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Research Article

Impact of Poor Working Conditions on Health and Productivity of building Construction Labourers of Ranchi city, Jharkhand

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Abstract

The National Education Policy (NEP) 2020 positions skill development as a foundational objective of higher education in India. While policy provisions emphasise vocational integration, multidisciplinary learning, and industry collaboration, empirical evidence on institutional implementation remains limited. This study investigates the effectiveness of skill development initiatives in Higher Education Institutions (HEIs) under NEP 2020 through a questionnaire-based survey of students and faculty members. Using descriptive statistics and factor analysis, the study identifies key skill outcomes, institutional practices, and implementation challenges. The findings reveal moderate progress in curriculum flexibility and vocational exposure, alongside persistent gaps in industry engagement and faculty preparedness. The study contributes empirical insights for policymakers and HEIs seeking to strengthen employability-oriented reforms.

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1. INTRODUCTION

India's construction industry is one of the fastest-growing sectors and plays a major role in national development. It supports housing, transportation, industries, infrastructure (roads and bridges), education (schools), healthcare (hospitals), and commerce (commercial buildings). The sector also employs a large number of people, especially from economically weaker and rural backgrounds, because it requires minimal educational qualifications and offers daily wage opportunities. However, construction work is widely known for unsafe working environments and weak labour welfare. Since construction is labour-intensive, workers face multiple hazards and health risks every day.

Construction Sector Background (India and Jharkhand)

Modernisation, government initiatives for new infrastructure, and urban sprawl are all major factors leading to increased construction activity in India. There has been an increased demand for construction workers in urban and peri-urban areas due to increased activity in such areas. This demand includes workers such as bricklayers, plasterers, finishers, painters, scaffolders, carpenters, electricians, and transporters.

Urban sprawl and improved infrastructure are also the major contributors to the increased construction activity in Jharkhand. In the capital city, Ranchi, there has been a wave of development that includes new housing, commercial structures, improved roadways, and enhanced public services such as schools and government offices. All of these initiatives have created a growing demand for construction workers in Ranchi.

The construction workforce in Ranchi is a mixture of construction workers from the local villages, the surrounding rural and peri-urban districts of Gumla, Khunti, Lohardaga, Simdega, and Latehar, and other parts of India such as Bihar, West Bengal, Odisha, and Chhattisgarh. This construction workforce is composed of skilled and unskilled workers that include masons and their helpers, painters, carpenters, bar benders, plumbers, and head-loaders.

Most construction workers belong to poor economic strata and work in the unorganised sector. Many work through sub-contractors, which leads to the precarisation of the work and impacts wage payment, working time duration, and safety conditions. Health coverage, safety at work, and accident insurance are often absent. Construction work takes place in places such as Lalpur, Kanke, Doranda, Harmu, Bariatu, Ratu Road and Hinoo, where conditions are hazardous and detrimental to the workers' health and productivity.

The meaning and some illustrations of poor working conditions

Poor working conditions entail environments where workers are exposed to hazards and risks without protective barriers, leaving them unprotected from the elements, without adequate sanitary and welfare provisions, and without fair work provisions. A big problem is the lack of PPE, such as dust and other particulate masks, safety shoes, safety belts, and other protective equipment. Workers are exposed to dangers of falling objects, sharp tools, unprotected scaffolding and other temporary structures. Many workers carry out tasks at elevation and are unprotected by guardrails, safety nets, or fall arrest harness belts. Working hours of 9-12 hours are frequent, with no breaks and insufficient welfare provisions, such as working in extreme heat or cold, unprotected by sanitary toilets, without areas for rest, drinking water is not provided, and unprotected by adequate first aid.

The link between working conditions, health outcomes, and productivity

Health problems construction workers face are a direct result of insufficient working conditions. Muscle, respiratory issues, and skin rashes, as well as heat stress and injuries. Frequent heavy lifting may bring about musculoskeletal disorders, while a deficiency of protective gear raises the risk of cuts, fractures, and head injuries. Mental health suffers due to job insecurity, meagre pay, lengthy hours, and chronic stress, which brings about anxiety and emotional exhaustion. Poor health outcomes, such as decreased work speed, reduced quality, increased mistakes, and absenteeism, drain a construction worker's productivity. Lastly, fatigue impairs focus and increases the probability of accidents, which raises the risk and decreases productivity further.

The Problem

The construction workers of Ranchi City grapple with numerous unsanitary and unsafe working conditions. Many of them work without safety gear such as helmets, gloves, masks, and boots. Those working at heights do so on unsecured scaffolding without safety harnesses. There are also usually inadequate basic amenities, such as clean drinking water, toilets, rest areas, and first aid kits. Construction labourers in Ranchi, Jharkhand, are affected by poor working conditions in multiple ways. They are frequently subjected to back pain, fatigue, body aches, and even respiratory complications, along with various injuries.

Common injuries include skin rashes, falls, cuts, head injuries, and fractures. These injuries and health problems ultimately diminish employees' efficiency, heighten absenteeism, and reduce overall productivity. Because of these issues, it is important to assess the relationship between working conditions, health, and productivity of construction labourers in Ranchi, Jharkhand.

2. OBJECTIVES OF THE STUDY

2.1 General Objectives

To examine the impact of poor working conditions on the health and productivity of construction labourers in Ranchi city.

2.2 Specific Objectives

- To study the construction site labourers of Ranchi city to understand the prevailing bad working conditions.
- To understand the health issues and injuries resulting from working in an unsafe environment.
- To evaluate the association of negative working conditions with employee productivity in terms of tiredness, absenteeism and poor output.

- To assess the construction sites in Ranchi in terms of the presence of safety and welfare measures.
- To offer strategies to enhance working conditions, safety, health and productivity.

3. Research Questions / Hypotheses

3.1 Research Questions

- What types of poor working conditions do building construction workers face in Ranchi city?
- What health problems and workplace injuries are most common among these workers?
- How do poor working conditions affect labour productivity and work quality?
- Are safety equipment and welfare services available at construction sites in Ranchi?
- What measures can improve the safety, health, and productivity of construction workers?

3.2 Hypotheses (Optional)

- **H1:** Construction workers in Ranchi city develop more health problems because of bad working conditions**.**
- **H2:** Workplace injuries and health problems lower the productive capacity of labour.
- **H3:** More accidents and lower productivity are a result of insufficient protective measures and welfare services.

4. REVIEW OF LITERATURE

The construction industry in India is brutally dangerous for its employees. Workers deal with chemicals and other environmental effects, while construction sites have safety measures from the contractors. THIS causes health issues and lowers productivity. Workers on construction sites have extremely difficult jobs that require large amounts of lifting and mixing cement. Most construction labourers are daily wage employees, which makes contracting their jobs even more dangerous and decreases the safety provided. Studies have shown that construction sites are often unsanitary, and workers have limited healthcare options (British Safety Council, 2022).

Hours, wages, and safety issues

Construction workers typically work long hours and are not given breaks. Because of this, they are extremely fatigued and overwhelmed. There are wage issues, which include no overtime pay and no paid time off. Construction workers, due to how hazardous the jobs are, are not provided with PPE. The Building and Other Construction Workers Act, 1996, is designed to improve the safety and health of construction workers on site, but the act remains neglected on most construction sites.

Job Security and Informal Employment

Most construction jobs are informal, and many workers do not have any written contracts. Working through a contractor creates uncertainty about the duration and scope of the job. It also limits compensation and benefits like insurance and welfare. On top of this, job insecurity creates mental stress and economic strain for the workers and their families.

4.2 Job-Related Risks of Working in Construction

There are many risks that construction workers face, such as dust, weather, and heavy lifting. Unsafe equipment and tools make the problems worse. The ILO claims that vibration and other dangers are also concerns that affect the safety and health of employees.

Dust from materials such as sand, cement, and brick leads to coughing and breathing problems. Construction equipment is noisy and increases worker stress and fatigue, and can cause hearing loss. Muscle and joint pain from heavy lifting is common, and unprotected work on elevated surfaces increases the risks of falling. Furthermore, weak scaffolding, unsafe equipment and tools, missing safety rails, and no safety nets increase the risk of injury. Many construction sites lack a plan for safety and risk management. Working in extreme heat and sun can cause heat stress, and dehydration decreases work efficiency and increases the likelihood of accidents. These conditions are of great concern and have become a global concern for workers.

4.3 Health Problems of Construction Labourers

Unhealthy conditions in construction sites create multiple disorders like musculoskeletal issues, respiratory problems, injuries, skin problems, and issues due to stress. There have been many studies in India about construction workers and their health problems (International Journal of Medical and Public Health, 2013). Problems like pain in the back, knees, neck and shoulders result from the construction workers' repetitive heavy lifting and poor posture. Working for long hours creates more problems like the ones stated before (Anjali et al., 2016). Dust and smoke create problems such as chronic cough and workers' breath, especially for workers who don't wear masks.

Skin problems such as irritation and wearing due to the chemicals in the cement are also common. Eye problems also occur, which are due to dust and cement. Construction workers are at risk of whole-body injuries like falls, fractures, and cuts. The lack of PPE increases the severity of the whole-body injuries. Problems such as long hours, low pay, and job insecurity create mental issues. Worker exodus creates isolation, stress and tiredness, which diminishes mental motivation and productivity. Illnesses reduce work capacity and income.

4.4 Research Gap

Although many studies discuss construction hazards in India, two gaps remain:

Fewer studies in Ranchi: Most research focuses on metro cities, while Ranchi has limited local studies despite rapid growth.

Limited combined focus on health and productivity: Many studies focus only on safety or health, but fewer examine how health issues reduce productivity.

Therefore, this study is essential to examine the impact of poor working conditions on both the health and productivity of construction workers in Ranchi city, Jharkhand.

5. METHODOLOGY

This chapter explains the methods adopted to assess the effect of poor working conditions on the health and productivity of building construction labourers in Ranchi city, Jharkhand. It includes the research design, study area, population, sampling procedure, tools for data collection, variables, data analysis methods, and ethical considerations.

5.1 Research Design and Study Area

With regards to the methodology, descriptive and cross-sectional research designs are used. A descriptive research design is used to understand the current state of the construction labourers' work environment, safety, and health issues. A cross-sectional design is used because the data is to be collected at one point in time, thus providing a snapshot of the current situation in regard to the workers and exploring the correlation between the working conditions, state of health, and productivity outcomes. The research will be carried out in the Ranchi district of Jharkhand, India, where there is a significant amount of construction work taking place as a result of urban expansion. Ranchi has been chosen because construction workers are at a greater risk of developing work-related health issues, and there is insufficient research on the health and productivity of construction workers in this area.

5.2 Study Population, Sampling, and Data Collection

The study population comprises masons, helpers, painters, carpenters, plumbers, bar benders, and material loaders, construction workers in Ranchi city's building sites. Construction workers only, those directly involved in construction work and exposed to the conditions at the site, will be considered. Depending on time constraints and available resources, a sample of 80 to 150 construction workers will be used. For data collection, construction workers who are present on site and are easy to approach will be selected using convenience sampling. In addition, those construction workers who are sufficiently experienced and actively engaged in construction work will be included using purposive sampling.

The primary data collection tool will be a structured questionnaire, which will be written in uncomplicated English. The questionnaire will cover socio-demographic data, working hours, wages, availability and use of PPE, welfare, health problems and injuries, stress and fatigue, absenteeism, and work productivity. In some instances, interviews will be conducted to capture and elaborate on the experiences of the respondents, and observational checklists will be used to capture and record site conditions, including scaffolding, water and toilet facilities, the use of PPE, dust, and noise.

Table 1 : Demographic Profile of Construction Workers (Sample Characteristics)

Variable	Category	Frequency (n)	Percentage (%)
Age group	18–25	12	24%
	26–35	18	36%
	36–45	13	26%
	46	7	14%
Gender	Male	35	70%
	Female	15	30%
Work experience	< 2 years	10	20%
	2–5 years	22	44%
	> 5 years	18	36%

5.3 Variables, Data Analysis, and Ethics

The independent variables consist of the working condition factors outlined in the survey, including the use of PPE, safety training, work hours, rest break policies, wage structure, sanitation, and the availability of rest facilities. Dependent variables include the health problems described, such as pain, respiratory issues, and skin problems, as well as injuries, absenteeism, fatigue, and productivity or work performance.

Frequency, percentages, and mean scores are very basic statistical methods that will be employed to analyse the collected data. Productivity and health condition correlations will be assessed using correlation analysis. Findings will be illustrated using tables and graphs in MS Excel and SPSS if the software is available.

The ethical principles of research will be upheld during all phases of the study. Participants will be told what the study is about, and will receive an informed consent form. The data will be kept confidential. Participants will be able to voluntarily participate or withdraw from the study at any time as well. The data collected will be used for academic purposes only.

6. RESULTS / FINDINGS

This part highlights the main findings from the construction labourers in Ranchi city. The findings include the socio-demographic details, working conditions, health problems, the outcomes of productivity, and the correlation between inadequate working conditions and productivity.

6.1 Socio-demographic Characteristics of Respondents

Most respondents fell into the 20-45 age group. This shows that the construction industry primarily employs young and middle-aged workers. The majority of the respondents were men, while the few female workers assisted in secondary activities such as material handling and site cleaning.

While many workers reported having 2-10 years of experience, a few workers noted having experience that spanned beyond a decade. This suggests that the construction industry provides a long-term employment niche for many individuals. Most respondents had low educational attainment, with a majority reporting only having primary or even middle schooling, and a few of the older workers had no formal schooling. A lack of formal schooling increases the workers´ vulnerability since they lack the necessary education to be aware of safety protocols and the welfare measures to which they may be entitled.

6.2 Nature of Work and Working Conditions

Bar bending, plastering, masonry, painting, and carpentry were all reported as tasks that workers were engaged in. A large group of workers also reported that they were engaged in tasks as helpers. Helpers, in particular, seemed to make up a large portion of the workforce as they also assisted in other activities such as cement mixing and the handling of construction materials.

Most workers reported that, on average, they worked anywhere from 8 to 10 hours a day, while others worked even more than that, especially when deadlines were imminent. Breaks were short and were mostly taken in an informal way. Most workers were paid on a daily rate, with the skilled workers earning more than the unskilled helpers. On the other hand, payments were often delayed, there were no policies for paid overtime, and there was little guarantee of continued employment since most workers were contracted through subcontractors, and there were no formal contracts. Welfare conditions are inadequate at many sites. Workers are provided with little to no sanitary facilities and are forced to use the brush and public toilets. Workers' shelters are few; many workers have to sit on the materials themselves or take cover under makeshift shade. Drinking water is available at some sites and at some of good quality, but access is inconsistent, and the high temperatures worsen the situation.

Little to no PPE is available. Workers are missing a considerable number of individual protections, including hard hats, dust masks, safety shoes and harnesses. During inspections, some workers use hard hats, but masks are used very rarely, even when dust levels are high. Procedures do little to change this, and workers are forced to learn through accidents.

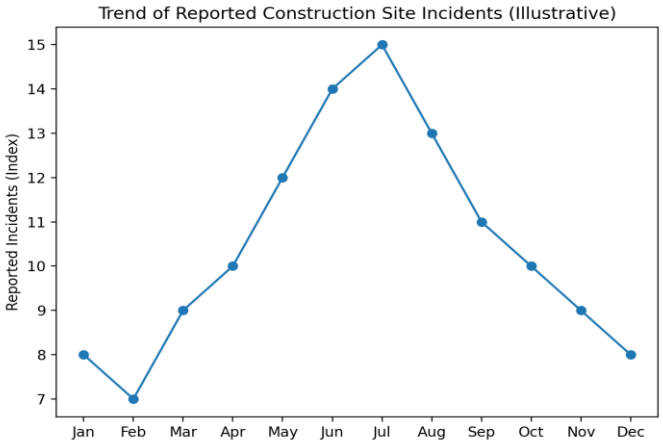
6.3 Health Problems Reported by Pump Operators

Due to the nature of their work, many employees are reporting pain in the back, in the shoulders, and in the knees. Coughing and difficulty breathing are also common, and they are the result of dust and the absence of masks. During the course of work, some labourers experienced more serious injuries than cuts and bruises, reporting serious injuries like fractures due to falls or accidents. Fatigue, in particular, was widespread due to dehydration and heat stress, especially in summer. Stress was also reported due to low income, job insecurity, and family responsibilities. Mental and emotional stress, as well as loneliness, were reported among migrant workers.

Table 2 : Common Occupational Hazards in Construction Work

Hazard Type	Examples	% Workers Affected (Illustrative)
Falls	Working at height, slips	28%
Dust	Cement dust, sand particles	22%
Noise	Machines, drilling	18%
Heat stress	Sun exposure, dehydration	17%
Chemicals	Paints, solvents	15%

Figure 1: Trend of Reported Construction Site Incidents (Illustrative)



6.4 Productivity-Related Outcomes

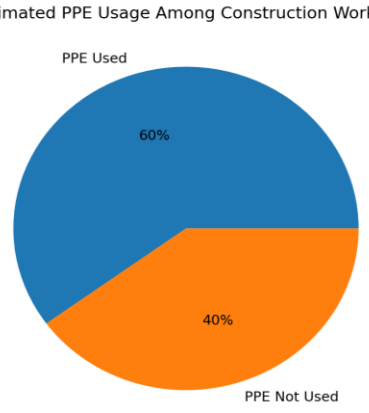
Employees reported that ill health, fatigue, and pain decreased the efficiency and speed of work. Some of the skilled workers said that health issues compromised the quality of work, such as in the alignment of bricks and the finishing of plaster. workers also lacked safety, and this made them slower and more cautious in the more dangerous tasks.

Due to fevers, injuries, and body pain, absenteeism was frequent. Absences mean a lower income as the wages are on a daily basis. Because of the stress of the situation, some employees continued to work in ill health, which compromised their health even more. The injuries lessened the work ability, and some workers were made to rest or change their tasks for a while.

Table 3: PPE Awareness and Usage Among Construction Workers

PPE Component	Awareness (%)	Regular Use (%)	Main Reason for Non-use
Helmet	85%	60%	Not provided / discomfort
Gloves	70%	45%	Reduces work efficiency
Safety shoes	65%	40%	Cost / not available
Mask/Respirator	75%	50%	Breathing difficulty
Ear protection	55%	30%	Lack of awareness

Figure 2: Estimated PPE Usage Among Construction Workers

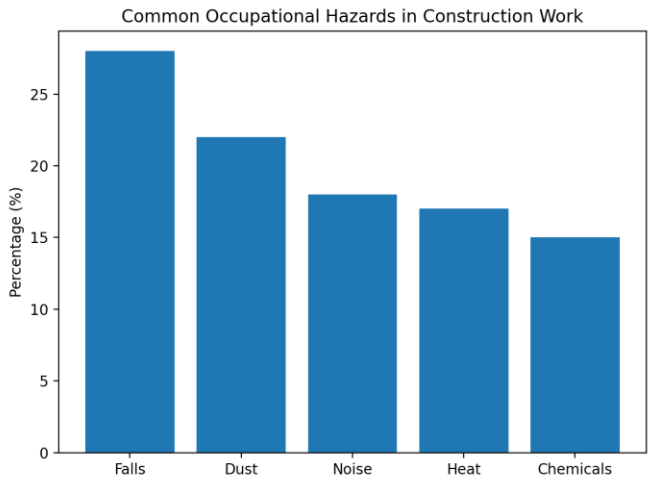


6.5 Relationship Between Working Conditions and Productivity

The results indicate a clear connection between bad working conditions and loss of productivity. Extended periods of work without breaks resulted in increased tiredness and discomfort. Working in dusty environments without masks resulted in greater difficulties from working continuously due to increased respiratory problems. Working without PPE resulted in more accidents and injuries, which led to being absent and less work. All in all, the relationship can be summarised as:

Poor working conditions → Increased illness and injuries → Reduced efficiency and productivity

Figure 3: Common Occupational Hazards in Construction Work



7. DISCUSSION

The study's outcome shows that the construction workers of Ranchi endure long hours, poor welfare facilities, and safety measures that are altogether inadequate. Such variables create an environment that fosters a plethora of potential health issues. These issues include musculoskeletal pain, injuries, fatigue, and stress, which all contribute to lower productivity through decreased work quality, increased absenteeism, and decreased speed of work.

The outcomes correlate with prior studies that illustrate heavy lifting causes musculoskeletal issues and dust exposure triggers respiratory problems. The same injuries are evident, with past studies pointing out the absence of protective scaffolds and the absence of PPE as major causes of accidents. The research on mental stress coincides with the studies documenting informal workers' financial insecurity.

The lack of safety practices can be associated with the cost-cutting mentality of the contractors, low worker awareness, inadequate training, lack of safety regulation enforcement, and poor safety monitoring. The informal employment system and the temporary workers from other parts of the country highly increases risk in small and medium projects where a lack of safety is prevalent.

8. CONCLUSION

Our study demonstrates that the working conditions the construction workers of Ranchi city, Jharkhand experience, harm their physical, mental, and occupational health as well as their productivity. Construction workers experience long work hours with fewer break, and are exposed to an unsafe work environment with no or inadequate safety and hygiene facilities (e.g., potable water, toilets, resting places, etc.) and are exposed to unsafe work environments with no or inadequate safety and hygiene facilities (e.g. water, toilets, resting places), unsteady wages, and lack of job permanence. They themselves often do not use PPE, and safety training is absent.

These conditions lead to the development of pain in muscles and joints, sickness of the lungs and other respiratory organs, exhaustion, injuries of various sorts, and mental exhaustion/stress, etc. This impacts work efficiency and degrades the quality of that work. It also causes absenteeism. As the construction workers are dependent on daily income, this adds financial strain to their family budgets. Therefore, construction workers of Ranchi city, Jharkhand, need to improve their working environment to enhance their health and productivity.

Recommendations

Contractors should improve on-site safety training and provision of PPE. They should also improve the hygiene and safety facilities by providing potable water, toilets, shaded resting areas, and first aid. Government departments should improve their supervision and regulation of safety and encourage the registration of workers in welfare programs. Construction workers should use the provided PPE, report unsafe working conditions, and protect their health by taking water, resting, and seeking medical assistance when needed.

Limitations of the Study

There was a time and resource constraint that affected the number of construction sites and workers that were studied. Some of the contractors did not permit open communication with the workers, and the study was dependent on the participants to report on the conditions that may include a fear of losing their jobs if they reported honestly. The study was able to provide some useful insight into the labour conditions, the associated health problems, and the productivity issues in Ranchi.

Scope for Future Research

Future studies may focus on the construction industry and its impact on the health of the workers. Evidence on construction-related occupational health issues may be strengthened by the inclusion of medical assessments. Jamshedpur, Dhanbad, and Bokaro may provide useful data for comparative research. Research on the challenges in women labourers, the usefulness of health and productivity of construction workers in Jharkhand and the effectiveness of the welfare policies and safety policies to improve the health and productivity of construction workers in Jharkhand also remains to be explored.

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