

Clinicoepidemiological Profile of Agricultural Work Related Injuries in Rural Agrarian Community of Nepal: A Cross Sectional Study

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ABSTRACT

Introduction

Injuries have a significant proportion in global burden of diseases and are in increasing trend. Nepal being agrarian country had frequent reporting of injuries among rural communities whose major occupation is agriculture. So, we had this study with objective to assess clinicoepidemiological profile of agricultural work-related injuries in rural agrarian community of Nepal.

Methods

A community based cross sectional study was conducted among 362 farmers of rural agrarian communities of Budhiganga Rural Municipality of Nepal from 20 December 2022 to 20 June 2023 after getting ethical clearance from institutional review committee (IRC-PA 254/2022). A specially designed pro forma was used to collect data through convenient sampling techniques. Collected data was entered in Microsoft Excel and analyzed by SPSS version 20.

Results

Annual prevalence of agricultural work-related injury was 48.6%. The most common primary causes were Sickle cut injury 43(24.4%), followed by Oxen/Cow hit injury 33 (18.8%). Injury typically occurs in lower extremities 71 (40.3%). Among them 102 (58%), 82 (46.6%), 28 (15.9%) and 147 (83.5%) had a disability, bedridden, hospitalized and received some sort of treatment. Twenty-two (12.5%), 36 (20.5%) and 32 (18.2%) reported stress, self-reported decreased vision and self-reported hearing loss at time of injury respectively. Only 9 (5.1%) had used personal protective equipment during agricultural work and about 36 (20.5%) had helping hands at time of injury.

Conclusions

About half of farmers experienced agricultural work-related injury with significant days of disability from daily activities and regular work. Use of personal protective equipment during work is miserable.

Keywords: agrarian community; rural community; work related injuries.

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INTRODUCTION

Injury is a body lesion due to an external cause, either intentional or unintentional.^{1, 2} Injuries affect people of all ages and range from minor cuts and bruises to major catastrophes due to road traffic injuries, domestic injuries, agricultural work-related injuries and industrial injuries etc.³ Majority of Nepalese population depends on agrarian work as a source of income and daily living.⁴ Moreover, most of people of rural communities of Nepal have limited secondary means of earning thus making them more vulnerable to suffer if they meet agricultural work-related injuries.⁵ Studies on agricultural work-related injuries among farmers outside Nepal have described various prevalence, patterns and potential risk factors.^{6,7,8} Agricultural work-related injuries in Nepal hasn't yet gone to great length and thus this study shall prove to be very useful and its findings supports in making policies for improvement of their health condition. So, we conducted this study with objective to assess clinicoepidemiological profile of agricultural work-related injuries in rural agrarian community of Nepal.

METHODS

A community based cross sectional study was conducted among people whose major occupation was agriculture at Budhiganga Rural Municipality of Nepal from 20 December 2022 to 20 June 2023 after getting ethical clearance from institutional review committee (IRC-PA 254/2022) of Birat Medical College Teaching Hospital. The inclusion criteria for the study were a household member who was actively involved in agriculture related works since last 1 year and able to provide consent. Those who refused to give consent and injuries took place before 1 year of the data collection were excluded from the study. A convenient sampling technique was used. Sample size was calculated by using the formula, $n = Z^2 pq / L^2$ Where, n=minimum required

sample size required, $Z=1.96$ at 95% confidence interval (CI), p =prevalence of agriculture related injuries, 69%⁹, $q=1-p$, L =margin of error, 5% , Drop out=10%. The calculated minimum sample size was 362. Data was collected by face to face interview and observation through door to door visit. A specially designed proforma was used to collect data. The variables used in this study were operationalised. Specifically, agricultural work related injury refers to mechanisms by which injury took place during agricultural work like cut injury, hit injury, fall injury, snake bite and others as primary causes that have occurred past 1 year of data collection for that particular study participant only. Body part injured refers to the body part which is injured like upper extremities, lower extremities, body and others. Duration of disability refers to the number of days the injured person could not perform his or her daily activities or go for farm work. Stress during farming refers to whether the injured was under any stress during injury. Personal protective equipment refers to any protective measures adopted by the injured like wearing slippers, gloves, mask, clothes etc. The collected data was checked thoroughly for completeness and coded first. The anonymity and confidentiality of data was maintained. Collected data was entered in Microsoft Excel and analyzed by SPSS version 20.

RESULTS

We enrolled 362 farmers as study participants. The mean±Std. deviation of age was 44.4±15.8 years. The majority were male 210 (58%), Dalit ethnicity 159 (43.9%), illiterate 214 (59.1%) and married 329 (90.9%). In context of addiction status, 212 (58.6%) were current smokers, 139 (38.4%) had a habit of drinking alcohol and chewing tobacco 185 (51.1%). Majority 221 (61%) of the study participants were from joint families and resides in Kachha House 257 (71%). About 93 (25.7%) had no land. The mean monthly family income was 17121.58 NPR. Among them

240 (66.3%) had a 15-minute walking distance to the nearest health center. The annual prevalence of agricultural work-related injury was 48.6 percent. Various primary causes of agricultural injury were reported. The most common cause was cut injury followed by hit injury and fall injury (Table 1).

Table 1. Primary cause of Agricultural Injury. (n=176)	
Type	Frequency (%)
Cut injury (90)	
Sickle cut injury	43(24.4)
Traditional plough cut injury	15 (8.5)
Spade cut injury	15 (8.5)
Thresor cut injury	9 (5.1)
Cut injury by khukuri	6 (3.4)
Cut injury by glass	2 (1.1)
Hit injury (n=33)	
Oxen/cow hit injury	33 (18.8)
Fall Injury (n=37)	
Fall injury during harrowing	8 (4.5)
Fall injury during traditional ploughing	8 (4.5)
Tractor for ploughing overturned	6 (3.4)
Byalgadi overturned	6 (3.4)
Fall injury from straw pile	4 (2.3)
Fell from tree while cutting grass	3 (1.7)
Fell while picking paddy	2 (1.1)
Others (n=16)	
Snake bite	9 (5.1)
An ox-rope wrapped around it	3 (1.7)
Finger amputation by cow rope	2 (1.1)
Eye injury	2 (1.1)

The injury typically occurs in lower extremities 71(40.3%) followed by upper extremities 63(35.8%). The details of the injured body part are listed in (Table 2).

The total days of disability, bedridden and hospitalized of study participants were 4811 days, 2252 days and 120 days. The average disability day, bedridden day and hospitalized

Table 2. Body part injured. (n=176).	
Type	Frequency (%)
Lower extremities	71(40.3)
Upper extremities	63(35.8)
Body	23 (13.1)
Eye	2 (1.1)
Mixed	17 (9.7)

day were 27 days, 13 days and 1 day respectively. Among them 102 (58%) had a disability, 82 (46.6%) were bedridden and 28 (15.9%) were hospitalized. About 147 (83.5%) had received some sort of treatment. Among them 22 (12.5%), 36 (20.5%) and 32 (18.2%) reported stress, self reported decreased vision and self reported hearing loss at the time of injury respectively. Very less 9 (5.1%) had used personal protective equipment (PPE) during agricultural work. Only 36 (20.5%) had helping hands at the time of injury. Only 65 (36.9%) had taken precaution after injury. The 166 (94.3%) of study participants felt the requirement of the awareness program regarding agricultural work related injury prevention (Table 3).

Table 3. Characteristics of agricultural injury. (n=176)	
Characteristics	Frequency (%)
Disability (Yes)	102 (58)
Cannot do daily activities	66 (64.7)
Cannot go to work place	36 (35.3)
Bedridden (Yes)	82(46.6)
Hospitalisation (Yes)	28 (15.9)
Treatment received	147 (83.5)
Had stress at the time of injury	22 (12.5)
Decreased vision at the time of injury (self reported)	36 (20.5)
Decreased hearing at the time of injury (self reported)	32 (18.2)
Use of personal protective equipment (PPE)	9 (5.1)
Helping hands available at the time of injury	36 (20.5)
Taken precaution after injury	65 (36.9)
Requirement of awareness program	166 (94.3)

DISCUSSION

This study found the mean±standard deviation of age was 44.4±15.8 years. This finding is almost similar with another study from eastern part of Nepal where mean±standard deviation of age of the respondents was 43.6 ± 13.2 years.⁹ A study from India also reported similar age group of 47.6 + 15.7 years.¹⁰ This finding suggests the involvement of middle aged persons in the agricultural work in Nepal. This group of population is responsible to take care of their offspring and their own parents. Injury among this productive age group might have various problems in their families. This also justifies the need for this type of study. In this study the majority were male 210 (58%). Another study from Egypt also reported that all the farmers were males.¹¹ A study from India also reported that majority of them were males (78%).¹⁰ A study from China also found similar result.⁶ Similarly in a study by the Department of Health and Human Services, Centers for Disease Control, National Institute for Occupational Safety and Health Worker where the majority 75.6% were found to be male.¹² The similar findings with male predominance in agriculture is consistent. In this study, majority 329 (90.9%) were married which is consistent with a study from another part of eastern Nepal 443 (88.6%)⁹ and also a study from Egyptian farmers 95.7%.¹¹ We found that the majority were illiterate 214 (59.1%). Higher illiteracy 72.1% was reported by an Egyptian study.¹¹ In contrast to this, in a study from Chinese farmers, the majority has their primary level of education.⁶ The illiteracy of farmers restricts them to advocate regarding the issue of injuries and personal safety while working at farm. We found, in the context of addiction status, 212 (58.6%) were current smokers, 139 (38.4%) had a habit of drinking alcohol and chewing tobacco 185 (51.1%). These addiction habits further increase the vulnerabilities during agricultural related works. The use of such addiction during

work and its association with injuries needs to be further studied. In this study the majority 221 (61%) of the study participants were from joint families and resides in Kachha House 257 (71%). About 93 (25.7%) had no land. The mean monthly family income was 17121.58 NPR. This finding reflects the socioeconomic status of the farmers which directly impacts their health service utilization, use of personal protective equipment etc. We found that the annual prevalence of agricultural work related injury was 48.6%. This signifies that almost one out of two farmers had some sorts of injury during agriculture related work. This is a public health alarm for this vulnerable group of population. Further, higher prevalence (69%) was reported by another study conducted in eastern Nepal.⁹ Study from Indian farmers found 61.9% prevalence of work related injury.¹⁰ The higher prevalence reported by this study might be due to inclusion of all injuries to farmers, but we were more specific to agricultural work related injuries in our study. Slightly lower prevalence (33%) was reported by a study from Chinese farmers.⁶ In a report by Safe Work Australia on work-related injuries and fatalities on Australian farms reported that, Agriculture workers in 2009–10 found 17400 had incurred a work-related injury or illness in the previous 12 months. This equates to 56.4 injuries per 1000 workers.¹³ So, these studies from different study populations highlighted that the agricultural work injuries is a significant problem of concern. We found various primary causes of agricultural injuries viz. Sickle cut injury 43(24.4%), followed by Oxen/Cow hit injury 33 (18.8%), Traditional Plough cut injury 15 (8.5%), Spade cut injury 15 (8.5%) and so on. Similar findings reported by another study from eastern Nepal where the majority had hand tools (Sickle, spade etc.) injuries 258 (74.7 %).⁹ Similar findings were reported by a study among Chinese farmers, where major causes of the injuries were knives/sickles (31.5%), falls (26.1%), hoes (12.2%),

heavy falling objects (10.3%) and 3.6% by large farm animals such as buffalo.⁶ Similarly in USA, it was found that farm machinery, falls, and animal related injuries being the 3 major external causes of injury.¹⁴ Further study from central Nepal reported cuts and piercings accounted for 39.8% of all work-related injuries and 36.3% were falls.¹⁵ In a study from Ethiopia, the use of a hand tool 95 (55.9%) was a frequent cause of injury among farmers. They included an axe, spade, and hand saw.¹¹ A study from neighboring country India found the leading external causes of farm injury were hand tools 64.7%¹⁶ and 58.6 %.¹⁰ A study from Bangladesh reported about 67% injuries of all incidents were due to hand tools.¹⁷ We found that the injury typically occurs in lower extremities 71(40.3%) followed by upper extremities 63(35.8%). Similar finding was reported by a study from eastern Nepal where upper limb injury comprised 67 % of all injuries.⁹ A study from India reported that the most frequent body part involved were legs (45.2 %).¹⁰ Among Chinese farmers, extremities (68.5%) injury was common.⁶ In a report by Safe Work Australia on work-related injuries and fatalities on Australian farms reported that, the body part most affected by a work-related injury was hands, fingers and thumbs which accounted for 17% of all workers compensation claims made by Agriculture employees.¹³ The Egyptian study also found similar result where fingers 115 (67.6%) was commonly injured body part.¹¹ In this study, the average disability day, bedridden day and hospitalized day were 27 days, 13 days and 1 day respectively. Further, 102 (58%) had a disability, 82 (46.6%) were bedridden and 28 (15.9%) were hospitalized. A study from India reported that 33.6 % of farmers lost two days of their work due to this injury.¹⁰ A report by Safe Work Australia on work-related injuries and fatalities reported that 45% of the work-related injuries were hospitalized.¹³ The higher hospitalization might be due to a better health care delivery system in Australia.

Similar findings was reported from a study at India where 17.3% farmers injured required hospitalization.¹⁰ We found 240 (66.3%) had a 15 minute walking distance to the nearest health center. Among the injured 147 (83.5%) had received some sort of treatment. The higher percentage of treatment taken might be due to better healthcare facilities or severity of injury. In this study 22 (12.5%), 36 (20.5%) and 32 (18.2%) reported stress, self reported decreased vision and self reported hearing loss at the time of injury respectively. These factors can be identified earlier to prevent agriculture work related injuries. We found 9 (5.1%) had used personal protective equipment (PPE) during agricultural work. Other studies reported higher use of PPE viz 175 (35%)⁹, 60 (25.8%)¹¹ and 77 (45.8%).¹⁰ This study found 36 (20.5%) had helping hands at the time of injury. This highlights that lack of helping hands at the time of injury might delay or stop to take further medical or hospital care.

In this study, only 65 (36.9%) had taken precaution after injury. This prompts the requirement of health advocacies. It is further supported by this study's findings that 166 (94.3%) of study participants felt the requirement of the awareness program regarding agricultural work related injury prevention. The findings of the dire need of awareness program might accelerate the injury prevention strategies in this marginalized segment of populations. Awareness is a low-cost measure through which stakeholders reduce injuries among farmers and address their occupational health needs.¹⁸ The regular survey on agricultural work related injury needs to be advocated as the use of modern farm machinery is increasing without its significant skills for its operation.¹ To address the health problems of the agricultural workers, a multifaceted strategy is required.¹⁹ The government must be collecting and updating statistics to have the required data to enact the legislations.²⁰

CONCLUSIONS

About half of farmers experienced agricultural work-related injury with significant days of disability from daily activities and regular work. Use of personal protective equipment during work is miserable.

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