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A research review on health and safety in different unorganized manufacturing sectors

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Abstract

The modernization and innovation in industries and rapid increase in chemical, hazardous, and polluting industries in recent years has not only resulted in unsafe working conditions but has created problems of occupational health hazards. The incidence of occupational hazards is much higher in developing countries and the workers are mostly exposed to occupational risks of those who are employed in unorganized sectors of manufacturing industries. Apart from poor equipment and heavy workload, even environmental factors and the materials used in the industry are causing damage to certain organs of the body. It is, therefore, essential to take effective measures to protect the workers from such risks and dangers. Alarming health problems among the workers indicate the need for interventions to protect the workers. Exploring the seriousness of the problem and undertaking appropriate intervention measures can protect the workers health to a larger extent. Hence, the aim of this review is to throw light on the occupational health and safety among workers in the unorganized manufacturing industries.

Keywords: Occupational health, safety, unorganized sector, manufacturing

Introduction

The majority of labor in rural areas and a significant portion of labor in urban areas are employed in the unorganized sector. It covers tasks performed entirely or in part by family members in small and family businesses. Due to the sporadic locations of businesses and the seasonal and casual nature of work, wage-paid labor in this sector was mainly non-unionized. Low pay, erratic and irregular work, and a lack of legal or trade union protection were characteristics of this industry. The majority of the technology used by the unorganized sector is indigenous and labor-intensive. Because the unorganized sector's workforce is so dispersed, the legislation's execution was woefully insufficient and ineffectual. However, the contributions of the unorganized sector to the national income were significantly substantial when compared to those of the organized sector (Rudder, 2007) ^[33]. Status of Unorganized Workers according to the National Sample Survey Organization's survey report from 2004-2005, the total employment in the country was 45.9 crore. Of this, approximately 2.6 crore were employed in the organized sector, while the remaining 43.3 crore fell into the unorganized category. The Ministry of Labor and Employment in India, which is tasked with protecting and safeguarding the interests of workers, has defined unorganized laborers as those individuals who have been unable to organize themselves in pursuit of their common interests due to various constraints, such as the casual nature of employment, ignorance and illiteracy, and the small and

scattered size of establishments, among others. The unorganized sector laborers are irresistible in terms of its number range and therefore they are universally present throughout India. The laborers in the unorganized sector are significant in number and are thus found throughout India. There exists no formal employer-employee relationship. Unorganized workers often do not receive adequate attention from trade unions (Rajesh, 2009) ^[30]. To safeguard the rights and health of these workers, both the central and state governments in India have enacted various laws and regulations (NCEUS, 2006) ^[24]. A study examining the working conditions and livelihood opportunities in the unorganized sector revealed that the economy has been significantly bolstered by the contributions of these workers. The issue of occupational health in India, particularly within the unorganized sector, is more intricate than merely a health concern; it encompasses issues such as child labor, inadequate industrial legislation, insufficient focus on industrial hygiene, and a lack of reliable surveillance data (Joshi and Smith, 2013) ^[15]. Assessing the disease burden in this nation has proven challenging due to limited occupational exposure. Numerous hazardous industries have been relocated from developed nations to India, driven by stricter environmental regulations, rising labor costs, and green initiatives. Consequently, due to the poor enforcement of regulations, India has become a destination for these hazardous industries (Jeyaratnam, 2013) ^[14].

Occupational health and safety in the sector

The domain of occupational safety and health (Ladou, 2006) ^[18] has developed progressively and consistently in reaction to social, political, technological, and economic transformations. In recent years, the globalization of the world's economies and its repercussions have been recognized as the most significant catalyst for change in the workplace and in the realm of occupational safety and health, manifesting both beneficial and detrimental effects. The liberalization of global trade, swift technological advancements, evolving employment trends, modifications in work organization practices, the varying employment patterns of men and women, as well as the size, structure, and life cycles of enterprises and emerging technologies have resulted in the emergence of new types and patterns of hazards, exposures, and risks (Pingle, 2012) ^[26].

Demographic shifts and population migrations, along with the resulting pressures on the global environment, have also influenced safety and health in the workplace. Occupational safety and health represent a crucial component in the pursuit of sustained decent working conditions and robust preventive safety cultures. Nearly 80 percent of all ILO standards and instruments are either entirely or partially focused on matters pertaining to occupational safety and health (ILO, 2008) ^[13]. The performance of Occupational Safety and Health varies considerably across different economic sectors within nations. Statistical evidence indicates that globally, the highest rates of occupational fatalities are found in the Manufacturing, Agriculture, Forestry, Mining, and Construction sectors. In other terms, three out of every 1,000 workers experience fatal accidents annually, or from a lifetime perspective, on average, one in every ten workers succumbs to a work-related incident (Kaija and Jukka, 2016) ^[17]. In a similar vein, certain professions and industries, including packaging and mining, have also been identified as having elevated incidences of work-related illnesses. The International Labour Organization (ILO) reported in 2008 that smaller workplaces exhibited poorer safety records compared to their larger counterparts. It appears that the incidence of fatal and severe injuries in smaller workplaces was double that of larger ones. Certain demographics seem to be particularly vulnerable, with their unique challenges often being neglected. The division of labor by gender has significantly influenced the safety and health of women in the workplace (Guddi, 2011) ^[11], extending well beyond issues related to reproductive health. The field of health and safety has been predominantly male-oriented, with eighty-six percent of Health and Safety Inspectors being male. Historically, resources have been disproportionately allocated to industries associated with men, rather than to sectors where women are employed. Safety regulations have been formulated based on the archetype of a male worker, with tasks and equipment tailored to fit the size and shape of the male body.

Generally in industries, preventive measures focused more often on occupational accidents than on work related diseases. Results found to be seen faster in decreasing accident rates but Work related diseases often had a long latent period (Nelson *et al.*, 2005) ^[25] as the reason might be different work-related factors like working time (Caruso *et al.*, 2006) ^[5] and workload (Akerstedt *et al.*, 2004) ^[2].

Exposures occurred usually lead to ill health in the future. This was due to level of exposure to the risk posed was underestimated (Driscoll *et al.* 2005., Nelson *et al.*, 2005) ^[9, 25] which had led to musculoskeletal disorders, cancers (Zahm and Blair, 2003) ^[36] musculoskeletal disorders (Punnett *et al.*, 2005) ^[27] respiratory diseases, psychosocial problems and circulatory diseases.

Statistics of occupational injuries and diseases in the manufacturing sector in India

The data regarding the overall incidence or prevalence of occupational diseases and injuries in the country is insufficient. Leigh *et al.* (2009) ^[19] estimated that the annual incidence of occupational diseases ranged from 924,700 to 1,902,300, with 121,000 fatalities occurring in India's manufacturing sectors. According to a survey on injury incidence in the unorganized sector, a study conducted by Mohan and Patel (2002) ^[20] in Northern India estimated an annual incidence of 17 million injuries (including 2 million classified as moderate to serious) and 53,000 deaths each year. The primary occupational diseases or morbidities of concern in India include silicosis, musculoskeletal injuries, pneumoconiosis, chronic obstructive pulmonary diseases, asbestosis, byssinosis, pesticide poisoning, and noise-induced hearing loss. Census data from 2011 indicated an increase of approximately 28 percent among male workers and 45 percent among female workers from 2001 to 2011 in unorganized sectors. Over the past decades, the number of working females has significantly risen. This growth in the female workforce has raised several concerns, including negative impacts on reproductive health, musculoskeletal disorders, and exposure to hazardous chemicals in the workplace, as the tasks and equipment utilized were not tailored to their physical build and physiology.

Furthermore, studies indicate that female employees experienced particular stress-related conditions due to workplace discrimination, including lower wages and reduced decision-making authority, as well as the dual pressures of professional and domestic responsibilities. A report from the National Institute of Occupational Health (2009) documented that over 3 million individuals, predominantly women, were employed in diverse sectors such as mining, concrete production, ceramics, pottery, metal grinding, stone crushing, slate pencil manufacturing, and other industries. These workers were occupationally exposed to dust, placing them at an increased risk of developing respiratory issues and skin disorders.

Review of research studies

Thomas and Lavanya (2015) ^[34] conducted a study focusing on the health conditions of women workers in the unorganized sector. The findings revealed that 47 percent of women across all groups experienced diseases or illnesses attributed to unhealthy food and poor environmental conditions. The women reported that they neither sought treatment for these ailments nor were admitted to hospitals after enduring prolonged illnesses, as hospitalization imposed financial burdens and resulted in lost work opportunities. Additionally, the study identified poor sanitation, insufficient water supply, and unhygienic working environments as significant factors adversely affecting the health of these women. The study underscored

the importance of providing improved health facilities and living conditions for women workers, suggesting that such enhancements could lead to better health outcomes. Despite the challenging working conditions, the realization of benefits associated with improved health and well-being remained an elusive goal.

The health status of women working in the unorganized and self-employed sectors within the Parbhani district was examined by Ranjwan and Zend (2007) ^[31]. The research involved 110 participants from various occupational categories, including brick makers, construction workers, and pot makers. The assessment of women's physical fitness was performed using the step-test method, revealing that none of the subjects demonstrated good physical fitness. Furthermore, the Body Mass Index (BMI) of most participants was identified as below average, while the aerobic capacity of the majority was deemed good, albeit decreasing with age. The findings indicated that the physical fitness index for most respondents fell into the low average category, with musculoskeletal complaints being most prevalent among brick makers, followed by potters and construction workers. Additionally, the study concluded that the incidence of eye problems was particularly severe among brick makers, and other health issues faced by workers could be linked to abnormal or constrained working postures and environments. The results underscored the urgent necessity for ergonomic evaluations of the tasks performed by brick, pottery, and construction workers, as well as the development of appropriate technologies to mitigate their musculoskeletal issues. Mohapatra and Mohan (2012) ^[21] sought to comprehend the extent of vulnerability experienced by women workers in India's unorganized sector. Their study revealed that approximately 86 percent of the workforce in India is employed in the unorganized or informal sector, with women constituting 91 percent of this group, often serving as the primary earners for their families. Inconsistent employment, low socioeconomic standing, limited or nonexistent bargaining power, limited or nonexistent access to institutional financing, training, and information, and a lack of assets were also identified as contributing factors to vulnerability. The findings showed that a significant portion of the occupational group, regardless of their average monthly income, nevertheless had to deal with a number of limitations that forced them to make compromises in their daily lives.

A study on Upper Extremity Cumulative Trauma Disorder (CTD) in several unorganized sectors of West Bengal, India, was carried out by Gangopadhyay *et al.* in 2003 ^[10]. The study assessed the incidence of CTD in workers in India's unorganized sectors who were linked to physically demanding jobs and emphasized the hazardous working circumstances to which these individuals had been subjected for a number of years. Twenty-five men who worked as meat cutters, typists, tailors, visual display terminal (VDT) operators, and weavers participated in the experiment. Along with a thorough time assessment of the workers' performance of the various tasks during the whole work cycle, a questionnaire and checklist procedure were put into place. A two-tail chi-square test of independence was used in this investigation to ascertain whether there was a significant correlation with the work's repetitiveness. The study's findings showed that all of the tasks were repetitive

and that comparable motion patterns were used for more than half of the work cycle. In light of this, the study's findings indicated that high levels of repetitiveness, extended work activities, and prolonged periods of static posture were the main causes of CTD in employees.

The occupational risk variables of many Manual Material Handling (MMH) tasks at an Indian construction site were studied by Ray *et al.* (2015) ^[32]. 278 employees participated in a questionnaire-based study that took into account factors like the nature of MMH duties, the kinds of instruments and equipment utilized, and the kinds of occupational health issues. The dependent response variables, such as neck, shoulder, elbow, wrist, spine, hip, knee, and ankle joint pain, were modeled using the Classification and Regression Trees (CART) technique in terms of the exploratory variables for the group of workers for different construction vocations. According to the study's findings, MMH-related ergonomic issues, including back, shoulder, and wrist pain, sprain injuries, MSDs, extreme fatigue, poor design, and unsafe practices, were the primary causes of construction's high risk of work-related injuries. According to the study, creating suitable standards for construction workers could improve their performance, safety, and health in the current environment while ensuring a long-lasting change in the systems of construction work with a significant reduction in occupational dangers.

Arti and Shastri (2014) ^[3] examined the role, issues, and difficulties faced by women workers in the unorganized sector. The contemporary circumstances of Indian women workers engaged in various unorganized activities were the main focus of the study. The study also examined women's roles, the type of their jobs, their living conditions, and the issues they regularly faced in the unorganized sector. It also looked at the policies the Indian government had put in place to support women's economic empowerment. According to the survey, women workers experienced gender discrimination, a lack of fundamental information and a lack of understanding of the government, and insufficient regulations that prevented them from being successfully implemented. According to the report, the government should compile statistics on working women in order to create programs that educate women about their rights and improve the lot of women in the unorganized sector. The central and state governments' initiatives fell short in addressing the issues faced by female employees. According to the research, legislation and programs must be put in place to empower women.

Monika (2015) ^[23] investigated how living and socioeconomic circumstances affected the health of female construction workers. According to the study, the health of the living workers was affected since they frequently experienced malaria, fever, colds, and headaches. The workers' ignorance of the offered schemes was another finding of the study. Neither their supervisor nor their contractor informed them about the government's rights and schemes. According to the report, workers should be more informed of the many government programs and their living conditions should be improved for better health.

Tiwarly *et al.* (2012) ^[35] carried out a study to determine the socioeconomic position of construction workers and whether this working group was utilizing social security measures. According to the study's findings, the majority of

them were found to be addicted to various behaviors, such as smoking, chewing tobacco, and drinking alcohol. They also had a high literacy rate and an average salary of less than \$5,000. Additionally, it was discovered that the amount of food they regularly consumed was insufficient. Most of them didn't know about the various social security programs.

Dave (2012) ^[8] looked into women employed in Haryana's unorganized sector as domestic servants, construction workers, and agricultural laborers. The study determined the socioeconomic status of female workers, the type of work they do, their working circumstances, their pay pattern, wage discrimination, and other challenges they encounter at work. The bulk of migrant women, according to the findings, worked in the construction sector in low-paying, unskilled positions as laborers, coolies, and assistants. Women were shown to be more exploited than men since they were paid less for doing similar work and putting in the same amount of hours. They faced severe issues and bad working conditions in the unorganized sector. Their poverty, debt, and lack of literacy compelled them to labor in unfair terms and for lower pay. Mohapatra (2015) ^[22] examined the situation of women employed in India's unorganized industries using published research papers, books, reports, and other material. Regarding the effects of technology, it was discovered that women suffered greatly as a result of the transition from subsistence to the market economy. Men have frequently replaced women workers wherever technology has been introduced. Women were forced to work outside for pitiful pay and without social security due to economic necessity. Because they couldn't work long hours, women experienced a lot of sexual harassment at work. Study suggested the need for skill development programmes for women to enhance their skill level and create awareness about the institutional support available to them to protect their rights. A comprehensive law was needed to protect the rights of women workers and mass media should be used to communicate the social message relating to women's equality. Separate women grievance cell headed by a woman should be established in every organization employing women workers in the organized sector and in case of unorganized sector women has to form self-help groups for their protection.

Rajanna (2015) ^[28] did a study on the status and amenities of 300 women workers in the Chikmagalur area of Karnataka, India, both before and after they entered the construction sector. According to the survey, women workers' living conditions significantly improved after they entered the construction sector. It was discovered that they had access to electricity, safe drinking water, and sanitary amenities like toilets with pits in their homes. The study recommended that the government implement social, economic, and legal policy initiatives that might improve the environment and resource potential of women construction workers and empower them, thereby fostering family growth and the advancement of the country.

Anjali *et al.* (2016) ^[4] investigated the state of occupational health in India's unorganized sector. A health questionnaire was used to evaluate 1,122 employees from five distinct industries, including construction, weaving, transportation, tobacco processing, and fish processing. The findings demonstrated that employees experienced musculoskeletal issues, respiratory health risks, ocular issues, and skin-

related issues. In the chosen industries, self-reported occupational health issues were highly prevalent. According to the findings, workers were exposed to a variety of hazards at work, and their health conditions were made worse by the lack of protective guards. According to a study, primary health centers might be set up at the workplace, where employees could receive medical checkups, be informed of recognized hazards, and be motivated to enhance their working conditions.

Das (2015) ^[7] has out a case study on the socioeconomic circumstances of female brick kiln workers in Purbamedinipur, West Bengal. According to the survey, there were many migrant workers and the majority of the women workers and their kids were illiterate. The working women lived in kachha homes since their monthly and annual family income was insufficient to support them. Due to extreme poverty, it was discovered that people turned to other endeavors like farming and other jobs when the brick kiln was unavailable. Brick lugging, brick drying, mud processing, and other tasks occupied the majority of the workers. The majority of female employees requested a pay increase since their current salary was insufficient.

A study of the brick manufacturing sector among Nepali workers was carried out by Joshi *et al.* (2013) ^[16]. In order to do repetitive tasks that posed risks to the musculoskeletal system, workers had to employ their physical power, lift heavy objects, and spend extended periods of time squatting. Workers' physical, mental, and general well-being have been at danger due to inadequate physical infrastructure, unfavorable working conditions, and a lack of safety protocols. According to the survey, Nepal's brick industries are dominated by physical illnesses and discomforts associated to the job. Seventy-three percent of working children reported experiencing pain and discomfort related to musculoskeletal disorders. According to the odds ratio, working people were eight times more likely than non-working people to encounter problems or physical discomfort. The existence of subpar physical surroundings, working circumstances, and procedures has led to musculoskeletal disorders and issues, putting youngsters who work at danger.

Conclusion

Gaining a better understanding of the state of health and safety in the unorganized sector of various manufacturing businesses is the aim of this methodical search and review. All industrial and occupational accidents were caused by avoidable causes that might have been avoided by using known and accessible strategies and procedures. The steadily declining accident rates in developed nations served as evidence of this. Thus, the implementation of preventive measures provided substantial economic and human advantages. Compared to formal workers, informal sector workers were far more likely to be subjected to hazardous working conditions, insufficient safety and health standards, and environmental dangers, which could lead to poor health or injury. The majority of informal laborers knew very little or nothing about the dangers they encounter and how to prevent them. Because of the informal economy's very character, governments found it nearly impossible to gather the essential data required to implement the necessary corrective measures. Therefore, one of the main concerns in recent years has been the extension of social security and

fundamental rights to workers in the informal economy. Other industrialists, with the exception of a small number of prominent, well-known public and private sectors, were not made aware of the significance of occupational safety in their fields. Their finances never gave occupational health a proper place. In certain cases, worker groups viewed occupational safety equipment negatively, and working without safety precautions was viewed as bravery by illiterate people. Other issues included malfunctioning equipment, inadequate equipment inspections and a lack of training on how to use the safety equipment, and alcoholism at work.

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