ejpmr, 2024, 11(11), 146-149

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

COMPREHENSIVE REVIEW OF PRANAVAHA STROTAS IN OCCUPATIONAL HAZARDS

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Article Received on 04/09/2024 **Article Revised on 24/09/2024** **Article Accepted on 14/10/2024**

ABSTRACT

The Pranavaha Strotas, as described in Ayurvedic literature, refers to the channels responsible for transporting Prana (vital life force) and the respiratory system. Occupational hazards, especially those involving exposure to dust, chemicals, and other airborne pollutants, are known to adversely affect the respiratory system. This article provides a comprehensive review of the impact of occupational hazards on Pranavaha Srotas, discusses Ayurvedic and modern perspectives on respiratory health, and suggests Ayurvedic interventions for the prevention and management of occupational respiratory diseases. **Material and Method:** This review synthesises data from Ayurvedic texts, modern occupational health studies, and clinical research on respiratory diseases. **Result:** Occupational hazards pose significant threats to respiratory health, as they can obstruct and damage the Pranavaha Srotas. So, there are several Ayurvedic interventions like pranayama, yoga, etc which can help to prevent and manage disorders of the Pranavaha Strotas in individuals exposed to occupational hazards. **Discussion:** Occupational hazards such as exposure to dust, chemicals, smoke, extreme temperatures, and pollutants can have a direct impact on *Prana Vaha Srotas*, particularly for workers in industries such as construction, mining, manufacturing, and healthcare. So, it is important to maintain the balance of *Prana Vaha Srotas* through preventive and therapeutic approaches.

KEYWORDS: Pranavaha Strotas, Occupational Hazards, Respiratory Health, Pollution.

INTRODUCTION

Ayurveda emphasizes a holistic approach to health, focusing not only on the treatment of diseases but also on their prevention by maintaining the balance of bodily systems. A detailed understanding of how occupational hazards influence the Pranavaha Srotas is critical in devising both Ayurvedic and modern strategies to mitigate these risks. This review aims to explore the impact of occupational exposures on the respiratory pathways, examine the physiological and pathological aspects of Pranavaha Srotas, and discuss preventive and therapeutic measures from an integrative medical perspective.

The **Pranavaha Srotas—**the respiratory system in Ayurvedic physiology—plays a crucial role in maintaining the flow of life-sustaining **prana** (vital air) throughout the body. India is a developing country with a variety of occupations including agriculture, manufacturing, industries and services. With growing industrialization and technological advancements, exposure to various occupational hazards affecting the respiratory system has become a significant public health concern. Workers in various sectors, such as mining, manufacturing, construction, and agriculture, are frequently exposed to harmful substances like dust, fumes, chemicals, and gases, which may disrupt the normal functioning of the Pranavaha Srotas.

According to the **International Labour Organization (ILO)**, about 2.78 million workers die annually due to work-related illnesses and injuries. Occupational diseases account for approximately **2.4 million** of these deaths, which is around 86% of the total. More than **160 million new cases** of occupational diseases are estimated to occur every year worldwide. In developing countries, underreporting of occupational diseases is common, so the actual prevalence may be higher.

By combining traditional Ayurvedic concepts with contemporary occupational health practices, this review seeks to provide a comprehensive understanding of maintaining respiratory health in hazardous work environments.

METHODOLOGY

- **Ayurvedic Texts**: Classical Ayurvedic sources, including **Charaka Samhita**, **Sushruta Samhita**, and **Ashtanga Hridaya**, were consulted to understand the concept of Pranavaha Strotas.

- **Modern Research**: Peer-reviewed journal articles, occupational health guidelines, and epidemiological studies related to respiratory diseases were reviewed to assess the impact of occupational hazards on respiratory health.

- **Intervention Studies**: Studies on the efficacy of Ayurvedic treatments, including **Nasya (nasal therapy)**, **Dhumapana (medicated smoke inhalation)**, **Herbal Formulations**, **Pranayama and Yoga** were evaluated for their potential in managing occupational respiratory disorders.

Literature Review

Concept of Srotas

Charaka has defined it as "Sravanata Srotamsi" means the structure through which Sravanam takes place. ("www.ijrap") according to Chakrapani, Sravarnat refers to the Sravanam of Rasadi Poshya Dhatu. "Srotas" refers to the channels or pathways in which specific tissues are created, substances are metabolised, released, or transferred materials.

Prana Life

The most important of all of these Srotas is called Pranavaha Srotas. Because Pranavaha Srotas are a particular kind of Srotas that transport Prana, Sushrut provides a comprehensive explanation of Prana. Acharya Sushurta say Agni, Soma, Vayu, Satva, Rajas, Tamas, Panchendriya (five sense organ) and Bhutatma (soul) – together constitute prana (life).

Action of Vayu

All the life activities of the life body are performed by the normal Vata which is said to be the very life of living beings.

Prana Vayu is a vital concept in Ayurveda, representing one of the five types of **Vayu** in the body. It plays a crucial role in the overall functioning of the body and mind.

Specific action and sites of Pranavayu

Pranavayu is responsible for these activities like Swasa (Respiration), Sthivana (Spitting), Ksavathu (Sneezing), Udgara (Belching), Ahara (Swallowing of food etc.).

Pranavayu mainly remains in the following places in the body like Murdha (Brain and head), Uras (Chest and heart), Kantha (Neck and trachea), Jivha (Tonge), Mukha (Mouth), Nasika (Nose).

Pranavaha Strotas in Ayurveda

The Pranavaha Strotas, according to classical Ayurvedic texts like Charaka Samhita and Sushruta Samhita, are responsible for the intake of air, its purification, and its distribution throughout the body. These texts emphasize the importance of maintaining balance in these strotas to avoid diseases related to breathing, such as **Shvasa (dyspnea)** and **Kasa (cough)**.

Pranvaha Srotas 's Mool

According to Charaka the heart and the Maha Srotas (alimentary tract) are the sites of origin (controlling organs) of the channels carrying Pranvayu. According to Sushrut Hridya (heart) and Rasavahi Dhamani (arteries carrying rasa dhatu) are the sites of origin (controlling organs) of the channels carrying Pranvayu.

Symptoms of Pranvaha Srotodushti

According to Acharya Charaka the following are characteristics symptoms.

Ati Srushta Shwasam-too long berathing, Ati Baddham-too short breathing, Kupitam Shwasam-difficult breathing, Alpam Alpam Shwasam- frequent and interrupted Breathing., Abheekshnam Shwasam- highly disturbed breathing patterns looking scary, Sashabda Shwasam - abnormal sound during breathing, Sashula Shwasam- painful breathing.

Prana Vayu Dusti Hetu

It refers to the imbalance or disturbance of Prana Vayu, which can lead to various physical and mental health issues. Prana Vayu governs essential functions such as respiration, mental clarity, sensory perception, and the regulation of the mind and emotions. When there is an imbalance, it can disrupt these functions, leading to illness.

Causes of Pranava Srotas vitiation

Kshaya - depletion of tissues, Sandhaaranaat - forcibly withholding the natural body reflexes or urges Example, those of stools, urine etc, Roukshyaat - intake of dry foods, Vyaayaamaat Kshudhitasya - excessive exercise in presence of hunger, Anya daaruna kaarya - doing many such activities which are beyond ones physical capacity.

Occupational Hazards and Respiratory Health in Modern Medicine

Occupational hazards can significantly impact the respiratory system depending on the type of exposure. Below are some common ways in which the respiratory system is affected by different occupational hazards:

1. Dust and Particulates

- **Example:** Coal mining, construction, agriculture, and textile industries.

- **Impact:** Inhalation of dust (silica, coal dust, asbestos fibers, etc.) can lead to conditions like pneumoconiosis,

asbestosis, and silicosis. These particles accumulate in the lungs, causing scarring (fibrosis) and reducing the lungs' ability to expand and function properly. Long-term exposure increases the risk of chronic lung diseases like **chronic obstructive pulmonary disease (COPD)** and lung cancer.

2. Gases and Fumes
- **Example:** Welding, chemical manufacturing, and cleaning industries.

- **Impact:** Inhalation of harmful gases like ammonia, chlorine, sulfur dioxide, and volatile organic compounds (VOCs) can cause acute respiratory problems such as chemical pneumonitis, asthma, and bronchitis. Chronic exposure can damage lung tissue, leading to irreversible conditions like pulmonary fibrosis or severe forms of COPD.

3. Allergens and Irritants
- **Example**: Agriculture, healthcare, and food processing industries.

- **Impact:** Exposure to allergens such as mold, animal dander, or food particles can cause hypersensitivity pneumonitis or occupational asthma. Repeated exposure can lead to chronic inflammation of the airways, reducing lung function over time.

4. Biological Agents
- **Example:** Healthcare, waste management, and laboratories.

- **Impact:** Exposure to bacteria, viruses, or fungal spores in certain work environments can lead to infections that affect the respiratory system, such as **tuberculosis** or **legionnaires' disease.** Workers exposed to biological hazards may also develop chronic conditions like hypersensitivity pneumonitis.

5. Toxic Chemicals
- **Example:** Chemical industries, plastic manufacturing, and pesticide use.

- **Impact:** Exposure to chemicals like formaldehyde, benzene, and pesticides can lead to toxic inhalation injuries. These chemicals can cause damage to the respiratory tract lining, leading to chronic conditions like **bronchiolitis obliterans**(also known as "**popcorn lung")** or increasing the risk of cancer in the lungs or airways.

6. Heat and Smoke
- **Example:** Firefighting, foundries, and metalworking industries.

- **Impact:** Repeated inhalation of smoke or exposure to high heat can cause thermal damage to the respiratory tract. Inhalation of toxic combustion products like carbon monoxide, hydrogen cyanide, or fine particulate matter during fires can lead to acute lung injury, carbon monoxide poisoning, or long-term respiratory issues such as chronic bronchitis.

7. Mechanical Stress
- **Example:** Deep-sea diving, high-altitude work, and space travel.

- **Impact:** In some occupations, rapid changes in atmospheric pressure can stress the respiratory system. In diving, for example, improper decompression can lead to pulmonary edema.

Long-Term Effects
- **Chronic Respiratory Diseases:** Prolonged exposure to hazardous substances can cause irreversible damage to the lungs, leading to conditions like COPD, asthma, fibrosis, or even lung cancer.

- **Reduced Lung Function**: Scarring or inflammation from these occupational hazards can reduce lung capacity, limit oxygen exchange, and decrease overall lung function.

- **Increased Susceptibility to Infections:** Occupational lung damage can make individuals more vulnerable to respiratory infections like pneumonia.

Understanding the specific hazards present in a work environment is essential for minimizing respiratory risks and ensuring proper protections are in place.

METHODOLOGY

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DISCUSSION

Occupational hazards, particularly exposure to particulate matter, gases, and vapors, directly affect the Pranavaha Strotas by obstructing the flow of Prana. The effects can be categorized as follows

- **Vata Imbalance**: The inhalation of dry and rough particles, such as dust and chemicals, aggravates Vata dosha, leading to dryness and constriction of the

respiratory passages. This can manifest as wheezing, dry cough, and shortness of breath.

- **Pitta imbalance**: Exposure to heating, sharp, or toxic substances, can lead to inflammatory and heat-related conditions within the Pranavaha Strotas, manifesting as burning sensations, infections, and respiratory inflammation.

- **Kapha Imbalance**: Exposure to moist and oily substances, such as industrial chemicals, increases Kapha dosha, resulting in excessive mucus production and congestion in the lungs. Symptoms include productive cough and heaviness in the chest.

Ayurvedic Perspectives on Disease Pathogenesis

In Ayurveda, diseases of the Pranavaha Strotas can arise from **Avarodha (blockage)** and **Dhatukshaya (tissue depletion)**. Occupational hazards can trigger these processes.

Avarodha: Blockage caused by the accumulation of dust or chemicals in the respiratory passages leads to conditions like bronchitis and asthma.

Dhatukshaya: Prolonged exposure to harmful agents can deplete the tissues of the lungs, leading to degenerative conditions such as emphysema and fibrosis.

Ayurvedic Interventions for Occupational Respiratory Disorders

Several Ayurvedic interventions can help prevent and manage disorders of the Pranavaha Strotas in individuals exposed to occupational hazards

- **Nasya**: The administration of medicated oils through the nasal passage helps clear accumulated doshas and pollutants from the Pranavaha Strotas, promoting respiratory health.

- **Dhumapana**: Inhalation of medicated smoke is beneficial in clearing excessive Kapha and Vata from the respiratory channels, reducing congestion and promoting the free flow of Prana.

- **Herbal Formulations**: Herbs like **Vasa (Adhatoda vasica)**, **Tulsi (Ocimum sanctum)**, and **Pippali (Piper longum)** are recommended for their anti-inflammatory, bronchodilatory, and mucolytic properties.

- **Yogasana & Pranayama:** Practice of Pranayama ie. Kapalbhatr purifies the Nadi. Simple diaphragmatic breathing increases the volume of air moving through the lungs on inhalation and exhalation, it reported that practice of Pranayama and meditation enables patients to take some control over autonomic function, offering the patient an opportunity to dilate the bronchial passages at the onset an asthmatic episode. This may also benefit patients with additional breathing challenges such as chronic bronchitis.

- **Yoga**: Bhujangasana, Savasana, Shalabhasana, Paschimotasana are useful Asana for Pranavaha Srotas as it accelerates the blood circulation of the lungs and thus increase the vital capacity of lung.

CONCLUSION

- Occupational hazards pose significant threats to respiratory health, as they can obstruct and damage the Pranavaha Strotas. The Ayurvedic understanding of respiratory diseases provides valuable insights into the prevention and management of these disorders. Ayurvedic interventions, including Nasya, Dhumapana, and herbal remedies, offer potential therapeutic benefits for individuals exposed to occupational hazards. The yogic practices ike Bhujangasana, Savasana, Shalabhasana, etc. accelerate the blood circulation of the lungs and thus increase the vital capacity of the lung.

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