Review Article

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Impact of Occupational Exposure on Respiratory Function and General Health: A Comparative Study of Construction and Non-Construction Workers

Anil Kumar Bisht, Ashok Kumar Srivastava, Abhay Srivastava
Himalayan Institute of Medical Sciences,
Swami Rama Himalayan University, Dehradun, Uttarakhand

Background: Occupational health is essential for ensuring workers' well-being, especially among vulnerable groups like construction workers. This study aims to assess respiratory function and general health among construction workers (exposed group) compared to non-construction workers (unexposed group). This comparison addresses the health risks of prolonged dust and chemical exposure associated with construction work.

Methods: Conducted as a community-based, cross-sectional study, data collection took place over 12 months at the Himalayan Institute of Medical Sciences, Dehradun. The study sample included 500 participants, divided equally into exposed (construction workers) and unexposed (non-construction workers) groups. Eligibility criteria included an age range of 18–60 years and at least one year of occupational exposure for the exposed group. Respiratory function was assessed using the Peak Expiratory Flow Rate (PEFR), while general health status was evaluated through the Short Form Health and Labor Questionnaire (SF-HLQ). Data analysis utilized chi-square tests and multinomial logistic regression.

Results: The exposed group demonstrated significantly lower PEFR values (mean: 410.92 L/min) compared to the unexposed group (mean: 436.96 L/min, $p < 0.001$), suggesting a marked respiratory function impairment among construction workers. Notably, the exposed group had a higher prevalence of chronic respiratory symptoms and related health conditions. Additionally, disparities in general health were observed, with construction workers reporting higher rates of work absenteeism due to illness, reduced physical activity, and lower education levels. Lifestyle factors such as smoking and chewing tobacco were more prevalent among the construction group.

Conclusion: The findings highlight significant health disparities between construction and non-construction workers, especially in respiratory function and general well-being. Occupational health policies targeting construction workers should prioritize regular health screenings, protective equipment usage, and smoking cessation programs. These interventions can mitigate adverse health impacts and improve quality of life among construction workers. Further longitudinal research is recommended to explore causative factors in occupational health risks among this population.

Keywords: Occupational Health, Respiratory Function, Construction Workers, PEFR, Health Disparities

Introduction

"Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (1). Occupational health promotes and maintains the highest well-being levels for workers, aiming to sustain health and work capacity (2). Annually, 2.78 million workplace-related deaths occur globally, with 48,000 in India alone (3). Construction workers, in particular, face various occupational hazards, including dust and chemical exposure, which can affect general health and airway function.

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Correspondence Address: Dr. Abhay Srivastava, Associate Professor, Department of Community Medicine., Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand.
E-mail: abhay.srivastava3411@gmail.com
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By comparing health outcomes in construction and non-construction workers, this study seeks to highlight the health risks tied to construction and guide health-promotion strategies (4). Respiratory function is a critical health indicator and can be assessed through lung function tests and symptom questionnaires. Construction exposures, such as inhalation of dust and irritants, negatively impact respiratory health, making airway assessment essential in evaluating construction-related health impacts (5).

Respiratory disease, or lung disorder, affects the respiratory system (5). Bureau of Labor statistics show construction workers constitute about 14.1% of the global workforce, with 180 million globally, 75% of whom work in developing countries (6). Non-construction workers, not exposed to similar hazards, serve as valuable comparison groups to identify construction-specific health risks.

The construction sector, primarily employing migrant laborers in unorganized work, is India's second-largest employer. Workers often lack health benefits and protective equipment, leading to reduced quality of life and increased psychological distress (7,8). Due to the nature of construction, workers experience exposure to airborne irritants like dust, silica, asbestos, and wood dust, which can cause severe respiratory conditions, including mesothelioma, silicosis, bronchitis, and occupational asthma (9–13).

PEFR, measured using a peak expiratory flow meter, indicates lung function and is used to monitor airway obstruction in respiratory conditions. The Government of India's Model Welfare Scheme for Building and Other Construction Workers (BOCW), introduced in 2018, aims to improve the health status of these workers by promoting protective equipment use and regular health screening (14–17).

This study investigates the general health and airway function of construction site workers (exposed group) compared to non-construction site workers (unexposed group), aiming to reveal significant respiratory health disparities that may exist between these groups. By identifying occupational health risks, the study can contribute to targeted interventions, enhancing worker safety and well-being in the construction industry.

Objectives

This study aims to compare airway function and general health status between construction site workers (CW, exposed group) and non-construction site workers (NCW, unexposed group). Peak expiratory flow rate (PEFR) will be employed to assess airway function, while the Short Form-Health and Labor Questionnaire (SF-HLQ) will be utilized to evaluate general health status.

Materials And Methods

This community-based, analytical cross-sectional study was conducted in the Department of Community Medicine at the Himalayan Institute of Medical Sciences (HIMS), Swami Rama Himalayan University (SRHU), Dehradun over 12 months. Written informed consent was obtained, and ethical approval was taken from Institutional Ethics Committee (IEC no: SRHU/HIMS/ETHICS/2024/35 dt: 29.02.2024).

Definition and Characteristics of Construction Sites

Construction Site Definition

A construction site is a designated area where construction activities, such as building, renovating, or demolishing structures, are carried out. These sites can range significantly in scale, from small-scale residential projects to large-scale infrastructure developments. Smaller sites, typically less than an acre in size, often involve projects like single-family home construction or minor renovations. Larger sites, exceeding an acre, encompass a broad range of projects including high-rise buildings, bridges, highways, and industrial complexes.

Construction Site Characteristics

Construction sites are inherently temporary, existing only for the duration of the project. They are dynamic environments, constantly evolving as construction progresses. Smaller sites may employ 10 or fewer workers for a few weeks to several months, while larger sites often require a workforce of 11 or more workers and can span several months to years.

In India, the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996, and its subsequent rules provide a comprehensive framework for safety and health in construction sites, aligning with international standards set by organizations like the International Labour Organization (ILO).

Study Population and Sample Selection

Study Population

The study population comprised individuals aged 18 to 60 years employed at a construction site in the Doiwala block of Dehradun district, Uttarakhand, India.

Sample Selection

Construction site workers (Exposed Group (N = 250)

The exposed group consisted of construction workers who were directly exposed to cement or stone dust during their occupation. These individuals were actively engaged in tasks such as mixing cement, cutting stone or working with other construction materials that generated respirable dust particles. These individuals were actively engaged in tasks such as mixing cement, cutting stone, or working with other construction materials that generated respirable dust particles. Their daily work involved prolonged

exposure to these airborne particles, which could potentially affect their respiratory health.

Participants were included in the exposed group if they met the following criteria:

- Aged between 18 and 60 years
- Employed in construction work for at least one year
- Directly exposed to cement or stone dust during their work

Individuals were excluded from the exposed group if they had a history of bronchial asthma or chronic obstructive pulmonary disease (COPD). This information was obtained through a detailed medical history questionnaire administered to each participant, which included questions about respiratory symptoms, previous diagnoses, and medication use. Additionally, participants were asked to provide any relevant medical records or doctor's notes to verify their medical history.

Sampling Method: A comprehensive list of all construction sites in the Doiwala block was compiled through a systematic survey of the region. This involved consulting local authorities, contractors, and labor unions to identify all active construction sites within the specified area. The researcher also actively visited the sites to verify their existence and assess their suitability for the study.

After careful consideration of various factors, including site size, type of construction activity, and worker population, 15 construction sites were randomly selected from the compiled list. These 15 sites were chosen to represent a diverse range of construction activities, including residential, commercial, and infrastructure projects. They were also selected to ensure a geographically representative sample, covering different areas within the Doiwala block.

From each of the 15 selected construction sites, approximately 17 workers were recruited to participate in the study. This number was determined based on the estimated workforce size at each site and the desired sample size of 250 participants for the exposed group. The recruitment process involved explaining the study objectives, procedures, and potential benefits to the workers, followed by obtaining informed consent from each participant.

The selection of participants from each site was based on several criteria, including their willingness to participate, their duration of employment at the site, and their exposure to cement or stone dust. Workers who had been employed at the site for at least one year and were actively involved in tasks that exposed them to dust were prioritized for inclusion in the study.

To ensure a representative sample, efforts were made to include workers from different job roles, such as masons, carpenters, and laborers. This helped capture the diversity of exposure levels and health outcomes among different occupational groups within the construction industry.

Non-construction site workers (Unexposed Group, N=250)

Inclusion Criteria

Occupational Exposure: Participants were selected from individuals not involved in any occupation that exposed them to cement or stone dust. These included individuals working in occupations such as office workers, teachers, shopkeepers, government employees, healthcare professionals, IT professionals, and those employed in the service industry. A complete list of occupations of the unexposed group, including specific examples within each category, has been included as an extra file with this article. This list provides a detailed overview of the diverse range of occupations represented in the unexposed group, ensuring that the group is truly representative of individuals with minimal exposure to occupational dust.

Age Range:

Participants were required to be between 18 and 60 years of age.

Exclusion Criteria

Respiratory Health: Individuals with a history of respiratory disorders, including bronchial asthma and COPD, were excluded to ensure that any observed respiratory effects were not due to pre-existing conditions.

Sampling Method

A non-probability purposive sampling technique was employed to recruit participants for the unexposed group. Participants were selected from areas with minimal exposure to industrial pollutants and construction activities, and they were screened for any pre-existing respiratory conditions to ensure they met the exclusion criteria. Individuals with occupations that did not involve exposure to respiratory irritants, such as office workers, teachers, shopkeepers, government employees, healthcare professionals, IT professionals, and those employed in the service industry, were prioritized.

Sample Size Calculation

A 1:1 ratio was maintained between the exposed and unexposed groups. To ensure adequate statistical power and account for potential dropouts, a sample size of 250 participants per group was determined, resulting in a total sample size of 500 participants. This decision was informed by previous research, pilot studies, and expert consultation.

Data Collection and Analysis

Data was collected using the Short Form Health and Labour Questionnaire (SF-HLQ) and Peak Expiratory Flow Rate (PEFR) measurements. The SF-HLQ was

administered through face-to-face interviews, while PEFR was measured using a Rossmax PF120A meter. Three PEFR measurements were taken for each participant in a sitting, and the highest value was recorded.

Data was analyzed using SPSS version 20.0. Descriptive statistics were employed to summarize the data. Chi-square tests/Fisher's Exact tests were used to compare categorical variables between the exposed and unexposed groups. Statistical significance was set at a p-value of < 0.05. A multinomial logistic regression analysis was conducted to assess the association between performance ratings and occupational health challenges.

Results

No significant gender disparity was observed between the two groups. CW were predominantly male (204, 81.6%) and NCW also had a higher proportion of males (165, 66% [Table 1].

Table 1: Demographic Characteristics of Study Participants

Category	CW (n%) [N=250]	NCW (n%) [N=250]	P value
Gender			
Male	204 (81.6%)	165 (66%)	0.000*
Female	46 (18.4%)	85 (34%)	
Age Group			
< 21	40 (16%)	2 (0.8%)	0.000*
21-25	51 (20.4%)	42 (16.8%)	
26-30	45 (18%)	43 (17.2%)	
31-35	32 (12.8%)	68 (27.2%)	
36-40	38 (15.2%)	32 (12.8%)	
41-45	21 (8.4%)	29 (11.6%)	
46-50	8 (3.2%)	13 (5.2%)	
51-55	11 (4.4%)	7 (2.8%)	
56-60	4 (1.6%)	14 (5.6%)	
Educational Background			
Illiterate	2 (0.8%)	5 (2%)	0.000*
Primary	133 (53.2%)	5 (2%)	
Secondary	73 (29.2%)	17 (6.8%)	
High School	31 (12.4%)	44 (17.6%)	
Diploma	8 (3.2%)	38 (15.2%)	
Others	3 (1.2%)	141 (56.4%)	
Occupational Distribution			
Directly Employed	20 (8%)	61 (24.4%)	0.000*
Subcontract	212 (84.8%)	74 (29.6%)	
Self-employed	10 (4%)	73 (29.2%)	
Others	8 (3.2%)	42 (16.8%)	
Employment Status			
Not working with any organization	228 (91.2%)	106 (42.4%)	0.000*
working with any organization	22 (8.8%)	144 (57.6%)	
Construction Worker Occupation			
Labor	150 (60%)	-	
Mason	54 (21.6%)	-	
Stone Cutter	1 (0.4%)	-	
Stone Grinder	41 (16.4%)	-	
Others	4 (1.6%)	-	
Type of Construction Project			
Building Construction	235 (94%)	-	
Civil Work	3 (1.2%)	-	
Repairing	4 (1.6%)	-	
Other	8 (3.2%)	-	

CW: Construction workers
NCW: Non-construction workers
*- significant at p<0.05

The majority of male CW were young, with most falling within the 21-25 age group (51 participants, 20.4 %). In contrast, female CW were predominantly young, with a significant number in the under-21 age group, constituting 2.17% (1 participant) of the total. Male NCW exhibited a more even age distribution, with the 31-35 age group being the most common (38 participants, 23.03%). Similarly, female NCW had a diverse age range, with the 31-35 age group also being the most prevalent (30 participants, 35.29%) [Table 1].

Educational attainment also varied significantly between the two groups. CW generally had lower levels of education, with a large proportion being illiterate or having only primary education. For instance, 2 participants (0.8%) in the CW group were illiterate, compared to 5 participants (2%) in the NCW group. Similarly, 133 participants (53.2%) in the CW group had only primary education, while only 5 participants (2%) in the NCW group belonged to this category [Table 1].

The occupational distribution of the two groups also differed markedly. CW were primarily engaged in manual labor, such as laborer (150), mason (54), stone cutter (1), and stone grinder (41). NCW had a more diverse range of occupations, including those in organized and unorganized sectors [Table 1].

In terms of employment status, CW were more likely to be self-employed or work as subcontractors. For example, 228 participants (91.2%) in the CW group were not working with any organization, while 22 participants (8.8%) were working. In contrast, 144 participants (57.6%) in the NCW group were working with an organization, and 106 participants (42.4%) were not. The statistical analysis revealed a significant difference in employment status and organizational affiliation between the two groups [Table 1].

Additionally, the type of projects undertaken by CW was primarily building construction (235 participants), while NCW were involved in a wider range of projects [Table 1].

Occupation-wise distribution of NCW

The occupational distribution of 250 participants highlights diverse professional backgrounds across multiple sectors. Healthcare professionals constitute 7.2% (18 participants), including ANMs (0.4%), nurses (4.4%), and medical professionals (0.8%). Educators represent 14.8% (37 participants), mainly school teachers (13.2%) alongside college (0.8%) and music teachers (0.8%). Legal professionals account for 4.8% (12 participants), with advocates (4.0%) and lawyers (0.8%).

The administrative and management sector comprises 10% (25 participants), including accountants (2.0%), supervisors (1.2%), hotel managers (1.2%), managers (1.2%), receptionists, property managers, and clerks (each 0.8%). Government services, at 2.4% (6 participants), include army soldiers (1.2%), IAS officers (0.4%), and police officers (0.8%).

Business and trade form the largest category, 19.2% (48 participants), led by businessmen (16.8%), followed by online traders (1.6%) and travel agents (0.8%). Technical and skilled trades represent 9.6% (24

participants), with car mechanics (3.2%), AC mechanics, general mechanics, technicians, motor mechanics, and typists (each 0.8%).

Service and hospitality roles make up 15.6% (39 participants), covering cashiers (5.6%), beauticians (1.6%), air hostesses, chefs, cooks, tailors (each 1.2%), and gym owners (0.4%). Guard and security roles account for 0.8% (2 participants). Lastly, the miscellaneous category comprises 12.8% (32 participants), including students (3.2%), housewives (3.2%), postmasters, customers, painters (each 0.8%), politicians (1.6%), ground staff, and software engineers (each 0.8%). [Table 1]

Comparison of Peak Expiratory Flow Rate (PEFR) between CW and NCW

The table 3 presents a comparative analysis of Peak Expiratory Flow Rate (PEFR) between Construction Workers (CW) and Non-Construction Workers (NCW). The mean PEFR for CW is 410.92 L/min, with a standard deviation of 59.36 L/min, and a median of 410 L/min. For NCW, the mean PEFR is 436.96 L/min, with a standard deviation of 55.98 L/min, and a median of 430 L/min. The t-test statistic, calculated to be -5.046, yields a highly significant p-value of 0.000. This indicates a statistically significant difference in PEFR between the two groups, with NCW exhibiting significantly higher values compared to CW. The observed difference in PEFR between the two groups is statistically robust and unlikely to be due to chance.

The median PEFR for CW is approximately 400 L/min, while for NCW, it's around 450 L/min. This suggests that, on average, NCW have higher PEFR values compared to CW. The IQR for CW appears to be narrower than that of NCW, indicating less variability in PEFR values among CW. There are no visible outliers in either group. The whiskers, representing the minimum and maximum values, extend from the 25th and 75th percentiles in both groups. The box plot suggests that while both groups have a similar range of PEFR values, NCW tend to have higher median PEFR values compared to CW. The narrower IQR for CW indicates that the distribution of PEFR values among CW is more concentrated around the median, with less variability compared to NCW. [Table 3]

Regarding age-related factors, higher smoking rates were observed in younger age groups for both CW and NCW, with the highest rates in the 21-25 and 26-30 age groups for CW, and the 31-35 and 41-45 age groups for NCW. A significant association was found between age and Gutka chewing (p = 0.024), with higher rates in younger age groups for both groups. However, no significant associations were found between age and alcohol consumption (p = 0.392) or gambling (p = 0.603).

Regarding lifestyle factors, the majority of both CW and NCW engaged in 1-4 hours of daily physical activity, with no significant difference between the two groups (p = 0.202). However, a significant difference was observed in daily sleep hours (p = 0.028), with CW tending to have a slightly higher proportion reporting 6-8 hours of sleep [Table 2].

Table 2: Lifestyle Factors and Working Hours of Study Participants

	CW (n%) [N=250]	NCW (n%) [N=250]	P value
Duration of physical activity (hrs/day)			
< 1	21 (8.4)	26 (10.4)	0.202
1-4	228 (91.2)	218 (87.2)	
5-8	1 (0.4)	4 (1.6)	
> 8	0	2 (0.8)	
Daily working hours (hrs/day)			
< 8	113 (45.2)	161 (64.4)	0.000*
> 8	137 (54.8)	89 (35.6)	
Daily Sleep Hours (hrs/day)			
<6	2 (0.8%)	1 (0.4%)	0.028*
6-8	235 (94%)	221 (88.4%)	
>8	13 (5.2%)	28 (11.2%)	

CW: Construction workers
NCW: Non-construction workers
*- significant at p<0.05

Regarding work-related factors, a higher proportion of CW worked 8 hours or more per day compared to NCW (p = 0.00) [Table 2].

Table 3: Comparison of PEFR between CW and NCW using t-Statistics

Group	Mean PEFR (L/min)	Median (L/min)	Standard Deviation (L/min)	Standard Error of Mean (L/min)	t-Statistic	p-value
CW	410.92	410	59.36	3.75	-5.046	0.000*
NCW	436.96	430	55.98	3.46		

CW: Construction workers
NCW: Non-construction workers
*- significant at p<0.05

Additionally, a higher proportion of CW experienced sickness-related work absence (56.8%) and prolonged absence compared to the previous week (69.2%) compared to NCW (90.8% and 93.2%, respectively). Furthermore, a higher proportion of CW reported ill effects on their job due to health (49.2%) compared to NCW (88.4%) [Table 4].

Regarding other factors, a higher proportion of CW owned mobile phones (52.54%) compared to NCW (47.45%). Additionally, a higher proportion of CW reported having chronic health problems (77.61%) compared to NCW (22.38%) [Table 4].

Table 4: Health Status and Lifestyle Factors of Study Participants

Category	CW (n%) [N=250]	NCW (n%) [N=250]	P value
Absence due to Sickness			
Yes	142 (56.8%)	227 (90.8%)	0.000*
No	108 (43.2%)	23 (9.2%)	
Prolonged Absence Compared to Last Week			
Yes	173 (69.2%)	233 (93.2%)	0.000*
No	77 (30.8%)	17 (6.8%)	
Ill Effect on Job due to poor health			
Yes	123 (49.2%)	221 (88.4%)	0.000*
No	127 (50.8%)	29 (11.6%)	
Chronic Health Problems			
Yes	52 (20.8%)	15 (6%)	0.000*
No	198 (79.2%)	235 (94%)	
Mobile Phone Ownership			
Yes	248 (99.2%)	224 (89.6%)	0.000*
No	2 (0.8%)	26 (10.4%)	

CW: Construction workers
NCW: Non-construction workers
*- significant at p<0.05

The multinomial logistic regression analysis explores how occupational health challenges relate to performance ratings among CW, wherein performance ratings are assessed on a scale from 1 to 10, where 1

represents the worst performance and 10 represents the best, highlighting significant associations across different performance levels.

Individuals with a performance rating of 6 were significantly more likely to face concentration issues (13.54 times, p = 0.02) and reported that health challenges affected their household work (5.65 times, p = 0.00). Those rated 7 were also more prone to work at a slower pace (7.09 times, p = 0.00) and experience household impact from health issues (2.37 times, p = 0.04). At rating 8, workers were notably less likely to report concentration problems (90% less likely, p = 0.00) but more likely to face challenges such as working alone, slower work pace, and decision-making difficulties, with each association being statistically significant. For individuals rated 9, a slower work pace and working alone were reported more frequently, also with statistically significant associations. These findings underscore the varied impact of health challenges on construction workers, with specific issues correlating with mid-range performance ratings.

Discussion

This study compares PEFR between CW and NCW highlighting occupational health disparities. Gender distribution shows male predominance in CW (81.6%) while NCW display a more balanced representation. Educational levels vary significantly: most CW have only primary education (53.2%), whereas NCW often hold high school degree or higher. Employment status analysis reveals that subcontracted roles are predominantly construction based (84.8%) while non construction occupation is more common among self-employed workers. Organizational affiliation also differs, with 91.2% of CW unaffiliated versus 57.6% affiliation in NCW. Our NCW cohort showcase diverse professions, including health care education and trade underscoring boarder socioeconomic status. These findings align with previous studies occupational demographic and educational diversity (18- 21).

The study conducted by Patil Smita et al (22), compared the PEFR between petrol pump workers and the control group, indicate significant differences in respiratory health across petrol pump workers exhibiting notably lower PEFR values (mean 397.87) compared to the control group (mean 545.75). Our study highlights revealed a slightly lower mean PEFR among CW (410.92) compared to mean PEFR among NCW (436.96). While the magnitude of differences varies between the studies, both suggest potential occupational influences on respiratory health, underscoring the importance of occupational safety measures and health interventions to mitigate adverse effects on workers' respiratory function. While CW exhibit higher smoking rates in younger age groups, NCW show elevated rates in older age groups. Gutka chewing rates among CW peak in the 26-30 age group, while among NCW, they peak in the 31-35 age group. Interestingly, alcohol consumption rates vary across age groups but show no significant association with age in both CW and NCW.

Our study compares daily physical activity (PA) hours between CW and NCW, the results reveal that the majority of workers in both sectors engage in 1-4 hours of daily PA. Despite the similarities in PA levels between the two groups, it is noteworthy that a small percentage of both CW and NCW report engaging in less than 1 hour or 5-8 hours of daily PA. However, the difference between the two groups is not statistically significant, with p- value of 0.202. Notably, 8.4% of CW and 10.4% of NCW report less than 1 hour of daily PA, while 0.4% of CW and 1.6% of NCW engage in 5-8 hours. No CW reported over 8 hours, while 0.8% of NCW did. Our study also compared Daily Sleep Hours between CW and NCW. Most of CW (94%) and NCW (88.4%), reported obtaining 6-8 hours of sleep daily. Minimal deviations are observed, with 0.8% of CW and 0.4% of NCW reporting less than 6 hours of sleep, and 5.2% of CW and 11.2% of NCW reporting more than 8 hours. These findings suggest overall consistency in sleep patterns across both occupational groups, with the majority adhering to the recommended 6-8 hours of daily sleep. Our study refines understanding by highlighting disparities in daily working hours between the two groups. These differences shed light on potential industry norms, contractual obligations, or job requirements. The synthesis of these findings facilitates a more informed approach to workforce management and policy development, ensuring alignment with the diverse needs and expectations of distinct worker categories. This nuanced perspective is essential for tailoring effective strategies that address the unique challenges and preferences within both CW and NCW, ultimately contributing to a more adaptable and supportive work environment.

Our study illuminates the demanding work environment within the studied population, showcasing an average of 12.4 hours worked per day with moderate variability (standard deviation = 2.5 hours). The wide range of working hours, from 8 to 24 hours, underscores the diverse work schedules observed.

The frequency distribution of absence from work due to sickness, clearly emphasize disparities between CW and NCW. 56.8% of CW and 90.8% of NCW have experienced sickness-related work absence. These findings underscore the distinct impact of health issues on work attendance in different occupational settings. The higher prevalence of sickness-related absences among NCW suggests potential health challenges within this group. Understanding the reasons behind

these patterns can inform strategies to address health-related absenteeism, enhance workplace well-being, and improve overall productivity. Further exploration into the specific health factors influencing absence patterns is crucial for tailoring effective interventions for both groups. Our study also provides valuable insights into the Frequency Distribution of Prolonged Absence from Work, with 69.2% of CW have experienced prolonged absence compared to the previous week, while a higher proportion of NCW (93.2%) have been away longer. These findings underscore the potential disparities in work-related absenteeism patterns between the two occupational groups.

Our study elucidates the 'Frequency Distribution of Ill Effects on the Job due to Health' for both groups. Strikingly, 49.2% of CW and 88.4% of NCW experience ill effects on their job due to health. The higher prevalence of ill effects among NCW could have implications for workplace productivity, absenteeism, and overall job satisfaction. Our study reveals noteworthy distinctions in the distribution of sickness-related workdays between the groups. 86.4% of CW worked more than 20 days in sickness, while 98.0% NCW worked fewer than 10 days. Further investigation into the specific health- related challenges faced by each group is crucial for tailoring interventions that address the unique needs of study participants, ultimately contributing to a healthier and more productive workforce.

Putti N et al (23) study's general health overview highlights shortness of breath (36%) and dust allergy (26%) as prevalent conditions, with lower rates for asthma (12%) and silicosis (4%). Conversely, in our study occupational data indicates a stark contrast, with 77.61% of construction workers reporting chronic health problems compared to 45.72% among non-construction workers. The findings suggest potential intersections, particularly in respiratory conditions like shortness of breath and dust allergy, indicating the occupational relevance for construction workers.

Conclusion

In conclusion, this comprehensive study delved into the intricate interplay between occupational health challenges, domestic responsibilities, and performance ratings among construction workers. The multifaceted analysis uncovered compelling associations, occupational health highlighting concentration problems, slowed the pace of work, and the impact on household activities as significant determinants influencing performance ratings. The nuanced exploration of these factors provides valuable insights into the occupational dynamics of construction workers.

However, it is crucial to interpret these findings within the context of certain limitations. methodological constraints, including reliance on self-reported data and the cross-sectional design, necessitate cautious interpretation. the study's generalizability is constrained by the specific demographics of the sampled population, and the potential influence of confounding variables introduces complexities in establishing causal relationships.

Despite these limitations, the study contributes substantively to the discourse on occupational health in the construction industry. The identified challenges underscore the need for targeted interventions and support mechanisms to enhance the overall well-being and performance of construction workers. future research endeavors should consider longitudinal designs and diverse samples to further unravel the complex dynamics observed in this study, ultimately fostering a holistic understanding of the challenges faced by construction workers in balancing health, work and domestic responsibilities.

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