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A STUDY FOR PROGNOSTIC EVALUATION OF RAJAYAKSHMA W.S.R TO BALA & MAMSA KSHAYA

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ABSTRACT

In *Ayurveda* several numbers of diseases are described under which infectious or communicable diseases both are covered very well, *Rajayakshma* is one of them which is considered *Aupsargika Vyadhi* (communicable disease). On the basis of symptomatology, *Rajayakshma* can be correlated with Pulmonary tuberculosis in modern science. The prevalence of Pulmonary Tuberculosis is still alarming in most developing countries like India. India accounts for about 24% of the global prevalence As *Acharya Charaka* stated that when diseases like *Vatavyadhi, Apasmara, Kushtha, Shopha, Udara, Gulma, Madhumeha*, and *Rajayakshma* are associated with loss of strength and muscle wasting then such diseases become *Asadhya* in nature & it should be avoided by the physician. Even in the presence of all the symptoms if *Bala* is good then the disease is Curable by treatment but if *Bala* is not good then the disease is difficult to cure because the patients who are having good strength can withstand the severity of medicine. So, the research work has been designed to evaluate the prognosis of Rajayakshma about the *Bala Kshaya* and *Mamsa Kshaya* to validate the concept of *Ayurveda* in terms of the prognosis of the disease. For this study, 60 diagnosed patients with pulmonary tuberculosis were registered. *The Bala* and *Mamsa* assessment was done, and we found that *Bala* and *Mamsa* have a significant correlation with the prognosis of *Rajayakshma*. A good prognosis was observed in patients with gradual improvement in *Bala* and *Mamsa* while prognosis was poor in those individuals who have the condition of *Bala Kshaya* & *Mamsa Kshaya*.

Keywords: *Aupsargika Vyadhi, Dhatukshaya, Bala Kshaya, Mamsa Kshaya*

INTRODUCTION

Ayurveda is an ancient evidenced based life science. *Ayurveda* aims to preserve the health of healthy people as well as cure disease. Health is the state of dynamic equilibrium of *dosha- dhatu- mala* and any disturbance in the equilibrium of all those results in *Vyadhi* (disease). Diseases are destroyers of health, well-being, and life. In *Ayurveda* several numbers of diseases are described under which infectious or communicable diseases both are covered very well, *Rajayakshma* is one of them which is considered *Aupsargika Vyadhi*[1] (communicable disease). As *Acharya Charaka* stated that when diseases like *Vatavyadhi, Apasmara, Kushtha, Shopha, Udara, Gulma, Madhumeha,* and *Rajayakshma* are associated with loss of strength and muscle wasting then such diseases become *Asadhya* in nature & it should be avoided by the physician.[2] He also mentioned the etiology of *Kshaya*[3] i.e., excessive physical activities, fasting, anxiety, excessive thinking, intake of dry food, food in small amounts or habitual intake of food having one taste only, exposure to the wind and sun, fear, grief, intake of dry drinks, night vigil, excessive elimination of phlegm, blood, semen and other excreta, old Page and period of *Adana Kala* & *Bhuta* (microbes). The reduction of *Vyadhikshamatva* (immunity) makes the person more susceptible to producing diseases. Due to extreme *Dhatukshaya* the physical and mental strength of the person reduces but if the person has well-formed *Ojas* then he will not fall prey to diseases like *Rajayakshma* easily and will also help in better recovery from the diseases. Even in the presence of all the symptoms if *Bala* is good then the disease is Curable by treatment but if *Bala* is not good then the disease is difficult to cure because the patients who are having good strength can withstand the severity of medicine. On the basis of symptomatology, *Rajayakshma* can be correlated with Pulmonary tuberculosis in modern science. It is a chronic pulmonary and systemic disease caused by *Mycobacterium tuberculosis* which is the leading cause of morbidity & mortality worldwide despite many preventive and curative measures. It is a major public health problem in developing countries including India due to population explosion, under nutrition, poor quality of life & lack of awareness about the cause of disease. As to WHO, in 2018, a total of 1.5 million people died from Tuberculosis and an estimated 10 million people fell ill worldwide. The prevalence of Pulmonary Tuberculosis is still alarming in most developing countries like India. India accounts for about 24% of the global prevalence[4].

AIM AND OBJECTIVE:

- To study the etiopathogenesis of *Rajayakshma*.
- To evaluate the prognosis of *Rajayakshma* in reference to *Bala* and *Mamsa Kshaya*.

MATERIALS AND METHODS:

After the approval of IEC ref., no UAU/RC/IEC/2021/1-53 dated 02.07.2021, a total of 56 patients of *Rajayakshma* (Pulmonary tuberculosis) of either sex with age group 16-70 years were selected from OPDs of Rishikul Campus Haridwar and Govt. TB clinic Haridwar. All the registered cases were evaluated clinically and investigated thoroughly. A special proforma was prepared which includes the details of history taking, physical signs, and symptoms as mentioned in our classics.

I. INCLUSION CRITERIA-

- Patients between the age group of 16-70 years of both sexes.
- Patients having classical symptoms of *Rajayakshma*.
- Newly diagnosed cases of Pulmonary Tuberculosis confirmed through investigations (sputum examination for AFB, Chest X-ray, etc)

II. EXCLUSION CRITERIA-

- Patients of age groups less than 16 years and more than 70 years.
- Patients with Diabetes, Bronchial asthma, Chronic Bronchitis, Bronchiectasis, etc.
- Patients with Tuberculosis are associated with chronic diseases like HIV, Malignancies.

III. INVESTIGATION-

- Sputum examination for Acid Fast Bacilli
- Chest X-ray (PA view)
- Random blood sugar
- CBC, ESR

IV. CRITERIA FOR ASSESSMENT

The assessment has been done on the basis of subjective and objective criteria.

SUBJECTIVE CRITERIA: - The subjective assessment was done on the basis of- Improvement in *Samanya Lakshana* of *Rajayakshma* described in classical texts. The assessment of *Nidana* was done on the basis of a questionnaire as follows:

SAHASA

1. Does your work involve vigorous intense activity like carrying heavy weight, digging, walking continuously, etc?– Yes / No
2. Do you have to do these kinds of work regularly? – Yes / No
3. Does your work involve continuously speaking which causes a feeling of tiredness? – Yes / No
4. Do you have to work continuously even though you are tired? – Yes / No
5. Do you get involved in any kind of vigorous physical sports regularly? – Yes / No
6. Do you feel deprived of sufficient sleep? – Yes / No

VEGASANDHARANA

1. Frequency of suppressing urges to micturate? – Yes / No

(Skip subsequent question of 1 if never)

a. Difficulty in passing urine?
b. Pain around the urinary bladder & genital area?

2. What frequency of suppressing urges of defecation? – Yes / No

(Skip subsequent question of 2 if never)

a. Difficulty in passing bowel?
b. Persistent/ repeated episodes of pain in the abdomen?
c. Persistent/ repeated bloating of the abdomen?
d. Persistent/ repeated episodes of headache?

3. Frequency of suppressing urges to pass flatus? – Yes / No

(Skip subsequent question of 3 if never)

a. Difficulty in passing flatus?
b. Persistent/ repeated bloating of the abdomen?
c. Persistent/ repeated episodes of pain in the abdomen?
d. Feeling of lassitude?

KSHAYA

1. Are you often worried? – Yes / No
2. Are you often unhappy, or disappointed? – Yes / No
3. Are you easily scared? – Yes / No
4. Do you feel nervous in new situations? – Yes / No
5. Do you have any fears? – Yes / No
6. Do you often get short-tempered? – Yes / No
7. Do you skip your food? – Yes / No
8. Do you have food up to your desire? – Yes / No
9. Do you have a frequency of sexual intercourse? – Yes / No
10. Have you been involved in premarital sexual intercourse? – Yes / No
11. How often do you masturbate? – Yes / No
12. Do all your sexual intercourse ends up with ejaculation? – Yes / No

VISHAMASANA

1. Do you consume food in the stipulated time? – Yes / No
2. Do you skip your food frequently? – Yes / No
3. Do you have a habit of having less quantity of food frequently? – Yes / No
4. Do you have a habit of having a greater quantity of food frequently? – Yes / No
5. Does the food which you take cause heaviness frequently? – Yes / No
6. Do you have a habit of knowing non-compatible food? – Yes / No
7. Do you consume food after the digestion of the previous meal frequently? – Yes / No

OBJECTIVE CRITERIA: - The objective assessment of *Mamsa* was based on the following criteria:

- **Weight**- The weight of the individual was recorded by using a portable digital weighing machine.
- **BMI**= BMI will be calculated by using the formula i.e., BMI = weight (kg) / height (m^2)

TABLE NO. 2

<24.5 - >18.5	Normal	0
<18.4 - >17.0	Mild wasting	1
<16.9 - >16.0	Moderate wasting	2
<16.0	Severe wasting	3

Mid-upper arm circumference- The MUAC will be taken at the point midway between the acromion and the radiale of the upper-arm using a plastic coated non-stretchable measuring tape on the left side.

TABLE NO. 3

>22 cm	Normal	0
<22cm - >12.5 cm	Mild wasting	1
<12.4 cm- >11.5 cm	Moderate wasting	2
<11.5 cm	Severe wasting	3

- **Skinfold thickness-** The Skinfold thickness will be measured using a skinfold Calliper.

TABLE NO. 4

>20mm	Normal	0
17mm-20mm	Mild	1
13mm-16mm	Moderate wasting	2
9mm-12mm	Severe wasting	3

Assessment of *Bala*: The objective assessment of *Bala* was based on the following criteria:

- **Hand grip strength-** Grip strength is a measure of muscular strength or the maximum force/tension generated by one's forearm muscles and it will be measured by using a Sphygmomanometer.

TABLE NO. 5

Hand grip strength	Observation	Grade
≤ 150mmHg	Poor	0
151-200mmHg	Mild	1
201-249mmHg	Moderate	2
≥ 250 mmHg	Good	3

- **Walking time-** walking test will be used to assess the physical capacity of the individual which is recorded by counting the walking steps in one minute.

TABLE NO. 6

Walking time (steps/min)	Observation	Grade
≤ 70 Step	Poor	0
71-90 Step	Mild	1
91-100	Moderate	2
≥101	Good	3

- **Exercise endurance-** Endurance refers to the body's physical capability to sustain an exercise for an extended period.

TABLE NO. 7

Skipping rope	Observation	Grade
Unable	Poor	0
<69 - >40	Mild	1
<99 - >70	Moderate	2
>100 jump	Good	3

OBSERVATION & RESULTS:

Wilcoxon signed-rank test method was used to check the significance of subjective criteria and objective criteria.

- *Nidana*-wise, out of the 60 patients, 3% *were Sahasa*, 2% were *kshaya* & 7% of patients were found to have *Vishamasana* as a single *Nidana*. 10% of patients were found to have *Sahasa-Kshaya* in combination. 20% of patients were having *Sahasa-kshaya-Vishamasana*, 15% of patients were having *Sahasa -Vegasandharana-Kshaya* & 18% were having *Vegasandharana-kshaya-vishamasana.* Whereas 25% of the patients have all four *Nidana* of *Rajayakshma*.
- BMI-wise, the data shows that maximum patients i.e., 46% had BMI in the range of 17.0-18.5, 36% of patients had BMI in the range of 16.1-16.9 while 9% of patients had a BMI <16.0, and 9% of patients had BMI in the range of 18.6-24.5.
- Mid-arm circumference-wise maximum patients i.e., 55% had Mid arm circumference in the range of 15-18cm, 25% had 19-22cm while 15% had mid-arm circumference in the range of 23-26cm and 5% of patients had in the range of 10-14cm.
- Skinfold thickness-wise maximum patients i.e., 54% had skinfold thickness in the range of 13-16mm, 25% of patients had skinfold thickness in the range of 9-12mm while 21% had skinfold thickness in the range of 17-20mm.
- Handgrip strength-wise maximum patients, i.e., 57% had handgrip strength in the range of 151-200mmHg, <150mmHg found in 27% of patients while 16% had handgrip strength in the range of 201-250mmHg.
- Walking time wise maximum patients i.e., 43% had walking time in the range of 31-50 steps in 1 min, 32% of patients had in the range of 51-70 steps in 1min, 14% of patients had in the range of 71-100 steps and 11% of patients had <30 steps in 1min.
- Exercise endurance (skipping rope) wise maximum patients i.e., 48% had in the range of 31-50 jumps in 1min, 36% of patients had in the range of 51-70 jumps in 1min while 16% of patients had <30 jumps in 1min.
- The percentage increase in weight i.e., 1.31% which was statistically significant (p=0.003). The percentage increase in BMI i.e., 1.12 % which was statistically significant (p=0.023). The percentage increase in Mid Upper Arm Circumference i.e., 2.28% which was statistically significant (p=0.031). The percentage increase in Skinfold thickness i.e., 6.60 % which was statistically significant (p=0.002).
- The percentage increase in Handgrip strength i.e., 19% which was statistically significant (p=0.007). The percentage increase in walking time i.e., 34.2% which was statistically significant (p=0.008). The percentage increase in exercise endurance i.e., 42.8% which was statistically significant (p=0.031). The percentage increase in foot pressure i.e., 21.9% which was statistically not significant (p=0.185).

DISCUSSION

In this study, it was observed that most of the patients i.e., 52% belonged to 36-55 years of age. The probable cause for prevalence might be that, in this age group people work with many efforts such as labour-

ers. Also, individuals are addicted to smoking, alcohol, drugs, etc which diminished their immunity. Also, a maximum number of patients i.e., 67% were males. The probable reason might be due to their living styles as males could be positioned in social networks such that they contact more people or social groups. The etiology of *Rajayakshma* is segregated into *Sahasa, Sandharana, Kshaya,* and *Vishamashana* by almost all the *Acharya*. These four terms incorporate almost all the prevalent lifestyle heckles of the current day. It indicates that each of the *Nidana* is single handed capable of leading into the disease based on its magnitude but in the present-day scenario, due to drastic shifts in the work pattern and job culture, it is rather a collaboration of multiple *Nidana* which causes the disease. In the study, 73.2 % of the patients were found with gradual improvement in *Mamsa* (muscle mass) and *Bala* (strength). The result might be due to the additive effect of intake of a balanced and healthy diet along with lifestyle modification. During the period of 6 months, these patients took proper medicine without a gap as they were aware of the severity of the disease and treatment. Although Anti-tubercular drugs play a critical role to kill bacteria, adequate nutrition also plays an important role in supporting health and quality of life. A nutritive diet especially a protein-rich diet was also recommended to the patients during the study. Protein is an important component of a healthy diet and is essential for the growth and development of tissue structure. They are the most important component of striated skeletal muscle. In our classics, *Samanya Vishesha Siddhant*- [5] is mentioned as the principle of similarity which signifies that at any given time or phase of life, a thing that is the same or alike to any constituent in the body or a thing similar in qualities with any constituents turn into the enhancing effects on a similar constituent always increases which can be in term of quantity, quality, and effects. As *Acharya Charaka* has described *Dravya Samanya* by the statement– मांसमप्यायते मांसेन। i.e., the consumption of flesh/meat (*Mamsa*) enhance the growth and strength of muscles (*Mamsa Dhatu*). Therefore, in the treatment of *Rajayakshma*, the use of *Mamsa Rasa* has been mentioned to increase body strength. The same concept is given by the German nutritional scientist Carl von Voit that "flesh makes flesh" as it is well known that protein is the most important nutrient for maintaining the structure of the body. Nutritional supplementation may help to improve outcomes in tuberculosis patients. A study found that nutritional counselling to increase energy intake combined with the provision of supplements, when started during the initial phase of tuberculosis treatment, produced a significant increase in body weight, total lean mass, and physical function after six weeks.[6] In the study, 26.8% of the patients were found with no changes in *Mamsa* and *Bala* even on regular ATT administration. Few symptoms of Pulmonary tuberculosis may have persisted. This might be due to the poor immune status of the patients. This indicates that they might be more susceptive to further infection and even if they get treated, they will not recover fully.

CONCLUSION

Rajayakshma is a *Kshayaja Vyadhi* which can be closely correlated with Pulmonary tuberculosis based on symptomatology. The mode of spread of infection was explained in the form of a mythological story, where the disease came out from the breath of king *Daksha Prajapati* during expiration, which may be the earliest documented evidence of droplet infection of Tuberculosis. The etiological factors of *Rajayakshma* described in *Ayurvedic* classics i.e., *Sahasa*, *Vegsandharan*, *Kshaya*, and *Vishamasana* were seen in the majority of the patients. Although, these *Nidana* either an individual or in combined form cannot manifest the disease without the *Upsarga* of *Yakshmana* organism (i.e., *Mycobacteria tuberculosis*). In *Ayurvedic* classics, *Bala* and *Mamsa* are considered important factors regarding the prognosis of eight diseases, *Rajayakshma* in one of them. If the disease is associated with loss of strength and muscle wasting, then it will become *Asadhya* in nature. Here, *Bala* signifies *Vyadhikshamatva* /*oja*, as well as immunity of the body, and *Mamsa* is responsible for the physical strength of the body. The diminution of *Bala* and *Mamsa* makes the person more susceptible to

disease and the person finds it difficult to overcome the *Vyadhi Bala* (strength of the disease). For the assessment of *Bala* and *Mamsa* the patient's objective parameters such as Handgrip strength, foot pressure, walking time, exercise endurance, weight, BMI, mid-upper arm circumference & Skinfold thickness were included respectively. On the basis of statistical analysis of objective parameters, we found that *Bala* and *Mamsa* have a significant correlation with the prognosis of *Rajayakshma*. In this study, good prognostic sign or prognosis was observed in those patients in whom gradual improvement was seen in *Bala* and *Mamsa* while in those individuals who have the condition of *Bala Kshaya* & *Mamsa Kshaya*, there prognosis was poor. They are more susceptible to reinfection or relapse of Tuberculosis.

RECOMMENDATION

Since this is the attempt to evaluate the prognosis of *Rajayakshma* on the basis of *Bala* and *Mamsa*, the study has shown interesting results, it is recommended that the study should be carried out in a large sample size to evaluate and analyze the results. As the study shows significant results so the evaluation of *Bala* and *Mamsa* in reference to prognosis should be carried out with other associated diseases mentioned under citation *Asthamahagad.*

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