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Research Article

AYURVEDIC INSIGHTS ON LINKAGE BETWEEN *GRIVASTAMBHA* (CERVICAL SPONDYLOSIS) TO PATIENT OUTCOMES: A STATISTICAL ANALYSIS OF PERSONALIZED DATA

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ABSTRACT

Disease can be traced back for its manifestation since antiquity, just with development of mankind. Day by day, advancement in medical science is approaching diseases with utmost treatment and diagnostic applications. Though, before starting treatment- nature of disease, course of disease, causative factors etc, should be kept in mind to understand and eradicate disease from its root. Patients' detail history including habit, activity etc, can help to understand his/her health status, disease condition and prognosis. Here, subjects of *Grivastambha* (cervical spondylosis), one of the *Vataja Nanatmaja Vikara* (*Vata Doshika* disease) are taken and observed for their personalized data to link with disease pathogenesis, which can further be used for effective prevention and treatment policies in future. This study shows the application, interpretation of data individually and relatively.

INTRODUCTION

Ayurveda, the science of life consists numerous diseases with their treatment. These diseases are *Dosha*-specific, *Dhatu*-specific, *Prakriti*-specific in *Nidanapanchaka*. Under the umbrella of *Dosha*-specific diseases apart from *Sansargaja* and *Dvandvaja Vikara*, some Acharya has mentioned diseases related to only single *Dosha*. These diseases are known as *Nanatmaja Vikara*, viz. *Vataja Nanatmaja Vikara*, *Pittaja Nanatmaja Vikara* and *Kaphaja Nanatmaja Vikara*. Maximum number of diseases come under *Vataja Nanatmaja Vikara*. Some of them are – *Gridhrasi*, *Urustambha*, *Grivastambha*, *Manyastambha*, *Badhirya*, *Timira*[1] etc.

Grivastambha is a disease affecting *Grivapradesha*, characterized as stiffness at neck region along with other associated symptoms like, pain at neck region, headache, difficult movement of shoulders. It is a condition which causes morbidity at *Grivapradesha* due to affection of various structural parts of neck through *Vata Dosha*. Neck region is very susceptible as it is the site of some specific *Marma* (vital organs) like *Krikatika* and *Nilamanya Dhamani*. Any harm to these *Marma* can lead to serious complications. So, special care should be taken of this region. Nowadays, many people are being affected through this condition. Disease manifestation occurs as a result of various causative factors, they might be physical, mental, habitual, age-related etc. It is a need of hours to look into the causative factors of this disease, so that it can be prevented and treated well.

In Ayurveda, there is no direct reference of cervical spondylosis nor any direct medicine for this ailment is described. However, there is a term like *Grivastambha* having an indirect correlation with cervical spondylosis. It is also observed that there are many medicines, therapies indicated for this disease. Most of these medicines are not clinically explored for this disease condition. As the subject falls under chronic cadre and takes long term painkillers, may cause adverse effects on vital organs and produce effects like drowsiness, mental fog, nausea, constipation, dizziness, respiratory-depression[2], stomach aches, feeling sick, diarrhea, headache, stomach ulcers[3], ringing of ears, skin itching or rash, dry mouth[4], renal failure, delirium, depression, etc[5]. It is always better and justifiable if these complications

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can be avoided along with relief in the diseased condition.

Globally, there is a demand of evidence-based knowledge and most of the traditional medicines are asked to fulfill the rationality of their applications. By reviewing many papers in nutshell, it is observed that diabetes 10.9%-14.2%[6], dysmenorrhea 50%-87.8%[7], low back pain 42%[8], hypothyroidism 11%[9], hypertension 29.8%[10] prevalent in India. The international incidence of cervical spondylosis is 3.5 cases per 1000 population. Evidence from 2009 report indicated that cervical spondylosis was the common primary diagnosis (36%) subjects admitted to the hospital for surgical treatment of degenerative cervical spine between 1992 and 2015.[11] Among all these diseases cervical spondylosis is also categorized under chronic diseases. This disease, too has no complete cure. It is managed by long term pain-relieving medicines used in the form of oral, external, parenteral route. However, till date researches on this, not observed to be optimistic. It is extreme need, to take this issue seriously and come with some justifiable resolutions.

There are more than 700 single herbal drugs documented to be used for various diseases/symptoms in Ayurveda. Most of the herbs individually are not clinically tested for this diseased condition. In a situation, where subjects suffering from diseases, facing the complications, adopting the adverse effects, indulging into heavy cost of treatment, the exploration of Ayurvedic herbs become more crucial. Ayurvedic herbs are part of tradition, being used since centuries, observed to be effective, cost bearing, approachable and subsiding other issues along with main disease.

Proper statistical analysis strongly imparts on acceptance of outcome of any study. In current era of Artificial Intelligence, various upgraded statistical software are being used to calculate numerical data, viz., SPSS, Stata, SAS, R, MATLAB, JMP, Python, Excel etc. Among them SPSS is highly used, effective and simple tool for analysis. It gives numerous calculative options and reliable outcomes. It provides effective data management for both qualitative and quantitative data.

This analytical study comprises of *Grivastambha* diseased patients' personalized data analysed statistically. Their personalized data might link with disease pathogenesis, which can further be used for effective prevention and treatment policies in future.

MATERIAL AND METHODS

Method of collection of data

Clinical study was conducted at OPD of Department of Dravyaguna, Government Ayurved Hospital, Vadodara, after obtaining permission from IEC and registration at CTRI. 24 subjects were recruited under four groups. Data regarding all subjects were numerically classified in excel-sheet, further various statistical tools were applied using SPSS. Personalized data was distributed under two major cadre, viz. single-response analysis and multiple-response analysis.

Sampling technique

Computerised randomization Technique.

Study design

Single centric- Single Blinded- Parallel randomized clinical trial.

Inclusion criteria[1-16]

1. Either sex
2. 25-50 years
3. Clinical symptoms of *Grivastambha* with or without radiological changes.
4. Symptomatology of *Grivastambha* (cervical spondylosis) for more than 3 months or in recurrent phase.

Exclusion criteria[12-16]

1. <25 Years or >50 Years
2. Any acute/ infectious disease
3. Chronic disease (SLE, rheumatoid diseases, ankylosing spondilitis)
4. Stenosis of the spinal canal
5. Fibrositis
6. Unwilling to participate in the trial.

OBSERVATION AND RESULT

Table 1: Profile of patients

S. No.	Personalised variables of subjects		Frequency and Percentage (%)
1.	Age	26-30	02 (8.3)
		31-35	01 (4.2)
		36-40	06 (25)
		41-45	06 (25)
		46-50	09 (37.5)
2.	Gender	Male	08 (33.3)

		Female	16 (66.7)
3.	**Educational qualification**	Primary	2 (8.3)
		Secondary	7 (29.2)
		Higher secondary	1 (4.2)
		Graduate	10 (41.7)
		PG	4 (16.7)
4.	**Occupation**	House wife	9 (37.50)
		Service	6 (25)
		Labour	2 (8.33)
		Business	6 (25)
		Retired	1 (4.17)
5.	**Sleep**	Disturbed	13 (54.17)
		Sound	8 (33.33)
		Reduced	3 (12.50)
6.	**Type of physical activity**	Sitting	14 (58.33)
		Standing	8 (33.33)
		Walking	4 (16.67)
		Lifting	2 (8.33)

With application of single response analysis, got to know that majority of the subjects i.e., 37.50% belonged to the age group of 46-50 years followed by 25% subjects each to age group 36-40 years and 41-45 years. While age group of 26-30 years having 8.33% subjects and 31-35 years of group consisted only 4.17% subjects. (Table No. 1)

After applying single response analysis, data showed that majority of the subjects 66.67% were females, while 33.33% subjects were males. (Table No. 1)

After applying single response analysis, all the subjects in trial were observed to be literate. Among them 41.67% subjects had completed their graduation, while 29.17% subjects had education up to secondary school, 16.67% subjects had post graduate qualification. Subjects who had only primary education are 8.33%, while higher secondary education pursuance was observed among 4.17% subjects. (Table No. 1)

Data of single response analysis reveals that 37.50% of subjects were housewives as female dominated trial, followed by 25% having office job or teaching as occupation. 25% of each registered population had in business and 8.33% were labourer and 4.17% were retired. (Table No. 1)

Single response analysis data depicted that in 54.17% subjects sleep was disturbed, while in 33.33% and 12.50% subjects sleep was sound and reduced respectively. (Table No. 1)

After applying single response analysis, data revealed that 58.33% subjects were having history of sitting work in excess, while 33.33% and 16.67% subjects were having standing and walking work in excess. Few were having history of lifting activity viz. 8.33%. (Table No. 1)

Table 2: Personalised data with multiple responses

S.No.	Parameter for response		Frequency and Percentage (%)	Percent of cases (%)
1.	**Food taste (*Rasa*)**	*Madhura* (Sweet)	12 (30.8)	50
		Amla (Sour)	05 (12.8)	20.83
		Lavana (Salty)	04 (10.3)	16.67
		Katu (Pungent)	18 (46.2)	75
		Tikta (Bitter)	0	0
		Kashaya (Astringent)	0	0
2.	**Property of**	*Guru* (Heavy)	07 (11.1)	29.17

	food (*Guna*)	*Laghu* (Light)	08 (12.7)	33.3
		Shita (Cold)	05 (7.9)	20.83
		Ushna (Hot)	21 (33.3)	87.50
		Snigdha (Unctuous)	09 (14.3)	37.50
		Ruksha (Dry)	13 (20.6)	54.17
3.	**Psychological stress factor**	Economical	07 (22.6)	30.4
		Personal	10 (32.3)	43.5
		Occupational	08 (25.8)	34.8
		Social	06 (19.4)	26.1

Some of the subjects had inclination towards more than one *Rasa,* more than one *Guna* and having multiple psychological stress factor. So, multiple response analysis was applied. (Table No. 2)

Katu Rasa dominant diet was noted in 75% of subjects followed by *Madhura Rasa* dominant diet in 50% of registered subjects. *Amla Rasa* and *Lavana Rasa* dominancy was noted in 20.83% and 16.67% of subjects respectively. (Table No. 2)

Data showed that 87.50% subjects were having inclination towards *Ushna Guna Pradhana Aahara* followed by 54.17% for *Ruksha Guna*. 37.50%, 37.50%, 29.17% and 20.83% for *Laghu*, *Snigdha, Guru* and *Shita Guna Pradhana Aahara.* (Table No. 2)

The data showed that maximum 41.67% subjects were under personal stress while 33.33% subjects were having occupational stress and 29.17% and 25% subjects were having economic and social stress respectively. (Table No. 2)

DISCUSSION

Clinical studies or any other experimental studies add extra knowledge for society. It opens-up new pathways for research. Any research study is completed and concluded only after applying appropriate statistical tool. Progress of science and technology has contributed significant benefits in applying statistics through various sophisticated software like SPSS, Stata, SAS, Python, Excel etc. However, it depends upon our intelligence to accept and interpret the data given by any software.

Grivastambha and age

Among 24 subjects, 37.50% subjects were from the age group 46-50 years. While 25% subjects were from age group 36-40 years and 41-45 years each. It shows that total 87.50% subjects were from age group 36-50 years. In elderly age normally *Vata Dosha* increases. *Grivastambha* is also a *Vataja Vyadhi*, so as age increases, chances of *Grivastambha* increases. Its correlated disease cervical spondylosis is a degenerative disorder. Usually, degeneration starts in body after some age, leading to body make prone towards such degenerative disorders.

Grivastambha and gender

It was seen that 66.67% subjects were female, while 33.33% were male subjects. The prevalence of under-nutrition and anaemia among almost half of the women in India as per MoHFW's National Family Health Survey (NFHS-4) 2015-2016. Moreover, according to the State of Food Security and Nutrition in the world 2020 report, nearly 51.4% of women of reproductive age group in India were suffering from anaemia. This data shows the malnourishment of females in elderly age. It also causes deficiency of micronutrients leading to susceptibility towards different degenerative disorders. In addition, apart from the busy schedule of household responsibilities, in today's era women are also getting education and high authoritative work based on their skills. It increases burden on their physical strength. All these phenomena can make females prone towards excessive *Vata Vridhhi* and degeneration. This might be the reasons behind high percentage of prevalence of *Grivastambha* in females in present clinical study.

Grivastambha and education

Among 24 subjects, maximum number of subjects i.e., 41.67% were having completed their graduation. The second highest number of subjects (29.17%) had secondary education. As the awareness about education's importance is increasing day by day, people are getting higher education. With that they are getting jobs having office work on computers continuously for prolonged time period. Thus, after getting higher education, people's lifestyle is making them more susceptible towards disease.

Grivastambha and occupation

37.50% of subjects registered in this trial were housewives, while subjects doing service or business were 25% for each. Subjects were having services like as teacher, market research analyser, mechanical engineer, government officer etc. Some subjects were having business work like saree selling, yoga training, construction site work, cloth shopkeeper etc. Some having their own farming work. After taking into consideration above various works of subjects, it might be said that mostly housewives with heavy household burden are more susceptible toward

Grivastambha. Then persons having continuous computer work or repeated heavy weight lifting or continuous activity of neck and shoulder may become prone to this disease.

Grivastambha and food taste

Maximum number of subjects i.e., 75% subjects were having inclination toward *Katu Rasa*, followed by 50% subjects having inclination towards *Madhura Rasa*. This shows that maximum number of subjects are using *Rasa* in excess, which is *Vata Dosha* aggravating, leading to pathogenesis of *Grivastambha*.

Grivastambha and food property

87.50% subjects were having their diet *Ushna Gunayukyukta* in excess, followed by 54.17% subjects having *Ruksha Gunayukta Ahara* and *Laghu Gunayukta* by 33.3% subjects. Though maximum number of subjects were taking *Ushna Gunahara*, but parallel use of *Ruksha* and *Laghu Guna* might have induced *Vata Dosha* imbalance.

Grivastambha and sleep

In 54.17% subject's night sleep was disturbed due to pain. As discussed earlier that bedtime was the *Kalaja* aggravating factor. So, with increased pain intensity subjects were facing difficulty in sound sleep, which further leads to *Vata Vriddhi*.

Grivastambha and type of physical activity

58.33% subjects were having work as continuous sitting position in their daily lifestyle. 33.33% subjects were having prolonged standing condition. These excessive sitting and standing, sometimes along with improper postures may lead to *Vata Vriddhi*.

Grivastambha and psychological stress factors

Apart from, dietic causative factors (*Aharaja Nidana*) and regimenal causative factors (*Viharaja Nidana*), which can directly affect body, there are also some psychological stress factors (*Manasika Nidana*) frequently observed in subjects leading to increased *Vata Dosha*. Most of the subjects were having personal and occupational/economical stress. *Chinta* and *Krodha* were two common *Manasika Nidana* affecting most of the subjects. Along with *Mana*, they also cause trouble to *Sharirika Dosha*. Thus, concurrent stressful life and short-temper mind can lead to *Vata Dosha* aggravation.

CONCLUSION

Little things make great changes. Same way little bad habits can degrade the health gradually. To follow first line of treatment – *Nidana Parivarjana*, one must stay aware about the causative factors of disease. In current fast era of modernisation, persons are moving towards unhealthy lifestyle and habits knowingly or unknowingly. Factors which are increasing *Vata Dosha* directly or indirectly should be controlled timely. Keeping apart all these discussed causative factors can avoid/treat the pathogenesis of *Grivastambha*.

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