



Occupational Respiratory Disorders & Ergonomic Intervention in Indian Unorganized Sector

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The effect of health and safety on productivity cannot be properly discussed without touching on the concept of ergonomics. This term covers a field which in recent years has expanded to an extraordinary degree.

Ergonomic interventions can provide educational, engineering and environmental solutions to help reduce the potential for strains and sprains that decrease a worker's productivity level and may lead to more serious injuries.

Ergonomics is the study of work in relation to the environment in which it is performed (the workplace) and those who perform it (workers). It is used to determine how the workplace can be designed or adapted to the worker in order to prevent a variety of health problems and to increase efficiency; in other words, to make the job fit for the worker, instead of forcing the worker to pursue the job. One simple example is raising the height of a worktable so that the worker does not have to bend down unnecessarily to reach his or her work. In ergonomics, the relation between the worker and the work organization is studied, to achieve the best fit between the worker and his environment.

Ergonomics has the potential of becoming a driving force for the development of new quality management strategies.¹

About the Unorganized Sector

In India, the terms 'unorganized sector' and 'informal sector' are used interchangeably in research literature. The term 'unorganized sector' is used commonly in all official records and analyses. It is defined as the residual of the organized sector. The term 'organized' is generally used when we refer to enterprises or employees in which 10 or more employees work together.

Problems of underestimation and insufficient coverage in the unorganized sector lead to further problems in deriving the residual estimate of the unorganized sector. Therefore, definitions based on the residual approach, that consider the organized sector as employing 10 or more workers and the unorganized sector as the residual, no longer seem to be dependable. Many new types of enterprises and employments that have emerged in recent years have to be taken into account.

However, it will be useful to list some of these characteristics:

1. Low scale of organization
2. Operation of labour relations on a casual basis, or on the basis of kinship or personal relations
3. Small own account (household) or family-owned enterprises or micro enterprises

4. Ownership of fixed and other assets by self
5. Risking of finance capital by self
6. Involvement of family labourers
7. Production expenditure indistinguishable from household expenditures and use of capital goods
8. Easy entry and exit
9. Free mobility within the sector
10. Use of indigenous resources and technology
11. Unregulated or unprotected nature
12. Absence of fixed working hours
13. Lack of security of employment and other social security benefits
14. Lack of support from Government
15. Workers living in slums and squatter areas
16. Lack of housing and access to urban services
17. High percentage of migrant labour

India's workforce comprises nearly 92 per cent in the unorganized sector. Over half of India's national output comes from the unorganized sector. Large portion of the workforce in India is found to be employed in the unorganized sector. Out of 399 million workers in 1999-2000, it is estimated that 371.2 million workers (nearly 93 per cent) are employed in the unorganized segment of the economy whereas only 27.8 million workers (7 per cent) are engaged in the organized sector.

It cannot be denied that the unorganized sector does not get enough protection through labor legislation. Despite the existence of labor laws, for various reasons, the workers in this sector do not get social security and other benefits, as do their counterparts in the formal sector.

Table 1: Size of Workforce in Organized and Unorganized Sector (In millions)

Year	Organised	Un-organised	All	Organised (Per Cent)	Unorganised (Per Cent)
1983	24.0	275.6	299.6	8.0	92.0
1987-88	25.4	301.9	327.3	7.8	92.2
1993-94	27.4	348.8	376.2	7.3	92.7
1999-00	27.8	371.2	399.0	7.0	93.0

Note: Employment figures represented here correspond to usual principal and subsidiary status taken together.

Source: Organised employment figures are obtained from annual reports (1983 and 1988) and Quarterly Employment Review (1994 and 2000), DGE and T. Unorganised employment figures have been calculated using residual method.

Work Organization and Ergonomic interventions

There is still limited quality research that addresses ergonomic interventions designed for secondary prevention. Further high quality studies are needed to support evidence-based ergonomic interventions in practice. For all stakeholders to fully evaluate the usefulness of the ergonomic intervention studies need to attend to outcomes not only of worker comfort but also to productivity and safety.² Therefore, good quality intervention studies are needed to provide more generalizable data and improve our understanding on planning, implementing and sustaining effective measures.

Occupational Respiratory Health

The respiratory health effects have been documented in workers exposed to a variety of dusts in small and large-scale industries, which generate dust during their production process. The diseases of the respiratory system induced by occupational dusts are influenced by the type of dust and duration of exposure. Occupational diseases are caused by a pathologic response of the patients to their working environment.³ Exposure to flour dust occurs across a range of food industries such as grain mills, Saw mills and baking factories. Flour dust is a heterogeneous substance that may include particles from numerous cereal grains (paddy, wheat, oats, corn) and may contain a large number of contaminants including silica, fungi

and their metabolites (aflatoxin), bacterial endotoxins, insects, mites, mammalian debris and various chemical additives such as pesticides and herbicides.

There are number of common exposure that will lead to respiratory illness. These include organic dust; followed by other respiratory hazards include inorganic dust, pesticides and other agrochemicals. These exposures occur when dealing with harvesting, processing or storing grains or other plant matter, or when the soil, plants or stable are treated with chemical agents such as pesticides and disinfectants. The complex inorganic fraction of this dust comes chiefly from the soil.

Ergonomic Intervention on Some Unorganized Sectors Improves Productivity, Health and Safety

1. Zarda (Tobacco) Manufacturing Industry⁴

Zarda is a type of chewing product made of tobacco leaves. In a zarda factory workers mix tobacco leaves with different chemicals, then they bake or dry the leaves and pack the product.

It was found that manufacturing workers may develop respiratory changes. A large number of zarda manufacturing workers complained of respiratory symptoms. They were also exposed to high ambient air temperatures as well as to high relative humidity. Workers in zarda manufacturing also have non-respiratory occupational health problems like headaches and tendencies to vomit. The prevalence of lung function abnormalities/impairment and respiratory disorders in workers occupationally exposed to tobacco dust in a tobacco-processing plant was significantly higher than that in control workers ($p < .05$).

In view of the deleterious effects of tobacco dust on the respiratory system, we suggest that preventive measures need to be taken.

These measures include control of the dusty environment and

wearing personal protective masks. Medical surveillance should be part of this preventive program and it should include lung function testing before the beginning of employment and regularly during employment in this industry. Workers with respiratory disorders or atrophy should be closely monitored while working in the tobacco industry. Finally, since smoking is clearly an additional risk factor affecting the respiratory system in this setting, tobacco workers should be strongly discouraged from smoking.

2. Gold smith⁵

One of the main activities of the goldsmiths is Blowing Pipe. The blowpipe is to expand and shape the gold beads by means of positive pressure produced by careful, controlled oral expiration. A large number of goldsmiths complained of respiratory symptoms in this industry. Reduced lung volumes and peak expiratory flow rates of goldsmiths was found, presumably from heavy pressure generated by using blow pipe. This work habit also increases the fatigue of facial muscles, at the end of the day.

This work habit also increases the fatigue of facial muscles, at the end of the day. By introducing the mechanical hand air pipe, it can reduce or can give relief the goldsmiths from various occupational hazards. Due to the automation (air pump will supply the air flow), easy control (air key), Safety reason of the intervention (hand pipe), there will be No blowing activity and which will significantly reduce facial muscle fatigue, respiratory discomfort and physiological stress of the goldsmiths.

This way it can conclude that, by implementing the ergonomic intervention (alternative air pipe/hand pipe) can effect on facial muscle fatigue and respiratory stress of goldsmiths. It can say that, the ergonomic intervention (alternative air pipe/hand pipe) is potent to give more productivity (in term of reducing physiological stress) and safety to the goldsmiths to continue

their work.

3. Rice mill Worker⁶

Rice mill workers are potentially exposed to organic and inorganic dusts and synthetic chemicals that may have adverse effects on their respiratory health. Grain dust has a long history of association with disease, and its adverse effects on various organs such as eyes, nose, skin, lung and airways have been described.

Rice mill workers complained of several types of respiratory disorders like phlegm (40.8 %), dyspnea (44.2 %), chest tightness (26.7 %), cough (21.7 %), and nose irritation (27.5 %). Rice mill workers exposed to dust presented significantly ($p < 0.05$) lower levels of FVC (3.44 ± 0.11), FEV1 (2.73 ± 0.15) and PEFR (304.95 ± 28.79) than the controls. The rice mill workers are having significantly higher absolute eosinophil counts, total IgE and ESR than control groups. The hematological findings suggest that the harmful effects may be linked to both non-specific irritation and allergic responses to rice husk dust among rice mill workers. The findings showed that they demonstrate the extensive need for preventive measures. It is advisable therefore, that rice mill workers to adopt technical preventive measures, such as having well ventilated work areas and wearing appropriate respiratory protective devices. For this target in this study face mask were prepared by considering different head dimensions of rice mill workers, affectivity, shape and cost. A modified Cup shape Face Mask (Non Woven) were design and compared with one Cotton Face Mask and Cotton cloth, in the basis of questionnaire, Quality and the acceptability of the subject's. These measures will help to prevent lung damage, which often, over time, contributes to morbidity and mortality. It is also suggested that rice mill workers must undergo periodic medical surveillance tests.

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