Original Research Article

Risk Factors Associated With Occupational Injuries Among Motor Vehicle Repair Workers; A case study of Kigandaini Juakali Sector Thika, Kenya.

ABSTRACT

Background: There has been a drastic rise of informal sectors commonly referred to as Juakali, which has been of vital importance in job creation. The majority of motor vehicle repair workers are at risk of occupational injuries due to nature of the work they are engaged in and the exposure to various hazards in their working premises.

Objective: The study aimed to determine the associated factors for occupational injuries at Kigandaini Juakali sector, Thika town, Kenya

Method: An analytical cross-sectional study design was applied. Stratified random sampling method was applied to recruit 260 respondents. Both qualitative and quantitative techniques of data collection were applied. Chi-square and logistic regression were applied to determine the degree of association between the dependent and covariet.

Results: The annual prevalence rate of work-related injuries was (43.5%) and (39.8%) for the past two weeks. Body cuts at 78.8% were the most reported injuries. PPEs in suitable working condition (OR=39, 95%CI=12.73-119.66), whether PPEs were worn properly (OR=59, 95%CI=16.94-209.84), provision of occupational health and safety information (OR=2.5, 95%CI=1.23-5.28), Use of PPEs (OR=8.1, 95%CI=0.037-0.42), presence of safety information boards(OR=3, 95%CI=1.08-8.08) reduced the risk of work-related injuries while poor working condition (OR=2.5, 95%CI=0.19-0.85) increased the risk of having a work-related injury.

Conclusion: The study reported a high prevalence of occupational injuries among motor vehicle repair workers. Poor working conditions increased the likelihood of having an occupational injury while the provision of occupational safety information, presence of safety boards, proper wearing of protective gears, use of full protective gears, use of protective gears in good working condition, and good perception on mandatory use PPEs reduced the risk of an occupational injury. There is need to safeguard the necessary safety measure which will result to a safer working environment.

Keywords*: Occupational injuries, Juakali, motor vehicle repair workers, risk factors***.**

1. INTRODUCTION

Occupational injury refers to a physical injury that a worker encounters while working (1). Job-related injuries and work-related injuries are equal to occupational injuries. Work-related injuries are commonly accompanied by body harm such as cuts, fractures, or limbs confiscation. Work-related injuries are becoming a serious public health problem (2). According to global estimates of work-related injuries and work-related illnesses, internationally there were 313 million work-related injuries(3). According to statistics, traumatic job-related injuries are immensely rivaling the burden imposed by already existing lifestyle diseases(3).

Globally,260000million employees present the labor force and are increasing tremendously, 75% of these employees are situated in developed countries (4). World record shows that 250 million job-related accidents and 160 million work-related diseases occurred in 2012(5). Injuries are the principal cause of morbidity and mortality among employees, which result in loss of time, increased medical burden, restriction to various types of jobs, or transfer to other jobs(4). Developing countries are highly affected by work-related accidents and illnesses. It's estimated that 270 million accidents and diseases with over 200000 deaths occur every year. Sub-Saharan Africa remains to be the most affected region followed by

Asia (6).In 2010, there were over 350,000 lethal work-related accidents and over 1.9 million fatal work-related diseases (3). Underdeveloped nations experience a higher magnitude of injuries as compared to developed countries (7).

In Kenya, the Juakali segment is unfavorably affected by inadequate access and observance to health and safety regulations; this is because the occupational safety and health Act Cap 15 does not cover this segment. Yet this is a segment where workers are exposed to all kinds of occupational hazards and other forms of work-related accidents originating from the nature of their, equipment, and materials used, mainly without any shielding procedures(8). Kenya has experienced a drastic rise in the informal sector, commonly known as Juakali, which has been playing a momentous role in job creation (9). Despite the existence of work-related safety and health measures, In Kenya, there were 6796 occupational accidents in the year 2015(10). There is limited information concerning the present status of occupation injury and underlying factors and how these factors affect the safety and welfare of workers. Therefore, the study aimed to determine the prevalence and associated factors for work-related injuries among motor vehicle repair workers in the Kigandaini Juakali sector Thika, Kenya.

2. METHODOLOGY

2.1Study design

An analytical cross-sectional study design was used, it helped quantify an association between associated risk factors and occupational injuries. The research design gave a snapshot of the burden of occupational injuries. The research design applied a mixed-methods approach, this was important for triangulation purposes.

2.2 Study area

This study was carried out at Kigandaini Juakali sector located in Thika town which has been recognized as a center for industries in Kenya. Large-scale enterprises and small-scale industries comprising informal sectors exist within the town (11). The cluster is an employment zone made up of informal sector manufacturing enterprises, car repair, and other small retail enterprises (12).

2.3 Study population

All motor vehicle repair workers at Kigandaini Juakali sector and who were members of the Thika Juakali welfare association were the source of the sampling frame. The study population for this study was employed or self-employed or own-account workers. They were engaged in different activities, namely; general mechanical, welding, panel beating, spray painting, and wiring.

2.4 Sample size determination

A sample size of 260 respondents was obtained by using a finite method of Fischer formula. For qualitative data, Three KIIS were conducted and five FDGs comprising of the five motor vehicle repair workers categories.

2.5 Sampling design and sample size

A stratified sampling method was applied to generate the study participants. The sample in each cluster was proportionally obtained from each stratum of motor vehicle repair activities. Simple random sampling was applied to select respondents from each stratum.

2.6 Data collection methods and instruments

Both qualitative and quantitative data collection techniques were used whereby semi-structured research administered questionnaires were used. The questionnaire covered the social demographic characteristics, presence of a work-related injury in the last year and two weeks, part of the body affected by the injury, type of injury, source of the injury, and the reason for the injury to occur, behavioral risk

factors and finally the work-environmental factors. A key informant guide and FGD guide were used to collect the qualitative data.

2.7 Testing for validity and reliability

A pilot study was done at vehicle repair firms in Ziwani, whereby ten percent of the sample, that is, about 29 participants were considered. Internal consistency was measured through the coefficient alpha, Data was entered into SPSS version 26 to check for reliability. The results were 0.79 meaning the tools were reliable. To enhance accuracy of tools, interview questionnaires were pretested by an occupational health and safety expert.

2.8 Data processing and analysis

Quantitative Data collected was keyed into excel, cleaned, cross-checked, and finally imported to SPSS version 26 for analysis. Categorical variables were described by frequency and percentage. Bivariate analysis was applied to assess for a relationship between the dependent and independent variables. The association was statistically significant between the variables if the p-value was ≤ 0.05. Binary logistic regression was applied for factors found to be significant in bivariate analysis. Analyzed data was presented using both charts and tables. Qualitative data recorded in the audio was transcribed and analyzed thematically.

3. RESULTS

3.1 Prevalence and Characteristics of Occupational Injuries

As indicated in the table below, The annual prevalence of occupational injuries was (43.5%), while the prevalence of occupational injuries in the last two weeks was (39.8%). Body cuts (78.8%) were the most reported occupational injuries followed by body abrasions (32.7%) among study participants.

Table 1. prevalence and characteristics of occupational injuries

Variables	Categories	Frequency	Valid percentages %
Presence of injury in the last year	yes	113	43.5
	no	147	56.5
Presence of injury in the last two weeks	yes	45	39.8
	no	68	60.2
Burns	yes	17	15
	no	96	85
Body abrasions	yes	37	32.7
	no	76	67.3
Body puncture	yes	31	27.4
	no	82	72.6
Body cuts	yes	89	78.8

	no	24	21.2

3.2 Social-Demographic Characteristics among respondents

As indicated in the table below, The majority(97.7%) of the respondents in this study were males. Close to a half (46.2%) of the respondents were aged between 19-28 years. Study findings revealed (47.3%) had attained the secondary level of education. Close to half (46.2%) of the respondents had 1-5 years of work experience. The majority(80.2%) of the respondents were on a temporal term of employment. More than half (57.3%) of the participants reported earnings ranging between 4500-14500ksh.

Table 2: Frequency Distribution Table on occupational injuries and Social demographic factors linked to work-related injuries

Independent Variables	Category	Frequency	Valid Percentage (%)
Age	19-28	120	46.2
	29-38	111	42.7
	39-48	29	11.2
Gender	Male	254	97.7
	Female	6	2.3
Term of employment	Temporary	210	80.2
	contractual	50	19.2
Level of education	Primary school	60	23.1
	Secondary school	123	47.3
	Vocational school	70	26.9
	University	7	2.7
Years of work experience	< one year	34	13.1
	1-5 years	120	46.2
	5-10 years	54	20.8
	Over ten years	52	20.0
Income	4500-14500	149	57.3
	14600-24600	67	25.8

	24700-34700	43	16.5
	≥35000	1	0.4

3.3 Socio-demographic Factors linked with Occupational Injuries

In social demographic factors, none of the variables had a significant relationship occupational injuries; Age(X^2*=1.985, df=2, P=.37*), gender (X^2*=0.107, df=1, P*=1.00*), Level of education (X^2*=6.134, df=3, P*=.10*), term of employment (X^2*=0.054, df=1, P=.82*), years of working experience (X^2*=4.001, df=3, P=.26*) and level of income (X^2*=3.444, df=3, P=.29*). This means injuries sustained were independent of the social demographic characteristics.

Table 3: Chi-square tables on Socio-demographic Factors linked with Occupational Injuries.

Independent variable	Categories	Dependent variable (Occupational injuries)		Statistical significance (X^2-Test of independence)
		YES (N=113)	NO (N=147)	
Age	19-28	47(39.2%)	73(60.8%)	X^2=1.985
	29-38	51(45.9%)	60(54.1%)	df=2
	39-48	15(51.7%)	14(48.3%)	P=0.37
Gender	male	110(43.3%)	144(56.7%)	X^2=0.107
	female	3(50%)	3(50%)	df=1
				P*=1.00
Term of employment	temporarily	92(43.8%)	118(56.2%)	X^2=0.054
	contractual	21(42%)	29(58%)	df=1
				P=0.82
Level of education	primary	22(36.7%)	38(63.3%)	X^2=6.134
	secondary	53(43.1%)	70(56.9%)	df=3
	vocational	32(45.7%)	38(54.3%)	P*=0.10

	university	6(85.7%)	1(14.3%)	
Years of work experience	<one year	11(32.4%)	23(67.6%)	X2=4.001 df=3 P=0.26
	1-5years	57(47.5%)	63(52.5%)	
	5-10 years	26(48.1%)	28(51.9%)	
	> ten years	19(36.5%)	33(63.5%)	
Income level	4500-14500	61(40.9%)	88(59.1%)	X^2=3.444 df=3 P=0.29
	14600-24600	28(41.8%)	39(58.2%)	
	24700-34700	23(53.5%)	20(46.5%)	
	≥35000	1(100%)	0(0%)	

3.4 Work Environment Characteristics among Respondents

Close to three quarters (73.8%) of the study participants reported having never been supervised, more than half of the respondents(56.2%) reported working for more than eight hours a day. More than half of the respondents (52.3%) reported having never been trained in health and safety training. Only (70.8%)of the respondents reported having been provided with occupational safety information. The majority(70%) of the respondent reported working in poor working conditions. More than half of the study respondents (58.5%) reported working in a crowded work environment. The majority of (84.6%) of the respondents reported absences of safety information boards. Close to three quarters (71.9%)of the respondents reported the presence of warning signs at their workstations .lasty, majority of the respondents (86.5%) reported absences of first aid equipment.

3.5 Bivariate and multivariate analysis on Work Environment Factors associated with Occupational Injuries

As indicated in the table below,The following variables revealed a significant relationship with occupational injuries when the bivariate analysis was done; provision of occupational health and safety training (X^2 =12.109, *df* =1, *P*<.001), number of hours spent in work in a day(X^2 =15.100, *df* =3, *P** <.001), presence of crowded work environments (X^2 =9.187, *df* =1, *P*<.002), presence of poor working conditions (X^2 =21.288, *df* =1, *P*<.001), the provision of warning signs (X^2 =10.659, *df* =1, *P*<.001), provision of safety information boards(X^2 =8.453, *df* =1, *P*<.004), occupational health and safety supervision(X^2 =5.930, *df* =1, *P* =.02) and provision occupational health and safety information (X^2 =19.445, *df* =1, *P*<.001). However, the provision of first aid equipment (X^2=*3.649, df=1, P=.06*) didn't have a significant association with occupational injuries.

Significant variables in work environmental factors were then modeled in the logistic regression. The Wald criterion demonstrated that the following three variables had a significant contribution to the prediction model: Provision of occupational health and safety information (*P* =.01), Presence of poor working conditions (*P* =.01), and Presence of health and safety information boards on working section (*P* =.03). Workers who spent more than 8 hours daily in the workplace were two times more likely to sustain occupational injuries than those who spent 4-to 8 hours in their work. The majority of the respondents narrated that long working hours increased the vulnerability to occupational injuries. For instance, one of the discussants in the welders FGD noted that:

"…*There is something we call brakes, when I get to my work at 7 am, I get out at 6 pm, even I lack time to have my food, hope you get my point, now us lacking that time to make our brains relax, you just brainless, you find you just fixed by the work, you get fixed today, tomorrow, because of this work in the fifth day there is a high chance you will make a mistake and getting an injury…*"(Respondent 1, Welding FGD).

Besides, the provision of occupational health and safety information reduced the odds of sustaining the injuries by 2.5. The majority of the discussant in the FGD, employers in the KII noted that inadequate provision of occupational health and safety information played a big role in whether an employee sustained an occupational injury. One of the discussants in the general mechanic FGD narrated that:

"*…we are not provided with adequate occupational safety information, for instance, when doing these jobs, there are procedures to follow, to prevent harming yourself, let's say like when lifting a vehicle using a jack, the ground should be stable and not slippery, but we don't have that knowledge to remind us, Soo, we just assume, in the process some of us have had injures as a result…*" (Respondent 1, Mechanics FGD).

The presence of poor working conditions increased the odds by 2.5. The majority of the discussants in the FGD noted poor working conditions had a role in sustaining occupational injuries. One of the discussants in the panel beating FGD narrated that:

"…Now there are these, windows, vehicle windscreens which have been removed and dumped here carelessly now the shoes we wear are not strong and sometimes we lay down to repair vehicles underneath. so we tend to get cuts and even deep cuts. Sometimes when it rains there is a lot of mud here …" (Respondent 3, panel beaters FGD).

Lastly, the presence of health and safety information boards in the working section reduced the odds of sustaining Occupational injuries by 3. The majority of the discussants in the various FGD noted that insufficient and lack of safety information boards had a significant role in whether workers sustained an occupational injury. One of the discussants in welders FGD noted that:

"…let's say it has been written don't close there, you will not close hahaha but they are not provided here, let's say if am repairing a lorry on top and there is a signboard written welding operations is on progress, even a customer will not that place is an X, unfortunately, they are not provided, lack of that reminder it causes a lot of negligence or carelessness at work…" (Respondent 1, Welders FGD).

Table 4: Bivariate and Multivariate analysis table on work-environment factors

Independent variables	**Chi-square value**	**Binary logistic regression OR,95%CI**	**P-value**
Hours spent in work per day	X^2=15.100 df=3 P*<.001		0.165
<2 hours		41(0.00)	1.00
2 to 4 hours		1.498(0.52,4.36)	0.46
4 to 8 hours		2(1.09,3.68)	0.02
>8 hours		Reference	
Occupational health and safety supervision	X^2=5.930 df=1 P=.02		0.25
Yes		1.49	
no		Reference	
Occupational health and safety training	X^2=12.109 df=1		0.28

yes	P<.001	1.4(0.75,2.97)	
no		Reference	
Occupational health and safety information	X^2=19.445 df=1 P<.000		0.01
yes		2.5(1.23,5.28)	
no		Reference	
Poor working condition	X^2=21.288 df=1 P<.000		0.02
yes		0.41(0.19,0.85)	
no		Reference	
Crowded work-environment	X^2=9.187 df=1 P<.002		
yes		1.38(0.65,2.95)	0.40
no		Reference	
Provision of warning sign	X^2=10.659 df=1 P<0.001		0.11
yes		1.8(0.86,3.74)	
no		Reference	
Provision of safety information boards	X^2=8.453 df=1 P<.004		0.03
yes		2.95(1.07,8.08)	
no		Reference	
First Aid equipment	X^2=3.649 df=1 P=.06	-	-
yes			
no			

3.6 Work Behavioral Characteristics among Respondents

The majority 79.2% of the respondents didn't engage in smoking. More than half (66.9%) of the respondents reported not engaging in alcohol drinking. More than half of the participants (56.5%) reported experiencing job stress while (41.2%) of participants reported being satisfied with their work. More than half (55%) of the respondents reported having never been trained on PPEs use while (46.5%) of the respondents agreed it was mandatory to use PPEs in their workshops. More than half (52.7%) of the participants reported their PPEs being in suitable working conditions, a section (63.8%) of the participants had their PPEs worn properly. More than three-quarters (76.5%) of the participants were not using full protecetive gears.Only 6.9% of the respodnents reported engaging in khat chewing,

3.7 Bivariate and multivariate analysis on Work behavioral Factors associated with Occupational Injuries

As indicated in the table below,The following variables revealed a significant relationship with work-related injuries when the bivariate analysis was done; whether personal protective gears were worn properly(X^2 *=103.912, df =1, P<.001*), alcohol consumption(X^2 *=4.109, df =1, P =.04*), job satisfaction (X^2*=7.760, df=3, P*=.04*), perception on mandatory use of PPEs (X^2 *=12.395, df =3, P<.006*), job stress (X^2=23.266, df=1, *P<0.001*), whether personal protective gears were in suitable working condition (X^2 =113.642*, df* =1*, P*<.001), training on PPEs use (X^2*=13.946, df=1, P<.001*) and use of full protetive gears(X^2*=7.848, df=1,P<.005*). None of the following variables revealed a significant association with work-related injuries; Chewing khat (X^2*=0.336,df=1,P=0.56*) and Smoking (X^2*=2.910, df=1, P=0.08*).

Significant variables in work behavioral factors were then modeled in the logistic regression. The Wald criterion indicated the use of full protective gears (*P*<.001), proper wearing of personal protective gear (*P*<.001), and using personal protective equipment in suitable working conditions (P<.001) contributed significantly to the prediction model. The exp(B) values revealed workers who were using full protective gears were 8.1 times less likely to sustain occupational injuries. Moreover, individuals properly wearing personal protective gear were 59.6 times less likely to sustain occupational injuries. A large proportion of the employers reported insufficient and poor use of PPEs by workers increased the vulnerability of sustaining occupational injuries. One of the employers in the KII narrated that:

"…cause others, they have overall, but they don't know how to use them well, others have gloves but they don't know how to use them well or even they dint use them at all. So, it makes them get injuries which can easily be avoided…" (KII one, employer).

Employees whose personal protective gears were in suitable working condition were 39 times less likely to sustain occupational injuries. Besides, respondents who were dissatisfied with their work were 37 times more likely to sustain occupational injuries than those who were very satisfied. A large proportion of the participants in various FGD noted that job dissatisfaction had a role in sustaining a work-related injury: one of the discussants in the spray painters FGD narrated that:

"…. you can't do something that you don't like and expect evade injuries, you can't tell me what, like doing something I don't want. when doing that activity I will never succeed? people get success because you determined and satisfied with what you do…" (respondent 4, spray painters FGD

Table 5: Bivariate and Multivariate analysis table on Work behavioral factors

Independent variables	**Chi-square value**	**Binary logistic regression OR,95% CI**	**P-value**
Do you smoke	X^2=2.910	-	-
yes	df=1		
no	P=0.08		
Do you drink alcohol	X^2=4.109		0.59
yes	df=1	0.75(0.27,2.11)	
no	P=0.04	Reference	
Job satisfaction	X^2=7.760		0.07
very satisfied	df=3	37(2.11,651.51)	0.01
satisfied	P*=0.04	49(2.66,930.05)	0.00
neutral		32(1.65,640.71)	0.02
dissatisfied		Reference	
Job stress	X^2=23.266		0.08
Yes	df=1	0.42(0.15,1.14)	

no	P<.001	Reference	
Training on PPEs use	X^2=13.946		0.12
yes	df=1	2.11(0.82,5.43)	
no	P<.001	Reference	
Perception on Mandatory use of PPE	X^2=12.395 df=3 P<.006		0.05
Strongly agree		0.90(0.23,3.39)	0.87
Agree		3.71(0.90,15.17)	0.06
neutral		6.90(0.56,84.49)	0.13
disagree		Reference	
PPE worn properly	X^2=103.912		0.00
yes	df=1	59(16.94,209.84)	
no	P=<0.001	Reference	
PPE in suitable condition	X^2=113.642 df=1		0.00
yes	P<.001	39(12.72,119.66)	
no		Reference	
Use of full protective gears	X^2=7.848 df=1		0.00
yes	P<.005	0.12(0.03,0.42)	
no		Reference	

4. DISCUSSION

From this study, the annual prevalence of work-related injuries was 43.5%. These findings were consistent with other studies conducted in Eastern Africa. This was similar to a study conducted in Ethiopia that reported the prevalence of occupational injuries being at 42.7%(13). However, a study in Northwest Ethiopia reported a higher prevalence of occupational injuries being at 63.4%(14). The difference between reported prevalences could be attributed to differences in study areas, different sampling procedures, and different study populations.

Workers carrying out their duties in poor working conditions were 2.5 times more likely to sustain a work-related injury than their fellow counterparts. This was consistent with a study conducted in Mexico which revealed the odds of sustaining an occupational injury was at 7 among employees performing their duties in poor working conditions (15). This was associated with increased exposure to various hazards in working premises that put employees vulnerable to various work-related injuries. Workers provided with safety information boards were 3 times less likely to sustain work-related injuries. This was contrary to a study done among welders in coastal south India which found no association between the provision of safety information boards and sustaining a work-related injury(16). The presence of safety information boards enhances awareness of various impending hazards and dangers thus prompting adequate safety measures to workers. Provision of occupational safety information reduced the odds of sustaining occupational injuries by 2.5, this was similar to a study done in Korea, which revealed that workers without occupational safety information were two times more likely to sustain an occupational injury (17). Provision of occupational safety information promotes awareness of the impending hazards at the place of work thus prompting the necessary safety measures. Workers who spent more than 8 hours daily were two times more likely to sustain workplace injuries than those who spent fewer than 2 hours, this was consistent with a study done in Ethiopia, which reported that workers, working more than eight hours in a day were 3 mores time likely to sustain an occupational injury than those who spent less than three hours in work per day(18). This could presumably be due to the excessive tiredness connected to long working hours. However, another study done among factory workers in Ethiopia found no association between the number of hours spent in work and sustaining a work-related injury(2). This was attributed to the presence of working shifts within the eight hours of work.

Employees properly wearing PPEs were 59.6 times less likely to sustain work-related injuries, this was in agreement with a study in KwaZulu-Nepal which revealed that appropriate use of PPEs reduced the likelihood of sustaining a work-related injury(19). However, this was contrary to a study done among building construction workers in Ethiopia which found no association between appropriate use of PPEs and having a work-related injury(20). The appropriate wearing of PPEs reduces exposure to various impending hazards at the workstations. Study respondents who were dissatisfied with their work were 37 times more likely to sustain work-related injuries than those who were very satisfied, this was consistent

with a study in South Korea which reported employees who were dissatisfied with their work were 2 times more likely to sustain a work-related injury than those who reported being satisfied(21). However, another study done in Ethiopia among Cement Factory workers found no association between occupational injuries and job satisfaction(2). Dissatisfied workers may find no meaning and reason to take responsibility or focus on safety precautions which may exacerbate their risk for injury. Employees whose personal protective gears were in suitable working condition were 39 times less likely to sustain work-related injuries, This was consistent with a study done in Ethiopia which revealed, workers whose PPEs were worn out were 7.4 more times likely to sustain an occupational injury compared to their counterparts(22). Another study done in Ethiopia confirmed the same findings where workers whose PPEs were suitable working conditions were 5 times less likely to sustain an occupational injury(2). Workers who were using full protective gears were 8.1 times less likely to sustain occupational injuries, This meant use of PPES provided protection against injuries, this was consistent with another study done in Jeddah, which reported the use of full protective gears reduced the likelihood of sustaining a work-related injury(23). However, another study in Ethiopia was not in agreement with these findings as it reported there was no association between use full protective gears and sustaining an occupational injury(2). Studies conducted have reported that employees who are aware of the need to use full protective gears in the working premises are more less likely to sustain work-rleated injuries compared to their fellow counterparts.

5. Conclusion

The prevalence of occupational injuries was high. Poor working conditions increased the risk of having an occupational injury while the presence of safety information boards, use of full protective gears, provision of occupational and safety information, good perception of PPE use, Workers properly wearing PPEs, and workers whose PPEs were in suitable working condition were found to reduce the risk of sustaining occupational injuries. There is a need to ensure motor vehicle repair workers are regularly provided with adequate occupational safety information. Both the employers and other relevant stakeholders should collaborate to ensure workers are provided with good working conditions and are regularly trained on PPEs use, this will ultimately result in a safe working environment.

9. Ethical consideration

Ethical clearance and approval to conduct the research were obtained from Mount Kenya University Institutional of Ethics and Review Committee (IREC) with reference number (MKU/ERC/1880) and NACOSTI of license number (NACOSTI/P/21/12806). Permission to undertake the research at the study area was obtained from the appropriate offices in Kiambu County. Confidentiality of the participant's information was highly maintained. Participation of the respondents in the study was purely voluntary whereby the researcher asked for informed written consent from the participants.

References

1. Aderaw Z, Engdaw D, Tadesse T. Determinants of occupational injury: A case-control study among textile factory workers in Amhara regional state, Ethiopia. J Trop Med. 2011;5(1):34–7.

2. Gebretsadik M, Kumie A, Gebremichael G. Magnitude of occupational injury and associated factors among factory workers in Ethiopia: The case of Mugher Cement Factory. J Public Heal Epidemiol. 2017;9(12):318–31.

3. Noora N, Takala J, Saarela KL. Global Estimates of Occupational Accidents and Workrelated Illnesses. J Occup Environ Hyg. 2014;(XXI)(September).

4. Jovica Jovanović, Jovanović M. Occupational Accidents and Injuries. Natl Inst Occup Heal. 2011;6(3):1–8.

5. World Health Organization. the world health organization report. Geneva, Switzerland; 2012.

6. Mamuya S, Badi S. Factors contributing to occupational injuries among solid waste collectors: across sectional study in a municipal in Tanzania. Medcrave Online J Public Heal. 2017 [cited 2021 Apr 10];8(6):237–41. Available from: http://medcraveonline.com

7. Berhan E. Prevalence of occupational accident; and injuries and their associated factors in iron, steel and metal manufacturing industries in Addis Ababa. Pham D, editor. Cogent Eng . 2020 Jan 1 [cited 2021 May 4];7(1):1723211. Available from: https://www.tandfonline.com/doi/full/10.1080/23311916.2020.1723211

8. Hasle, Limborg H. A review of literature on preventive occupational health and safety activities in small enterprises. Ind Health. 2016;44(1):6–12.

9. Muthyoi A. The relationship between informal sector size and economic growth in Kenya. 2017;67–70.

10. DOSHS. the National Occupational Safety and Health Policy. 2015. Available from: http://www.labour.go.ke/downloads/dosh downloads/National OSH Policy.pdf

11. KAM. Years Celebrating 60 Years Of Adding Value Policy & Sustainability Report 2018. Nairobi,Kenya; 2019.

12. Kinyanjui MN. Tapping opportunities in Enterprise Clusters. Geographical Proximity or Collective Efficiency.IDS working paper. Nairobi,Kenya; 1996. Report No.: No 58.

13. Damtie D. The-Prevalence-of-Occupational-Injuries-and-Associated-Risk-Factors-among-Workers-in-Bahir-Dar-Textile-Share-Company-Amhara-Region-Northwest-EthiopiaJournal-of-Environmental-and-Public-Health.pdf. environmetal public Heal. 2020;2020(2):9.

14. Molla GA, Salgedo WB, Lemu YK. Prevalence and determinants of work related injuries among small and medium scale industry workers in Bahir Dar Town, north west Ethiopia. Ann Occup Environ Med. 2015;27(1):1–6.

15. Gonzalez-Delgado M, Gómez-Dantés H, Fernández-Niño JA, Robles E, Borja VH, Aguilar M. Factors associated with fatal occupational accidents among Mexican workers: A national analysis. PLoS One. 2015;10(3):1–19.

16. Ganesh Kumar S, Dharanipriya A. Prevalence and pattern of occupational injuries at workplace among welders in coastal south India. Indian J Occup Environ Med. 2014;18(3):135–9.

17. Seo J, Shin G, Kim MG, Min Y. Relationship between occupational injuries and the provision of safety and health information : data from the 4th Korean working conditions survey. J Occup Health. 2018;4(9):1–13.

18. Dejen Y, Berhe A. Magnitude of Occupational Injuries and Associated Factors among Small-Scale Industry Workers in Mekelle City, Northern Ethiopia. Occup Med Heal Aff. 2015;03(03).

19. Nkomo H, Niranjan I, Reddy P. Effectiveness of Health and Safety Training in Reducing Occupational Injuries Among Harvesting Forestry Contractors in KwaZulu-Natal. Work Heal Saf. 2018;66(10):499–507.

20. Alemu AA, Yitayew M, Azazeh A, Kebede S. Utilization of personal protective equipment and associated factors among building construction workers in Addis Ababa, Ethiopia, 2019. BMC Public Health. 2020;20(1):1–17.

21. Lee H, Chae D, Yi KH, Im S, Cho SH. Multiple risk factors for work-related injuries and illnesses in Korean-Chinese migrant workers. Work Heal Saf. 2015;63(1):18–26.

22. Hunegnaw B, Molla M, Mulugeta Y, Meseret M. Assessment of occupational injury among industrial workers in the Bahir Dar city of northwest Ethiopia: Institution-based cross-sectional study. J Environ Public Health. 2021;2021(4):6–7.

23. 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 J Biol Sci . 2019;26(4):653–9. Available from: https://doi.org/10.1016/j.sjbs.2018.06.011

Abbreviations

FDG; focused group discussions, KII; key informant interview, PPE; Personal Protective Equipments, NACOSTI; National Commission for Science Technology and Innovation, SPSS; statistical package for social sciences.