



# Human Health Associated with Occupations concerning Age and Sex

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## Abstract

On par with civilization, perception to their surroundings has been regularly altering the individual lives. Diseases and disorders associated with occupations in relation to age and sex were studied in a selected population of human individuals, dividing them into '10' age groups. Clinical based case control study has been done to determine the occurrence of diseases and disorders in human individuals with different occupations in relation to age and sex. Male individuals with primary type and secondary type of occupations suffered more than that of business level and government and private sector. Female individuals with secondary type, business level and primary type suffered more than that of government and private sector. Age group (in years) 41-70 in male individuals is more affected than 21-40 of primary type and also of secondary type. And in business level and government and private sector, age group 41-60 is more affected than 21-40 with greater significant values indicating  $p < 0.05$ . Contrary to this in female individuals, age group 31-60 of primary type, 31-50 of secondary type and business level, 21-40 of government and private sector were affected more than age group 21-30, 61-70 of primary type, 21-30 of secondary type and 41-50 of government and private sector with greater significant values indicating  $p < 0.05$ . Male individuals of age group 41-60 and female individuals of age group 31-60 are more vulnerable to occurrence of several diseases and disorders associated with the various occupations.

**Keywords:** Age, Human Health, Occupation, Sex

## 1. Introduction

Advancements and modifications in the lifestyle, habits etc., are created by the changes in civilization. Urban and countryside lifestyles differ in terms of health in all the aspects. The latter has less access to health care as compared to its former counterpart. Human individuals of our research study have the occupations as mentioned and has the probability of exposure to chemicals, metal dust, strain, stress, radiation, carcinogens, accidents etc., and are suffering from arthritis, hearing loss, circulatory diseases, cancer, musculoskeletal diseases, respiratory diseases, reproductive health, skin diseases, heart diseases, kidney diseases, stress related disorders, communicable diseases and others<sup>1</sup>. Silicosis, musculoskeletal injuries, chronic obstructive lung diseases, asbestosis, pesticide

poisoning, and noise induced hearing loss are the most commonly observed occupational diseases of concern in India<sup>2</sup>. Carpal tunnel syndrome, cramp of the hand or forearm, tendonitis or tenosynovitis, hand arm vibration syndrome, occupational asthma, occupational dermatitis are reportable diseases in relation to occupations at workplace exposure<sup>3</sup>.

Various peril factors determining the workers' health at the workplace causing 5-8 % of healthcare costs are long working hours, working nights, rotating shifts or other non-standard shifts, job related issues, work-family imbalance<sup>4</sup>. Asthma (workplace) is linked with triggers such as chlorine-based cleaning products, materials from cockroaches, cold air, dust mites, indoor dampness and mold, irritant chemicals, metal dust, strong fumes, vapours from chemicals, physical exertion, pollen and

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plants<sup>5</sup>. Chemicals absorbed through the skin is another danger the workers pose from various industries. The proportion of workers who smoke tobacco cigarettes varies with different industries and occupations. The maximum percentage of smoking workers are in industries like mining (30%), accommodation and food services (30%), construction (29.7%). Slandering and even attacking physically by the workers at workplace/duty is also an act of violence<sup>6</sup>.

An incidence of occupational ill health in the workplace worsens a pre-existing condition<sup>7</sup>. Acknowledging the importance of occupational health determines public health status and development. A suitable investigation is essential in establishing the relationship of symptoms and exposure at work on the occurrence of occupational disorders. The World Health Organization (WHO) is acknowledging all determinant risk factors of workers' health and access to health services.

Studies to identify diseases and disorders that are in the individuals with various occupations in relation to age and sex are limited and there is a significant relationship between them. This work has been done to explore the same and increase the health caution among human individuals by practicing respective guidelines at workplace.

## 2. Materials and Methods

The village Pasupala (15.7735° N, 78.0723° E) is located in Kurnool, Andhra Pradesh having a human population of approximately 2900 including both educated and uneducated. Diversity of occupations is more and is easily accessible because of which this village was selected for this study. Human individuals were divided into '10' age groups of the age 1 to 100 years. Serum blood samples were also collected. Diagnosis for the diseases and disorders was carried out by standard clinical methods and procedures in accordance with ethical standards as per the guidelines laid down by central ethical committee of Indian Council of Medical Research (ICMR). This study and the collection of data were carried out with the approval of Institutional Review Board (IRB) from October 2022 to September 2023.

For convenience, the individuals with various occupations classified in to different types as Primary, which includes farmers, labour, housewives, masons; Secondary, which includes drivers, tailors, sales persons,

mechanics, barbers, painters, welders, carpenters, watchmen, electricians etc.; Business level, which includes medical shop, hotel, mobile shop, rice mill, real estate, granite owners; Government and Private sector includes software engineers, *sachivalayam* employees, lawyers, doctors, government employees, marriage bureau etc., Statistical analysis of the data was done by 'DMR test' and found that the individuals in the particular age groups in 1 to 100 years, distinguishing males and females suffering from respective diseases, disorders; where  $p < 0.05$  considered as significant. Unaffected individuals are treated as controls in the study samples.

## 3. Results

Of 1557 males and 1318 females, 716 and 410 respectively are at various occupations (Table 1). Male individuals of occupations of primary type are predominant than that of secondary type followed by business level later government and private sector. Similar situation is also for female individuals except that in government and private sector are more in number than that of business level.

Results show that male individuals with primary type and secondary type of occupations suffered more than that of business level and government and private sector. Age group 41-70 is more affected than 21-40 of primary type and also of secondary type. And in business level and government and private sector, age group 41-60 is more affected than 21-40 with greater significant values indicating  $p < 0.05$  (Table 2). Female individuals with secondary type, business level and primary type suffered more than that of government and private sector. Age group 31-60 of primary type, 31-50 of secondary type and business level, 21-40 of government and private sector were affected more than age group 21-30, 61-70 of primary type, 21-30 of secondary type and 41-50 of government and private sector with greater significant values indicating  $p < 0.05$  (Table 3).

On the whole, male individuals are more suffering with 34.91% than the female individuals with 23.41% with respect to various occupations (Tables 2 and 3). Age group 41-60 is more vulnerable in males and age group 31-50 in females to diseases and disorders associated with various occupations.

**Table 1.** Details of various occupations of male and female individuals

Age group (in years)	Males (in nos.)	Occupation (types)				Total (in nos.)	Females (in nos.)	Occupation (types)				Total (in nos.)
		Primary	Secondary	Business	Government and Private			Primary	Secondary	Business	Government and Private	
0-10	227	0	0	0	0	0	197	0	0	0	0	0
11-20	275	10	18	02	04	34	239	15	02	0	06	23
21-30	279	85	65	15	09	174	284	71	17	03	03	94
31-40	277	100	61	17	12	190	185	94	11	04	02	111
41-50	182	122	43	18	10	193	124	95	03	05	08	111
51-60	126	61	25	02	02	90	129	35	0	0	0	35
61-70	113	20	12	0	0	32	91	29	0	0	0	29
71-80	64	02	01	0	0	03	43	05	0	0	0	05
81-90	14	0	0	0	0	0	26	02	0	0	0	02
91-100	0	0	0	0	0	0	0	0	0	0	0	0
Total (in nos.)	1557	400	225	54	37	716	1318	346	33	12	19	410

**Table 2.** Affected male individuals of various occupations in different age groups

Age group (in years)	Males (in nos.)	Affected (%) in occupation (types)								Total Affected (in nos.)
		Primary	Affected (%)	Secondary	Affected (%)	Business	Affected (%)	Government and Private	Affected (%)	
0-10	0	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
11-20	34	10	0 (0.00)	18	05 <sup>a</sup> (27.77)	02	0 (0.00)	04	0 (0.00)	05
21-30	174	85	18 <sup>b</sup> (21.17)	65	17 <sup>d</sup> (26.15)	15	03 <sup>b</sup> (20.00)	09	01 <sup>ab</sup> (11.11)	39
31-40	190	100	26 <sup>c</sup> (26.00)	61	18 <sup>c</sup> (29.50)	17	04 <sup>c</sup> (23.52)	12	03 <sup>c</sup> (25.00)	51
41-50	193	122	49 <sup>e</sup> (40.16)	43	23 <sup>f</sup> (53.48)	18	07 <sup>d</sup> (38.88)	10	03 <sup>cd</sup> (30.00)	82
51-60	90	61	40 <sup>d</sup> (65.57)	25	14 <sup>c</sup> (56.00)	02	01 <sup>a</sup> (50.00)	02	01 <sup>a</sup> (50.00)	56
61-70	32	20	12 <sup>a</sup> (60.00)	12	05 <sup>ab</sup> (41.66)	0	0 (0.00)	0	0 (0.00)	17
71-80	03	02	0 (0.00)	01	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
81-90	0	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
91-100	0	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
Total (in nos.)	716	400	145 <sup>d</sup> (36.25)	225	82 <sup>c</sup> (36.44)	54	15 <sup>b</sup> (27.77)	37	08 <sup>a</sup> (21.62)	250 (34.91)

Unaffected individuals are treated as Controls;

Values (means, n = 6) not having similar superscript differ with significance at  $p < 0.05$ .

## 4. Discussion

Etiology of occupational disease has the necessity of understanding both epidemiology and detailed assessment of the nature of exposure and the vulnerability of those exposed. Risk increases according to the occupation concerning duration of exposure, stress,

hard work. Occupational health majorly aims all health aspects, workplace safety with primary attention on prevention of hazards. An occupational disease is caused or made worse by exposure at work<sup>8</sup>. Epidemiological studies of populations can determine this rather than an individual patient. It is the duty of the state to implement policies that encourage workplace safety and the health of

**Table 3.** Affected female individuals of various occupations in different age groups

Age group (in years)	Females (in nos.)	Affected (%) in occupation (types)								Total Affected (in nos.)
		Primary	Affected (%)	Secondary	Affected (%)	Business	Affected (%)	Government and Private	Affected (%)	
0-10	0	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
11-20	23	15	0 (0.00)	02	0 (0.00)	0	0 (0.00)	06	0 (0.00)	0
21-30	94	71	14 <sup>c</sup> (19.17)	17	05 <sup>c</sup> (29.41)	03	0 (0.00)	03	01 <sup>ab</sup> (33.33)	20
31-40	111	94	21 <sup>d</sup> (22.34)	11	04 <sup>b</sup> (36.36)	04	01 <sup>a</sup> (25.00)	02	01 <sup>a</sup> (50.00)	27
41-50	111	95	26 <sup>c</sup> (27.36)	03	01 <sup>a</sup> (33.33)	05	02 <sup>b</sup> (40.00)	08	02 <sup>c</sup> (25.00)	31
51-60	35	35	12 <sup>b</sup> (34.28)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	12
61-70	29	29	06 <sup>a</sup> (20.68)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	06
71-80	05	05	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
81-90	02	02	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
91-100	0	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0	0 (0.00)	0
Total (in nos.)	<b>410</b>	346	<b>79<sup>d</sup> (22.83)</b>	33	<b>10<sup>c</sup> (30.30)</b>	12	<b>03<sup>a</sup> (25.00)</b>	19	<b>04<sup>b</sup> (21.05)</b>	<b>96 (23.41)</b>

Unaffected individuals are treated as Controls;

Values (means, n = 6) not having similar superscript differ with significance at  $p < 0.05$ .

workers. In India, constitutional provisions form the basis of workplace safety and health laws.

Workers can ensure their job ability by having a healthy family though workplace exposures affecting reproductive health. Assessing chemical hazards has focused on inhaling chemicals rather than that absorb through the skin and researchers have developed many methods to evaluate this. At present only fifteen percent of workers have accessibility to specialized occupational health services across the world<sup>9</sup>. National Occupational Research Agenda (NORA) is a partnership program to stimulate innovative research and improved workplace practices. The Cancer, Reproductive, Cardiovascular and Other Chronic Disease Prevention (CRC) cross-sector of NORA provides leadership in the prevention of numerous work-related diseases and conditions. Workplace absenteeism is also a total measure of the impact of flu outbreaks and epidemics or pandemics caused by other diseases<sup>10</sup>.

As the years go by, the body becomes weak and prone to any sort of pressure caused by continuous activity. Proneness to infections is increased by ageing and subsequent immune system function alteration<sup>11</sup>. Similar trend was observed in the present study that age group 41-60 in males and 31-60 in females affected much than any other age group. Further male individuals are affected much more than females as is proportionate to

the working numbers and because of having other habits like smoking, consumption of tobacco leaf, alcohol etc., in addition to the occupational work. Metabolism at optimal levels in the age group 21-40 rather reduces from the age of 40 onwards.

Ergonomists and industrial hygienists of the National Institute for Occupational Safety and Health (NIOSH) are in the way of creating healthy work environment by revising the measures that fit workers/employees' physical capabilities and limitations<sup>12</sup>. The aim of ergonomics is the prevention of soft tissue injuries and Musculo-Skeletal Disorders (MSDs) which are caused by sudden/sustained exposure to physical postures while at work. WHO's work on occupational health is governed by the Global Plan of Action on Workers Health 2008-2017, endorsed by the World Health Assembly in 2007<sup>13</sup>. NORA, NIOSH established the Healthy Work Design and Well-Being (HWD) at the beginning of their third decade to ensure safety, health and wellbeing of workers by adapting respective measures like better work design, management practices and physical and psychosocial work environment<sup>14</sup>. Further investigation is essential to fill the lacunae if any on impact of various occupations on human health concerning age and sex and also efficient governance on occupational health.

## 5. Conclusion

Age groups (in years) between 41-60 of male individuals and 31-60 of female individuals are more vulnerable to occurrence of several diseases and disorders associated with the various occupations.

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