

A Study of Occupational Health Hazards among Workers in Ceramic Factories of Uttar Pradesh

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Abstract

People are one of the important resources in any industry. Therefore, their health and safety are essential for overall well-being. Various ceramic factories expose workers to various occupational health risks because of their distinct manufacturing processes. This study focused on identifying various health hazards among ceramic workers in selected units of the Bulandshahr district of Uttar Pradesh. The aim of this study was to assess the occupational health hazards experienced by ceramic workers in specified ceramic factories in the region and to evaluate measures for improving their health and safety. A cross-sectional quantitative study was conducted using the purposive sampling method from December 2025 to June 2026 on 80 workers from different units of the ceramic industry in Bulandshahr. Both male and female workers from ceramic industry were included. A self-developed, structured, and undisguised questionnaire on occupational health hazards was prepared to collect data directly from the respondents through face-to-face surveys. This study revealed occupational health hazards among ceramic workers. Most participants were male, 85% and female, 15%. Psychological hazards were most reported (82.5%), followed by ergonomic (56.25%), physical (32.5%), biological (27.5%), and chemical hazards (26.25%). Of the studied workers 45% suffered from these hazards in which 40% of the workers suffered from musculoskeletal problems and only 5% were suffered from respiratory problems. To make the things in favor of workers, there is a need for workload management where reasonable working hours, counselling sessions, and breaks to reduce stress should be fixed. Regular training and awareness programmes should be conducted for workers to educate them about mental health and stress management.

Keywords: Ceramic, Occupational Health, Occupational Health Hazards, Occupational Health and Safety.

Introduction

Occupational health is an area of public health that maintains and promotes the highest degree of mental, physical, and social well-being of workers in all occupations (World Health Organization: WHO, 2019). Occupational health plays a vital role in safeguarding worker well-being, and owing to its specialized production methods, the ceramic sector presents workers with different health and safety challenges. This study focuses on occupational health hazards among workers employed in ceramic factories in Uttar Pradesh.

Material which is neither metallic nor organic and can be either glassy or crystalline or both is referred to be ceramic. Heat is used to shape or compact ceramics, which are generally rigid and chemically non-reactive. The broad category known as ceramic materials is primarily characterized by the absence of metallic components and organic compounds. Materials like Clay, minerals, oxides, and

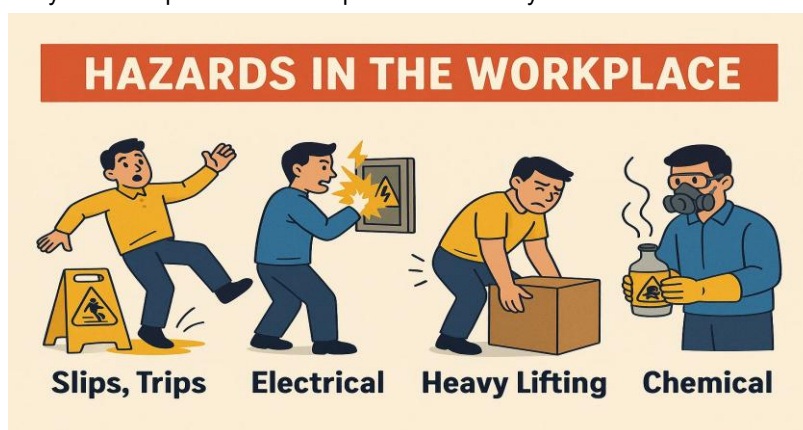
other compounds can make up ceramics. After removing organic and metallic material what remains is the ceramic. Common examples include tiles, plates, glass, bricks, and toilet seats. Ceramics are considered as the refractory materials i.e. they are long lasting and can withstand high temperatures.

To make the ceramic usable, many employees and workers perform different tasks at each stage of ceramic making, starting from material selection to forming a paste and packaging for its final distribution.

Occupational health hazards refer to potential threats or risks in a work environment that negatively affect employees' health and safety. These hazards originate from chemical, biological, physical, and psychological elements. These include exposure to toxic substances, hazardous working conditions, poor ergonomics, and mental stress. It is essential to recognize and reduce the above-stated hazards to ensure the safe and healthy working environment of employees (Rosenstock, 2006). Occupational Health and Safety is the process of controlling hazards and defending against danger in the workplace. These are the rules, actions, and forces that protect employees from hazards.

Objectives

- To identify common occupational health hazards faced by workers in ceramic factories.
- To identify the most prevalent health problems faced by workers.



Literature Review

Junier, et.al (2016) conducted a qualitative study titled "Knowledge workers on occupational hazards in the industry of ceramics" in 2015. The researchers conducted research on 12 workers between 16 and 65 years of age and concluded that workers had sufficient awareness of various occupational risks, such as falling objects and environmental factors, and expressed concerns about potential health effects. The study highlights the need for ongoing educational initiatives to enhance worker safety and well-being in the ceramic industry.

Fuortes, et.al (2016) In the research "Health hazards of working with ceramics Recommendations for reducing risks". In 1989 USA, a descriptive Quantitative study was conducted in postgraduate medicine where the health risk of working with Ceramics were highlighted. It underlines how little knowledge ceramicists and their physicians have about the possible risks associated with the materials used in ceramic workshops. The study examines the dangers of kiln emissions, lead poisoning from glazes, and exposure to fibro genic clay chemicals. To lower health risk of the workers working in ceramic it suggests preventive measures like appropriate ventilation, personal protective apparel, and understanding of hazardous materials.

Aziz, et.al (2010) A cross-sectional research on respiratory risks among Egyptian pottery workers was published by researcher in 2010. The study considered 80 controls and 150 exposed ceramic workers with mean ages of 37.68 +/- 6.86 and 36.10 +/-7 .26 respectively. The objective was to evaluate environmental risk factors such as random and Silica dust, exposure response connections and health risk. The findings indicated nine ventilatory functions, increased levels of free silica and radon progeny and greater respiratory signs among exposed workers. The study suggests consequences for occupational health and preventive majors for workers.

Majumdar, et.al (2016) A cross-sectional study on 329 male ceramic industry workers in India with an average age 26.5 years, published in the American Journal of Industrial medicine to examine their work involvement and assess the associations between work hazards, work category, and self-reported symptoms. The results showed that there is a high prevalence of musculoskeletal discomfort, in which load handlers and machine operators faced the highest level of work hazards. There are the factors such as poor job autonomy, task clarity, hot workplace conditions, inappropriate workplace design, inadequate auxiliary support, and mental workload that are significantly associated with self-reported symptoms.

Alim, et.al (2015) In 2011, a cross-sectional descriptive study was conducted to assess respiratory symptoms among 200 ceramic factory workers in Mirpur ceramic works limited, Dhaka. Results showed 45.5% prevalence of respiratory problems, including 27.0% chronic bronchitis and 20.0% bronchial asthma workers not using PPE had a significantly higher prevalence of respiratory problems (78.0%).

Gupta, et.al (2015) A study of Rajat Das Gupta, 2015 highlights the health risks faced by garment workers in Bangladesh. The study found that mostly young and female workers experienced accidents and occupational illness. There is a significant relation between noise pollution and headaches. The study finds the need for improved safety measures and health facilities in the garment industry to protect the well-being of workers.

Fathy Mahmoed, et.al (2021) A study conducted in Egypt which revealed 53.3% of workers had allergic rhinitis & sinusitis and 74.7% of them had chronic cough. Apart from this, 19.3% of them had good total knowledge scores related to occupational health hazards, 82.7% of studied workers had satisfactory practices regarding prevention of occupational health hazards. Workers of ceramic factories exposed with health hazards such as biological, chemical, physical ergonomic and psychological factors.

Ahmadi, et.al (2015) conducted a study in Iran, 2015 to assess the prevalence of musculoskeletal illness and occupational posture among porcelain industry workers. After studying the frequency of musculoskeletal disorder among workers of the porcelain industry, the waist was found to be the most common site of discomfort and dysfunction. The findings suggest that printing, carpentry, engineering, and material supplement units were the most hazardous, and the waist, hands, wrist, neck, shoulders, and elbows were the body parts most affected.

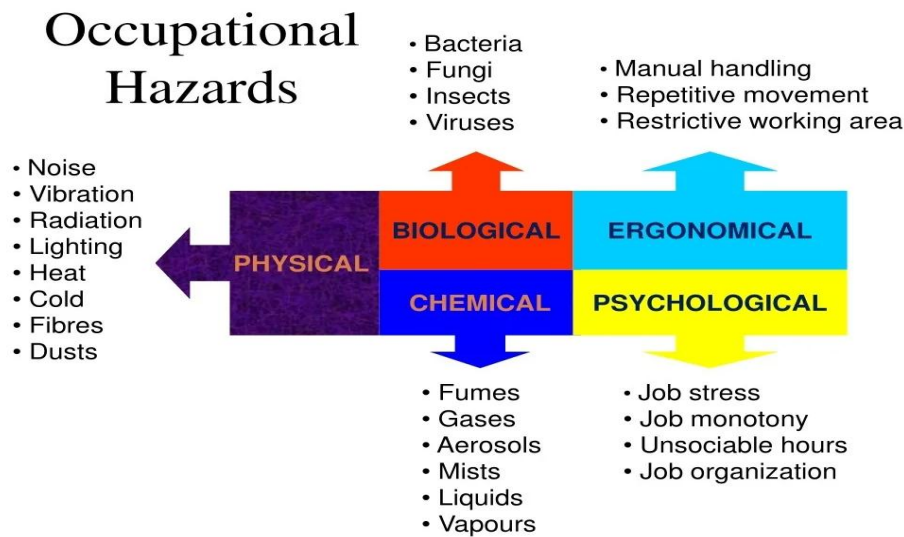
A study was conducted on 80 pottery workers in India in June 2020 to evaluate occupational and psychological health, revealing a high prevalence of musculoskeletal disorders in the shoulder, neck, lower back, hip, and knee. And notable disparities between genders in how uncomfortable ratings across different body parts.

Ghudasara, et.al (1984) conducted a survey on 41 ceramic factories to assess their hygienic conditions and thermal stress; of these 8 (four rural and four urban) were selected for assessing the work environment. The study revealed that the hygienic conditions of both urban and rural factories were poor because of poor plant design and inadequate sanitary facilities. The airborne dust concentration, respirable dust concentration, and thermal stress in urban ceramic factories were higher.

Nizum, (2023) A study on occupational health hazards was conducted on 197 workers working in ceramic factory of Bangladesh. The study reported that ergonomic hazards were highly reported by workers at the workplace. The study suggests that stricter safety measures, comprehensive training, and increased awareness of health hazards are crucial factors that need to be considered to improve the situation of workers.

Research Methodology

A systematic and organized effort was made to investigate a specific problem of workers working in the ceramic industry via a planned and undisguised questionnaire. The current study considered workers in the concerned industry of Uttar Pradesh region as a population and 80 workers of Bulandshahr District working in ceramic factory as the sample. A cross-sectional quantitative research design was considered from December 2025 to June 2026. Convenience and purposive sampling techniques were used to collect data from different ceramic units working in the area to give the results objectively. Data were collected from the primary source where a self-developed undisguised structured questionnaire was prepared and filled as per respondents' views.



Data Analysis and Interpretation

For analyses, the study considered primary data collected through direct personal investigation from 80 respondents. To interpret the results, this chapter contains the findings of the study in tables and figures focusing on socio-demographic characteristics, health hazards, ergonomic hazards, physical hazards, biological hazards, psychological hazards, and health-related issues.

• Socio demographic characteristics

Variable	Category	Frequency	Percentage
Age	Above 18	80	100.00%
Gender	Male	68	85.00%
	Female	12	15.00%
	Illiterate	46	57.50%
Educational level	Literate	34	42.50%
	Smoker	13	16.25%
Smoking habit	Non-smoker	67	83.75%
	Very good	08	10.00%
Health status	Good	53	66.25%
	Not good	19	23.75%
	8 hrs.	80	100.00%
Working Hours	Body & Forming	41	51.25%
Working section	Firing	09	11.25%
	Casting	08	10.00%
	Glaze	10	12.50%
	Packaging	09	11.25%
	Other	03	3.75%

• Occupational Health Hazards Faced by Sample Group

Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Ergonomic Hazards	45	56.25%	35	43.75%	80	100%
Physical Hazards	26	32.5%	54	67.5%	80	100%
Biological Hazards	22	27.5%	58	72.5%	80	100%
Chemical Hazards	21	26.25%	59	73.75%	80	100%
Psychological Hazards	66	82.5%	14	17.5%	80	100%
Overall Health Hazards	36	45%	44	55%	80	100%

• **Ergonomic hazards**

Ergonomic Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Improper height of chairs and tables	05	6.25%	75	93.75%	80	100%
Frequent manual lifting	06	7.5%	74	92.5%	80	100%
Prolong sitting and standing	0	0%	80	100%	80	100%
Awkward working posture or movements for prolong	12	15%	68	85%	80	100%
Use of high-level force while transporting or supporting load	0	0%	80	100%	80	100%
Task with repetitive movement	22	27.5%	58	72.5%	80	100%
Inadequate equipment	0	0%	80	100%	80	100%

• **Distribution of respondents regarding physical environment of factory**

Physical Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Slippery risk	00	0%	80	100%	80	100%
Risk of cuts/lacerations	04	5%	76	95%	80	100%
Electrical shock hazards	00	0%	80	100%	80	100%
High dust concentration	09	11.25%	71	88.75%	80	100%
Inadequate lighting	00	0%	80	100%	80	100%
Noise pollution	10	12.5%	70	87.5%	80	100%
Poor ventilation system	00	0%	80	100%	80	100%
Overcrowding	03	3.75%	77	96.25%	80	100%

• **Biological hazards faced by workers**

Biological Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Availability of clean drinking water	80	100%	00	0%	80	100%
Availability of separate toilets	80	100%	00	0%	80	100%
Have a balanced and adequate food intake	58	72.5%	22	27.5%	80	100%

• **Chemical Hazards faced by the workers**

Chemical Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Silica dust	05	6.25%	75	93.75%	80	100%
Glaze & pigment chemicals (for shining)	07	8.75%	73	91.25%	80	100%
Solvents & binders (body preparation, printing, decoration)	00	0%	80	100%	80	100%
Fumes from firing (carbon monoxide, sulphur dioxide, fluorine gases)	09	11.25%	71	88.75%	80	100%
Hydrofluoric acid (for HF acid surface treatment)	00	0%	80	100%	80	100%

• **Psychological Hazards faced by the workers**

Psychological Hazards	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Excessive workload	06	7.5%	74	92.5%	80	100%
Lack of communication opportunity and support from management/colleagues	00	0%	80	100%	80	100%
Mental harassment	06	7.5%	74	92.5%	80	100%
Physical harassment	00	0%	80	100%	80	100%
Job insecurity	54	67.5%	26	32.5%	80	100%
Lack of flexibility	00	0%	80	100%	80	100%

• **Health Hazards faced by the workers**

Health Problems	Response(yes)		Response(no)		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Respiratory Problems (cough, chest pain, shortness of breath)	04	5%	76	95%	80	100%
Physical Problems (Hearing, Weakness, Chemical Burn, Allergies)	00	0%	80	100%	80	100%
Musculoskeletal Problems (Pain in neck, Upper back, Lower back, Shoulder, Hands, legs, Knees)	32	40%	48	60%	80	100%

Conclusion

The main objective of this study was to determine the status of occupational health hazards among workers working in the ceramic industry in the Bulandshahr District of Uttar Pradesh. Ergonomic, physical, biological, chemical, and psychological have harmful and adverse effects on the health and safety of workers. Psychological hazards were most reported, indicating issues such as excessive workload, mental harassment and job insecurity. A small percentage of workers suffered from chemical hazards. The study revealed that a significant number of workers suffered from health problems, which mainly arose from psychological hazards. Both stricter and flexible safety measures should be implemented along with proper training and education for workers to make them aware of health risks which are very much connected with their working. Apart from this, Regular medical examination is required and availability of healthcare services is crucial for early detection and management of any health issue that may arise in future. By addressing these challenges and enhancing workplace conditions via regular counselling sessions and workload management techniques, the ceramic industry can safeguard the workers' well-being while fostering a safer and more sustainable environment.

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