

## Study of Various Bites among Agricultural Workers at a Tertiary Care Hospital of Maharashtra

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### Abstract

**Background:** Agricultural work is subject to the health risks inherent to a rural environment and at the same time to those deriving from the specific work process involved. It appears that a large number of people die from snakebites every year, with many cases in the south and southeastern regions of Asia. Most bites occur in rural areas where the work place (forest and field) is the most likely site. Scorpion bites & Spider bites too are a relatively frequent concurrence. **Objectives:** The main objective is to find out the magnitude and seasonal variations of various bites among agricultural workers in this area. **Methodology:** *Type of Study:* It is a Cross-Sectional study. The study was conducted from the period of June 2009 to December 2011. **Data Collection:** Data collection was done through asking questionnaire from the patients/relatives; clinical examination and clinical case records of the patients. **Analysis of Data:** Data was analyzed in the form of percentage (%) and presented in the tabular form. **Results:** Total 301 patients of agriculture related biological health hazards were studied, out of these maximum number of patients were males (58.47%), followed by females (41.53%). Majority of the patients (30.57%) were belonging to age group of 20 to 35 years. Majority (81.72%) of the victims were from rural area followed by 18.28% of patients were from urban area. The maximum cases were due to snake bite (46.18%) followed by unknown bite (22.60%), scorpion sting (19.93%), insect bite (8.97%) & others (1.99). Among the majority cases (46.04%) of snake bites were during rainy season followed by winter (35.97%) and least (17.99%) cases were found during summer.

**Keywords:** AWs: Agricultural Workers; Snake bite; Scorpion sting.

### Introduction

Agriculture is considered to be one of the oldest occupations, perhaps as old as human civilization. Approximately 2 billion people are engaged in agriculture and related work in the developing countries of Asia, whereas the developed countries contribution is merely 100 millions.[1] In a country like India, large workforce is employed in diverse settings. Today we have 360 million workforce, of which 225 million in agriculture & 120 million

are in industrial sector.[2] 50% of our Gross Domestic Product is being contributed by agriculture sector.[3]

It appears that a large number of people die from snakebites every year, with many cases in the south and southeastern regions of Asia. Most bites occur in rural areas where the work place (forest and field) is the most likely site.[3] It is estimated that about 2,000,000 people are bitten by snakes annually in India out of which about 15000 to 20000 are fatal. This constitutes the majority of the fatal cases occurring due to snake bites worldwide.[4] Insect stings usually produce one of the two reactions; a local irritative reaction and an allergic one. Prophylaxis will consist of adequate hypo sensitization of person who is hypersensitive to insect stings.

Spider bites too are a relatively frequent concurrence. The poison of spider bite has hypertensive action as well as action on central and peripheral nervous system resulting in muscle spasm. All the scorpion

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bites are not poisonous. The sting from species with a lethal poison produces general symptoms, as a result of the neuronal action.[3]

India being a country of agriculture, majority of its population is engaged in agriculture based activities in a varied manner either directly or indirectly. This sector of activity being most unorganized, very little attention has been given to the occupational health problems of these workers; though the need of investigation and intervention towards these problems has repeatedly been mentioned.[5]

### Objectives

- 1) To find out the magnitude of various bites among agricultural workers.
- 2) To find out the area wise distribution of various bites.
- 3) To find out the seasonal variations of various bites.
- 4) To give the necessary recommendations for the prevention of various bites.

### Material & Methods

#### *Study Design*

It is a Cross-Sectional study. The study was conducted from the period from June 2009 to December 2011.

#### *Study Area*

Pravara Rural Hospital of Rural Medical College Loni falls under Ahmednagar District of Western Maharashtra, which is a tertiary care teaching hospital chiefly catering the demands of Ahmednagar and adjacent districts of Maharashtra and thus acts as an apex referral institution. The Ahmednagar district has 80.34% rural population and 19.66% urban population. Majority of the people in study area are engaged in agricultural activities.

#### *Data Collection*

- 1) A pilot study was conducted on 30 patients. Data collection was done through asking questionnaire from the patients/relatives; clinical examination and clinical case records of the patients.

#### *Analysis of Data*

Data was analyzed in the form of percentage (%) and proportion and presented in the tabular form. Chi-square( $\chi^2$ ) test was applied as a test of significance with the help of statistical software SPSS statistics (version-17).

### Results

Out of total 301 cases, the maximum number of patients were males (58.47%), followed by females (41.53%). Majority of the patients (30.57%) were belonging to age group of 20 to 35 years. Males (30.57%) were preponderant in the age group of 20 to 35 years followed by females (20.94%), in the same age group (Table 1). Male:Female ratio was 1.40:1. Mean age was 30.36 with SD of 15.19. This highlights that majority of the respondents were between age group of 20 to 35 years which is physiologically active and most commonly engaged age group in agricultural activities. The Majority (81.72%) of the respondents were from rural area followed by urban (18.28%) (Table 2). Further more a significant number of patients were from urban area it could be due to it is a tertiary care teaching centre and patients also came from urban area. Males were more (48.17%) as compared to females (33.55%) in rural area similar pattern is observed in urban area. Amongst the cases there were majority cases of snake bite (46.18%) followed by unknown bite and sting (22.60%), scorpion stings (19.93%), insect bite (8.97%) & others (1.99) (Table 3). Where the majority of the cases (46.04%) of snake bites were during rainy season followed by winter (35.97%) and least (17.99%) cases were found during summer

**Table 1: Age and Gender-wise Distribution of Cases**

Age group	Male No. (%)	Female No. (%)	Total No. (%)
< 20	15(04.98)	09(02.99)	24(07.97)
20-35	92(30.57)	63(20.94)	155(51.51)
36-50	48(15.95)	36(11.96)	84(27.91)
>50	21(06.97)	17(05.64)	38(12.61)
<b>Total</b>	<b>176(58.47)</b>	<b>125(41.53)</b>	<b>301(100)</b>
<b>Mean/ SD</b>	<b>30.53/15.47</b>	<b>30.10/14.75</b>	<b>30.36/15.19</b>

**Table 2: Area-wise Distribution of Cases**

Area	Male No. (%)	Female No. (%)	Total No. (%)
Rural	145(48.17)	101(33.55)	246(81.72)
Urban	31(10.30)	24(07.98)	55(18.28)
<b>Total</b>	<b>176(58.47)</b>	<b>125(41.53)</b>	<b>301(100)</b>

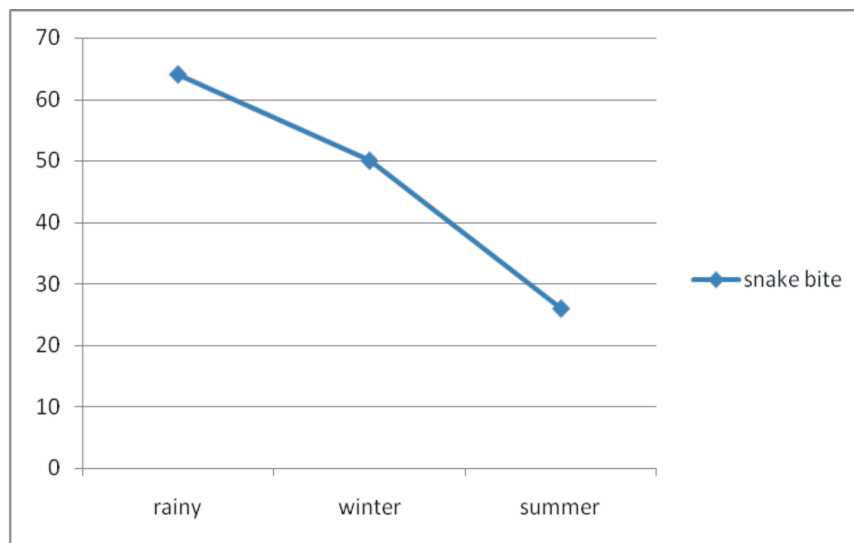
Value of  $\chi^2= 4.224$ ,  $df=1$ ,  $p<0.05$ , significant

**Table 3: Distribution of Cases according to Types Various Bites and Stings**

Hazard	Male No. (%)	Female No. (%)	Total No. (%)
Snake bite	71(23.59)	68(22.51)	139(46.18)
Scorpion stings	39(12.96)	21(06.97)	60(19.93)
Insect bite	18(05.98)	09(02.88)	27(08.97)
Unknown bite/sting	42(13.95)	26(08.65)	68(22.60)
Others	06(01.99)	01(0.33)	07(02.32)
<b>Total</b>	<b>176(58.47)</b>	<b>125(41.53)</b>	<b>301(100)</b>

Value of  $\chi^2= 7.469$ ,  $df=5$ ,  $p>0.05$ , not significant

**Figure 1**



**Table 4: Association between Cases of Snake Bite and Other Bites and Stings Versus Seasonal Variations**

Hazards	Season			Total
	Rainy	Winter	Summer	
Snake Bite	64 (46%)	50 (36%)	25 (18%)	139
Other Bites	53 (33%)	65 (40%)	44 (27%)	162
<b>Total</b>	<b>117 (39%)</b>	<b>115 (38%)</b>	<b>69 (23%)</b>	<b>301</b>

Value of  $\chi^2= 6.406$ ,  $df=2$ ,  $p<0.05$ , significant

**Table 5: Seasonal Variation of Cases of Nnake Bite (N=139)**

Season	Male No. (%)	Female No. (%)	Total No. (%)
Rainy	30(21.58)	34(24.46)	64(46.04)
Winter	27(19.42)	23(16.55)	50(35.97)
Summer	14(10.07)	11(07.92)	25(17.99)
<b>Total</b>	<b>71(51.07)</b>	<b>68(48.93)</b>	<b>139</b>

Value of  $\chi^2= 0.866$ ,  $df=2$ ,  $p>0.05$ , not significant

(Table 4). It may be due to logging of water in the hiding places of snakes and they are forced to come out during rainy season.

## Discussion

In the present study majority (81.72%) of the respondents were from rural area. It could be due to this hospital is situated in rural area and there is less awareness, less facilities, less access to safe technology, more number of AWs and farming is a major occupation in rural area. Similar findings reported by B.N. Gupta *et al*[6] (78.84%) of agricultural workers were from rural area and 21.16% from urban area. Sharma *et al*[7] also found that the majority (78.7%) of the patients were belonging to rural area and rest 21.3% from urban area similar to present study. Findings of the present study were different from study of Nayak CS *et al*[8] (N=138) in which majority of the cases were belonging to urban area because they conducted their study in a urban area. Phalke D.B. *et al* (2009)[9] study also revealed that the majority (64.90%) were males followed by females (35.09%) in the age group of 21 to 30 years. Majority of the snake bite cases (74.50%) were amongst those directly involved in the agricultural work. Kwan LEE and Hyun Sul LIM[10] also found that prevalence of snake bite as compare to other biological hazards. In contrast to present study it was observed that majority of the cases of snake bites were seen in summer, because in their study area due to different geographical and environmental conditions, pit vipers bites were commonest occurrence and pit viper appear in late april and go into hibernation in mid november and this snakes are most active in summer. Similar findings were revealed by Bawaskar HS *et al*[11] (53.8%), Hati AK *et*

*al*[12], Brunda G *et al*[13], Batra AK *et al*[14] (70%) and Kirte RC *et al*[15](35.5%), where they found high incidence of cases of snake bites in the rainy season. However in contrast to our findings, Suleman MM *et al*[16] found 75% of the cases of snake bites in the summer season because they have studied in a desert area and pit viper bites were most common in their study area.

## Recommendations

1. Snake bites, scorpion stings and other bites are the preventable events and can be prevented by simple protective measures like wearing gumboots, hand gloves and wearing protective clothes and carrying flashlight at night, need to be popularize amongst the agricultural workers.
2. One of the most important and simple components of the control programme is health education to agricultural workers.
3. There is need of further exploratory research in direction of prevention and control of incidence of various bites amongst agricultural workers.

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