

INDUSTRIAL DISEASES, PREVENTIVE MEASURES AND AYURVEDIC INTERVENTIONS

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ABSTRACT

An occupational disease is any chronic ailment that occurs as a result of work or occupational activity which is more prevalent in a given body of workers than in the general population, or in other worker populations. Understanding of occupational diseases is essential to manage and prevent the disease by giving health support to the worker or making a modification in the work environment. In present era, where people turning towards *Ayurveda* and *yoga* for the management of chronic diseases including occupational diseases, its need of the hour for an *Ayurveda* physician to be accustomed with common occupational diseases and their management through *Ayurveda*. This paper is an attempt of the same idea.

Keywords: occupational disease, prevention, *Ayurveda*, *yoga*.

INTRODUCTION

Exposure to chemical, physical or biological hazards can cause occupational diseases. Occupational diseases are acute or chronic (gradual or delayed) reactions and are very diverse. To avoid occupational diseases the exposure should be prohibited, regulated, restricted, limited or controlled by industrial hygiene practices & programs. Common occupational diseases are lung diseases, skin diseases, musculoskeletal disorders and diseases of eye and ear.

In India and China, the rates of occupational fatalities and accidents are similar at, respectively, 10.4 and 10.5 per 100,000 for fatalities, 8,700 and 8,028 for accidents.¹

The main motto of *Ayurveda* is “*swasthasyaswasthyarakshana and aturasya vicar prashamana*”, i.e. preventing diseases and maintaining health of healthy individual and treating the illness of a patient.² *Ayurveda* can be utilized in the occupational health both prevention of disease by providing good immunity and treating the occupational disease with proper medications.

OBJECTIVES

- To learn about industrial hygiene
- To understand about occupational exposure limits (OEL)
- To learn what occupational diseases are and how to prevent them.

- To know the *Ayurveda* concepts in prevention and management of these diseases.

Industrial Hygiene

Industrial Hygiene is the art and science of the anticipation, recognition, evaluation, and control of environmental health hazards arising in or from the workplace.

- Safety = prevention of accidents / incidents
- IH = prevention of occupational illnesses

Fundamentals of Industrial Hygiene

- Serial order of controls
- Identification of risks
- Theoretical assessment of exposure
- Monitoring³

OCCUPATIONAL DISEASES

Occupational diseases can be very diverse: viz, Interstitial lung disease Ex: Tuberculosis, Black lung disease, Metal fume fever etc. Skin diseases, Hearing loss, welder's arc eye, Acute and chronic poisoning, Occupational cancer and Muscular disorders like Carpel tunnel syndrome, Lower-back morbidity and trauma of the spine.

Common ailments of occupational health issues: ⁴

Chemical agents: gases, vapors, dust, API & IPI, fumes, mist

Physical: noise & vibration, IR & NIR, climate, Radiation-Ionizing radiation: Alpha-Beta-Gamma-Non-ionizing radiation: UV-light, visible light, infrared, radio waves, microwaves.

Ergonomics: repetition, posture, workforce

Biological agents: bio hazards, fungi, allergens, toxins, viruses, bacteria, plants, insect, animals

Occupational health hazards

- **Immediate or acute reactions**, like shortness of breath or nausea, can be caused by a one-time event, (e.g., a chemical spill) (usually no permanent reactions).
- **Gradual reactions**, like asthma or dermatitis (skin rashes), can get worse and persist when

there is exposure over longer periods (reactions tend to last for a longer time).

- **Delayed reactions or diseases that take a long time to develop**, like lung cancer or loss of hearing, can be caused by long-term exposure. These reactions can be noticed long after the job is over.
- Hazardous substances are chemicals which have a harmful effect on health. Viz,
- **Chemicals** - organic solvents, acids, pharmaceutical ingredients
- **Dust** - metal dust, wood dust, flour
- **Fumes** - welding, soldering...
- **Fibers** - asbestos

Hazardous substances can enter the body in three modes: inhalation, dermal, ingestion

Type of Health Effects: Acute effects – immediate reaction, chronic effects – develop over years

Occupational Exposure Limit (OEL):

The limit how much of a hazardous substance a worker can breathe without harm.

The OEL is the concentration in the air to which nearly all workers may be repeatedly exposed day after day without adverse health effects to themselves or their children.

OCCUPATIONAL RESPIRATORY DISEASES:

The occupational respiratory diseases are of different from viz, rhinitis, laryngitis. Tracheitis, bronchitis, bronchiactis, asthma, COPD and cancer.

Clinical classification: based primarily upon etiology

- Inhalational injury, nitrogen oxides, ammonia, welding fumes, or food flavoring fumes (eg, diacetyl);
- Infections: respiratory syncytial virus, adenovirus, Mycoplasma pneumoniae; Legionella
- Drug-induced reaction: e.g. busulfan, gold, penicillamine.
- Idiopathic cases are often characterized by the insidious onset of cough or dyspnea. An obstructive ventilator defect, without significant responsiveness to bronchodilators, may be present.

Asthma

- Work-related asthma is the most commonly reported occupational lung disease in many countries, which is often under recognized and misdiagnosed. Following are the varieties of occupational asthma.
- Occupational asthma with latency (immunologic)
- Occupational asthma without latency Reactive Airways Dysfunction Syndrome (RADS) or irritant-induced asthma (non-immunologic)
- Work aggravated asthma: Exacerbation as a result of a workplace exposure in an individual with a prior history of asthma

Pneumoconioses

Group of interstitial lung diseases caused by the inhalation of certain dusts and the lung tissue's reaction to the dust. Primary pneumoconiosis are asbestosis, silicosis, and coal dust. Other forms aluminum, antimony, barium, graphite, iron, kaolin, mica, talc, among other dusts. There is also a form called mixed-dust pneumoconiosis.

Pneumoconioses occurs typically after many years of exposure. But in some cases – silicosis, particularly – rapidly progressive forms can occur after only short periods of intense exposure.

Coal workers pneumoconiosis

Inhalation and deposition of silica-free coal dust particles that induce the formation of coal macules, once they reach the alveoli.

Radiographic features to silicosis, but is classified as a separate disease due to its rather characteristic pathologic findings

Preventive measures: use of protection cloth, gloves, aprons, mask, goggle, application of oil

Ayurvedic Perspective of Occupational Lung Disease

Classical texts of Ayurveda have clearly mentioned the *Nidana* (etiological factors) like *Dhoomavata* (inhalation of fumes), *Raja* (exposure to dust & smoke), *vyayama* (strenuous work), *Adhwa* (Prolong walking), *Ratri jaagarana* (awakening at night)

vishamashana (improper food taking) etc.⁵ which directs towards exposure and life style related with specific occupations. It indicates that ancient practitioners of Ayurveda were well aware of the fact that occupation has its impact on human health.

Treatment principle

Treatment principle for respiratory disorders as per Ayurveda is to balance both *vata* and *kapha*.

Ayurveda has potent single drugs and compound formulations for breaking the pathology of these respiratory ailments. These *ayurvedic* drugs possess properties like mucolytic, expectorant, bronchodilator, mast cell stabilizer and have inhibitory action on mediators of inflammation.

Shodhana (bio-purification) procedures may also be prescribed before administering these drugs as per the strength of patient.

Single drugs - Scientifically proven Ayurvedic herbs used to treat respiratory diseases are:

- *Kantkari, Vasa, Madhuyashti, Bharangi, Pushkaramoola, Vibhitaki, Shati, Tulsi, Haridra.*
- Which possess properties like Anti-tussive, Bronchodilator, Anti-allergen, Expectorant, Anti-asthmatic, Anti-inflammatory, Immune-stimulant, Anti-spasmodic, Anti-histaminic, improves pulmonary function, Anti-oxidant, Reduces elevated eosinophilic count, Immunomodulation, Anti-oxidant, Anti-cancer activity.

Compound formulations

- *Vasa VyaghriKashaya, Dashmoola Katutranyakashaya, Bharangyadikashaya, Somlataphanta, Talishadichurna, Sitopladiichurna, Shringyadichurna, Somasava, Vasarista, Vyaghriharitaki, Vasavleha, Kantkaryavleha, Vasa ghrita, Kantakarighrita, Abhrakabhasma, Sameerpannaga rasa, Swasakuthara rasa, Swasakasachintamani rasa, Chandramrit rasa, Shringrabhra rasa, Mahalaxmivilas rasa, Tribhuvankirti rasa, Swasandagutika* and *Mallasindoora* are the common compound formulations which can be

used in the management of occupational respiratory diseases.

- *Haridrakhanda, Shirishadikwatha, Kankasava, Shirishavleha* and *Rasa manikya* are found to be effective in respiratory illness of allergic origin.

Preventive Principles of Ayurveda

- The classical *shodhana* or *rutu shodhana* like *vamana karma, virechana karma* to detoxify the body which is being exposed to dust, fumes etc in daily routine.
- The person can undergo *Rasayana* therapy to boost the immunity and improve efficiency of lungs.
- The use *AmalakiRasayana, AgastyaRasayana, Dashamoolaharitaki rasayana, Vardhamanapippalirasayana* etc., may be used according to the condition after thorough examination.
- Dietary and Lifestyle modification
- Smoking, exposure of dust, cold and humid atmosphere, fumes, pollutants, chilled water, curd and curd preparations should be avoided and intake of lukewarm water may be preferred.

Yoga Modalities

- *Surya namaskara, Bhujangasana, Ushtrasana, Dhanurasana, Ardachakrasana, Matsyasana, Chakrasana, Kapalabhati, Jalaneti, Vamanadhouti, Pranayama.*

Pranayama

- *Pranayama* is one of the eight limbs or branch of *Ashtanga Yoga*. It is an art of controlling the life force of breath. Practice of *Pranayama* is also found to be effective in managing respiratory diseases. *Pranayama* if practiced regularly for a longer duration may provide benefit in the outcome of respiratory ailments.
- *Nadi-shodhana Pranayama* leads to marked improvement in the lung functions by strengthening the respiratory muscles and decreasing the resistance to the air flow in the lungs. *Pranayama* causes increase in lung and thorax compliance, respiratory muscle strength. Hence,

Pranayama can also be advised as lung strengthening tool to manage occupational lung diseases.

Metal Fumes Fever⁶

- An acute, self-limiting, flu-like inhalational fever attributed to exposure to a number of metal oxide fumes classically associated with zinc oxide (ZnO) fume exposure from welding, cutting or brazing on galvanized steel, also in High temperature zinc coating process & metal pouring in brass foundry.
- **Clinical features:** Within 2-10h following inhalational exposure to zinc oxide fumes, workers begin to experience a metallic taste with dryness & soreness in the throat, cough, fever, chill, malaise, headache, dyspnea, myalgia, nausea, vomiting. Signs & symptoms peak at 18h & resolve spontaneously within 1-2d
- **On examination:** wheeze and/or rale may be present in acute phase

Prevention

- Avoid of exposure
- Awareness of presence of a potential hazard
- Engineering control: local exhaust, general ventilation
- Personal protective equipment :respirators
- education of workers regarding the features of the syndrome

Treatment:

1) IV Fluids, 2) Antipyretics/analgesics, 3) Drinking warm COW milk

- The *Ayurvedic* and *Yoga* treatment principle which is previously discussed in lung diseases can be implemented in case of metal fume fever.
- *Yogarajguggulu, amrutaguggulu, laxmivilas rasa.Panchagavyaghrita* can be used.

SOUND AND NOISE⁷

- Sound is a pressure change detectable by the human ear. Noise is a type of sound which is random and carries no information. It is generally described as undesirable or unwanted sound.

Various causes of Hearing Loss

- Middle ear hearing loss results from lack of conduction, Impacted wax, ruptured ear drum, due to aging, Loud noises and Other systemic disease

Occupational Hearing Loss

- Noise-Induced Hearing Loss or Noise-Induced Permanent Threshold Shift (NIPTS) which is permanent sensori-neural condition which cannot be treated or corrected medically.
- Loud noise damages or destroys the nerves in the inner ear. Another effect can be “tinnitus” or permanent ringing in the ear.
- Ears can recover from short exposure to loud noise, but over time nerve damage will occur. The longer and louder the noise, the greater chance permanent damage will occur.

Non-Auditory Effects of Noise

- Effects cardiovascular system, nervous system.
- Interferes with speech and concentration.
- Causes annoyance, stress, fatigue and reduces work efficiency

Hearing Protectors: ear plugs or soundproof ear phones should be provided at no cost to the employee which should be properly fitted and replaced as necessary.

Ayurvedic Prevention of ear disease:

- *Shiroabhyanga*
- *Karnapoorana*
- *Sarvangaabhyanga*

Ear care through Ayurveda

- Ringing sound in ear (tinnitus): *Sarshapataila* 2 drops Bd⁸
- Reduced hearing: *Bilwataila* 2 drops bd⁹
- Hard wax: *Tilataila* 2 drops bd for 2-3 days and cleaning with probe.¹⁰

Common EYE problems in industries¹¹

- Welders arc eye
- Dry eyes
- Computer eye syndrome

EYE care through Ayurveda

- Burning sensation: rose water(gulabjal) cold pad

- Foreign body sensation: *triphala kwatha* eye wash
- Dry eye: *Jeevaneeya ghrita* eye drops^{12/} proprietary eye drops like I tone, Ophthacre etc.,
- Welders arc eye: *yashti- haridra kwatha* eye wash
- Computer eye syndrome: Palming 20 sec. after every 20 minutes.¹³

DISCUSSION

Industrialization is a major factor for developing India, it has equal merits and demerits, though industrialization is giving job opportunity to the youth of country and contributing to increasing GDP but also causing environment pollution and occupational hazards. The duty of medical system is also very important in developing industrial growth by providing health support to the industrial workers. So as Ayurveda, being a life science has role in improvising health status of industrial workers by giving preventive and curative therapeutics viz, *shodhana*, *shaman* and *rasayanachikitsa*. The policy makers and Ayurveda Vaidya community should emphasize in making SOP's on management of occupational hazards and involve them in national programs.

CONCLUSION

Though there were no industries in ancient days, but the treatment protocols and medicines explained in *Ayurveda* are more effective in these occupational diseases. Most of the occupational diseases are chronic in nature, and *Ayurveda* has the best solutions for chronic diseases. *Nidana parivarjana* (avoiding causative factors) was the first line of precautionary method used to keep the disease away; which is explained in *ayurveda* classics briefly and which is quite suitable for current occupational diseases. Hence, *Ayurveda* treatments of occupational diseases should be well adopted and publicized for betterment of society.

REFERENCES

1. Benjamin o. alli, Fundamental principles of occupational health and safety, Second edition, International labour office. Geneva, 2008
2. Vaidya Jadavji Trikamji Acharya, Charakasamhita (sutra sthana 30/26). Varanasi; Choukhamba Surabharati Prakashan;2009 p. 187
3. https://www.osha.gov/dte/library/industrial_hygiene/industrial_hygiene.html
4. David Koh and Ken Takahashi, Text book of occupational practice, 3rd edition, May 2011
5. Vaidya Jadavji Trikamji Acharya, Charakasamhita (chikitsasthana 17/11)Varanasi; Choukhamba Surabharati Prakashan;2009 p. 533
6. https://www.osha.gov/Publications/OSHA_FS-3647_Welding.pdf.
7. Great Britain health and safety executive, Essentials of health and safety at work , Fourth edition, HES Books 2006
8. Pt. HariSadashiva Shastri, Ashtanghridaya (Uttaratantra 18/26) Varanasi ; Choukhmba Surabharati prakashana;2010 p 839
9. Prof K R Shrikanthamurthy, Sharangadhara samhita, Varanasi, choukhmbaorientalia. P 173
10. Pt. Hari Sadashiva Shastri, Ashtanghridaya (Uttaratantra 16/28) Varanasi ; Choukhmba Surabharati prakashana;2010 p 832
11. Minton, J. (1946). Occupational Eye Diseases. *British Medical Journal*, 1(4440), 211–212.
12. Pt. HariSadashivaShastri, Ashtanghridaya (Uttaratantra 18/33) Varanasi ; Choukhmba Surabharati prakashana;2010 p 839
13. Meghwaniand Deshmukh; Ayurvedic approach on computer vision syndrome; International Journal of Ayurveda andPharmaceutical Chemistry, Vol. 4 Issue 2 2016; 298-304

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