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REVIEW ARTICLE

RASAYANA: A BETTER ALTERNATIVE FOR DISEASE PREVENTION

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Abstract:

In present era, infectious diseases are expanding like anything. To catch all the organisms (newly evolved, resistant strains, capsulated organisms etc) and to treat them accordingly is not become possible all the time. Prevention might be the right choice against such kind of diseases. Thus vaccination since its conceptualization remains one of the important pillars of preventive medicine. But even after enormous efforts, preventing all the diseases (which are produced by known organism) still remain out of reach. This fact catches up the eyes towards other methods of disease prevention described in traditional health care systems like ayurveda. Rasayana is one such measure to strengthen the general immunity (both innate and cell mediated), which makes body so strong that it can resist variety of infectious agents entering the body system. Hence rasayana improves non specific immunity where as vaccination works on limited specific immunity. This article aims to illustrate the disease Burden, cost factor of rasayana and vaccines, income per capita in India, mode of action of some rasayana drugs and vaccines, drugless preventive measures in ayurveda & concept of non specific immunity.

Key Words: Rasayana therapy, Vaccination, Preventive methods in ayurveda

Introduction:

Vaccination is the administration of antigenic material to stimulate an individual's immune system to develop adaptive immunity to a specific pathogen.[1] Vaccines can prevent or ameliorate morbidity from specific infection. But it is also true that only 37 % of diseases occur due to infection.[2] Even all infectious diseases are not vaccine preventable. Thus vaccine can prevent very small area of disease spectrum. Vaccination could not be primary solution; rather it must be secondary, in the field of preventive medicine. So it is need of present era to find the primary preventive method. On the path of enlightening the preventive methods for almost every kind of diseases, answer is within the body itself, by improvement in body's homeostasis and non specific immunity. If it happens, then almost all kind of diseases can be prevented.[3] Microorganism keep changing their form and acquiring resistance. Hence practically it is impossible to have vaccines for all. Instead better option is to improve and sensitize body's immune system by using rasayana. Rasayanas refers to use of complex herbal preparations, individual herbs or some code and conducts with the aim to rejuvenate or attain the maximum potential of an individual in order to prevent diseases.

Aim and Objectives:

1. To compare the present (vaccination) and proposed (rasayana) preventive method

2. To propose the broad spectrum preventive method through Ayurvedic concept

Material and Method:

This article is purely based on information which was collected through various authentic books, journals, and internet sites. A compilation followed by critical review has been done for this burning issue.

Data and Discussion:

Disease Burden:

There are several measures used to quantify the burden imposed by diseases on people. The years of potential life lost (YPLL) is a simple estimate of the number of years that a person's life was shortened due to a disease.[4]

Disease category	% of all YPLLs lost, worldwide[5]
Infectious and parasitic diseases, especially lower respiratory tract infections, diarrhea, AIDS, tuberculosis, and malaria	**37%**
Neuropsychiatric conditions, e.g. depression	2%
Injuries, especially motor vehicle accidents	14%
Cardiovascular diseases, principally heart attacks and stroke	14%
Premature birth and other perinatal deaths	11%
Cancer	8%

(YPLL= years of potential life lost, **AIDS**= acquired immunodeficiency syndrome)

Table no. I - Disease burden on years of potential life lost (YPLL)

37% diseases are infectious disease, and rest of diseases cannot prevent by vaccinations. Even out of n number of infectious diseases, only 28-30 infectious diseases are there, which can be prevented through available vaccination.[6] Out of these, only 9-10 vaccines has been included in NIS (National immunization schedule) and available for free at govt. hospitals, PHC (public health centre), Aanganvadi etc. which doesn't cover all infectious diseases. So we need some methods, which can prevent almost all types of diseases and ones again the answer is rasayana drugs.

Cost Factor:

Below is rough approximation of vaccine cost. It may vary due to change in brands, different administration charge and consulting fees of the doctor. [7]

The Universal Immunization Program (UIP) seems to have slipped almost entirely into the grip of the private sector as the government's vaccine institutes that were reopened in Feb 2010 after being shut down two years ago are yet to contribute insignificant way. In the process, the cost of most vaccines has more than doubled since 2006-07.[8]

Name of Vaccine	Single dose approximate price in rupees	Number of doses	Total
BCG	150	1	150
OPV	200	6	1200
DTwP	250	5	1250
Hep-B	200	3	600
Measles	200	1	200
MMR	250	2	500

HiB	350	4	1400
TYPHOID	250	3	750
IPV	450	4	1800
TDAP	1200	1	1200
HPV	3100	3	9300
CHICKEN POX	1500	2	3000
Hep - A	1100	2	2200
ROTA VIRUS	1250	3	3750
PNEUMONIA	4200	4	16800
DTaP	1200	5	6000
FLU	900	5	4500
Total			**54,600**

(**BCG**=Bacillus Calmette–Guérin, **OPV**=Oral polio vaccine, **DTwP**= Diphtheria, Tetanus, whole cell Pertussis, **Hep-B**=Hepatitis B vaccine, **MMR**=Mumps Measles Rubella, **HiB**=Haemophilus influenzae type B vaccine, **IPV**= Inactivated Polio vaccine, **Tdap**= Tetanus, Diphtheria, Pertussis, **HPV**= Human Papilloma Virus, **Hep-A**=Hepatitis A)

Table no. II: Cost of different vaccines

On the other hand**,** if proper rasayana are introduced during initial life, then one can achieve Swastha (Healthy) children and ultimately a healthy long life in true sense. [9]

These all herbo-mineral compound are very safe to take for long time at the same time these all are easily available with comparatively less prize.

Rasayana	**Benefits**
Suvarna Prashana[10]	Improves Intellectual ability, digestive power & immunity
Medhya rasayana[11]	Increase Intellectual power
Brahma rasayana[12]	Gives healthy long life
Haritaki rasayana[13]	Increase strength and healthy long life
Shatavari rasayana[14]	Ones remain protected from various diseases throughout the life
Chyavanprashavleha[15]	Improves bodily homeostasis and prevent respiratory symptoms.

Table no. III: Different rasayana and its effect

Income per Capita: India's per capita income is Rs. 5,729 per month,[16] which is ranked 142nd in the world. 27.5% of the population was living below the poverty line in 2004–2005. So to prevent diseases in this economy, multi dimensional adravyabhuta chikitsa (drugless therapy like dina charya, ritu charya, yoga, sadavrutta etc) should be introduced in every ones daily schedule, which has been mentioned in Ayurvedic classics.[17] Dina Charya means the daily regimen. One should wake up early in the morning, should perform danta dhavana (Tooth brush), Jihva nirlekhana (tongue cleaning), mukha prakshalana (face washing), gandusha (gargle), nasya (nasal oleation), abhyanga (oil massage), snana (bath), vastra dharana (clean and ironed clothes), padatrana dharana (foot wear) and then all daily work should be done by following proper sadavrutta round the clock. these are personal hygiene measures to reduce

the susceptibility to diseases and remain fit. ritu charya means the codes of conduct and food regimen as per seasonal variation. in ayurveda there are mainly six ritu (shishira, vasanta, grishma, varsha, sharad and hemanta) and all ritu have their own effect on atmosphere as well as human body. To prevent kala kruta (seasonal) diseases ritu charya should be followed strictly. For example river water should not be used in varsha ritu to prevent water borne infections. Yoga means to control the mind. By following the rules of yoga, psychological diseases can be prevented. Asana (one part of the yoga) prevents the majority of systemic diseases by activation of metabolic and endocrinal functions. [18] Sadavrutta is right conduct in order to lead an ideal social harmonious life as guided by the classics.[19] by following these codes and conducts one can prevent social damage as well as prevent majority of diseases as mentioned bellow. one can even achieve healthy 100 years.[20]

Sadvritta (Cord and Conducts)	Benefits
Beard should be cut 3 time in 15 days	Prevent infections from lice, which are contagious and infect a large number of children annually[21]
Leg should be cleaned thoroughly	Transdermal transmission of larvae in the soil (geo-helminths) actively penetrating the sole skin and migrating through the tissues to the gut.[22]
	Filarial can also be prevented or diagnosed in early stage
	Prevent Cracked heels.
Always wear foot wear	Prevent Corns and callus (hyperkeratosis
Always use umbrella (to prevent UV rays damage to the body)	To prevent heat burn, Photosensitive dermatitis like condition
Always use Danda while going somewhere	To prevent wild/domestic animal bite (rabbis)
Pacify the anger	Prevent psychological disturbance and helps in maintaining the social wellbeing
Help the poor	Helps to minimizing socio economical status gap
Should not tell lie	Prevent depression and psychological ailment
Should not move towards animals having prominent teeth and horns	Prevents from trauma and animal bite
Should abstain from excessive wind	Prevent infective pathogens and even allergic condition like asthma
Should not eat without washing hand, feet and face, with unclean mouth, depressed mind, in improper place, untimely	To Prevent parasitic infestation & indigestion
Should not suppress natural urges like Urine	
Stool	Prevent bladder pain, accumulation calculi.
Sex	Prevent abdominal pain and constipation
Vomits	Prevent phymosis, spermoliths

Flatus Lacrimation (cry)	Prevent aspiration pneumonia Prevent abdominal Pain Prevent dry eye syndrome, headache
Sex should not be done without adequate privacy. Sex should not be perform with undesirable women, impure women and after physical exercise, fatigue, fasting and exhaustion	Prevent voyeurism in society Prevent rape and women sexual assault in society, STD (Sexually Transmitted Diseases), the deterioration of condition
Should not study in unpleasant light	Prevent refractive errors, which is a major cause of blindness in India
Should not submissive of his sense organ	Prevent sense organ diseases
Always cough/sneeze after covering the nose and mouth	Prevent droplet (nasopharyngeal secretions) infection to others
Nose should not be unnecessarily fiddled	Prevent epistaxis
Soon after bath previous cloth should be changed	Prevent fomite born infections[23]
Should not sit on utkatasana (awkward pose)	Prevent arsha (piles)

Table no. IV: Drugless preventive measures in ayurveda

Mode of Action:

Vaccines work by presenting a foreign antigen to the immune system to evoke a specific immune response, but there are several ways to do this. Four main types are currently in clinical use:

1. An inactivated vaccine consist virus or bacteria that are grown in culture and then killed. Although the particles are destroyed and cannot replicate, the virus capsid proteins/bacterial wall are intact enough to be recognized and remembered by the immune system and evoke a response.
2. In an attenuated vaccine, live virus or bacteria with very low virulence are administered. They will replicate, but locally or very slowly. Since they do reproduce and continue to present antigen to the immune system beyond the initial vaccination, boosters may be required less often.[24]
3. Virus-like particle vaccines consist of viral protein(s) derived from the structural proteins of a virus. These proteins can self-assemble into particles that resemble the virus from which they were derived but lack viral nucleic acid, meaning that they are not infectious.
4. A subunit vaccine presents an antigen to the immune system without introducing viral particles, whole or otherwise.

A number of other vaccine strategies are under experimental investigation. These include DNA vaccination and recombinant viral vectors. But these all actions are useful to build a specific immunity against specific pathogens.

Mode of action of rasayana drugs: Majority of rasayana drugs works on multiple areas and helps in achievement of vyadhikshamatwa through its dipana, pachana, medhya, and non specific immune buster properties. Pharmacology of some rasayana drugs has been given in the bellow table.

Rasayana Drugs	Proved Pharmacological Actions
Yashtimadhu (*Glycyrrhiza Glabra*)	Enhance the macrophage membrane function [25]
Guduchi (*Tinospora cordifolia*)	Inhibit the lipid peroxidation and superoxide and hydroxyl radicals in vitro[26]
Amlaki (*Emblica officinalis*)	Strengthen the defense mechanism against free radical damage induced during stress [27]
Haritaki (*Terminalia Chebula*)	In immune-modulation studies, humoral immunity was enhanced where T-cell counts remained unaffected in the animals, but cell-mediated immune response was stimulated.[28]

Table No. V: Pharmacological action of some rasayan drugs

Concept of Non Specific Immunity: The non-specific immune system also known as innate immune system, and first line of defense, comprises the cells and mechanisms that defend the host from infection by organisms in a non-specific manner. This means that the cells of the innate system recognize and respond to pathogens in a generic way. Innate immune systems provide immediate defense against infection, and are found in all classes of plant and animal life. Ayurvedic drugs enhance the power of non specific immune system through above mentioned probable mode of action, whereas vaccines provide immunity for respective pathogens only.

Problems in Vaccination:

Unavailability of Vaccines for Villages of India: It is very difficult to maintain a "cold chain" for majority of vaccines. Availability and storage of various vaccines are very difficult in peripheral part of villages in India. Though national programs and repeated effort of government, many preventable diseases are yet not eradicated from our country. Few difficulties in maintenance of vaccines are described here.

Vaccine	Minimum dose in 1 ampule	Temperature required for storage	Time for use
BCG	20	2-4 ^{0} C	3 hours after reconstitution
DPT	20	4-8 ^{0} C	7 days
Measles	20	2-8 ^{0} C	Within 1 hour of dissolving
Typhoid	-	2-4 ^{0} C	Up to 18 month

Table No. VI: Difficulty in maintenance of vaccine

As mentioned in table no. 6, many vaccines come in multi dose vial, and once it reconstructed, it cannot be used for longer time period. Many small clinical set up don't have enough number of children to use one vial in a given time. So either they avoid putting vaccine or they are wasting many doses from that particular vial. Ultimately patients have to go back home without having vaccination on scheduled time, or they have to pay more for that vaccine.

Complications: Vaccine Adverse Event Reporting System (VAERS) is for reporting reactions. The National Vaccine Injury Compensation Program (VICP) is a federal program that was created to compensate people who may have been injured by certain vaccines. A report found that 1 in 300 DPT immunizations resulted in seizures.[29] The FDA's VAERS receives about 11,000 reports of serious adverse reactions to vaccination annually, some 1%

(112+) of which are deaths from vaccine reactions.[30]

In a research work on small pox vaccine, 99.7% of volunteers reported at least 1 local symptom at the vaccination site and 61.8% had axillary lymphadenopathy, 15.0% developed satellite lesions, and 7.6% developed a rash away from the vaccination site. Fever developed in 21.5%.[31]

Name of Vaccine	Complications
BCG	**Local**: Abscess, Indolent ulcer, keloid, Lupus vulgaris, tuberculoides **Focal**: Enlargement of draining lymph nodes **General**: Fever, Mediastinal lymphadenitis, Otitis media, Osteomyelitis
DPT	Encephalitis, Prolonged convulsion, Infantile spasm
MMR	Arthralgia, parotitis
Measles	**Major**: Encephalitis, SSPE, Convulsion, Death **Minor**: Fever, Rash, Diarrhea, Catarrh
Typhoid	**Local**: erythema, induration, pain **Constitutional**: Fever, malaise, Headache
OPV	Vaccine induced polio, due to mutation and neovirulence in vaccine viruses
Chickenpox (Varicella)	**Mild problems:** Soreness or swelling where the shot was given, Fever, Mild rash. It is possible for these people to infect other members of their household. **Moderate problems:** Seizure (jerking or staring) caused by fever. **Severe problems:** Pneumonia.

Table No. VII: Common complications of vaccine[32]

Success Rate: In a research work on smallpox vaccine, total 340 volunteers were vaccinated and 99.4% of successful vaccination was found in ideal setup.[33] This kind of vaccination success rate is available but actual prevention from that particular diseases are lesser than this, which indicates the failure to remain prevented from disease in large number in community.

Limitations: It must be done appropriately with plenty of technical limitation; few of them are listed below,

- Women should not get pregnant for 1 month after getting chickenpox vaccine.[34]
- People should not get chickenpox vaccine if they have ever had a life-threatening allergic reaction to a previous dose of chickenpox vaccine or to gelatin or the antibiotic neomycin.
- Vaccine overload (giving many vaccines at once) may overwhelm or weaken a child's immature immune system and lead to adverse effects.[35]

Controversy: Pertusis Vaccine Controversy: England actually saw a drop in pertusis deaths when vaccination rates dropped from 80% to 30% in the mid 70's. Swedish epidemiologist B. Trollfors' study of pertusis vaccine efficacy and toxicity around the world found that "pertusis-associated mortality is currently very low in industrialized countries and no difference can be discerned when countries with high, low and zero immunization rates were compared."[36]

SIDS (Sudden Infant Death Syndrome) Controversy: There are studies that claimed to find SIDS-vaccine relationship. In the mid 70's Japan raised their vaccination age from 2 months to 2 years; their incidence of SIDS dropped

dramatically.[37] Though these researches are later proved to be biased and their results are proved to be unauthentic. **Measles Vaccine:** A recent study found that measles vaccination "produces immune suppression which contributes to an increased susceptibility to other infections." **Thiomersal controversy:** In 1999, the Centers for Disease Control (CDC) and the American Academy of Pediatrics (AAP) asked vaccine makers to remove the organomercury compound thiomersal from vaccines as quickly as possible, and thiomersal has been phased out of US and European vaccines, except for some preparations of influenza vaccine.[38]

Conclusion:

Widespread immunity due to vaccination is largely responsible for the worldwide eradication of smallpox and the restriction of diseases such as polio, measles, and tetanus from much of the world. This truth can't be ignored, but at the same time if we are looking to our income per capita, adverse events due to vaccination, actual rate of success, controversies, difficulty to have regular vaccination in peripheral part of Indian village etc, we could definitely say that vaccine could be used as an additional but not as a compulsory measure. Rather we can use better measures to get prevention against almost all kind of diseases, and that may be the corrective steps of life style (achara rasayana) and regimen (rasayana aushadha) which has been mentioned in Ayurveda. The present paper reviews various types and mode of action of rasayanas to support the above concept, its role as a prophylactic medication and significance in the prevention of diseases in both healthy as well as diseased individuals. The emerging data suggest that the possible mechanisms of rasayana drugs may be immune-stimulation, quenching free radicals, enhancing cellular detoxification mechanisms; repair damaged non-proliferating cells, inducing cell proliferation and self-renewal of damaged proliferating tissues, and replenishing them by eliminating damaged or mutated cells with fresh cells.[39] So we can conclude that vaccines are totally superfluous and rasayana drugs should be used as a compulsory measure.

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