Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area

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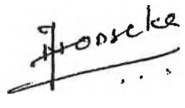
In partial fulfillment of requirement of the degree of Master of Science

In Community Medicine

DECLARATION

Dissertation title "Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area "

I hereby declare that the work presented in the above mentioned dissertation is my original work and generated from the research conducted by me to fulfil the part requirement of the degree of MSc Community Medicine.



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ABSTRACT

Introduction

Occupational injuries represent a considerable part of the injury burden to society. Carpentry is a common industry in Sri Lanka. There are many hazards associated with carpentry and injuries can occur due to multiple factors. A descriptive epidemiology of injuries among carpenters is required to identify timely interventions and reduce the burden of work related injuries.

Objective

To determine the incidence, describe type of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area.

Methods

A community based, retrospective, descriptive study was conducted between September to November 2014 to determine the incidence during three month period immediately prior to the survey. The total calculated sample size was 352. Multistage sampling method was used. Twenty one Grama Niladhari divisions were selected using simple random sampling method, in which clusters were selected using probability proportional to population size (PPS) method. From each selected carpentry workshop, one carpenter was selected randomly. A pre tested interviewer administered questionnaire was administered. Associations were tested using chi square test and a probability of less than 0.05 was selected as the significant level. Results were expressed as Odds Ratio (OR) and 95% Confidence Interval (CI) using bivariate analysis.

Results

Response rate was 90.06 % (n=317). Cumulative incidence of occupational injuries for a period of three months was 255.5 per 1000 carpenters (95% CI: 209.8-305.7). The commonest type of injury was superficial cuts (44.6%, n=42). Hands and fingers (64.9%, n=61) were commonly affected. A majority (85.5%, n=271) had good knowledge. With regard to work practices,

carpenters those who do not check machines (OR 2.85; 95% CI: 1.105-7.22, P=0.032), use personal protective equipments (OR 2.14; 1.087-4.21, P=0.025), work without rest (OR 2.3:95%CI: 1.08-4.94, P=0.034) and work with vibrating equipments continuously (OR 1.9: 95%CI: 1.11-3.37, P=0.024) were significantly associated with occurrence of occupational injuries.

Conclusions and Recommendations

Incidence of occupational injuries observed is considerably high. Although high proportion of carpenters had a good knowledge on occupational injuries, it would appear that they do not follow the safety measures. Therefore proper mechanism for implementation of regulations and provision of basic training is required. Focus should be made to conduct prospective longitudinal studies in future.

Key words

Carpenters, Occupational injuries, Incidence, Work practices

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List of Abbreviations

WHO - World Health Organization

ILO - International Labour Organization

PPE - Personal Protective Equipments

OR - Odds Ratio

CI - Confidence Interval

A/L - G.C.E Advanced Level

O/L - G.C.E Ordinary Level

GN - Grama Niladari

WRI - Work related injury

OSH - Occupational Health and Safety

PI - Principal Investigator

CHAPTER 1

INTRODUCTION

1.1. Background information

Carpentry industry could be considered as one that is as old as human civilization itself. Wood provides important material not only for habitation, but also, subsequently, as raw material for manufacture of utility items for convenient and comfortable living. Wood industry offers many career opportunities for people with different kinds of interests, skills, abilities and education. Carpentry can be defined as the art of working with timber/wood in order to construct and maintain buildings, furniture, and other objects.

Carpentry industry, which during its infancy was manually operated, has become highly mechanised with the emergence of modern technology, with machinery being used from sawing of logs to finishing of the ultimate product. Mechanisation of the industry also had given rise to increasing tragic, sometimes fatal accidents. Machine tools, hand tools and portable power tools should be in correct working order, used correctly, carried carefully and stored safely. Accidents due to machine tools and portable power tools are usually caused by electrical faults, mechanical faults and careless or incorrect working techniques.

1.2 Definitions

1.2.1 Definition of Occupational Health

Occupational health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs. (ILO/WHO, 1950).

1.2.2 Definition of Occupational Injury

Occupational injury is defined as any personal injury, disease or death resulting from an occupational accident. An occupational injury is therefore distinct from an occupational disease, which is a disease contracted as a result of an exposure over a period of time to risk factors arising from work activity. (ILO, 1998). Work environment may include not only a physical location such as factory, office or other place of business but also the equipment, vehicles or material used by the employees. (Greenberg, 2011).

1.3 Magnitude of the problem

1.3.1 Global situation

International Labour Organization (ILO) estimates that every day, 6,300 people die as a result of occupational accidents or work-related diseases. More than 2.3 million deaths per year, 317 million accidents occur on the job annually. That means every 15 seconds a worker dies from a work related accident or disease, and every 15 seconds 160 workers have a work related accident. (ILO, 1996-2004).Developing countries contribute to a large number of work-related deaths and injuries where substantial numbers of workers are engaged in hazardous occupations such as agriculture, construction, fishing and mining.

According to Linacre (2007), a study done in Australia revealed that work-related injury (WRI) rate for the period of 2005-2006 was 64 per 1000 employed. Young men, aged 20–24 years, experienced the highest WRI rate of any age group. Their injury rate was 98 per 1,000 employed men and the most commonly reported injuries were sprains or strains of joints and adjacent muscles, comprising almost one-third (30%) of work-related injuries.

A surveillance conducted for all patients with work-related injuries between2010-2012 in Qatar showed 29% sustained WRI with a mean age of 34.3 ± 10.3 years. Fall from height at 51% was followed by being struck by heavy object at 18%. WRI patients were mainly labourers involved in industrial work (43%), and carpentry (9%). (Al-Thani et al., 2014)

1.3.2 Sri Lankan situation

The work force in Sri Lanka is around 8 million and about 4,000 occupational accidents are being reported annually, while the number of working days lost due to accidents is estimated to be around 600,000 every year (ILO, 1996- 2014). In 2008, 49 fatal and 1525 non-fatal occupational accidents were reported (Department of Labour, 2008). Out of fatal accidents, 30% were reported from construction industry and out of all accidents 30% of the accidents were related to machinery.

Though 1970 inquiries were conducted in respect of demand of workmen compensation during the period of one year (2012-2013), number of accidents reported by the employers were only 392 (Ministry of Labour and Labour Relations, 2013). Sri Lanka loses around 500,000 person-days per year owing to occupational accidents. (United Nations Development Programme, 2012)

A study done on health and safety aspect on building construction in Sri Lanka revealed the most critical factors that affect both death and permanent disabilities. They are: persons being struck by machinery, persons falling down, electricity hazards, and person being struck by tools, objects and fire hazards (Halwatura and Jayathunga, 2013)

1.4 Burden of occupational injury

Occupational factors make an important contribution to the global burden of disease. Work-related morbidity and mortality not only results in suffering and hardships for the worker and his family, but also adds to the overall cost to society through lost productivity and increased use of medical and welfare services. The cost to society has been estimated at 2% to 14% of the gross national product in different studies in different countries (Leigh et al., 1999)

A study by Concha-Barrientos et al. (2005) estimated the consequences of occupational injuries in terms of DALYs. The authors estimate that the occupational injuries that occurred in year 2000 among the 2.9 billion workers worldwide, including death and injuries are responsible for 10.5 million lost DALYs. This means that these injuries "cost" 10.5 million years of life in perfect health or 3.5 life years per 1,000 workers. (Lebeau and Duguay, 2013)

Work-related injuries can have direct and indirect effects, and the indirect costs of an accident or illness can be four to ten times greater than that the direct cost.

1.4.1 Direct costs of an injury

Direct cost for workers include the pain and suffering of the injury, loss of income, possible loss of job and health care costs and for the employer the costs include, medical and compensation payment, damage to property, reduction or temporary halt in production and negative effect on morale in other workers.

1.4.2 Indirect costs of an injury

For workers, the most obvious indirect cost is the human suffering caused to their families, which cannot be compensated with money. For the employer, the injured worker has to be replaced; a new worker should be trained. Poor public relationship can be a consequence if health and working conditions at the work place are poor. Breakdown in manufacture or output lays heavy burden in executing accepted orders of customers and the customer in turn suffers delays and loses in meeting his commitments, particularly if the items are required for the smooth operation of the entity. Thus we can see that personal accidents set off a vicious chain reaction affecting social and economical environment.

1.4.3 Effects of occupational injuries after return to work

Two studies conducted using data for Ontario Workers with Permanent Partial Disabilities, revealed that nearly two-thirds of injured workers who initially return to work experience subsequent spells of injury-related work absence, and a substantial proportion eventually withdraw from the labour market because of their injuries. (Butler et al., 2006). Thus occupational rehabilitation plays an important role in such situations. Vocational rehabilitation is defined as the combined and coordinated use of medical, social, educational and vocational measures for training or retraining the individual to the highest possible level of functional ability. (ILO, 1998)

1.5 Risk Factors

It is very much important to identify the risk factors in order to minimize the occurrence of occupational injuries. Investigations and analysis of accidents reveal that 90% of accidents are results of unsafe acts or behaviour. The common unsafe behaviour found at industry include operating without authority, working with moving machinery, working without personnel protective equipment, wearing dangling clothes, unsafe lifting carrying and placing, using hand instead of using tools, unsafe handling of hazardous materials. (Ahamed et al., 2011)

A study carried out on occupational hazards in some selected small scale industries in Gampaha district of Sri Lanka revealed that out of 102, 78.4% (n = 80) of the factories did not have safety signs displayed while machines were properly guarded only in 25 (24.5%) of the factories. The working environment was found to be accident-prone in 38.2% (n = 39) of the industries. Lighting was adequate in 93 (91.2%) and noise was found to be excessive in 35 (34.3%) factories. (Suraweera et al., 2013)

1.6 Prevention of occupational injuries

Though occupational injuries and deaths continue to add up to an unacceptable toll, most such injuries and deaths are preventable.

According to Stout and Linn (2002) The Public Health Model is essentially a problem solving framework that includes following phases:

- Identify and prioritize problems through injury surveillance
- Quantify and prioritize risk factors through analytic injury research
- Identify existing strategies or develop new ones to prevent occupational injuries, including evaluation and confirmation of effectiveness
- Implement the most effective injury control measures through dissemination and technology transfer
- Evaluate and monitor the results of intervention effort

1.7 Injury surveillance system

In countries like Australia, New Zealand and Malaysia the percentages of Injuries reported versus estimated are as high as 89%, 88% and 79%, respectively, whereas in Sri Lanka it is only 1%. (Wickramatillake, 2011). Examples and evidence from other countries which have strong Occupational Safety and Health (OSH) policies and laws (e.g., Japan, Malaysia, Singapore, and New Zealand) have proven that the number of work-related fatalities and diseases can be reduced significantly with such policies and laws.

Developed countries use a wide range of data sources, including death records, hospital records, workers' compensation claims, cancer registry records, workplace records, surveys, sentinel reports to estimate the work related morbidity and mortality. (Leigh et al., 1999)

In Sri Lanka a major drawback of injury prevention is lack of accurate, complete, timely data and reason for this is non availability of an institutional mechanism to ensure accountability to make a strong surveillance system. Sri Lanka's Trauma Secretariat piloted an Injury Surveillance System (ISS) in four hospitals in 2006 and the testing showed that the new ISS provides feasible and sustainable mean of injury surveillance system in Sri Lanka. (Jayatilleke et al., 2013)

1.8 Occupational safety, health (OSH) and welfare legislation

Occupational health is a fundamental human right. Every worker has the right to work in conditions which respect his or her health, safety and dignity. Every worker has the right to limitation of maximum working hours, to daily and weekly rest. (Article 31 of the European Charter)

In Sri Lanka main legislation for safety and health at work places is Factories Ordinance No 45.of 1942. It is compulsory for all factories to report all injuries and diseases caused to workers if the workers do not report to work for 3 days to the Labour Department, and to send in their returns every six months. Workmen's Compensation Ordinance No.19 of 1934, Shop and Office Employee's Act No. 15 of 1954, Municipal Councils by-laws and regulations also cover OSH related matters.

There should be a good inter-sectoral collaboration between Ministry of Labour, as the primary agency for the provision of occupational health and the Ministry of Health, hence neither of these agencies cannot address these issues on its own. It can be achieved by developing a national plan of action, strengthen institutional mechanisms and analytical facilities.

1.9 Justification

In Sri Lanka data on occupational injuries are few and scattered. It is hardly reported and proper records are not available, except for few studies done. The reason for this is largely attributable to lack of an institutional mechanism to ensure accountability and to make the surveillance system operational.

Correct magnitude of the occupational injuries associated with carpenters is not known in Sri Lanka due to non availability of proper functional notification system of occupational diseases and injuries. Although there are occupational health services and legal protection for the employees in industries in developed countries, the protection and facilities are poor in Sri Lanka.

Carpentry is practised mainly as a small scale industry, majority being cottage industries. There are many hazards associated with carpentry and injuries can occur due to multiple factors. Although carpentry is a common industry in Sri Lanka there are no published data available on occupational injuries in carpenters.

Through this study it is proposed to assess the incidence of occupational injuries in carpenters of Moratuwa area which is the main area in carpentry industry. Further types of injuries, knowledge and practices of carpenters in preventing occupational injuries will be assessed. These data would be of much useful to the health authorities and policy makers to make an informed decision on preventing occupational accidents in the carpentry industry. Interventions can be planned targeting the areas identified by the study that needs much attention. Therefore it is proposed to conduct a study on work related injuries in carpenters.

1.9 Objectives

1.10 General objective

To determine the incidence, describe type of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa, Medical Officer of Health area.

1.11 Specific objectives

1. To determine the incidence of occupational injuries among carpenters in the Moratuwa MOH area.

2. To describe the types of occupational injuries among the carpenters in the Moratuwa MOH area.

3. To assess the knowledge on occupational injuries of carpenters in the Moratuwa MOH area.

4. To describe the practices of carpenters in preventing occupational injuries in the MOH area of Moratuwa.

CHAPTER 2

LITERATURE REVIEW

2.1 Background information

Timber is one of the oldest building materials used by man. According to the history of Sri Lanka, "Lovamahapaya" which was built by King Dutugemunu in the second century B.C., had a complete timber structure originally comprising nine stories, having a height of over 20 meters. (Ruwanpathirana, 2008)

Ancient records reveal the strict traditions that were observed during the cutting and seasoning of wood in earlier periods. Mature trees were selected and cut in the new moon when the sugar content in the timber was lower, so that destructive wood boring insects were not attracted to the timber. The stone remains indicate that the axe, adze and chisel were the common tools used in timber work. The Saddharmarathnavali mentions two carpentry practices where oil was applied to timber to prevent decay, and heated to straighten it. (Seneveratne, 2010)

Wood and wood based industry of Sri Lanka is performing as one of the important manufacturing sector in the country with a wide variety of products and the industry has spread all over the country, and 19.2% of total small and medium enterprises (SMEs) fall under this specific wood and furniture industry category. There are 19,200 furniture manufacturing establishments in Sri Lanka. Out of that 35.8% establishments are located in the western province. Within the western province, more than 50% of furniture and other wood product manufacturing establishments are concentrated in the Colombo district.(Shantha and Ali, 2013) 95% of the carpentry industry is dominated by the private sector while government has less involvement.

The Forest department conducted a timber survey (census) in 1995 covering 19 districts to assess the functions of all the timber based enterprises. It was disclosed that there were 16,824 units of timber based enterprises comprising 1297 saw mills, 2277 timber depots, 3573 mechanized carpentry sheds, 8706 manual carpentry sheds and 971 fuel wood sheds. The census indicated that the majority of (75%) of timber based enterprises was not registered (Ruwanpathirana, 2008).

Although there are few studies done on carpentry globally, there are no records available of any research being done to assess work related injuries among carpenters in Sri Lanka.

2.2 Work and health

The World Health Organization (WHO) has stated "When work is fully adapted to human goals, capacities and limitations and occupational health hazards are under control, work often plays important role in promoting physical and mental health"

Healthy workers are productive workers. Productive workers will not only benefit their workplace but also themselves. Healthy worker can enjoy the fruit of their labour and take better care of their families. The impact of health extends beyond the worker, his family and employer. In addition to the financial rewards work also affords opportunities to express creativity, broaden outlook and provides avenues for social interaction.

2.3 Characteristics of work force

The labour force is composed of the economically active population 15 years of age and over. Only persons who work 20 hours or more per week are considered to be employed. (Department of Census and Statistics, 2013)

Global work force refers to the international labour pool of workers. As of 2012, the global labor pool consisted of approximately 3 billion workers, around 200 million unemployed. (ILO, 2013)

According to WHO report on regional strategy on occupational health In South East Asian Region (SEAR) countries, the active work-force comprises approximately 630 million employed work population. Out of this active population, about 60% are males and 40% females. Overall, both the male and female work populations tend to be concentrated in rural areas where most of the agricultural sectors are located. Agriculture, which also includes forestry and fishing, is the major sector providing employment to 65% of active workforce in the region. Approximately 20% of the active workforce is employed in the service sector. Around 15% of the work-force is regionally employed in industries, such as mining and quarrying, construction, repair and demolition, commerce and manufacturing. (WHO, 2005)

In Sri Lanka estimated economically active populations is around 8.8 million and of that 64.5% are males and 35.5% are females. Economically inactive population accounts for about 7.6 million and of that majority are females (74.9%).The labour force participation rate increases up to a point as the age group advances and declines thereafter. The peak age group for males was 35 - 39 years, while that of females was of 45– 49 years (Department of Census and Statistics, 2013).

Out of the total employed population, highest share is reported under 'Services' sector (44.1%) and, the lowest is from Industries sector (26.2%). Also the estimated share of agriculture sector employment is 29.8%. According to Department of Census and Statistics (2013), manufacture of furniture wood and products of wood and cork consists of 28,878 establishments and it engages 104, 326 persons which is 10.1% of total workforce.

A study on the status of furniture manufacturing industries in Moratuwa area in 2004,revealed that there were a total of 3515 workers which comprised of, skilled carpenters (68%), semi skilled carpenters (11%), laborers (7%), other category workers (5%), managers(4%) and supervisors (4%).(Rathnayake and Amarasekara, 2004)

2.4 Self reporting of occupational injuries

In surveys based on self reports, difficulty with recall of injuries can result in under estimates of injury incidence and bias in risk estimates.

Landen and Hendricks (1995) conducted a study on effect of recall on reporting of at work injuries. Estimates of annual injury incidence were obtained from recall intervals of increasing time between injury date and interview date and suggested that several factors may influence a respondents ability to recall occurrence of any injury. Length of time between injury and interview is a primary consideration, but characteristics of the respondent, the circumstances in which the injury occurred and the nature and severity of the injury may also be important. Only few researches have addressed these factors. Longer reference period is frequently used in order to obtain an adequate number of injuries for analysis. A shorter reference period is desirable to provide more accurate estimates.

A household survey of injuries in Ghana was conducted and study setting included both urban and rural areas. Participants were selected using stratified two stage cluster sampling with probability proportional to size. Estimated annual non fatal injury incidence rate was calculated for 12 recall periods (1-12 months prior to the interview, with each successively longer period, including the proceeding shorter periods). There was notable decline in the estimated rate from 27.6 per 100 per year for a month recall period to 7.5 per 100 per year for a 12months recall period (72% decline). This rate of decline was not influenced by the age, gender, rural versus urban location or type of respondent but by the severity of the injury. Injuries resulting in <7 days of disability showed an 86% decline and injuries resulting in >30 days of disability showed minimal decline. (Mock et al, 1999)

In conclusion longer recall periods significantly under estimate the injury rates compared to shorter recall periods. Shorter recall periods (1-3 months) should be used when calculating overall non fatal injury incidence rate. (Mock et al, 1999)

2.5 Incidence of occupational injuries

2.5.1 Case of occupational injury

A person may be injured in more than one occupational accident during the reference period. It is proposed that the unit observation for occupational injuries should be the "case of occupational injury", defined as one person injured in one occupational accident. (ILO, 1998)

2.5.2 Incidence rate

Incidence rates relate the number of new cases of occupational injury to the number of workers exposed to the risk of occupational injury (ILO, 1998)

An anonymous survey of 1020 apprentice carpenters in three union training programs in United Sates was conducted. Participants were between 18 and 59 years of age with a mean of 27.5 years and they have worked for the current employer for a mean of 17 months. Thirty percent (n=314) of respondents reported having had at least one work-related injury at some time while working as a carpenter. Out of those who reported work related injury 66% (n=207) carpenters reported having sought medical care for a work injury and 38% (118) missed work because of an injury. Nearly 80% (n =239) reported at least one injury to their employer or supervisor. (Lipscomb et al, 2013)

A study was carried out among 24830 union carpenters in Washington State, from 1989 to 2008, over 20 year period. The cohort of union carpenters who worked between1989-2008 was identified using data from the Carpenters Trust of Western Washington and the Washington State Department of Labour and Industries. Work related injuries involving hand or fingers and associated costs were calculated. Injury rate and rate ratio were calculated by using Poisson regression. Hand and finger injuries accounted for 21.1% of reported injuries and the injury rate that resulted in medical care or paid lost time from work was 5.81 (95% CI 5.65-6.18) per 200,000 hrs worked. (Lipscomb et al, 2013)

As per statistical update 2005-06 end of year by the Australia Queensland government (2007) the traumatic injury rate increased in the log saw milling and timber dressing industry sub-sector by 79% to 36.6 claims per 1,000 workers in 2005-06. This was the third highest traumatic injury rate out of all industry sub-sectors. Three-quarters of claims were from the log saw milling industry in particular. In the other wood product manufacturing industry sub-sector, the claim rate increased by 2% to 15.2 claims per 1,000 workers in 2005-06. It had the 16th highest traumatic injury rate out of all industry sub-sectors. The wooden structural component manufacturing industry accounted for 72% of claims. Fingers were injured in 39% of cases.

A study done among 1260 male construction workers from 24 construction sites in central China revealed that the annual prevalence of non fatal work related injuries was 15.0 per 100 workers (95% CI: 13.0-17.0). The three main causes of injuries were collisions (27.3 per 100 workers), cuts/piercings (17.5 per 100 workers), and falls (15.5 per 100 workers). (Zheng et al, 2010)

According to a study done among sewing machine operators in selected garment factories at the Export Processing Zone, Awissawella in 2012, incidence of occupational injuries was 52.1 (95% CI: 33.0-77.9) per 1000 workers for the three month period with an estimate of 208.4 (95% CI:170.7-250.5) per 1000 workers per year.(Fernando,2012)

According to Perera (2004) incidence of injuries among 640 male agricultural workers in the Dambulla MOH area, was 8.8 per 100 workers (n=56) over three months duration.

A study was done in all small scale aluminum casting and manufacturing factories located in Biyagama and Kelaniya MOH area where 259 eligible workers were engaged in aluminum casting and manufacturing activities. Out of 259 workers, 71 had reported one or more occupational injuries during the past three month period (total of 92 injuries).The incidence of spells of occupational injuries for the past three month period was 355.2 per 1000 workers. Among the workers who reported the injuries, 76.1% (n=54) had only one injury, 18.3% (n=13) had two injuries, 3.6% (n=4) workers had 3 injuries and none of the workers had four or more injuries. (Perera, 2012)

Mambulage (2012) studied the prevalence of occupational injuries among labourers of Ceylon Electricity Board (CEB) by a cross sectional descriptive study. Overall prevalence of non fatal occupational injuries was 7.6 per 100 persons during a 6 month period (95% CI: 4.6-10.6) and thus estimated annual prevalence was 15.2 per 100 workers (95% CI: 11.14-19.25). None of them reported multiple injuries. Therefore the proportion of workers with occupational injury was 7.6%.

2.6 Types and mechanisms of occupational injuries

There are several types of injuries that a carpenter would face during work. Mode of injury relates to how the person was injured (physical or psychological contact) by the item or object of injury. If there are several possibilities, the one causing the most serious injury should be recorded. (ILO, 1998)

ILO (1998) has classified mode of injury into 9 categories.

1. Contact with electrical voltage, temperature, and hazardous substances
2. Drowned, buried, enveloped
3. Fall, crash into a stationary object
4. Struck by objects with motion
5. Contact with sharp, pointed or course elements
6. Trapped, crushed
7. Acute overloading of the body, physical constraint
8. Bites, kicks, blows
9. Other known

Lipscomb et al. (2003) carried out a study on falls in residential carpentry and dry wall installation. Active injury surveillance was conducted with a large, unionized workforce of residential and drywall carpenters over a 3-year period. Falls accounted for 20% of injuries (n=117) reported and investigated among these carpenters and falls from heights were twice as common as from the same level. The injuries sustained in these falls for both falls from height (less than 6 feet) and the same level most often involved sprain/strains (40%) contusions (36%) and fractures (10%).

A study on direct costs and patterns of injuries among residential carpenters for a period of 6 years (1995-2000) was done. Workers' compensation records for residential contractors combined with hours worked provided by the union were examined. Injury rates and costs revealed that the main mechanisms of injury were struck by/against (25%), over exertion (19%), cut or rubbed (8.8%), and fall from elevation 7.6% respectively. (Lipscomb et al, 2003)

Work related injuries involving hand and fingers among union carpenters in Washington state revealed that the vast majority of the injuries were the result of the carpenter being struck by or against something (n=4317, 75.4%), followed by being caught (n=374, 6.5%), bodily reaction or over exertion (n=183, 3.2%), falls from the same level (n = 115, 2.0%), and abrasions (n = 71; 1.2%). Commonest injuries which caused non paid lost time in the worker was cuts (71%),contusions (10.5%),fractures (7.5%) and sprains (3.19%) respectively. (Lipscomb et al, 2013)

Udayasiri (2002) assessed the occurrence of occupational injuries among tea plantation workers in Kegalle district. There were 4.3% of abrasions, 4.1% of cut injuries and 3.4% of contusions during period of one month among 534 plantation workers. Commonest mechanisms of injury were bites and stings 33.9% (n=181), falls from the same level 3% (n=16), striking against stationary objects 2.8% (n=15) and improper use of hand tools 0.9% (n=5). As the plantation industry is not mechanized so far, injuries due to improper usage of hand tools are minimal.

Commonest injuries among male agricultural workers in Dambulla MOH area were abrasions and contusions 7.3% (n=47), lacerations and cut injuries 1.9% (12).There were no internal organ injuries, fracture or dislocations. (Perera, 2004)

Most frequently occurred injuries among the workers engaged in aluminium casting and manufacturing activities in factories located in Biyagama and Kelaniya MOH area, were burns (31%,n=22) cuts (22.5%,n=16) , abrasions and lacerations (18.3%,n=13) and acute muscle strains (11.3%,n=5).The mostly affected parts of the body were fingers and hands, involved in 56.2 % of the cut injuries,75% crush injuries, 46.2 % abrasion and lacerations, 50% of prick injuries, and 41% burn injuries. Lower limb hand been affected in 12.5 % cut injuries, 25% crush injuries,15.4% abrasions and lacerations,50% prick injuries and 45.4% in burn injuries. (Perera, 2012)

According to Mambulage (2012), among laborers of CEB, commonest cause of injury was stuck by tool or equipment which accounted for 30.4% (n=7) of the injuries followed by falls from same level or from height 17.4% (n=4). Common types of injuries were lacerations 34.78% (n=8), fractures 13% (n=3), cut 13% (n=3), and contusions 8.7 % (n=2) while upper limbs are the most commonly involved body part accounting for 34.8 % (n=8),followed by lower limb 21.5 % (n=5) and trunk 17.4 % (n=4).

2.7 Factors contributing to occupational injuries

2.7.1 Demographic factors

Occupational Health is inextricably linked to social and economic conditions as well as influenced by globalization. Therefore, attaining the goal of occupational health for all will require a strategy to secure work conditions that protect and promote occupational health, especially among the vulnerable groups. (WHO, 2005)

According to Linacre (2007), a study done in Australia on work related injuries for the period of 2005–2006 revealed, workers aged 15–19 years experienced an injury rate of 78 per 1,000 employed, while those aged 20–24 years experienced an injury rate of 75 per 1,000. Young men, aged 20–24 years, experienced the highest work-related injury rate of 98 per 1,000 employed men, in contrast to women of the same age who experienced an injury rate of 51 per 1,000 employed women (aged 20–24 years). Older workers aged 55 years and over, experienced the lowest work-related injury rates – 50 per 1,000 employed. Unlike all of the younger age groups, the injury rates for men and women in this age group were similar.

Work related injuries involving hand and fingers, among union carpenters in Washington state revealed that the carpenters aged 40 years or older had more amputations, fractures, and multiple injuries and fewer contusions and cuts than younger carpenters. Carpenters younger than 20 years experienced more overexertion injuries, while carpenters older than 30 years were more likely to report same-level falls. (Lipscomb et al, 2013)

A study done among 207 rubber tappers (91 males, 116 females) in the Kalutara district has revealed that there is no much difference between males and females with regard to usage of personal protective measures. Only 6 (2.9%) workers wore boots, in which 2 (2.2%) were males and 4(3.4%) were females. Among males only 12 (13.2%) used heavy duty gloves, whereas among females it was 11 (9.5%) (Navodani, 2009)

2.7.2 Risk factors

The burden of disease from selected occupational risk factors amounts to 1.5% of the global burden in terms of DALY. The World Health Report 2002 places occupational risks as the tenth leading cause of morbidity and mortality. Almost 22.5 million DALY and 699000 deaths are attributable to these risk factors. WHO reports that occupational risk factors account globally for a number of morbidity conditions including 37% of back pains, 16% of hearing loss, 13% of chronic obstructive lungs disease, 11% of asthma, 10% of injuries, 9% of lung cancer and 2% of leukaemia. (WHO, 2005)

According to a study on falls in residential carpentry and dry wall installation, factors associated with falls involved a mix of human, object (equipments, tools, material), environmental, and organizational factors. Falls from the same level were most often related to weather, carrying objects, sometimes with view obstructed, poor housekeeping, terrain of the building lot, and speed of work. Carpenters were considered to be at risk of injury at any time. (Lipscomb et al, 2003).

In the study on occupational injuries among the workers of small scale aluminum casting and manufacturing factories most of the injuries (83.1%, n= 59) had occurred when worker engaged in work assigned to them normally and 16.9% (n=12) of injuries occurred within the factory premises but not when they were engaged in their normal assigned work. (Perera, 2012)

2.7.3 Knowledge and awareness

A survey was conducted on safety, intensives and the reporting of work related injuries in United States, among 1020 apprentice carpenters and they were asked regarding the things they should be aware of to improve the safety at work place or the reporting of work-related injuries and 157 carpenters (15.4%) offered comments. A few singular comments were made regarding specific recommendations for improving safety on work place including better housekeeping, tool maintenance, use of personal protective equipment, encouragement for hydration especially in heat, and the need for more safety training including "real tool box talks". There were only a few comments specifically about safety programs that included incentives or rewards. People tend to try harder to be safer in order to receive incentives or they might hide the injuries. "Don't report it and we will get a bonus at 100 days. (Lipscomb et al, 2013)

According to Perera (2004), when assessing the knowledge on injury prevention during agricultural work a total of 634 (99.1%) farmers knew that hand tools and machinery should be maintained properly to prevent occurrence of injuries, 89.5 % said work should not be done under the influence of alcohol and 79.2 % agreed with following of instructions by the manufacturer when using the machines to prevent occurrence of injuries. Overall knowledge on preventive measures 56.7% of the farmers had poor knowledge, while 27.5% and 15.8% respectively had a 'good' and 'very good 'knowledge.

There was a significant association between knowledge on preventive measures with educational status ($p<0.01$), and experience in agricultural work ($p<0.01$), and also the knowledge on first aid measures was significantly associated with educational status ($p<0.01$) among the agricultural workers in Dambulla MOH area. (Perera, 2004)

Rubber tappers (n=207) in the Kalutara district were questioned to test their knowledge on work and health. When asked whether work can promote health, 66.2 % (n=137) of workers gave the correct answer, whereas 30.4% (n=63) were incorrect and 3.4% (n=7) said did not know. Only 36.2 (n=75) gave the correct answer when questioned whether work can give rise to disease. Most of the workers (55.1%, n=114) gave a wrong answer and 8.7% (n=18) said don't know. According to overall results, rubber tappers had poor knowledge regarding the association between work and health. (Navodani, 2009)

A Study conducted in fruit and vegetable processing factory showed that though the employees were sufficiently aware of correct ergonomics, they were reluctant to change certain practices because of their misconception that the tasks required more time and effort once it was done with correct bodily postures. (Edirimanne and Jayawardena, 2011)

Perera (2012) assessed the first aid knowledge among the workers engaged in small scale aluminuim casting and manufacturing factories in Biyagama and Kelaniya MOH areas. Workers were asked few questions about the steps that should be followed in an injury to reduce the harm and things that should not be done following an injury. A majority of the workers had relatively low level of knowledge on first aid treatment for the common types of injuries that could happen in their work place. Respectively 66%, 37.7%, 54.1 %, 23.1 % of workers had poor first aid knowledge on burn injury, arresting of a bleeding, fracture injury and injury to eye and 59.1 % workers had poor knowledge on cut, crush, prick, abrasion and laceration injuries . Very few workers had good knowledge on first aid.

Safety experts, Fleming, and Lardner (1999) have shown that the personal factors contribute to 80 – 90% of all industrial accidents. The main reason found was incorrect procedure. Work related stress is also an important risk factor. Accidents caused by human element and human error can be reduced by changing workers' attitudes and behavior. (Idirimanne and Jayawardena, 2011)

2.8 Health and safety practices

"Once you get used to working in an environment that is unsafe, and you get used to working unsafe, then being unsafe is not unsafe to you anymore. It's just the norm."(Lipscomb et al, 2003)

Attention should be drawn carefully to implement and evaluate changes and mainly focus on safe design and appropriate guarding, followed by protection, and lastly training. Such a strategy has been demonstrated to be effective for prevention of nail gun injuries among residential carpenters; these injuries result from a tool used only in wood-frame construction. Injury rates declined more than 50% because carpenters had access to tools with safer triggering mechanisms and they received training in tool use. (Lipscomb, 2013)

A study was conducted in fruit and vegetable processing factories located at Biyagama export processing zone to access the factors affecting the health and safety behavior of factory workers. Sampling frame consisted of 217 industrial staff. Thirty percent of employees showed a moderate level of contribution to workplace health and safety practices and fifty percent of the sample had repetitive injuries or near misses. A majority of the respondents had faced the same injury for 2 to 3 times, and some have experienced a maximum of six occurrences. The three main reasons identified for occupational incidents were, lack of attention at work, repetitive motions in long working hours, and workers' poor compliances in wearing personal protective equipments. Great majority (90%) of the workers had practiced hazard and risk communication as an accident prevention method. Only 32.5% of the workers had taken initiatives to make improvements, changes to identified risk causing machines or operations. However, many workers expected their immediate staff members to look for all the risks at work and make corrections. (Idirimanne and Jayawardena, 2011)

A study done among 534 tea plantation workers in Kegalle district has shown limited use of personal protective equipments (PPE). Only 0.6 % (n=3) workers used face mask, boots were worn by 0.6% (n=3) and 35% (n=187) used slippers. Only about 11.8% of workers wore rain coats while they were working in the rainy environment and most of the workers used a piece of polythene as protective measure. (Udayasiri, 2002)

A study carried out by Mohotti (2006) in Puttalam district on coir industry workers (n=182) and coconut estate workers (n=190) showed that the use of occupational safety measures were very low among both sectors. Masks were worn by only 29.7% (n=54) of coir industry workers, whereas 15.3% (n=29) of coconut estate workers used masks. Boots (n=99; 52.1%), rain coats (n=109; 57.4%), gloves (n=112; 58.9%) were worn by coconut estate workers, but not by any of the coir workers.

Navodani (2009) assessed the personal protective measures among the rubber tappers in Kalutara district. There were 207 participants and more than 85% (n=117) of rubber tappers were using common rubber slippers while working and only 2.9% (n=6) used boots and foot wear. About 9.3% of tappers used to sharpen their knife regularly for easy tapping and over half of the workers (51.21%) did not practice the proper procedure when lifting a weight.

According to a study done among the agricultural workers in the Dambulla MOH area 38.6% (n=393) workers said they always followed the instruction given by the manufacturer. When questioned about use of alcohol 71 .1 % (n=455) workers said they do not use alcohol while at work. Regarding the first aid practices that would be practiced following a bleeding wound 84.7% (n=98) said they would wash with soap and running water, 87.7 % (n=561) were aware that they should apply direct pressure on bleeding site in order to arrest bleeding, only 35.2% (n=225) said they would seek medical care immediately and 64.4% (n=425) knew that the bleeding part should be kept over the heart level. (Perera, 2004)

Among the CEB workers a majority, 81.4 % (n=244) used PPE frequently or always and 19.6 % (n=57) used it only sometimes or never. When they were questioned the reason for not using PPE and main reason given for not using gloves were not having enough gloves 62.4 % (n=98) and inability to work well with gloves 30 (19.1 %) . No one said that they used alcohol during work and 33 (11%) said they chew betel while working. The most frequently used unsafe practice was unsafe lifting (24.9%, n=75). The behavior of using of hands instead of tools was the least practiced 0%, followed by use of mobile phones 4.7% (n=14). (Mambulage, 2012)

According to Fernando (2012) majority of the of the garment sewing machine operators (89.3%, n=377) have had job related training and among them 48.5% (n=183) had received it preceding the commencement of the job and the balance 51.5% (n=194) following the commencement of the job.

2.9 Work related morbidity and mortality

Measurements of occupational mortality were first introduced in England and Wales in middle of the nineteenth century by Dr. William Farr of the General Registrar Office. He used census, population figures, and recorded deaths in certain occupations to calculate mortality rates. (Schilling, 1981)

According to new estimates, more than 2.3 million people die every year due to fatal occupational accidents or work-related diseases. This means that every day approximately 7,000 people die from these causes. Also, more than 960,000 workers get hurt at work daily. Over a 10 year period both occupational accidents and fatal work-related diseases have increased. Fatal work-related diseases and occupational accidents that cause at least four days of absence have especially increased (Hamalainen et al., 2009)

Occupational hazards increase the risk for morbidity and mortality. The most common hazards are,

- Physical hazards such as poor ventilation, poor illumination, noise, extreme temperatures, humidity and radiation
- Biological hazards such as variety of pathogenic bacteria, fungi and parasites.
- Chemical hazards due to hazardous gases and dusts,
- Ergonomic hazards. (WHO, 2005)

2.10 Surveillance

Surveillance is considered as a very important component of injury prevention but unlike in developed countries, developing countries do not have strong injury surveillance system to address the issues relating to occupational safety and health.

Lipscomb et al (2013)conducted a survey on safety, incentives and the reporting of work related injuries among union carpenters and most of these the workers felt that they could report injuries to their current supervisor without worrying about how it would affect their job (64%; n = 642). Twenty-two percent (n =222) felt they could not and 14% (n = 141) were unsure. When asked how often injuries were reported on their current job site, 47% reported "always" or "most of the time" while 31% reported "Rarely" or "never".

According to Idirimanna and Jayawardena (2011) in the study among fruit processing factories reporting of accidents and near misses in the absence of the company nurse was poor. Nearly half had never recorded accidents and 87.5% had near misses. Higher under reporting of workplace incidents was notable and also the company had not identified the importance of injury or incident recording. Only 45% of workers suggested that work place safety should be improved. Workers communicated first with the co-workers, and less than 50% had informed their supervisors.

In a survey done by the Employers' Federation of Ceylon among tea plantation workers (1998) the commonest cause of injuries were due to falls, incorrect use of work tools and mechanical injuries respectively. This was in contrast to the study done on occupational related health problems among 534 tea plantation workers in the Kegalle district, which showed the commonest cause as bites and stings (35%) and least common as improper usage of hand tools (0.9%). The reason for this may be that data of the Employers' Federation survey were

taken from the occupational injuries reported to Estate Medical Assistants' and Assistance Medical Officers in estates and minor injuries like bites and stings and abrasions are usually not reported to the estate health staff. (Udayasiri, 2002)

According to Perera (2012) who carried out a study in 27 small scale aluminum casting and manufacturing factories, none of the owners or the factory management were aware of occupational injury reporting system and none of the factories had a General Register stipulated by the Factories Ordinance.

Total of 704 labourers who were permanently employed in the Ceylon Electricity Board, Western Province North and annual injury rate for 2012 was 1.8 per 100 workers but the study done by Mambulage (2012) proportion of reportable injuries was 21.7%. This shows the under reporting of injuries.

2.11 Legislation

The first ILO convention dealt with the regulation of working time, one of the oldest concerns of labour legislation. The dangers to the workers' health and to their families of working excessive hours had already been recognized in 19th century. The hours of work (industry) convention, 1919 established the famous eight-hour day and the 48-hour week. (ILO, 2011)

According to WHO (2005) report on South East Asia Region countries, 80%-90% of the working population belonged to agriculture and other informal economic sectors. Occupational safety and health regulation covers only 10-20% of this working population.

The major statute ensuring a safe working environment for the workers in Sri Lanka is the Factories Ordinance No.45 of 1942 which has separate provisions for health, safety and welfare of the employees. The employees who are eligible for compensation due to work related injuries are safeguarded by the Workmen's Compensation Ordinance No 19 of 1934. Director General of National Institute of Occupational Safety and Health in Sri Lanka (NIOSH) observed only 32% of the workforce were covered under the existing law of the country. (Idirimanna & Jayawardena, 2011)

Sri Lanka has poor statistical information on occupational health and safety and also work related injuries and accidents are hugely under reported. Although it is a legislative requirement for reporting it is seldom implemented. Various factors such as fear of prosecution need for payment of compensation, poor awareness among medical practitioners on the requirement for reporting of occupational diseases and lack of trained officers for implementation of the provision of the legislation has lead to this situation.

2.12 Workers' compensation and insurance

All the workers who are injured or disabled on the job should be provided with a compensation to cover the loss of wages directly related to the accident. According to a study conducted among 1020 apprentice carpenters in United States, at the time of injury 244 (79%) reported that they were covered by health insurance, and among those who were covered, a majority (n= 219; 90%) had coverage through their union-provided private coverage. Fifteen percent (n = 150) reported knowing of co workers use of private health insurance to cover care for work-related injuries. (Lipscomb et al, 2013).

Among the workers who are engaged in aluminum casting and manufacturing activities, out of 71 workers who had occupational injuries 42.5 % (n=30) were absent from work for a day more due to the index injury. Among injured workers only 8.4 % (n=6) received total payment for absent days and cost of medical treatment while another 25.4% had received part of the payment for absent days and cost of medical treatment. However, 66.2% workers had not received any payment for their injuries. (Perera, 2012)

A majority of the carpenters who belonged to both furniture and construction industry are not covered by an insurance scheme and not contributing to employees provident fund. Most of them are employed on piece-rate basis and on daily basis and receive no benefits under workmen compensation act in case of injury, loss of limb or even death.

2.13 Prevention of occupational injuries

Half of the world's population are economically active and spend at least one third of their time at the workplace. Fair employment and decent work are important social determinants of health, and a healthy workforce is an essential prerequisite for productivity and economic development. (WHO, 2013) Most victims of occupational trauma are in the prime of their lives. They are the main source of income to their families and contributors to national productivity.

Work is one of the most important determinants of a person's health. Although improvements in occupational health and safety are ongoing, workers continue to suffer work related injuries, illnesses and death. Therefore the work place provides a unique forum for public health action.

A survey was carried out in India to analyze the effect of safety measures on rate of injuries at two major construction sites. It was conducted in two phases. In the first phase parameters of injured person like age, gender, educational status, experience etc was analyzed and based on results some suggestions were recommended to the site management. Second phase was carried out after implementation of the suggestions and 75% reduction in the injury rate was observed. The second phase data revealed that implementation of safety measures like good housekeeping, training and use of certified quality personal protective devices can significantly decreases incidence of injuries. (Mehta et al, 2011)

Regular inspections of work settings should be carried out by the relevant authorities. According to Perera (2012) Public Health Inspectors (PHI) should visit at least twice a year and only 40.8 % (n=11) factories had been visited by the PHI during the past one year. Two factories have been visited by the officers of Labour Department. This shows the lack of interest of responsible government officers regarding occupational health. Nearly half of the factories (55.6%) were not registered at relevant Pradeshiya Shabas. Furthermore none of the factories maintained a General Register to record details of occupational injuries, which they are supposed to document under the factories ordinance and all the owners of the factories were not aware of the injury reporting system.

Occupational safety and health can be achieved through workplace design, maintenance of a healthy and safe work environment, training and retraining, assessment of work demands, medical diagnosis, health screening and assessment of functional capacities. Workplace health promotion focuses on a number of factors such as the organizational environment, the promotion of healthy lifestyles, and non-occupational factors which include family welfare, home and commuting conditions, and community factors which affect workers' health. (WHO, 2014)

CHAPTER 3

METHODS

3.1 Study design

A community based retrospective, descriptive, cross sectional study to assess the incidence of occupational injuries among the carpenters.

3.2 Study setting

Carpentry workshops in the Medical Officer of Health area of Moratuwa were the study setting. Moratuwa is located in the Colombo District of the Western Province. It is bounded by Dehiwala-Mt Lavinia Municipal Council to the North, Indian Ocean to the West, and Bolgoda river to the South and to the East. It consists of 42 Grama Niladari (GN) divisions and 31 villages in an area of 23.4km^2 (Annex I). The total population in the area in year 2012 was 167,160. According to the Moratuwa carpenters' union, there are approximately 4600 carpentry workshops in the MOH area of Moratuwa.

3.3 Study period

The study was carried out from September to November 2014.

3.4 Study population

Carpenters working in the carpentry workshops belong to the MOH area of Moratuwa.

Study unit- Carpenters working in the carpentry workshops in the MOH area of Moratuwa who fulfilled the following eligibility criteria.

3.4.1 Inclusion criteria

1. Carpenters working fulltime as a carpenter in carpentry workshops.
2. Working as a carpenter for one year or above in the current workshop
3. Age 15 years and above

4.2 Exclusion criteria

1. Assistants to the carpenter
2. Carpenters who are not involved in working with tools and machinery

Assistants to the carpenters were excluded after discussing with the workers in the carpentry workshops regarding the type of work carried out by them. Only those who are involved in helping the carpenters were considered as assistants to the carpenters.

3.5 Sample size calculation

$$N = \frac{Z^2 P (1-P)}{d^2}$$ (Lwanga & Lameshow, 1991)

N =Required minimal sample size

Z = Confidence level 95%

d = Degree of accuracy desired set at 0.06

P = Anticipated population proportion - Since no previous prevalence study on work related injuries among carpenters had been carried out in Sri Lanka the anticipated population proportion was taken as 50%.

$$= \frac{1.96^2 \times 0.5 \times 0.5}{0.06^2}$$

= 267

Anticipated non response rate = 10%

N = 294

Design effect =1.2

Total sample size = 352

Sampling technique

Multi stage sampling method was used

3.6.1 First stage - Selection of primary sampling unit

Carpentry workshops are distributed over 42 Grama Niladari (GN) divisions in the Moratuwa MOH area. Using a simple random sampling method, 21 out of 42 GN divisions were selected as primary sampling units. Computer based random number generator (Intemodino, 2013) was used for random selection of these 21 GN divisions.

3.6.2 Second stage –Selection of secondary sampling unit

Clusters were selected using probability proportional to population size (PPS) method. The numbers of carpenters in each selected GN area was obtained from the Department of Census and Statistics according to the latest available data taken from the census of population and housing 2001(Table 3.1). Though a survey has been carried out in 2011, data have not been published (Annex II).

- Total sample size = 352
- Average size of a cluster = 10
- Total number of clusters = 352/ 10 = 35.2
- Sampling interval = $\frac{\text{Total population}}{\text{Number of clusters}}$

  = $\frac{4900}{35}$ = 140

- Thirty five clusters were selected from 21 GN areas.
- First Random number was obtained from random number table between 1 and sampling interval 140.
- Random number = 102.
- First cluster was selected from first GN area Egoda Uyana.
- Second cluster = 102+140 = 242 selected from second GN area Uswatte.
- Subsequent clusters were selected using above method.
- Though the cluster size was 10, 12 study participants were selected from the last cluster of GN area Egoda Uyana Central to make the total number of study participants 352.

Table 3.1: Grama Niladhari areas with number of clusters

	Grama Niladhari area	Number of carpenters	Cumulative population	Number allocated	Number of clusters
1.	Egoda Uyana South	238	238	1-238	1
2.	Uswatte	84	322	239-322	2
3.	Uyana South	61	383	323-383	3
4.	Rawathawatte West	45	428	384-428	0
5.	Angulana North	91	519	429-519	0
6.	Molpe	218	737	520-737	4,5
7.	Edibedda East	676	1413	738-1413	6,7,8,9,10
8.	Kaldemulla	62	1475	1414-1475	0
9.	Borupana	41	1516	1476-1516	11
10.	Moratuwella West	75	1591	1517-1591	0
11	Rawathawatte South	103	1694	1592-1694	12
12	Koralawella West	332	2026	1695-2026	13,14
13.	Villorawatte West	766	2792	2027-2792	15,16,17,18,19,20
14.	Moratuwella South	160	2952	2793-2952	21
15	Koralawella South	264	3216	2953-3216	22,23
16.	Lakshapathiya South	125	3341	3217-3341	24
17.	Villorawatte East	572	3913	3342-3913	25,26,27,28
18.	Katukurunda South	264	4177	3914-4177	29,30
19	Kadalana	456	4633	4178-4633	31,32,33
20.	Lakshpathiya North	68	4701	4634-4701	34
21	Egoda Uyana Central	199	4900	4702-4900	35

(Census of population and Housing Sri Lanaka,2001)

3.6.3 Third stage – Selection of final sampling unit

- In a selected cluster the first carpentry work shop located closest to the Grama Niladhari office was selected as the starting point.

- Thereafter every other carpentry shop towards the right side was visited until the required sample size was recruited for a particular cluster.

- From all the eligible carpenters in each selected carpentry workshop, one carpenter was selected using a simple random sampling method on a list of all eligible carpenters.

3.7 Study instruments

A structured interviewer administered questionnaire consisting 46 questions was used (Annex III). It was the most suitable method for this study considering the Sri Lankan carpenters having varying educational levels. Of the total of 46 questions, 45 were closed ended and only one was open ended and were constructed to achieve the specific objectives. The questions were arranged to maintain the best possible flow to minimize the time duration

3.7.1 Components of the questionnaire

1) Socio-demographic factors
2) Details related to occupation
3) Occurrence of occupational injuries
4) Description of injury and treatment received
5) Knowledge on occupational injuries
6) Work practices

3.7.1.a Socio-demographic factors

The personal information such as age, sex, civil status, and educational level was assessed.

3.7.1.b Details related to occupation

Work category, work experience as a carpenter, period of work in the present work place, details regarding the training, average working hours per day, number of working hours per week and type of work done was covered under this section.

3.7.1.c Occurrence of occupational injuries

This section assessed the Incidence of occupational injuries during three months period (from June to August) and the mechanism of injury. Workers were asked about each and every episode of injury that they experienced in the work place.

3.7.1.d Description of injury and treatment received

Details of the injury were questioned by the site of injury and the type of injury. Type of care received, duration of hospital stay and the squeal of recovery were also questioned.

3.7.1.e Knowledge on occupational injuries

Questions were oriented to assess the knowledge of carpenters. Mechanisms, on types of injuries which can occur during work, measures to be taken to prevent or minimize work place injuries, factors in the carpentry workshop which can have effect on injuries like light, noise, vibration etc., and the actions that would be taken when an injury occurs were questioned.

3.7.1.f Work practices

A series of questions were asked on work practices of carpenters like checking tools or machines before starting the work, engage in work that are not assigned or trained, use of personal protective equipment, if not wearing the reason, working with unguarded machines, working under the influence of alcohol, working environment like proper light, noise, vibration, housekeeping, adequate rest and long duration of work.

3.7.2 Construction of the questionnaire

The content included in the questionnaire was based on the observations made by the Principal Investigator (PI) in relation to the work process carried out by the carpenters and some questions were based on literature evidence.

It was originally constructed in English language and then translated into Sinhala and Tamil languages and also re translated to English to assess whether the re translation remained similar with the original version.

3.8 Pre-testing

Pre –testing of the questionnaire was done by the PI among the carpenters belong to MOH area of Panadura, which is outside the study setting but shares most of the socio-demographic and geographic characteristics of Moratuwa MOH area. It was carried out one week before the commencement of the study. Ten carpenters from the Panadura MOH area with same eligible criteria were selected.

Purpose of the pre-testing was to identify the appropriateness of the questionnaire to clarify the questions, time spent to complete the questions and the acceptance of the questionnaire. Few modifications were made based on the findings of the pre test.

3.9 Data collection

Data collection was carried out during the period of September - November 2014. One assistant accompanied the PI as a data collector and to ensure the uniformity, he was given an extensive training on administering the questionnaire by the PI and also he carried out mock interviews with carpenters in Panadura MOH area, under the supervision of the PI.

Data was collected on week days since certain carpentry shops were closed on weekends and public holidays. Carpentry shops were visited in selected GN areas as described in the sampling technique. The assistant accompanied the PI and data collection was done under the supervision of PI in the selected GN areas.

Once the selected carpentry workshop was approached PI introduced herself and explained about the research purpose, benefits and the procedure after checking the eligibility of the participants. Then the information sheet (Annex IV) and the consent form (Annex V) were administered. Once they agreed to participate, interviews were conducted.

Leisure time and the intervals were used to interview the carpenters in order to minimize the disturbance to work and increase the response rate of eligible carpenters. Most suitable and comfortable place in the workshop area which can maintain the privacy was selected to carry out the interview. Finally they were provided with a health education material regarding the work related injuries and its prevention.

3.10 Quality of data

Following steps were taken to ensure the quality of data.

3.10.1 Measures to minimize selection bias

a. Minimal sample size was calculated in order to minimize sampling error due to chance.
b. Cluster effect was minimized using design effect.
c. A probability sampling method with an allowance for non respondents was used to select the sample

3.10.2 Measures to minimize information bias

a. Questionnaire was constructed according to the objectives.
b. Face validity of the questionnaire was checked by the two heads of carpenters union of Moratuwa and the content validity was assessed by the supervisor.
c. Pre testing of the questionnaire was done in a similar MOH area and appropriate changes were made.
d. Translation and back translation was done to check the accuracy of Sinhala and Tamil versions as the questionnaire was initially prepared in English.
e. Information bias was minimized using an interviewer administered questionnaire, considering the varying level of literacy among the participants.
f. Interviews were conducted in their mother tongue in simple way.
g. Data was collected by the PI and the completeness of the data was assured.
h. The assistant data collector was given extensive training on administering of the questionnaire and data collection was done under the supervision of PI.
i. Recall bias was minimized using only the personal injuries that occurred during the past 3 month period.

3.11 Data analysis

Data were entered by the PI and rechecked for accuracy. A coding key was prepared and questions were coded before data entry.

Data was statistically analyzed using Statistical Package for Social Sciences version 21 software. Double entry was carried out to minimize error during entry of data.

Descriptive statistics included qualitative variable was expressed as percentages and quantitative variable was expressed as mean and relevant SD.

3.11.1 Incidence of injuries

Cumulative Incidence (CI) of injuries for a period of 3 months with the relevant 95% CI was computed for the following

1. Overall CI
2. Age specific CI

Chi Square test was utilized for statistical calculations

3.11.2 Assessment of knowledge on injuries

A scoring system was developed to allocate a score for each response of the closed ended knowledge questions. There were 9 questions to assess the knowledge of the participants and scores were given according to the responses.

Correct answer (Yes or No) was given 2 marks and the incorrect answer (Yes or No) and don't know answer was given 0 marks.

Total score ranged from 0-108, and the percentage was calculated for each participant. Based on percentage scoring, it was further categorized into four levels as shown below.

0 -24 % -	Very poor knowledge
25 -49 % -	Poor knowledge
50- 74 % -	Satisfactory knowledge
75 -100% -	Good knowledge

3.11.3 Assessment of work practices of the carpenters

There were 16 questions regarding work practices and it was described as numbers and percentages. Chi Square test was utilized for statistical calculations.

3.12 Administrative requirements

Approval to conduct this study was granted by the Board of Study in Community Medicine, PGIM (Annex VI). Permission was obtained from the Divisional Secretariat of Moratuwa to conduct the study in the area (Annex VIII) as well as for obtaining information such as maps, resource profile, details of carpentry workshops and the carpenters.

3.13 Ethical considerations

Before administering the questionnaire, ethical clearance was obtained from the Ethical Review Committee of the Post Graduate Institute of Medicine (Annex VII). Participants were given information sheet regarding the details of the study, verbally explained and opportunity was given to ask questions and any clarifications were dealt with. Consent form was given to the participant before the procedure and both verbal and written consent were obtained from the participant after explaining the purpose of the study.

Assurance of non penalty for the non participants was given and the participants were informed that they could withdraw from the study at any time without citing a reason. Principal investigator was available for clarification of doubts and the contact details of PI were provided in the information sheet for further reference. Interviews were conducted at their own settings. Privacy was assured during data collection or reporting, transferring and presenting the study findings. Data collection was done in shortest possible time with minimal effect to the work of the carpenter.

As the questionnaire was anonymous no identification data was included during data entry and the individuals were identified by a code and the original list used for collection of code was kept with the PI and was not accessible to others. At the end of the interview each participant was given a health education material on preventive measures at work place injuries (Annex IX).The study findings will be made available relevant authorities and policy makers, to be made used in future policies and planning of preventive measures.

3.14 Dissemination, storage and disposal of data

The collected data will be kept with the principal investigator where no one will have access other than the PI. The study findings will be published /presented at relevant scientific journal/forums. The data will be disposed by burning after period of 5 years by the principal investigator.

3.15 Operational definitions of relevant variables for the study

3.15.1 Carpenter- A person who makes and repairs wooden objects and structures (Oxford Dictionary, 2014)

According to International Standard Classifications of Occupations (ISCO -08), Carpenters and joiners cut, shape, assemble, erect, maintain and repair various types of structures and fittings made from wood and other material and belongs to unit group 7115.(ILO,2012)

Annual Survey of Industries in Sri Lanka (2012) has categorized employees by nature of employment and following categories of carpenters are included. (Department of Census and Statistics, 2014)

2010 - Saw- milling and planning of wood
2021 - Manufacture of veneer sheets, plywood, lamin board, particle board
2022 - Manufacture of builders carpentry and joinery
2023 - Manufacture of wooden containers
2025 - Manufacture of Household utensils of other wooden article and ornaments
2026 - Manufacture of tools, coffins, other equipments used in funerals
2029 - Manufacture of all kinds of other wood products

3.15.2 Carpentry

The activity or occupation of making or repairing things in wood (Oxford Dictionary, 2014)

3.15.3 Case of occupational injury

Case of one person incurring an occupational injury as a result of one occupational accident.(ILO,1998)

3.15.4 The incidence rate of new cases of occupational injury

$$\frac{\text{Number of new cases of occupational injury during the reference period}}{\text{Total number of workers in the reference group during the reference period}} \times 1000$$

(ILO, 1998)

3.15.5 Types of injuries

Described using working definitions (Farlex Medical Dictionary, 2014)

1. Abrasion

   A scraped area on the skin or on a mucous membrane, resulting from injury or irritation

2. Prick

   A small mark or puncture made by a pointed object

3. Laceration

   Also called a tear.Separation of skin or other tissue by a tremendous force, producing irregular edge

4. Cut injury

   Separation of skin or other tissue made by a sharp edge, producing regular edges

5. Superficial cut injury

   Cut injury situated on or near the surface

6. Deep cut injury

   Cut injury situated far beneath the surface, not superficial.

7. Crush injury

   A bruise or contusion from pressure between two solid bodies.

8. Fracture

   Break, rupture, or crack, in bone or cartilage.

9. Acute muscle strain

   Soreness and stiffness in a muscle due to overexertion or contusion, especially in muscles that have not been conditioned for hard use, some of the muscle fibers may actually tear.

CHAPTER 4

RESULTS

A descriptive cross sectional study was carried out to determine the incidence, describe the type of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area.

Number of GN divisions selected	-	21
Number of clusters	-	35
Calculated sample size	-	352
Total number of study participants interviewed	-	317
Total number of non-respondents	-	35
Response rate	-	90.06 %
Non –response rate	-	9.94 %

Moratuwa Medical Officer of Health area is consists of 42 Grama Niladari (GN) areas in which 21 GN areas were selected using simple random method. Calculated sample size was 352 and there were 317 (90.06%) respondents. The non response rate was 9.94% (n=35).

4.1 Socio-demographic characteristics

Table 4.1 Distribution of carpenters by selected socio demographic characteristics

Characteristic	Frequency	Percentage (%)
Age (years)		
15-24	24	7.6
25-34	90	28.4
35-44	103	32.5
45-54	66	20.8
>54	34	10.7
Total	317	100.0
	Mean =39, SD=11	Range =15-68
Civil status		
Never married	58	18.3
Married	253	79.8
Divorced	04	1.3
Widowed	02	0.6
Total	317	100.0
Educational Level		
No formal education	04	1.3
Grade 1- 5	49	15.4
Grade 6-8	89	28.1
Grade 9- O/L	169	53.3
A/L or above	06	1.9
Total	317	100.0

O/L- Ordinary Level, A/L-Advanced Level
SD- Standard deviation

A majority (32.5%, n=103) belonged to the age group of 35-44 yrs and 34 (10.7%) were aged over54 years. Highest proportion of carpenters (79.8%, n=239) were married. Only 4 (1.3%) study participants had no formal education, while a majority 53.3% (n=169) had grade 9 –O/L education. (Table 4.1)

4.2 Occupational characteristics

Table 4.2 Distribution of carpenters by factors related to occupation

Characteristic	Frequency(n=317)	Percentage (%)
Work experience (years)		
1-3	19	6.0
>3-5	14	4.4
>5-7	24	7.6
>7-10	29	9.1
>10	231	72.9
Total	317	100.0
	Mean =16.5 , SD=9.6	Range =1-47
Period of work in the present work place (years)		
1-3	71	22.4
>3-5	55	17.4
>5-7	47	14.8
>7-10	42	13.2
>10	102	32.2
Total	317	100.0
	Mean =8.2 , SD=5.5	Range =1-30
Job related training		
Formal training	07	2.2
On the job training	254	80.1
Informal training before starting job	07	2.2
No training received	49	15.5
Total	317	100.0
Average working hours per day		
<8	16	5.0
8-10	246	77.6
>10-12	36	11.4
>12	19	6.0
Total	317	100.0
	Mean =9.3 , SD=1.31	Range =5-14
Number of working days per week		
<3	06	1.9
3-5	19	6.0
6	272	85.8
7	20	6.3
Total	317	100.0
	Mean =5.8 , SD=0.88	Range =2-7

SD-Standard deviation

A majority of carpenters (72.9%, n=231) had more than 10 years work experience as a carpenter while only 19 (6.0%) had < 3years of experience. Out of 317 study participants 102 (32.2%) had experience in the present working place for more than 10 years. Though majority of the carpenters (84.5%, n=268) have had some form of training, among them highest proportion (80.1%, n=254) has had on the job training, while only 7 (2.2%) carpenters had formal training. A majority of the carpenters (77.6%, n=246) worked for 8 to 10 hours per day while 6% (n=19) worked more than 12hrs. Among the respondents, highest proportion (85.8%, n=272) worked 6 days per week and 20 carpenters (6.3%) worked every day (Table 4.2).

4.3 Type of work done

Table 4.3 Distribution by type of work done

Type of work	Frequency	Percentage (%)
Cutting with hand saw	282	89.0
Cutting with machine	286	90.2
Shaping the wood using mechanised hand tools	271	85.5
Shaping the wood using non mechanised hand tools	231	72.9
Fastening materials together with nails, screws, staples, etc	258	81.4
Polishing	110	34.7
Sanding with mechanised tool	119	37.5
Sanding without mechanised tools	93	29.3
Unloading and stacking of the logs	47	14.8
Sawing of the logs manually	26	8.2
Sawing of the logs on the bench run by electric machine	59	18.6
Carving by mechanised tool	63	19.9
Carving by non mechanised hand tool	96	30.3

*Total percentage does not equal to 100% due to multiple responses

Most of the carpenters were involved in cutting with machines (90.2%, n=286), cutting with hand saw (89%, n=282) and fastening materials together with nails, screws, etc (81.4%, n=258). Only 8.2% (n=26) carried out sawing of logs manually (Table 4.3).

4.4 Occupational injuries

4.4.1 Cumulative incidence

The total number of carpenters who have sustained any form of occupational injury, during three month period prior to the survey was 81. Thus the cumulative incidence of occupational injuries for a period of three months was 255.5per 1000 carpenters (95% CI: 209.8-305.7) in the study population.

4.4.2 Age specific incidence

Table 4.4 Distribution by age specific incidence of occupational injuries for a three month period

Age (years)	No of workers injured (%)	Total workers in the age group (%)	Age specific cumulative incidence per 1000 population per 3 month period (95% CI)
15-24	07 (2.2)	24 (7.6)	289 (196 - 398)
25-34	24 (7.5)	90 (28.4)	264 (215 - 317)
35-44	20 (6.3)	103 (32.50	193 (153 - 239)
45-54	19 (6.0)	66 (20.8)	288 (230 - 352)
>54	11 (3.5)	34 (10.7)	327 (243 - 420)
Overall	81 (25.5)	317 (100)	255 (210 - 306)

95% CI- 95% Confidence Interval

Among the age groups, 25-34 years age category reported more injuries (7.5%, n=24). Age specific injury rate was highest among >54 years age group (Table 4.4).

4.4.3 Frequency of occupational injuries

Table 4.5 Distribution by frequency of occupational injuries during a three month period

Frequency	Number	Percentage (%)
One injury	69	85.2
Two injuries	11	13.6
Three injuries	01	1.2
Total	81	100.0

Among the carpenters who had reported occupational injuries during the past three month period, 69 (85.2%) had only one injury, while 11 (13.6%) claimed two episodes of injuries and one carpenter with three episodes (Table 4.5)

The total number of spells of occupational injuries that had occurred in the past 3 month period was 94 and the incidence of the spells of occupational injuries for the period of past 3 months was 296 per 1000 workers (95% CI : 248 - 348).

4.4.4 Mechanism of the injury

Table 4.6 Distribution by mechanism of injury

Mechanism	Frequency	Percentage (%)
Cut by an object	57	60.6
Struck by an object	16	17.1
Crushed by an object	11	11.7
While lifting an object	03	3.2
Pushing or pulling an object	03	3.2
Falls	02	2.1
Electrocution	02	2.1
Total	94	100.0

The most common forms of mechanisms of injuries were, cut by an object (60.6%, n=57) struck by an object (17.1%, n=16) and crush by an object (11.7%, n=11) (Table 4.6).

4.5 Description of Injuries and treatment received

Table 4.7 Distribution by site of injury

Injury site	Frequency	Percentage (%)
Hands and fingers	61	64.9
Forearm and upper arm	11	11.7
Eye	03	3.2
Face	05	5.3
Head	01	1.1
Lower limb	09	9.6
Other parts of the body	04	4.2
Total	94	100.0

Other parts (back -2, lower abdomen 2)

Of the 94 injuries, 61 (64.9%) were injuries of hands and fingers, 11 (11.7%) injuries of the forearm, were the common sites of injuries (Table 4.7)

4.5.2 Type of injury

Table 4.8 Distribution by type of injury

Type of injury	Frequency	Percentage (%)
Superficial cut	42	44.6
Deep cut	21	23.3
Abrasion /laceration	8	8.5
Crush	12	12.7
Prick	01	1.1
Injury to eye	03	3.1
Fracture	00	0.0
Acute muscle strain	05	5.3
Electrocution	02	2.1
Burn	00	0.0

Total	94	100.0

Highest proportion of injuries belonged to superficial cuts (44.6%, n=42) and the second commonest being deep cuts (23.3%, n=21). There were no fracture or burn injuries reported (Table 4.8).

4.5.3 Management of occupational injuries

Table 4.9 Distribution of carpenters by type of care received

Management of injury	Frequency	Percentage (%)
First aid at worksite	32	34.0
OPD/PCU/ETU treatment at government hospital	27	28.7
Treatment from GP	30	31.9
Hospital admission-non surgery	05	5.3
Hospital admission-minor surgery	06	6.3
Hospital admission-major surgery	02	2.1

OPD-Out Patient Department, PCU-Preliminary Care Unit, ETU-Emergency Treatment Unit, GP-General Practitioner

*Total percentage does not equal to 100% due to multiple responses.

Considerable number of carpenters were given first aid at worksite (34%, n=32), while 31.9% (n=30) had taken treatment from general practitioner and 28.7% (n= 27) from government hospital OPD. Out of 94 injuries 13 injuries (13.8%) required hospital admission in which, 2 injuries (2.1%) needed major surgery (Table 4.9).

Table 4.10 Distribution of carpenters by duration of hospital stay

Number of days	Frequency (n=13)	Percentage (%)
1 -2 days	06	46.2
3 - 4 days	04	30.7
5 to 7 days	01	7.7
>1week to 2 weeks	01	7.7
> 2 weeks	01	7.7
Total	13	100.0

Six admissions (46.2%) out of 13 needed only 1-2 days of hospital stay while 2 injuries (15.4%) required hospital stays of more than one week. (Table 4.10)

4.5.4 Sequel of injuries

Table 4.11 Distribution of carpenters by sequel of injuries

Sequel of injury	Frequency (n=94)	Percentage (%)
Complete recovery	74	78.7
Temporary disability	15	16
Permanent partial disability	03	3.2
Permanent complete disability	02	2.1
Total	94	100.0

A Majority (78.7%, n=74) of the injured carpenters had complete recovery, while 5 carpenters (5.3%) had permanent disability (Table 4.11).

4.6 Knowledge on occupational injuries

4.6.1 Knowledge on mechanisms and types of injuries

Table 4.12 Distribution by knowledge on mechanisms and types of occupational injuries

Knowledge area	Correct response	
	Number	Percentage (%)
Mechanisms of injury		
Cut by an object	317	100.0
Struck by an object	299	94.3
Crushed by an object	315	99.4
Lifting	304	95.9
Pushing or pulling an object	294	92.7
Falls	302	95.3
Types of injuries		
Cut injuries	317	100.0
Abrasion /laceration	317	100.0
Crush	317	100.0
Prick	313	98.7
Injury to eye	317	100.0
Fracture	300	94.6
Acute muscle strain	308	97.2
Electrocution	309	97.5
Burn	266	83.9

A majority of carpenters knew about the mechanisms and types of occupational injuries that could occur in a work place. All the respondents (100%, n=317) gave correct answers, regarding cut injuries, abrasions/laceration, crush and injuries to eyes while least score was regarding burn injuries (83.9%, n=266) (Table 4.12).

4.6.2 Knowledge on preventive measures

Table 4.13 Distribution by knowledge on prevention of occupational injuries

Preventive method	Correct response	
	Number (n=317)	Percentage (%)
Checking tools/machine before starting work	317	100.0
Guarding the dangerous parts of the machines	277	87.4
Using personal protective equipment	262	82.6
Good house keeping	285	89.9
Undergoing proper training	260	82.0
Adhering to proper techniques in operating machinery	296	93.4
Adequate rest	283	89.3
Having realistic targets and workload	282	89.0

All respondents (100%, n=317) knew that machines and tools should be checked before starting to work. Only 82 %(n=260) were aware that undergoing proper training and using personal protective equipment (82.6%, n=262) was a preventive measure. (Table 4.13)

4.6.3 Knowledge on workplace factors associated with occupational injuries

Table 4.14 Distribution by knowledge on workplace factors associated with occupational injuries

Associated factors	Correct response	
	Number (n=317)	Percentage (%)
Inadequate light	310	97.8
Overcrowding of the workshop	262	82.6
Excessive noise	252	79.5
Working long duration with vibrating machinery	265	83.6
Excessive workload	268	84.5
Working for long hours	270	85.2
Feeling that you are stressed	278	87.7

Inadequate light was considered as a factor associated with occupational injuries by 97.8% (n=310) of the respondents. Only 79.5% (n=252) knew that excessive noise was a factor associated with occupational injuries. (Table 4.14)

4.6.4 Knowledge on actions that should be taken in an occupational injury

4.6.4.1 Knowledge on actions that would be taken when an injury occurs

Table 4.15 Distribution by knowledge on actions that would be taken when an injury occurs

Action	Correct response	
	Number (n=317)	Percentage (%)
Wash the wound with clean water and gently remove contaminated particles	309	97.5
Apply antiseptic or antibiotic cream	190	59.9
Cover the wound with clean cloth or gauze	297	93.7
Apply oil/ turmeric powder /coffee powder to the wound	272	85.8

Out of 317 respondents, 85.8 % (n=272) knew that oil, turmeric or coffee powder should not be applied to the wound. However, only 59.9% (n=190) were knowledgeable about application of antiseptic or antibiotic cream. (Table 4.15)

4.6.4.2 Knowledge on actions to be taken to arrest bleeding

Table 4.16 Distribution by knowledge on actions to be taken to arrest bleeding

Action	Correct response	
	Number (n=317)	Percentage (%)
Apply pressure directly over the bleeding site	292	92.1
Elevate the bleeding part if possible above the heart	251	81.0
In case of heavy bleeding apply the pressure above the bleeding site with tourniquet	70	22.1
Apply the pressure below the bleeding site with tourniquet	228	71.9

Applying pressure directly over the bleeding site was answered correctly by 92.1% (n=292) of the participants. However only 22.1 % (n=70) knew that tourniquet should be applied above the bleeding site in case of heavy bleeding. (Table 4.16)

4.6.4.3 Knowledge on actions to be taken in an injury with fracture

Table 4.17 Distribution by knowledge on actions to be taken in an injury with fracture

Action	Correct response	
	Number (n=317)	Percentage (%)
Identify the broken limb	185	58.4
Apply ice to reduce pain, swelling and bleeding	258	81.4
Immobilize by applying a splint	51	16.1
Try to correct the deformity	256	80.8
Give drinks to the injured person	162	51.1
Push the protruding bone back through the skin	284	89.6

Only 16.1% (n=51) were aware of immobilization by application of a splint and 58.4 % (n=185) about identifying the broken limb. Half of the respondents said (51.1%, n=162) they would not give drinks to the injured person. (Table 4.17)

4.6.4.4 Knowledge on actions to be taken in an injury to the eye

Table 4.18 Distribution by knowledge on actions to be taken in an injury to the eye

Action	Correct response	
	Number (n=317)	Percentage (%)
When foreign body or chemical gets into eye, wash thoroughly with clean water	278	87.7
Cover the eye with clean dressing or cloth	276	87.1
Seek medical treatment	312	98.4
Wash the eye with anything other than water	302	95.3
Rub the eye	293	92.4
Remove the embedded foreign bodies in the eyeball	205	64.7

Although a majority of the carpenters (98.4%, n=312) were aware that medical treatment should be sought, only 64.7% (n=205) answered correctly when questioned regarding the removal of foreign body in the eye ball (Table 4.18).

4.6.4.5 Knowledge on actions to be taken in a case of amputation of fingers

Table 4.19 Distribution by knowledge on actions to be taken in a case of amputation of fingers

Action	Correct response	
	Number (n=317)	Percentage (%)
Take amputated part/parts to the hospital	315	99.4
Carry amputated part/parts in a clean bag placed inside an ice bag (should not be in direct contact with ice)	188	59.3
Rush to a hospital immediately	317	100.0
Carry the amputated part/parts in a bag filled with water	258	81.4
Place the amputated part/parts in direct contact with ice	181	57.1

Almost all the carpenters (99.4%, n=315) were aware that they should take the amputated part/parts to the hospital and rush to a hospital immediately (100%, n=317). Only 59.5 % (n=188) knew that amputated parts should not be placed in direct contact with ice. (Table 4.19)

4.6.5 Knowledge Score

Table 4.20 Distribution by knowledge score

Knowledge level	Number	Percentage
Good	271	85.5
Satisfactory	46	14.5
Poor	0	0.0
Very Poor	0	0.0
Total	317	100.0

All the study participants scored more than 50% and a majority (85.5%, n=271) had good knowledge. (Table 4.20)

4.7 Work practices

4.7.1 Healthy work practices among carpenters

Table 4.21 Distribution by healthy work practices among carpenters

Work practices	Always No (%)	Frequently No (%)	Sometimes No (%)	Never No (%)	Total No (%)
Checking whether machines are in proper condition before work	165 (52.1)	51 (16.1)	82 (25.9)	19 (5.9)	317 (100.0)
Use of personal protective equipments	21 (6.6)	13 (4.1)	207 (65.3)	76 (24.0)	317 (100.0)
Working with adequate light in the work place	227 (71.6)	49 (15.45)	41 (12.9)	00 (0.0)	317 (100.0)
Good house keeping	176 (55.5)	46 (14.5)	91 (28.7)	04 (1.3)	317 (100.0)

A majority (52.1%, n=165) of carpenters claimed that they always check machine before starting work, always work with adequate light (71.6%, n=227) and always involved with good housekeeping (55.5 %, n=176). However Only 10.7% (n=34) used personal protective equipments (PPE) regularly. (Table 4.21)

Table 4.22 Distribution by reasons for non usage of PPE

Reason	Number	Percentage
Uncomfortable	151	53.4
Difficult to perform tasks with PPE	102	36.0
Adequate quantities not supplied	17	6.0
Wearing PPE will not have a significant effect in preventing injuries	13	4.6
Total	100	
283		

Out of 317 study participants, 45.4% (n=144) were not provided with adequate personal protective equipment. Among the carpenters (89.2%, n=283), those who never use PPE and those who use PPE sometimes, main reasons for non usage were uncomfortable (53.4%, n=151) and difficult to perform task (36%, n=102).

4.7.2 Unhealthy work practices among carpenters

Table 4.23 Distribution of unhealthy work practices among carpenters

Work practice	Always No (%)	Frequently No (%)	Sometimes No (%)	Never No (%)	Total No (%)
Engage in work that are not assigned	00 (0.0)	04 (1.3)	118 (37.2)	195 (61.5)	317 (100.0)
Engage in work ,which have not been trained or not very competent	00 (0.0)	06 (1.9)	140 (44.2)	171 (53.9)	317 (100.0)
Work with unguarded/unprotected machines	02 (0.6)	14 (4.4)	175 (55.2)	126 (39.7)	317 (100.0)
Work under the influence of alcohol	00 (0.0)	00 (0.0)	76 (24)	241 (76)	317 (100.0)
Working without adequate rest	05 (1.6)	13 (4.1)	237 (74.8)	62 (19.6)	317 (100.0)
Working for long duration (10-12 hrs per day)	06 (1.9)	26 (8.2)	250 (78.9)	35 (11)	317 (100.0)
Working in noisy environment	24 (7.6)	30 (9.5)	233 (73.5)	30 (9.5)	317 (100.0)
Work with vibrating equipments continuously for at least 1-2 hours	30 (9.5)	57 (18)	109 (34.4)	121 (38.2)	317 (100.0)
Working in poorly illuminated work environment	00 (0.0)	04 (1.3)	63 (19.9)	250 (78.9)	317 (100.0)
Working in an untidy/overcrowded work environment	00 (0.0)	07 (2.2)	84 (26.5)	226 (71.3)	317 (100.0)

A majority of the workers (61.5%, n=195) were never engaged in work that is not assigned, 53% (n=171) were never engaged in work for which they have not been trained. More than half of the workers (55.2%, n=175) sometimes work with unguarded machines. With regard to working under influence of alcohol, 24% (n= 76) had done so sometimes. Most of the workers, sometimes work without taking adequate rest (74.8%, n= 237), work for long duration (78.9%, n=250), and work in noisy environment (73.5%, n=233). (Table 4.23)

4.8 Association of socio-demographic factors with incidence of occupational injuries among carpenters

Table 4.24 Distribution by association of socio-demographic factors with incidence of occupational injuries among carpenters

Characteristic	Occupational injury			
	Yes (n=81)		No (n=236)	
	Number	%	Number	%
Age category (years)				
>44	51	63.0	166	70.0
15-44	30	37.0	70	30.0
			OR=1.4 (95% CI= 0.82 -2.4)	
			χ^2= 1.519 (df= 1), P=0.264	
Marital status				
Ever married	68	84.0	191	81.0
Unmarried	13	16.0	45	19.0
			OR=1.23 (95% CI =0.62 - 2.42)	
			χ^2=0.368 (df=1),P=0.619	
Level of education				
Upto Grade 8	39	48.0	103	44.0
Above Grade 8	42	52.0	133	56.0
			OR=1.19 (95% CI = 0.723-1.989)	
			χ^2=0.495 , (df=1), P=0.518	

OR: Odds Ratio, 95% CI: 95% Confidence interval, df: degrees of freedom

*Ever married include married, divorced and widowed workers

*Ever married include married, divorced and widowed workers

Age - Carpenters aged >44 years were 1.4 times (OR 1.4; 95% CI:0.8-2.4) more likely to sustain injuries compared to the 15-44 year age group . However it was not a statistically significant association.(P=0.26)

Civil status - Ever married carpenters were 1.23 times (OR 1.23; 95% CI:0.6-2.4) more likely to sustain injuries compared to unmarried carpenters. However this association was not statistically significant.(P=0.619)

The level of education –Although the direction of the odds ratio indicated that carpenters who have not studied above grade eight were 1.19 times (OR 1.19 ; 95% CI: 0.723-1.989) more likely to sustain injuries than those who have studied above grade 8, this observation was not statistically significant.(P=0.518). (Table 4.24)

4.9 Association of work related factors and injuries among carpenters

Table 4.25 Distribution by association of work related factors and injuries among carpenters

Characteristic	Occupational injury			
	Yes (n=81)		No (n=236)	
	Number	%	Number	%
Work experience				
>5 yrs	76	94.0	209	88.0
Up to 5 yrs	10	6.0	47	12.0
			OR=1.9 (95% CI = 0.73 – 5.28)	
			χ^2=1.84 (df=1)	
			P=0.205	
Occupational training				
Not Received	14	17.0	36	15.0
Received	67	83.0	200	85.0
			OR=1.16 (95% CI = 0.59 – 2.28)	
			χ^2=0.187 (df=1)	
			P=0.724	

OR: Odds Ratio, 95% CI: 95% Confidence interval, df: degrees of freedom

Work experience - The association between the carpenters who have work experience more than 5 yrs to that of the workers who have less than 5 yrs, with likely hood of occurrence of injuries was not statistically significant. (P=0.205)

Occupational training - Occupational training was not significantly associated with the occurrence of injury. (P=0.724). (Table 4.25)

4.10. Association of knowledge of carpenters with occupational injuries

Table 4.26 Distribution by association of knowledge of carpenters with occupational injuries

Level of knowledge	Occupational injury			
	Yes (n=81)		No (n=236)	
	Number	%	Number	%
Good	73	90	198	84
Satisfactory	08	10	38	16
			OR=1.75 (95% CI = 0.78 – 3.9)	
			χ^2=1.88 (df=1)	
			P=0.203	

OR: Odds Ratio, 95% CI: 95% Confidence interval,
df: degrees of freedom

Carpenters with good knowledge were 1.75 times (OR 1.75; 95% CI : 0.78-3.9) more likely to sustain injuries when compared to that of the carpenters with satisfactory knowledge. However this association was not statistically significant. (P=0.203)(Table 4.26)

4.11 Association of healthy work practices with occupational injuries

Table 4.27 Distribution by association of healthy work practices with occupational injuries

Work practice		Occupational injury			
		Yes (n=81)		No(n=236)	
		Number	%	Number	%
Checking whether machines are in proper condition	No	09	11	10	43
	Yes	72	89	226	57
				OR=2.85 (95% CI = 1.105 – 7.22)	
				. χ^2=5.05 (df=1)	
				P=0.032	
Use of personal protective equipment	Yes	69	85	172	73
	No	12	15	64	27
				OR=2.14 (95% CI = 1.087 – 4.21)	
				χ^2=5.008 (df=1)	
				P=0.025	

OR: Odds Ratio, 95% CI: 95% Confidence interval, df: degrees of freedom
*Yes =always + frequently + sometimes
*No = never

Checking whether machines are in proper condition - There was a statistically significant association between, checking the machines before starting to work with occurrence of occupational injuries(P=0.032). Carpenters those who do not check machines were 2.8 times (OR 2.85; 95% CI: 1.105-7.22) more likely to sustain injury to that of the carpenters who check machines whether it's in proper condition.(Table 4.27)

Use of personal protective equipments - Carpenters who use personal protective equipments (PPE) were 2.14 times (OR 2.14 ; 95% CI: 1.087-4.21) more likely to sustain injuries than those who do not use PPE. This observation was statistically significant. (P=0.025)(Table 4.27)

4.12 Association of unhealthy work practices with occupational injuries

Table 4.28 Distribution by association of unhealthy work practices with occupational injuries

Work practice		Occupational injury			
		Yes (n=81)		No (n=236)	
		Number	(%)	Number	(%)
Engage in works that are not assigned	Yes	33	41	89	38
	No	48	59	147	62
			OR=1.13 (95% CI = 0.678 –1.9)		
			χ^2=0.234 (df=1)		
			p=0.62		
Engage in works which have not been trained	Yes	42	52	104	44
	No	39	48	132	56
			OR=1.75 (95% CI = 0.78 – 3.9)		
			χ^2=1.88 (df=1)		
			p=0.203		
Work without adequate rest	Yes	72	89	183	77
	No	9	11	53	23
			OR=2.32 (95% CI = 1.08 – 4.94)		
			χ^2=4.9 (df=1)		
			p=0.034		
Work with vibrating equipments continuously (at least 1-2 hrs)	Yes	59	73	137	58
	No	22	23	99	62
			OR=1.94 (95% CI = 1.11– 3.37)		
			χ^2=5.58 (df=1)		
			p=0.024		
Work under the influence of alcohol	Yes	23	(28)	53	(22)
	No	58	(72)	183	(78)
			OR=1.369 (95% CI = 0.77 – 2.42)		
			χ^2=1.16 (df=1)		
			p=0.293		

OR: Odds Ratio, 95% CI: 95% Confidence interval, df: degrees of freedom

*Yes =always + frequently + sometimes

*No = never

Engage in works that are not assigned - No statistically significant observation was made between the engage in works that are not assigned and the occurrence of occupational injuries (P=0.62).

Engage in works which have not been trained -Though the carpenters who were engaged in works which they have not been trained were 1.75 times (OR 1.75; 95% CI:0.78-3.9) more likely to sustain occupational injuries, than those who do not engage, the association was not statistically significant.(P=0.23)

Work without adequate rest - There was a statistically significant (P=0.034) association between work without rest and occurrence of occupational injuries, where carpenters who work without adequate rest were 2.3 times (OR 2.3:95%CI: 1.08-4.94) more likely to be sustain with work related injury than the others who take adequate rest.

Work with vibrating equipments continuously - Carpenters who work with vibrating equipments continuously were 1.9 times (OR 1.9: 95%CI:1.11-3.37) more likely to experience work related injuries, when compared to those do not work with such machines and this association was statistically significant.(p=0.024)

Work under the influence of alcohol - Carpenters who work under the influence of alcohol were 1.3 times (OR 1.3:95% CI 0.77-2.42) more likely to sustain injuries than the others .However this association was not statistically significant (P=0.29). (Table 4.28)

CHAPTER 5

DISCUSSION

5.1 Summary of the study

The calculated sample size was 352 and 317 responded to the invitation to participate, therefore the response rate was 90.06%. All the study participants were males due to the sex specific nature of the occupation. Cumulative incidence of occupational injuries for a period of three months was 255.5 per 1000 carpenters (95% CI: 209.8-305.7). Highest proportion of injuries belonged to superficial cuts (44.6%, n=42) while the commonest site of injury was hands and fingers (64.9%, n=61). A majority (85.5%, n=271) had good knowledge. Carpenters those who do not check machines (OR 2.85; 95% CI: 1.105-7.22, P=0.032), use personal protective equipments (OR 2.14; 1.087-4.21, P=0.025), work without rest (OR 2.3:95%CI: 1.08-4.94, P=0.034) and work with vibrating equipments continuously (OR 1.9: 95%CI: 1.11-3.37, P=0.024) were significantly associated with occurrence of occupational injuries.

5.2 Incidence of occupational injuries

First objective of this study was to determine the incidence of occupational injuries.

5.2.1 Overall incidence rate

The incidence of spells of occupational injuries was 296 per 1000 workers (95% CI: 248 - 348). Perera (2012) also reported similar results among the workers engaged in aluminum casting and manufacturing activities, in which the incidence of spells of injuries was 355.2 per 1000 workers, for period of three months.

5.2.2 Age specific incidence rate

Mean age was 39 (SD=11). Similar findings was reported by Mohotti (2006) in which the mean age of coir industry workers and coconut estate workers was 40.2 years (SD=9.2) and 41.3 years (SD=9.1) respectively. In the present study the highest incidence (327 per 1000 carpenters for a period of three months) of the occupational injuries was seen in >55 years age group. It was also observed that > 44 years workers were more likely (OR 1.4; 95% CI: 0.8-2.4, P=0.26) to sustain an injury compared to the <44 years workers, although the association was not statistically significant.

The age related issues like decreased coordinative reflexes, poor eye sight and few other issues like dementia and lack of concentration could be the reason. Similar findings were observed by Lipscomb et al. (2013) in which the carpenters aged 40 years or older had more amputations, fractures, and multiple injuries. Fernando (2012) also revealed that, older garment workers were more likely to sustain injury. In contrary, Mehta et al. (2011) found that 61% of the injured construction workers were in the age group of 21-30 and Mambulage (2012) also found that young age was significantly associated with injuries (OR 2.5; 95% CI: 1.04-6.19, P=0.03) among laboures of Ceylon Electricity Board. This may be due to younger workers being engaged in more labour intensive and risky activities such as carrying heavy loads and working at heights.

5.2.3 Socio-demographic factors and occupational injuries

Civil status

Civil status was not significantly associated with occupational injuries (OR 1.23; 95% CI: 0.6-2.4, P=0.619), However, the direction indicated that the ever married carpenters were more likely to sustain injuries. The reason for this may be the married people are less likely to fully concentrate to the work engaged since their mind may be preoccupied with their domestic and economic issues compared to the unmarried.

Mehta et al (2011) also reported similar finding with regard to construction workers in India, in which high proportion (82%, n=58) of injured workers were married. Moreover Fernando (2012) too revealed that, ever married garment workers had statistically significant association in sustaining injuries (OR 2.8; 95% CI: 1.05-8.3, P=0.04) compared to those who were unmarried. However Mambulage (2012) reported that injured people were more likely to be unmarried compared to uninjured (OR 3.5; 95% CI: 1.431-8.626, P=0.004).

Educational level

Although educational level was not significantly associated with occurrence of injuries (OR 1.19; 95% CI: 0.723-1.989, P=0.518), the direction of the odds ratio indicated that those who have not studied above grade 8, were more likely to sustain injuries. Uneducated were more susceptible to injuries due to lack of acquisition of knowledge of working with the instruments and learning how to avoid injuries, and also they may not have undergone technical training

or due to their low educational level they may not have been selected by a recognized training authority for a proper training in the trade.

In supportive to this finding of the study, Mehta et al. (2013) also stated, that chances of injuries decreases as the education qualification improves. According to Perera (2004) in terms of educational status, significant association was observed with proportion of farmers injured (P=0.024). In contrary to the finding of this study, Fernando (2012) reported that educated workers were more likely to sustain injuries (OR 1.4; 95% CI: 0.5-3.6, P=0.61).

5.2.4 Occupational related factors and occupational injuries

Work experience

The direction of the work experience more than 5 years was found to be more likely (OR 1.9; 95% CI: 0.73 – 5.28, P=0.205) to increase occurrence of occupational injuries, even though statistically not significant. As a person gains experience and expertise in his trade sometimes he could assume a sense of over confidence which may lead him taking risks ignoring the safety practices. This could be attributed to the fact that over confidence leading to paying less attention to their work.

In contrary to this findings, Mambulage (2012) reported that workers with less than 10 years work experience are more likely to sustain injuries, than those who have work experience more than 10 years and this association was statistically significant (OR2.658;95% CI: 1.091-6.476, P=0.025). A statistically significant difference was not observed between the service period and the injury of the rubber tappers and service and the injury of sundry workers (P>0.05) by Jayathilake (2010).

Occupational training

There was no significant association found between undergoing training and sustaining occupational injuries. The direction of the odds ratio indicated that untrained carpenters were more likely (OR 1.16; 95% CI: 0.59 – 2.28, P=0.724) to sustain injuries than the others who had any form of training. It can be assumed that a trained carpenter is aware of the risk of injury involved in his trade unlike an untrained worker as such liable to be exposed to the various risks at work.

5.3 Types of occupational injuries

Second objective of this study was to describe the type of injuries.

According to the results of the present study commonest type of injury was cut injuries, followed by crush injuries and lacerations and the most affected site was the fingers. Study done by Udayasiri (2002) among tea plantation workers has shown that, commonest injuries occurred during one month was abrasions (4.3%, n=23), lacerations (4.1%, n=22) and cut injuries (4.1%, n=22).

Cut injuries were the commonest injury type reported by both rubber tappers (13.1%, n=27) and sundry workers (18.9%, n=39) (Jayathilake, 2010) and according to Perera (2004) commonest injuries among farmers were abrasions and contusions (7.3%,n=47), lacerations and cut injuries were only 1.9% (n=12).

The commonest site of injury was hands and fingers, which accounted for 64.9% of all injuries and it was a quite high figure when compared to the study finding of Lipscomb et al (2013) as it was 21.1%. Among the construction workers in India it was, upper limb 34%, lower limb 22% and head 11 %. (Mehta et al. , 2011). This could be attributed to the fact that, improper use of tools and non usage of protective gear, injuring hands fingers.

The present study showed that, most common forms of mechanisms of injuries being, cut by an object (60.6%, n=57) struck by an object (17.1%, n=16) and crush by an object (11.7%, n=11). According to Lipscomb et al (2003) it was, struck by an object (25%), over exertion (19%), and cut or rubbed (8.8%).

5.3.1 Management of occupational injuries

First aid at worksite was given to 34% of the carpenters (n=32) and seems to be much lower than in other industrial sectors, as almost all the injured garment workers were given first aid (Fernando,2012). 31.9% (n=30) had taken treatment from general practitioner and 28.7% (n= 27) from government hospital OPD. Out of 94 injuries, 13 (13.8%) required hospital admission in which, 2 injuries (2.1%) needed major surgery. It could be thus projected that nearly 94 persons would be treated by a medical officer yearly. This appears to be fairly high figure for this population under study.

5.3.2 Sequel of injuries

A majority (78.7%, n=74) of the injured carpenters had complete recovery. However it is alarming that during a period of three months 5.3% (n=5) of study participants have received injuries which have left them with permanent disability and projection for one year could be much higher. Similar finding was reported by Fernando (2012) among garment workers, in which 90.9 % (n=20) of the injured garment workers had complete recovery whereas 9.1 % (n=2) were left with permanent disability.

5.4 Knowledge on occupational injuries

Third objective was to assess the knowledge on occupational injuries.

A majority of carpenters were aware about the mechanisms and types of occupational injuries that could occur in a work place and all respondents (100%, n=317) knew that machines and tools should be checked before starting to work and similar finding was reported by Perera (2004), in which 99.1% (n=634) farmers knew that hand tools and machines should be maintained properly to prevent the occurrence of injuries. Least scores were for undergoing proper training (82%, n=260) and using personal protective equipment (82.6%, n=262) as a preventive measure.

When considering the workplace factors associated with occurrence of injuries, only 79.5% (n=252) knew that excessive noise and overcrowding (82.6%, n=262) could increase the occurrence of occupational injuries, whereas inadequate light was considered as a factor associated with occupational injuries by 97.8% (n=310) of the respondents.

With regard to the knowledge on actions that would be taken when an injury occurs, 97.5% (n=309), said they would wash the wound with clean water, where as 93.4% agreed with the same, among the male agricultural workers (Perera ,2004).However only 59.9% (n=190) gave correct answer regarding application of antiseptic or antibiotic cream.

In the present study, with regard to the knowledge on actions that would be taken to arrest bleeding, applying pressure directly over the bleeding site was answered correctly by 92.1% (n=292) of the participants and elevate the bleeding part above the heart level by 81% (n=251). Similar findings (93.4%, n=598 and 93.9%, n=601 respectively) were reported by Perera (2004). However only 22.1 % (n=70) knew that tourniquet should be applied above the bleeding site in case of heavy bleeding.

Knowledge on application of splint for immobilization, in case of fracture, was not satisfactory. Only 16.1% (n=51) gave correct answer and almost half of the participants said they would give drinks to the injured in case of fracture (48.9%, n=155) and only 58.4% (n=185) agreed with identifying the broken limb.

Most of the carpenters had satisfactory knowledge, with regard to actions to be taken in case of eye injury. However considerable proportion (35.3%, n=112) of carpenters said they would try to take out the embedded foreign body in the eye ball.

Almost all the carpenters (99.4%, n=315) were aware that they should take the amputated part/parts to the hospital and rush to a hospital immediately (100%, n=317). Only 59.5 % (n=188) knew that amputated parts should not be placed in direct contact with ice.

Overall knowledge score given to each participant was further categorized as very poor (<25%), poor (25%-49%), satisfactory (50%-74%) and good (75%-100%) marks. All the study participants scored more than 50% and majority had good knowledge (85.5%, n=271), owing to the fact that they were questioned about basic facts related to the occupational injuries and majority of the carpenters (72.9%, n=231) having a work experience as a carpenter for more than 10 yrs, made them aware of the types and mechanisms of injuries, preventive measures as well as actions should be taken in case of injury. Further the inputs from awareness made through mass media and public health staff would have contributed for this satisfactory knowledge level.

On the contrary to above findings, Perera (2004) reported, overall knowledge on preventive measures 56.7% of the farmers had poor knowledge, while 27.5% and 15.8% respectively had a 'good' and 'very good 'knowledge.

According to the findings of the present study there was no statistically significant association between the knowledge level and the occurrence on injury (P=0.203), however the direction of the odds ratio showed that carpenters with good knowledge were 1.75 times (OR 1.75; 95% CI: 0.78-3.9) more likely to sustain injuries when compared to that of the carpenters with satisfactory knowledge. Although good portion of the workers expressed awareness of the risks involved and safety measures it would appear that they do not follow the safety measures.

Similar to the present study findings, Mambulage (2012) revealed that, marginally higher proportion with good knowledge reported higher number of injuries when compared to workers with poor knowledge, but the difference was not significant at 95% confidence interval.(OR 1.164; 95% CI : 0.488-2.780,P=0.728)

In supportive to above findings, Edirimanne and Jayawardena (2011) stated that, though the employees are sufficiently aware of correct ergonomics, they were reluctant to change certain practices because of their misconception that the tasks required more time and effort once it was done with correct bodily postures.

5.5 Work practices

Fourth objective of the study was to describe practices of carpenters in preventing occupational injuries. Workers were questioned about healthy and unhealthy work practices adopted by them at the work place and the answers were categorized as "always", "frequently", "sometimes" and "never".

5.5.1 Healthy work practices among the carpenters

More than half of the workers (52.1%, n=165) always checked whether the machines are in proper condition before starting to work, always work with adequate light (71.6%, n=227) and always involved with good housekeeping (55.5 %, n=176). Carpenters who do not check machines were 2.8 times (OR 2.85; 95% CI: 1.105-7.22) more likely to sustain injury to that of the carpenters who checked machines and the observation was statistically significant (P=0.032). This may be due to regular maintenance along with proper use of machinery and equipments could reduce injuries caused by faulty machinery and equipments.

Nearly half of the carpenters (45.4%, n =144) were not provided with adequate Personal Protective Equipments (PPE) and 89.2% (n=283) of the workers use PPE "sometimes" or "never". Among them the main reasons for non usage were uncomfortable (53.4%, n=151) and difficult to perform task (36%, n=102).

According to Mohotti (2006) only 29.7% (n=54) coir workers wore masks and none of them used boots, raincoats or gloves. Usage of PPE among 412 rubber tappers and sundry workers were very limited. Only 3 (0.7%) used boots, 4 (0.9%) wore masks, 3 used gloves (0.7%) and 17 used rain coats (4.1%). (Jayathilake, 2010). However, Mambulage (2012) reported that a majority of workers (81.4%, n=244) used PPE frequently or always and reason for not using gloves was not having enough gloves (62.4%, n=98) and inability to work well with gloves (19.1%, n=30)

Statistically significant observation (P=0.025) was made with regard to use of PPE and occurrence of injuries, in which carpenters who PPE were 2.14 times (OR 2.14; 95% CI: 1.087-4.21) more likely to sustain injuries than those who do not use PPE. It could be argued that improper and infrequent use, poor maintenance of the equipment as well as use of equipment such as face masks, which was the most commonest protective equipment used by the carpenters would not give any protection against occurrence of injuries.

According to Fernando (2012), the use of personal protective equipment was not found to be associated (OR 1.3; 95% CI 0.4-3.8, P=0.83) with occurrence of occupational injuries. However the direction of the odds ratio indicated that those using personal protective equipment were more likely to sustain injury.

5.5.2 Unhealthy work practices among the carpenters

Most of the workers (61.5%, n=195) were never engaged in the work that are not assigned, while 53% (n=171) were never engaged in work which they have not been trained. According to Mambulage (2012) 74.1% (n=223) said they never do what is not assigned to them.

A majority (76%, n=241) would never work under the influence of alcohol. Perera (2004) mentioned that 71.1% (n=455) farmers do not consume alcohol while at work.

Considerable proportion of study participants sometimes work without taking adequate rest (74.8%, n= 237), work for long duration (78.9%, n=250), work in noisy environment (73.5%, n=233), working in poorly illuminated work environment (78.9%,n=250), and working in an untidy/overcrowded work environment (71.3%,n=226) Only 38.2% (n=121) workers would never work with vibrating equipments continuously for at least 1-2 hours.

No statistically significant observation was made between the engage in works that are not assigned (P=0.62), engage in works which have not been trained (P=0.23), and the occurrence of occupational injuries. According to Perera (2012) most of the injuries (83.1%, n= 59) had occurred when worker engaged in work assigned to them.

Carpenters who work without adequate rest were 2.3 times (OR 2.3:95%CI: 1.08-4.94) more likely to be sustained with work related injury than the others who take adequate rest and this association was statistically significant (P=0.034). This could be attributed to the fact that physical and mental fatigue caused by continuous exposure to work.

Working with vibrating equipments was significantly associated with occurrence of injury (P=0.02) and carpenters who work with vibrating equipments continuously were 1.9 times (OR 1.9, 95% CI: 1.1-3.3) more likely to experience work related injuries, when compared to those do not work with such machines, and the reason for this may be muscle fatigue, sheer forces by the vibrating machines and also interference with the concentration.

Although there was no statistically significant association (P=0.29) between work under the influence of alcohol and occurrence of injury, the direction of the odds ratio indicated that those who work under the influence are more likely to sustain injury (OR 1.3:95% CI 0.77-2.42). Reasons for this may be deterioration of skills, reckless behavior, and poor concentration. Zheng et al. (2010) also reported that serious alcohol consumption is significantly associated with work related injuries. (OR 1.73; 95% CI: 1.12-2.69).

5.6 Strengths of the study

Moratuwa is the area which is famous for carpentry in Sri Lanka, thus it was the most suitable study setting for recruiting study participants.

A cross sectional descriptive study, which is the simplest form of epidemiological studies was adopted to determine the incidence, and describe the type of occupational injuries, knowledge and practices on occupational injuries among carpenters.

Incidence studies by Lwanga and Lemeshow (1991) was used to compute the sample size, which is based on critical value for the Type 1 error (95% confidence level) and the relative precision. Total sample of 352 was calculated with the non response rate 10% and design effect 1.2. Adequacy of the sample size and precision can be assed using the 95% confidence level. With regard to the present study, cumulative incidence of occupational injuries for a period of three months was 255.5per 1000 carpenters (95% CI: 209.8-305.7) which is relatively a narrow confidence interval and it indicates the adequacy of the sample size. Most of the variables calculated for associations had considerably narrow confidence interval suggesting adequacy of the sample size (age – OR 1.4; 95% CI;:0.82 -2.4, civil status-OR 1.23;95%CI: 0.62-2.42).

Sample was selected using three stage sampling procedure, therefore it was a good representative sample and internal validity was preserved.

Selection bias was minimized by having an appropriate eligibility criterion for the study population and using probability sampling technique with a design effect to select the sample.

A good response rate of 90.06% was achieved by good cooperation with the carpenters union of Moratuwa and it is unlikely to affect the external validity.

An interviewer administered questionnaire was used to collect data, considering the varying levels of education of carpenters, thus opportunity for clarification of doubts was provided. Further it is one of the instruments that could be applied conveniently in a community based study.

Based on supported literature (Mock et al, 1999 and Landen & hendrick , 1995) three month recall period was taken. The ability to recall increases with the severity of the injury, thus minor injuries could be easily forgotten by the worker so the use of only three month period was justifiable. In addition, maximum effort was taken to minimize recall bias and interviewer bias by using a questionnaire with simple wordings and interviewer training.

5.7 Limitations

The incidence observed may be an underestimate, since the study design was retrospective descriptive one which the reference period was three months immediately prior to the survey.

Although the expected injury rate could have been obtained from the surveillance data, since there was no proper recording system and especially injuries to the carpenters are not recorded either at workshop or by the health care provider, the investigator had to rely only on self reporting by the participants and there is a chance that minor injuries would have been missed.

Apparently there were no records maintain with regard to absence of work due to injury. Since only the survivors in the carpentry industry are assessed carpenters who had fatal injuries or were out of work due to injuries during this three month period, such as death, permanent disabilities could have been missed. Therefore the best study design to overcome above mentioned issues is a well designed prospective longitudinal study, where one is able to follow up the work related injuries and related factors. This was not feasible due to limited time available to complete the study.

The study was carried out in a single MOH area, using half of the Grama Niladahari divisions. Findings cannot be generalized to all the carpenters in Sri Lanka owing to the wide variation in socio-cultural, geographical as well as different work practices among carpenters in different parts of the country.

The interviews were conducted at workplace during working hours and the tendency might have been to finish responding to this survey early in order to continue with their routine work.

Except one, all the questions were closed ended, which have the disadvantage of confining to the answers selected by the investigator.

Instrument and subject bias also could have been associated with knowledge assessment as the knowledge questionnaire was not validated. Lack of validity of these data will affect the internal validity.

Although assessment of practices should ideally be through observations it was not feasible to carry out in this study due to limited resources and time constrains.

Confounding effect can distort the true association between occurrence of injuries and the variables assessed. Although use of methods such as multivariate analysis could control confounding, it was not done.

Only limited aspects of the epidemiology of injuries were assessed since the scope of the study had to be confined in order to complete data collection with the stipulated period.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

- The incidence of occupational injuries among carpenters in the Moratuwa Medical Officer of Health area, for a period of three months was 255.5 per 1000 workers and the incidence of spells occupational injuries for the period of three months was 296 per 1000 workers.

- The commonest types of injuries were superficial cuts and deep cuts and the most common forms of mechanisms of injuries were, cut by an object, struck by an object and crush by an object , while hands and fingers and forearm were the commonest sites of injuries.

- A majority had a good knowledge about types and mechanisms of injuries, preventive measures, workplace factors associated with occupational injuries and actions that should be taken when an injury occurs.

- Carpenters who do not check whether machines are in proper order, use of personal protective equipments, work without adequate rest, and work with vibrating equipments continuously, were significantly associated with occurrence of occupational injuries. Although engage in work that are not assigned, engage in works which have not been trained, work under the influence of alcohol were not significantly associated with occurrence of occupational injuries, their odds ratio were in the positive direction.

6.2 Recommendations

- Establishment of a proper injury surveillance system is recommended as injuries involving the informal sector workers are highly under reported and it should be considered as an important component of injury prevention.

- Although certain regulations are available with regard to industrial safety it appears that implementation of regulations at grass root level is almost nonexistent. Thus it is recommended that proper mechanism for implementation of regulations by relevant authorities be carried out.

- It is apparent that there is no institution or an authority that possess a list of carpentry shops that operate within the local authority area. However, it is noted at least societies which have been formed by carpenters in practice do exist. Thus any monitoring authority could first obtain the details of such carpentry shops as an initial step and prepare up to date records. This would provide ground level information for statutory authorities to implement and monitor their regulations either through direct or in collaboration with the local authority.

- There is a necessity to provide basic training on work techniques, handling equipments/tools and occupational safety measures for carpenters. This could be done through National Apprentice and Industrial Training Authority (NAITA) or through Institute for Construction Training and Development or other suitable authority.

- The results of this study indicated that carpenters who use personal protective equipments are more likely to sustain injuries, hence it is suggested that proper training in usage of personal protective equipments should be given and during the field visits by relevant authorities monitoring should be done on use of PPE.

- In order to reduce fatigue, regulations contained in factories ordinance for tea and meal breaks have to be implemented as the carpenters who work without taking proper rest are more likely to sustain in occupational injuries.

- To overcome the limitations of the retrospective study described above, focus should be made to conduct future prospective longitudinal studies as it provides more accurate data.

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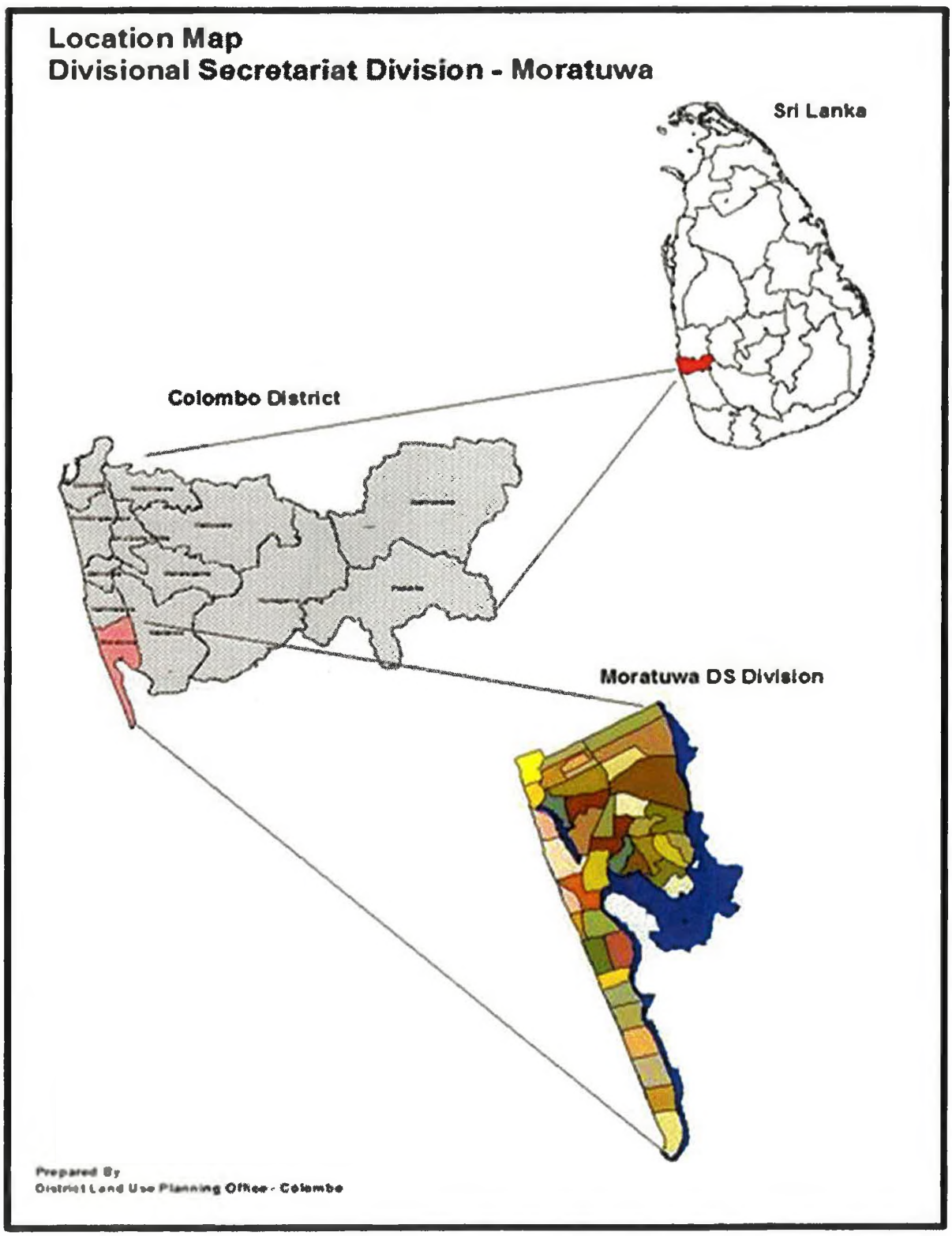
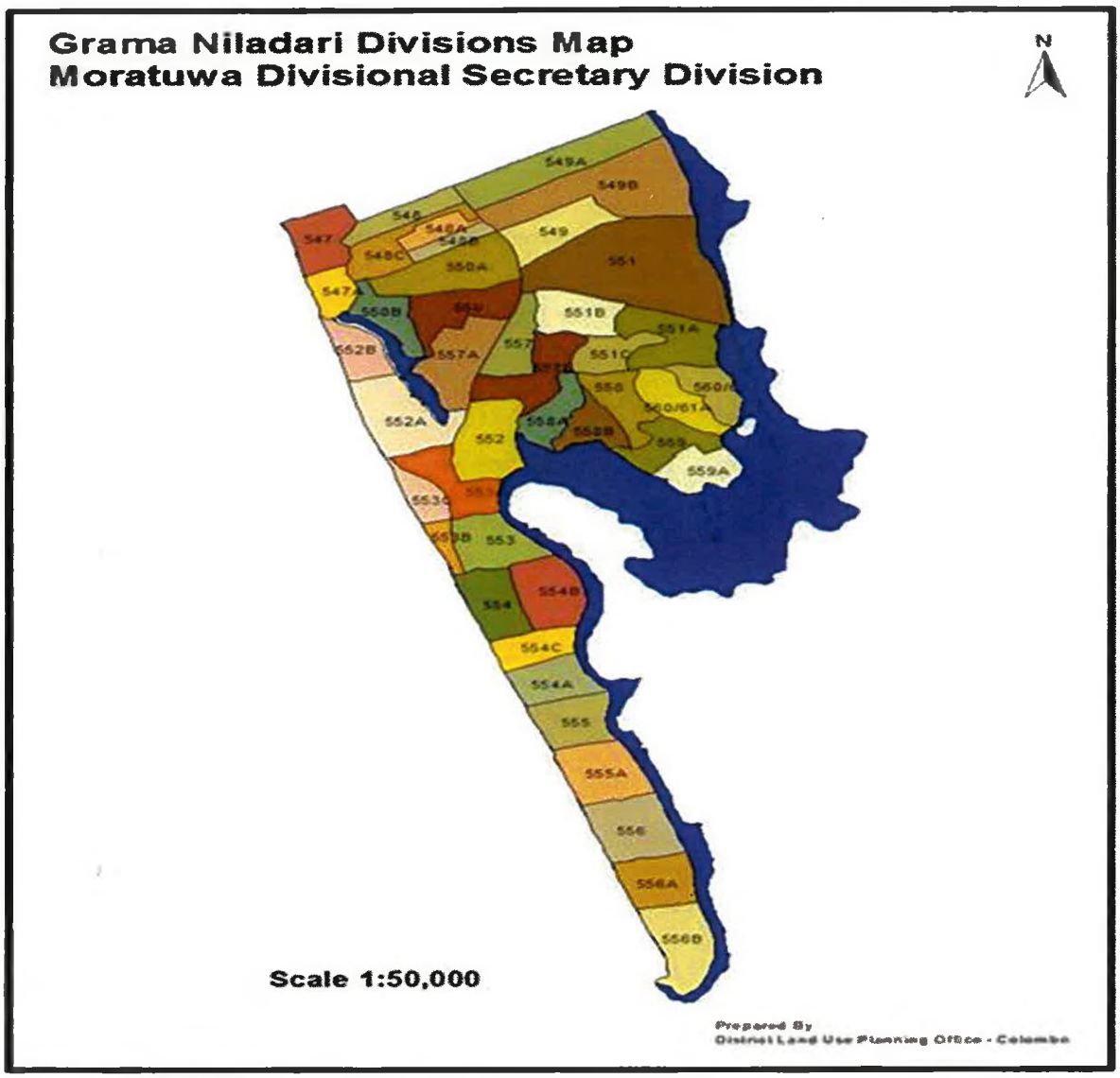
ANNEX - I

Map of the Moratuwa Divisional Secretary / Medical Officer of Health area




Grama Niladari Divisions Map
Moratuwa Divisional Secretary Division
N
549A
549B
548
548A
549
547
548C
551
550A
547A
550B
551B
551A
552B
557A
557
551C
550
560/61A
552A
552
558A
558B
553
559A
553C
553B
554B
554
554C
554A
555
555A
556
556A
556B
Scale 1:50,000
Prepared By
District Land Use Planning Office - Colombo

ANNEX - II

Carpenters in the Moratuwa Divisional Secretary/Medical Officer of Health area

GN name	GN number	Number of carpenters
Angulana North	547	91
Kaldemulla	548	62
Soysapura North	548A	37
Soysapura South	548B	5
Dahampura	548C	22
Thelawala North	549B	56
Borupana	549A	41
Thelawala South	549	30
Lakshapathiya North	550A	68
Lakshapathiya Central	550B	49
Angulana South	547A	77
Uyana South	552A	61
Uyana North	552B	209
Rawathawatta South	557B	103
Rawathawatta East	557	120
Lakshapathiya South	550	125
Kuduwamulla	551B	77
Katubedda	551	123
Molpe	551A	218
Moratumulla North	551C	312
Kadalana	558A	456
Rawathawatta West	557A	45
Idama	552	47
Uswatta	553C	84
Moratuwella South	553	160
Indibedda West	559	703
Moratumulla East	558	584
Moratumulla West	558B	557
Villorawatta East	560/61	572
Villorawatta West	560/61A	766
Indibedda East	559A	676
Moratuwella North	553A	24
Moratuwella West	553B	75

Table continued

GN name	GN number	Number of carpenters
Koralawella North	554	311
Koralawella East	554B	73
Koralawella West	554C	332
Koralawella South	554A	299
Katukurunda North	555	248
Katukurunda South	555A	264
Egoda Uyana North	556	275
Egoda Uyana Central	556A	199
Egoda Uyana South	556B	238
Total		8,874

Source; Census of Population and Housing -2001
Department of Census and Statistics
GN- Grama Niladhari Division

ANNEX- III

Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area

Interviewer Administered Questionnaire

Confidential. To be filled by the Principal Investigator

Serial number	
Date of data collection	

1. Socio–demographic factors

1. Age (In completed years at last birthday) D.O.B.....

1.	< 16 yrs	
2.	16- 30yrs	
3.	31 -45yrs	
4.	46-60yrs	
5	>60yrs	

2. Sex

1.	Male	
2.	Female	

3. Civil status

1.	Never married	
2.	Married	
3.	Divorced	
4.	Widowed	
5.	Other (Specify)	

4. Level of education

1.	No formal education	
2.	Grade 1 to 5	
3.	Grade 6 to 8	
4.	Grade 9 to O/L	
5.	A/L or above	

2. Details related to occupation

5. Work experience as a carpenter

1.	1 to3yrs	
2.	>3 to 5 yrs	
3.	>5 to 7 yrs	
4.	>7 to 10yrs	
5.	>10yrs	

6. Period of work in the present work place

1.	1 to 3 yrs	
2.	>3 to 5 yrs	
3.	>5 to 7 yrs	
4.	>7 to 10 yrs	
5.	> 10 yrs	

7. Were you given any form of training related to carpentry?

1.	Yes	
2.	No	

8. If yes, what was the training

1.	Formal training	
2.	Informal training before starting the work	
3.	On the job training while at work	

9. Average working hours per day

1.	< 8 hrs	
2.	8-10 hrs	
3.	>10-12 hrs	
4.	> 12 hrs	

10. Number of working days per week

1.	< 3 days	
2.	3 to 5 days	
3.	6 days	
4.	7 days	

Average working hours per week ..... hours

11. Type of work done (multiple answers possible)

1.	Cutting with hand saw	
2.	Cutting with machine	
3.	Shaping the wood using mechanised hand tools	
4.	Shaping the wood using non mechanised hand tools	
5.	Fastening materials together with nails, screws, staples, and adhesives	
6.	Polishing	
7.	Sanding with mechanised tool	
8.	Sanding without mechanised tools	
9.	Unloading and stacking of the logs	
10.	Sawing of the logs manually	
11	Sawing of the logs on the bench by circular saws run by electric machine	
12.	Carving by mechanised tool	
13.	Carving by non mechanised hand tool	

3. Occurrence of occupational injuries

12. Did you have any incidence of personal injury/injuries during the past 3 months while working?

1.	Yes	
2.	No	

13. If yes, how many episodes/frequency

1.	One	
2.	Two	
3.	Three	
4.	Four	
5.	Five or more	

14. Date and time of occurrence

Injury	**Date**	**Time**
Injury 1		
Injury 2		
Injury 3		
Injury 4		
Injury 5		

15. Mechanism of the injury

	Mechanism	Injury 1	Injury 2	Injury 3	Injury 4	Injury 5
1.	Cut by an object					
2.	Struck by an object					
3.	Crush by an object					
4.	Lifting an object					
5.	Pushing or pulling an object					
6.	Falls					
7.	Electrocution					
8.	Others (specify)					

4. Description of Injury and treatment received

16. Site of the Injury

	Site	Injury 1	Injury 2	Injury3	Injury4	Injury 5
1.	Hands and fingers					
2.	Forearm and upper arm					
3.	Eye					
4.	Face					
5.	Head					
6.	Lower limb					
7.	Other parts of the body					

17. Type of the Injury

	Type	Injury1	Injury2	Injury3	Injury4	Injury 5
1.	Superficial cut (near the surface)					
2.	Deep cut (beneath the surface)					
3.	Abrasion					
4.	Laceration					
5.	Crush					
6.	Prick					
7.	Injury to eye					
8.	Fracture					
9.	Acute muscle strain					
10.	Electrocution					
11.	Burn					
12.	Other injury (specify)					

18. Type of care received (multiple answers possible)

	Type of care	Injury1	Injury2	Injury3	Injury4	Injury 5
1.	First aid at the work site					
2.	OPD treatment at the hospital					
3.	Treatment from GP					
4.	Hospital admission– Non surgery					
5.	Hospital admission – Minor surgery					
6.	Hospital admission – Major surgery					

19. If treatment outside workplace type of service provider

	Type of care	Injury1	Injury2	Injury3	Injury4	Injury 5
1.	Government hospital					
2.	Private hospital					
3.	GP dispensary					

20. If admitted to the hospital, duration of stay

		Injury 1	Injury2	Injury3	Injury4	Injury 5
1.	1 -2 days					
2.	3 - 4 days					
3.	5 to 7 days					
4.	>1week to 2 weeks					
5.	> 2 weeks					

21. Recovery

		Injury1	Injury2	Injury3	Injury4	Injury 5
1.	No disability					
2.	Temporary disability					
3.	Permanent partial disability					
4.	Permanent complete disability					

5. Knowledge on occupational injuries

22. What are the mechanisms where workplace injury could occur in a carpentry workshop?

		Yes	No	Don't know
1.	Cut by an object			
2.	Struck by an object			
3.	Crush by an object			
4.	Lifting			
5.	Pushing or pulling an object			
6.	Falls			

23. What are the types of injuries which can occur during work?

		Yes	No	Don't know
1.	Cut injuries			
2.	Abrasion /laceration			
3	Crush			
4.	Prick			
5.	Injury to eye			
6.	Fracture			
7.	Acute muscle strain			
8.	Electrocution			
9.	Burn			

24. What are the preventive measures that you should take to prevent/minimize workplace injuries?

		Yes	No	Don't know
1.	Checking tools/machine before starting the work			
2.	Guarding the dangerous parts of the machines			
3.	Using the personal protective equipment			
4.	Good house keeping			
5.	Undergoing proper training			
6.	Adhering to proper techniques in operating machinery			
7.	Adequate rest			
8.	Having realistic targets and workload			

25. Do you think the following factors in the carpentry workshop have an effect on injuries?

		Yes	No	Don't know
1.	Inadequate light			
2.	Overcrowding of the workshop			
3.	Excessive noise			
4.	Working long duration with vibrating machinery			
5.	Excessive workload			
6.	Feeling that you are stressed			

State the action that you would take in following situations

26. When a cut injury, crush injury, abrasion, laceration or prick injury occur.

	Action	Yes	No	Don't know
1.	Wash the wound with clean water and gently remove contaminated particles.			
2.	Apply antiseptic like betadine or antibiotic cream			
3.	Cover the wound with clean cloth or gauze			
4.	Apply oil/ turmeric powder /coffee powder to the wound			

27. In an injury to arrest bleeding

	Action	Yes	No	Don't know
1.	Apply pressure directly over the bleeding site			
2.	Elevate the bleeding part if possible above the heart			
3.	In case of heavy bleeding apply the pressure above the bleeding site with tourniquet			
4.	Apply the pressure below the bleeding site with tourniquet			

28. In an injury with fracture

	Action	Yes	No	Don't know
1.	Identify the broken limb (gentle pressure or movement cause severe pain, appear as deformed, numbness or discoloration of extremity of limb			
2.	Apply ice to reduce pain, swelling and bleeding			
3.	Immobilize by applying a splint			
4.	Try to correct the deformity			
5.	Give drinks to the injured person			
6.	Push the protruding bone back through the skin			

29.In an injury to an eye

	Action	Yes	No	Don't know
1.	When foreign body or chemical gets into eye , wash thoroughly with clean water			
2.	Cover the eye with clean dressing or cloth			
3.	Seek medical treatment			
4.	Wash the eye with anything other than water			
5.	Rub the eye			
6.	Remove the embedded foreign bodies in the eyeball			

30. In a case of amputation of fingers

	Action	Yes	No	Don't know
1.	Take amputated part/parts to the hospital			
2.	Carry amputated part/parts in a clean bag placed inside an ice bag (should not be in direct contact with ice)			
3.	Rush to a hospital immediately.			
4.	Carry the amputated part/parts in a bag filled with water			
5.	Place the amputated part/parts in direct contact with ice			

6. Work practices

31. Do you check whether tools/machines are in proper working condition before starting the work?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

32. Do you engage in works that are not assigned to you?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

33. Do you engage in work in which you have not been trained or not very competent?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

34. Have you been provided with adequate personal protective equipment?

1.	Yes	
2.	No	

35. Do you use personal protective equipment?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

36. If not wearing Personal Protective Equipment what is the reason?

1.	Uncomfortable	
2.	Difficult to perform tasks with PPE	
3.	Adequate quantities not supplied	
4.	Wearing PPE will not have a significant effect in preventing injuries	

37. Do you work with unguarded/unprotected machines?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

38. Do you work under the influence of alcohol?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

39. Do you work with adequate light in the work place?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

40. Do you store equipment/tools in a specific place safely and arrange the work place neatly after finishing the work?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

41. Do you work without adequate rest?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

42. Do you work for long duration (10 -12 hours per day)?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

43. Do you work in a noisy environment?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

44. Do you work with vibrating equipment continuously for at least 1 – 2 hours?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

45. Do you work in a poorly illuminated work environment?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

46. Do you work in an untidy overcrowded work environment?

1.	Always	
2.	Frequently	
3.	Sometimes	
4.	Seldom	
5.	Never	

මොරටුව සෞඛ්‍ය වෛද්‍ය නිළධාරී කොට්ඨාශයේ වඩුකාර්මිකයන් අතර දක්නට ලැබෙන වෘත්තීමය අනතුරු සහ එම වෘත්තීමය අනතුරු සම්බන්ධයෙන් ඔවුන්ගේ දැනුම හා ක්‍රියාමාර්ග

ප්‍රශ්නාවලිය

රහසිගතයි. සම්පූර්ණ කරනු ලබන්නේ මූලික විභාගකරු විසිනි

අනුක්‍රමික අංකය	
තොරතුරු ලබාගත් දිනය	

01. පෞද්ගලික තොරතුරු

1. වයස (අවසන් උපන් දිනයට)

1.	< අවු 16	
2.	අවු 16-30	
3.	අවු 31-45	
4.	අවු 46-60	
5	>අවු 60	

02. ස්ත්‍රී පුරුෂ භාවය

1.	පුරුෂ	
2.	ස්ත්‍රී	

03. විවාහක /අවිවාහක බව

1.	අවිවාහක	
2.	විවාහක	
3.	දික්කසාද	
4.	වැන්දඹු	
5.	වෙනත්	

04. අධ්‍යාපන මට්ටම

1.	විධිමත් අධ්‍යාපනයක් නොමැත	
2.	1 සිට 5 පංතිය දක්වා	
3.	6 සිට 8 පන්තිය දක්වා	
4.	9 සිට සාමාන්‍ය පෙළ දක්වා	
5.	උසස් පෙළ හෝ ඊට ඉහළ සුදුසුකම්	

02.රැකියාව සම්බන්ධ තොරතුරු

5 වඩුකාර්මිකයකු ලෙස සේවා පළපුරුද්ද

1.	අවු 1 සිට 3 දක්වා	
2.	>අවු 3 - අවු 5	
3.	>අවු 5 - අවු 7	
4.	>අවු 7 - අවු 10	
5.	>අවු 10	

6. වර්තමාන සේවා ස්ථානයේ සේවා කාලය

1.	අවු 1 සිට 3 දක්වා	
2.	>අවු 3 - අවු 5	
3.	>අවු 5 - අවු 7	
4.	>අවු 7 - අවු 10	
5.	>අවු 10	

7. වඩු කර්මාන්තය සම්බන්ධයෙන් කුමන ආකාරයක හෝ පුහුණුවක් ලබා තිබේද ?

1.	ඔව්	
2.	නැත	

8. ඔව් නම් කුමන ආකාරයේ පුහුණුවක්ද?

1.	විධිමත් පුහුණුවක්	
2.	අවිධිමත් පුහුණුවක් රැකියාවට බැඳීමට පෙර	
3.	රැකියා කරන අතරතුර ලබන පුහුණුව	

9. සාමාන්‍ය වශයෙන් දිනකට සේවයේ යෙදී සිටින පැය ගණන

1.	< පැය 8	
2.	පැය 8 -10	
3.	>පැය 10 ී 12	
4.	> පැය 12	

10. සතියකට සේවය කරන දින ගණන

1.	< දින 3	
2.	දින 3 -5	
3.	දින 6	
4.	දින 7	

සතියකට සේවක කරන සාමාන්‍ය පැය ගණන .....

11. ඔබ යෙදෙන කාර්යයන් වර්ග මොනවාද?(බහු පිළිතුරු දිය හැක)

1.	කියතෙන් කැපීම	
2.	යන්ත්‍ර භාවිතයෙන් කැපීම	
3.	යාන්ත්‍රික කළ අත් උපකරණ භාවිතයේදී ලී හැඩ කැපීම	
4.	යාන්ත්‍රික නොකළ අත් උපකරණ භාවිතයේදී ලී හැඩ කැපීම	
5.	ඇණ, ඉස්කුරුප්පු , කොකු ඇණ හා ඇලවුම් ද්‍රව්‍ය භාවිතයෙන් ද්‍රව්‍ය එකිනෙකට සවි කිරීම	
6.	ඔප දැමීම.	
7.	යාන්ත්‍රික කළ අත් උපකරණ භාවිතයේදී ලී මැදීම	
8.	යාන්ත්‍රික නොකළ අත් උපකරණ භාවිතයේදී ලී මැදීම.	
9	ලී කඳන් බෑම සහ ඇහිරීම	
10	යන්ත්‍ර බාවිත නොකර ලී කඳන් ඉරීම	
11	විද්‍යුත් යන්ත්‍රයකින් ක්‍රියා කරන රවුළු කියත ආධාරයෙන් බංකුව මත තබා ලී කඳන් ඉරීම	
12	යාන්ත්‍රික කළ අත් උපකරණ භාවිතයෙන් කැටයම් කැපීම	
13	යාන්ත්‍රික නොකළ අත් උපකරණ භාවිතයෙන් කැටයම් කැපීම.	

03. රැකියා ආශ්‍රිත තොරතුරු සිදුවීම.

12. පසුගිය මාස 3 තුළදී රාජකාරියේ යෙදි සිටියදී ඔබ යම් අනතුරකට ලක්වී තුවාල සිදුවූයේද ?

1.	ඔව්	
2.	නැත	

13. ඔව් නම් සිද්ධි / වාර ගණන

1.	එකයි	
2.	දෙකයි	
3.	තුනයි	
4.	හතරයි	
5.	පහයි හෝ ඊට වැඩි	

14. අනතුරට ලක්වූ දිනය සහ වෙලාව

අනතුර	දිනය	වේලාව
අනතුර1		
අනතුර 2		
අනතුර 3		
අනතුර 4		
අනතුර 5		

15. අනතුර සිදුවූ ආකාරය

	ආකාරය	අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර5
1.	කැපීමකින්					
2.	වස්තුවක් හා ගැටීමෙන්					
3.	තැළීමකින්					
4.	වස්තුවක් ඉස්සීමෙන්					
5.	වස්තුවක් තල්ලු කිරීමෙන් හෝ ඇදීමෙන්					
6.	වැටීමකින්					
7.	විදුලි සැර වැදීමෙන්					
8.	වෙනත් (සඳහන් කරන්න)					

04. අනතුරු සම්බන්ධ විස්තරය හා ප්‍රතිකාර කළ ආකාරය

16.අනතුරට ලක්වූ ශරීරයේ කොටස

	ශරීර කොටස	අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	දෑත් සහ ඇඟිලි					
2.	අත (උඩු සහ යට බාහුව)					
3.	දෑස					
4.	මුහුණ					
5.	හිස					
6.	දෙකකුල්					
7.	ශරීරයේ වෙනත් කොටස්					

17.අනතුරේ ස්වභාවය

	ස්වභාවය	අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	නොගැඹුරු කැපීමක් (සම මතුපිට)					
2.	ගැඹුරු කැපීමක් (සම මතුපිටට පහළ)					
3.	සිරීමක්					
4.	සම ඉරීමක්					
5.	තැලීමක්					
6.	ඇනීමක්					
7.	ඇසට සිදුවූ අනතුරක්					
8.	අස්ථි බිඳීමක්					
9.	මාංශ පේශී ඇදීමක්					
10.	විදුලි සැර වැදීමක්					
11.	පිළිස්සුම් තුවාල					
12.	වෙනත් (සඳහන් කරන්න)					

18.ලබාගත් ප්‍රතිකාරයේ ස්වභාවය (බහු පිළිතුරු දිය හැක)

	ලබාගත් ප්‍රතිකාරය	අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	ප්‍රථමාධාර රාජකාරී ස්ථානයේ					
2.	රෝහලේ බාහිර රෝගී අංශයෙන්					
3.	පෞද්ගලික වෛද්‍යවරයකුගෙන්					
4.	රෝහල් ගත වීම - ශල්‍ය කර්ම නොවන					
5.	රෝහල් ගත වීම - සුළු ශල්‍ය කර්ම					
6.	රෝහල් ගත වීම - මහා ශල්‍ය කර්ම					

19.ප්‍රතිකාර ලබා ගන්නේ රාජකාරී ස්ථානයෙන් පිටත නම් ප්‍රතිකාර ලබා ගත් ස්ථානය

	ප්‍රතිකාර ලබා ගත් ස්ථානය	අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	රජයේ රෝහලකින්					
2.	පෞද්ගතික රෝහලකින්					
3.	පෞද්ගලික බෙහෙත් ශාලාවකින්					

20.රෝහල් ගත වූයේ නම් රෝහලේ සිටි දින ගණන

		අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	දින 1 -2					
2.	දින 3-4					
3.	දින 5 -7					
4.	>දින 7 - සති 2					
5.	> සති 2					

21.යථාතත්වයට පත්වීමේ ස්වභාවය

		අනතුර 1	අනතුර 2	අනතුර 3	අනතුර 4	අනතුර 5
1.	ආබාධිත නැත					
2.	තාවකාලික ආබාධිත					
3.	ස්ථිර අර්ධ ආබාධිත					
4.	ස්ථිර පූර්ණ ආබාධිත					

5.රැකියා ආශ්‍රිත අනතුරු සම්බන්ධ දැනුම

22.වඩුකාර්මික සේවා ස්ථානය තුළ අනතුරු සිදුවිය හැකි ආකාර මොනවාද ?

		ඔව්	නැත	නොදනී
1.	කැපීම			
2.	වස්තුවක් හා ගැටීම			
3.	තැලීම			
4.	වස්තුක් ඉස්සීමෙන්			
5.	වස්තුවක් තල්ලු කිරීම හෝ ඇදීම			
6.	වැටීමකින්			

23.රැකියාවේ යෙදී සිටියදී සිදුවිය හැකි අනතුරු වල ස්වාභාවය මොනවාද ?

		ඔව්	නැත	නොදනී
1.	කැපීම්			
2.	සිරීම් /විදාරණය			
3	තැලීම්			
4.	ඇනීම්			
5.	ඇසට වන අනතුරු			
6.	අස්ථි බිඳීම්			
7.	මාංශ පේශී වල ඇඳීම්			
8.	විදුලි සැර වැදීම්			
9.	පිළිස්සුම් තුවාල			

24.සේවා ස්ථාන තුල අනතුරු වල වළක්වා ගැනීමට / අවම කර ගැනීමට ගතහැකි ක්‍රියාමාර්ග මොනවාද?

		ඔව්	නැත	නොදනී
1.	වැඩ කිරීම ඇරඹීමට පෙර උපකරණ/ යන්ත්‍ර පරීක්ෂා කිරීම			
2.	යන්ත්‍ර වල අනතුරුදායක කොටස් ආවරණය කිරීම			
3.	පුද්ගලික ආරක්ෂාවට උපකරණ භාවිත කිරීම			
4.	සේවා ස්ථානයේ සැලසුම් කරණය/ පිළිවෙලකට තැබීම			
5.	නිසි පුහුණුවක් ලැබීම.			
6.	යන්ත්‍ර ක්‍රියා කිරීමේදී නියමිත ක්‍රියා පිළිවෙලක් අනුගමනය කිරීම			
7.	ප්‍රමාණවත් විවේකය			
8.	තාත්වික ඉලක්ක සහ වැඩ ප්‍රමාණයක් තබා ගැනීම			

25. ඔබ සිතන ආකාරයටවඩුකාර්මික සේවා ස්ථානය තුල අනතුරු ඇති වීමට පහත සඳහන් සාධක බලපකරයි ද?

		ඔව්	නැත	නොදනී
1.	ආලෝකය ප්‍රමාණවත් නොමැති වීම			
2.	සේවා ස්ථානය තුළ අධික ජනගහනය			
3.	අධික ශබ්දය			
4.	කම්පනය වන යන්ත්‍ර සමඟ දිගු වේලාවක් වැඩ කිරීම			
5.	අධික වැඩ ප්‍රමාණය			
6.	ඔබ පීඩනයට ලක්වී ඇතැයි යන හැඟීම			

පහත සඳහන් අවස්ථාවන්හිදී ඔබ ක්‍රියා කරන ආකාරය සඳහන් කරන්න.

26 .කැපීම් , තැලීම් , සිරීම් හෝ ඇනීම් වැනි අනතුරක් සිදු වූ විට

	ක්‍රියාව	ඔව්	නැත	නොදනී
1.	තුපවාලය පිරිසිදු ජලයෙන් සෝදා මෘදු ලෙස අපිරිසිදු දෑ ඉවත් කිරීම			
2.	බෙටඩින් හෝ ප්‍රතිජීවක ආලේපන තැවිරීම			
3.	තුවාලය පිරිසිදු රෙදි කැබැල්ලකින්/ ගෝස් කැබැල්ලකින් ආවරණය කිරීම			
4.	තෙල්/කහ කුඩු / කෝපි කුඩු වැනි දෑ තුවාලයේ ආලේපනය කිරීම			

27. අනතුරක් සිදු වූ විට ලේ වහනය වීම නැවතීම සඳහා

	ක්‍රියාව	ඔව්	නැත	නොදනී
1.	ලේ වහනය සිදුවන තැනට උඩින් පීඩනයක් යෙදීම			
2.	ලේ වහනය වන ශරීර කොටස , හැකිනම් හෘද මට්ටමට වඩා ඉහළට එසවීම			
3.	අධික ලේ වහනයකදී , ලේ යාම වලකන තිරිංගයක් ලේ වහනය වන තැනට ඉහළින් බැඳීම			
4.	ලේ යාම වලකන තිරිංගයක් , ලේ වහනය වන තැනට පහළින් බැඳීම			

28. අස්ථි බිඳීමක් වැනි අනතුරකදී

	ක්‍රියාව	ඔව්	නැත	නොදනී
1.	කැඩුනු අවයවය හඳුනා ගන්න. (සියුම් පීඩනයක් හෝ සෙලවීමකදී දරුණු වේදනාවක් ඇතිවේ. විකලාංගතාවය පෙනක්නුම් කරයි , හිරි වැටීම හෝ අවයව වල පැහැය වෙනස් වීම.			
2.	වේදනාව , ඉදිමීම, හා ලේ වහනය අවම කිරීමට , අයිස් තැබීම.			
3.	පතුරක් භාවිතයෙන් අස්ථිය නිශ්චල කිරීම.			
4.	විකලංගතාව නිවැරදි කිරීමට උත්සහ කිරීම.			
5.	අනතුරකට ලක්වූ පුද්ගලයාට බීමට යමක් දීම.			
6.	පිටතට නෙරා ඇති අස්ථි කොටස් සම හරහා ඇතුළට තල්ලු කිරීම.			

29. ඇසට අනතුරක් සිදු වූ විට

	ක්‍රියාව	ඔව්	නැත	නොදනී
1.	ආගන්තුක හෝ රසායනික දෑ ඇසට ඇතුල් වූ විට , පිරිසිදු ජලයෙන් හොඳින් ඇස් සෝදන්න			
2.	පිරිසිදු රෙදි කැබැල්ලකින් ඇස් ආවරණය කිරීම			
3.	වෛද්‍ය උපදෙස් පැතීම			
4.	ජලය හැර ඕනෑම දෙයකින් ඇස් සේදීම			
5.	ඇස ඇතිල්ලීම			
6.	ඇසේ ඇති ආගන්තුක දෑ ඉවත් කිරීම.			

30. අනතුරකින් ඇඟිලි වෙන්වීමක් සිදු වූ විට

	ක්‍රියාව	ඔව්	නැත	නොදනී
1.	වෙන් වූ ඇඟිලි කොටස /කොටස් රෝහලට රැගෙන යාම			
2.	ඇඟිලි කොටස් / කොටස පිරිසිදු බෑගයකට දමා එය අයිස් සහිත බෑගයක බහාලීම . (ඇඟිලි කොටස් කෙළින්ම අයිස් හා සම්බන්ධ නොවිය යුතුයි)			
3.	හැකි ඉක්මනින් රෝහලට රැගෙන යාම			
4.	වෙන්වූ ඇඟිලි කොටස වතුර පිරි බෑගයක බහා ලීම			
5.	වෙන්වූ ශරීර කොටස / කොටස් කෙලින්ම අයිස් හා සම්බන්ධ වන සේ තැබීම.			

6. රැකියාව සම්බන්ධ ක්‍රියා මාර්ග

31. වැඩ ආරම්භ කිරීමට පෙර , උපකරණ / යන්ත්‍ර නියම ක්‍රියාකාරීත්වයේ තිබේදැයි ඔබ පරීක්ෂා කර බලනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

32. ඔබට නොපරවන ලද කාර්‍යයන්හි ඔබ යෙදෙනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

33. ඔබ පුහුණු නොමැති හෝ කාර්යක්ෂම නැති හෝ කාර්‍යයන්හි නියැලෙනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

34.ප්‍රමාණවත් පුද්ගලික ආරක්ෂක උපකරණ ඔබ හට ලබා දී තිබේද ?

1.	ඔව්	
2.	නැත	

35. ඔබ පුද්ගලික ආරක්ෂක උපකරණ භාවිතා කරනවාද?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

36. පුද්ගලික ආරක්ෂක උපකරණ භාවිතා නොකරන්නේ නම් ඊට හේතුව ?

1.	උපහසුයි	
2.	කාර්යයන් ඉටු කිරීමට අසීරුයි	
3.	ප්‍රමාණවත් ගණනක් සපයා නොමැත	
4.	පුද්ගලික ආරක්ෂක උපකරණ භාවිතයෙන් සැලකිය යුතු ලෙස අනතුරු වළක්වා ගත නොහැක.	

37. ඔබ ආවරණය නොකරනු ලද/ අනාරක්ෂිත යන්ත්‍ර ක්‍රියා කරනවාද?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

38. ඔබ මත්පැන් පානය කර, සේවයේ යෙදෙනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

39. ඔබ සේවයේ යෙදෙන්නේ ප්‍රමාණවත් ආලෝකයක් සමඟද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

40. ඔබ වැඩ අවසන් වූ පසු උපකරණ නිශ්චිත ස්ථානයක අසුරා, සේවා ස්ථානය පිළිවෙලකට සකසනවාද?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

41. ඔබ ප්‍රමාණවත් විවේකයක් නොමැතිව වැඩ කරනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

42. ඔබ දීර්ඝ වේලාවක් වැඩ කරනවාද ? (පැය 10 -12 දිනකට)

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

43. ඔබ අධික ශබ්දය සහිත පරිසරයක වැඩ කරන්නේද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

44. ඔබ කම්පනය වන උපකරණ හා අඛණ්ඩ සේවය කරනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

45. අසාතුටුදායක ආලෝක්යක් සහිත සේවා පරිසරයක ඔබ සේවය කරනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

46. අපිළිවෙල , අධිජනගහනයක් සහිත සේවා පිසරයක් තුළ වැඩ කරනවාද ?

1.	සැමවිටම	
2.	නිතර	
3.	සමහර විට	
4.	කලාතුරකින්	
5.	කිසි විටෙකත් නැත	

ANNEX- IV

INFORMATION SHEET

DR.H.N.A Fonseka,
Post Graduate trainee-Msc Community medicine,
Post Graduate Institute of Medicine,
Colombo 7.

Research on Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area

This is to kindly request for your participation in the research study conducted by me titled "Incidence
Of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Office of Health area. The purpose of the study is to find details of the work related injuries among carpenters which adversely affect the carpenter community socially and economically and your participation will provide important and valuable information which will be very useful in bringing out safety procedures in the future in reduction of injuries of various magnitudes.

You will be asked few questions on your personal data, occupational injuries you may have faced during past three months, your knowledge and practices on occupational injuries. You are welcome to ask questions at any point of the interview to clarify any matters.

This is entirely a voluntary exercise on your part and your unwillingness to participate or withdrawal after consent will not affect you in anyway and you are free to withdraw at anytime without giving a reason.

Absolute confidentiality of all information, personal or occupational provided is guaranteed.

Thanking you.

Dr.H.N.A Fonseka.

Contact details-
Mobile no 0718047860.

තොරතුරු පත්‍රිකාව

වෛද්‍ය එච්.එන් .ඒ .ෆොන්සේකා
ප්‍රජා වෛද්‍ය පශ්චාත් උපාධි (පුහුණුවන)
වෛද්‍ය විද්‍යා පශ්චාත් උපාධි ආයතනය,,
කොළඹ.

මොරටුව සෞඛ්‍ය වෛද්‍ය නිළධාරී කොට්ඨාශයේ වඩුකාර්මිකයන් අතර දක්නට ලැබෙන වෘත්තීමය අනතුරු සහ එම වෘත්තීමය අනතුරු සම්බන්ධයෙන් ඔවුන්ගේ දැනුම සහ ක්‍රියාමාර්ග පර්යේෂණය

කොළඹ වෛද්‍ය විද්‍යා පශ්චාත් උපාධි ආයතනයේ අභ්‍යාසලාභී වන වෛද්‍ය එච්.එන් .ඒ .ෆොන්සේකා මම ඉහත සඳහන් පර්යේෂණ සඳහා ඔබට කාරුණිකව ආරාධනා කරමි.

මෙම පර්යේෂණයේ මූලික අරමුණ වන්නේ වඩුකාර්මික ප්‍රජාවට සාමාජීය හා ආර්ථික වශයෙන් අහිතකර ලෙස බලපාන වෘත්තීමය අනතුරු සම්බන්ධයෙන් තොරතුරු සොයා ගැනීමයි. ඔබගේ සහභාගීත්වය සහ ඔබ සපයන වැදගත් තොරතුරු අනාගතයේදී වෘත්තීමය අනතුරු අවම කර ගැනීමට ඉවහල් වන ආරක්ෂිත ක්‍රියා මාර්ග ගෙන ඒමට උපකාරීවේ.

ඔබගේ පෞද්ගලික තොරතුරු, පසුගිය මාස 3 ඇතුලත ඔබ මුහුණ දුන් වෘත්තීමය අනතුරු, එම අනතුරු ගැන ඔබගේ දැනුම හා ක්‍රියාමාර්ග සම්බන්ධයෙන් ප්‍රශ්න කිහිපයක් අසනු ලැබේ.

මෙය සම්පූර්ණයෙන් , ස්වේච්ඡාවෙන් ඉදිරිපත් වීමක් වන අතර ඔබගේ නොකැමැත්ත හෝ අනුමැතිය දීමෙන් අනතුරුව ඉවත් වීම, ඔබට කුමන ආකාරයක හෝ බලපෑමකින් ඇති නොකරයි.

ඕනෑම වේලාවක මෙයින් ඉවත්වීමට ඔබට සම්පූර්ණයෙන් නිදහස ඇති අතර, ඒ සඳහා හේතු දීමට අවශ්‍ය නොමැත.

ඔබ සැපයූ පෞද්ගලික හා වෘත්තීමය තොරතුරු සම්බන්ධයෙන් සම්පූර්ණ රහසිගත බව සුරැකීමට සහතික වෙමි.

ස්තුතියි

.....

වෛද්‍ය එච්.එන් .ඒ .ෆොන්සේකා

සම්බන්ධීකරණ තොරතුරු
දුරකථන අංකය 0718047860

ANNEX- V

VOLUNTEER CONSENT FORM

DR.H.N.A Fonseka,
Post graduate trainee –Msc Community medicine
Post Graduate Institute of Medicine
Colombo.
Mobile no 0718047860.

Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area

I have read the information sheet and its contents were explained to me and I had the opportunity to ask questions and received satisfactory answers. I understood

1) The purpose of the study.
2) My participation is voluntary and I have the right to withdraw at anytime without giving the reason.
3) Refusal to participate will not affect me in anyway.

I agree to participate in this study and I confirm that I have received a copy of information sheet.

_____

Signature of the participant

Full name -

Date -

Postal address -

I have been present while the procedure has been explained to the participant and I have witnessed his/her consent to take part in the study.

_____

Signature of the witness

Full name -

Date -

Postal address -

ස්වකැමැත්ත ප්‍රකාශ කිරීමේ පත්‍රිකාව

වෛද්‍ය එච්.එන් .ඒ .ෆොන්සේකා
ප්‍රජා වෛද්‍ය පශ්චාත් උපාධි (පුහුණුවන)
වෛද්‍ය විද්‍යා පශ්චාත් උපාධි ආයතනය,,
කොළඹ.

දුරකථන අංකය : 071 8047860

මොරටුව සෞඛ්‍ය වෛද්‍ය නිළධාරී කොට්ඨාසයේ වඩුකාර්මිකයන් අතර දක්නට ලැබෙන වෘත්තීමය අනතුරු සහ එම වෘත්තීය අනතුරු සම්බන්ධයෙන් ඔවුන්ගේ දැනුම සහ ක්‍රියාමාර්ග පර්යේෂණය.

..... වන මම , තොරතුරු පත්‍රිකාව කියෙවිවෙමි. එහි අඩංගු දෑ මට පැහැදිලි කර දෙන ලදී. ප්‍රශ්න ඇසීමට මට අවස්ථාව ලැබුණු අතර , ලැබුණු පිළිතුරු වලින් මම තෘප්තිමත් විමි. පහත සඳහන් දේ මම තේරුම් ගතිමි.

01. මෙම අධ්‍යනයේ අරමුණ
02. මගේ සහභාගීත්වය ස්වේඡාවෙන් වන අතර, ඕනෑම වේලාවක හෝතුවක් නොදන්වා මෙයින් ඉවත් වීමට මට අයිතියක් ඇත.
03. සහභාගී වීම ප්‍රතික්ෂේප කිරීමෙන් මට කිසිම බලපෑමක් ඇති නොවේ.

මෙම අධ්‍යයනයට සහභාගී වීමට මම එකඟ වන අතර , තොරතුරු පත්‍රිකාවක් ලැබුණු බව මම සහතික කරමි.

.....
සහභාගිකයාගේ අත්සන

සම්පූර්ණ නම :
දිනය :
ලිපිනය :

මෙම අධ්‍යයනයට අදාළ ක්‍රියාමාර්ග , මා ඉදිරියේදී සහභාගිකයාට පැහැදිලි කර දෙන ලදී. මෙයට සහභාගී වීමට ඔහුගේ එකඟතාවය මා ඉදිරියේදී ප්‍රකාශ කරන ලදී.

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සාක්ෂිකරුගේ අත්සන
සම්පූර්ණ නම :
දිනය :
ලිපිනය :

Postgraduate Institute of Medicine

University of Colombo, Sri Lanka

PGIM/AC/12

20th June 2014

Dr.H.N.A.Fonseka

Dear Dr. Fonseka,

DISSERTATION PROPOSAL OF MSc. TRAINEES – 2014 (COMMUNITY MEDICINE/ COMMUNITY DENTISTRY)

The Board of Study at its meeting held on 02/06/2014, approved your research proposal subject to corrections.

Research Proposal Title: **"Incidence of occupational injuries, knowlege and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area."**

Yours sincerely,

Dr.D.T.P.Liyanage
Senior Lecturer/PGIM
For Director/PGIM

Cc: PF

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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO, SRI LANKA

PGIM/AC-04

24 September 2014

Dr H N A Fonseka
1/8, Holy Cross Avenue
Moratuwa

Dear Dr Fonseka,

RE: Application for Ethical Clearance - ERC/PG/004/2014/14/V(1)

This is to inform you that your application forwarded and the subsequent submissions after the corrections, ERC/PGIM has granted Ethical Clearance for your project proposal tilted **"Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area"**

On completion of the project a 5000 word summary with more emphasis on ethical issues and how these were addressed and with a declaration that "the project was conducted in accordance with the proposal for which approval was granted by the ERC of PGIM" is to be submitted. Committee will evaluate the summary.

Professor Sagarika Ekanayake
Secretary
Ethical Review Committee
PGIM

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DR.H.N.A Fonseka
Post Graduate Institute of Medicine
Noris canal road, Colombo.
19/08/2014.

Divisional Secretariat,
Divisional Secretariat Division,
Moratuwa.

Dear Sir,

Research on Incidence of occupational injuries, knowledge and practices on occupational injuries among carpenters in the Moratuwa Medical Officer of Health area .

As a Mandatory requirement of the completion of Msc Community Medicine Programme conducted by Post Graduate Institute of Medicine of University of Colombo ,I have undertaken to carry out the above research .

I kindly request you to grant permission to carry out the above research in carpentry community of Moratuwa MOH area.

Thanking you,

DR.H.N.A Fonseka

granted.

K.C.Niroshan
Divisional Secretary
Moratuwa.

අනතුරු වළකමු

- වැඩ ආරම්භ කිරීමට පෙර සෑමවිටම යන්ත්‍ර උපකරණ නියමිත තත්වයේ තිබේදයයි පරීක්ෂා කරන්න .
- යන්ත්‍රවල ඇති කැරකැවෙන සියලුම රෝද ,කැරකැවෙන දඩු හා දුවන පටිවලින් අනතුරු සිදුවීම වැළක්වීම සඳහා ඒවා මනා ලෙස ආරක්ෂක වැස්මකින් ආවරණය කරන්න
- කියත්තල මුදුන උස් පහත් කළ හැකි ශක්තිමත් ආවරණයන්ගෙන්ද ,පැලුම්තලවලින්ද ,කියත් බංකුවේ යටි පැත්තට යොදන ලද ආවරණයන්ගෙන්ද, ආරක්ෂිත කරන්න .
- යන්ත්‍රවල සවිකර ඇති ආරක්ෂණ ආවරණ ඉවත් නොකරන්න
- සෑමවිටම නිවැරදි ක්‍රම අනුගමනය කරන්න .
- සෑමවිටම අදාළ කාර්යය සඳහා නියමිත ආරක්ෂණ උපකරණ නිවැරදිව භාවිතා කරන්න .
- යම්කිසි කාර්යක් පිළිබඳව නිවැරදි අවබෝධයක් නැතිනම් සෑමවිටම ඒ පිළිබඳව උපදෙස් ලබා ගන්න.
- ඉනිමං භාවිතා කිරීමේදී ,බර එසවීමේදී / ප්‍රවාහනය කිරීමේදී නිවැරදි ක්‍රම අනුගමණය කරන්න .
- හොඳ ගෘහ කළමනාකරණයක් පවත්වා ගන්න .
- සේවා ස්ථානයක ඇති පීඩාකාරී වාතාවරණය සමනය කිරීම තුලින් සේවකයන්ගෙන් සුරක්ෂිතභාවය තහවුරු වන අතර සේවා ස්ථානයේ ඵලදායිතාවය වැඩි දියුණු වේ .