

Environmental health toxicology-a review

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ABSTRACT

A good quality environment has an assertive impact on human health. Healthy life and environmental are dependent on each other, all life on this planet is affected when our environment is contaminated or polluted. The physical, chemical, and biological factors are included in Environmental health. Toxicology helps us to understand what, and how chemicals may cause harm to public health. This article gives an insight to the fundamental concepts and scope of environmental health. In review we have tried to elaborate that the environment is directly linked to human health. The impacts of the pollutants on human health are discussed here. In various texts of Ayurveda *Dincharya*, *Ritucharya*, and *Janpadodhvasa*. Has been explaining environmental health.

Keywords: Environment, toxicology, *Dincharya*, *Ritucharya*, *Janpadodhvasa*

INTRODUCTION

Environmental health is very important as it helps in better understanding of relationships between our environment and the incidence of disease. Environmental health aims towards preventing disease and avoid major issues related to it. The impacts of environmental factors on health are varied in nature.

Toxicology mainly deals with the study of toxicants or toxic substances, their mechanism of action, chemical structure, potency, and effects human bodies.¹

Environmental toxicology is related to the study of various effects of synthetic and natural pollutants in the environment. It is mainly related to the study of anthropogenic origin environmental chemicals.

The study of the effects of harmful environmental pollutants on the human

body and animal body comes under the heading of Environmental health toxicology. also, it deals with the mechanism of action, toxicokinetic, toxicodynamic, and treatment that is associated with the pollutant.

Human beings are exposed to a wide variety of contaminants and pollutants in their homes and workplaces. The exposure to these pollutants can be short term or long term

Ayurveda implies a holistic approach to life and living in harmony with nature. *Panchkarma* therapy (*Vamana*-Emesis, *Virechana* Purgation, *Niruha*, *Anuvasanam*, *Nasya*) is the best treatment. Thereafter proper use of *Rasayan* (Rejuvenative therapy/Immuno-modulator) measures and management with the drugs collected in a normal environment is recommended. *Sadvritta* & *Aachar Rasayan* (Good behavioural activity and personal hygiene) is also helpful for reducing the effect of *Adharma* (i.e. not following the rules & regulations said by ancestors) which is the main reason of *Janpadodhvasa* (Imbalance of ecosystem).

MATERIALS & METHODS

REVIEW OF LITERATURE

Environmental toxicology is the study of the toxic effects of pollutants on environmental health. detailed account of environmental toxicity caused due to the different sources of pollution and pollutants has been taken into consideration in Environmental toxicology.

Environmental health:

human health and the quality of the environment are the components that are referred in environmental health. "It refers to the theory and practice of assessing, controlling, and preventing those factors in the environment that can potentially affect the health of the present and future generations" (WHO, 1993). It aims to control disease and illness. It also aims to promote the well-being of humans by finding the sources which are hazardous for the environment.

Environmental Health Hazards Material:

The pollutants that are potentially harmful and may pose long-term health risks to people who live and work around the area or facilities that produce or use them.

Hazardous materials include:

- Infectious Agents: Environmentally transmitted infectious diseases spread from interactions of individuals with food, water, air, or soil. Environmentally transmitted diseases include Salmonella, malaria, etc.
- Toxic heavy metals: mercury, lead, arsenic, cadmium, copper, selenium is of most concern. They have direct physiological toxic effects. Some are stored or incorporated in living tissue, sometimes permanently.
- Particulates: Released into the atmosphere by many natural processes and human activities. Chemical toxins, such as heavy metals, enter the biosphere as particulates.

- Electromagnetic fields: Electromagnetic fields are part of our everyday urban life.
- Personal pollutants: Most common of these are tobacco, alcohol, and other drugs.

Human Exposure and its impact on strotas (micro-channels)

Human beings are exposed to a wide variety of contaminants and pollutants in their homes and workplaces. The exposure to these pollutants can be short term or long term and the effects range from simple to complex diseases. Let us now see some pollutants humans are exposed to and their impacts *on strotas* of our body.

Air pollutant exposures and *Pranava Strotas*:

Mode of exposure-The most important sources of air pollution include improper modes of transport, vehicular exhaust, household fuels and waste burning, coal-fired power plants, and industrial activities. The pollutants that may penetrate into the lungs and in the cardiovascular system, causing very high risk to human health. such as sulphate, nitrates and black carbon, which go deep. Ozone can be transported over long distances and causes air pollution. High concentrations of ozone can result in higher incidences of respiratory disorders.

From Ayurveda point of view respiratory diseases occur due to encroachment of *Pranava Srotas*. *Pranava Srotas* is first and important *Srotas*, which carry *Prana* all over body. It is related to heart, lungs and other structures like pulmonary artery and pulmonary vein, most of the *lakshanas* explained in the

dushti of Pranava Srotas are related to the respiratory system so it has been related to respiratory system.

Radiation exposure and *Doshic Imbalance*: Radiation can arise from different sources and it has sufficient energy to cause chemical changes in our cells and damage them even permanently. Radiation exposure imbalances all three *doshas*, *Vata Pitta and Kapha*. The negative effects of radiation on the body will vary depending upon the degree of radiation exposure. Because radiation affects the nervous system, this disturbance in the nervous system shows up *doshic imbalances*.

Chemical exposure and *Twak Rogas*:

Mode of exposure: These days we are exposed to a number of chemicals every day. It can be in the products we use or in food, water, the soil and the air. We can also be exposed to different chemicals at our workplace. Chemicals also give rise to several health disorders. The factors that lead to chemical toxicity include: the type, the quantity of chemical exposure, when and how long you are exposed, also the route of exposure, age of an individual and the general state of the individual. Chemical toxicity can cause damages to our organs, weaken our immunity, may develop carcinogenicity and so on. In Ayurvedic literature, all skin disorders come under one umbrella called "*Kustha*," and different symptoms have been explained under the *Dooshi* and *Gara visha lakshana*.^[4] *Gara visha* (~acute toxicity) comes to be such context. Various methods through which combinations of

substances or chemicals can be administered to generate poisonous symptoms have been explained here. *Pani visha* (~hand wear poisons), *Paduka visha* (~footwear poisons), *Abhyanga visha* (~poisonous applications), and *Abharana visha* (toxic ornaments), etc., lead to dermatitis-like conditions. In the present case, pesticide-induced contact hand dermatitis has been diagnosed in Ayurvedic terms as *Gara janya twak roga* (~artificial poison-induced skin disease), and the principle management will be followed as per *Kustha chikitsa* and *Visha chikitsa* simultaneously to manage the condition.

Noise exposure and its effects on *Karnendriya*: High levels of noise can cause physical and psychological health disorders.

Mode of exposure: loud noise from industries, improper urban planning, loud social events, honking vehicles, construction sites and household appliances which include gadgets like TV, mixer, grinders, pressure cooker, washing machine and one of the important is mobile.

High noise exposures in factories, industries can cause hearing loss, hypertension, heart diseases, sleep disturbance. Presbycusis or hearing loss normally occurs with age but high noise level exposure over a period of time can lead to presbycusis. Noise exposure is known to cause tinnitus (ringing sounds in the ears), vasoconstriction, and also adverse effect on cardiovascular system. Chronic noise exposure has also been associated with insomnia and increased incidence of mental health disorders. In

Ayurveda Samhita like *Vagbhata samhita* while explaining the *Karnagata Vyadhi* many of *Karnaroga* has *Hetu* of *Mithyayogen Shabdasya*[6] which means many ear diseases are caused due to unpleasant sound which is noise pollution. *Mithyayogen Shabdasya* is unpleasant and unwanted sound which causes hearing problems.

Exposure to pesticides and their impacts:

Dichlorodiphenyltrichloroethane (DDT) is an insecticide which is used in agricultural purposes. exposure to DDT from foods, including fish, meat, and dairy products is seen very often. DDT can be absorbed in the body by eating, breathing, or touching products contaminated with DDT which leads to various *twak roga* (skin disorders). Here the first thought that should be taken into consideration is *Nidan Parivarjan* which means stop doing the thing that causes trouble. As per Ayurved the primary *chikitsa siddhant* is *Nidan Parivarjan*.

DISCUSSION

- *This review article is a preliminary approach to find out solutions for emerging environmental pollution problems.*
- Two things that we can do to manage the impact of these pollutants- one is to improve immunity and secondly, improving the quality of air at home. to strengthen immunity, a diet rich with antioxidants to protect the body from the hazardous impact of the pollutants. Right food is an important input to adequately handle the impact of pollution on

our health, since there is little that can be done to reverse the problem externally.

- **Modify Lifestyle:** Exercising regularly and maintaining normal body weight can help in preventing many disorders. Ayurveda recommends inculcating healthy habits like waking up early in morning. Following the *Dincharaya, Rutucharya, Sadvrita*, person's physical and mental health can be secured. *Yogasana and Pranayam: Bhujangasana, Shavasana, Shalabhasana, Pashchimotasana* are useful *asanas* for *Pranavaha Srotas* as it accelerates the blood circulation of the lungs and thus increase the vital capacity of lungs.
- Daily practicing *pranayam, kapalbhati and jal neti* to combat the ill effects of pollution. Will help in prevention of the respiratory disorders. "Inhale from nose and hold for few seconds. Exhale from nose and breathe out the maximum air from the nose and then open mouth and push out the last air left with a sound. Doing this in a standing position, 10 times a day could help to combat with the respiratory issues caused due to environmental pollutants.
- Taking diet which is rich in fibre, proteins and vitamin rich is highly recommended.
- In various *samhitas* many remedies and measures have been described by our Acharyas to detoxify the poisoned environment.

A healthy environment encourages us to live in harmony with nature. The concept of promoting various tree plantation shall play a crucial role while dealing with it and measures that improve the standard of living and quality of health in our environment. Therefore, maintaining a healthy environment is crucial in increasing the quality of our life and longevity of life. The basic necessity for a healthy environment include: Good air quality, clean surface and ground Water, reducing toxic substances and hazardous wastes, healthy homes, offices and communities, good surveillance, good water quality and sanitation.

- Conservation of electricity, recycling, electric vehicles, Purchase energy-efficient appliances can be taken to prevent from Global Climate Change.

CONCLUSION

- the detailed study of toxicants is far more essential to reduce the incidence of health disorders.
- Primarily the assessment and secondly the monitoring for the presence of toxic substances in environment, then the effects of toxins on biotic and abiotic components is very much essential.
- An extra care of diet, diet pattern modification and life style modification (*PathaApathya*) with Yogic procedures play major role in the prevention
- Healthy environments lead to healthy individuals. A healthy

environment encourages us to live in harmony with nature with an increased awareness of how our behaviour impacts our environment or surroundings. Therefore, maintaining a healthy environment is central for our healthy living.

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