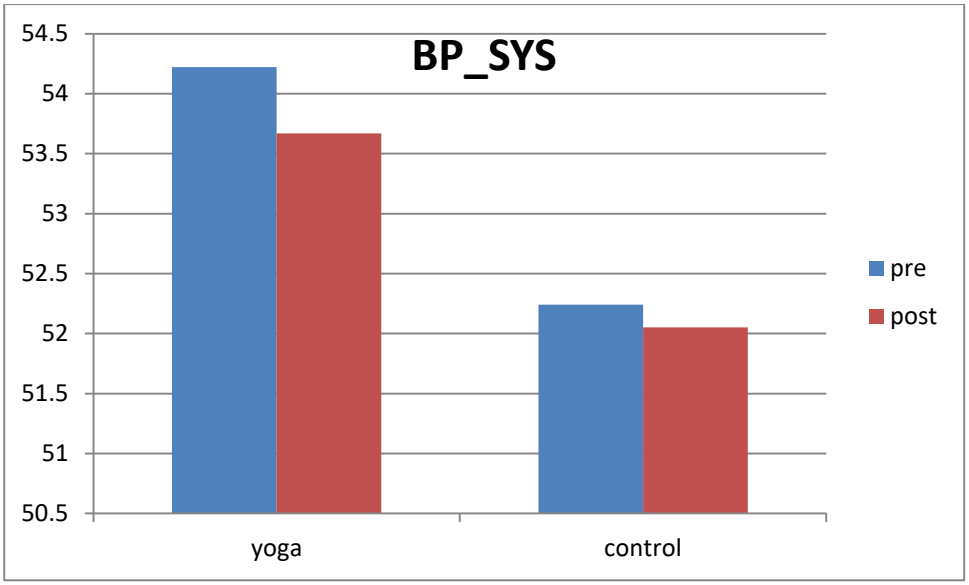
Paired sample t-test shows decrease in BP-systole and BP-diastole which are not significant statistically and a statistically significant reduction in weight in yoga group. In the same group, there is statistically significant increase in pulse rate and breathing rate. In control group, there is statistically insignificant decrease in BP-systole, Breathing rate and weight. There is significant increase in BP- dystole and insignificant increase in pulse rate all statistically (table 1).

Table 1. Paired sample t-test, *p>0.05

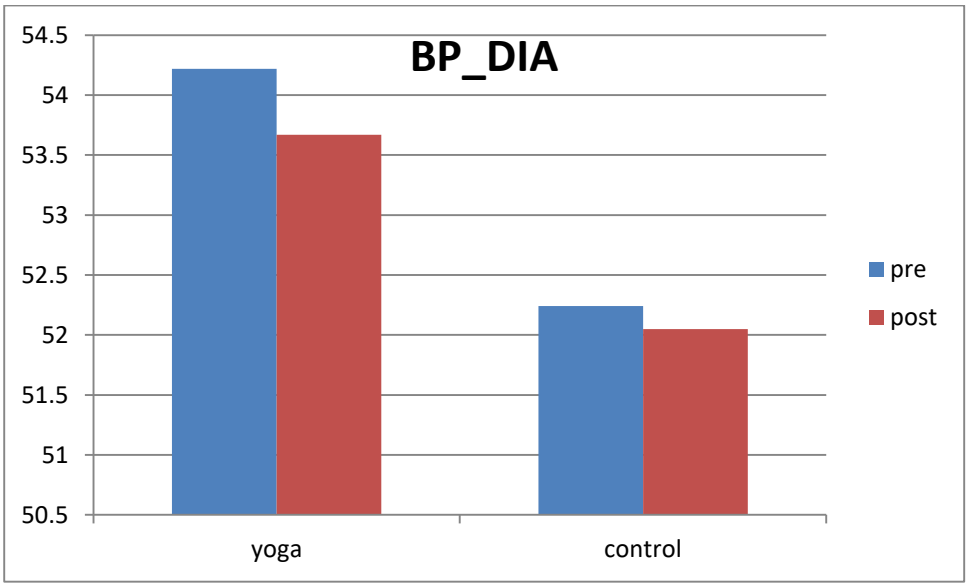
Sr No.	Groups	Variable	Subject	Mean ± SD	p-values	% change
1	Yoga group	BP_SYS_PRE	N=10	126 ± 17.76	0.1817	3.17
		BP_SYS_POST	N=10	122 ± 16.19		
		BP_DIA_PRE	N=10	86 ± 10.75	.09	4.42
		BP_DIA_POST	N=10	82.2 ± 8.92		
		PR_PRE	N=10	71.6 ± 11.61	0.002	-7.68
		PR_POST	N=10	71.9 ± 10.03		
		BR_PRE	N=10	15.56 ± 5.73	0.045	-18.89
		BR_POST	N=10	18.50 ± 4.96		
		WEIGHT_PRE	N=10	54.22 ± 7.60	0.02	1.01
		WEIGHT_POST	N=10	53.67 ± 7.28		

2	Control group	BP_SYS_PRE	N=20	126 ± 19	0.803	3.17
		BP_SYS_POST	N=20	126 ± 18.88		
		BP_DIA_PRE	N=20	82.5 ± 10.20	0.01	-5.09
		BP_DIA_POST	N=20	86.7 ± 9.21		
		PR_PRE	N=20	68 ± 11.18	0.85	-0.15
		PR_POST	N=20	68.1 ± 11.01		
		BR_PRE	N=20	13.60 ± 6.56	0.077	6.69
		BR_POST	N=20	12.69 ± 6.45		
		WEIGHT_PRE	N=20	52.24 ± 9.40	0.12	0.36
		WEIGHT_POST	N=20	52.05 ± 9.41		

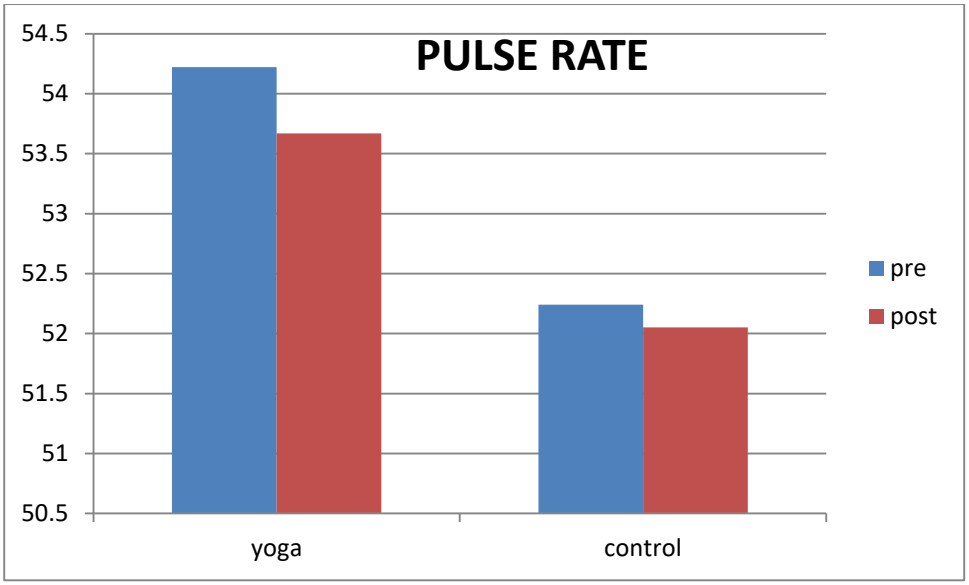
Graph 1. Pre and post changes in mean BP-systole score in yoga and control group before and after the intervention



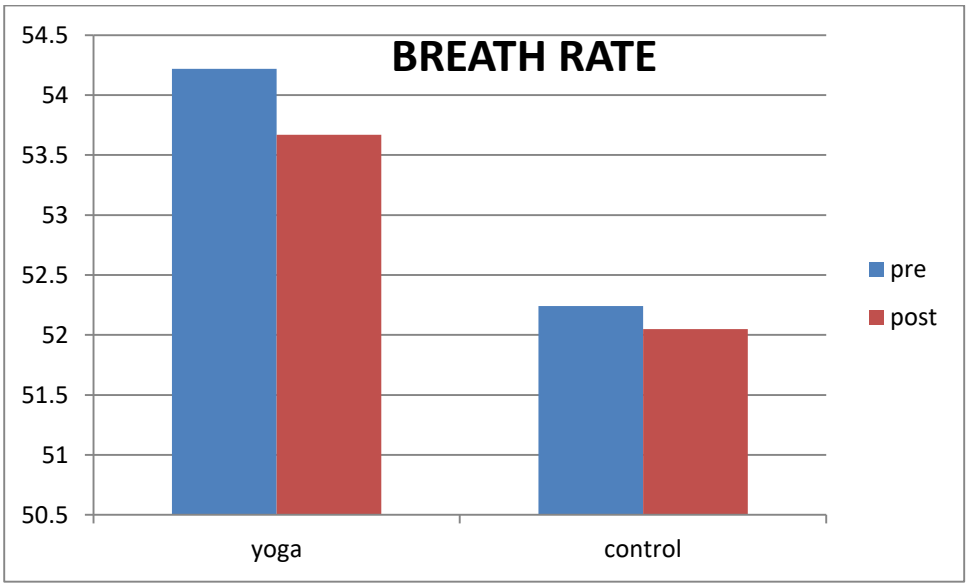
Graph 2. Pre and post changes in mean BP-diastole score in yoga and control group before and after the intervention



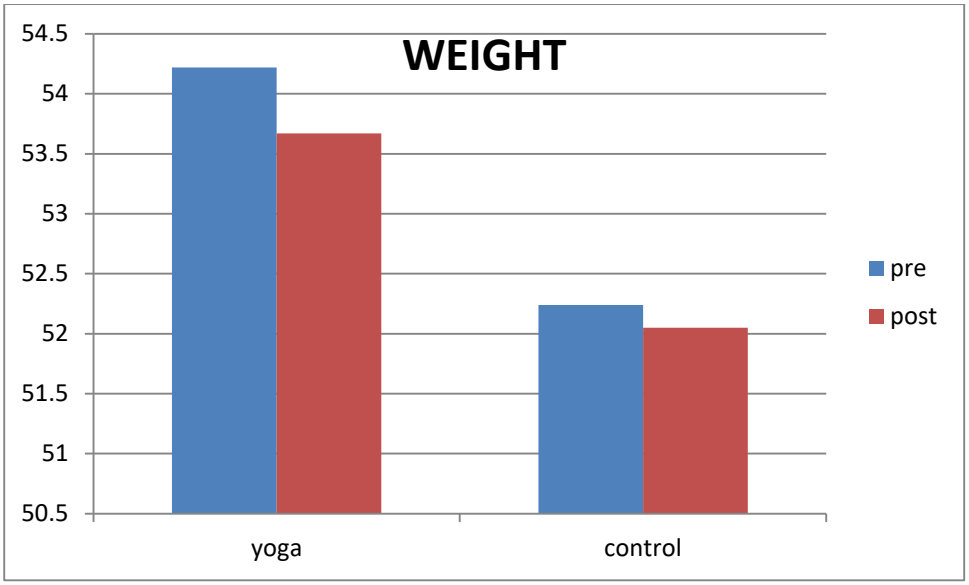
Graph 3. Pre and post changes in mean pulse rate score in yoga and control group before and after the intervention



Graph 4. Pre and post changes in mean breathing rate score in yoga and control group before and after the intervention



Graph 5. Pre and post changes in mean weight score in yoga and control group before and after the intervention



Independent sample t test, *p>0.05

Sr No.	Groups	Variable	Subject	Mean ± SD	p-values	
1	Pre	BP_SYS_yoga	N=10	126 ± 17.76	0.5158	
		BP_SYS_control	N=20	126 ± 19		
		BP_DIA_yoga	N=10	86 ± 10.75	0.4709	
		BP_DIA_control	N=20	82.5 ± 10.20		
		PR_yoga	N=10	71.6 ± 11.61	0.4185	
		PR_control	N=20	68 ± 11.18		
		BR_yoga	N=10	15.56 ± 5.73	0.4303	

		BR_control	N=20	13.60 ± 6.56		
		WEIGHT_yoga	N=10	54.22 ± 7.60	0.2711	
		WEIGHT_control	N=20	52.24 ± 9.40		
2	Post	BP_SYS_yoga	N=10	122 ± 16.19	0.9289	
		BP_SYS_control	N=20	122 ± 18.88		
		BP_DIA_yoga	N=10	82.2 ± 8.92	0.2128	
		BP_DIA_control	N=20	86.7 ± 9.21		
		PR_yoga	N=10	77.1 ± 12.03	0.0501	
		PR_control	N=20	68.1 ± 11.01		
		BR_yoga	N=10	18.50 ± 4.96	0.01873	
		BR_control	N=20	12.69 ± 6.45		
		WEIGHT_yoga	N=10	53.67 ± 7.28	0.367	
		WEIGHT_control	N=20	52.05 ± 9.41		

8. DISCUSSION:

8.1 Background

40 HIV-infected patients from a HIV rehabilitation centre in Manipur state of India were selected for the study and are divided into two groups, Yoga(n=20) and Control(n=20). Yoga group performed physical postures (asanas), breathing practices (pranayama) and yoga based relaxation techniques for 60 minutes six days a week for 30 days whereas, the control group continued their daily routine.

BP, pulse rate(PR), breathing rate(BR) and weight are the physiological vartiables taken into account.

BP systol and diastol get closer to normal value after the intervention in yoga group. In control group, BP systol remains same and BP diastol gets away from normal value both after the intervention. Further, in yoga group after the intervention, PR insignificantly increases increases getting closer to normalcy and BR increases significantly increases and weight decreases insignificantly. Whereas in control group, PR remains the same and BR decreases and weight also insignificantly decreases after the intervention.

8.2 Comparison of our study with previous studies

Earlier related studies showed that yoga as an intervention improves the health of not only our concerned HIV-infected people but also patients of other diseases as well as enhances the wellbeing of healthy people. In a study where whether yoga intervention has positive impact on blood pressure, it was found that resting systolic and diastolic blood pressures improved more (P=0.04) in the yoga group (-5±2 and -3±1 mmHg, respectively) than in the standard of care group (+1±2 and +2±2 mmHg, respectively). However, there was no greater reduction in body weight, fat mass or proatherogenic lipids, or improvements in glucose tolerance or overall QOL after yoga, (Cade,2010). Whereas in our study BP systol has become 122±16.19 from 126±17.76 and diastol_post 82±8.92 from 86±10.75 after the intervention in yoga group showing the closeness to the normal values.

In another randomized controlled pilot trial of yoga breast cancer survivors were randomly assigned to a 6-month, facility- and home-based viniyoga intervention ($n = 32$) or a waitlist control group ($n = 31$), it was found that Weight (kg) increases from 80.4 to 81.1 in yoga group whereas in controlled group it remains the same (81.3kg in both pre and post). Immune and virological status was not adversely affected(Littman, A. J., Bertram, L. C., Ceballos, R.,

Ulrich, C. M., Ramaprasad, J., McGregor, B., & McTiernan, A. (2012)). In our study, weight decreases from 54.22 ± 7.60 to 53.67 ± 7.28 in yoga group which may be due to less sample size and short duration of the practice or intervention.

In another study which was conducted to examine the effect of yoga on cardiovascular function in subjects above 40 yrs of age, The mean value of height, weight and BMI in study group was not significantly less than in controls (P>0.05). The mean value of pulse rate was lower in study than control group statistically to the significant extent: Pulse rate (beats/min) 078.04±4.551 (yoga or study group) ,083.92±6.229(control group). The statistical difference in the mean systolic and diastolic BP in between study and control group was significant: Systolic B.P. (mm Hg) 131.72±7.354(yoga group), 138.20±11.61(control group); Diastolic B.P. (mm Hg) 083.88±4.970(yoga group), 089.00±5.4(control group).(Bharshankar, J. R., Bharshankar, R. N., Deshpande, V. N., Kaore, S. B., & Gosavi, G. B. (2003)). Whereas in our study pulse rate post intervention in yoga group is 71.9 ± 10.03 from 71.6 ± 11.61(pre) and pulse rate in control group is 68.1 ± 11.01(post) from 68 ± 11.18(pre).

Overall the study has shown that yoga as an intervention improves the physiological conditions of HIV-infected people.

8.3 Our study and HPA-axis

This study is a play of HPA axis mechanism in stress response attempting to give a long lasting our systems-friendly solution to physiological imbalances (Heart rate, Blood rate etc) with the help of yoga.

HPA axis (hypothalamic-pituitary-adrenal axis) is used to represent the interaction between the hypothalamus, pituitary gland, and adrenal glands; it plays an important role in the stress response. When we face a stressful situation, the hypothalamus secretes corticotrophin-releasing hormone(CRH) which prompts the release of adenocorticotropic hormone (ACTH) which travels down to signal the release of cortisol fron adrenal glands. The release of cortisol causes a number of changes that help the body deal with stress.

Yoga decreases the activity or intensity of HPA-Axis which leads to balancing of autonomic nervous system which results in decrease in the activity of sympathetic nervous system and in increase of parasympathetic nervous system which relaxes the our systems. As vagal nerves

(a kind of parasympathetic nerves) get activated, heart rate, blood pressure, respiratory rate decrease. The overall activity ensures good health which means a better physiological health.

8.4 Conclusion

This study also ensures of bringing remedy to the side-effects of modern medicine prescribed for HIV-positive people even though it is nearly a solution to the disease. For example, intake of ART has its own adverse effects such as appetite loss, fatigue, diarrhea, high cholesterol, mood changes, rash, trouble sleeping and nausea and vomiting etc., leading to the possibility of occurrence of hypertension, cardiovascular diseases etc.

Therefore, to optimize the maximum benefit of the treatment, yoga combined with modern medicine is recommended.

9. APPRAISAL

9.1 Strength of the study

Previous studies even though they include yoga as an intervention only took CD4 counts or psychological factors into account keeping aside the physiological parameters as secondary variables. But this study represents a preliminary step which measures the effects of yoga taking into account the physiological parameters of HIV-1 infected patients.

This study followed a robust design.

9.2 Limitation of the study

Small sample size is the limitation of the study.

9.3 Application of the study

This study opens the new ideas to the researchers in the field of yoga.

This study shows the significance of yoga practice in HIV-1.

9.4 Suggestion of the further study

Same studies should be replicated with large sample size including CD4 counts in future.

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11. APPENDICS

Informed Consent Form (For yoga Practitioners)

Title: Effect of yoga on the physiological aspects of HIV positive people

Information to the participants:

We understand that you- Studies show that the practice of yoga has a positive influence on the overall quality of life. In this study, we are evaluating it. Thus this study, conducted as a part of the Degree program, examines, your consent is sought to take part in the study. If you accept to take part in this study, the investigator will interview you along with other participants. In this interview, the interviewer will ask you some demographic questions. The information collected from you would be helpful in diagnosing if you are at risk of HIV/AIDS. The interview may take one hour. Apart from this, if you have been earlier diagnosed with HIV, you will be required to share your medication prescription with the researcher. The interview and the tests are expected not to cause any serious adverse effect on your physical or mental health. During the entire period of the study you will continue your daily routine work activities.

Please note that you have a right to refuse to take part in the study at any time. Your refusal will not adversely affect your daily routine. Please also note that the information you are going to divulge to us kept in utmost confidentiality.

Undertaking by the investigator:

Your consent to participate in the above study is sought. You have a right to refuse consent or withdraw the same during any part of the study without giving any reason. I undertake to maintain complete confidentiality regarding the information obtained from you during the course of the study. If you have any doubts about the study, please feel free to clarify the same. Even during the study you are free to contact the investigator for clarifications if you desire so. This phone number of the investigator is given below:

Investigator's name: Nongmaithem Jyoti Devi

Phone number:9606152907 / 7085570459

Consent:

I have been informed about the procedures of the study. The possible risks too have been explained to me as stated in the information. I/ have understood that I/ have the right to refuse my consent or withdraw it any time during the study without adversely affecting me. I am aware that by subjecting to this investigation, I will have to give more time to assessments by the investigating team and that these assessments do not interfere with the benefits.

Signature of the participant Signature of the investigator

(Name and Address) (Name and Designation)

Date: Place

To,

The Programme Manager, TI project,

Rural Service Academy (RUSA),

New Lambulane, Imphal, Manipur,

11th June 2018

Subject: Request for allowing giving of yoga intervention to people who are taking ART (Anti Retroviral Therapy) and IDU (Intravenous Drug Users)

Dear Madam,

We are the students of SVYASA, Bangalore pursuing Master degree in Yoga Therapy (YT). As per this two year course, we have to do a project involving yoga intervention to people who are treated with ART and IDU for at least a month.

Therefore, we request you to help us complete the same mentioned above as this initiative will benefit them towards healthier living extending their life span and improving quality of life and simultaneously completing our project successfully.

Thanking You,

Yours faithfully,

Nongmaithem Jyoti Devi

Phurailatpam Annie

Msc Yoga Therapy

3rd Semester,

SVYASA, Prasanthi Kutiram

RURAL SERVICE AGENCY IMPHAL RUSA

14/06/18

Programme Manager
TI-Project (RUSA)

RURAL SERVICE AGENCY IMPHAL RUSA

TO WHOM IT MAY CONCERN

This is certified that Kumari Nognmaithem Jyoti devi and Phurailatpam Annie student of SVYASA,Bangalore ~~are~~ conducted successfully one month Yoga Intervention for ART patients and IDUs of Targeted Intervention project,RUSA. From the 15th June 2018 to16th July 2018.

M. Aruna Devi

M.Aruna Devi
Programme Manager,TI project,RUSA.
Programme Manager
TI-Project (RUSA)