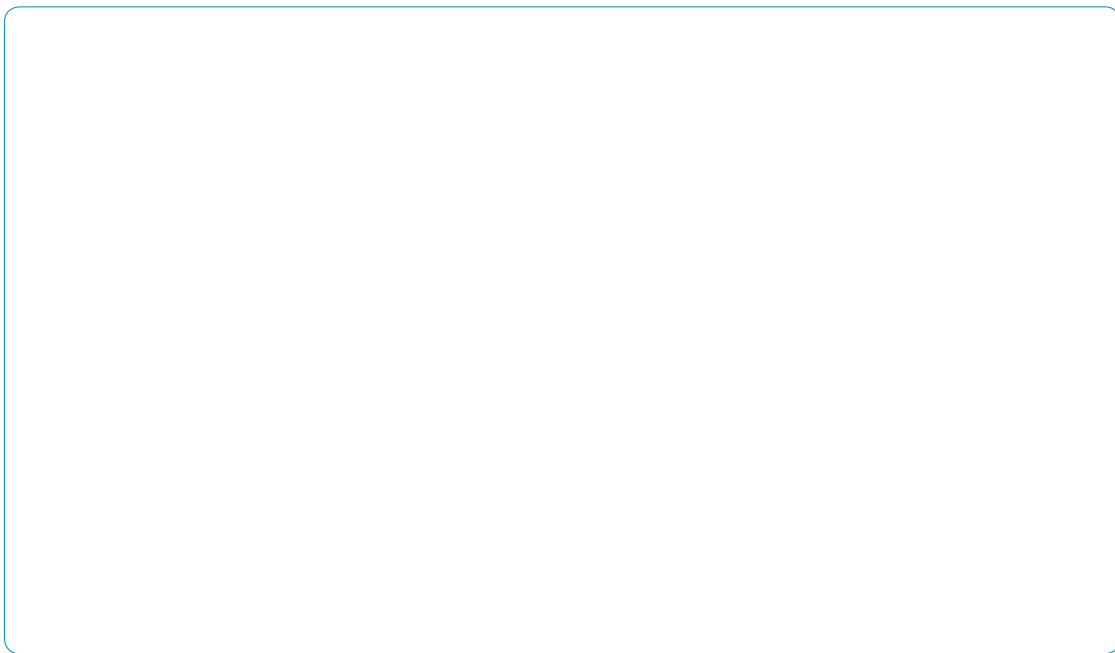


Self-reported Work-related Injury among Building Construction Workers in Arba Minch town, Southern Ethiopia

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Keywords: Occupational injury; Construction sector; Occupational safety and health; Safety practice

Introduction

Work-related injury is any personal injury or disease resulting from an occupational accident. It is one of the important factors that contribute to disability and life threatening situations in developed and developing countries. In 2017, the International Labor Organization estimates that 2.78 million people around the world die due to work-related accidents or diseases every year. Globally, 10.9 billion occupational accidents were estimated to be 374 million in a year. Every single day, more than 7,500 people deaths occur in work places, and Africa had the highest fatality rate of labor force with 16.6 per 100,000 persons. Some of the consequences of work-related injuries are work time, loss of productivity, disabilities, and death [1].

The construction sector has a disproportionately high rate of recorded accidents than any other sectors. It is accountable for 13 billion work-related injuries and deaths worldwide. About 13 billion dollars lost annually by fatal and nonfatal construction injuries. Moreover, 26 billion dollars lost annually for medical expenses of nonfatal injuries alone. Moreover, workers in construction sector are subjected to various kinds of hazards and are more exposed to mechanical, chemical, and ergonomic risk factors [2].

There are some risk factors that have been identified and reported in studies as they have influence on work-related injury. These factors are like age of the worker, sex of worker, educational status, work experience, working hours [3] occupational health and safety training, knowledge on occupational health and safety, work type, sleeping disturbance, khat chewing, drinking alcohol, supervision [4] work

satisfaction and use of personal protective equipment were found to be factors which has significant association with work-related injury [5].

Despite the growing trend of construction sector in Ethiopia, occupational safety and health related issues has given far too little attention [6]. A review report conducted in 2016 in Ethiopia indicates that there are gaps on research in construction sector on occupational safety and health [7]. Therefore, this study aims to contribute in assessing the prevalence of work-related injury among building construction workers from March 30 to April 20, 2020. Simple random sampling technique was used to select study subjects. The sample size was 459. A pretested and structured questionnaire and observation were used to collect data. Multivariable analysis was performed to identify independent risk factors for work-related injury.

Results: The overall prevalence of work-related injury among building construction workers was 5.2%. Factors like work experience, sleep quality, and use of personal protective equipment were found to be significantly associated with work-related injury.

Conclusion: The prevalence of work-related injury among building construction workers in Arba Minch town is higher compared to other studies. Factors like work experience, sleep quality, and use of personal protective equipment were found to be significantly associated with work-related injury. Therefore, occupational safety and health training for less experienced workers, respectively, and improving work environment and safety practice are recommended to prevent work-related injuries.

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Regional State (SNNPR), Ethiopia. The study was conducted starting from March 30 to April 20, 2020.

Study Design

An institution-based cross-sectional study design was used.

Participants

The study was conducted in grade one to eight licensed construction companies located in Arba Minch town. The source population was all construction workers working in selected construction industry, while study participants were randomly selected workers working in the selected construction sites. All employees who were directly involved in the process of construction in the last 1 year were included in the study. Workers who had not prone to exposure to work-related injury, like office workers, were excluded from the study. Additionally, individuals who started working in the selected construction site after the data collection process already began were excluded.

Sample Size Determination

Sample size was determined by Epi-info version 7 using both single and double population proportion formula. For our 1st objective, single population proportion formula and for our 2nd objective, double population proportion formula was used to calculate our sample size.

For single population proportion, sample size was calculated considering proportion of occupational injury of a previous study done in Dessie town, Northeast Ethiopia, which showed 32.6% prevalence of occupational injury among construction workers [8]. With 95% confidence interval certainty, 4.5% confidence limits and by anticipating a 10% nonresponse rate, the sample size for the study became 459. Sample size for the double population proportion was determined assuming 95% confidence interval and 80% power of the study (Table 1).

The sample size we calculated for our 1st objective was greater than the sample size we calculated by double population proportion. Therefore, the final sample size for the study was 459.

Sampling Procedure

The study was carried out in five randomly selected active building construction sites, which was been constructed by grade 1-8 licensed construction firms in Arba Minch town. The sites were randomly selected by the lottery method. Thereafter, the total sample size was proportionately allocated for the 5 randomly selected construction sites based on their average number of workers they have during data collection. Using workers in the registration book as a sampling frame, the participants were drawn from the site's list of workers using simple random sampling technique by lottery method.

Study Variables

The outcome variable of this study was a self-reported work-related injury status. The independent variables were socio-demographic

Data Management and Statistical Analysis

The collected data was coded and entered using Epi-data version 4.4.3.1, and analyzed using SPSS statistical package for windows, version 25.0. The data was cleaned by running frequency and checked for consistency. Descriptive statistics such as frequency, percentage, summary measures, tables, and graphs were used to describe the data.

Assumptions applied to binary logistic regression model including multicollinearity by variance inflation factor (VIF) and fitness of model by Hosmer and Lemeshow were checked. To assess risk factors associated with work-related injury, binary logistic regression model was fitted and variables with a p-value <0.25 in bivariable analysis were included in the multivariable analysis. The adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to test the statistical significance of variables in multivariable analysis. Only statistically significant variables were presented [16-19].

Operational Definition

Work-related injury

Any physical injury resulting from an accident in the course of construction work in the past 1 year prior to this study, at least one episode of injury.

Safety Practice

Refers to the behavior of construction workers to act safely and includes any activity enabling the prevention and control of any adverse work related hazards. This could be measured by calculating the composite scores; by adding all the questions categorized under five Likert scales and dividing by the total numbers of questions considered. Those scores greater than an average were considered as good occupational safety practices and those with composite index of less than average were considered as poor occupational safety practice in this particular study [20-22].

Sleep

Sleep is a period of inactivity and restoration of mental and physical function. To evaluate sleep quality, participants were asked using

Variables		Frequency (n)	Percent (%)
Sex	Male	296	66.67
	Female	148	33.33
Age (years)	< 18	19	4.28
	18 – 24	206	46.4
	25 – 49	213	47.97
	50	6	1.35
Marital status	Single (not married)	271	61.04
	Married	159	35.81
	Divorced or Widowed or Separated	14	3.15
Religion	Orthodox	199	44.82
	Protestant	158	35.59
	Muslim	33	7.43
	Catholic	46	10.36
	Others*	8	1.8
Educational status	No formal education	3	0.68
	Primary school	175	39.41
	Secondary school	164	36.94
	Diploma and Above	102	22.97
Employment status	Temporary	259	58.33
	Permanent	21	4.73
	Micro and small scale enterprises (Contract)	164	36.94
Experience	2 years	339	76.35
	>2 years	105	23.65
Type of work	Daily laborer	218	49.1
	Plasterer	46	10.36
	Carpenter	72	16.22
	Mason	71	15.99
	Welder/electrician	13	2.93
	Painter	3	0.68
	Driver/operator	12	2.7
	Site engineer	9	2.03
Monthly income (Birr)	1000 - 1999	76	17.12
	2000 - 3999	332	74.77
	4000	36	8.11

Table 2: Socio-demographic characteristics of building construction workers in Arba Minch town, Ethiopia, 2020.

(* Jehovah's Witness and has no religion).

Variables		Frequency (N)	Percent (%)
Khat chewer	Yes	124	27.93
	No	320	72.07
Alcohol drinker	Yes	54	12.16
	No	390	87.84
Cigarette smoker	Yes	34	7.66
	No	410	92.34
Knowledge on OSH	Good Knowledge	170	38.29
	Medium level Knowledge	114	25.68
	Poor Knowledge	160	36.04
Attitude on OSH	Positive Attitude	303ledge	25.68
			Poor Knowledge

Cause of injury	Frequency	Percent (%)
Cut by sharp objects	151	38.62
Falling from ground level	44	11.25
Falling from height	31	7.93
Hit by object	88	22.51
Slipping	23	5.88
Contact electric line	8	2.05
lifting object	42	10.74
Others	4	1.02

Table 6: Cause of injury among building construction workers, Arba Minch town, 2020.

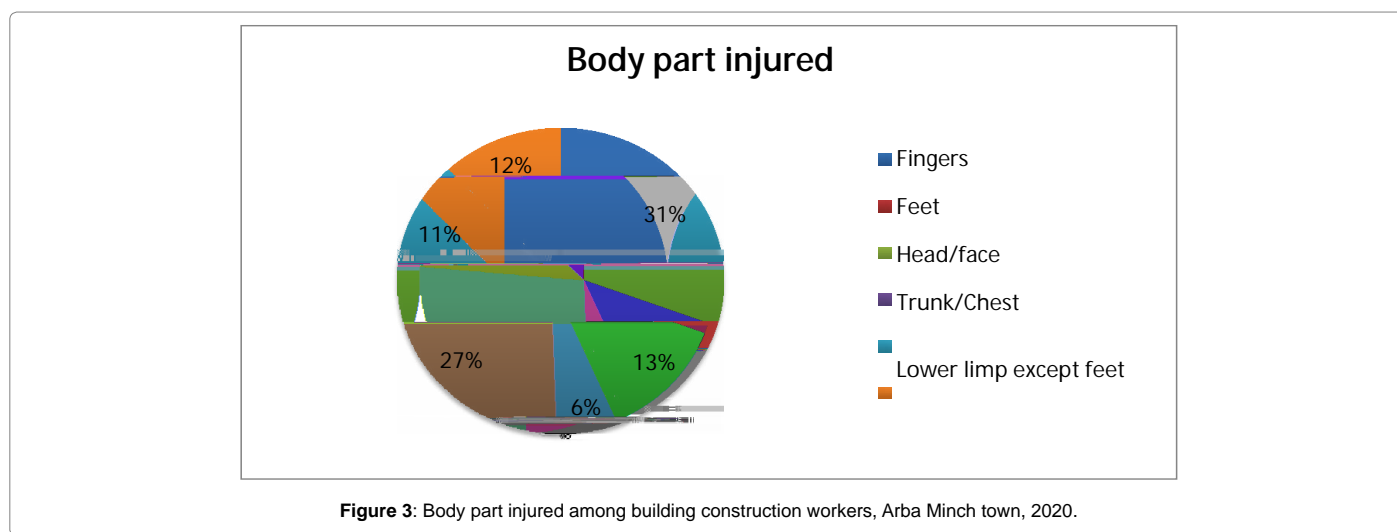


Figure 3: Body part injured among building construction workers, Arba Minch town, 2020.

Table 7: Activities during injury occur among building construction workers, Arba Minch town, 2020.

Activities during injury occur	Frequency	Percent (%)
Handling material	154	47.09
Heavy lifting	105	32.11
Operating machineries	15	4.59
Welding	10	3.09
Fixing wooden objects	26	7.95
Laying bricks	15	4.59
Others	2	0.61

Table 8: Injury severity among building construction workers, Arba Minch town, 2020.

Variables		Frequency	Percent (%)
Hospitalized (n=191)	Yes	22	11.52
	No	169	88.48
Days of hospitalization (n=22)	24 hours	15	68.18
	>24 hours	7	31.82
Days of absent from work (n=191)	3 days	129	67.54
	>3 days	62	32.46

and fall 26.33%. The majority, 47.09%, were handling materials during injury occurred (Table 7). Among the total injured workers, 11.52% were hospitalized, of which 31.82% were hospitalized for more than 24 hours. Around 32.46% of injured worker were absent from their work for more than 3 days (Tables 6-8 and Figure 2,3).

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In multivariable analysis, work experience (AOR; 2.05, 95% CI: (1.19, 3.55)), sleep quality (AOR; 2.80, 95% CI: (1.67, 4.69)), safety

practice (AOR; 1.70, 95% CI: (1.09, 2.63)), work hour 9AOR; 1.86, 95% CI: (1.19, 2.92)), and workplace supervision (AOR; 2.11, 95% CI: (1.29, 3.43)) were found to be significantly associated with work-related injury. Table 9 presents factors which remained statistically significant in the invariable and multivariable logistic regression analysis.

The VIF (variance inflation factor) test suggests that multicollinearity is not a problem for the data. Moreover, the Hosmer & Lemeshow test of the goodness of fit (p=0.727) suggests the model is a good fit to the data (Table 9).

At the multivariable model was adjusted for educational status, employment status, work type, knowledge on OSH, attitude on OSH, job satisfaction, safety and health training and PPE availability

D

Currently, Ethiopia has a relatively strong growth in construction sector and this is attracting thousands of laborers. However, occupational health and safety service is not strongly established to

poses a big burden on both the health system and workers' families in economy perspective.

Factors like work experience, sleep quality, safety practice, work hour and workplace supervision was a risk factor on occurrence of work-related injury among building construction workers according to this study. Therefore, to alleviate loss of life, productive time and money; promoting safety practice (including use of personal protective equipment and safe working environment), promoting workplace supervision, providing OSH training for less experienced workers, respecting employees working hour and improving workers sleep quality are recommended for better occupational health.

Re e a ce e d , b , c ea

e ndings of this study will serve as key for intervention against work-related injuries in building construction sector, particularly in Ethiopia context. It will also play a role in minimizing the social-demographic, economic, behavioral and work related problems of the workers.

Abb e a ,

AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio; ILO: international labor organization; IRB: institutional review board; OSH: occupational safety and health; PPE: personal protective equipment; SNNPR: southern nation's nationalities and peoples region

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Before data collection, ethical clearance was obtained from Institutional Review Board (IRB) of Arba Minch University, College of Medicine and Health Sciences. Official support letter was obtained from Arba Minch University and Gamo zone urban development and construction office. Permission was also obtained from each building construction industry site manager. The selected building construction workers were informed about the purpose of the study, the importance of their participation. Informed consent were obtained after explaining their full right to refuse, withdraw any time, without any explaining or giving reasons. Information's obtained from individuals participants were kept secure and confidential. Names and other identifying data of respondents were made by using code throughout the study process to obtain confidentiality. Also safe approaches like using glove, masks, hand sanitizer and keeping distance were applied to prevent corona virus transmission during data collection. Finally, safety education was given to workers. They were stgh to pavoi4yRlo obtained frohyRlvoiu(wi)0.PTc 0 Twhand syRlfionowy educatrugioT11 1 Tf-0.01 10 42.5197 413.2820

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