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Research Article

CRITIQUE ON BIOSTATISTICAL CONCEPTS IN AYURVEDA

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ABSTRACT

The gold standard to judge the popularity and usefulness of any scientific branch is associated with the ongoing research activities in that branch. For the present day research works the utility of the statistics, statistical principles are very crucial and necessary. Considering the fundamental research aspect in *Ayurveda* there is a need to emphasize the various statistical principles that *Ayurveda* itself has adopted in various instances. Hence, the reliable and valid information reaches the public in the systematic, unbiased, simple manner and people of all degree of intelligence will understand the Data/ information.

Collection, classification, presentation, analysis and interpretation of the Data and correlation concepts in statistics will be taken into consideration and they will be related with the concepts, instances mentioned in *Ayurvedic* authoritative textbooks like *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hrudaya* hence proving the essence of Statistics in *Ayurveda*.

Collecting information regarding plants from tribal people, Classification of *Prakruti* into *Vatala*, *Pittala*, *Sleshmala*, presenting the chapters, whole *Samhita* in the systematic manner, comments and various opinions of commentators and final concluding part of the each chapter, debate can be related to collection, classification, presentation, analysis and interpretation of the Data respectively. The concept of measurement of *Anjali* etc *Pramana*, *Sarva Dharmeshu Madhayma*, *Madhayama Sarata* etc and concept of *Bhuyista* in the context of types of *Desha* will be indirectly signifying the essence of statistical concepts of mean, median, mode respectively in *Ayurveda*. The relation between *Nidana* and *Roga*, *Kayagni* and *Dhatu* will be signifying the concept of correlation in *Ayurveda*

Keywords: Biostatistics, *Ayurveda*, Data, Central tendency, Correlation

INTRODUCTION

The quest for knowledge generates out of inquisitiveness, which ultimately leads to better understanding and explanation of various phenomena. In all ancient sciences, the methods adapted to increase understanding or knowledge base, are mainly experiential, observational and inferential. In the process of development of knowledge the perspective regarding a scientific concept or criteria of classification may change based on the logical interpretations and experimental evidences. *Ayurveda* is no exception to the rule where the knowledge has developed according to the above-mentioned system prevalent in those areas¹.

The gold standard to judge the popularity and usefulness of any scientific branch is associated with the ongoing research activities in that branch. This is because active research indicates addition of new dimensions of applications, which in turn is a marker of liveliness, vibrancy and futuristic approach of the branch. Research in health sector is of the utmost

importance pertaining to the immediate application of the outcome to relieve human beings from pain and agony. Amongst all the branches of science, medicine is the branch, which always receives high priority due to its potential to address and solve current health problems and issues².

Since a lot of changes as taken place in the modern scientific field, because of number of advancements in the methodology and technology a time has come to validate these ancient concepts of *Ayurveda* or the essence of various *Shastras* in *Ayurveda*.

For the present day research works the utility of the statistics, statistical principles are very crucial and necessary. Among the various fields of research Fundamental research is very important, a type of retrospective study. In this one has to study the basic principles/concepts. *Ayurveda* as put forth various concepts in order to maintain the health of the healthy and to cure the disease of the diseased. All these concepts are the original, essential, principal form which serves as a ground

work for the further research works. The important concepts are – *Tridosha Siddanta* (Principle of threedosha), *Panchamahabuta Siddanta* (Principle of five basic elements, *Loka Purusha Samya Siddanta*(Principle of universe-man similarity), etc. Some of the concepts have proven to be true by modern reasons giving specific reasons.

Not only the concepts but the essence of various science / *Shastra* is embedded in *Ayurveda* . For example few concepts of – *Yoga Shastra*(Yoga therapy), *Jyotisha Shastra*(Astrology), *Sankhya Shastra*(Statistics) etc are been highlighted in various places. Among that *Sankhya Shastra* in the present day can be considered as the Statistics.

In singular sense, word Statistics is used to mean a subject, science or a discipline. Statistics is a study of knowledge, which deals with different methods of collection, classification, presentation, analysis and interpretation of the data. It also deals with measures of central tendencies like mean, median, mode and measures of dispersions like range etc. It is a scientific method to make inference and to draw conclusions from numerical data. The application of statistical methods in the field of medicine, biology and public health in planning or conducting and analyzing data which arise in investigation is called as biostatistics³.

AIMS AND OBJECTIVES

To highlight the concepts of biostatistics in *Ayurveda*

MATERIALS AND METHODS

Various concepts in statistics will be taken into consideration and they will be related with the concepts, points, instances mentioned in *Ayurvedic* authoritative textbooks like *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hrudaya* hence proving the essence of Statistics in *Ayurveda* .

DISCUSSION

Statistics is the science of collecting and analyzing significant numerical data. Numerical means to deal with numbers. In all the three treatises, particularly in *Charaka Samhita*, numerical values are used for a particular data. Right from the beginning of the principles there are numerical values use to denote five *Mahabhutas* (five basic elements), three *Doshas* (bodily humors), three *Upakramas* (three line of treatment), etc. Wherever there is description regarding the thought process about the unknown disease, drug or treatment modality statements indicative of probability are made.

Anything is measurable is the principle of mathematics. It also relates to statistics, the concept of measurement is well evident in the *Ayurvedic* treatises. The section *Vimaanasthana* is developed around the focal theme of measurable variables and methods of measurement. A *Vaidya* must be well versed with method of measurement of all the variables like *Dosha*, drug, strength, diet etc. to be able to treat the diseases successfully. The measure is of three types quantitative, qualitative, and a combination of both. For example, quantity of urine passed by a person in 24 hours is measured using the unit liters while its color, clarity, smell are compared to standards and noted; is an example of application of both types of measurement⁴.

Data – It refers to given sort of information. There are two types of the data namely Qualitative, Quantitative. Qualitative

data is also called as attribute/ character, or those Data which cant be measured⁵. In *Ayurvedic* authoritative textbooks in many instances words like *Shula*, *Atyartha Vedana*, *Toda*, *Aruchi*, *Angamardha* etc terms are being used which indirectly signifies the Qualitative Data. The measurable type of Data is Quantitative Data, which can be considered as the *Anguli*, *Anjali Pramana* mentioned by *Acharyas* for the measurement of the various body parts and Quantity of various bodily fluids respectively.

Collection of Data – The various methods by which necessary Data are collected depending on the requisite is called as collection of Data. In this concept the word observational unites is used which refers to the source of information⁶. In *Ayurvedic* authoritative textbooks it is being mentioned that to get the complete knowledge of plants, its utility, recognition etc one should go to tribal, folklore people, shepherds etc and gain information from them⁷. In the context of *Gulma Chikitsa* word *Dhanwantarinam Adhikara* is mentioned which means for further details regarding the surgical treatment of *Gulma* you have to gain information from the Surgical Practioners⁸.

Classification of Data – Division of the Data on the basis of similar and dissimilar characteristics is Classification. It is two types simple (based on 1 character), Manifold (based on 2 or more character)⁹. On the basis of *Dosik* dominance *Prakruti* is being classified into *Vatala*, *Pittala*, *Sleshmala* and also on the basis of topic of discussed the whole *Samhita* is classified into various *Sthanas* like *Sutrasthana*, *Vimanasthana* etc can be considered as the examples for the indirect highlighting over the simple classification. The *Manasika Prakruti* is of three types namely *Satvika*, *Rajasika*, *Tamasika* and all these 3 types is again been subdivided into 7, 6, 3 types respectively¹⁰; In the context of *Rasabedha* it is said that *Rasa* are of six types and later it being mentioned that on the basis of various permutation and combination this six *Rasas* can be further classified into 63 types¹¹ which will be indirectly highlighting upon the concept of manifold classification.

Presentation of Data – Systematic representation of the Data is called as presentation of Data. Presenting the whole *Samhita* in the form of *Sutra*, *Vimana*, *Shareera*, *Nidana*, *Chikitsa*, *Kalpa*, *Siddhi*, *Indriya*, *Uttara Sthana* and in the context of *Mana Paribasha* arrangement of the *Mana* in the increasing/ascending order can be considered as the indirect highlighting the Presentation of Data of Statistics.

Analysis of Data – The method of onslaught, transforming, remodeling the Data is called analysis of Data. In *Ayurvedic* authoritative textbooks the verses written by *Agnivesha*, *Charaka* is being clearly analysed by the *Chakrapani* and any sort of indirect or hidden and contextual meaning if present then it being mentioned by him. The commentaries written by various *Acharyas* over the *Samhita* can be considered as the example of Analysis of Data in *Ayurveda* .

Interpretation of Data – In simple words it can be considered as the analysis of analysed Data or rather approaching towards conclusion regarding the analysed Data. In each and every chapter of the *Samhita* the Data/ information is being told, presented in a particular logic and with specific pattern and they are being analysed by the commentators, finally each chapters ends with the verse – '*Bavanthi Cha Atra*' (finally I conclude) continued by few verses which will be intended

upon the conclusion of that particular chapter. Considering another context of debate, regarding the types of Rasa there were different opinions regarding its number/types and finally considering all the information, discussion, Atreya concludes that Rasa is of six types¹².

Mean – In simple word it can be said as Average. In different contexts concept of average is being used in *Ayurveda*. For example - one *Anguli* is said to be as an average transverse length of index finger (ones own), one *Anjali* is said to be as an average quantity of fluid that can be hold when two hands are hold together in the form of saucage, one *Bindu* is considered as an average quantity of fluid that drops down when an individual lift the index finger which is submerged in fluid¹³.

Median – The middle value or it can be considered as the one which divides the Data into two equal halves. In *Ayurvedic* authoritative textbooks the verse saying – ‘*Sarva Dharmeshu Madhyama*’ and in the context *Dashavidha Pariksha* classification of status of *Satva, Sarata, Samhana, Vyayama* and *Jarana Shakti* the term ‘*Madhyama*’ is being used which indirectly signifies the middle way, in this context the middle way between *Pravara* and *Avara*¹⁴. These examples highlights the essence of *Sankya Shastra* in the form of Median in *Ayurveda*.

Mode – Dictionary meaning of mode is common, usual. In *Ayurveda* the word *Bhuyistam* will be signifying the concept of Mode. In the context of types of *Desha* it is mentioned that *Jangalam Vata Bhuyistam, Anupam Kapholvana*¹⁵ which can be applied in following manner – In *Jangala Desha*, people commonly suffer from *Vata Vyadhi* and in *Anupa Desha*, people usually suffer from *Kaphaja Vyadhi*.

Correlation – It is defined as the relation between two variables. This concept also being highlighted in *Ayurveda* in many of the instances. The first line of treatment for any disease is told as to avoid the *Nidana* (cause) of the *Roga* (disease)¹⁶. Even if patient is taking treatment and not avoiding the *Nidana* then it will lead to increase or incurability of the *Roga*. If, during treatment *Nidana* is being avoided or without treatment *Nidana* is avoided then *Roga* will be subsided or severity of the *Roga* will decrease. Hence signifying the positive correlation between *Nidana* and *Roga*. Moieties of *Kayagni*, located in its own place, are distributed to and permeate to all the *Dhatu*. A decrease of it (Below the normal) makes for an increase of the *Dhatu*s, while an increase of it (Above the normal) makes for a decrease of a *Dhatu*s¹⁷. This will indirectly signify the negative correlation between *Kayagni* and *Dhatu*.

CONCLUSION

For the present day research works the utility of the statistics, statistical principles are very crucial and necessary. Considering the fundamental research aspect in *Ayurveda* there is a need to highlight the various statistical principles that *Ayurveda* itself has adopted or been indirectly highlighted in various instances, so that the reliable and valid information reaches the public in the systematic, unbiased, simple manner and people of all degree of intelligence will understand the Data.

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