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Interpretation of the concept of *Ashraya - Ashrayi Bhava* from Ayurveda with the concept of correlation from Statistics

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ABSTRACT

Ayurveda is an ancient science that tells us to maintain a healthy life, along with curing ailments. All medical graduates need to study research methodology and medical statistics to complete the graduation. We need to correlate Ayurvedic terminologies and concept with the modern terms and concepts to conduct research, which will results in the globalization of *Ayurveda*. Correlation is one of the topics from statistics, and examples along with the same concept are found in *Ayurvedic* classics. Correlation from biostatistics can be compared with the *Ashraya - Ashrayi Bhava* from *Ayurveda*. There is a moderately positive correlation between *Pitta Dosha* and *Rakta, Pitta* and *Sweda*. There is a moderately positive correlation between *Kapha Dosha* and *Rasa Dhatu, Kapha* and *Mamsa Dhatu, Kapha* and *Meda Dhatu, Kapha* and *Majja Dhatu, Kapha* and *Shukra Dhatu, Kapha* and *Mutra Mala, Kapha* and *Purisha Mala*. There is a moderately negative correlation between *Vata Dosha* and *Asthi Dhatu, Vata Dosha* and *Kapha Dosha*. This will help research scholars from *Ayurveda* to write proper words in the research project. Thus, it is concluded that statistical terms and concepts are elaborated in the *Ayurvedic* classics having almost same meaning, and only the language is different.

Key words: *Correlation in Ayurveda, Correlation between Dosha and Dhatu, Bio-Statistics*

INTRODUCTION

If the values of the two variables deviate in the same direction i.e. if the increase in the values of one variable results, on an average, in a corresponding increase in the values of the other variable or if a decrease in the values of one variable results, on an average, in a corresponding decrease in the values of the other variable, correlation is said to be positive or direct. On the other hand, correlation is said to be negative or inverse if the variables deviate in the opposite direction i.e. if the increase (decrease) in the values of one variable results, on the average, in a corresponding decrease (increase) in the values of the other variable.[1] There are 5 types of correlation explained in statistics; these are Perfect Positive Correlation, Perfect Negative Correlation, Moderately Positive Correlation, Moderately Negative Correlation and No Correlation.[2] India is the origin of *Ayurveda*. *Ayurveda* is considered an *Upaveda* of *Atharvaveda,*[3] which is one of the *Ved* among the main four *Vedas*. *Ayurveda* is a *Shashwat,*[4] meaning it is eternal, perpetuity, and sempiternal. There is much more scope for research *Ayurvda,* by using the terms and concepts from it one can do research to get knowledge. Research scholars from other areas can also obtain

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information about *Ayurveda. Ayurveda* is not only ancient science, it is also have all the information which we are using now, but all information available is in *Sanskrit* language.

Currently, we are using words in English language in day-to-day life, and the terminologies are of modern era while doing any research. Numerous statistical terminologies and concepts have been explained in different language, but some of these terms and concepts can be found in the Vedic literature. Words in English language and *Sanskrit* language for such terminologies are different, but the meaning is same, or we can find the examples of such statistical terminologies in the *Ayurveda*.

Aim and Objectives

1. To understand the concept of correlation from statistics and the concept of *Ashraya - Ashrayi Bhava* from *Ayurveda*.
2. To interpret *Ashraya - Ashrayi Bhava* in terms of the correlation.
3. To find out examples of correlation from Ayurvedic classics.

Methodology

A. *Ashraya - Ashrayi Bhava*

तत्र अस्थीनि स्थितो वायु: पित्तं तु स्वेद रक्तयो: ।

Tatra Astheeni Sthito Vaayuhu Pittam Tu Sweda Raktayoho |

श्लेष्मा शेषेषु तेन् एषां आश्रय आश्रयिणां मिथं ॥

Shleshma Shesheshu Ten Aesham Aashraya Aashrayinaam Mitham ||

यद् एकस्य तदन्यस्य वर्धन क्षपण औषधं ।

Yad Aekasya Tadanyasya Vardhan Kshapana Oushadham |

अस्थि मारुतयो: नैवं प्रायो वृद्धि: हि तर्पणात् ॥

Asthi Maarutayoho Naivam Praayo Vruddhihi Hi Tarpanat ||

श्लेष्मणा अनुगता तस्मात् संक्षय: तद् विपर्ययात् ।

Shleshmana Anugataa Tasmatsamkshayaha Tat Viparyayat |

वायुना अनुगत्: ..... ॥

Vaayuna Anugat..... ||[6]

शेषेषु रस मांस मेदो मज्जा शुक्र मूत्र पुरीष प्रभृतिषु ॥

Shesheshu Rasa Maamsa Majja Shukra Mutra Purisha Prabhrutishu ||[7]

Table 1: *Ashrayi* and *Ashraya*

***Ashrayi* (Abode)**	***Ashraya* (Resident)**
Vata	*Asthi*
Pitta	*Sweda, Rakta*
Kapha	*Rasa, Mamsa, Meda, Majja, Shukra, Mutra, Purisha*

Ashrayi, that is, *Doshas* always need to stay in *Ashraya,* that is, *Dhatus* and *Mala*. *Ashrayi – Ashraya Bhava* is not only about the anatomical importance such as *Doshas* are having residents in the *Dhatus* and *mala,* but it also has clinical relationship between the *Doshas, that is, Ashrayi* (Abode) and *Dhatus – Mala,* that is, *Ashraya* (Resident) which must be followed in the situation of vitiation of *Doshas* to normalize them and cure the *Vyadhi* (disease) present in the body. Vitiation of the *Vata Doshas* affects the *Asthi Dhatu* (bones). Increase or *Vruddhi* in the *Guna* of *Vata Dosha* results into the *Kshaya* of *Asthi Dhatu* and vice versa. Vitiation of the *Pitta Doshas* affects the *Rakta Dhatu* (blood). Increase or *Vruddhi* in the *Guna* of *Pitta dosha* results into the increase / *Vruddhi* of *Sweda Mala* (sweating). Increase or *Vruddhi* in the *Guna* of *Pitta Dosha* results into the increase / *Vruddhi* of *Rakta Dhatu*. Vitiation of the *Pitta Doshas* affects the *Rakta Dhatu*. Increase or *Vruddhi* in the *Guna* of *Pitta Dosha* results into the increase / *Vruddhi* in *Guna* of *Rakta Dhatu*. Vitiation of the *Kapha Doshas* affects the *Rasa, Mamsa* (muscles), *Meda* (fat tissue), *Majja* (bone marrow), and *Shukra* (semen) *dhatu*. Increase or *Vruddhi* in the *Guna* of *Kapha Dosha* results in the increase / *Vruddhi* in *Guna* of *Rasa, Mamsa, Meda, Majja,* and *Shukra Dhatu*. Increase or *Vruddhi* in the *Guna* of *Kapha Dosha* results

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into the increase / *Vruddhi* in *Guna* of *Mutra* (Urine) and *Purisha Mala* (faeces).

B. Correlation - There are five types of correlation:

1. Perfect Positive Correlation
2. Perfect Negative Correlation
3. Moderately Positive Correlation
4. Moderately Negative Correlation
5. No Correlation

Methods of studying Correlation

a. Scatter Diagram / Correlation diagram / Dot diagram[4]

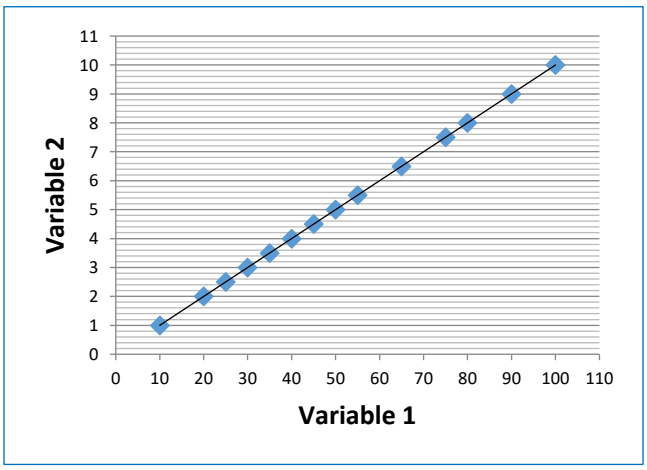
b. Karl Pearson's coefficient of correlation[5]

a. Scatter Diagram / Correlation diagram / Dot diagram

1. Perfect Positive Correlation

- When two attributes or variables are increases together.
- Correlation coefficient "r" = + 1.
- There is no example of Perfect Positive correlation in medical science.

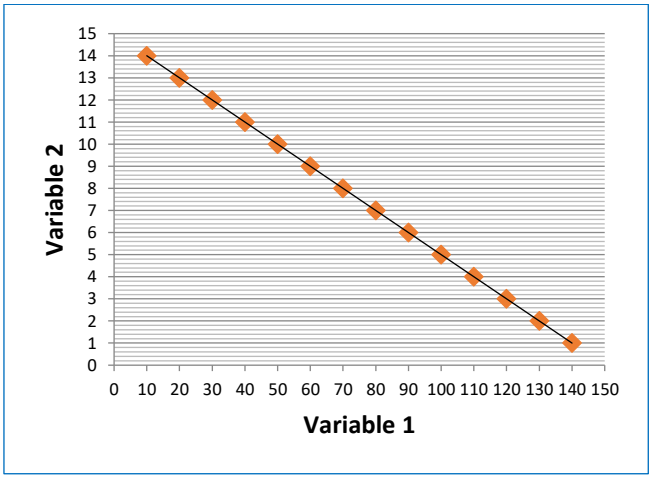
Graph 1: Scatter Diagram of Perfect Positive Correlation



2. Perfect Negative Correlation

- When one attributes or variables increases and another one decreases together.
- Correlation coefficient "r" = – 1.
- There is no example of Perfect Negative correlation in medical science.

Graph 2: Scatter Diagram of Perfect Negative Correlation

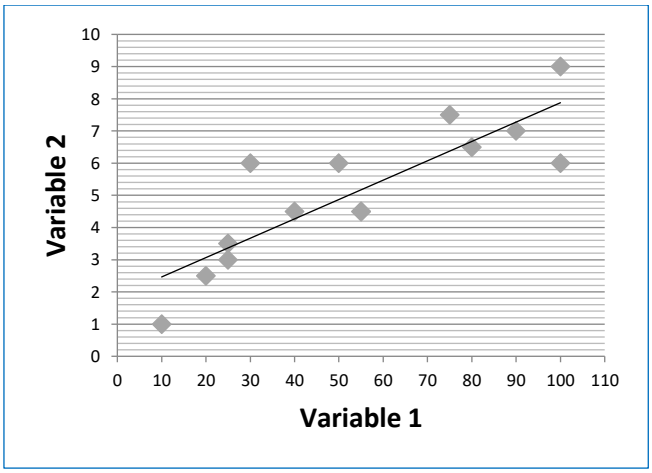


3. Moderately Positive Correlation

- When two attributes or variables are increases but not in a linear manner.
- Correlation coefficient "r" = 0 to + 1.
- Examples

1. Gestational age and weight of fetus
2. Smoking and Lung Cancer.
3. Age and Height (in Children).
4. Total Cholesterol and Systolic blood pressure.
5. Age and Systolic blood pressure (above 45 years).

Graph 3: Scatter Diagram of Moderately Positive Correlation



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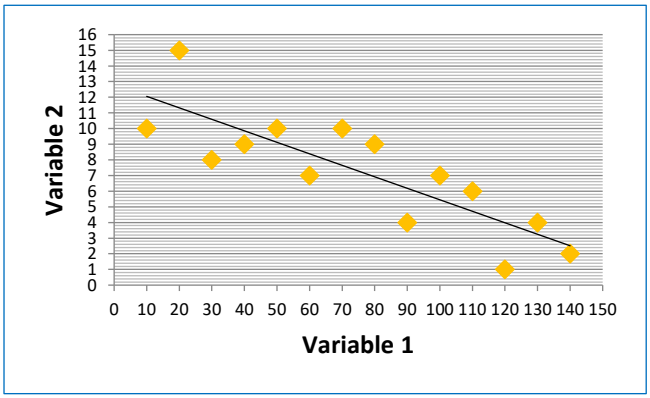
4. Moderately Negative Correlation

- When one attributes or variables increases and another one decreases but not in a linear manner.
- Correlation coefficient "r" = – 1 to 0.
- Examples

1. Smoking and Lung Capacity.
2. Age and PEFR (above 45 years).
3. Glomerular filtration rate and Plasma creatinine.
4. Age and Bone marrow density.

Graph 4: Scatter Diagram of Moderately Negative Correlation

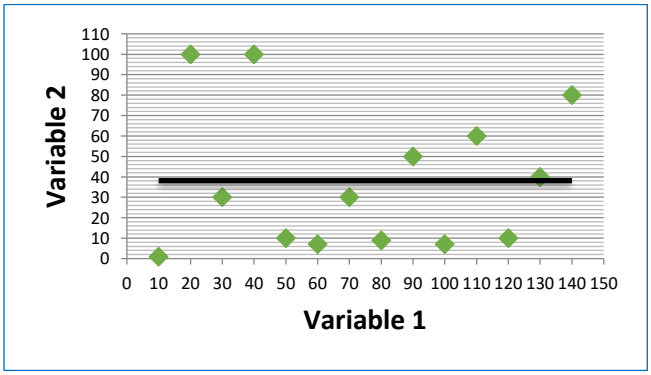


5. No Correlation

- When two attribute or variable are not associated with each other.
- Correlation coefficient "r" = 0.
- Examples

1. Height and IQ.
2. Weight and IQ.
3. Hemoglobin and Sr. Uric Acid.

Graph 5: Scatter Diagram of No Correlation



b. Karl Pearson's coefficient of correlation

Formula, R = (n (∑xy)- (∑x)(∑y))/(√ [n ∑x2-(∑x)2][n ∑y2–(∑y)2)

By using this formula, we can calculate exact r value and according to it we can interpret correlation is of which type.

Discussion

Single entity is not responsible for performing normal physiological condition and causing pathological changes in the human body. Assume that if we add one liter of water to the bucket, then the level increases by 1 cm and it follows the same proportion. If we add five liter water to the bucket, then the level increases by 5 cm, which is an example of a Perfect Positive correlation. The weight of the person is not going to increase by 1 or 2 kg daily or in the same proportion if he is having same quantity of food in a meal, because there are so many other factors responsible for the weight gain such as exercise, metabolic rate, surrounding environment, mental situation of that person, etc. Causative factors are responsible for formation of disease but it not seen that the every person consuming causative factor will suffer with the disease. Lung cancer is not developed in all people who smoke cigarettes, similarly any one anti-hypertensive drug prescribed to some people but it is not sure that blood pressure will be decreased by exactly 20 mm of Hg in all people.

Let us see an examples of Moderately Positive and Moderately Negative correlation according to the *Ayurveda*.

Ashraya-Ashrayu Bhava of *Vata dosha* and *Asthi Dhatu* is an example of Moderately Negative correlation because the *Guna* of *Vata Dosha* increases then it causes *Asthi Kshaya* i.e. decrease in *Kathinya Guna* of *Asthi Dhatu*. It means when there is a more consumption of *Aahara* (diet) and *Vihara* having *Guna* of *Vata dosha*, it increases the *Vata Dosha* then the bones becomes porous. So *Asthi Dhatu* becomes more porous in *Vatavyadhi*.[8] *Ashraya-Ashrayu Bhava* of *Pitta Dosha* and *Rakta Dhatu* is an example of Moderately Positive correlation because when there a

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Prakopa of *Pitta Dosha* then *Rakta Vruddhi* is seen in the *Vyadhi* such as *Raktapitta*. Thus in *Raktapitta Vyadhi* both *Pitta* and *Rakta* are vitiated.[9] When there is presence of *Lakshanas* of *Prakupit Pitta* then *Prakupit Rakta Lakshanas* are also seen. Same is happen when there is increase in *Guna* of *Pitta Dosha* then *Swedaparvatan* i.e. excessive sweating is seen.

Ashraya-Ashrayu Bhava of *Kapha Dosha* and *Rasa Dhatu, Kapha Dosha* and *Mamsa Dhatu, Kapha Dosha* and *Meda Dhatu, Kapha Dosha* and *Majja Dhatu, Kapha dosha* and *Shukra Dhatu, Kapha Dosha* and *Mutra Mala* and *Kapha Dosha* and *Purisha Mala* are the examples of Moderately Positive correlation. When the *Kapha dosha* in the body increases then it also increases the *Rasa dhatu* i.e. water content in the body, *Mamsa* i.e., muscles mass increases accordingly, *Meda* i.e. fat accumulation is seen, *Majja* i.e. bone marrow increases, *Shukra* i.e. Semen increases by qualitatively and quantitatively, *Mutra* i.e. Urine is more excreted and *Purisha* i.e. stool is excreted in more quantity. Vitiation of *Kapha Dosha* and *Prabhut Mutrata* is observed in *Prameha Vyadhi* (Diabetes mellitus).[10] There is a Moderately Negative correlation between *Vata dosha* and *Kapha dosha* when *Vata Dosha* increases then the *Kapha Dosha* decreases or vice-versa. *Guna* i.e. qualities of *Vata dosha* and *Kapha Dosha* are opposite to each other. *Vata* is possesses *Laghu Guna* while *Kapha* is *guru* in nature. Laghu means lighter and Guru means heavier, so consumption of *Dravya* having *Guru Guna* feels heaviness in the body as heaviness is increases obviously *Laghuta* i.e. lightness decreases.

Conclusion

Correlation and *Ashraya-Ashrayi Bhava* concepts are explained in different areas, but both explain the characteristics that two attributes / parameters are in a relation. Examples of Moderately Positive correlation and Moderately Negative correlations are given in *Ayurveda* classics. There is a Moderately Positive correlation between *Pitta dosha* and *Rakta* dhatu; *Kapha Dosha* and *Rasa Dhatu; Kapha Dosha* and *Mamsa Dhatu; Kapha Dosha* and *Meda Dhatu; Kapha Dosha* and *Majja Dhatu; Kapha Dosha* and *Shukra Dhatu; Kapha Dosha* and *Mutra Mala; Kapha Dosha* and *Purisha Mala.* There is a Moderately Negative correlation between *Vata Dosha* and *Asthi Dhatu*; *Vata Dosha* and *Kapha Dosha*. It is difficult to find examples of the Perfect Positive correlation and Perfect Negative correlation in the medical science.

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