

Discussion

The present study was undertaken with the aim to fulfill the need of the health sector, and to meet up the remaining gap in the primary health care. India has got its rich heritage of primary care and at every steps the advantages of those provisions may be explored with scientific evidences which will suit best for Indian population (Health Policy, 1981). As we start the new millennium the disease Rajyakshma of Ayurveda, nomenclatured as Pulmonary tuberculosis (PTB) appear as great threat to the medical community and for rationalization in therapeutics Ayurveda should not remain silent. The disease Rajyakshma is increasing and appearing as the second highest killer in the developed countries (WHO...)and Indian scenario is also gloomy. Available therapeutic management schedule improved the state of affairs in comparison to 1940s but the increasing trend of multi-drug resistance patient recorded due to poor awareness and incomplete treatment. At this juncture, incorporation of Ayurvedic regimen may be hope finding solution require appreciation with scientific reasoning. Rasayan chikitsa of Ayurveda existed since Vedic literature later on, included in Ayurveda as a speciality with broad base. In Rasayan therapy, the drugs used have specific site of action working in the posaka rasa level (nutrient supplement), Agni level (enzymatic activity) and srotas level (nurishment of tissue system). There are good number of rasayan drugs had shown immuno

modulatory activity to boost up functional immune material (oja) responsible for defence mechanism. It was thought worthwhile to incorporate rasayan drugs as adjunct to standard anti-tubercular drug therapy in the present programme.

As such, provisions existing in Ayurveda required to be evaluated in the modern concept strategies. This is required to make Ayurveda more logical and acceptable to the World Community. The following objectives were set to fulfill the laid down aims as add on therapy on the therapeutic management of PTB.

1. Supplementation of defined rasayan drugs in the treatment module of PTB with evidence.
2. Hope finding solution, to look into the toxic component of the ATD.
3. Role of adjunct rasayan drugs on the improvement of quality of life with possible mechanism at the immunity level.

It was a new venture and unique of its kind in the therapeutic management of Rajyakshma the PTB. The study design and the protocol devised at the beginning required moderation as study progressed. It was started with 36 patients termed as Phase I. The patients were divided into three group ATD, ATD + Aswagandha and ATD + Silajit as both the drugs showed immunomodulatory activity on experimental set-up (Katiyar). This preliminary study may be considered as initial exploratory observational clinical pharmacology. Rasayan drugs were used for initial phase of ATD with 4 weeks duration. After the completion of add on therapy as adjunct to the ATD regimen ATD was continued according to WHO norms. The observation made on the basis of 4 week treatment with repeated IgM, IgA, serum isoniazide and sputum smear test was encouraging. There was definite improvement by reduction in ESR level. ATD 18.63% while Aswagandha and Silajit 69.9% and 64.55% reduction respectively. IgM increased and IgA decreased reasonably. In ATD group out of 12 patient 2 patient observed with sputum possibility (56%). Serum isonized was studied 2h after drug but the results were not uniform. Usually, the sputum smear test are not done frequently. In the WHO clinical Manual monitoring of PTB patients with sputum positive clearly mentioned that sputum examination at of diagnosis and to monitor it at the end of initial phase i.e. after 8 weeks of AT drug therapy. In this series rasayan drugs were continued upto 4 weeks of initial phase and 16.5% patients with sputum positive after ATD while on add on therapy with ATD all the patients were sputum negation. This was unexpected to us. With this initial study we could draw

any conclusion as serum isoniazid level 0 day 2h after 1st dose and on day 29 again 2h sample was drawn and estimated results were inconclusive.

It was decided to repeat the study with small number and serum isoniazid study designing had to refrain.

In Phase II in total 20 patients were divided into 4 groups with addition of another group with Chaywanprash a time tested age old rasayan drug under use in continuity and is very popular in India. The market availability of this drug is uniform, even in remote area. In this series all the parameters were the same but serum isoniazid study was planned to draw the blood on 0 day – 1h, 2h and 4h after isoniazid and on 29th day 0'h, 1h, 2h, 4h After drug administration. It was observed that isoniazid a well known bactericidal drug maintaining constant blood concentration projected on 0'h level after 28 days of treatment. It is interesting to note that 29' day 4h level of isonizid 18.7% higher than the 0' day 4h level projecting increased bio-availability after Aswagandha. Other two drugs Silajit and Chaywanprash did not showed any appreciable change. The sputum smear positivity was confirmed i.e. 40% patients showed sputum positively in ATD group. This study tempted us after reviewing the results need for moderation of the study design envisaged. In depth bacterial load study proposed to be undertake along with serum pyrazinamide estimation on 40 patients comprising 4 group 10 patients each.

In Phase III study sequentially bacterial load was studied starting from day 10 to day 29. Bacterial concentration were also determined to know the exact day when the negativity of sputum starts. While selecting the patients great care was taken to maintain age, sex and religion matched with phase I and phase II study for uniformity. All the patients were with poor economic status representing from Sundarban area considered remotest location of West Bengal. Which is known as Aanupadesh according to Ayurveda.

Estimation of Serum pyrazinamide before and after treatment was included keeping time interval same as with isoniazid. In this series new PTB patients were randomly divided in to ATD, ATD + Aswagandha, ATD + Silajit and ATD + Chaywanprash groups. The treatment response on the symptoms of PTB was also recorded on day 0, day 15 and day 29. The rasayan drug therapy stopped after 28 days but AT drugs were continued according to WHO norms. In this series of 40 patients bacterial load study opened new facts of many unsolved question. Serum pyrazinamide level study did not showed any

appreciable change. But on 29th day 0'h level that is basal level of pyrazinamide was available more in comparison to only ATD group. The rasayan were made available by courtesy of Dabur Research Foundation New Delhi as defined sample.

In this series also 50% of the ATD patients showed sputum positive on day 29.

On evaluation of the results the members of the Research Committee encouraged to include some patients to study with locally available West Bengal grown Aswagandha and in house preparation of Silajit and Chaywanprash.

Phase IV was the repetition of the phase III study laying emphasis on treatment response on symptomatology and bacterial load study. The results showed similar pattern but incidence of sputum positivity was 60% in ATD group.

Excerpts of the four phases of clinical study reveals that rasayan drugs Aswagandha Silajit and Chayanprash could produce effect on the shifting of bacterial load from positive to negativity to all the patients while out of 37 patients bacterial load present on 13 patients over all 35.13%. This studies indicated that Ayurvedic rasayan drugs is helpful in the treatment of PTB.

In this study 136 patients were registered in four phases. In first phase being one patient died he was registered in debilitating condition. The exact cause of death could not be ascertained as most of the patients were included from rural Bengal. The postmortem facility was not available. Moreover all the patients we treated at the out patient department.

Demographic study reveals that patients were in between 11 year and 65 years. Out of them 51% represented in the vulnerable age group between 21 – 40 years. While between 10 to 20 years nearly 17% (23 patient). In the series more than 60 years aged patient comprised 506% (8 patients). 57.3% patients (78) were from muslim community and rest 42.7% (58) from Hindu Community.

In this study total male patients were 63% (86) and 37% (50) were females. In total male female patient ratio as 63:37. When the distributions are projected on community basis in Muslim the ration is 67:33 while in Hindu Community male female ration 56:44. In Hindu Community females are suffering more while in Muslim Community males are

more vulnerable. According to Ayurveda Sukra-dhatu Kshya leading to Oja kshya is responsible for the development of this disease and in the mythological origin of Rajyakshma oja kshya due to indulgence of sex was also related. In the rural muslim ethnic group polygamy marriage system prevailing and sukra kshya and oja kshya could be intricately. In the age group 11 to 40 there are 55 patients (40%) out of them 14 are (25%) are Hindu and 75% are Muslim the reason may be obvious but could not be substantiated with evidence.

In the National Health Policy 1981 ammended time to time role of ISM&H drug specially Ayurveda were laid emphasis on the primary healthcare. With this in view preventive aspect was given importance as a well developed speciality and the provisions were made with in specific category. Primary care, secondary and tertiary care. In the domain of Primary care, preventive aspect of the commen diseases were enlisted. In secondary care those patients suffering from chronic disease where medical treatment is not sufficient or not agreeable with the cost effectiveness and Tertiary care where medical treatment is equivocal. In accordance with the National Health Policy Our study are where i.e. tuberculosis treatment through Ayurvedic medicine are considered and as adjuvant to standard treatment.

Inspite of knowledge base on Ayurveda existed since long but require moderation and updating of knowledge is essential with clinical evidence. At parlanche with medical treatment Ayurvedic rasayan drugs are proclaimed to be used for the prevention of disease in one hand and treatment of diseases on the other. The mechanism of action of rasayan drugs are known to be mediated through the enhancement of Bala which is regarded as the expression of oja. The parameters were chosen to validate the parameters of Vyadhikshmatada i.e. immunity are Immunoglobulin-estimations.

In our studies hematological parameters like WBC count were stabilized. Due to acute infection neutrophilia was observed concomitantly lymphapenea erosinophila was evident. Haemoglobin level increased after one month of treatment reasonably. On the contrary the sign of degenerative change erythrosite sedimentation rate found to be raised significantly decreased. ESR is thought to be an prognostic index in chronic infection rather than diagnostic. Erythrocyte cells contain haemoglobin and cell walls are made up of lipid materials it has got affinity to adhere toxins and tissue debris. Raised ESR estimation reflects when the weight of cell increased after adherence of tissue dabrises then

it settle down quickly, estimated as ESR. When ESR is going down it may be presumed that toxins as protein containing tissue debris are less attached and reduce the weight of the erythrocyte cells give rise to rate of erythrocyte sedimentation is reduced. In Ayurveda parlance Dosha affecting the dushya i.e. tissue system dhatus resulting production of dhatumala this dhatumala circulate in the blood and raktadhatu being the important for poshana karma in disease condition raktadhatu is also affected being one of the dushya. In Rajyakshma Dosha (vata, pitta, kapha) is involved mainly vata and kapha balance is lost naturally dhatu kshya is apparent. During the process of kshya pitta contain the position of agni affect the agni of the cell.

In Rajyakshma, mainly vata and kapha balance is lost naturally dhatu kshya is apparent. During the process of kshya pitta being contain the composition of agni affect the agni of cell. The cell functioning affected by agni hamper the enzymatic activity.

When agni (enzymatic activity) of the cell is improved by the treatment with rasayan drugs the adherence of toxins at the cell wall will not be possible. In earlier studies by Dhanukar *et al* (1988) had clearly shown that immunomodulatory activity of rasayan could protect the subject from infection. In experimental model neutropenia induced by cyclophosphamide and challenged with *S. aureus*, hemispectanetomized mice challenged with *E. coli* and immunosuppressions where *T. cordifolia* found to protect or inhibit the *E. coli* sepsis. Thatte and Dahnukar (1998) had indicated that Ayurveda Rasayans are immunostimulant in nature. They further indicated that Ayurvedic rasayan drugs with Madura Vipaka had definite immunomodulatory activity. They tried to establish the rasayan activity intricated different experimental model for the answer of the following question to meet up the definition. The definition of rasayanas included three main aspect delaying aging, strengthening tissues to withstand stress both endogenous and exogenous and given freedom from disease. Rasayan were effective only if it is used as prophylatic and not if they were used after the injury or stress.

In the cascade of immune functioning in disease condition decreased number of CD₄ helper cells variable altered number of CD₈ suppressor cells and CD₄ : CD₈ ratio altered. The functional abnormality of T lymphocyte is detected by the assessment of decreased cytotoxic lymphocyte function. Decreased ability to provide help to the β lymphocyte for immunoglobulin production. Diminished lymphokines production. The functional abnormality of β lymphocyte. Elevated β immunoglobulin production specially

IgA and decrease IgM along with circulating complexes. Functional abnormality of monocyte and macrophages leading to serological abnormalities. At clinical parlance TH 1 is conceived to the functioning of cellular immunity through cytotoxic T lymphocyte while humoral immunity is the responsiveness of TH 2 through immunoglobulins.

The use of Ayurvedic rasayan drugs Aswagandha, Silajit and Chawyanprash is substantiated by the facts that they boost up immune system in the present study. In the present series our direction of approach was to find out whether add on therapy with AT Drugs has got any beneficial effect or not. Tuberculosis being a chronic infections and a disease with nutrition gap and stress both endogenous and exogenous is intricated (Debnath *et.al* 2006(1), (b)). In stressful situation both in body and mind is involved (mano-daihikvikara) and mostly psycho-somatic in origin. In our series of patients we did not probe in this direction. But it is well known that immune system to be translated to the myriad actions on CNS and other organs an elaborate systems of cytokine had to be activated.

The present study is the modest approach to fulfill the aims through evaluation on 136 patient. But all the objectivity could not be fulfilled to meet the validation approach towards evidences as we started the programme with hope finding solution backed by ancient literature starting from Vedic information. One study was conducted on the body composition through Bio-Electrical Impedence (BIA) study to find out any correlation with the descriptions in Veda. One point could be substantiated by the fact that the term 'Balasa' is used as synonyms of Rajayakshma means to sprinkle water. We presumed that there may be some deficiency in the total body water (TBW) so that 'Balasa' term is used as most of the Pulmonary tuberculosis patients are debilitated conditions report to the hospital for treatment after long suffering due to lack of awareness. The BIA study clearly indicate that out of 50 chronic PTB patients suffering more than 2 years admitted at the Patipukur TB Hospital due to relaps or after resistance development on improper treatment or discontinuation. In those patients out of 50 patients 35(70%) were male and 15 (30%) were females. Which comfortably match with out demography. To our surprise we detected normal TBW in only one male patient and two female patients those are highly significant. We could not repeat study on recovery and weight gain after treatment due to constrains. This point direct to ward the validation of Vedic informations.

The immune profile study with IgA and IgM was prognostic rather than to establish the immune status and their change after treatment. The immunoglobulin study project to humoral immune status. Lymphokines cytokines and cellular immunity study in depth may only pin point the intricacies of immune functional status.

In fine, it is stated that present study is unique of its kind because most of the studies on the immuno-modulatory rasayans are limited to experimental evidences. Moreover, those clinical studies are conducted mainly on the adaptogenic study. There are paucity of literature in this direction. The present study opines some directional approach towards planning for reevaluation of Ayurvedic concept strategies with the following evidences on the use of Ayurvedic rasayan drugs as adjunct to ATD with Add on therapy.

- (1) There are definite increase in body weight, Hb% and IgM and decrease ESR and IgA.
- (2) Bacterial load shift is earlier than only ATD
- (3) TBW is decreased in PTB patients
- (4) Toxic component of ATD could be protected.
- (5) Indication of increased bio-availability of ATD specially isoniazid and pyrazinamide.

Further to state that Ayurvedic Rasayans are immuno-stimulant in nature. Improved the quality of life. This early work gives us a glimmer of hope that we will one day be able to prove conclusively the intricacies of rasayan therapy in the cascade of events set into motion when rasayan plants will find place in the mainstream of therapy either to prevent toxicity or on the prophylactic measure to prevent adverse effect to maintain quality of life. The descriptions of Ayurvedic ancient saga as knowledge base will be revamped with modern concept strategies through research.

Existing concept of Ayurveda is survived through out the countries and still very much alive in India even today. The rich heritage of Ayurveda be rationalized and revamped for the use of the suffering millions over the world. The Ayurveda health care concept emphasized "*Aasatya indriyatha somyoga pronaparada*" responsiveness to the sense organs leading to stress as a starting point of disease intricating body-mind involved immune function. Dosha-Dushya Sammurchhana principle may be the substantiations of adoring. In recent years several plants known as rasayana have been investigated for

immunomodulatory activity links with the preventive and curative aspect. Another viable concept of Ayurveda, the '*Ama*' is the cause of pathogenesis of many disease development due to improper functioning of digestion and metabolism. '*Ama*' are immunologically active complexes generated in the intestine. Drugs that can influence '*Ama*' in two ways (a) those which increase digestive capacity and prevent formation of '*Ama*' and (b) those which digest '*Ama*' most of them are rasayan plants. In our study overall improvement in the quality of life might acting through both the ways to deter the pathogenesis. Ayurvedic principles are very much vibrant and demands exploration on the modern concept strategies.

The fundamentals of Ayurveda involve multiple dimensions of health care, suitable for Indian. Disease oriented research directions redesigning with indigenous technology devices will be appropriate. System development for research on Ayurvedic principles despite transforming methodologies is the need of the day. Herbal drugs of Indian origin is grooming exponentially.

Adhere with empowered research, nurture innovative ideas utilizing Core competence will be a long term gain as hope finding solutions.

Results

Phase – I (Total Patient 36)

Table 5.1.1 Demographic data

Age in years	Male	Female	Total
10 – 20	3	1	4
21 – 30	5	3	8
31 – 40	10	3	13
41 – 50	6	1	7
51 – 60	1	1	2
>60	1	1	2
	26	10	36

Table 5.1.2

General Blood Examination with percentage increase +
Decrease –

Table 5.1.4

Sputum Positivist after Treatment

	0'day	30'day
ATD	12	2
ATD + Aswagandha	12	0
ATD + Silajit	12	0

Table 5.1.5. Body weight change

	0'day	30'day	% change
ATD	43.20 ± 3.16	45.18 ± 2.93	4.6 ± 1.13
ATD + Aswagandha	41.31 ± 3.41	45.09 ± 3.42	9.2 ± 2.03
ATD + Silajit	39.9 ± 2.18	43.33 ± 13.14	8.6 ± 1.89

Table 5.1.3 Immunoglobulin

	IgA			IgM		
	0'day	29'day	% change	0'day	29'day	%change
ATD	110.65 ±7.63	109.85 ±8.92	-7.5 ±3.12	162.17 ±12.41	182.00 ±13.82	+8.4 ±2.31
ATD + Aswagandha	111.30 ±9.32	80.36 ±6.82	22.81 ±3.82	220.47 ±19.32	357.18 ±18.52	62.01 ±8.21
ATD + Silajit	111.17 ±8.61	70.25 ±7.21	-36.81 ±3.42	246.68 ±17.78	384.66 ±16.32	+55.9 ±9.32

Phase – II (Total No. of Patient 20)**Table 5.2.1 Demographic data**

Age in years	Male	Female	Total
10-20	1	2	5
21-30	4	2	6
31-40	5	1	6
41-50	2	-	2
51-60	1	1	2
>60	1	-	1
	14	6	20

Phase – III**Table 5.3.1 Total Number of patient 40**

Age in years	Male	Female	Total
10-20	5	2	7
21-30	4	5	9
31-40	8	3	11
41-50	4	2	6
51-60	3	1	4
>60	2	1	3
	26	14	40

Phase – IV**Table 5.4.1 Total Number of Patient**

Age in years	Male	Female	Total
10-20	3	2	7
21-30	5	5	9
31-40	5	3	11
41-50	3	2	6
51-60	3	1	4
>60	1	1	3
	20	20	40

Computed data

Table 1

Age in years	Male	Female	Total
10-20	12	11	23
21-30	18	13	31
31-40	28	11	39
41-50	15	8	23
51-60	8	4	12
>60	5	3	8
	86	50	136