Prevalence of occupational accident; and injuries and their associated factors in iron, steel and metal manufacturing industries in Addis Ababa

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Abstract: The purpose of the research is to investigate the prevalence of workplace accident/injuries (policymakers) and the associated factor in Iron, Steel and Metal Manufacturing Industries (ISMMI) in Addis Ababa, Ethiopia. To achieve this objective, primary data using a questionnaire was collected from 446 production workers in 89 ISMMI. The major findings of the study showed that both availability and cultures of Personal Protective Equipment (PPE) usage are found to be lower. The prevalence of workplace AoI in the metal manufacturing industries in Addis Ababa is found to be relatively very high as compared to previous studies. Employees have mostly faced AoI such as fracture, dislocation, abrasion, suffocation, burn and piercing in their workplace. Female workers are more likely to face cut AoI than their male counterparts. Moreover, employees who are working in medium and large size industries have more likely faced exhaustion, dislocation, sprain, fracture, and burn AoI than employees who are working in small size industries. The study concluded that workplace accident in ISMMI in Addis Ababa is very high and mostly caused by the absence of and poor culture on PPE usage that requires awareness creation and interventions from policymakers to improve the working environment.

Subjects: Ergonomics; Manufacturing & Processing; Environmental Health

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PUBLIC INTEREST STATEMENTS

Employment and working conditions are important determinants in the formal and informal economy. To this effect, occupational Safety and health programs are aspects of health and safety in the workplace and have a strong focus on primary prevention of hazards. However, in developing countries like Ethiopia, where there is no enforcing authority and regulatory body, workplace hazards and accidents remain salient killers in the manufacturing industries. This paper try to investigate the major causes for the prevalence of occupational health and accident in iron, steel and metal manufacturing industries in and around Addis Ababa. After assessing the prevalence, the study also investigates the major causes so as to create awareness for policymakers, employees, and companies to proactively respond to the situations. This is due to the fact that prevention saves lives, eliminates injuries, and even helps businesses save money.
Keywords: iron; steel and metal manufacturing industries; occupational accident; prevalence; employee; Ethiopia

1. Introduction

Safety becomes the highest priority of global industries because workplace accident/injury (AoI) substantially contributed to the loss of life, reduction on the productivity of employees and at large subsequently affect the economy (Atombo, Wu, Tettehfo, Nyamuane, & Agba, 2017; Cusick, Kiely, & Logan, 2010; Wochter & Yorio, 2014). Such situations were also more worsen in steel industries as well as in developing countries. Historically, steel industries were also known for their unsafe working environment (Pedrag Milic, 2011), as a result, the work-related injuries are more and more likely to arise in industry workers (Motbainor, Achenef & Kumie, 2007; Takele & Abera, 2007). In 1998 the average estimated number of fatal occupational accidents was 350,000 and there were 264 million non-fatal accidents (Driscoll et al., 2005; Hämäläinen, Saarela, & Takala, 2011; Santos, Rebelo, & Mendes, 2017; Takala, 1999). Global estimates of occupational accidents are needed to guide national policies and decision-making (Hämäläinen et al., 2011)

The risk of occupational diseases and injuries has become by far the most prevalent and major health problem (Mathers, Bernard & Iburg, 2003). Every year about 2.3 million people died in this World from unintentional injuries at work; and work-related diseases (Driscoll et al., 2005; Hämäläinen et al., 2011b; Santos et al., 2017; Takala, 1999).

Globally, each year some 268 million non-fatal workplace accidents including 160 million new cases of work-related illness result in severe socioeconomic consequences for workers and (Abugad, 2009; Kunar, Bhattacherjee, & Chau, 2008). The workplace fatal injury rates are 3–4 times higher in developing countries than the developed ones(Eijkemans, 2004). Compensation, work time loss, production interruption, training and retraining, medical expenses and social assistance account for 5% of the global gross national product (GNP).

In Africa where traditional hazards, such as workplace dust and noise levels have not been dealt adequately, the introduction of new technologies, chemical substances and materials have led to a new and extra increased burden of occupational injuries and diseases (Eijkemans, 2004). In Sub-Saharan Africa greater than 57,000 total work-related fatalities and 55,000 injuries resulted in a loss of about 4% of GNP(Eijkemans, 2004). In the year 2010 only, there were over 350,000 fatal occupational accidents and over 1.9 million fatal work-related diseases (Nenonen & Saarela, 2014). Consequently, approximately 6,300 people die every day because of these causes; occupational accidents killed over 970 people and approximately 5,400 died from work-related diseases(Nenonen & Saarela, 2014). Compared to the previous estimates for the year 2008, fatal occupational accidents have increased in 2010. The rate of fatal occupational accidents (per 100,000 persons in the labor force) has, however, remained almost the same with only a slight increase. The number of fatal work-related diseases remained almost the same with a small decline in 2011 compared to 2008. There were also over 313 million non-fatal occupational accidents (with at least four days absence) in 2010 meaning that occupational accidents cause injury or ill health for approximately 860,000 people every day (Nenonen & Saarela, 2014). The number and rate of non-fatal occupational accidents have remained almost the same in 2010 with only a small decrease since 2008 (Hämäläinen et al., 2011b; Nenonen & Saarela, 2014).

In considering the Ethiopian case, the health and safety issues in Iron, Steel and Metal Manufacturing Industries (ISMMI), in Addis Ababa, were given low attention but have a large proportion of employment as compared to other sectors. It seems that with no due attention about the safety issues, Ethiopia’s Growth and Transformation Plans (GTP), both GTP I & GTPII (Asratie, 2014; MoFED, 2010b) have identified metal and engineering sector as one of the strategic development sectors to be pursued by the nation. Though it is true that, when the manufacturing sector is well matured and efficient, it will provide growing employment opportunities(Liu et al., 2015) but should not ignore safety and health issues.
Having these situations, the employment capacity for the manufacturing sector in Ethiopia has grown drastically (93,500 workers in 2000, 132,172 in 2008 and 200,014 in 2012 (CSA, 2016; MoFED, 2010b).

The low concerns of workplace safety in ISMMI are manifested by the high prevalence of work-related accidents and injuries (Kifle et al., 2014). In the research findings of Jilcha, Kitaw, and Beshah (2016), they founded that workplace organization, workplace layout, human resource management, top management commitment, workers’ participation, policy, and training are points that were overlooked factors for strong workplace safety and health improvements. Enterprises in developing countries are unable to identify their hazards. Furthermore, nowadays many enterprises operate in several regions and countries and this often makes accident prevention programmers more challenging and occupational safety and health management systems incorporate context should take into account cultural differences (Larsson, 2000; Paivihamala, Jukka, & KaijaLeena, 2006). A commonly used argument is also that poor countries and companies cannot afford safety and health measures. There is no evidence that any country or company, in the long run, would have benefited from a low level of safety and health (Paivihamala et al., 2006). In many developing countries people work mainly in agriculture and the industry sector is growing (Paivihamala et al., 2006).

Moreover, it is evident that the Ministry of Labor and Social Affair, in Ethiopia, reported that out of 14,914 organizations, 25,812 employees encountered permanent disability and temporal disability or death. This may subsequently create an unsafe work environment for employees. Among the reported work accidents (56.05%) occurred in the manufacturing industries, which is relatively high while comparing with other sectors like construction 22.25%; and agricultural, hunting, forestry, and fishing together accounting 20.58% (MOLSA, 2016).

Similar studies conducted in different regions of the country have justified that Ethiopian manufacturing industries are under a high rate of workplace accidents (Aderaw, Engdaw, & Tadesse, 2011; Kifle et al., 2014; Serkalem, Moges, & Ahmed, 2014a, 2014b). However, having a safer and risk-free work environment is the most important strategy to ensure workers’ health and to contribute positively to the national economies through improved productivity, product quality, work motivation, job satisfaction and overall quality of the worker’s life and society (Ferri et al., 2016; ILO, 2014; MoFED, 2010a; Podgórski, 2006). Despite all these, the level of intervention by governments and policymakers on ISMMI industries in and around Addis Ababa which are in arm’s length from the central government is minimal as compared to the damage it causes to the society. Moreover, there has not been any comprehensive scientific study conducted on the prevalence of workplace health and accident in the ISMMI in Addis Ababa. This paper is, therefore, the first of its kind tries to conduct an in-depth assessment of the prevalence of workplace AoI and their associated factors in Addis Ababa ISMMI to draw policy options for policymakers.

2. Methodologies

2.1. Sample size
In this paper, the sample sizes were computed from 89 ISMMI stratified into three strata (33 small, 28 medium and 28 large). The sample size determination was considered the number of respondents under each stratum. During sample size determination, a 95% confidence level was used in the power estimation. The inputs for the sample size formulas include the desired power, the level of significance and the effect size. The effect size is selected to represent a statistically meaningful or practically important difference in the parameter of interest. The sample size was proportionally computed for small, medium and large industries based on the classification of industries from CSA. Accordingly, out of a total employee population of 5408 in the three strata, the minimum computed sample size is 372 employees required to ensure that the margin of error in the confidence interval for the population mean does not exceed designed margin error. However, in this research, the sample size considered in the three strata were 446 employees, which is larger than the minimum computed value. Therefore, by keeping the minimum sample size based on scientific computation, the researcher increased the sample from 372 to 446 (small 166, medium
137 and large 166 responses). The researcher believed that the sample size was adequate to be represented as compared to the total number of employees in ISMMI in Addis Ababa.

2.2. Primary data
A semi-structured questionnaire was designed to collect primary data related to occupational accidents in ISMMI. In the data collection, all the permanent employees who are working in ISMMI and have been worked for more than one year or workers who are employed on contractual/temporary basis but worked more than a year and only those who were willing to give their consent for the study were included in the study during data collection. Ethical clearance was considered during data collection and the purpose of the study was made clear for the companies’ managers and the employees. An official letter was written from the research and technology transfer director office of Addis Ababa Institute of Technology, Ethiopia, to the respective industries and employees to get the consent of the respondents. Primary data was collected using a close-ended questionnaire that contains the most workplace AoI’s in the metal manufacturing sectors collected from the different kinds of literature (Australia, 2015; Liu et al., 2015; Tong, Rasiah, Tong, & Lai, 2015).

The questionnaire was translated from English to the local language (“Amharic”) for the sake of understanding and clarity to the workers, and respondents were also assisted by research assistants during the data collection time. The questionnaire was undergone a pilot test survey and the reliability of each question was tested. It was also modified and improved based on the findings of the pilot test before the final data collection was carried out. In each randomly selected industry, a minimum of three to a maximum of five employees who were working in the production line was randomly selected and were asked to fill the questionnaire. All the questionnaires were filled and returned timely with a 100% respondent rate.

2.3. The study area and time framework
The study was conducted on ISMMI in and around Addis Ababa, Ethiopia. The data collection period was conducted in a time frame of June 2016 to August 2016.

2.4. Data analyses
The data were analyzed using SPSS Version 23. Descriptive statistics such as frequency, percentage, were used to describe selected variables. Pearson's chi-square test and Crude and Adjusted Odds Ratios (COR and AOR) with corresponding 95% Confidence Intervals (CI) were computed to find an association between independent and dependent variables. A P-value of <0.05 was considered statistically significant. All the variables which are included in the bivariate analysis were also subjected to a multivariate logistic analysis to identify factors that may independently predict AoI occurrences of an employee at work.

2.5. Limitations of the study
The study was conducted by taking iron, steel, and metal manufacturing industries in and around Addis Ababa as a target population. Due to this reason, the finding of the study may not be equally applicable in other regions and sectors in Ethiopia.

3. Results

3.1. Socio-demographic and company size
The socio-demographic results showed in Table 1 indicated that most of the respondents were male 91.90% and they have been working for a definite time of employment pattern. Among the respondents, 72.65% of the workers have an educational background of a diploma or less, 70.18% of the employees have six or more years of work experience. The proportion of employee who has an age of 30–39 and 40+ were more than 40.00%. The distribution of the respondent among company size and marital status was nearly proportionally equal. Moreover, the proportion of female employees and employees whose educational background degree and above were almost very small, which accounts for 8.10% and 1.12% respectively.
3.2. Availability of PPE and culture of employees using PPE

The study assessed the availability and cultures of the employees using Personal Protective Equipment (PPE) in ISMMI while they are at work. The findings of the analysis (n = 446 employee) are presented in Figure 1. With regard to PPE usage while workers are at work, the responses of the employees in the industries are also given in the same Figure. The result showed that the availability of Google, coverall; and safety shoes are greater than the frequency of usage. As the response indicated that 36.3% (162) of the respondents agreed that they were provided Google but their frequency of using the same PPE is 42.60%, which is greater than its availability.

Regarding Coverall and safety shoes, 20.4% (91) and 35.5% (159) of the employee were respectively provided during work, but their usage is higher than availability. Indicated that most of the workers have a relatively better culture to use Google, Coverall and safety shoes while they are at work through workers were not properly provided. However, the availability of these PPE items by the industries is limited. Some of the workers may have experience of buying Google, Coverall and Safe shoes on their own. Whereas PPE such as respirators 63.2 % (283) and earplug 58.1% (259) have better availability, but not frequently used by workers. Authors such as Olson (2009) and Carpenter (2002) has strongly emphasized the impact of PPE and the role of leaders to effect the same. The low usage of PPE and the loos control of the leaders are on PPE usage is similar to the findings of the (Carpenter et al., 2002; Olson, Grosshuesch, Schmidt, Gray, & Wipfli, 2009).

Most of the respondents do not frequently use respiratory protective devices 52.8 % (235) and earplugs 49.6 % (221), though they are provided by the company. Whereas with respect to Google, coverall and safety shoes they are not properly provided by the company, but most workers have frequently used while they are at work. The remaining proportions of response rates on each PPE are an indication that the companies’ employees either are not given those PPE or the employee do not have the culture to use them. The low availability and low culture of PPE usage are related to the finds of (Bogale, Kumie, & Tefera, 2014; Gebremichael, Kumie, & Ajema, 2015; Wadilo, 2015). Further, previous researches showed that 5% to 10 % of the workers in developing countries get access to occupational safety and health (ILO, 2013; WHO, 1998). As in many poorer countries, a large percentage of workers and firms (almost 50% such as in Brazil) do not contribute to social insurance and are not registered with the government for social security benefits, including compensation for injuries as well as proper PPE (John, 2015; Paul, Leslie, Seth, Ozonoff, & Ethan, 2012).

3.3. Prevalence of occupational aoi

During the study, employees in metal, ISMMI were asked if they have been faced AoI and at their workplace due to factors given in Table 2. Among the lists given, it is found that fracture 389 (90.68%) and dislocation 379 (90.21%) have exhibited higher prevalence followed by abrasion 386 (89.35%),

![Figure 1. Comparison of PPE availability and usage.](image)
suffocation 379(88.34%), burns 371 (86.28%), and piercing 343(80.71%). They are considered as the most prevalently occurring accidents or injuries that suffer employees during and at the workplace. These injury types have occurred at the maximum level as they have been obtained from the respondents.

Next to the above AoI, 331(78.07%) of the respondents have faced sprain, 277(64.57%) of the respondents have faced punctured, 269(61.84%) of the respondents have faced exhaustion, and 224 (51.97%) of the respondents have faced cuts in their workplaces. The overall AoI prevalence presented in Table 2 is relatively greater than the prevalence of the previous studies conducted by (Abera & Yemane, 2015; Bala & Tabaku, 2010; Kifle et al., 2014; Koparkar, Joshi, Kasturvar, & Biswas, 2014; Takele & Abera, 2007). This indicates that the prevalence of occupational AoI in ISMMI in Addis Ababa are relatively higher as compared to the prevalence of accident in Malaysian manufacturing industries (Hussin, Jusoff, Ju, & Kong, 2014), but similar to the findings of (Fitch, Villanueva, Quadir, & Alamgir, 2015) in Bengali

4. Discussions
In Ethiopia, working more than 48 hours per week, absence of health and safety training, sleeping disorder, alcohol consumption, job dissatisfaction and absence of protective devices were found to be significant factors that contributed to the prevailing occupational injuries (Carpenter et al., 2002; Olsen et al., 2009; Yiha & Kumie, 2010). A similar study also reported that abrasion accounted for 43.54%, followed by cuts and eye- injury, i.e., 13.67% and 9.40%, respectively, which mostly occurred due to machine, explosion, chemicals, fire, and steam.
The highest number of work accidents occurred in the age group of 19–24 which accounted for about 21.29%. The next highest number of accidents was experienced by workers in the age group 25–29 and 40–44 in which, about 18.04% and 15.09% cases had been reported respectively. The least case was registered in the age group of 55 and above which was about 1.98% (MOLSA, 2016).

In this study, a thorough investigation of the associated factors that might exist among company size, socio-demographic and work environment was conducted using multivariate analysis. Both unadjusted and adjusted logistic regressions (one on the other) were conducted and the findings of the analyses that are only statistically significant are presented in Table 3. The detailed analysis for each occupation AoI is on the hands of the researcher.

The findings of the result showed that occupational accidents or injuries like cut, punctured, exhaustion, dislocation, sprain and fracture have only at least one factor that is a statistically significant contribution to the higher prevalences of their occurrence. Both of the COR and AOR results showed that employees who are female were 2.73 times more likely to face a cut accident or injury [AOR = 2.73; 95% CI = 1.15–6.49 and COR = 2.99 95% CI = 1.31–6.80] compared to those male employees. This finding is related to the findings of (Fitch et al., 2015; Lin, Chen, & Luo, 2008) which stated that gender and age are major factors in occupational injuries.

Furthermore, a higher puncture rate was associated with the educational background of employees on both COR and AOR [AOR = 1.80 95% CI = 1.06, 3.06] when adjusted one on another. Indicating that, those who have better qualifications like diploma and degree might have higher confidence and exposed themselves for puncture type of risk. This finding is unexpected by the researcher and is different from the findings of Gyekye and Salminen (2009). But a significant difference was not observed among employees whose qualification is less than diploma and higher than a degree.

### Table 2. Prevalence of injuries/accidents

| variables | n   | %   |
|-----------|-----|-----|
| Abrasion  | Yes | 386 | 89.35 |
|           | No  | 46  | 10.65 |
| Burns     | Yes | 371 | 86.28 |
|           | No  | 59  | 13.72 |
| Cuts      | Yes | 224 | 51.97 |
|           | No  | 207 | 48.03 |
| Piercing  | Yes | 343 | 80.71 |
|           | No  | 82  | 19.29 |
| Punctured | Yes | 277 | 64.57 |
|           | No  | 152 | 35.43 |
| Sprain    | Yes | 331 | 78.07 |
|           | No  | 93  | 21.93 |
| Exhaustion| Yes | 269 | 61.84 |
|           | No  | 166 | 38.16 |
| Fracture  | Yes | 389 | 90.68 |
|           | No  | 40  | 9.32 |
| Dislocation| Yes | 387 | 90.21 |
|           | No  | 42  | 9.79 |
| Suffocation| No  | 379 | 88.34 |
|           | Yes | 50  | 11.66 |
Whereas for accident burn, exhaustion, dislocation, sprain, and fracture, only company size becomes the only significant predictor of accident and injury. In all these accidents, the larger the company is the more likely to become risky for ISMMI in Addis Ababa. For instance, employees who are working in medium-size industries were about two-fold more likely to face burn and exhaustion accidents or injuries (burn AOR = 2.24; 95% CI = 1.05–4.78; exhaustion COR = 2.84; 95% CI = 1.05–4.7) compared to those who are working in small size industries. Similarly, an employee who is working large size industries was about two-fold more likely to face burn and exhaustion accidents or injuries (burn COR = 2.05; 95% CI = 1.06–3.96; AOR = 2.01; 95% CI = 1.75–3.50) compared to those who are working in small size industries. These findings are similar to the findings of (Ararso, Anisha, 2014) that work-related accidents such as neck and shoulder musculoskeletal disorders were high among sewing machine operators in selected garment industries.

Further, both the COR and AOR have exhibited that companies that are large in size are more vulnerable to accident types of dislocation, sprain, and fracture. It shows that dislocation accident occurs 2.78 times more likely in large ISMMI compared to those which are small and medium [COR = 2.78; 95% CI = 1.15–6.77 and AOR = 2.78; 95% CI = 1.94–8.22]. With regards to sprain accident it occurs nearly 2.00 times more likely in large ISMMI compared to those which are small and medium [COR = 3.17; 95% CI = 1.70–5.90 and AOR = 2.99; 95% CI = 1.23–6.33]. However, as compared to the rest, fracture exhibits the highest odd ration in both cases. The result showed that fracture accident occurs more than 2.01 times more likely in large ISMMI compared to those which are small and medium [COR = 4.56; 95% CI = 1.67–12.29 and AOR = 2.24; 95% CI = 1.75–3.50]. It evident from the findings that, employees who have worked in large size industries have nearly threefold more likely to dislocation and sprain AoI and employee who are working in large size industries have more than 4-fold more likely to face fracture risk as compared to an employee who is working in small and medium-size industries. It seems that in

| Accident (Injury) | Gender | Yes (%) | No (%) | COR (95%CI) | AOR (95%CI) |
|-------------------|--------|---------|--------|-------------|-------------|
| Cut               | M      | 200(50.13) | 199(49.87) | 1*         | 1           |
|                   | F      | 24(75.00)   | 8(25.00)   | 2.99(1.31,6.80)* | 2.73(1.15,6.49)* |
| Respondents' Educational background |
| Puncture          | < Dip. | 192(61.74) | 119(38.26) | 1          | 1           |
|                   | Dip.- Deg. | 82(72.57) | 31(27.43)   | 1.64(1.02,2.63)* | 1.80(1.06,3.06)* |
|                   | Deg.++  | 3(60.00)    | 2(40.00)    | .93(15.5,65) | 1.93(19.19,73) |
| Company Size      |
| Exhaustion        | Small  | 84(51.53)   | 79(48.47)   | 1          | 1           |
|                   | Medium | 92(69.17)   | 41(30.83)   | 2.11(1.31,3.41)* | 1.83(1.10,3.08)* |
|                   | Large  | 93(66.81)   | 46(33.09)   | 1.90(1.19,3.04)* | 1.79(1.98,3.05)* |
| Dislocation       | Small  | 139(86.88)  | 21(13.13)   | 1          | 1           |
|                   | Medium | 119(89.47)  | 14(10.53)   | 1.28(63.2,64) | 1.51(67.3,44) |
|                   | Large  | 129(94.85)  | 7(5.15)     | 2.78(1.15,6.77)* | 2.78(1.94,8.22)* |
| Sprain            | Small  | 112(69.57)  | 49(30.43)   | 1          | 1           |
|                   | Medium | 103(78.63)  | 28(21.37)   | 1.61(94.2,75) | 1.37(76.2,47) |
|                   | Large  | 116(87.88)  | 16(12.12)   | 3.17(1.70,5.90)** | 2.99(1.42,6.33)** |
| Fracture          | Small  | 137(85.09)  | 24(14.91)   | 1          | 1           |
|                   | Medium | 122(91.73)  | 11(8.27)    | 1.94(91,6,13) | 1.95(84,4,56) |
|                   | Large  | 130(96.30)  | 5(3.70)     | 4.56(1.67,12.29)* | 4.05(1.23,13.26)* |
| Burn              | Medium | 122(91.73)  | 11(8.37)    | 2.84(1.37,5.86)* | 2.24(1.05,4.78)* |
|                   | Large  | 120(88.89)  | 15(11.11)   | 2.05(1.06,3.96)* | 2.01(1.75,3.50)* |
medium and large-sized industries, the volume and nature of work are hugely performed by more manual labor which might create fatigue and likely to expose employees towards accidents and injuries. These findings are contrary to (Fabiano, Currò, & Pastorino, 2004; Nordlöf, Witavuori, Höberg, & Westerling, 2017; Smith & Williams, 2014) where company size was found to be associated with better occupational safety and health as well as the findings of (Ararso, Anisha, 2014) where personal and environmental factors were identified as the potential risk factors related to neck and shoulder musculoskeletal disorders. Similarly, for dislocation, sprain and fracture types of accidents are more prevalent in large scale manufacturing industries.

5. Conclusion
The majority of the production workers in ISMMI are dominantly male, with a low educational background less than six years of work experiences and most of them are working in a definite period of time. In most industries, the availability of PPE while employees are at work is low similarly, the culture of employees using the provided PPE is also low. In some of the PPE, the usage is greater than its availability by the industry, it may be, because employees may able to use either their own PPE even though they have not been provided by their respective employers.

The less availability and poor culture of PPE usage might have made the prevalence of AoI in the industries very high. Moreover, employees in medium and large size metal manufacturing industries in Addis Ababa have faced more AoI than employees in small size industries. The company should make PPE available and change the employees’ culture in using PPE while they are at work. For the case where employees do have a low culture of PPE usage, the organization should strictly follow up PPE usage of workers while they are at work. The research strongly advises the iron, steel and metal manufacturing industries in and around Addis Ababa to improve their working environment. Such interventions would subsequently reduce the higher prevalence of the AoI on their working premises. By doing these, they can save the lives of their workers, their productive time as well as save money for their businesses. The higher prevalence of occupational AoI in ISMMI in Addis Ababa require also serious attention by industries and the government of Ethiopia to enforce their safety policies and its implementation.

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The authors have no conflicts of interest to declare.

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