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Association Between Socio-Dynamic and Other Individuals Characteristics on Perceptions of Occupational Safety Among Workers in Kathmandu, Nepal

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ABSTRACT

Background: Occupational safety is questioned in developing countries like Nepal. Health-care workers have been exposed to potential risks due to different kinds of hazards at their workplace. They are responsible for providing a safe climate for others, which is why their safety should be given high priority, ensuring that they feel safe. **Objective:** This study has aimed to provide insight into overall healthcare workers perceptions of the available hospital safety facilities and strategies adopted in the hospitals of Kathmandu, Nepal. **Methods:** The findings of this study are anticipated to assist the hospital industry and agencies to formulate plans and policies to improve safety precautions in hospital duties. For the perception and attitude of workers and nurses towards the safety and health status of workers, the primary data were collected from workers and nurses based on a questionnaire of two different sets, including demographic data. Data from workers and nurses was collected based on the questionnaire ranking the causes of accidents. **Results:** The study results indicate that several perception-based and socio-demographic variables were found to be significantly associated with the safety perception of workers and nurses. Among the perception-related variables, work motivation and education and training were found to significantly shape the workers' and nurses' perceptions during hospital duties. These results suggest that the management could increase the incentives and rewards for the workers and deliver safety education and training to make them feel safe working in a hospital. **Conclusion:** Among socio-demographic variables, gender, household size, household income, and personal income were statistically significant, and worker types, marital status, and possession of permanence were marginally significant predictors of workers' safety perceptions.

Keywords*: *Perception; Occupational; Safety; Health; Workers; Nurses; Association; Socio-demographic

INTRODUCTION

Occupational safety refers to the safety of workers during their duties. It addresses potential hazards and risks that may be associated with their working shifts. According to an estimation presented by Takala *et al.*, (2014) every year more than 2.3 million workers die at duty from an occupational-related injury or disease globally, and around 2 million of those casualties are due to fatal occupational-linked accidents and diseases. Healthcare professionals are more likely to be exposed to different hazards than their counterparts working in other sectors (Che Huei *et al*., 2020; Gan *et al*., 2020; Zhang *et al*., 2020). Occupational safety issues are very common in developing countries like Nepal. Occupational safety practice is not in good condition in Nepal as the majority of the workplaces do not have the proper safety and preventive systems, so the employees are exposed to the hazards (Joshi, Shrestha & Vaidya, 2011) Workers are working in unsafe working conditions causing lots of accidents and injuries. Healthcare workers have faced many occupational hazards that cause musculoskeletal related injuries, infectious related diseases, chemical-induced related disorders, and mental health related disorders (Yassi & Hancock, 2005; Chirico & Magnavita, 2021; Adamopoulos & Syrou, 2022). Health workers have also faced several mental health problems compared to other occupational groups. Healthcare workers are fatigued, stressed, and overburdened, so they are unable to provide quality care to their patients (Nicklin & McVeety, 2002). Joshi, (2021) has stated that healthcare workers are forced to take the potential risk of infecting themselves while delivering care to the patients. Shrestha *et al*., (2022) stated that there was a lack of preparedness and coordination among the three tiers of government during the Covid 19 pandemic in Nepal. Consequently, this has caused the infection of thousands of

healthcare workers and the deaths of a few workers during the Covid 19 pandemic. Employees' wellness and safety conditions are unsatisfactory due to the lack of workers' perception of occupational safety practices in most industries such as the healthcare industry.

Occupational safety is a significant issue, but it has not received much priority in Nepal. Occupational safety and health problems are perceived as mainly technical problems that require technical solutions. Managers do not want to publicize the occupational safety and health issues, thinking that it will increase the employees demand for the organization, resulting in an increase in expenses, and fail to acknowledge the importance of investment in safety (Dorman, 2000). Companies are unaware of the fact that investment in OSH minimizes accidents and incidents in the workplace, which leads to an increase in profit (Tompa *et al*., 2009). Both employers and workers need to be aware of the occupational rights and safety that are guided by provisions of the Nepal Labor Act 2017 and the conventions of the International Labor Organization (ILO) and guidelines of the World Health Organization (WHO). Hospitals need to conduct education and training programs relating to the use of equipment, create a safety culture, and motivate workers to follow the safety measures and precautions, which may reduce the rate of incidents and accidents in the work setting. There are many studies conducted in the international arena on occupational safety, but few are conducted in Nepal. Recently, few studies have been conducted in the construction and manufacturing industries (Mishra *et al., 2019;* Sukamani, Wang & Kusi, 2021; Gautam & Prasain, 2011). However, there are very few studies conducted in the context of the service sector. It is necessary to conduct more studies to know the real status of occupational safety in service sectors such as hospitals. The purpose of this study is to provide an overview of healthcare workers' perceptions of occupational safety in hospitals and create a decent workplace.

This conceptual research is attempted to be conducted in the hospital sector as health professionals have wide expertise and experience in the field of health to verify and test the experience of different industries (Shrestha, Mishra & Aithal, 2022; Basahel, 2021; Bond *et al*., 2004; Cleveland & Shore, 1992; Demirkesen & Arditi, 2015; Hellgren *et al*., 1999; Mishra, Sudarsan & Nithiyanantham, 2022). The perception might change with the dynamism of society across the industry and time period for the same ecological or different ecological reasons. So, it is essential to promote and update the great contribution of earlier research (Idrees *et al*., 2017; Lama, Sah & Mishra, 2019; Kumar Mishra & Aithal, 2021; Parker *et al*., 2003; Paul *et al*., 2005) and many more.

Limitation of the study:

- Only hospitals from the Kathmandu Valley are considered for the study.

- Due to the lack of pertinent literature from a Nepalese perspective, we mostly relied on international literature.

- The study is based on perceptions only.

Objectives

To analyze the association between socio-demographic and other individual characteristics of healthcare workers and their perception of occupational safety during hospital duty at Kathmandu Valley Hospital, Nepal.

Literature Review

Safety is one of the basic needs of every human being (McLeod, 2007). The working condition is a very important factor as a hygiene factor to motivate workers (Herzberg, 2005). Many prominent theories are the evidence regarding the importance of safety. Michael *et al.*, (2005) suggested that an employee's attitude towards management is positive if the management is concerned about the employee's safety and well-being in the workplace. Abdullah *et al., (2009)* studied the employees' concerns on occupational health and safety (OHS) in government hospitals in Malaysia and indicated that employees were more dedicated when they found the management was continuously improving the safety at their workplace. Robson *et al.,* (2012) have suggested workplaces conduct occupational safety training as it has a positive effect on worker practices. Birkmeyer *et al.,* (2013) noted hospital working culture is linked to deliver quality of care to patients. Moreover, the practice of safety culture in hospitals reduced the number of accidents and risks to patients and workers and eventually improved the productivity of the employees. Lama, Sah & Mishra, (2019) found the reason for occupational accidents is due to inadequate safety plans, policy, and safety culture integration in

the cement industry. Most industries do not have basic personal protection equipment and are neglecting the basic 'safety first' principle. Safety prevention measures such as for fire in the hospital building are essential in most Asian hospitals (Muhamad Salleh *et al.,* 2020). The quality care can be delivered to the patients only after ensuring the occupational health and safety of care providers in the healthcare settings. (Ahmad & Osei, 2021). Healthcare workers, especially front liners have reported mental distress and experience low psychological well-being during COVD -19 pandemic (Giusti *et al*., 2020; Sun *et al*., 2021; Cho *et al*., 2021; CDC *et al*., 2020) (refer to figure 1).

Based on the above previous research, the following research framework is proposed:

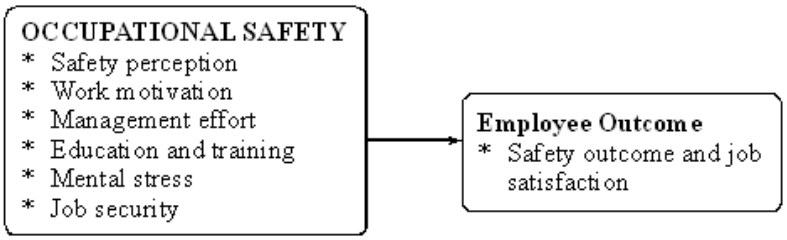

Figure 1: Conceptual Framework of This Study

METHODOLOGY

Research Philosophy:

Attached picture depicts the different stages in designing a research methodology by using the research onion framework (Saunders, Lewis & Thornhill, 2009) as in figure 2.

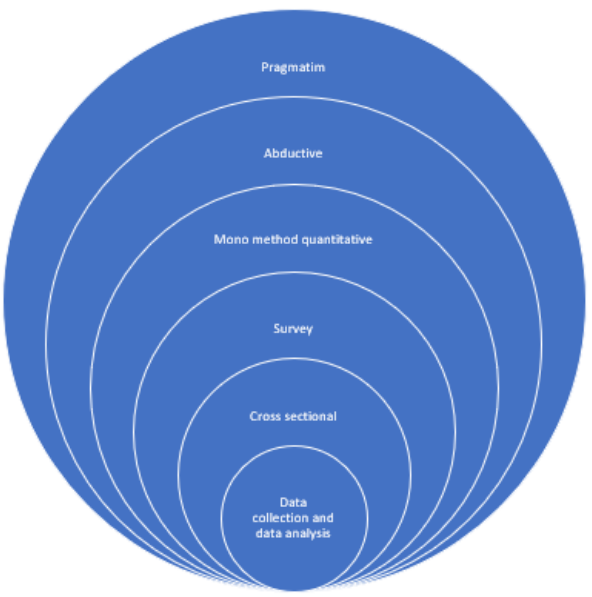

Figure 2: Research Philosophy

The research is taking singularity from ontology, as Likert scale is used for quantifying, and the self-measurability of the respondent is the epistemology of research without bias, which assures a critical realism-based research paradigm for overcoming solutions to real-world problems as action research.

Study area

This study assesses the safety perception of workers and nurses in hospitals. The data was collected from on-duty hospital workers and nurses. Five hospitals were chosen for the study.

Sample size:

The sample size was 185 from the five selected hospitals of Kathmandu.

Data collection

Primary data was collected from the five selected hospitals in Kathmandu. Two different sets of questionnaires were developed to determine the workers' perceptions of hospital duty, the relation of socio-demographic and other individual characteristics, and to rank the causes of accidents during hospital duty. The first questionnaire consisted of two parts: the first part asked about the socio-demographic and individual characteristics of the workers and nurses, and the second section asked about questions related to the workers' and nurses' perceptions of hospital safety using the 5-point Likert scale.

In addition, clarification of any doubts in the questionnaire was done immediately by the surveyor. During the process of filling out questionnaires by workers and nurses, the surveyor was careful enough not to differ the workers' and nurses' responses based on the surveyor's explanation and clarification to avoid possible bias in the survey data.

Data Analysis Method

Multiple Linear Regressions

The effect of most predominant variables on the workers' and nurses' perceptions of hospital safety was modeled with the multiple linear regression technique. The multiple linear regression technique is widely applied. A significant number of perceptions are based on it, and relationships between two variables are carried out. A generalized equation for multiple linear regression is shown in equation 1.

$$Y= \beta_0+\beta_1X_1+\beta_2X_2+\ldots+\beta_nX_n+\epsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where Y is the outcome variable (also called a dependent variable) and Xi are the predictors (also called independent variables). ϵ stands for the error of the term, which is assumed to have a normal distribution with a mean 0 and constant variance σ2. The modeling assumes that a predictor variable (Xi) is related to the outcome variable (Y) by βi times. The estimates of the β coefficients are the values that minimize the sum of squared errors for the sample. The intercept term, β0, represents the mean response of the outcome variable (Y) when all the predictors are zero (which may or may not have any practical meaning).

The multi-Linear Regression model was developed using R Studio to ascertain the determinants of workers' perceptions of hospital duty safety. To avoid the multi-co linearity issue, only one of the variables among the correlated variables shown in the correlation test is used.

The MLR model represents the perception of safety among workers and nurses on hospital duty and includes significant explanatory variables at a 95% confidence interval. A *T*-test was carried out, and the significance of the variables was extracted from the software. Based on the correlation matrix between independent and dependent variables, several model alternatives have been fitted. The coefficients of variables and the equation of each MLR model are represented below.

T-distribution, *p*-value, and chi-square tests were conducted to ensure the significance of the parameters. The goodness of fit statistics - R- square value of the fitted model was used to test the accuracy with which the model approximates the observed data. The R-squared value of a multiple linear regression model signifies how much variance in the dependent variable is explained by the independent variables. Here, in our case, the R-square value of the model signifies how well the psychological variables and socio-demographic variables can explain the workers' perception of hospital duty safety.

Ethical Consideration

All the ethical considerations have been taken while collecting data from the participants, on 12th March 2023 with the Statistical Act 2015 of Nepal.

RESULTS

The secondary data were obtained from the study of the document, the internet, and other relevant literature,

followed by the respondent's interview.

Table 1: Key Features of The Project in Terms of Safety

SN	Hospital Name	Key Features
A.	Norvic Hospital	• Bed number:200 • Departments: All • Years of operation:28 (1994) • Type: Private hospital • Number of respondents interviewed:54
B.	KMCTH	• Bed number: 900 • Departments: Major (all)
		• Year of operations: 25 (1997) • Type: Private Medical College • number of respondents interviewed:37
C.	Teaching Hospital (IOM)	• Bed number: 700 • Departments: All • Year of operation: 50 (1972) • Type: Public hospital and medical college • Number of respondents interviewed:29
D	Civil hospital	• Bed number: 132 • Departments: major (all) • Year of operation: 13 (2009) • Type: Hospital for Civil Servants • number of respondents interviewed:23
E	PAHS	• Bed number: 450 • Departments: Major all • Year of operation: 14 (2008) • Type: Autonomous hospital & Medical college • Number of respondents interviewed:42

The socio-demographic and individual characteristics of the workers and nurses interviewed are shown in table 2 and 3 presents the variables used to measure the workers and perception on occupational safety and it's the potential predictions, description of those variables (as indicated by the questions used in the questionnaire), and mean and standard deviation of the responses.

Table 2: Socio-Demographic and Other Characteristics of the Respondents

Variable	Categorical		Continuous	
	#	%	Mean	S.D.
Worker type				
Nurse	92			
Workers	71			
Supervisor	22			
Work experience			8.822	8.566
Gender				
Female	122			
Male	63			
Age			36.919	12.774

Marital Status				
Married	122			
Unmarried	40			
Divorced	23			
Household size			5.032	1.335
No. of Children			2.081	1.402
Education				
Diploma	90			
Bachelor	70			
Masters	20			
Masters in General	5			
Masters in Nursing				
Monthly Household Income				
<40k	63			
40-50K	74			
50-70k	12			
>70k	36			
Monthly Individual Income				
<20k	24			
20-30k	48			
30-50k	66			
>50k	47			
No. of Working Days in a Month				
10-15 days	9			
15-20 days	4			
20-25days	90			
>25 days	82			
Permanent (Job type)				
Yes	52			
No	133			
Safety Training				
Yes	37			
No	148			
Health and Accident Insurance				
No	56			
Yes	129			

Table 3: Variables to Measure Workers' Perception

Variable	Question	Mean	SD
Safety perception	I am satisfied with the safety facilities and strategies adopted in this hospital.	3.708	0.984
Work motivation	I get incentives of my good works.	3.319	1.360
Management effort	My site seniors always inform me of safety concerns and issues.	3.638	1.199
Education and training	I am capable of identifying potentially hazardous situations.	3.849	1.117
Mental Stress	Under work pressure it is normal to take shortcuts at the expense of safety.	3.805	1.231
Job Security	I am worried about losing my job in the near future.	3.476	1.264

Perception on Hospital Duty safety

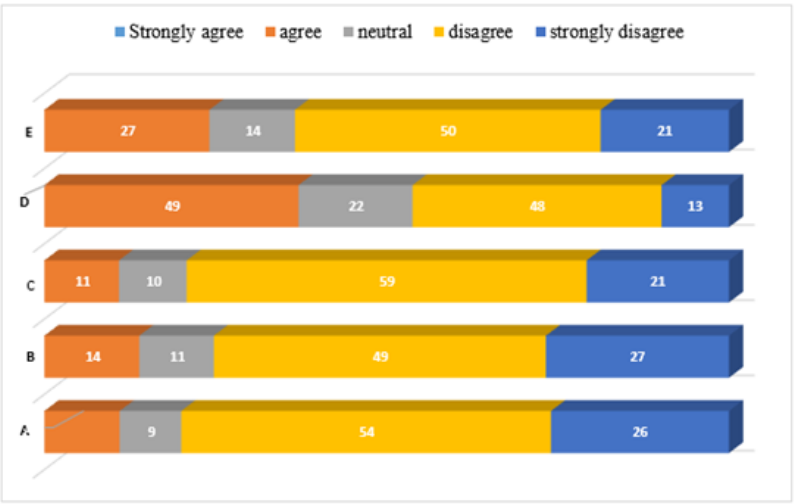

Figure 3: Bar Chart Showing the Response on Perception of Hospital Duty Safety

Hospital size does not affect the perception of workers and nurses towards safety. The safety budget of the hospital also doesn't affect the perception of workers and nurses towards safety, which means that the budget for safety is not properly utilized for the wellbeing and safety of workers and nurses. From the above data and secondary data, hospitals with high insurance costs have a high safety perception (refer to figure 3).

Multiple Linear Regression Modeling

Correlation matrix

The statistical measure of the relationship between two variables is described by the correlation coefficient. A correlation coefficient between any two variables lies between -1.00 and +1.00. The increasing relationship between two variables is indicated by a positive coefficient, and the decreasing relationship by a negative coefficient. A value of the coefficient close to +1.00 indicates a strong positive linear relationship, and a value of the coefficient close to -1.00 indicates a strong negative relationship. A correlation coefficient of 0 indicates that the movements of the variables are totally random, i.e., an increase in the first variable has no insight into the expected movement of the other variable. A correlation matrix among the variables was developed to ascertain the strength of the correlation between one variable and another. Only one variable from the variables having a strong correlation can be taken for regression analysis.

Table 4: Correlation Matrix

Variables	Safety perception	Work motivation	Management effort	Education and training	Mental Stress	Job Security
1.	1.000	0.484	0.347	0.642	-0.007	0.357
2.	0.484	1.000	0.414	0.390	-0.378	0.493
3.	0.347	0.414	1.000	0.283	-0.217	-0.133
4.	0.642	0.390	0.283	1.000	0.077	0.297
5.	-0.007	-0.378	-0.217	0.077	1.000	-0.188
6.	0.357	0.493	-0.133	0.297	-0.188	1.000

None of the variables had significant correlation with each other, as shown in table 4. Thus, all of the variables were considered for the multiple linear regression analysis.

Estimation Results

After ensuring that the considered dependent and independent variables wouldn't create a multi-co-linearity issue, multiple linear regression analysis was carried out to model workers' perceptions of hospital duty safety. Some psychological variables and socio-demographic characteristics of the workers were considered the dependent variables of the model. The results of the model are presented in Table 5.

Table 5: Results of Multiple Linear Regression Analysis

Variables	Estimate	SE	*t*-value	*p*-value
Intercept	2.307	0.818	2.820	0.005*
Psychological Variables				
Work motivation	0.166	0.055	2.996	0.003*
Management effort	0.046	0.056	0.817	0.415
Education and training	0.446	0.067	6.668	<0.001*
Mental Stress	0.120	0.073	1.634	0.104
Job Security	-0.034	0.061	-0.557	0.578
Socio-Demographic and Individual Characteristics				
Worker type (Base: Worker)				
Nurse	0.166	0.187	0.887	0.377
Supervisor	0.432	0.238	1.814	0.072~
Work experience	-0.001	0.018	-0.037	0.971
Gender (Base: female)				
Gender: male	-0.425	0.184	-2.313	0.022*
Age	-0.023	0.019	-1.218	0.225
Marital Status (Base: Unmarried)				
Married	-0.193	0.190	-1.018	0.310
Divorced	1.142	0.664	1.719	0.088~
Household size	-0.250	0.063	-3.955	<0.001*
# of children	0.080	0.082	0.976	0.331

Education (Base: Diploma)				
Bachelor	-0.271	0.214	-1.269	0.206
Masters General	0.177	0.225	0.788	0.432
Masters in Nursing	-0.462	0.517	-0.894	0.373
Household Income (Base: <40K)				
40000-50000	-0.389	0.203	-1.915	0.057~
50000-70000	0.720	0.349	2.064	0.041*
>35000	-0.232	0.363	-0.638	0.524
Personal Income (Base: <20K)				
20000-30000	-0.674	0.311	-2.171	0.031*
30000-50000	-0.095	0.371	-0.257	0.797
>50000	0.537	0.459	1.169	0.244
Work in Months (Base: 10-15 days)				
15-20 days	0.637	0.675	0.944	0.347
20-25 days	0.706	0.434	1.625	0.106
>25 days	0.418	0.451	0.927	0.355
Permanent: No	-0.521	0.296	-1.759	0.080~
Training: No	0.332	0.331	1.002	0.318
Insurance: No	0.558	0.249	2.240	0.026*
Sample Size: 185				
R-squared: 0.781, Adjusted R-squared: 0.740				
Dependent variable: perception on hospital duty safety				

Note: * indicates statistical significance at 95% confidence interval, ~ indicates statistical significance at 90% confidence interval (marginally significant)

DISCUSSION

Workers' perception of hospital safety was found to depend on a number of psychological factors and socio-demographic characteristics of the workers and nurses (Samur & Intepeler, 2017; Philip & Cherian, 2020). The results from the psychological factors suggest that management should motivate the workers and provide necessary safety education and training to the occupational staff, so they feel safe while working in the hospital. The result also indicates that arranging safety facilities in the hospital or providing safety equipment to the workers might not be sufficient to improve the safety practice, the workers need (1) to be well aware of the safety precautions to be taken at the site, (2) to have the necessary knowledge and skill to use the safety equipment and facilities, and (3) motivated to maintain the safety practice while working, and these can be achieved by providing safety education and training, and motivating them to occupation safety (Huang *et al*., 2019; Alrawahi *et al*., 2020) .

The socio-demographic result indicates that nurses and workers didn't have significantly different safety perceptions, but supervisors had significantly higher safety perceptions than that worker. It might be associated with safety knowledge and training as there is a common perception that supervisors get more training opportunities than other hospital workers. Years of work experience didn't affect their safety perception, but the gender of the worker did (Han *et al*., 2019; El Ghaziri *et al*., 2019). In comparison to females, males had lower hospital safety perception most probably because of overconfident behavior of males than that of females. This result indicates that the management should consider male workers as the first priority in terms of elevating their safety perception. The motivation, training, and education related to occupational safety should be more focused on males than females. This could also help maintain gender equity in hospital-related work and encourage men to get involved in hospital work.

The age of workers and their marital status were not significantly associated with their safety perception (except divorced workers had a higher safety perception than single workers). The larger the household size, the lower the worker's perception of occupational safety. The number of children in the household and the education level of the occupation were not associated with safety perception. The non-significant association might be overlooked by the significant association of safety education and training with safety perception. Occupational workers with a medium level of household and personal income had the highest level of safety perception. The workers' and nurses' perceptions of safety were not associated with the number of days they worked. However, the workers without having any permanent had marginally lower safety perception than those who had permanent. Again, the safety training was not found to be significant, and the explanation could be the same as that of the insignificant association of safety perception with the level of Diploma. Interestingly, hospital workers without insurance had a higher perception of safety than those who had insurance. This result could highlight the importance of safety education and training, those who don't have insurance might not be aware of the possible hazards and accidents in their hospital duties. Training must be provided, especially when workers are newly employed, if the definition of the workplace or work changes, if work machines are changed, or if working methods change (Geoffrion *et al*., 2020; Elhadi *et al*., 2020). However, there seems to be a significant difference between the legislation and its implementation in the hospital. It was found that over two-thirds of the participants (80%) had worked without receiving any training in hospital safety. Just a few workers (20%) said that they had gone to training. Training is not that expensive and time-consuming to conduct during hospital duty, but employers are underestimating the importance of training. They may consider it unnecessary, recognizing that workers and nurses can meet the requirements of their tasks and trades without it. Thus, the employer's commitment is crucial to conducting the safety education and training program for the hospital workers and nurses (O'donovan & Mcauliffe, 2020). The model had a significant goodness of fit with an R-square value of 0.781 which signifies that this model can explain about 78% variability in the workers perception on occupational safety.

Implication of the Study

This study may help the hospital management formulate and implement a sound safety policy that helps create a safe workplace for healthcare workers. This study may help the government authorities and other stakeholders know the present status of working conditions in hospitals in Nepal. This study suggests hospital management motivate the workers and provide necessary safety education and training to the occupational staff, so they feel safe while working in the hospital. Further extensive research is required to be carried out by the academicians and professional researchers to explore more about the occupational safety in the hospitals of Nepal.

CONCLUSION

This study's perception of occupational workers, i.e., nurses and staff on hospital duty, safety can be concluded from the findings that perception-related variables such as work motivation and education and training were found to significantly shape the workers perception of occupational safety. The motivation of employees through awards and recognition of safety performance needs to be considered. Hospital size and safety budget do not influence the workers perceptions of safety. However, in hospitals where accidents occur, workers have a less positive perception of safety.

The socio-demographic variables—gender, household size, household income, and personal income—were statistically significant, and worker types, marital status, and having a permanent job were marginally significant. Though hospital workers and nurses didn't have significantly different safety perceptions, supervisors had a significantly higher safety perception than that of workers. It might be associated with safety knowledge and training as there is a common perception that supervisors get more training opportunities than other workers on construction projects.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

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