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injuries in SSIs is rare, and very limited attempts have been made to investigate the magnitude and associated factors [9,22]. The basis for this study was to address the information gaps about the magnitude and associated factors with occupational injuries that could help in designing appropriate prevention and control measures.

Methods

Study design and setting

This study was conducted among selected small-scale industry workers using facility based cross sectional study design, from March to April, 2013 in Mekelle, a city in northern Ethiopia and the capital of Tigray regional state.

Study population and sampling techniques

The study subjects were all sampled small scale industry workers from the selected small-scale industries in Mekelle city. Sample size was determined using single population proportion formula, with prevalence estimates of 35.5% [9], considering 5% margin of error, 95% confidence level. Then multiplying by a design effect of 2 and adding a 10% contingency for the non-response rate, the total sample size was calculated to be 774.

A multi-stage sampling technique was used to select the sample among SSI workers.

Initially, the 893 SSIs were stratified into three strata based on the type of the SSI and the product the industries manufacture. The three strata consisted of 527 Metal-works, 170 wood-works and 196 concrete-block manufacturing SSIs. Using the list of all SSIs as a sampling frame; 268 (30%) SSIs located in the 7 sub cities of the study area were selected using systematic random sampling (SRS) with a sampling interval of 3 for the SSIs. Based on probability proportion to size (PPS) of the number of SSIs in each stratum we got 158 metal-works, 51 wood-works and 59 concrete-block manufacturing SSIs.

Finally, 774 sample of SSI workers were taken using simple random sampling based on PPS of the number of workers employed in each SSI (taking 2 respondents from SSIs employing <5 workers and 4 respondents from SSI employing 6-9 workers) getting 462 metal workers, 146 wood workers, and 166 block manufacturing workers recruited for the study (Figure 1).

Data collection technique and data quality control

Data were collected using a structured face to face interview questionnaire and observational checklist. The tools were adapted and developed after reviewing the standard occupational health and safety guidelines and other relevant literatures in reference to the research question [5,8,9,23-26]. The variables were checked for clarity and translated into the local language of Tigrigna and then back translated into English to check consistency of thoughts of the questions.

Six (6) experienced data collectors and one supervisor were hired to collect the data and training on the content, objective and methods of data collection and interviewing technique was given to data collectors and supervisors.

To support the self-reported information, the principal investigator also did the walkthrough survey using observation checklist.

Data management and analysis

The collected data was entered and cleaned in Microsoft excel sheet and then it was exported to STATA software Version 12 for analysis. Descriptive analysis of the variables was conducted using frequencies and percentages by making all variables categorical.

Regarding to the association between determinants and occupational injury, a bivariate logistic regression analysis was done making the dependent variable occupational injury with two categories (occupational injury: No=0, Yes=1). In the bivariate logistic regression, the variables with P-value<0.05 level of significance were entered to multivariate logistic regression.

In the multivariable logistic regression analysis, stepwise regression method was used to develop the model for the dependent variable occupational injury. The presence of significant interaction terms, and confounding effects were checked using Log likelihood ratio test at P-value<0.05 level of significance and if a variable's inclusion in the model alters the estimated regression coefficient for the other variable by >15%. Log likelihood ratio test at P-value<0.05 level of significance was used to decide inclusion of a variable in to the model and the goodness of fit of the final model was checked using Hosmer Lemeshow test of goodness of fit considering good fit at P-value>0.05.

Ethical consideration

Ethical clearance was obtained from Mekelle University, College of Health Sciences, Research and Community service office. Official permission letter was secured from Mekelle city trade and industry office.

Prior to the interview and walkthrough survey the owners of the SSIs were informed and communicated about the purpose of the study and permission was sought from them for data collection activities. Data collection was then conducted after explaining the aim of the study and its possible benefits to the study participants. Verbal and written consent was obtained after explaining their full right to refuse, withdraw any time, without any explaining or giving reasons and without repercussions.

The right of participants to anonymity and confidentiality was ensured by making the questionnaire anonymous and the data was secured and would not be used for other purposes.

Results

Socio-demographic and lifestyle characteristics of the respondents

A total of 758 SSI workers were interviewed, with a response rate of 97.9%. Male and female respondents were 736 (97.1%) and 22 (2.9%) respectively. Educational status of the respondents showed that 5.2% were illiterate and 94.8% were literate. The present study also showed, cigarette smokers were 64 (8.4%) and frequent alcoholic drink consumers were 37 (4.9%) in SSIs (Table 1).

Occupational characteristics of the respondents

The respondents worked in the same job for 5years were 601 (79.3%) and 157 (20.7%) of the respondents worked for >5years. The respondents used PPEs properly and consistently were 256 (33.8%) Only 99 (13.1%) of the respondents got occupational safety and health

training within the last 12 months. Workers job category showed that metalworkers (Table 2). Metalworkers were 3.17 times [AOR=3.17, 95%CI: 2.07-4.85] and wood workers were 2.34 times [AOR=2.34, 95%CI: 1.39-3.92] more likely to experience occupational injury than block manufacturing workers (Table 4).

Magnitude and characteristics of the occupational injuries

The one-year prevalence rate of at least one occupational injury in the last 12 months among the SSIs was 58.2%. The 441 respondents were injured including injury on their upper limbs 218 (49.4%), lower limbs 91 (20.6%), and on their neck or head parts 59 (13.4%). The respondents suffered from mild and severe injury were 307 (69.6%) and 134 (30.4%) respectively (Table 3).

Predictors of occupational injuries

The multivariable logistic regression analysis result revealed that use of PPEs, age of respondent's, number of years worked in the same job, number of hours worked per week, and the job category were found to be significantly associated factors with occupational injury among SSIs workers.

The respondents who did not use PPEs properly and consistently were 3.43 times [AOR=3.43, 95%CI: 2.39-4.94] more likely to sustain occupational injury than respondents who used PPEs properly and consistently. The respondents who worked for 5 or less years in the same job were 2.89 times [AOR=2.89, 95%CI: 1.88-4.43] more likely to experience occupational injury than respondents who worked for more than 5 years in the same job. The respondents who worked for more than 48 hours a week were 2.73 times [AOR=2.73, 95%CI: 1.92-3.87] more likely to experience occupational injury than respondents who worked for 48 or less hours a week.

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Discussions

The present cross-sectional study attempted to investigate the magnitude and factors associated with occupational injury among SSI workers in Mekelle city, 2013.

The respondents were predominantly young, male adults with <5 years of workplace experience. Majority (97.10%) of the respondents in this study were males. This may be attributed to the high level of physical manual labor in the SSIs. This study showed that one-year prevalence rate of occupational injury among the SSI workers was 58.2%. This finding was relatively higher than the studies conducted in North Gondar Ethiopia [9], Ghana [7], India [6], and Japan [2]. These differences in the prevalence rate of occupational injury could presumably be due to the differences in socio-economic levels. The respondents were 1.028 times more likely to experience occupational injury than those who did not use PPEs properly and consistently.

such equipments despite the equivalent exposure of the respondents to occupational hazards. This finding was consistent with findings of

injuries. Consistent with other studies, workers who didn't use PPEs, whose age is less than 30 years, who worked for 5 or less years in the same job, who work for more than 48 hours a week were more likely to experiencing occupational injury than their counter parts. Besides, metal and wood workers were more likely to experiencing occupational injury than block-manufacturing workers were.

Based on the study findings, we recommend promoting occupational safety and health through appropriate prevention programs and provision of comprehensive occupational health and safety services with the provisions of personal protective devices and follow up of their appropriate utilization, ensuring regular workplace inspections with feedbacks mechanism, and focused interventions for young, less experienced, workers who work for extended hours (>48 hours per week) and workers working on metal and wood works. Besides, reviewing the enforcement of regulations of safety standards and laws governing work practices, training on occupational health and safety to all categories of workers and integrating injury prevention by mainstreaming occupational health and Safety procedures in SSIs were highly advised.

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