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## HEALTH CHALLENGES AMONG INDUSTRIAL WORKERS: A CASE STUDY OF NASHIK INDUSTRIAL AREA

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### ABSTRACT:

The health of industrial workers is an important aspect of occupational safety and public health. It is influenced by various factors including the nature of work, Labour conditions, threat to life, and the implementation of safety measures. Occupational Hazards of Industrial workers may lead to risk to life in the form of chemical, physical safety, biological, physical, and Ergonomic hazards. Companies should execute comprehensive security programs that include insurance to life, hazard communication, emergency response training plans, and regular security drills. It helps in creating a safety-conscious culture and reduces the risk of accidents. Regular assessment, training, and a commitment to continuous improvement are key components of a successful occupational health and safety program for the overall well-being of industrial workers.

**KEYWORDS:** Health, Industry, Industrial workers, Occupational Hazards

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### INTRODUCTION:

Industrial development has played a decisive role in shaping economies worldwide, fostering growth, innovation, and employment opportunities. However, alongside its benefits, industrialization has also raised concerns related to health and safety of workers. The health of industrial workers is a critical aspect influenced by various factors inherent to industrial

environments. Exposure to hazardous substances, physical strains from repetitive tasks, ergonomic challenges, noise pollution, and psychological stress are among the major occupational hazards faced by workers in industrial environments. These problems can lead to a range of health concerns such as respiratory diseases, musculoskeletal disorders, hearing impairments, cognitive health issues like stress, anxiety, emotional equilibrium, and other occupational diseases. The International Labour Organisation (ILO) has identified various occupational diseases caused by chemical, physical and biological factors and infectious or parasitic diseases affecting workers in industries.

Occupational disease is any chronic disorder in which health problems result from exposure to specific hazards in the workplace (G. Anupama, 2016). These conditions typically develop over time due to prolonged exposure to certain substances or working conditions inherent to a particular job. This can lead to various disorders and diseases including those of the respiratory, skin, cardiovascular, nervous, musculoskeletal, and dermatological systems. Examples include lung diseases from inhaling asbestos fibres, skin disorders from exposure to chemicals, repetitive strain injuries from continuous repetitive movements, and hearing loss due to prolonged exposure to loud noise.

Various researchers have extensively studied the health implications for workers in industrial settings. Phoon W.O., Ramalingaswami V., (1975) discussed the health issues linked to industrial growth in Southeast Asia and African nations. El-Batawis (1975) under the Ciba Foundation Symposium (CFS) also identified common occupational diseases across different industries across the world. Mustafa. D.W., (1978) investigated byssinosis in a sisal factory in Tanzania, while Valic, (1971) reported a 28% prevalence of this condition among cotton workers. Johnson. A., (1985) observed respiratory abnormalities among iron and steel factory workers in Britain.

Ensuring the health and well-being of industrial workers requires comprehensive measures and policies. This includes implementing stringent safety protocols, providing proper training on handling hazardous materials and using protective equipment, designing ergonomic workspaces, monitoring health through regular check-ups, and fostering a culture of safety awareness and support within the workplace.

Efforts to diminish health risks for industrial workers are not only essential for their well-being but also contribute to sustainable industrial growth and development. By prioritizing worker's health and safety, industries can enhance productivity, reduce absenteeism, improve employee morale, and uphold their social responsibility towards the workforce. Balancing industrial development with the protection of worker's health remains a fundamental challenge,

demanding ongoing commitment and collaboration between stakeholders including governments, employers, workers, and health professionals.

The present study is an overview of Nashik city industrial area comprising Ambad and Satpur MIDCs, where some major industries have been selected to know the health challenges faced by the workers. These industries include Mahindra and Mahindra, Bosch Ltd, ABB, VIP Industries, CEAT, Graphite India Ltd, MSL Driveline System Limited (Mahindra Sona Ltd.), Xlo India Ltd from Satpur MIDC region. Whereas Mahindra Sanyo Special Steel Pvt. Ltd., CG Power and Industrial Solutions Ltd., Siemens India Ltd., Lear Corporation, Glaxo Smithkline Pharmaceuticals Ltd., Gabriel, Hindustan Hardy Spicer Ltd are from Ambad MIDC region for the study.

### **OBJECTIVES:**

The objectives of the present study are

1. Identifying major health problems across a variety of industries and the factors contributing to these problems.
2. To enumerate some of the conditions that need to be addressed urgently to tackle these problems.

### **THE STUDY AREA:**

Nashik city is physically and economically a developed region located between 19° 33' and 20° 53' N latitude and 73°16' and 75°06' E longitude. The city has an elevation varying between 300 meters to 500 meters and is away from Mumbai at 185km and Pune at 220 km. The population of Nashik was recorded at 648,000 in the 1991 census, growing to 1,486,973 by the 2011 census, underscoring its rapid demographic expansion. The city is the 4<sup>th</sup> largest city in Maharashtra in terms of population. The city is banked by the holy rivers of Godavari, Vaitarana, Bhima, Girana, Kashyapi, Darana, and Nasardi (Nandini), enriching its landscape. This vibrant city plays a vital role in the mythology, historical, social, and cultural heritage. Flowing through Nashik is the sacred river Godavari, enhancing its status as a revered destination for Hindus globally, adorned with temples and ghats along its banks.

Nashik is also pivotal in Maharashtra's industrial landscape, renowned for its robust industrial zones like Ambad, Satpur, Gonde, Igatpuri, and Sinnar, etc. These areas are facilitated by organizations like NIMA (Nashik Industries & Manufacturers' Association), which link industries with governmental bodies, resolving business-related challenges and fostering substantial growth. Key industrial areas in Nashik include Satpur spanning 1,600 acres with a

workforce of 700 employees, Ambad covering 1,400 acres with 600 employees, and extended Sinnar area over 6,671 acres, employing 332 individuals.

Nashik is celebrated as India's "Grape Wine Capital," owing to its ideal climate for cultivating premium grapes, supporting more than 50 wineries within its district. This niche has been bolstered by initiatives such as the Grape Wine Park in Vinchur, established by MIDC, Sula Vineyards has grown to be India's largest and most awarded wine brand, highlighting Nashik's global significance in wine production.

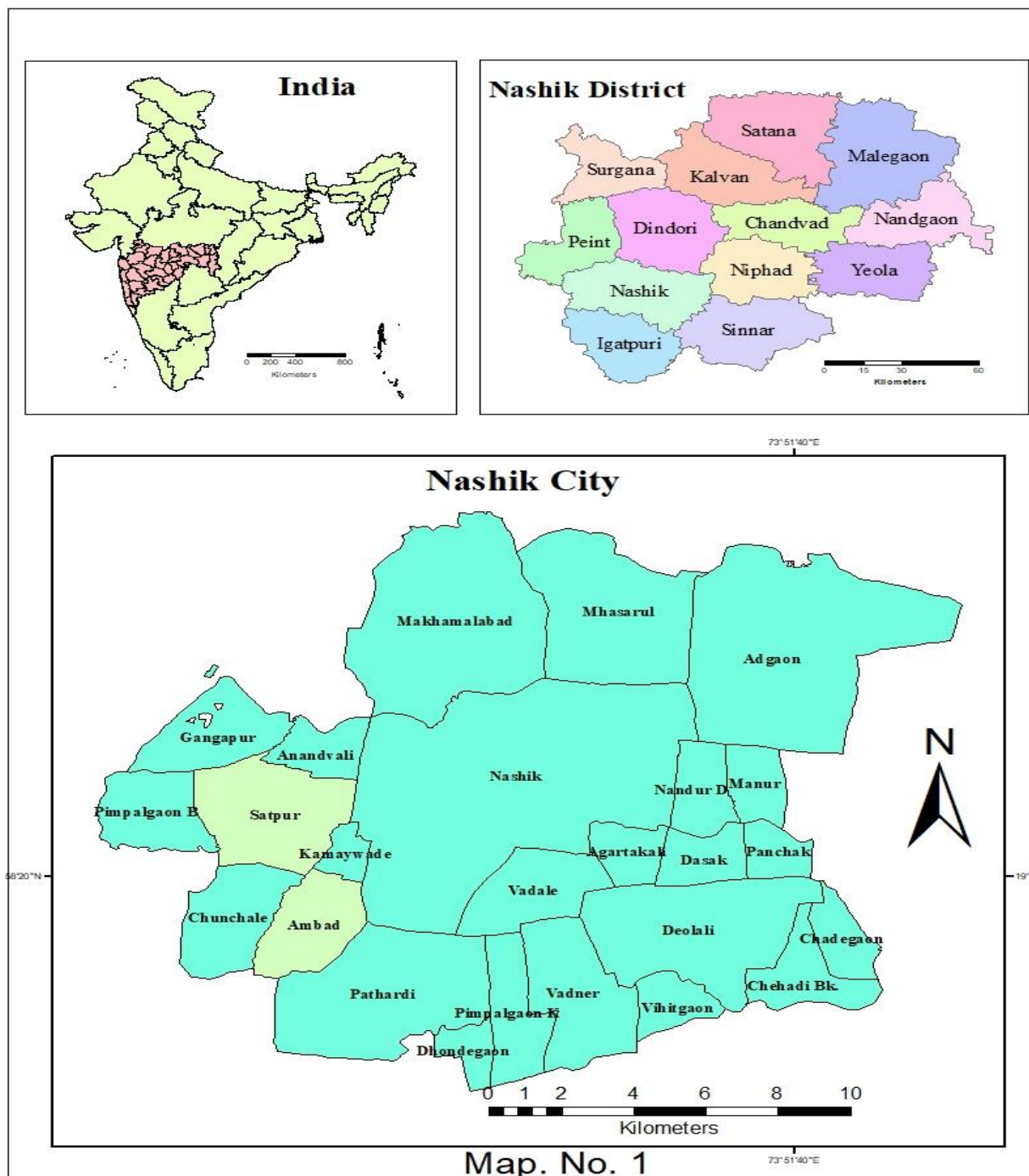


Figure: 1

## METHODOLOGY

In this study, a total of 500 workers were surveyed across 10 major industries, with 50 participants randomly selected from each industry category. The research aimed to evaluate the health status of respondents using structured interview schedules. Health issues were categorised into ergonomic, systemic, and psychological problems.

Ergonomic concerns centred on the physiological interactions between workers and their work environment, identifying discomfort in body areas such as the back, neck, shoulders, hands/arms, and feet/legs/thighs, stemming from various job conditions.

Systemic problems encompassed a range of health issues affecting the respiratory, cardiovascular, central nervous, gastrointestinal, ocular, auditory, nasal, throat, and dermatological systems. Based on mean symptom scores, symptoms like coughing, breathlessness, and chest tightness were evaluated using a five-point scale to distinguish between affected and unaffected individuals.

Psychological problems were assessed in terms of stress and sleep patterns. Analysis of variance (ANOVA) was employed to ascertain any potential associations between industry type and specific health hazards, with statistical significance set at a confidence level of 0.05. Descriptive statistics were utilized to analyze primary data, presented through frequency distribution tables.

## MAJOR HEALTH CHALLENGES IN INDUSTRIES:

The Maharashtra Industrial Development Corporation (MIDC) in Nashik hosts a diverse range of industries spanning various sectors. These industries are typically categorized based on the products they manufacture or the services they provide. Here's a generalized breakdown:

**1. AUTOMOBILES AND AUTO COMPONENTS:** Nashik has a significant presence in the automotive sector, with companies manufacturing automobiles, auto components and ancillary products. Employees working in the automobile and auto component industry may face various health challenges in the work environment such as musculoskeletal disorders (MSDs), hearing loss, skin disorders due to exposure to oil and metal working fluids, respiratory impairment, vibration syndrome due to hand-arm vibrations from power tools which may lead to vibration white finger (Raynaud's phenomenon) and other vascular and neurological problems and also eye injuries.

**2. ENGINEERING AND MACHINERY:** Workers in the engineering and machinery industries may face a variety of health risks inherent in their work environment. This includes respiratory problems in the form of dust, fumes and airborne particles generated during manufacturing processes which can contribute to problems such as asthma and chronic obstructive pulmonary disease (COPD), and also certain electrical hazards where workers may be at risk of electrocution or electric shock when working with electrical equipment, wiring or power sources.

**3. PHARMACEUTICALS:** The pharmaceutical sector is also prominent in Nashik, which includes companies involved in the manufacture of pharmaceutical products, formulations and active pharmaceutical ingredients (APIs). Employees working in pharmaceutical companies may face a variety of health risks, including chemical exposure, allergies and sensitivities to the body, which can cause dermatitis, hives or respiratory symptoms. In addition, employees involved in the research or production of vaccines, antibiotics or other biological products may face risks associated with handling infectious agents and viruses.

**4. FOOD PROCESSING:** The food processing industry in Nashik comprises of units involved in the processing and packaging of food products such as fruits, vegetables, dairy and beverages. But there are also health risks in the form of exposure to cleaning agents, sanitizers, pesticides and food additives that can pose a risk of skin irritation, chemical burns or long-term health effects if proper safety precautions are not followed. In addition, exposure to microorganisms, pathogens and biological contaminants found in raw materials or food products can lead to a risk of infections, foodborne illnesses or gastrointestinal disorders if proper hygiene and sanitation practices are not maintained.

**5. TEXTILES AND GARMENTS:** Textile mills and garment manufacturing units contribute to Nashik's industrial landscape, producing a range of textile products and clothing. However, workers in the textiles and garments industries may face various health risks inherent to their work environment in the form of contact with dyes, chemicals, and finishes used in textile manufacturing that may cause skin irritation, dermatitis, or allergic reactions among workers. Extending to it, contact with sharp objects, flying debris, or chemical splashes during textile cutting, sewing, or finishing activities can pose risks of eye injuries such as cuts, abrasions, or chemical burns if proper eye protection is not worn. Also, some ergonomic Challenges are faced where poor workstation design, inadequate seating, and repetitive motions involved in textile and garment production can contribute to discomfort increasing the risk of musculoskeletal injuries and reducing productivity.

**6. ELECTRONICS AND ELECTRICALS:** The electronics and electrical sector includes companies manufacturing electronic components, consumer electronics, and electrical equipment.

The health risk encountered by this field includes risk of electrical shock, electrocution, and arc flash incidents while working with live wires, circuits, and electrical equipment. Also, Repetitive Strain Injuries (RSIs) such as soldering, assembly line work, and keyboard/mouse usage can lead to RSIs such as carpal tunnel syndrome, tendonitis, and bursitis. Workers involved in the manufacturing of electronic components or devices containing radioactive materials (e.g., medical imaging equipment) may face risks of radiation exposure. Prolonged exposure to computer screens, soldering work, and bright light sources can cause eye strain, fatigue, and vision problems such as dry eyes, blurred vision, and headaches.

**7. CHEMICALS AND PETROCHEMICALS:** Nashik hosts industries involved in the production of chemicals, petrochemicals, and related products for various applications. Workers in the chemicals and petrochemicals industries face various health risks in work environment that includes chemical exposure to hazardous chemicals, solvents, and reagents can lead to skin irritation, chemical burns, respiratory issues, and long-term health effects if proper safety measures are not followed. Also, prolonged exposure to carcinogenic chemicals and substances in the petrochemical industry, such as benzene, ethylene oxide, and formaldehyde, may increase the risk of developing cancer among workers. Some chemicals used in production processes are highly toxic and can cause acute poisoning or chronic health effects if proper handling and ventilation systems are not in place. Workers involved in the handling of biological materials or wastewater treatment processes in chemical and petrochemical plants may face risks to infectious agents.

**8. IT AND ITES:** Information technology (IT) and IT-enabled services (ITES) companies have a presence in Nashik, offering software development, IT consulting, and business process outsourcing (BPO) services. Workers in the IT (Information Technology) and ITES (Information Technology Enabled Services) fields generally face health risks associated with sedentary work, prolonged screen time, and psychosocial factors. Continuous exposure to computer screens and digital devices can cause eye strain, dry eyes, blurred vision, and headaches, collectively known as Computer Vision Syndrome (CVS). Adding to it, excessive screen time, especially before bedtime, can disrupt sleep patterns and contribute to sleep disorders such as insomnia and sleep deprivation. Desk-bound work and long hours of sitting can increase the risk of obesity, diabetes, cardiovascular diseases, and metabolic disorders among IT and ITES professionals. Constant connectivity and information overload in the digital workplace can lead to technostress, characterised by feelings of anxiety, overwhelm, and inability to cope with technological demands.

**9. METAL FABRICATION AND METALLURGY:** Metal fabrication units and metallurgical industries operate in Nashik, catering to diverse industrial needs. However, workers in this field

also face various health risks in the form of Metal Fume fever where inhalation of metal fumes, particularly from welding and soldering operations causes flu-like symptoms such as fever, chills, coughing, and fatigue. Some Occupational accidents involving machinery, tools, and heavy objects cause injuries ranging from cuts and bruises to fractures and amputations in the industries. Also, machinery, tools, and equipment used in metal fabrication processes can generate high noise levels, potentially leading to hearing loss or auditory issues among workers.

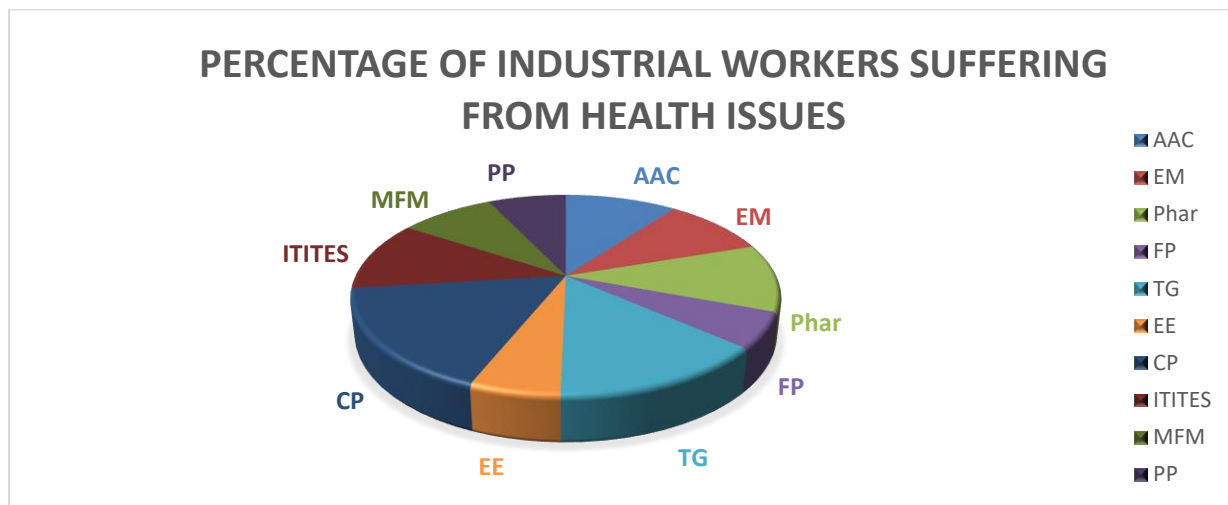
**10. PLASTICS AND POLYMERS:** Industries manufacturing plastic products, packaging materials, and polymer-based goods are also present in Nashik's MIDC industrial areas. Workers in the plastics and polymers industries also encounter various health risks associated with respiratory issues. Exposure to fumes, dust, and volatile organic compounds (VOCs) emitted during plastic processing can lead to respiratory problems such as asthma, bronchitis, and lung irritation. Some chemicals used in plastics manufacturing, such as benzene, vinyl chloride, phthalates, biphenyl A (BPA), and formaldehyde, are known or suspected carcinogens, increasing cancer risk among workers with prolonged exposure and reproductive health issues, including infertility, hormonal disruptions, and birth defects among workers also.

**Table 1: Health Problems Faced by the Industries in Nashik MIDC.**

Infirmities	Industrial Category									
	AAC	EM	Phar	FP	TG	EE	CP	ITIT ES	MFM	PP
	(Percentage of workers suffering from ailments)									
Back	32	30	25	20	37	18	45	52	22	18
Neck	20	21	23	18	11	12	30	50	25	10
Shoulder	35	30	25	20	12	11	28	38	18	08
Hands	25	28	15	25	24	14	37	15	20	10
Lower limbs	30	28	52	16	43	10	51	09	08	05
Respiratory	09	07	10	08	40	02	35	04	12	42
CVS	18	20	11	04	25	08	28	06	04	07
Nervous system	12	11	14	03	25	04	25	11	13	08
GIS	04	05	10	02	15	05	20	12	08	11
Eyes	28	22	28	06	52	12	93	88	42	15
Ears	29	30	15	10	06	15	09	10	45	11
Skin	06	05	24	08	08	06	65	04	12	09
Nose	20	18	20	16	60	18	55	08	10	04
Asthma	05	06	14	04	35	05	25	06	05	12
Sleep	45	40	55	11	78	25	06	30	25	32
Stress	58	55	65	42	42	50	75	74	50	60



**AAC:** Automobiles & Auto Components **EM:** Engineering & Machinery **Phar:** Pharmaceuticals  
**FP:** Food Processing **TG:** Textiles & Garments **EE:** Electronics & Electricals **CP:** Chemicals &  
 Petrochemicals **ITITES:** IT & ITES **MEM:** Metal Fabrication & Metallurgy **PP:** Plastics &  
 Polymers **CVS:** Cardiovascular system **GIS:** Gastrointestinal system



**Figure: 2**

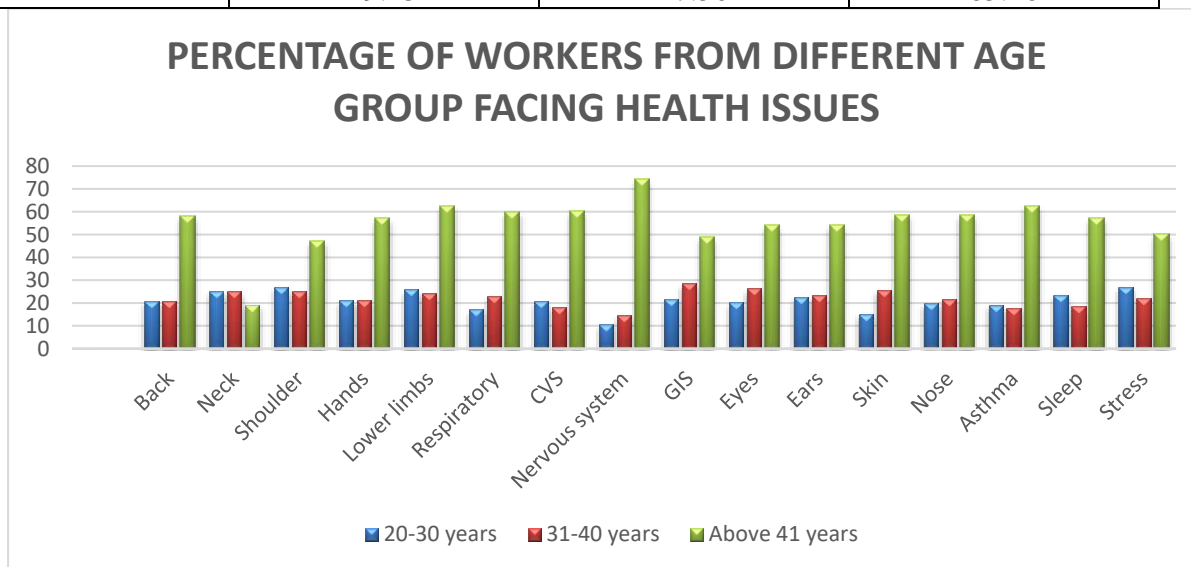
## EXPOSURE

Many of these health problems are exacerbated by the duration of exposure. Most health problems related to the respiratory system, including asthma, are more common in industrial workers with more than 10 years of exposure. Furthermore, except for shoulder, neck, back, gastrointestinal system and ear strain, a significant gradual increase in health problems was observed over time (Table 2). The same relationship was observed with respect to age, with workers over 40 years of age experiencing more problems (Figure. 3). In the case of back problems, analysis of variance showed no significant difference with respect to years of exposure. On the other hand, those in the 40+ age group were clearly different from the younger groups.

**Table 2: Exposure and health problems.**

Health Problems	Years of Exposure		
	0-5 years (%)	6-10 years (%)	Above 10 years (%)
Back	18.1	13.88	68.00
Neck	12.34	22.68	63.90
Shoulder	15.80	20.00	63.14
Hands	10.60	15.60	72.12
Lower limbs	13.01	17.20	68.80
Respiratory	11.02	14.68	73.23

CVS (Cardiovascular system)	12.61	13.80	45.38
Nervous system	9.01	16.11	71.20
GIS (Gastrointestinal system)	6.10	22.00	70.00
Eyes	12.82	18.12	65.72
Ears	16.02	18.58	73.08
Skin	8.01	20.00	74.10
Nose	14.24	12.34	73.32
Asthma	12.90	08.32	78.30
Sleep	17.84	11.40	72.00
Stress	19.15	17.50	65.20



**Figure: 3**

### KNOWLEDGE, AWARENESS AND PERCEPTION

The study attempted to assess the knowledge, awareness and perception of the workers regarding the health hazards faced by them in their work environment. The variables used for this purpose included:

- (i) awareness about the nature of health hazards;
- (ii) awareness about the prevention of health hazards;
- (iii) satisfaction with the available measures;
- (iv) management attitude towards health hazards.

The resultant analysis revealed that the awareness of workers was very poor in most industries except the fertilizer industry. The attitude of the management towards health hazards was perceived as unfavorable by the workers.

Most of the blue-collar workers interviewed for this study come from poor socio-economic strata, where low income and poor educational levels are significant in explaining the poor health conditions. Lack of awareness about health hazards and lack of financial support have aggravated their health problems.

## CONCLUSIONS

Today's industrial environment is not conducive to creating a sense of satisfaction among the people working in this environment. Different industrial raw materials and industrial processes create conditions which result in different health problems in different industries, as reflected in the physical and mental disorders affecting this population. Although the exact occupational diseases could not be identified during this study, the diseases reported by the respondents give ample indication of the nature of health problems. Some of the problems may even worsen with time, resulting in serious consequences in future. Clearly, the need of the hour is to make a concerted effort to deal with this adverse effect of industrial development in order to sustain human progress and well-being. The following are some of the issues that need to be addressed urgently:

1. Industrial workers as well as the general public should be made aware of work-related health problems. This can be done by well-documented programmes presented through the mass media or by door-to-door campaigns by non-governmental agencies to promote awareness. Spread of education is a primary requirement to prevent the adverse effects of industrialisation on health.
2. Legislation making it mandatory for industrial organizations to inform the workers about the health hazards in their work environment.
3. Employers should enforce the use of safety equipment, safe-guards against pollution and the disposal of wastes, and adopt the practice of judicious sharing of duties among workers to prevent excessive exposure to any one process.
4. Stress management should be introduced in the organization and a system of counselling and interaction could help in better occupational adjustment.
5. Doctors must be trained to identify occupational diseases. In fact, all ailments of industrial workers should be treated as potential occupational diseases.
6. Statistics of occupational diseases should be systematically maintained. Whenever an industrial worker is treated in a hospital, the nature of work performed by the patient may be noted along with other personal information.
7. All industrial organizations must enforce regular medical check-ups for their employees to enable timely detection of any occupational ailments.

8. Occupational health needs should be incorporated in national health policy. Micro-level studies, such as those currently being conducted, can be aggregated to identify broader regional patterns. The implementation of remedial measures to address health problems in industrial settings and assessing their impact could form the basis of multi-disciplinary research.

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