



DOCTRINE OF EPIDEMIOLOGY IN AYURVEDA

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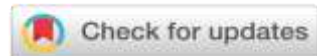
<https://doi.org/10.46607/iamj1212022024>

(Published Online: February 2024)

Open Access

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Article Received: 13/01/2024 - Peer Reviewed: 31/01/2024 - Accepted for Publication: 13/02/2024.



ABSTRACT

Epidemiology, the essential aspect of community medicine, is pivotal in understanding and controlling health-related states or events in populations. The Concept of Epidemiology and its principles in *Ayurveda*, apart from *Janapadodwamsa*, is a lesser-explored domain. Employing an advanced epidemiological model encompassing Time (*Kala*), Environment (*Desha*), Host (*Purusha*), and Causative factors (*Nidanas*), including Aharaja, Viharaja, Manaika, and Agantuja factors along with modes of transmission and factors influencing human health in *Ayurveda*, the analysis unravel the hidden doctrine of Epidemiology in *Ayurveda*. This study is a modest attempt to understand the epidemiological concepts mentioned in *Ayurveda*, shedding light on their potential contributions to contemporary public health understanding and programme planning.

Keywords: *Ayurvedic Epidemiology, Kala, Desha, Purusha, Nidana.*

INTRODUCTION

Epidemiology is the basic science of preventive and social medicine. It is defined as “The study of the distribution and determinants of health-related states or events in a specified population and the application of

this study to the control of health problems”.¹ Descriptive epidemiology is the study that describes the pattern of occurrence of a disease or a condition relative to other characteristics of a population. It mainly

describes the disease in terms of time, place, and person. Understanding and comprehending the epidemiological profile is a crucial prerequisite for tailoring healthcare recommendations and treatments to the specific needs of individuals and communities in different regions, thereby determining the country's public health requirements, addressing them, and facilitating effective programme planning. In the broad sense, it is the study of the effects of multiple factors on human health.

In *Ayurveda*, epidemiology is widely known in terms of *Janapadodwamsa*. But meticulous observation apart from this shows there are hidden tenets of epidemiology in *Ayurveda*. Understanding epidemiology under the advanced model of the triangle of epidemiology, including

Time factor (*Kala*), Environmental factor (*Desha*) and Host factor (Groups or population) as (*Purusha*), Causative factors (*Nidanas* including *Aharaja*, *Viha-
raja*, *Manasika*, and *Agantuja*) as well as concepts like modes of transmission mentioned according to *Ayurveda* is necessary.

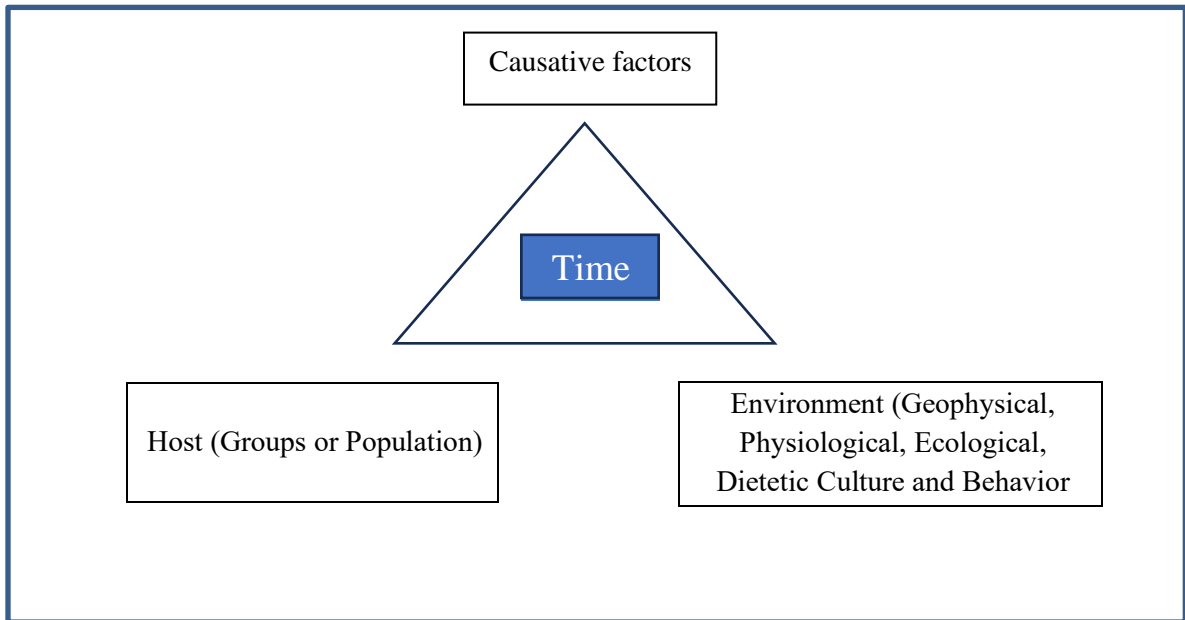
The current endeavor is a modest attempt to analyze the concept of *Ayurvedic* epidemiology under the heading of Time factor, Environment factor, Host factor as well as Agent factor.

Materials and Methods

The present work is primarily based on theoretical research whereas classical textbooks of *Ayurveda* like *Charaka Samhitā*, *Sushruta Samhita*, *Ashtanga Sangraha*, *Ashtanga Hridayam*, *Bhela Samhitā*, etc was used—online Publications cited through Research Gate, Google Scholar, Medline database, etc.

The whole concept of epidemiology relies on the advanced model of the triangle of epidemiology, Natural history of disease, Web of causation of disease, etc. Where the prime concentration is given to factors like Time, Environment (Geophysical, ecological, physical, dietetic culture and behavior), Causative factors, and Host (Groups or population).

Chart no. 1: Advanced model of the triangle of epidemiology



In *Ayurveda*, mainly these areas are dealt with under the heading *Janapadodwamsa*. The term *Janapadodwamsa* refers to the destruction of a large number of people within a community or region. It encompasses both natural calamities (such as epidemics) and pandemic diseases and communicable diseases. The factors involved in *Janapadodwamsa* are *Vayu*, *Udaka*, *Desha*, and *Kala*.² In *Susrutha Samhitā* concept of *Maraka* has been explained. *Adharma* is the reason for *Vyapanna Ritu* (vitiated season). It leads to the vitiation of *Aushadha* (herbs) and *Jala*. Consuming these leads to *Maraka* in humans.

Apart from this, In *Ayurveda* concept of *Kala*, *Desha*, *Purusha*, and Various *Nidanas* for the occurrence of disease and the concept of *Samkramika rogas* has been told as a prime cause for the occurrence and distribution of disease.

EPIDEMIOLOGICAL SHREDS OF EVIDENCE IN AYURVEDA IN TERMS OF TIME

The distribution of a disease in epidemiology or disease rate can vary from time to time. The time factor in epidemiology accounts for the incubation periods, life expectancy of the host or pathogen, and duration of the course of illness or condition. *Kala* is given utmost importance in *Ayurveda*, Considered as “*Kalo hi nama Bhagavan*”.³

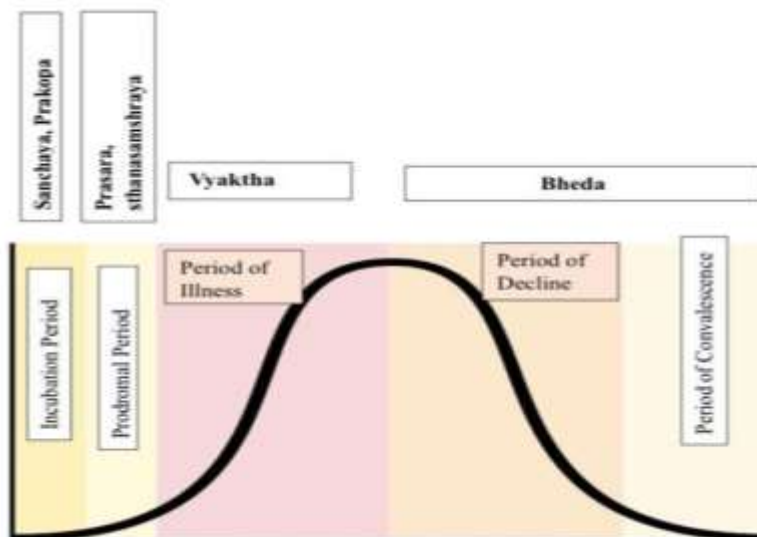
The whole universe is under the control of *Kala*. *Kriyakala* concept in *Ayurveda* can be understood as *Vyādhi Kriyakala* and *Ritu Kriyakala*. *Vyādhi Kriyakala* explained by *Susrutha* gives an idea about the consecutive stages of the disease progression as *Sanchaya*, *Prakopa*,

Prasara, *Sthana samshraya*, *Vyaktha*, and *Bheda* stage⁴ *Ritu Kriyakala* gives an idea about the *Chaya*, *Prakopa*, and *Prashamana* of *Tridoshas* in the body. These concepts in *Ayurveda* can be understood in terms of modern epidemiology concepts.

Understanding and Analyzing of Ayurvedic concept of Vyādhi Kriyakala with Natural History of disease:

Natural history of disease is a key concept in epidemiology. Which says disease results from a complex interaction between man, agent (or cause of disease), and environment. The natural history of a disease signifies how a disease evolves from the earliest stage of its Pre-Pathogenesis phase to the Pathogenesis phase. The stages of disease in Epidemiology are explained in 5 levels. (1) Incubation period (2) Prodromal period (3) Period of illness (4) Period of decline and (6) Period of convalescence.

Chart no. 2: Ayurvedic concept of Vyādhi Kriyakala with Natural History of Disease



Acharya Susruta illustrates the stage of development of pathological processes in a very comprehensive manner under the heading of *Kriyakala*. *Shatkriyakala* is the concept that describes different stages of disease formation. Here *Kriya* means action and *Kala* means time or period. So *Shatkriyakala* means an appropriate period to take action/ treatment in the stages of a *Vyādhi*.

The incubation period, Prodromal Period, Period of illness, period of decline, and stage of convalescence can be visualized in the *Sanchaya* and *Prakopa* stages (Accumulation and vitiation of *Dosha*), *Prasara* and *Sthanasamshraya* stage (Dissemination and localization of *Doshas*),

Vyaktha stage (Manifestation of disease) and *Bheda* stage (Complication) respectively. And *Achaya purvaka prakōpa* stage in *Shatkriya kala* can be understood in the view of short-term fluctuation in modern epidemiology.

Understanding and Analyzing of Ayurvedic concept of Ritu Kriyakala with Cyclic or Seasonal trends of descriptive epidemiology:

Epidemiologists have identified three kinds of time trends or fluctuations in disease occurrence. Short-term fluctuations, periodic fluctuations, long-term fluctuations, and periodic trends or cyclic trends. Seasonal trends in periodic fluctuations are a well-known characteristic of many communicable diseases. The seasonal variations of disease occurrence may be related to environmental conditions such as temperature, humidity, rainfall, etc.

The natural changes that occur to *Dosha* according to the season are explained under the heading of *Ritu Kriyakala* in *Ayurveda*. The stages are (1) *Chaya* (2) *Prakopa* and (3) *Prashama*. Due to the influence of changes occurring in the season, there is *Dosha* vitiation in the body. If the person adopts the *Charya* of existing *Ritu (Ritucharya)*, *Doshas* will be brought back to the normal stage thus halting the disease progression.

Table: 01 Showing Dosha Avasthas in Various Ritus.

<i>Dosha</i>	<i>Chaya</i>	<i>Prakopa</i>	<i>Prashama</i>
<i>Vāta</i>	<i>Grishma</i>	<i>Varsha</i>	<i>Sharad</i>
<i>Pitta</i>	<i>Varsha</i>	<i>Sharad</i>	<i>Hemanta</i>
<i>Kapha</i>	<i>Sisira</i>	<i>Vasantha</i>	<i>Grishma</i>

Every season has its meteropathy. It is mentioned in *Ayurveda* that understanding the seasonal variations, *Avasthas* of dosha, and adopting *Ritucharya* helps to check further progress of disease and thus breaking the epidemiology of disease progression or seasonal outbreaks of diseases. For example, Measles is usually at its peak during early spring, upper respiratory tract

infections frequently show a seasonal rise during winter months. Bacterial gastrointestinal infections are prominent in summer months because of warm weather and the rapid multiplication of flies. Seasonal outbreaks of today's era can also be synchronized under this concept of *Ritu*. Cyclic trends/ Seasonal trends in epidemiology can be understood in this way.

Table: 02 shows Dosh Vitiations and Probable diseases to occur in Various Ritus along with Seasonal outbreaks of disease in the present era.

Ritu	Dosha Vitiations	Probable Disease	Seasonal Outbreaks of disease in the present era
Vasantha	Kapha	Agnisadana, Praseka, Gouravata etc	Chickenpox, Measles, Whooping cough, Rubella etc
Varsha	Vata	Ushnakamitva, Kampa, Anaha, Sakrutgraha, Pralapa, Bhrama	Typhoid fever, Malaria, Polio, Cholera etc
Sharad	Pitta	Alpanidrata, Daha, Peetavinmutra netra twak	Polio, Typhoid fever, Malaria which resembles Pitta vitiation.

EPIDEMIOLOGICAL SHREDS OF EVIDENCE IN AYURVEDA IN TERMS OF ENVIRONMENTAL FACTOR (DESHA)

The Greek Physician Hippocrates known as ‘The father of medicine’ was the first person known to have examined the relationship between the occurrence of a disease and environmental influence.

The father of Epidemiology John Snow designed a spot map to understand the relation between the occurrence of the disease Cholera and nearby water bodies, which identifies the importance of environmental factors in the causation of disease.

Environmental factor in Epidemiology encompasses extrinsic elements that impact both agents and the opportunities for exposure. This includes physical attributes including geophysical conditions, climatic variables, and physical surroundings. An individual’s health is profoundly affected by these factors.

Understanding and Analyzing the Ayurvedic concept of Trividha Desha with Geophysical or Ecological and Physical Conditions in epidemiology:

The concept of Trividha Desha (*Jangala*, *Anupa*, and *Sadharana*) is attributed to the concept of epidemiology in Ayurveda and it plays a vital role in clinical practices.

The geophysical condition of *Jangala Desha* shows that it is largely covered by dry and rough sands as well as gravel. *Anupa Desha* is generally the marshy land which is located near the riverbanks or sea and *Sadharana Desha* has more trees having both fruits

and flowers, birds, etc. The people residing in *Jangala desha* (Dry Forest land) are dominated by *Vāta* and *Pitta* and most of them are sturdy.⁵ Vangasena stated that *Jangala Desha* will vitiate *Raktha* and *Pittavikaras*.⁶

The people residing in *Anupa Desha* (Marshy Land) have tender bodies and are generally dominated by *Vāta* and *Kapha*.⁷ People inhabiting *Sadharana Desha* (Normal land) are said to be sturdy, tender, and endowed with strength, complexion, and compactness.⁸ *Desha* contributes to the severity of the disease also. Disease severity lessens when the disease produced in *Anupa Desha* is brought to *Jangala Desha* and vice versa.⁹

If the person residing in *Marubhumi Pradesha* gets afflicted with *Vatavyadhi* the prognosis is said to be *Kashtasadya* and similar in the case of a person residing in *Anupa Desha* gets affected with *Kapha* predominant *Vyadhis*. Altogether *Chakrapani* quoted that the non-conducive geographical condition for disease is said to be *Sukhasadya* (Easy to cure).¹⁰

Understanding and Analyzing of Concept of Desha and Water Sources in Ayurveda concerning Epidemiology:

The existence of human beings depends upon land and the quality of water depends on the *Desha* originates and the direction of flow of the particular water body. Water flowing from *Marubhumi* or *Jangala Desha* is said to be an aphrodisiac and good for health.¹¹ Water from *Anupa Desha* is not suitable for health¹² and that of the *Sadharana* region is suitable for drinking, it is

light, kindles digestion, and is cold in potency.¹³ Disease *Slipada* is found to be prevalent in areas where accumulation of stagnant water is seen.¹⁴

Table: 03 Shows the place of River origin and prevalent disease conditions.

Origin of River	<i>Charaka Samhita</i> ¹⁵	<i>Susrutha Samhita</i> ¹⁶	<i>Ashtanga Hrudayam</i> ¹⁷
<i>Paschima Abhimukha</i>	Possess wholesome water	River's flow through the <i>Jangala Desha</i> is <i>Laghu</i> and <i>Pathya</i>	Clear water and good for health
<i>Purva Abhimukha</i>	Water is soft and heavy	River's flow through <i>Anupa Desha- Guru Apathya</i>	Not good for health
<i>Dakshina Abhimukha</i>		River's flow through <i>Madhavaa Desha Pathya</i>	
<i>Sahya and Vindya Parvata</i>	Water causes disease- <i>Shiro roga, Hrud roga Kushta and Sleepada</i>	<i>Sahya</i> – causes <i>Kushta roga. Vindya</i> – causes <i>Kushta and Panduroga</i>	Cause <i>Kushta, Panduroga, Shiroroga</i>
<i>Malaya Prabhava</i>	Water which possesses stones is clear and just like nectar	<i>Krimi, Pashanasikata vahinya Pathya</i>	Fall from height and dispersed into drops - Good for health Stagnant water produces diseases of the head and heart, <i>Sleepada</i>
<i>Himavat Prabhava</i>	The rivers that dispersed by hitting stones are sacred and wholesome	Cause <i>Hrudroga, Swayadu, Shiro roga, Slipada and Galaganda</i>	Fall from height and dispersed into drops – are good for health Stagnant water – produces diseases of the head and heart, <i>Sleepada</i>
<i>Prachi - Avanthi</i>		Causes <i>Arshas</i>	<i>Arshas, Udara, Sleepada</i>
<i>Pariyatra</i>	Responsible for the diseases of the head, heart, skin diseases, and <i>Sleepada</i>	<i>Pathya, Give Bala and Arogya Tadagaja - Pathya</i>	<i>Tridosha Shamana Balya and Vrishya</i>

Understanding and Analyzing the Concept of *Desha* and Dietetic Culture in *Ayurveda* concerning Epidemiology:

Ayurveda says “*Aharasambhavam Vasthu rogaschaahara sambhavaha*”.¹⁸ *Ahāra* not only helps in nourishing the body and preserving

health, but when used improperly, it is also a major contributing factor to the majority of diseases. Dietary regimens followed in particular populations have various health impacts on the people residing there. Food articles endow the attributes of that particular region it grows.

Table: 04 Shows the place of the Dietetic regimen of Specific *Desha* and Disease Prevalence

Region	Food items	Diseases/ Health condition
<i>Anupa desha</i>	<i>Vrihi</i> ¹⁹	<i>Apathya/Ahita Pittakaraka</i>

<i>Dhanva desha</i>	<i>Vrihi</i>	More Ahita Yields Poor strength
<i>Prachya/ Eastern</i>	<i>Matsya, Anna</i> ²⁰	<i>Kaphaja Vikaras</i> <i>Sleepada, Galaganda</i>
<i>Dakshina/ South</i>	<i>Matsya</i> from both <i>Nadi</i> and <i>Samudra</i>	<i>Kushta</i>
<i>Kambhoja</i>	<i>Masura, Yava, Kodala, Tila</i>	<i>Arshas</i>
<i>Pratichi</i>	<i>Māmsa, Sura</i>	<i>Rajayakshma</i>
<i>Bahlika</i>	<i>Teeksna Ushna Abhishyandi Annapa-naas</i>	<i>Balasaka</i>
<i>Parvata</i>		<i>Abhishyanda</i>

The dietary habits of particular *Desha* even account for the prevalence of certain diseases. e, g. People of *Bahlika, Surashtrika, Sind,* and *Sauvira Desha* consume large amounts of salt and they consume salt even with milk. Produces fatigue, Lassitude, and weakness in their body.²¹

- **EPIDEMIOLOGICAL SHREDS OF EVIDENCE IN AYURVEDA IN TERMS OF HOST FACTOR (PURUSHA)**

Host factors represent intrinsic characteristics unique to a specific individual, exerting a discernible influence on an individual's encounter with the disease progression, susceptibility to or reaction to a causative agent. Host factors include demographic characteristics such as Age, Sex, biological characteristics, Social and economic characteristics, and lifestyle factors.

In *Ayurveda*, while mentioning the concept of *Desha*, the unique concept of *Deha Desha* has been given prime importance. The *Deha Desha* accounts for the examination of patients in terms of their *Vaya, Agni, Bala, Prakṛti, Satva, etc.* Place of birth can even decide the *Bala* of the patient, A Person who takes birth in *Jangala Desha* is said to be *Balavanta Purusha* (sturdy and hard), *Anupa Desha Purusha* are with tender bodies and *Sadharana Desha* are endowed with good strength and complexion.²²

People taking birth in *Balavantha* places like *Sindh* are strong by nature because of some characteristics of that particular region.²³

While dealing with the disease pathogenesis and prognosis *Ayurveda* considers *Purusha* a special entity. According to *Chakrapani*, the *Asadharana* cause of *Janapadodwamsa* is subjective and it varies from human to human like food, habits, etc.²⁴.

EPIDEMIOLOGICAL SHREDS OF EVIDENCE IN AYURVEDA IN TERMS OF AGENT FACTOR (NIDANAS)

One or several agents may contribute to the illness. Agents of infectious disease include bacteria, viruses, parasites, fungi, and Molds. About non – infectious diseases, disability, injury, or death, agents can include chemicals from dietary foods, tobacco smoke, solvents, radiation or heat, nutritional deficiencies, or other substances such as poison, and also mental factors.

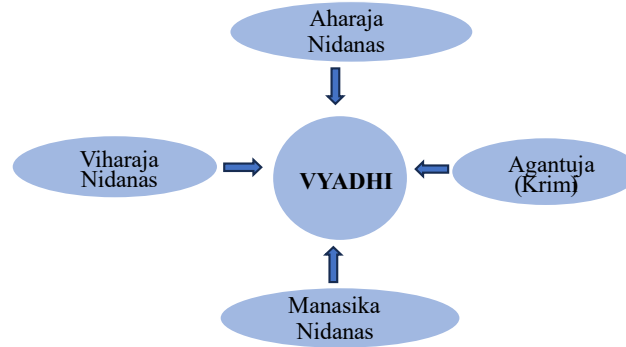
Understanding and Analyzing of Ayurvedic concept of Different *Nidāna Sevana* with Concept of causation and Dynamic of disease transmission in epidemiology:

In the early period, various concepts of disease causation were in vogue. Later evolved the concept of multifactorial causation of disease which states there are many factors in the etiology of disease. Later ages it was found that there was a complex interrelation between all these causative factors thus evolving the concept of the web of causation of disease. Ideally suited for chronic disease.

In *Ayurveda*, while mentioning the prevention of disease it is said that those who indulge in healthy food and activities, who discriminate good and bad accordingly, who develop the habit of charity, and who have the quality of forgiving will always

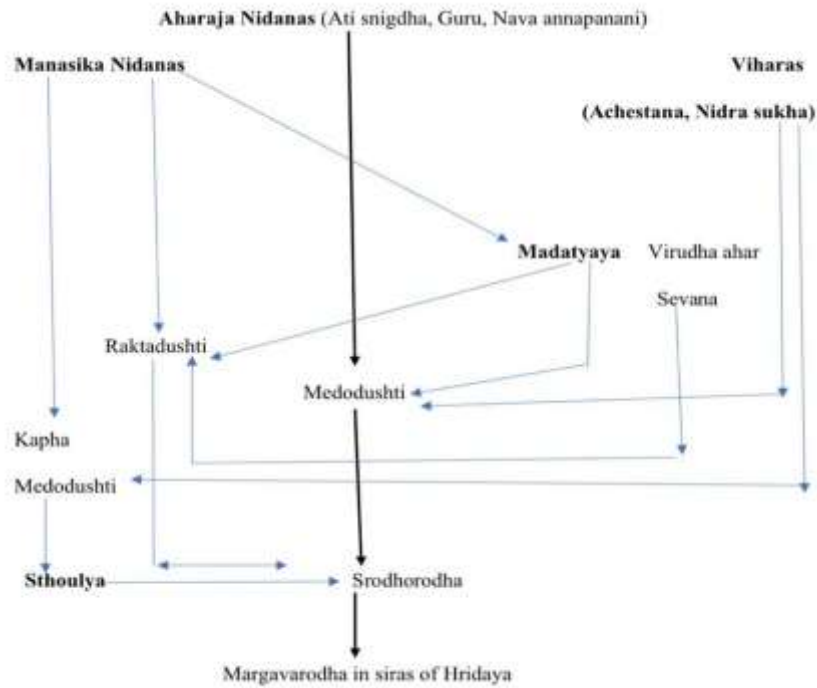
be devoid of physical, mental, social and spiritual ailments which indirectly states that all these factors are contributory for the occurrence of a disease,

Figure: 01 Ayurvedic view of Multifactorial disease causation



Taking *Hridroga* as an example to understand the concept of the Web of causation in epidemiology.

Figure: 03 Ayurvedic view of Web of Causation of Disease



Understanding Dynamics of disease transmission in Ayurvedic concept of Samkramika Rogas.

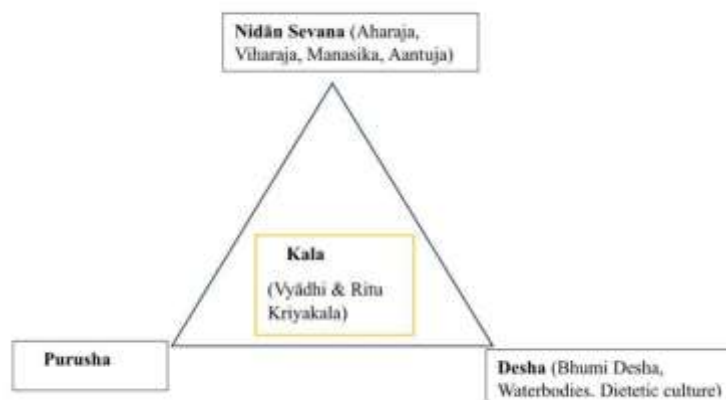
Infectious disease continues to be a significant threat to public health. *Ayurveda* pays huge attention to restricting the progression of infectious diseases. *Sankramika Roga* in *Ayurveda* describes a communicable or contagious disease that transfers from one person to another. Infectious diseases are transmitted from the reservoir/Source of infection to the susceptible host through different modes. The concept of *Krimi* has been mentioned In *Ayurveda*, which correlates with the agent factor in the epidemiology of infectious diseases.^{25,26,27,28} The word *Krimi* here accounts for various types of microorganisms like protozoa, bacteria, helminths, and viruses.

Ayurveda mentions *Samkramika rogas*²⁹ and its different ways of communicability such as *Prasanga* (Close contact), *Gatra Samsparsha* (Skin to skin contact), *Nishwasath* (Exhaled air) *Sahabhojanat* (Sharing food on the same plate), *Saha Sayyat* (Sharing bed with others), *Vastramalyanulepanath* (using clothes, garlands, anointing paste can be correlated with modes of transmission said in epidemiology.

DISCUSSION

Epidemiology has contributed significantly to our present-day understanding of the multifactorial causation of disease. The new advanced model of the triangle of epidemiology includes all facets of disease causation i.e., the time factor, environmental factor (behavior, culture, physiological factors, ecological elements), host factor (groups or populations and their characteristics), and agent factor (causative factors). All living body is a miniature representing the universe, clearly stated by *Loka purusha sāmānya siddhānta*. Alteration of the structure and function of the universe can have an impact on the human body. There are hidden tenets of epidemiology mentioned in *Ayurveda* but they are scattered. Converging all the possible concepts of epidemiology mentioned in *Ayurveda* and synchronizing them under the advanced model of the triangle of epidemiology provides background data that helps in better planning and organization of preventive curative aspects. *Kala*, *Desha*, and *Purusha* play a significant role in the etiopathogenesis of disease in humans.

Figure no 4: Ayurvedic understanding of epidemiological triad.



Time factor (*Kala*) has been given utmost importance in *Ayurveda* and it plays a major role in disease epidemiology. Understanding *Kala* in terms of *Vyādhi*

kriyakala can have a direct correlation with the Natural history of disease.

Climate fluctuations instigate the emergence of infectious diseases as pathogenic organisms endure in

external environments under conducive conditions like changes in temperature, humidity, sunlight, etc. Consequently, annual climate variations contribute to heightened occurrences of various seasonal diseases. These seasonal trends or cyclic trends in descriptive epidemiology can be seen in Ritu Kriyakala mentioned in *Ayurveda*.

Environmental factors in epidemiology can correlate with the *Desha* concept in *Ayurveda*.

Geophysical or ecological and physical aspects of environmental factors are mentioned under.

Trividha Desha concept, which shows the probable disease epidemiology of that concerned *Desha*. e.g., People residing in *Jangala Desha* are more prone to get afflicted with *Vāta vyadhis*. Not only in disease causation, but *Desha also* has its role in the prognosis of the disease. E.g.,

The severity of the disease that occurred in *Jangala Desha* lessened when it was brought to *Anupa Desha*. Water source is a major part of ecology, it has a direct effect on disease causation. The quality of a water body depends on the *Desha* from which it originates and its direction flow. Generally, water from *Jangala Desha* is considered as one which gives good strength, water from *Anupa Desha* (Marshy land) carries all the blemishes that are not suitable for health and that of *Sadharana Desha* is considered suitable for consumption. Even dietetic culture and

behavioral habits of people residing in a particular region contribute to specific disease formation and its progression. For people residing in *Bahlika desha* are accustomed to taking *Abhishyandi āhāra* which commonly causes diseases like *Balasaka*. The host factor mentioned in epidemiology can be correlated with the concept of *Purusha* in

Ayurveda. The unique concept of *Purusham purusha veekshya* states the importance of the host in *Ayurveda*. Though all factors contribute to the occurrence of a disease, only some individual gets affected by the disease as such this makes strong evidence of host factors in *Ayurveda*.

Agent factor or causative factor in *Ayurveda* can be considered as every possible *Nidanas* for the occurrence of a *Vyādhi*. *Nidanas* like *Aharaja*, *Viharaja*,

Manasika as well as *Aganjuja* contribute to this. Any one of these factors along with the above-mentioned two other limbs of the triad of epidemiology cause disease (Can be correlated to Multifactorial causation of disease) or the interconnection of all these *Nidāna* factors along with the other two limbs causes the occurrence of a disease (Can be correlated with the web of causation of disease) in *Ayurveda*. *Sankramika Roga* concept in *Ayurveda* clearly states the different modes of disease transmission, which hold good in present-era epidemiology as well.

CONCLUSION

The basic doctrine of epidemiology is to study the clusters of causes and their relation to other factors like time, environment, and groups or populations in the causation of a disease and its whole concept is to halt the progression of ailments and thereby enable effective treatment with minimal patient discomfort. As *Ayurveda* primarily aims for the prevention aspect understanding of epidemiological tenets mentioned in *Ayurveda* plays relevance even today.

Epidemiology in *Ayurveda* apart from the concept of *Janapadodwamsa* may sound relatively new area, but the doctrine of epidemiology is well narrated in *Ayurvedic* classics. The whole concept of epidemiology in *Ayurveda* can be understood under various headings of epidemiology like the Advanced model of triangle of epidemiology, multifactorial causation of disease, Web of causation of Disease, Modes of disease transmission as well as the complete concept of descriptive epidemiology. It provides data concerning the types of disease problems and if an appropriate regimen is followed, there is no fear of causation of disease. The meticulous understanding of epidemiology in *Ayurveda* proves the theories of epidemiology given years back hold good even today with the concepts of present-day epidemiology.

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Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Anjana Krishnan et al: Doctrine of epidemiology in ayurveda. International Ayurvedic Medical Journal {online} 2024 {cited February 2024} Available from: http://www.iamj.in/posts/images/upload/386_397.pdf