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St. Paul's Hospital Millennium Medical College**

Pattern of Injury and Associated Factor among Pre hospital Health Care Provider
in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis
Ababa Ethiopia, 2022

By-; Kokebe Workneh (MSC candidate)

A Research submitted to St. Paul Hospital Millennium Medical College; Nursing
Education Directorate, Department of Emergency and Critical Care Nursing; in
Partial Fulfillment of the Requirements for the Degree of Master of paramedic
science

February 2022

Addis Ababa, Ethiopia



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Advisor-; Tesfaye Girma (MPH, Assistant professor)

Co-advisor-; Assefa Abdissa (MSC in CCNP)

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Acronyms and Abbreviations

AOR.....	Adjusted odds ratio
BSC.....	Bachelor science
CPR.....	Cardiopulmonary resuscitation
EMS.....	Emergency medical services
EMT.....	Emergency medical technician
ERB.....	Ethical reviewed board
FTE.....	Full time equivalent
HCW.....	Health care worker
MSC.....	Master science
MVA.....	Motor vehicle accident
NSI.....	Needle stick injury
OSHA.....	Occupational safety and health administration
RT.....	Response time
SPHMMC.....	St, Paul’s Hospital Millennium Medical College
US.....	United state
WPV.....	Work place violence
WRI.....	Work related injury

Information Table

Name of investigator	Kokebe workneh
Full title of the research project	Pattern of injury and associated factors among pre hospital health care provider in fire and emergency prevention and rescue commission and Red cross Addis Ababa Ethiopia 2021/2022
Duration of the research	From October to February 2021/2022
Study Area	Addis Ababa pre hospital health care provider
Total Cost of the project	25,870 Ethiopian birr
Source of Funding	Saint Paul's Hospital Millennium Medical College.
Address of investigator	Cell phone; +251910572843 Email;adikokeb@gmail.com
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Abstract

Background: Injuries and illness are multi-factorial and remain major problem of the public throughout the world. Health-care workers (HCWs) are at a higher risk of sustaining an injury. Injury defined as any accident or situation in which a person is threatened or attacked at work or in a related condition. Emergency medical technicians and paramedics conduct a number of tasks that put them at risk for both deadly and nonfatal workplace accidents and illnesses.

Objectives; To determine injury patterns and associated factors among pre-hospital health care providers in the Fire and Emergency Prevention and Rescue commission and Red Cross Addis Ababa, Ethiopia.

Methods; Institutional based cross-sectional study design was used. All pre hospital care providers (183) were used as the study participants among Fire and Emergency Prevention and Rescue commission and Red Cross health professional. Data was collected via a self-administered structure questioner. The collected data was checked and edited manually if any error was present. Once the collected data was checked manually, the data was entered in to Epi-Info and then the data was exported to SPSS cleaning and analysis with multivariate logistic regression p-value <0.05 and 95% confident interval.

Result: A total of 175 selected participants (non response rate=4%) pre hospital health care provider at fire and emergency prevention and rescue commission and Red Cross in Addis Ababa were included in the study. Most of the study participants had injury in their work place 145 (82.9%). On multivariable logistic regression age <25 (**AOR=0.13CI, 0.24-0.2**) and no training (**AOR=2.774, CI, 1.057-7.124**) were found to have significantly associated with the occurrence of injury.

Conclusion and Recommendation: Injury pattern was higher in this study area. Each pre hospital service would be providing training program to educate all pre hospital health care provider about injury, injury reduction and prevention.

Keyword; Injury pattern, pre hospital care, health care provide

1. Introduction

1.1. Background

Injury defined as any accident or situation in which a person is threatened or attacked at work or in a related condition. (1)

Previous studies in the United States, Australia, and low- and middle-income nations have found that 60.0 % to 87.5 % of emergency healthcare providers (such as nurses and physicians) face workplace violence (WPV) on a yearly basis. Bystanders, patients, patients' families, and coworkers have all been victims of WPV, which encompasses both physical and verbal assault from a variety of culprits. (2)

Paramedics and emergency medical technicians (EMTs) in the United States have higher rates of work-related injuries and deaths than the national average for all occupations. According to the Department of Labor, EMTs and paramedics have a three-fold higher injury rate than the national average for all occupations. The great majority of fatalities are caused by accidents involving transportation. Assaults have also been identified as a leading cause of death.(8)

During work hours, emergency medical technicians (EMTs) and paramedics are at a high risk of work-related injuries (WRIs). EMS employees have a greater rate of workplace injury than the general working public and other high-risk occupations.(9,10)

Violence against pre-hospital emergency personnel is a subject that is usually ignored. There is no comprehensive awareness of the prevalence of violence in the Czech Republic, and there are no suggestions for specific professional communities on how to address the problem of violence in pre-hospital emergency treatment. Paramedics and other EMS personnel have an occupational injury rate that is eight times greater than the national average for all workers and twice that of police officers.(11)

In developing country health-care workers (HCWs) are at a higher risk of sustaining an injury. Any clinical treatment or intervention provided by qualified individuals in the pre-hospital environment to a severely unwell or injured person is referred to as pre-hospital emergency care. While all health-care workers in a hospital or primary-care clinic may face violence, those

working in pre-hospital emergency treatment are more likely to be targeted. Because their close initial contact with patients, sometimes during crisis situations, occurs without the security and support mechanisms that exist in hospitals and primary care centers, pre-hospital care personnel may be at a higher risk of workplace violence than individuals who work in those settings. (3-5)

1.2. Statement of the Problem

Paramedics and emergency medical technicians (EMT) are vulnerable to work-related injuries and exposures when responding to emergency calls, which can occur as a result of physical effort, slips, falls, ambulance accidents, violence, and so on and they are also more vulnerable than other emergency professionals to situation that risk their safety. (7)

The risk of injury for Emergency medical technicians (EMT) and paramedics has allegedly increased, as has the rate of work-related injuries. (9)

EMTs and paramedics conduct a number of tasks that put them at risk for both deadly and nonfatal workplace accidents and illnesses.(14)

Paramedics and other emergency medical services (EMS) workers work in a unique health-care setting that demands them to give care in unregulated and sometimes dangerous environments. (12)

Emergency Medical Technicians (EMT) are a group of employees about who little is known concerning occupational hazards and accidents. Back and extremities injuries were found to be widespread among EMTs in Connecticut, according to an early survey. Injury rates were found to be greater in certain categories of provider level and practice patterns.(18)

When compared to personnel in other industries, the time spent at work by emergency medical technicians (EMTs) and paramedics is substantially longer; as the result of they are apparently at a higher risk of injury, and the rate of work-related injuries (WRIs) has risen. Motor vehicle accidents (MVAs) are a common occurrence in a variety of WRIs. Turkey's mortality rates have grown by 40% as a result of increased ambulance use (increased by 83.2 percent. (9)

Citizens' safety is the responsibility of firefighters, who provide responsibilities such as fire suppression and emergency medical assistance (EMS). As a result, they are exposed to physical or chemical risks, which result in a high percentage of workplace injuries. According to a survey

by the National Fire Protection Association, 18 500 occurrences of hazardous exposure were documented in the United States in 2014, with 63 350 injuries occurring in the line of duty.

In the United States EMS workers are at risk for a variety of occupational injuries.(19,20)

Hundreds of thousands of healthcare workers in poor countries are injured on the job every year. Accidental accidents to healthcare workers, such as needle sticks and sharps injuries, continue to be a major issue in the healthcare system. Annually, approximately more than 54, 000 fatal occupational accidents occur in Sub-Saharan African countries. (9)

Despite, different studies done on the pattern of injury and associated factors among pre hospital health care providers worldwide, as far as my knowledge and extensive literature review there is no published research on injury patterns and associated factors in this study area.

This study was fill in the information gap about the injury pattern and associated factors among pre hospital health care provider and also utilized to establish guidelines for other researchers.

Work experience, sex, age, qualification, mode of transport, length of stay, working environment, working place, training, response time are factors of the outcome variable across different studies. But, these studies conducted worldwide showed that factors associated with work related injury are different and lacks uniformity. This study was also revealing factors which significantly associate with the outcome variable.

Therefore, this research investigates the current pattern of injury and associated factors among pre hospital health care provider in Fire and Emergency Prevention and Rescue commission and Red Cross Addis Ababa branch.

1.3. Significant of the Study

In developing country including Ethiopia the health related issue of pre hospital health care provider and the risk factor still needs to be addressed.

Injury against pre-hospital emergency personnel is a subject that is usually ignored. There is no comprehensive awareness of the prevalence of injury in Ethiopia, and there are no suggestions for specific professional communities on how to address the problem of injury in pre-hospital emergency treatment. Therefore this study will play its own role in the identification of the risk factors, and in the adoption of controlling and preventing strategies of occupational injuries associated with pre hospital care among pre hospital health care provider.

This study's findings were help policymakers identify injury patterns and associated factors among pre-hospital health care providers. Policymakers can utilize the findings of this study to determine the frequency and severity of injuries, as well as adopt preventative measures.

This study can be used by the Minister of Health to emphasize injury patterns, as well as to discover the causes and risk factors linked with injury patterns among pre-hospital health care providers.

Knowing the pattern and risk factors connected with injury can help implement preventative measures and identify injuries early.

Researchers can also use the findings of this study as a starting point for future research by employing other study designs and comparison groups to conduct various assessments of injury patterns among pre-hospital health care providers in other settings.

2. Literature Review

2.1. Pattern of injury in pre hospital health care provider

According to a Systematic Literature Review conducted in Iran nine studies (50 %), around 53-90 percent of personnel have been exposed to workplace violence among Emergency Medical Services personnel. According to ambulance missions, the violent incidence ranged from 0.8 to 8.5 % in four studies (22%). Threats or intimidation, sexual violence or assault, or harassment were recorded in 12 studies (67 %), while threats or intimidation, sexual violence or assault, or harassment were reported in five studies (28 %). Verbal violence was reported to occur between 21 and 82 % of the time, and was usually in the form of insults and humiliation. Pushing, hitting, scratching, kicking, slapping, biting, or the use of weapons was recorded in roughly 13 - 79 % of cases. (1)

Observational study conducted in US a total of 950 reports were submitted by 677 employees. Nearly 75% of the complaints were classified as injuries. One in every five accidents or illnesses resulted in a restriction of the individual's typical work activities (22.3%), and 12.7 % resulted in times away from work. For 878 complaints, the location of the accident or illness was specified (92.4 %). The most prevalent site for injuries and illnesses was the emergency room (51.7 %). 29.2 % happened in the ambulance or while being transported. Approximately one-sixth of the reports originated within the reception facility (15.4%), while 33 reports originated at the base site itself (3.8 %). A brief summary of the occurrence was included with each report. The words 'sprain' or 'strain' appeared in nearly three-quarters of the 705 injury reports (79.2%). In 84 cases, contusions or abrasions were mentioned (11.9 %). Concussions were reported in 21 cases (3.0%), while needle stick injuries were reported in 15 cases (2.1 %). Nearly half of all injuries (48.9%) had the phrases "lifting," "moving," or "transferring" in the description.(10)

The responders in New England indicated stress as the most common incident. Eleven percent of the respondents (49/439) said they were stressed. Stress was observed to interfere with patient care at a rate of 27.1 occurrences per 100 full-time equivalent (FTE) each year.(7)

Low back strains were coded 93 times (36%), making it the most commonly reported injury. The remainders of the injuries were mostly minor. There were a few significant injuries that occurred seldom. (22)

In all, 56.0 percent of poll respondents said they were "somewhat concerned," while 27.7% said they were "extremely concerned" about their overall workplace safety. In addition, 45.6 % said they were concerned about physical assault at work, while 15.5 percent said they were very concerned. Overall, 34.5 % of EMTs said they put themselves in danger at work on sometimes, while 4.9 percent said they put themselves in danger regularly or "all the time."

Despite these significant safety concerns, 78.5 % of EMTs surveyed said they had not received any formal training on how to deal with workplace violence. (2)

While on duty in an ambulance, 81.4 % of participants had been in at least one traffic collision; most often, the ambulance had collided with another vehicle (53.6 %).

These accidents killed a total of three healthcare workers and seven others. Personnel who had not been involved in an on-duty traffic collision were reported to be more satisfied with their 112 job. Intravenous line procedures (55.3 %) and processes performed in the ambulance were the most common causes of needle-stick injuries (34.7 %). The number of needle-stick injuries reduced as employees' ages grew. (9)

Eighty-three people (50.9 %) were female in a study done in Western Turkey, with a mean age of 29.7 years. According to the employees, the most common causes of WRIs were MVAs (31.9 %), needle stick injuries (16.0 %), ocular exposure to blood and other body fluids (15.4 %), and sharp injuries (ie, injuries by sharps other than needle stick; 9.8 %).(17)

The number of EMS providers in the United States has been estimated to be anywhere from 150,000 and over 800,000. The number of EMS providers in the United States was estimated using data from the EMS Magazine survey.(3)

Verbal assault was the most commonly reported form of violence, followed by intimidation, physical assault, sexual harassment, and sexual assault. After correcting for the other variables, the regression analysis revealed that females were more likely to be victims of all sorts of violence.(12)

Fortunately, the majority of the bruises and abrasions detailed in the account were minor. Eye injuries, facial injuries, bites, lacerations, dislocations, fractures, and sprains were among the more serious injuries mentioned by some responders. Knives, firearms, Mace, pepper spray, and a baseball bat have all been used in attacks. (6)

2.2. Associated Factor of injury pattern

In the United States, a study was undertaken; overall, the average shift length was 12.6 hours, with a median of 12 hours. The average shift length differed significantly between agencies. The shortest agency median was 8 hours, while the longest was 24 hours; the longest shift length is more experience injury than the shortest shift length. (10)

A study conducted in Iran found that men and those with a lot of work experience were more vulnerable to violence; others found that the less experienced were more vulnerable to violence, and that women were the ones who were sexually assaulted the most. Another study in Iran found that in the face of threats and/or violence, gender, job experience, and professional group do not differ considerably in recent years. (1)

In the America Women had a slightly greater injury rate than men for low back strains (0.43 v 0.23 injuries/ person-years at risk). Emergency medical technicians had a considerably greater rate of back injuries (0.33 injuries/person-years at risk) than paramedics (0.17 injuries/person-years at risk)(22)

In India the case of verbal assault, Emergency medical technician (EMTs) between the ages of 25 and 29 years were substantially more likely to report verbal assault in the previous 12 months than EMTs 35 years. EMTs in the state of Karnataka were half as likely to report verbal assault in the previous year as those in the state of Telangana (95% CI 0.29 to 0.86). Physical assault was considerably less probable in EMTs with a university degree (95% CI 0.16 to 0.48) and postgraduate degree (95%CI 0.12 to 0.46) in the previous 12 months. (2)

Study conducted in Turkey female employees were more likely to be subjected to verbal abuse, while male employees were more likely to be subjected to physical violence. (9)

There was a statistically significant link between age and needle stick injuries (NSIs) in West Virginia. The biggest proportion of EMS providers was among those aged 60 and more (50.00%), followed by those aged 50–59 (40.00%), and those aged 40–49 (40.00%). (19.29 %). NSIs were statistically linked with certification level. Critical care paramedics had the largest percentage of NSIs (32.43 %), followed by paramedics (27.50 %) and EMT-intermediate (21.43 %). NSIs were also statistically linked with years of experience. The proportion of participants who received NSIs was highest among EMS practitioners with more than 15 years of experience (38.57 %).(23)

According to the Bureau of Labor Statistics, the national rate of occupational injuries in 2000 was 6.1 injuries per 100 full-time workers per year in Us. In the same year, it was discovered that "meat packing plants" had the highest rate of occupational injuries and illnesses, with around 25 injuries and illnesses for every 100 workers per year. Only two articles give information that could be utilized to predict EMS risks. (3)

A total of 46 percent of the 1,050 cases extracted involved workers aged 25 to 34. Females were the victims in 53% of the incidents, despite the fact that they only made up 27% of the workforce in this occupation in 2007. More than a quarter of the instances resulted in 31 days of lost work. Sprains, strains, and tear were the most common injuries in US.

Employees with 1 to 5 years of service with their current job accounted for 52% of the cases, while employees in their first year of employment accounted for 30%. Twenty percent of EMT cases resulted in a loss of 31 work days, compared to 34% for all US workers. The median number of days lost ranged from eight in 2007 to four in 2008; the total number of days lost in the United States was 12 in 2008.

The lowest percentage of incidents occurred on Saturdays and between midnight and 4:00 a.m. On Mondays and Thursdays, especially between the hours of 4:00 and 20:00, the highest percentages were recorded. Between eight and ten hours after the start of the shift, the biggest percentage of incidents happened.(24)

A study was carried out in the Czech Republic. The delay in response time (RT), which can be caused by a delay in asking help, a perceived delay, unreasonable expectations, or actual delays in EMS arrival, is one of the leading causes of violence in EMS situations. Further delays may occur as a result of staff carelessness or a lack of resources, such as an ambulance.

In the United States, a study was undertaken. The EMS agency reported that its 337 staff put in an average of 2,208 hours per year (42.5 hours per week). The first research period lasted 126 weeks, while the second lasted 41 weeks, for a total of 167 weeks and 2,391,858 total hours spent. The quantity of time spent on the job did not appear to be connected to the frequency of assaults. The linear relationship between years on the job and the number of attacks recorded was weak. (11, 25)

Sixty-eight percent had EMT-B certification, and 29 percent had paramedic certification. During a professional setting, 90% (299 of 331) have experienced abuse, assault, or a violent act directed at them by a patient, family member, or bystander. This statistic is lower than that of a similar

study of nurses, which found that 97.7% had been in an abusive patient situation at some point during their careers, but it is still quite high. At work, 84 percent of respondents (277 out of 331) felt their personal safety was at risk due to violence.(26)

2.3. Conceptual Framework of injury pattern

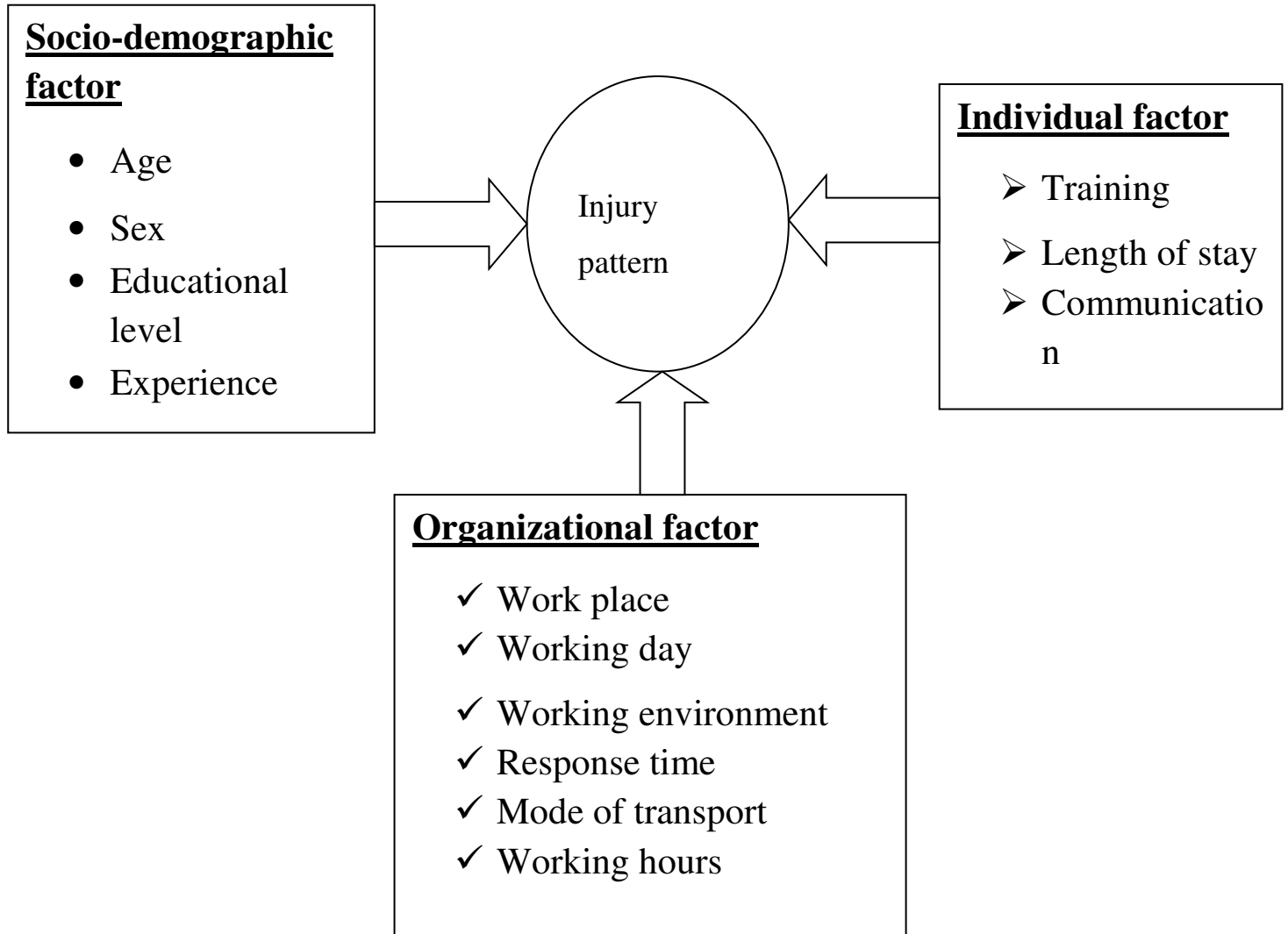


Figure 1: Conceptual Framework of injury pattern among pre hospital health care provider

A review of several literatures used to adapted the conceptual framework (3, 4, 9- 11, 17, 22, 23 and 26)

3. Objectives

3.1. General Objectives

- To determine pattern of injury and associated factors among pre-hospital health care providers in the Fire and Emergency Prevention and Rescue commission and Red Cross Addis Ababa, Ethiopia, 2022.

3.2. Specific Objectives

- To determine pattern of injury among pre-hospital health care providers in Fire and Emergency Prevention and Rescue commission and Red Cross Addis Ababa, Ethiopia, 2022.
- To identify factors associated with pattern of injury among pre hospital health care provider in Fire and Emergency Prevention and Rescue commission and Red Cross Addis Ababa, Ethiopia, 2022.

4. Methods and Materials

4.1. Study setting and Study Period

The research was conducted in Addis Ababa, Ethiopia's capital city. Which has a population of 3.6 million people and a metro population of more than 4.6 million? With altitudes ranging from 2200 to 3000 meters above sea level, an average temperature of 22.8°C, and an annual rainfall of 1,180.4 millimeters, it has an estimated size of 530 km².

Fire and Emergency Prevention and Rescue commission and Red Cross are institution that provides the public with free emergency and ambulance services in city. Fire and Emergency Prevention and Rescue commission was opened in 1926 E.C At the time of in 1926 the service was only fire but in 2001 E.C it started ambulance service .It had nine ambulance stations and 165 health care professional at the time of the study, which were dispersed among the town's many sub-cities.(14)

Ethiopia Red crosses society Addis Ababa Branch Office was established in 1973 E.C The branch is located in Lideta sub-city, near the Police Hospital with a walking distance from Mexico square.

Red Cross Addis Ababa branch is one of institution that provides the public with free emergency and ambulance service in the town. It has five ambulance stations, nine permanent health care professional and seven volunteer health care professional at the time of the study, which were dispersed among the town's many sub-cities.

Study was conducted at two pre hospital service that is Fire and Emergency Prevention and Rescue commission and Red Cross in Addis Ababa, Ethiopia.

The research was carried out From October _ February 2021/22.

4.2. Study Design

Institutional based cross-sectional study design was conducted among pre-hospital health care providers.

4.3. Population

4.3.1. Source Population

All Addis Ababa pre hospital health care providers working pre hospital services in Addis Ababa, Ethiopia

4.3.2. Study Population

All health professionals employed by the Fire and Emergency Prevention and Rescue commission and Red cross in Addis Ababa, Ethiopia from January 20 to February 4,2022 that fulfill the inclusion criteria.

4.4. Eligibility Criteria

4.4.1. Inclusion Criteria

All pre hospital health care professional working in Addis Ababa Fire, Emergency Prevention and Rescue commission and Red Cross present during data collection.

4.4.2. Exclusion Criteria

- Health professional less than six month experience

4.5. Study Variable

4.5.1. Dependent Variable

- Pattern of injury

4.5.2. Independent Variable

- Socio-demographic (Age, Sex, Work experience),Educational level (clinical nurse ,BSC),training, length stay, communication ,mode of transport ,working day ,working environment ,Response time ,Working hours

4.6. Sample Size Determination

The sample sizes of the study were all pre hospital health care providers from both Fire and Emergency Prevention and Rescue commission and Red Cross. That is 183

4.7. Sampling Procedures

Fire and Emergency Prevention and Rescue commission and Red Cross were selected by using purposive sampling technique.

Sampling procedure was necessary if samples deriving from the source population. In this Study, since all pre hospital health care providers were including in the study a special Sampling procedure was not employ. It implies that the source population and the sample of the study were equal.

4.8. Data Collection Tools and Procedures

Data was collected via a self-administered structure questioner which was developed after various literature reviews based on objectives. Each participant was given a structural self-administered inquiry. Four data collectors and two supervisors were included for data collection. The questioner was adopted from different literature (5, 7, 10, 11, 12 14, 16, 20, 21 23 and 26)

4.9. Data Quality Assurance

A well-designed questioner produced to assure the quality of the data. Data collectors and supervisors were received one-day training from the primary investigator. Each day of data collection was overseen by main investigators. The questioner was prepared on an English version of the question. The validity and reliability of the question was calculated with Combat's alpha the results was 0.85. Before the real study, a pretest was conducted on 5% of the study participants at Tebita. The data was scrutinized by the primary investigator and supervisor. Each structural questioner was evaluating for completeness, consistency, and accuracy during the data gathering process.

4.10. Data Entry and Analysis

The collected data was checked and edited manually if any error was present. Once the collected data was checked manually, the data was entered in to Epi-Info version 7.1, and then the data was exported to SPSS version 25 for cleaning and analysis. Descriptive statistics such as frequencies, central tendency, and lists of variables was analyzed by SPSS software by using bivariate logistic regression and multivariate logistic regression. Bivariate and multivariate logistic regression analysis was performed to assess the association between dependent and

independent variable. To control confounding affect those variable having p-value <0.05 in the bivariate logistic regression was included in the multiple logistic regression analysis. Adjusted odd ratio was computing with their corresponding 95% confidence interval p-value of <0.05 was used declare statically significance of the results.

4.11. Operational Definitions

- Pattern of Injury:-According to this study injury pattern means, types, causes, and mechanism of injury. (7)
- Field;-A place were pre hospital health care provider working environments.
- Pre hospital health care provider:-means health care which is working in the ambulance (like nurse ,paramedic, emergency medical technician ,health officer).(2)
- Work related injury:-any damage due to work.(17)
- Violence:-The use of physical force to injure or destroy somebody.(12)
- Abuse:-improper use of force or voice.(26)
- Work day:-a time in which health professional in the work place.(10)
- Length stay:- time spent in work place(the mean length of stay is 12.6 hrs).(10)
 - ❖ Minimum :- time less than the means of length of stay
 - ❖ Maximum:- time more than the means of length of stay
- Communication:-Exchange of message between two or more than two.
- Response time:-The time when the victims requesting help.(11)
 - ❖ Delay response time:-the response time is greater than 10 second to arrive in the scene.

4.12. Ethical Consideration

Ethical clearance was obtained from the SPHMMC Ethical Review Board (ERB). After fully explaining the nature and design of the study and confidentiality, permission letter was obtained from Fire and Emergency Prevention and Control Authority and Red Cross. During the data collecting period, the data collectors were show each participant their ethical clearance. Informed verbal consent was also obtained from each pre hospital institution and study participant to conduct the study. Participant's involvement in the study was on voluntary basis; participants

who were unwilling to participate in the study and those who were to quit their participation at any stage were informing to do so without any restriction. Participants' names were not included in the data gathered, and it was kept private at all times. The principal investigator handled and protected the obtained data on each data collection day, and the data was utilized strictly for the objectives of this study.

4.13. Dissemination of Results

After the study was conducted, presented and fully defended, and it will be submitted to the SPHMMC Nursing Education Directorate and Public Health Department. The result of this study will also be disseminated; Addis Ababa City Administration Health Bureau, to Fire and Emergency Prevention and Rescue commission Red Cross and the Federal Ministry of Health will all get the findings of this study. The findings will be shared to the wider community if necessary through internal seminars, frequent reporting to stakeholders, scientific community, journals and community outreach. Finally, the paper will be submitted to National and International Scientific Journal for possible publication.

5. Results

5.1. Socio-Demographic Characteristics

A total of 175 selected participants (non response rate=4%) pre hospital health care provider at fire and emergency prevention and rescue commission and Red Cross in Addis Ababa were included in the study. One hundred ten (62.9%) were males and 65(37.1%) were females. Majority of the pre hospital health care providers were in the age group 25-35 years , which accounted for 154 (88%), the minimum age was 25, maximum was age 45 and the mean age the study population was 30.53 (S.D.= 3.853) years. About ninety seven (55.4%) out of the respondents were clinical nurses and 78(44.6%) were BSC nurses. From the total respondents 118 (67.4%) of pre hospital health care provider were ≤ 3 years of experiences in pre hospital setting, the minimum year of experience was one year, maximum was 15 years and the mean years of experiences was 3.50 (S.D=2.541) years.

Table 1: Socio-demographic characteristics of pre hospital health care provider with pattern of injury at fire and emergency prevention and rescue commission and Red Cross in Addis Ababa, 2022(n=175)

Variable	Category	Frequency	Percent	Injury (n, %)
Sex	Male	110	62.9%	96(66.2%)
	Females	65	37.1%	49(33.8%)
Age	≤ 25	5	2.9%	1(63.6%)
	25-35	154	88%	129(27.5%)
	≥ 35	16	9.1%	15(9.2%)
Level of education	Clinical nurse	97	55.4%	78(45%)
	BSC nurse	78	44.6%	67(46%)
Experiences	< 3	118	67.4%	96(66.2%)
	3-6	39	22.3%	32(22.1%)
	> 6	18	10.3%	17(11.7%)

5.2. Characteristics of injury pattern among pre hospital health care providers

Most of the study participants had work related injury in their work place 145 (82.9%). Among these most of them were injured once 127 (72.6%) in their work experience. the most common types of injury were Abrasion 44 (25.1%) and Sprains and Strains 44 (25.1%) and the least one was fracture 3 (1.7%).

Most common Source of injury was Patients by itself 62 (35.4%) followed by Needle sticks 53 (30.3%). Delay to reach in scene 72 (41.1%) was the common cause of injury followed by communication 71 (40.6%).

Table 2: Characteristics of injury pattern among pre hospital health care providers

Variable	Category	Frequency	Percent (%)
Injury in the your work experiences	Yes	145	82.9%
	No	30	17.1%
Frequency of injury occurrence	One	127	2.6%
	More than one	18	10.3%
Types of injury	Abrasion	44	25.1%
	Sprains and Strains	44	25.1%
	Dislocation	20	11.4%
	Burn	16	9.1%
	Puncture	10	5.7%
	Cut	8	4.6%
	Fracture	3	1.7%
Source of injury	Patients by it self	62	35.4%
	Needle sticks	53	30.3%
	Vehicles	18	10.3%
	Bystanders	10	5.7%
	Family	2	1.1%
Cause of injury?	Delay to reach in scene	72	41.1%

	Communication	71	40.6%
	Other	2	1.1%
Injury due to?	Distraction from other	65	37.1%
	Lack of light	42	24.0%
	Unclean condition	26	14.9%
	Lack of work space	12	6.9%
Injury of event or exposure	overexertion in lifting	50	28.6%
	Overexertion	35	20.0%
	Assault ,violent act	29	16.6%
	Expose to harmful substance	23	13.1%
	Fall to lower level	8	4.6%
Have you taken training regarding work place injury prevention	No	110	62.9%
	Yes	65	37.1%
Have you had shift in your work place?	Yes	175	100.0%
	No	0%	
Injury due to mode of transport	Ambulance	145	82.9%

5.3. Parts o the body affected

In the case of part of the body affected 51(29.1%) was back followed by upper limp 43(24.6%) and the least part of the body affected was eye 9 (5.1%).

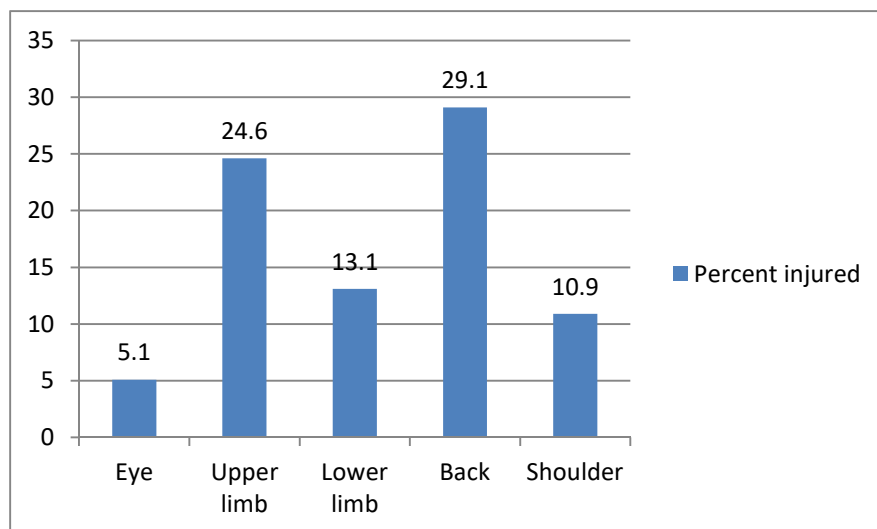


Figure 2: Parts of the body affected among pre hospital health care provider in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.4. How much time you spent in work place per day

Most of pre hospital health care provider were spent nine hours per day 70(40%) followed by ten hours 64 (36.6%).

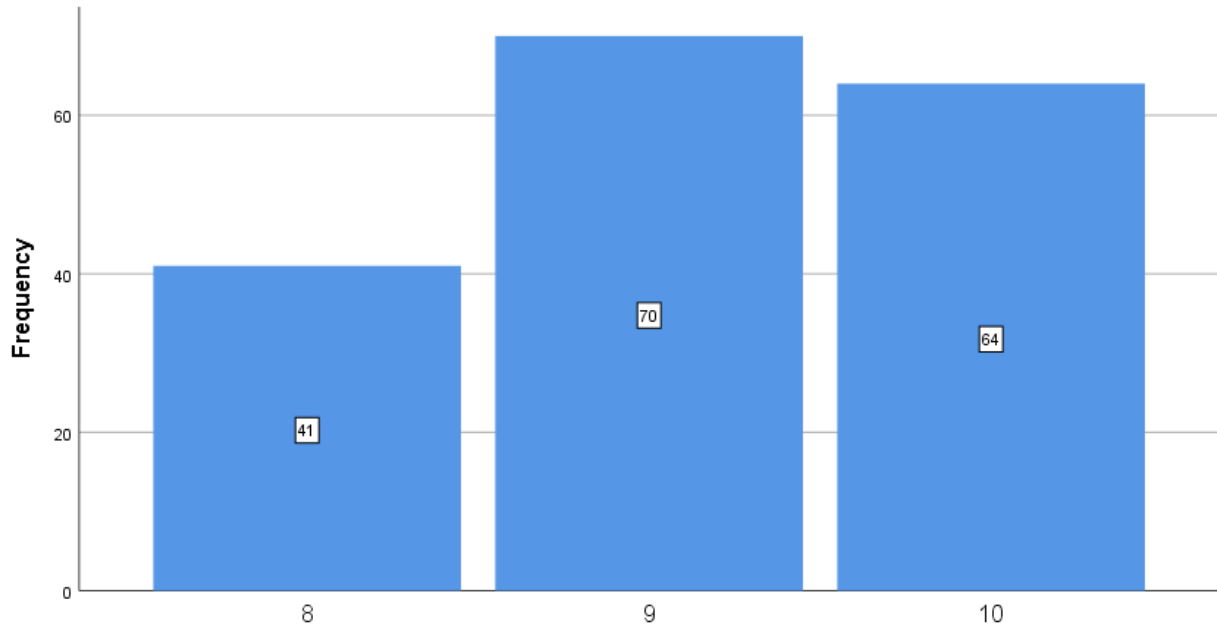


Figure 3 how much time you spent in work place per day among pre hospital health care provider in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.5. How many day you spent in work place per weeks?

Most of pre hospital health care provider were spent three day per week 101(57.7%) followed by four day 48 (27.4%).

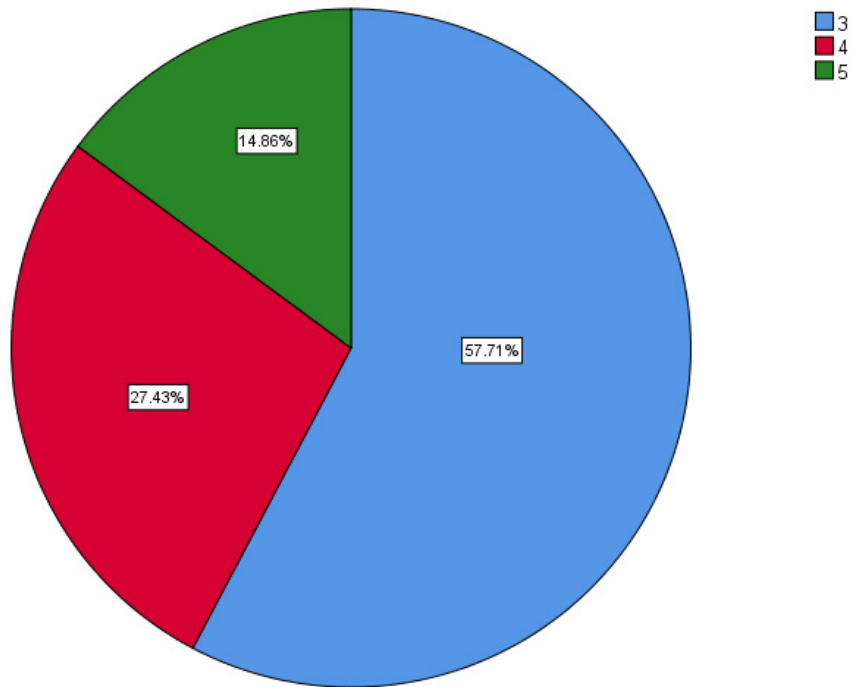


Figure 4: Day spent in work place per weeks among pre hospital health care provider in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.6. Shift length of the study participants

Majority of the pre hospital health care providers were twelve hours of shift length, which accounted for 134 (76.57%), the minimum shift length was nine hours and the mean shift length of the study population was 11.38 (S.D.= 1.143) hours

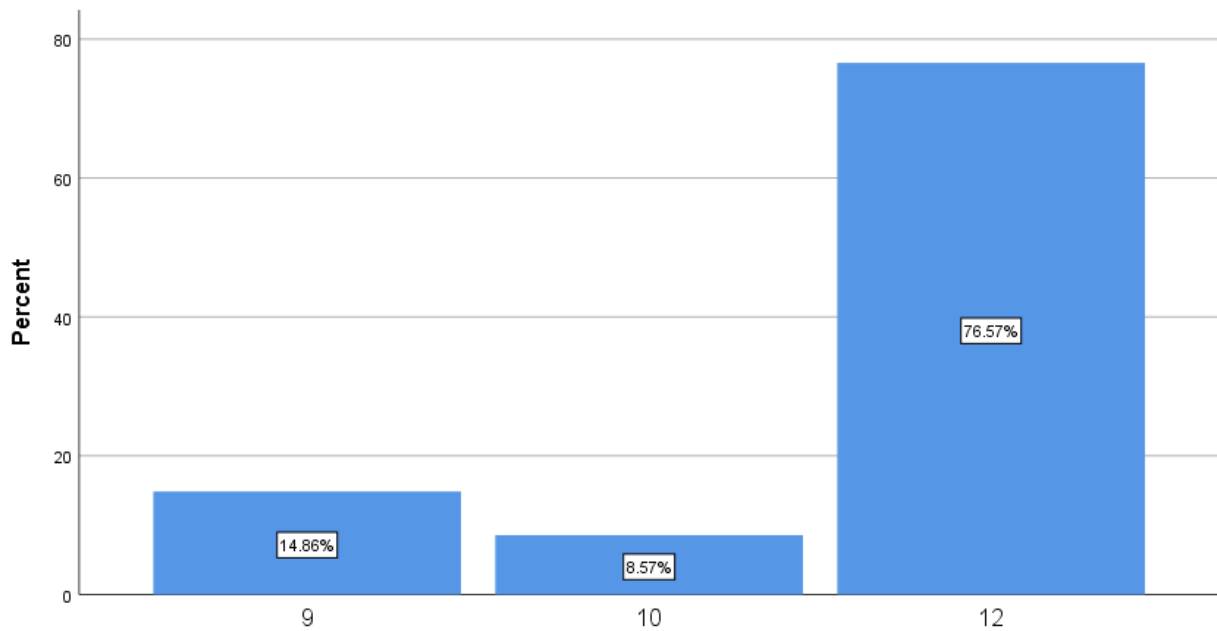


Figure 5: Shift length of the study participants in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.7. When the injury occurred?

Most of the injury occurred during producer 75(42.9%) followed by patient transfer 52(29.7%) among the study participants.

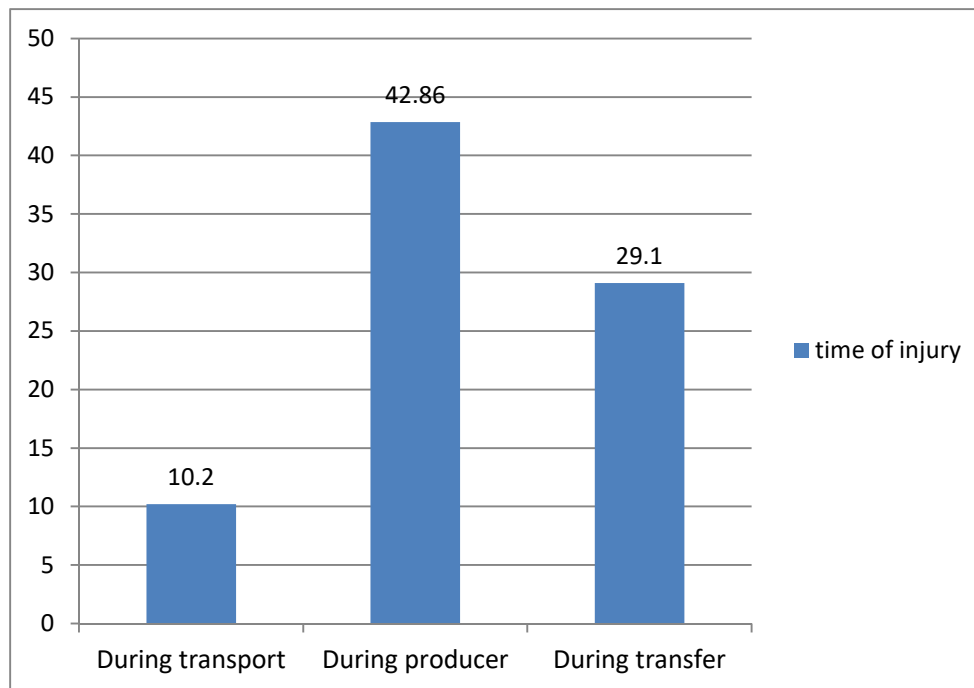


Figure 6: When the injury occurred among pre hospital health care provider in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.8. Location of injury occurred

In the case of location of injury most of the injury occurred on the field 108 (61.7%)

Table 3: Location of injury occurred among pre hospital health care provider participants in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

Variable	Category	Frequency	Percent (%)
Location of injury occurred	On the field	108	61.7%
	Inside the ambulance	29	16.6%
	On the ambulance station	8	4.6%

5.9. The time of injury occurred?

The highest number of pre hospital health care providers 120(68.6%) were injured at the night shift.

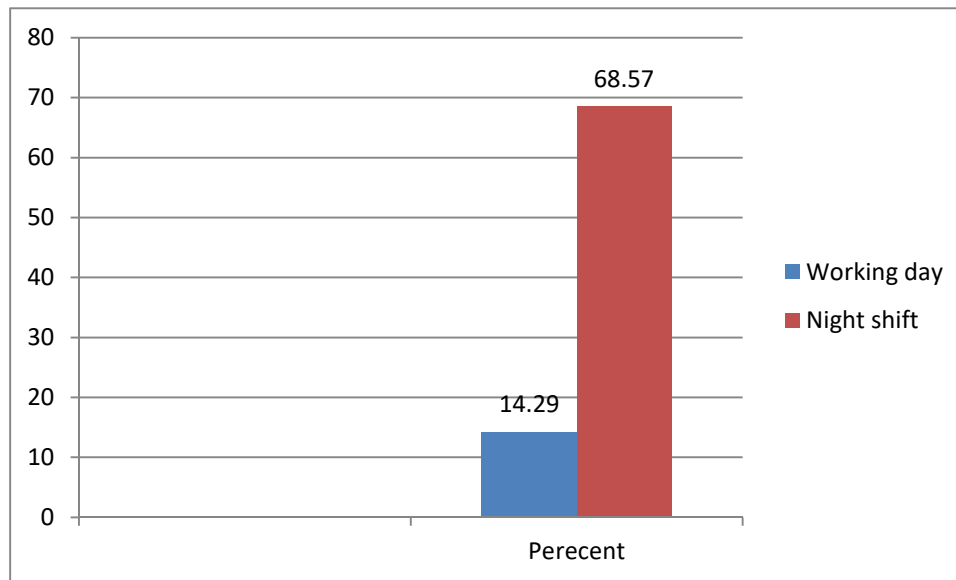


Figure 7: Time of injury occurred among pre hospital health care provider participants in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022

5.10. Associated Factors of injury pattern

By entering each variable to bivariable logistic regression age, sex, qualification, training, experience, Day per weeks and Length of shift in hours were found to be candidate for multivariate logistic regression with p value of <0.05 . This variable all together was entered in to multivariable logistic regression in order to control the confounders.

Table 4: Binary logistic regression of injury pattern among pre hospital health care provider working in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022 n=(175)

Variable	Category	P-value	COR(CI)
Sex	Male	.047	0.477(0.022-0.990)*
	Female		1
Age	≤ 25	.007	60.000(3.038-1185.035)*
	25-35	.312	2.907(.367-23.016)
	≥ 35		1
Training	Yes		1
	No	.038	2.744(1.057-7.124)*

N.B. * = Significant level with p-value <0.05 , CI=95%

CI= Confident Interval, COR= Crude Odd Ratio

Table 5: Multiple Logistic Regression of injury pattern among pre hospital health care provider working in Fire and Emergency Prevention and Rescue Commission and Red Cross Addis Ababa Ethiopia, 2022 n=(175)

Variable	Category	P-value	AOR(CI)
Age	<=25	.019	.130(.024-.720)**
	25-35	.385	2.526(.312-20.452)
	>=35	1	
Training	No	.061	2.744(1.057-7.124)**
	yes	1	

N.B.** = Significant level with p-value <0.05, CI=95%

CI= Confident Interval

AOR= Adjusted Odd Ratio

Age was the significant socio demographic determinants of injury pattern.

Younger age <=25 were more likely develop injury than others. Pre hospital health care provider age <25 years 87% more likely develop injury than others ages (**AOR=.130, CI, .024-.720**).

Pre hospital health care provider who had not training regarding to injury prevention 2.744 times more likely develops injury than trained one.

6. Discussion

This study assessed the injury pattern and associated factors in their work experience among pre hospital health care provider working in Fire and Emergency Prevention and Rescue commission and Red Cross. Types of injury were also assessed.

In this study, the overall injury pattern was 82.9%. This figure is markedly greater than rate reported by other studies. A study conducted in Iran nine studies (50 %) around 53-90 percent of personnel have been exposed to workplace violence among Emergency Medical Services personnel. (1)

Other study conducted in US with sample size of 677 employees nearly 75% of the complaints was classified as injuries (10). The highest occurrence of injury in the study area may be justified as: sample size different, data collection techniques.

This study has depicted that Back 29.1%, upper limb 24.4% and lower limb 13.1% as the most commonly injured area of the body. Similar study conducted in New England Low back strains were coded 93 times (36%), making it the most commonly reported injury. The remainders of the injuries were mostly minor (7). Back is the most affected part of the body in both study .this due to lifting of the patient.

In this study, the most frequent causes of work related injury were Patients by itself 35.4%, Needle sticks 30.3%, Vehicle 10.%, Bystanders 0.7% and Family 1.1%. A study conducted in Western Turkey, the most common causes of WRIs were MVAs (31.9 %) and needle stick injuries (16.0 %) (17). the possible reasons in which Patients by itself were the common cause of injury for this study population are: may be no suitable environment for the patients and there were no protective material for the study participant.

In this study the common types of injury were Abrasion, Sprains and Strains (25.1%).

Observational study conducted in US sprain' or 'strain' appeared in nearly three-quarters of the 705 injury reports (79.2%). In 84 cases, contusions or abrasions were mentioned (11.9 %)(10). Sprains and Strains were higher in Observational study conducted in US this may be due to work load. Whereas abrasions was high in this study due to poor personal protective equipment use.

Another study in US Sprains, strains, and tear were the most common injuries. (24)

In this study the common sources of injury was delay response time 41.1%. A study was carried out in the Czech Republic. The delay in response time is one of the leading causes of violence in EMS situations (11, 25). The study conducted in this area and study conducted in the Czech Republic delay response time was the common sources of injury it may be due to similar sample size.

In this study the highest number of pre hospital health care providers 120(68.6%) were injured at the night shift. study conducted in US Mondays and Thursdays, especially between the hours of 4:00 and 20:00, the highest percentages were recorded. The possible reason of this in night shift the road is free from traffic.

In this study Majority of the pre hospital health care providers were twelve hours of shift length, which accounted for 168 (96%), the minimum shift length was nine hours and the mean shift length of the study population was 11.89 (S.D.= 0.566) hours. In the United States, a study was undertaken; overall, the average shift length was 12.6 hours, with a median of 12 hours (10).

This study revealed that the injury pattern decrease with increasing age among pre hospital health care provider. Study conducted In India Emergency medical technician (EMTs) between the ages of 25 and 29 years were substantially more likely to report verbal assault in the previous 12 months than EMTs 35 years (12).

Younger age ≤ 25 were more likely develop injury than others. Pre hospital health care provider age < 25 years 87% more likely develop injury than others ages (**AOR=.130, CI, .024-.720**). Study conducted in India Younger age 25-29 years EMT was substantially more likely to report verbal assault. These results were similar to this study area.

7. Strength and Limitation of the Study

Strength

- This study was the first study in the area and gives direction for further studies.
- Data were collected from the whole pre hospital health care provider working in Fire and Emergency Prevention and Rescue commission and Red Cross to increase the power of the study.
- Data collectors and supervision had one day training.

Limitation

- The study was cross sectional study. So that it did not identify the cause and effect relation between the dependent variable and determinants.
- There could be possibility of recall bias and social desirability bias resulting in under or over reporting and misreporting of events.
- There is limited recourse to conduct the study.

8. Conclusion

Compared to other similar studies conducted in developed and developing countries, higher injury pattern (82.9%) was reported in the study areas. The commonest causes of injury were delay to reach in scene. The highest number of pre hospital health care providers 120(68.6%) were injured at the night shift.

Factors related to pattern of injury were age, sex, qualification, training, experience, day per weeks and shift length. However, some factors proved to be more significant and more influential than others. Consistent other study age and training had significantly associated with injury pattern.

9. Recommendation

The growing number of injury pattern among pre hospital health care providers pays more attention to pre hospital service for prevention and strategies. Therefore, based on the results of this study the following points are recommended:-

To FMOH:

- Strengthen the relationship between pre hospital service and security guard.

To Respective pre hospital service:-

- Provide on job training programs and on an ongoing basis to educate all pre hospital health care providers about injuries, their reduction and prevention.

For pre hospital health care provider:

- Be respectful for the patients during producers.

For other researchers

- Extend the study on different health problems other than pattern of injury like severity of injury.

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11: ANNEX

ANNEX I: Information Sheet

Research title: Pattern of injury and associated factor among pre hospital health care provider in Fire and Emergency Prevention and rescue commission and Red cross Addis Ababa Ethiopia, 2022 insitutional based cross sectional study.

Objective of the study: This study aim to determin Pattern of injury and associated factor among pre hospital health care provider in Fire and Emergency Prevention and rescue commission and Red cross Addis Ababa Ethiopia from october to February 2021/2022.

Participants to be included: participants in this study were all pre hospital health care provider in Fire and Emergency Prevention and rescue commission and Red cross present during data collection.

Confidentiality: All participants' information was not included there name and was kept confidential in all possible circumstances. The participant's personal information in this study was secured. The collected data was used only for research purpose.

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Sponsor: St. Paul's Hospital Millennium Medical College (SPHMMC)

ANNEX 2: Self administer English version of Questioner

St. Paul's hospital millennium medical college

Department of Paramedics science

Questionnaire for pattern of injury and associated factor among pre hospital health care provider in Fire and Emergency Prevention and rescue commission and Red cross Addis Ababa Ethiopia 2022.

Questionnaire identification number _____

Verbal consent form before giving self administer English version of Questioner

Greeting

Hello, I am kokebe workneh. I am currently student in St. Paul's Hospital Millennium medical College and am preparing graduation thesis. The objective of study is to determine pattern of injury and associated factor among pre hospital health care provider in Fire and Emergency Prevention and rescue commission and Red cross Addis Ababa Ethiopia, 2021.

You are selected and included in the study as part of the sample population to complete the questionnaire designed for this purpose. The information obtained in this study was used only for thesis purposes. Identifiers such as respondents' name was not used rather codes were given instead. Thus; any other person can't know any information obtained from you. Involvement in this study is optional and on a voluntary basis and you can drop any individual question or the whole questionnaire. But your participation and contribution in the study is very important to achieve the intended objectives of the study.

Thank you for your cooperation!!!

Do you have any opinion regarding this study?

Do you agree to participate in this study? Yes, continue _____ No, thank you!

Section one: Socio demographic information

	Code		
	Variable		Remark
1.1	Sex	A. male	
		B. female	
1.2	Age	-----Years	
1.3	Qualification	A. clinical nurse	
		B.Bsc nurse	
		C. other.....	
1.4	Experience in pre hospital	-----years	

Section Two: Injury characteristics question

2.1	Have you had injury in your work place?	1.Yes	
		2.No	
2.2	If yes Q2.1 how many?	1.One	
		2.More than one	
2.3	part of the body affected	1.Eye	
		2.upper limp	
		3.lower limp	
		4.Back	
		5.shoulder	
		6.other specify.....?	
2.4	Types of injury	1. Abrasion	
		2. Cut	

		3. Burn	
		4. Puncture	
		5. Fracture	
		6. Sprains and strains	
		7. Dislocation	
		8. other specify.....?	
2.5	Source of injury	1. Needle sticks	
		2. Bystanders	
		3. Family	
		4. Patients by it self	
		5. Vehicles	
		6. Other specify.....?	
2.6	When the injury occurred?	1. During transport	
		2. During producer	
		3. During transfer	
		4. Other specify....?	
2.7	Injury of event or exposure	1. Fall to lower level	
		2. Overexertion	
		3. Overexertion in lifting	

		4.Assault, violent act	
		5.Exposed to harmful substance	
2.8	Where the injury occurred	1.inside the ambulance	
		2.on the field	
		3.on the ambulance station	

Section three; associated factors question

3.1	How much time you spent in work place per day?	(in hours)	
3.2	How many day you spent in work place per weeks?	(in day)	
3.3	Have you taken training regarding work place injury prevention?	1.Yes	
		2.No	
3.4	Have you had shift in your work place?	1.Yes	
		2.No	
3.5	If yes Q3.4 Wright in hours	(in hours)	
3.6	Injury due to?	1. Lack of work space	
		2. Lack of light	
		3. Distraction from other	
		4. Unclean condition	
		5. Other specify.....?	

3.7	Cause of injury?	1.Comunication	
		2.Delay to reach in Scene	
3.8	When the injury occurred?	1.in working day	
		2.in the night shift	
		3. Other specify.....?	
3.9	Injury due to mode of transport	1.Ambulance	
		2.Motor vehicle	
		3. Other specify.....?	

The questioner was adopted from different literature (5, 7, 10, 11, 12 14, 16, 20, 21 23, 26)

N.B. Data Collectors and supervisors

1. Name of data collector's: _____ Code: _____ Signature: _____

2. Name supervisor's: _____ Code: _____ Signature: _____

Date: _____

ANNEX 3: Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I was communicating timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of student: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the co-advisor: _____

Signature: _____

Date: _____

Approval of the Examiner

Name of the Examiner: _____

Signature: _____

Date: _____