

**Awareness and Practices on Occupational Safety among Building Construction Workers in Pokhara Metropolitan**Sujata Adhikari<sup>1</sup>, Shreejana Wagle<sup>1</sup><sup>1</sup>School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Kaski, Nepal**ABSTRACT**

**Introduction:** The risk of occupational injury and accident is more prominent in the construction industry than in other sectors. These accidents and injuries are the results of a low level of awareness and limited practice of safety measures. So, the main aim of this study was to assess the awareness and practices on occupational safety among the building construction workers.

**Methods:** A cross-sectional study was carried out among 384 building construction workers of Pokhara Metropolitan. Multi-stage sampling technique was used. Face-to-face interview and interview schedule was the data collection technique and tool. The questionnaire was pre-tested among (10%) of the total sample. Ethical approval was taken from the Institutional Review Committee of Pokhara University.

**Results:** This study showed that most of the workers (94.8%) were aware of the use of Personal Protective Equipment (PPE). The majority of the workers (63.8%) had poor levels of practice of PPE. The practice of PPE was significantly associated with the marital status, work experience, work hours, First aid kit facilities, Insurance services, awareness of the use of PPE, PPE availability, awareness about the occupational health problems, and workplace safety training.

**Conclusion:** Most of the workers were aware of the use of safety measures but the practice of safety measures was poor. Marital status, awareness of safety measures, and so on were found to be significantly associated with the practice of PPE. Construction companies should implement the compulsory use of PPE to prevent accidents and injuries at construction sites.

**Keywords:** *Awareness, Building construction workers, Personal protective equipment, Practice*

**INTRODUCTION**

Occupational health and safety aim to assess, evaluate, and minimize the health risks and hazards encountered at work.<sup>1,2</sup> It tends to improve and maintain the physical, social, mental, and emotional health and well-being of an employee in an entire job.<sup>3</sup> It is a cross-disciplinary area concerned with fostering the health and welfare of workers at the worksite.<sup>2</sup> Occupational Injuries have become a major public health issue in developing countries like Nepal.<sup>4</sup> The risk of occupational injury and accident is prominent in the construction industry as compared with other sectors.<sup>5-8</sup> Data shows that 9% of all occupational death and 18% of all occupational injuries arises from construction sites.<sup>9</sup> Similarly, workers' low level of awareness and knowledge of health and safety leads to an increase in accidents and death at worksites.<sup>10</sup> Literatures on "Occupational Health and Safety in Nepal" revealed that Occupational health and safety (OHS) is a neglected area.<sup>11,12</sup> The concerned ministry has not taken this matter as a key issue.<sup>6</sup> Very few policies and activities related to Occupational health and safety are implemented. The working environment is not safe for the workers. The employer focuses on the profit rather than the health and safety of the workers. The contractor and the worker focuses on the completion of

the job and earning money. No one is concerned about the health and safety of the workers.<sup>13</sup>

These work-related accidents can be prevented by the use of safety measures such as PPE.<sup>2</sup> Personal protective equipment is the equipment used by the workers in the working environment to safeguard them from occupational hazards and risks.<sup>14,15</sup> Personal protective equipment includes safety helmets, safety goggles, visible dress, cut-resistant gloves, hearing protectors, masks, leg boots, safety harness, and so on. PPE utilization is a crucial part of Occupational health and safety practices which protects the health of the workers.<sup>2,16</sup> However, the use of PPE is given less importance in many developing countries. No use of PPE leads to exposure to different sorts of hazards which eventually results in adverse health conditions for workers.<sup>16</sup> Therefore, the main aim of this study was to identify the awareness and practices on occupational safety among the building construction workers in Pokhara Metropolitan.

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## METHODS

A cross-sectional study design was used from June to December 2019 in Pokhara Metropolitan and the study method was quantitative. A total of 384 workers were determined based on the study held in Nepal where the prevalence of PPE use was 50%.<sup>17</sup>

There are 33 wards in the Pokhara Metropolitan. Eleven wards (one-third) were selected from 33 wards by using Randomizer Software to represent all the wards of Pokhara Metropolitan. From each selected ward, 5 building construction sites were selected by simple random sampling from the list of all building construction sites taken from the Pokhara Metropolitan Office. From each selected construction site, 50% of workers were interviewed randomly. So, the sampling technique was Multi-stage sampling.

A face-to-face interview was the data collection technique and the interview schedule was the data collection tool. The validity of the tools was maintained by incorporating expert opinion and through the extensive literature review. The reliability of the tool was maintained by pretesting the tools among 10% i.e. 38 of the sample size in the homogeneous area. The data collection tool was developed in both English and Nepali.

The dependent variable was the level of practice of PPE. The practices of different kinds of PPE were measured by using 10 questions. Total scores on practice-related questions were 10. The mean score of the participant was (2.6953 ± 2.07770). While the median score was 3.00. Participants who scored less than or equal to the median i.e. ≤3 were classified as poor while those who scored more than median i.e. >3 were classified as good level of practice as suggested by the study done in Mangalore, India.<sup>18</sup> The independent variables were sociodemographic variables, work-related variables, awareness-related variables, and workplace safety training.

The collected data were entered into Epi data version 3.1 and exported to SPSS version 20 for further analysis. The data was collected after getting ethical approval from the Institutional Review Committee of Pokhara University. Permission to carry out the study was taken from the Health section of Pokhara Metropolitan. To go to the construction site, approval was taken from the contractor. Written informed consent was taken from each of the respondents and confidentiality of the information was maintained. The Chi-square test was used to find out the association between the practice of PPE and various independent variables.

## RESULTS

### Socio-Demographic and Work-Related Characteristics of the respondent

Out of 384 respondents, more than half (60.2%) of the workers belonged to the age group of (20-29) years. The mean age of the participant was 27.10±7.02 years. The majority were male and belonged to the Hindu religion. Nearly half of them were disadvantaged Janajatis and earn in the range of 20,000 to 30,000 per month and 80.2% were married. More than half (57.8%) had studied up to the basic level of education. About one-third of the subjects (37.8%) had less than or equal to 4 years of experience. Most of the workers (55.7%) had worked less than 8 hours per day. Regarding facilities of safe drinking water and clean latrine at the worksite, 88.5% of workers had received such facilities while 11.5% had not received them. The majority of the workers (83.1%) did not receive the first aid facilities. The majority of the workers (85.9%) were not provided with insurance services.

Table 1: Socio-Demographic and Work-related characteristics

Variables	Frequency (n=384)	Percent (%)
<b>Age (in years)</b>		
< 20	34	8.9
20 – 29	231	60.2
30 – 39	90	23.4
40+	29	7.6
Mean=27.10, Median=25.5, Min=18, Max=59, S.D.=7.022		
<b>Gender</b>		
Male	356	92.7
Female	28	7.3
<b>Religion</b>		
Hindu	323	84.2
Muslim	48	12.5
Christian	9	2.3
Buddhist	4	1.0
<b>Ethnicity</b>		
Disadvantaged Janajatis	191	49.7
Dalit	78	20.3
Religious minorities	48	12.5
Upper caste groups	46	12.0
Disadvantaged non-Dalit Terai caste group	12	3.1
Relative advantaged Janajatis	9	2.3

<b>Marital status</b>		
Married	308	80.2
Unmarried	76	19.8
<b>Educational status</b>		
Illiterate	53	13.8
Able to read and write	27	7.0
Basic level	222	57.8
Secondary level	82	21.4
<b>Monthly Income (in Rupees)</b>		
<20000	142	37
20000-30000	208	54.2
>30000	34	8.9
Mean=24460, S.D=7185, Min=5000, Max=50000		
<b>Work experience in year</b>		
≤4 years	145	37.8
5-9 years	110	28.6
≥10 years	129	33.6
Mean=7.2, Median=5.5, S.D=5.6, Min=0.5, Max=37		
<b>Working Hours per day</b>		
less than 8 hours	214	55.7
greater than 8 hours	170	44.3
Mean=8.5, Median=8, S.D=0.9, Min=1, Max=12		
<b>Safe drinking water and clean latrine facilities</b>		
Yes	340	88.5
No	44	11.5
<b>Provision of First Aid Kit</b>		
No	319	83.1
Yes	65	16.9
<b>Insurance services by company/contractor</b>		
No	330	85.9
Yes	54	14.1

#### Awareness and safety training related information

Table 2 revealed that most of the workers (94%) were aware of the use of PPE. Among them, almost all (99.2%) were aware of the use of gloves. The majority (91.5%) were aware of the benefits of using PPE. Most of the subjects (90.9%) were aware of the consequences of not wearing PPE. About one-fourth (26.9%) of workers were provided with PPE at the worksite. About two-fifth (36.2%) were aware of Occupational health problems. Only (6.5%) had received safety training.

Table 2: Awareness and safety training related information

Variables	Frequency (n=384)	Percent (%)
<b>Aware of the use of PPE</b>		
Yes	364	94.8
No	20	5.2
<b>If yes, PPE known*(n=364)</b>		
Gloves	360	99.2
Hard hats	307	80.2
Leg boots	239	62.4
Face masks	217	56.7
Eye protector	214	55.9
Safety Belt	97	25.3
Hearing protector	47	12.3
Reflective Jackets	55	14.4
Back support	40	10.4
Protective clothing	18	4.7
Skin protection	18	4.7
Earplugs	1	0.3
<b>Aware of benefits of using PPE(n=364)</b>		
Yes	333	91.5
No	31	8.5
<b>If Yes, it benefits*(n=333)</b>		
Reduces the accident	264	79.3
Prevents work-related disease	151	45.3
Protect from exposures	91	27.3
Improves the health of the employee	49	14.7
<b>Availability of PPE(n=364)</b>		
No	266	73.1
Yes	98	26.9
<b>Aware of consequences of not wearing PPE(n=364)</b>		
Yes	331	90.9
No	33	9.1
<b>If Yes, it's consequences*(n=331)</b>		
Suffer from injury and illness	293	88.5
Increase accidents	130	39.3
Exposure to hazard	92	27.8
May get killed at the workplace	8	2.4
<b>Aware of occupational health problems</b>		
No	245	63.8
Yes	139	36.2

<b>If Yes, different health problems*(n=139)</b>		
Respiratory	67	48.2
Skin related	62	44.6
Back pain	48	34.5
Visual problem	32	23.0
Nervous related	9	6.5
Hearing problem	3	2.2
Kidney stone	1	0.7
<b>Received workplace safety training</b>		
No	359	93.5
Yes	25	6.5
<b>Area of training received*(n=25)</b>		
Handling equipment and the tools	24	96.0
Fall protection	12	48.0
Handling PPE	11	44.0
Basic first aid course	6	24.0

\*Multiple responses

**The practice of Personal Protective Equipment among the workers**

The majority of the respondents used face masks (62.5%) and skin protection (54.9%) at the worksite.

Table 3: Practice related variables

Variables	Frequency (n=384)	Percent (%)
<b>Use of gloves while mixing cement</b>		
No	198	51.6
Yes	186	48.4
<b>Use of helmet when working on site</b>		
No	314	81.8
Yes	70	18.2
<b>Use of face masks during work at the sites</b>		
No	144	37.5
Yes	240	62.5
<b>Wear long boots during work at the sites</b>		
No	260	67.7
Yes	124	32.3
<b>Use of ear protection when exposed to loud sound</b>		
No	341	88.8
Yes	43	11.2
<b>Use of a safety belt while working at a higher level</b>		
No	289	75.3

Yes	95	24.7
<b>Use of safety goggles during welding</b>		
No	366	95.3
Yes	18	4.7
<b>Use of reflective jackets while working at sites</b>		
No	358	93.2
Yes	26	6.8
<b>Use of back support while lifting heavy objects</b>		
No	362	94.3
Yes	22	5.7
<b>Use of skin protection while working on sites</b>		
No	173	45.1
Yes	211	54.9

**Level of Practice of PPE among the workers**

The majority (63.8%) of the respondents had a poor level of practice of PPE.

Table 4: Level of Practice of PPE

Level of Practice of PPE	Frequency (n=384)	Percentage (%)
Poor practice (below median)	245	63.8%
Good practice (above median)	139	36.2%

**Factors associated with the practice of PPE**

Table 5 revealed that various independent variables such as Marital status ( $\chi^2=7.8, p=0.005$ ), Working experience ( $\chi^2=5.3, p=0.021$ ), Working hours ( $\chi^2=34.65, p=0.001$ ), First aid kit services ( $\chi^2=24.5, p=0.001$ ), Insurance services ( $\chi^2=10.4, p=0.001$ ), awareness on the use of PPE ( $\chi^2=6.3, p=0.012$ ), awareness about the benefits of using PPE ( $\chi^2=11.3, p=0.001$ ), awareness about consequences of not wearing PPE ( $\chi^2=10.1, p=0.002$ ), PPE availability ( $\chi^2=37.5, p=0.001$ ), awareness about Occupational Health Problem ( $\chi^2=20.89, p=0.001$ ), Workplace Safety Training ( $\chi^2=18.3, p=0.001$ ) shows the significant association with the practice of PPE.

Table 5: Factors associated with the practice of PPE

Variables	Practice of PPE		$\chi^2$	P-value
	Poor	Good		
<b>Marital status</b>				
Married	207(67.2)	101(32.8)	7.816	0.005*
Unmarried	38(50)	38(50)		
<b>Working experience in years</b>				
≤6 years	118(58.4)	84(41.6)	5.345	0.021*
>6 years	127(69.8)	55(30.2)		
<b>Working hours per day</b>				
>8 hours	136(80.0)	34(20.0)	34.655	0.001*
≤8 hours	109(50.9)	105(49.1)		
<b>Provision of First Aid Kit</b>				
No	221(69.3)	98(30.7)	24.477	0.001*
Yes	24(36.9)	41(63.1)		
<b>Insurance services by company/ contractor</b>				
No	200(60.6)	130(39.4)	10.379	0.001*
Yes	45(83.3)	9(16.7)		
<b>Aware of the use of PPE</b>				
No	18(90)	2((10)	6.270	0.012*
Yes	227(62.4)	137(37.6)		
<b>Aware of benefits of using PPE</b>				
No	28(90.3)	3(9.7)	11.286	0.001*
Yes	199(59.8)	134(40.2)		
<b>Aware of the consequences of not wearing PPE</b>				
No	29(87.9)	4(12.1)	10.066	0.002*
Yes	198(59.8)	133(40.2)		
<b>Availability of PPE</b>				
No	191(71.8)	75(28.2)	37.526	0.001*
Yes	36(36.7)	62(63.3)		
<b>Aware of Occupational health problems</b>				
No	177(72.2)	68(27.8)	20.890	0.001*
Yes	68(48.9)	71(51.1)		
<b>Received workplace safety training</b>				
No	239(66.6)	120(33.4)	18.343	0.001*
Yes	6(24)	19(76)		

\*p-value significant at &lt;0.05

## DISCUSSION

This study assessed the awareness and practices on occupational safety among the building construction workers of Pokhara Metropolitan. This study revealed that among 384 respondents, 63.8% of the respondents had a poor level of practice of PPE and 36.2% had a good level of practice. The good practice of PPE in this study is higher than in the studies conducted in Nigeria (14.3%) and Bhaktapur, Nepal (2.3%), and India (5%).<sup>1,17,18</sup> These differences might be due to the study setting and study population. The low level of PPE practices could be due to the lack of PPE availability in the workplace, low level of knowledge and awareness on the use of safety measures and its importance, inadequate workplace safety training, uncomfortable to use PPE.

The majority (60.2%) were within the age group of 20-29 years. Marital status was found significantly associated with the practice of PPE ( $p=0.005$ ,  $UOR=2.050(1.232-3.409)$ ). These findings were similar to the study held in Nigeria.<sup>19</sup> While, the study done in Kenya showed the contradictory result which showed that there was no significant relationship between the marital status and the use of PPE.<sup>20</sup> In this study, unmarried workers practice more PPE than married ones. The reason behind it may be that married workers may involve in other jobs due to their increasing responsibilities in life. They may have more stress and exhaustion than single ones which leads to less practice of PPE.

This study indicated that the practice of PPE was associated with the work experience of the workers. The workers with less working experience were more likely to practice PPE than workers with higher working experience which is in line with the findings of Eastern Nepal.<sup>3</sup> But its contrasts with the findings from the study conducted in Nigeria and Southern Ethiopia which revealed that workers with greater working experience practice more PPE.<sup>19,21</sup> The reason behind this could be that the workers who had worked for more years viewed themselves as experienced. Therefore they do not see the need to utilize safety measures at the worksite.

Other variables such as Working hours per day, provision of first aid kits at the workplace, and insurance services were also found significantly associated with the practice of PPE. The workers who worked less than or equal to 8 hours per day practice more PPE than those who worked greater than 8 hours per day as the laborers who worked under 8 hours do not have work pressure. Thus, they practice more PPE. The construction workers who had received first aid services used more PPE than those who had not received

such facilities. Similarly, the workers who had not received insurance services practice more PPE than those who had received because the construction companies cover all the cost of medical treatment for those workers who had received insurance services while the non-insured workers had to pay all the costs by themselves if there were any work-related accidents and disease. That's why they use PPE to be protected from accidents that could result in financial problems.

Data of this study showed a significant association between the awareness of PPE use and awareness of occupational health problems with the practice of PPE. The workers who were aware of the use of PPE were more likely to practice PPE than the workers who were not aware. This finding was consistent with the finding of the study conducted in Nepal.<sup>3</sup> The reason could be that the workers who were aware of the use of PPE had known the importance of PPE use. Hence, they practice more PPE.

The practice of PPE was significantly associated with workplace safety training [ $p=0.001$ ,  $UOR=6.307(2.455-16.205)$ ]. The workers who had received safety training practiced more PPE. These findings were consistent with the study held in Uganda and Ethiopia.<sup>9,22</sup> Similarly, a very few percentage of construction workers had received safety training in this study. This might be because the contractor and worker only focus on the completion of the job and earning money. No one is concerned about the safety of the workers and provides safety training to the workers.

This study was limited to the building construction sites of Pokhara Metropolitan. Hence, not able to cover all the construction sites in Nepal.

## CONCLUSION

Most of the construction workers were aware of the use of safety measures but the practice of safety measures was poor. Some of the variables like marital status, awareness of safety measures, safety training, and so on were found to be significantly associated with the practice of PPE. Construction companies should implement the compulsory use of personal protective equipment to prevent accidents and injuries at construction sites.

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## REFERENCES

1. Oluwafemi F. Knowledge of occupational hazards, attitude, and practice of occupational safety measures among construction workers in different building sites located in Ibeju-Lekki local government area of lagos state, Nigeria. *Online journal of health and allied sciences*. 2018;16(4):1-6.
2. Acharya SR. Utilization pattern of personal protective equipment among industrial workers of nawalparasi, nepal. *health prospect*. 2014;13(2):24-7.
3. Budhathoki SS, Singh SB, Sagtani RA, Niraula SR, Pokharel PK. Awareness of occupational hazards and use of safety measures among welders: a cross-sectional study from eastern Nepal. *BMJ Open*. 2014;4(6):e004646.
4. Lette A, Ambelu A, Getahun T, Mekonen S. A survey of work-related injuries among building construction workers in southwestern ethiopia. *International journal of industrial ergonomics*. 2018;68:57-64.
5. Zerguine H, Tamrin SBM, Jalaludin J. Prevalence, source and severity of work-related injuries among "foreign" construction workers in a large Malaysian organisation: a cross-sectional study. *Industrial health*. 2018:2017-0205.
6. Koirala MP. Health and safety concern of workers of building materials producing industries in Nepal. *International journal of engineering research & technology (IJERT)*. 2016;5(12):2278-0181.
7. Khashaba E, El-Helaly M, El-Gilany A, Motawei S, Foda S. Risk factors for non-fatal occupational injuries among construction workers: A case-control study. *Toxicology and industrial health*. 2018;34(2):83-90.
8. Galappaththi L, De Silva S, De Silva S. Investigation on methods to improve health and safety practices in construction sites. 2013.
9. Izudi J, Ninsiima V, Alege JB. Use of personal protective equipment among building construction workers in kampala, Uganda. *Journal of environmental and public health*. 2017(3):1-5.
10. Widaningsih L, Susanti I, Chandra T, editors. The attitude of construction workers toward the implementation of occupational health and safety (OHS). *IOP conference series: materials science and engineering*; 2018.
11. Joshi SK, Shrestha S, Vaidya S. Occupational safety and health studies in Nepal. *International journal of occupational safety and health*. 2011;1(1):19-26.
12. Rupakheti D, Pradhan PMS, Basel P. Occupational safety and health vulnerability among brick factory workers in dhading district, Nepal. *Annals of global health*. 2018;84(3):481-487.
13. Koirala MP. Safety awareness of workers for construction sites in Nepal. *Journal of advanced research in civil and environmental engineering*. 2018;5(4):34-41.
14. Shamsi M, Pariani A, Shams M, Soleymani-Nejad M. Persuasion to use personal protective equipment in constructing subway stations: application of social marketing. *Injury prevention*. 2016;22(2):149-52.
15. Tam VW, Fung I. A study of knowledge, awareness, practice and recommendations among hong kong construction workers on using personal respiratory protective equipment at risk. *The open construction and building technology journal*. 2008;2(1):1-5.
16. Balkhyour MA, Ahmad I, Rehan M. Assessment of personal protective equipment use and occupational exposures in small industries in Jeddah: Health implications for workers. *Saudi journal of biological sciences*. 2019;26(4):653-9.
17. GC KB, Budhathoki A, Sushmita K, Karki K. Practice related to occupational health and safety among workers of brick factories at bhaktapur, Nepal. 2018;3(6):98-104.
18. Buyite ST. Assessment of knowledge on occupational hazards and utilization of safety measures among construction labourers at selected construction sites of mangalore: RGUHS; 2007.
19. Aigbkhao A, Isah E, Isara A. Knowledge and practice of occupational safety among quarry workers in a rural community in Edo state. *Journal of community medicine and primary health care*. 2011;23(1-2):16-24.
20. Muema LM. Evaluation of personal protective equipment utilization among construction workers in mombasa county, Kenya: COHES, JKUAT; 2017.
21. Tadesse S, Kelaye T, Assefa Y. Utilization of personal protective equipment and associated factors among textile factory workers at hawassa town, Southern Ethiopia. *Journal of occupational medicine and toxicology*. 2016;11(1):6.
22. Beyene Gebrezgiabher B, Tetemke D, Yetum T. Awareness of occupational hazards and utilization of safety measures among welders in aksum and adwa towns, tigray region, Ethiopia, 2013. *Journal of environmental and public health*. 2019.