Original Article

Awareness of Occupational Health Hazards and Practice of Safety Measures Among Construction Workers in Rewa City

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Abstract

Context/Background: Occupational hazards refer to potential risks and dangers that exist in the workplace, which can harm the health, safety, and well-being of workers. Understanding and managing occupational hazards is necessary to ensure a safe and healthy working environment for employees.

Aims/Objectives: The study is aimed at studying the demographic profile of the construction workers, awareness and knowledge regarding occupational health problems, occupational safety, and practices of occupational safety measures.

Methodology: This community-based cross-sectional study was carried out in various construction projects of unorganized sector in Rewa City. About 180 construction site workers were included in the study. 14 construction sites in Rewa city were identified and randomly 13 construction workers from each site were selected by simple random sampling. Managers/supervisors of the selected projects were contacted, and data was collected using an interview administered questionnaire from construction workers giving consent to participate in the study.

Conclusion: From the study, it is evident that it is essential to come up with measures that can create awareness among the construction workers on the importance of safety measures and preventions. To improve the safety of construction workers, it is necessary to identify certain factors that are essential to safety practice, be it education or personal behavior.

Key-words: Occupational hazard, occupational health, construction workers, safety measures.

Introduction

Occupational hazards refer to potential risks and dangers that exist in the workplace, which can harm the health, safety, and well-being of workers. These hazards can arise from various sources, such as physical, chemical, biological, ergonomic, and psychosocial factors. Understanding and managing

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occupational hazards is crucial to ensure a safe and healthy working environment for employees. The impact of occupational health and safety hazards faced by construction workers in developing countries is 10 to 20 times higher than those in industrialized countries.[1,2] Factors contributing to these prevalence rates of occupational injuries were lack of safety training, job stress, the absence of safety signs, sleep problems, workload & drinking alcohol.[3-5]

World Health Organization (WHO) stated poor occupational health and reduced capacity of workers can make loss up to 10–20% of the gross national product (GNP) of a country. Worldwide, occupational diseases, illnesses, and death accounts for an estimated loss of 4% of the country's gross domestic product.[6]

Construction is an important component of the developmental work in our country. Nearly half of the government expenditure in its Five-Year Plans has been devoted to construction activities - be it in the area of irrigation, power, roads, surface transport, communications, health, housing, or urban development. This sector attracts huge investment from individual house owners as well as from big contractors/companies, having a very high rate of return. In recent years, this has been one of the fastest growing sectors of the economy. After agriculture, it is the largest provider of employment for people, with one out of every seven workers in the country employed in construction-related activities. However, construction is among the most unregulated sectors in the country.[7]

Objectives:

1. To analyse the demographic profile of the construction workers.
2. To assess knowledge & awareness regarding occupational health problems among construction workers.
3. To assess the practices of occupational safety measures among construction workers.

Methodology

The cross-sectional study took place in Rewa district, facilitated by the Department of Community Medicine, Shyam Shah Medical College, Rewa (MP) from December to February 2023. The determination of the minimum required sample size was derived from a previously reported morbidity prevalence of 47.8%, aiming for a precision of 5% at a 95% confidence level, resulting in an approximate minimum sample size of 180[8].

The research was carried out across diverse construction projects of unorganized sector within Rewa City, involving a total of 180 construction site workers. The selection process encompassed various roles such as labourers, earth/ground workers, digging workers, cement workers, and concreting workers, which were randomly identified among construction sites in Rewa City. Unorganized sector was chosen as workers employed here have no organized occupational health service and their compliance with safety measures is not known. Specifically, 14 sites were randomly chosen for inclusion in the study. Subsequently, 13 construction workers were randomly selected from each of these sites through a simple random method to meet the sample size of 180 participants.

To ensure participation and adherence to ethical standards, managers/supervisors of the selected projects were contacted and briefed about the study. Participants below the age of 18 years were excluded from the study. Data collection was done through the administration of interview-based questionnaires to construction workers who gave their consent to participate in the study.

This research used a semi-structured questionnaire that included questions about sociodemographic details including average daily income, smoking, and alcohol intake at the workplace. Additionally, the questionnaire explored participants' knowledge and awareness of occupational health hazards and safety measures in construction, along with their reported & observed practices of safety measures. A pilot test of the interview schedule was done among construction workers, specifically chosen from outside the final study participants.

The study protocol underwent approval from the institutional ethics committee, and data collection was done only after obtaining informed consent from the participants.

Data analysis:

The data was entered into a Microsoft Excel spreadsheet and analysed using the statistical software SPSS version 25. Presentation of data was done in terms of frequency and percentages. To test for association, the Chi-Square test was employed, with a significance probability set at 5%.

Results

Table 1: Sociodemographic profile of study participants

SOCIODEMOGRAPHIC PROFILE		
AGE-WISE DISTRIBUTION OF RESPONDENTS		
AGE	**COUNT**	**PERCENTAGE**
18-25	53	29.4%
26-34	66	36.6%
35-43	36	20%
44-52	19	10.5%
53 & above	6	3.3%
Total	180	100%

GENDER-WISE DISTRIBUTION OF RESPONDENTS		
GENDER	**COUNT**	**PERCENTAGE**
Female	46	25.6 %
Male	134	74.4 %

RELIGION-WISE DISTRIBUTION OF RESPONDENTS		
RELIGION	**COUNT**	**PERCENTAGE**
Hindu	136	75.6 %
Muslim	33	18.3 %
Others	11	6.1 %

EDUCATIONAL QUALIFICATION OF RESPONDENTS		
EDUCATION	**COUNT**	**PERCENTAGE**
No formal education	94	52%
Primary (1 to 4)	60	33%
Secondary (5 to 10)	17	9%
Higher Secondary (11 & 12)	9	5%

YEARS OF EXPERIENCE AS A CONSTRUCTION WORKER		
EXPERIENCE (YEARS)	**COUNT**	**PERCENTAGE**
0 To 5	66	36.7 %
6 To 10	53	29.4 %
More than 10	61	33.9 %

ALCOHOL INTAKE AT WORK		
	COUNT	**PERCENTAGE**
Yes	34	18.9%
No	146	81.1%

SMOKING AT WORK		
	COUNT	**PERCENTAGE**
Yes	56	31.1%
No	124	68.9%

AVERAGE DAILY WORKING HOURS		
	COUNT	**PERCENTAGE**
0-7	44	24.4 %
8 or Above	136	75.6 %

Table 1 outlines the sociodemographic profile of construction workers in the study, consisting of 180 respondents, it reveals a predominant age group of 26-34 years (36.6%), with distribution as follows: 18-25 years (29.4%), 35-43 years (20%), 44-52 years (10.5%), and 53 years and above (3.3%). In terms of gender, 74.4% are male, while 25.6% are female. The religious composition shows a majority identifying as Hindu (75.6%), followed by Muslims (18.3%), and others (6.1%). Regarding educational qualifications, 52% have no formal education, 33% completed primary education (1 to 4 years), 9% completed secondary education (5 to 10 years), and 5% completed higher secondary education (11 & 12 years). Experience as construction workers is varied, with 36.7% having 0-5 years, 29.4% having 6-10 years, and 33.9% having more than 10 years of experience. In terms of habits, 18.9% reported alcohol intake at work, while the majority (81.1%) did not, and 31.1% reported smoking at work, while 68.9% did not. Additionally, the distribution of respondents based on daily working hours indicates that 24.4% work for 0-7 hours, while the majority (75.6%) work 8 hours and above daily.

Table 2: Knowledge of study participants on occupational hazards & safety measures in construction.

KNOWLEDGE OF OCCUPATIONAL HAZARDS & SAFETY MEASURES IN CONSTRUCTION		
INFORMATION	**COUNT**	**PERCENTAGE**
Exposure to occupational hazards can result in work-related injuries or disease.	130	72.2%
Wearing personal protective equipment protects workers from occupational hazards.	148	82.2%
Strict compliance with occupational safety rules and regulations protects workers from occupational injuries.	123	68.3%

Table 2 presents the knowledge of occupational hazards and safety measures among construction workers based on their responses. Among the respondents, 72.2% acknowledged that exposure to occupational hazards can lead to work-related injuries or diseases. Additionally, 82.2% recognized that wearing personal protective equipment is a crucial measure to safeguard workers from occupational hazards. Furthermore, 68.3% of the respondents emphasized the importance of strict compliance with occupational safety rules and regulations as a means of protecting workers from occupational injuries.

Table 3: Awareness of study participants on different exposures as occupational health hazard

AWARENESS OF THE FOLLOWING AS OCCUPATIONAL HEALTH HAZARDS		
EXPOSURE	**FREQUENCY**	**PERCENTAGE**
Dust	147	81.7%
Extreme Heat	169	93.9%
Extreme Cold	125	69.4%
Manual Handling (Lifting & Carrying)	114	63.3%
Excessive Noise	135	75%
Prolonged Work Under Sunlight	150	83%
Mosquito Bites	158	87.8%
Stress	142	78.8%
Fire & Electricity	169	94%

Table 3 outlines the awareness of construction workers concerning various occupational health hazards, with a substantial majority recognizing the following hazards: dust (81.7%), extreme heat (93.9%), extreme cold (69.4%), manual handling (lifting & carrying) (63.3%), excessive noise (75%), prolonged work under sunlight (83%), mosquito bites (87.8%), stress (78.8%), and fire & electricity (94%).

Table 4: Awareness of Different Types of Morbidity Among Survey Participants

AWARE ABOUT TYPE OF MORBIDITY*		
EXPOSURE	**FREQUENCY**	**PERCENTAGE**
Ocular morbidities	130	72%
Skin injury	100	56%
Respiratory morbidities	66	37%
Postural problems	34	19%
Hearing problems	75	42%

*Multiple responses

Table 4 outlines construction workers' awareness of various types of morbidities resulting from occupational exposures, revealing that 72% are aware of ocular morbidities, 56% recognize the risk of skin injuries, 37% acknowledge respiratory morbidities, 19% identify postural problems, and 42% are cognizant of the potential for hearing problems associated with their work.

Table 5: Utilization patterns of personal protective equipment (PPE) among construction worker respondents (reported)

RESPONDENTS' REPORTED PRACTICE OF OCCUPATIONAL SAFETY MEASURES		
PRACTICE	**FREQUENCY**	**PERCENTAGE**
Use gloves while mixing cement	45	25%
Wear protective cap (helmet) when working on site	30	16.7%
Put face mask while mixing cement	55	30.6%
Wear long boots/canvas while working on sites	23	12.8%
Work more than 8 hours a day	113	62.8%
Use earplugs when exposed to loud sound or noise	22	12.2%
Use elevating work platform (ladder, step ladders, scarf holding) or safety belts while working at higher level	45	25%
Take rest in between work	149	82.7%
Use repellent while working on site to prevent insect bites	22	12.2%

Table 5 displays the reported practice of occupational safety measures among construction workers in Rewa City. The data reveals that 25% of respondents use gloves while mixing cement, 16.7% wear protective caps (helmets) on-site, 30.6% employ face masks during cement mixing, and 12.8% wear long boots/canvas while working on sites. Additionally, 62.8% of respondents reported working more than 8 hours a day, 12.2% use earplugs in loud environments, and 25% utilize elevating work platforms or safety belts when working at higher levels. Furthermore, 82.7% of respondents take breaks between work sessions, and 12.2% use repellent to prevent insect bites while working on-site.

Table 6: Utilization patterns of personal protective equipment (PPE) among construction worker respondents (observed)

RESPONDENT'S OBSERVED PRACTICES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)		
PPE	**FREQUENCY**	**PERCENTAGE**
Head Protector/Helmet	9	5%
Hand Gloves	22	12.2%
Leg Boot /Canvas	13	7.2%
Face Mask	27	15%
Safety Glasses	9	5%
Ear Plugs	7	4%
Safety Clothing	11	6%

Table 6 shows construction workers' observed practices regarding the utilization of Personal Protective Equipment (PPE), with 5% observed wearing Head Protectors/Helmets, 12.2% using Hand Gloves, 7.2% wearing Leg Boots/Canvas, 15% employing Face Masks, 5% utilizing Safety Glasses, 4% using Ear Plugs, and 6% observed wearing Safety Clothing.

Table 7: Association between correct responses on knowledge questions, use of gloves while mixing cement, and demographic factors among construction workers.

VARIABLES	CORRECT RESPONSE ON KNOWLEDGE QUESTIONS				USE GLOVES WHILE MIXING CEMENT		
Gender	1 or Less	2	3		Yes	No	
Female	7	23	16	χ^2= 3.799	2	44	χ^2= 13.978
Male	22	46	66	p= 0.1496	43	91	p= 0.0002*
Educational Qualification	**1 or Less**	**2**	**3**		**Yes**	**No**	
No Formal Education	18	35	36	χ^2= 11.309	2	21	χ^2= 26.737
Primary (1 To 4)	7	14	24		14	75	
Secondary (5 To 10)	2	14	7	p= 0.0793	24	21	p< 0.0001*
Higher Secondary (11 & 12)	2	6	15		5	18	
Average Daily Income (In Rs.)	**1 or Less**	**2**	**3**		**Yes**	**No**	
500 To 1000	5	14	25	χ^2= 3.081	15	29	χ^2= 2.553
Less Than 500	24	55	57	p= 0.214	30	106	p= 0.1101
Experience As A Construction Worker (Years)	**1 or Less**	**2**	**3**		**Yes**	**No**	
0 To 5	8	27	31	χ^2= 3.062	21	45	χ^2= 2.588
6 To 10	9	23	21	p= 0.547	11	42	p= 0.2741
More Than 10	12	19	30		13	48	
Alcohol Intake At Work	**1 or Less**	**2**	**3**		**Yes**	**No**	
Yes	4	14	16	χ^2= 0.602	2	32	χ^2= 8.125
No	25	55	66	p= 0.740	43	103	p= 0.0044*
Smoking At Work	**1 or Less**	**2**	**3**		**Yes**	**No**	
Yes	5	16	35	χ^2= 9.747	24	32	χ^2= 13.748
No	24	53	47	p= 0.0076*	21	103	p= 0.0002*
Total	29	69	82	180	45	135	180

Table 7 reveals knowledge distribution among construction workers, showing no significant gender differences, a borderline significant variance based on educational qualification, and no significant distinctions related to income or years of experience. Notably, a significant difference in knowledge exists between those who smoke at work and those who do not (χ2= 9.747, p= 0.0076*).

The table also reveals significant differences in the usage of gloves while mixing cement among construction workers based on various factors. Notably, there is a significant gender difference (χ2= 13.978, p= 0.0002*), with more males using gloves. Educational qualification also significantly influences glove usage (χ2= 26.737, p<0.0001*), showing variations across different education levels. Additionally, significant differences are observed based on alcohol intake at work (χ2= 8.125, p= 0.0044*) and smoking at work (χ2= 13.748, p= 0.0002*), with non-alcohol consumers and non-smokers showing higher glove usage. No significant differences are found based on income or years of experience.

Discussion

This research investigated the knowledge & awareness of occupational hazards and the

implementation of safety measures among construction workers at selected construction sites of unorganized sector in Rewa district (MP).

The sociodemographic profile of construction workers, consisting of 180 respondents, revealed a predominant age group of 26-34 years (36.6%) and a male majority (74.4%). Hinduism was the dominant religion (75.6%), and educational levels varied, with 52% having no formal education. Experience ranged from 0 to over 10 years with a majority of participants with 0-5 years of work experience (36.7%), and a substantial portion reported alcohol (18.9%) and smoking (31.1%) habits. Most respondents worked 8 hours and above daily (75.6%). Previous research by Tam & Fung (2008)[9]& Gebremeskel and Yimer (2018)[10] has also indicated a significant prevalence of young male workers with similar work experience in the construction industry with more than 8 hours of average work duration a day.

In terms of lifestyle factors, a noteworthy portion of respondents abstained from smoking (68.9%) or alcohol consumption (81.1%) during work hours, whereas a minority was involved in these activities while on duty. Earlier research has indicated the detection of ethanol in the blood of construction workers who experienced fatal occupational injuries.[11]

The knowledge assessment indicated a high awareness level among construction workers regarding occupational hazards and safety measures. A significant majority recognized the link between exposure to hazards and work-related injuries or diseases (72.2%). The importance of personal protective equipment (82.2%) and adherence to safety rules (68.3%) was well-understood. The respondents' awareness regarding occupational hazards, injuries, work-related illnesses, and safety measures is likely shaped by their direct exposure to such situations, either through personal experiences or incidents involving co-workers.

The awareness of various occupational health hazards was substantial, with notable recognition of dust (81.7%), extreme heat (93.9%), and stress (78.8%). Similarly, respondents demonstrated awareness of potential morbidities, including ocular issues (72%) and hearing problems (42%), associated with their work. The substantial awareness of various occupational health hazards among the respondents, could be attributed to workplace exposure as construction workers are directly exposed to these hazards during their daily tasks, leading to firsth and experiences and heightened awareness, industry knowledge, previous incidents, and communication & information. The awareness of various occupational health hazards, such as dust, extreme heat, and stress, is consistent with findings from other study done by Oluwafemi FS et al in 2017 [12]. Reported practices of occupational safety measures highlighted variations in adherence. While some measures like taking breaks (82.7%) were commonly followed, others, such as using safety equipment, showed room for improvement. Observations regarding Personal Protective Equipment (PPE) utilization indicated varying practices. For instance, while face masks were used by 15% of respondents, only 5% were observed wearing head protectors/helmets. Consistent with the current study, prior research has consistently highlighted inadequate compliance and irregular adherence to safety measures among construction workers, particularly in developing countries. The root causes often include the absence of robust occupational health and safety policies [12,13,14]. The lack of adoption of safety devices among workers may be attributed to forgetfulness or the perception that these measures are inconvenient or deemed unnecessary. Some workers also reported that they are not supplied with essential protective gear, including boots, gloves, helmets, and masks, required for their respective activities. Examining knowledge distribution, no significant gender differences were noted, but educational qualifications influenced knowledge. Significant differences were observed in the reported practice of using gloves while mixing cement, particularly related to gender, educational qualification, alcohol intake, and smoking habits.

Conclusion

To conclude, this study highlights a strong awareness among construction workers in Rewa city regarding occupational hazards and safety practices. Although the respondents displayed a satisfactory level of understanding, there was a notable discrepancy in the implementation of occupational safety measures. It emphasizes the necessity for

effective occupational health and safety policies to address variations in safety practices and ensure the provision of essential protective gear, contributing to a safer working environment for construction workers in the unorganized sector.

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