



A STUDY OF KNOWLEDGE, ATTITUDE AND AWARENESS ON SNAKES AND SNAKE BITE MANAGEMENT AMONG PUBLIC IN SARLAHI DISTRICT, NEPAL

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ABSTRACT

Introduction: Snake bite is a very common problem in rural Nepal which even today leads to a large number of deaths. **Objective:** To find out the knowledge, attitude and awareness regarding snake bite and to measure the association between socio-demographic characteristics with knowledge and attitude regarding snake bites among residents of Sarlahi district. **Methods:** The cross-sectional study was conducted among residents of Sarlahi District where 303 individuals were taken as subjects. Semi-structured questionnaire was used for data collection. The Chi-square test was applied to measure the association between socio-demographic characteristics with knowledge and attitude regarding snake bites in Sarlahi District. **Results:** Almost 51.2% of the participants could identify snake. Regarding first aid measures, majority of the respondents (95.4%) apply tourniquet, rinse the wound with water (78.2%) and make local incision (91.7%). Majority of the respondents (71.9%) would take the victim to hospital for further management immediately. Majority of the participants had good knowledge (61.7%) and attitude (92.4%) about snake bite. The study population with aged above 60 years (100%), male (66.5%), Chhetri (72.7%), SLC and above (63.4%), and living in kaccha house (63.9%) was seen good knowledge, and aged above 60 years (100%), female (93.4%), and Brahmin (98.1%) was seen good attitude regarding snake bite management ($p > 0.05$). The respondents living in kaccha house (94%) was seen significantly good attitude regarding snake bite management ($p < 0.05$). **Conclusions:** Majority of the participants had good knowledge and attitude about snake bite management. The participants were aware to minimize snake bites and first aid measures.

KEY WORDS: Knowledge, Attitude, Awareness, Snakes bite management, Sarlahi District.

INTRODUCTION:

Snake bite is a life threatening medical emergency. Most of the snake bites are seen in the rural areas all over the world.^{1,2} There are approximately 5.5 million snake bite victims each year worldwide.³ In Asia alone there are around 4 million victims per year, which is a conservative incidence because of underreporting.⁴

Snake bites are commonly seen in the rural areas where the risk increases because of farming/ agriculture.⁵ The situation gets worse in the rural areas of developing countries because the patients do not have rapid access to life saving anti-snake venom.^{5,6} Similarly, studies reflect that a high proportion (80%) of snake bite victims, first consult the traditional healers before they get any proper medical treatment.^{7,9} First aid management of snake bite is very important which is usually done by the relatives, friends or co-workers.¹⁰ If proper first aid is given at the time of bite it can even delay the life-threatening effects. As most bites are from non-venomous snakes, only reassurance can bring the victims out of their shocked phase.^{6,7}

Estimated annual deaths due to snakebites in Asia are around 100,000 (major contributors are South Asian countries e.g. 1000 in Nepal, 1000 in Sri Lanka and around 20,000 each in India and Pakistan).¹¹ Snake bite is significantly overlooked as a public health problem in the world which is evident from lack of reliable epidemiological data.^{10,11} Therefore this study aimed to find out the knowledge, attitude and awareness regarding snake and snake bite management in endemic area of Sarlahi District of Nepal.

Methodology

A Community based cross-sectional study was conducted about snake bite in endemic area of Sarlahi District of Nepal from 23rd April-18th May 2018. The endemic area of the District was known from District hospital and other treatment center for snake bite (Snakebite Treatment Center, Netragunj) and was used to construct sampling frame. This research was based on random selection of the study area Sarlahi District. Sarlahi District a part of province no. 2 with malangwa as its District Headquarter covers an area of 1259 sq. km and a population of 7, 69,729 as per census 2011. It is border to the west by the Bagmati River, to the East by Mahottari district, to the North by the shivalik hills and to the South by Bihar state of India. It falls in Tropical climate zone with 83.3% area below 300 m above sea level and 11.7% area between 300-1000 m elevation ranges. Geographically it is divided into 3 parts i.e. Terai region of south, Bhanwar region of middle and Chure Mountain of north. Five VDC e.g. Laxampur, Barhatawa, Hariwon, Lalbandi and Nawalpur of Sarlahi District were randomly selected to conduct this study.

This study considered 57.28% of knowledge about measures to reduce snake bite i.e. cleaning of weeds could lead to decrease incidence of snake bite for sample size estimation. It was calculated as 298.4 by using the formula, sample size (n) = $4pq/L^2$ [$(n-4 \times 57.28 \times 42.72) / (5.73)^2 = 298.4$] individuals as sample based on the prevalence of 57.28%, 95% confidence level and 10% allowable error.¹² A total of 303 individuals aged 18 years and above are processing units of the study site. Purposive sampling method was applied for data collection. This was a four

weeks study to fulfill the elective posting carried out by students of MBBS 3rd year Batch 2015 of B. P. Koirala Institute of Health Sciences, Dharan, Nepal. There was a group of three medical students who helped for this study for four weeks.

The ethical approval was taken from the Institutional Review Committee (IRC) of B. P. Koirala Institute of Health Sciences, Dharan, Nepal. The written consent was taken from the concerned authority and each participants of the study. Attendees those willing to take part in the research and gave written consent were included in the study.

Samples are collected after informed consent from subjects who meet inclusion criteria. Semi-structured questionnaire and an observational checklist were used for data collection and face to face interview was taken. Questions were asked in Nepali language and then were recorded in English. The confidentiality and privacy of the study was maintained; name of the individuals or participating group was not disclose after the study.

All interviewed questionnaire were indexed and kept in file. Data were entered in Microsoft Excel 2007. The analysis was done by using statistical software SPSS (Statistical Package for Social Science) version 17. For descriptive studies, percentages and proportions were calculated where ever applicable. Chi-square test was applied to measure the association between socio-demographic characteristics with knowledge and attitude regarding snake bites in Sarlahi District. The confidence level was set at 5% in which probability of occurrence by chance is significant if $P < 0.05$ with 95% Confidence Interval.

RESULTS:

Table 1: Distribution of the study population by socio-demographic characteristics

Characteristics	Frequency	Percentage
Age of Participants		
18-30 years	141	46.5
31-45 years	113	37.3
46-60 years	42	13.9
60 years above	7	2.3
Sex		
Male	167	55.1
Female	136	44.9
Religion		
Hindu	264	87.1
Muslim	26	8.6
Buddhist	13	4.3

Characteristics	Frequency	Percentage
Ethnicity		
Brahmin	52	17.2
Chhetri	22	7.3
Janjati	77	25.4
Dalit	32	10.6
Others (Madhesi)	120	39.6
Education		
Illiterate	82	27.1
Below SLC	57	18.8
SLC & Above	164	54.1
Occupation		
Service Holder	21	6.9
Business	44	14.5
Farmer	111	36.6
Laborer	2	0.7
Unemployed	20	6.6
Others (Housemaker, Students & Abroad)	105	34.7
Types of Family		
Nuclear	179	59.1
Joint	124	40.9
Type of House		
Kaccha	133	43.9
Pucca	80	26.4
Semi-pucca	90	29.7
Total	303	100.0

Table 1 shows the results from a survey on general population aged 18 years and above in snake bite endemic area of Sarlahi District. Majority of respondents were Hindu by religion with good literacy rate by education and farmers by occupation. Most of the family lived in kaccha and semi-pucca houses.

Table 2: Knowledge regarding snake and snake bite

Characteristics	Frequency	Percentage
Can be identify the Snake		
Yes	155	51.2
No	148	48.2
*How Identify the Snake (N=303)		
Pattern on the Body	125	41.3
Shape and Size	130	42.9
Body Color	133	43.9
Can be distinguish between poisonous & non-poisonous Snake		
Yes	72	23.8
No	231	76.2
High incidence period		
Noon	36	11.9
Evening	55	18.2
Night	212	70.0
High incidence season		
Summer	154	50.8
Rainy	140	46.2
Spring	9	3.0
*Behaviors likely to cause snakebite (N=303)		
Walking Barefoot	188	62.0
Not using a light (torch, flashlight or lamp) when walking at night	157	51.8
Rest near the holes, nests and other hidden places.	202	66.7
Accidently stepping on snake while walking.	300	99.0
Attempting to kill the snake.	283	93.4
How to know that someone is bitten by the snake		
Bite Mark	127	41.9
Pain at the site	59	19.5
Victim complain	117	38.6

Characteristics	Frequency	Percentage
Symptoms of snakebite		
Local bleeding and swelling	194	64.0
Severe pain at site of bite	37	12.2
Nausea and vomiting	35	11.6
Drowsiness and weakness	37	12.2
Reasons for snake being seen in home		
For food	112	37.0
For shelter	155	51.2
To hide from enemy	36	11.9
Total	303	100.0

**Multiple Response Question*

Table 2 shows almost half of the participants could identify snake but most of them could not distinguish between poisonous and non-poisonous snakes. Most of the participants said summer and rainy season is the high incidence season for snake bite. Maximum number of people knows that local bleeding, swelling and severe pains at site of bites are the prominent symptoms of snake bite. Most of the people believed that snake is seen in home for food and shelter.

Table 3: Attitude regarding snake and snake bite

Characteristics	Frequency	Percentage
What you do if you encounter the snake		
Run away	56	18.5
Call for help	219	72.3
Kill the snake	19	6.3
Put them away from residential area	9	3.0
*First aid measures (N=303)		
Tell him/her to stay calm	209	69.0
Immobilize the victim's whole body, especially the wounded limb	18	5.9
Raise the site of the bite above the level of the person's heart	13	4.3
Application of tourniquets around the upper part of the limb	289	95.4
Applying a pressure immobilization bandage	57	18.8
Where you would take the snake bite victim for further management		
Hospital	291	96.0
Ayurvedic treatment	12	4.0
When you would take the victim to hospital		
Immediately without any first aid	85	28.1
Immediately after first aid	218	71.9
*What you do with the wound of snakebite		
Rinsing the wound with water as soon as possible	237	78.2
Making local incisions at the site of the bite	278	91.7
Application of alcohol	58	19.1
Massage the bite wound	20	6.6
Total	303	100.0

**Multiple Response Questions*

Table 3 shows that Majority of the respondents would call for help when encounter with snake. Regarding first aid measures, majority of the respondents apply tourniquet above the bitten site and tell the victim to stay calm. Majority of the respondents would take the victim to hospital for further management immediately. Majority of them would rinse the wound with water and make local incision at the site of bite.

Table 4: Awareness regarding snake and snake bite (N=303)

Characteristics	Frequency	Percentage
*What you do to protect from the risk of snake bite		
Wearing protective shoes while walking outside and while working in field	233	76.9
Carrying a torch or a flame while walking outside at night	245	80.9
Clearing an area and grass around the houses	259	85.5
Storing firewood outside the houses	169	55.8
Controlling rodents inside the houses	97	32.0
Avoiding of storing paddy harvest inside houses	24	7.9

**Multiple Response Questions*

Table 4 shows that most of them were aware that clearing areas around the houses, carrying torch while walking outside at night and wearing protective shoes while walking outside and while working in field were lower risk of snake bite.

Knowledge and attitude on snake bite was assessed by the scoring system. A score of 1 was awarded for the correct answer and 0 for wrong answer. On the basis of knowledge and attitude score it has been found that the lowest score attained was 2 and the highest score attained was 9. Those having score 5 and above were considered having good knowledge or attitude separately.

Table 5: Association between Socio-demographic characteristics and knowledge on snake and snake bite management (N=303)

Characteristics	Knowledge		Total	P-value
	Good Knowledge	Poor Knowledge		
Age				
18-30 years	86 (61%)	55 (39.0%)	141	0.10
31-45 years	65 (57.5%)	48 (42.5%)	113	
46-60 years	29 (69.0%)	13 (31.0%)	42	
> 60 years	7 (100.0%)	0 (0%)	7	
Sex				
Male	111 (66.5%)	56 (33.5%)	167	0.05
Female	76 (55.9%)	60 (44.1%)	136	
Religion				
Hindu	165 (62.5%)	99 (37.5%)	264	0.38
Muslim	13 (50.0%)	13 (50.0%)	26	
Buddhist	9 (69.2%)	4 (30.8%)	13	
Ethnicity				
Brahmin	31 (59.6%)	21 (40.4%)	52	0.71
Chhetri	16 (72.7%)	6 (27.3%)	22	
Janajati	50 (64.9%)	27 (35.1%)	77	
Dalit	18 (56.2%)	14 (43.8%)	32	
Terai caste	72 (60.0%)	48 (40.0%)	120	
Education				
Illiterate	48 (58.5%)	34 (41.5%)	82	0.75
Below SLC	35 (61.4%)	22 (38.6%)	57	
SLC & Above	104 (63.4%)	60 (36.6%)	164	
Occupation				
Service Holder	13 (61.9%)	8 (38.1%)	21	0.46
Business	24 (54.5%)	20 (45.5%)	44	
Farmer	74 (66.7%)	37 (33.3%)	111	
Laborer	1 (50.0%)	1 (50.0%)	2	
Unemployed	15 (75.0%)	5 (25.0%)	20	
Others (Housemaker & Students)	60 (57.1%)	45 (42.9%)	105	
Types of House				
Kaccha	85 (63.9%)	48 (36.1%)	133	0.78
Pucca	48 (60.0%)	32 (40.0%)	80	
Semi-pucca	54 (60.0%)	36 (40.0%)	90	
Total	187 (61.7%)	116 (38.3%)	303	

SLC: School Leaving Certificate

The study population with age group of above 60 years was seen good knowledge regarding snake and snake bite management in comparison to other age groups but the difference was not significant. The knowledge regarding snake and snake bite management was found to be higher in male than female. The study population having educational level SLC and above was seen good knowledge about snake and snake bite management in comparison to below SLC and illiterate but the difference was not significant. (Table 5)

Table 6: Association between Socio-demographic characteristics and attitude on snake and snake bite management (N=303)

Characteristics	Attitude		Total	P value
	Good Attitude	Poor Attitude		
Age				
18-30 years	128 (90.8%)	13 (9.2%)	141	0.43
31-45 years	104 (92.0%)	9 (8.0%)	113	
46-60 years	41 (97.6%)	1 (2.4%)	42	
> 60 years	7 (100.0%)	0 (0%)	7	
Sex				
Male	153 (91.6%)	14 (8.4%)	167	0.56
Female	127 (93.4%)	9 (6.6%)	136	
Religion				
Hindu	242 (91.7%)	22 (8.3%)	264	0.40
Muslim	25 (96.2%)	1 (3.8%)	26	
Buddhist	13 (100%)	0 (0.0%)	13	
Ethnicity				
Brahmin	51 (98.1%)	1 (1.9%)	52	0.13
Chhetri	18 (81.8%)	4 (18.2%)	22	
Janajati	69 (89.6%)	8 (10.4%)	77	
Dalit	30 (93.8%)	2 (6.2%)	32	
Terai caste	112 (93.3%)	8 (6.7%)	120	
Education				
Illiterate	77 (93.9%)	5 (6.1%)	82	0.25
Below SLC	55 (96.5%)	2 (3.5%)	57	
SLC & Above	148 (90.2%)	16 (9.8%)	164	
Occupation				
Service Holder	19 (90.5%)	2 (9.5%)	21	0.26
Business	37 (84.1%)	7 (15.9%)	44	
Farmer	106 (95.5%)	5 (4.5%)	111	
Laborer	2 (100%)	0 (0.0%)	2	
Unemployed	18 (90%)	2 (10.0%)	20	
Others (Housemaker & Students)	98 (93.3%)	7 (6.7%)	105	
Types of House				
Kaccha	125 (94.0%)	8 (6.0%)	133	0.04
Pucca	69 (86.2%)	11 (13.8%)	80	
Semi-pucca	86 (95.6%)	4 (4.4%)	90	
Total	280 (92.4%)	23 (7.6%)	303	

SLC: School Leaving Certificate

The study population with age group of above 60 years was seen good attitude regarding snake and snake bite management in comparison to other age groups but the difference was not significant. The attitude regarding snake and snake bite management was found to be slightly higher in female than male but the difference was not significant. The study population living in kaccha house was seen significantly good attitude regarding snake and snake bite management in comparison to having pucca house ($P < 0.05$). (Table 6)

Table 7: Association between knowledge and attitude on snake and snake bite management of the study population (N=303)

Characteristics	Attitude		Total	P-value
	Good Attitude	Poor Attitude		
Knowledge				
Good knowledge	173 (92.5%)	14 (7.5%)	187	0.93
Poor knowledge	107 (92.2%)	9 (7.8%)	116	
Total	280 (92.4%)	23 (7.6%)	303	

Table 7 shows that there was no significant association between knowledge and attitude regarding snake and snake bite management ($P=0.93$). Those who had good knowledge, they had positive attitude.

DISCUSSION:

Snake bite is a neglected public health issue which results in at least 100,000 deaths each year globally that can be prevented if proper first aid management is given to the victims.⁷ South Asia is the world's most heavily affected region, due to its high population density, widespread agricultural activities, numerous venomous snake species and lack of functional snake bite control programs.^{13,14}

This study showed that there was 51.2% of the participants could identify snakes but only 23.8% of them could distinguish between poisonous and non-poisonous snakes. Lack of knowledge regarding distinguishing between poisonous & non-poisonous Snake was seen in studies conducted in rural Bengal and Maharashtra, India.^{12,15} A study conducted by Joseph et al¹⁰ in India which summarized the majority urban participants (96%) cannot differentiate between poisonous and non-poisonous snakes, this ratio is slightly better in rural population where around 14% can differentiate. The identification of snake species is crucial for optimal clinical management, as it allows clinicians to choose the appropriate treatment, anticipate complications, and thereby reducing mortality.¹⁵

Most of the participants said summer (50.8%) and rainy (46.2%) season is the high incidence season for snake bite. Knowledge about the common snake seasons was higher in our study than a study conducted by Usman HB et al in Southern Punjab, Pakistan which showed the snake bites are more common in rainy seasons (44.4%) and summers (41.2%).¹⁶

In our study 71.9% of respondents showed the positive attitude regarding its first aid measures, after that snake bite victims should be transported as quickly as possible to a medical centre. A study conducted by Usman HB et al in Southern Punjab, Pakistan shows that the awareness regarding snake bite, its first aid and treatment measures was very low among the study participants. However, there was a difference between urban and rural population, urban being more educated had better knowledge also.¹⁶

Current study shows that most of them were aware that clearing areas around the houses (85.5%), carrying torch while walking outside at night (80.9%) and wearing protective shoes (76.9%) while walking outside and while working in field were lower risk of snake bite. The most cited preventive measure was cleaning weeds, bushes etc. near participant's houses¹⁶, a finding which relates closely with the findings of another study conducted in rural India^{12,15} while much less than what Srilankans¹⁷ suggest (98%). A study conducted by Silva A et al in Sri Lanka which showed that almost 94% of the farmers were aware that wearing protective footwear would protect them against snakebite.¹⁷

The current study showed that the study population with age group of above 60 years (100%) was seen good knowledge regarding snake bite in comparison to other age groups but the difference was not significant. But a study conducted by Kumar A et al in rural Bengal showed the study population with age group of ≤50 years (50.44%) was seen good knowledge regarding snake bite in comparison to >50 years (35.48%) age group.¹² Another study shows that knowledge about types of snakes was significantly higher in 12-20 years of age group ($p < 0.05$). On the other hand, knowledge about symptoms of snake bite was more common after middle age group beyond 40 years of age. Knowledge about first aid measures was found more in above 60 years of age group as compared to remaining all age groups.¹⁵ A study conducted by Duminda SB et al in Mihintale, Sri Lanka showed there were no significant differences in answers regarding the identification of highly venomous snakes from other demographic factors in such as age group.¹⁸

This study showed that the study population having educational level SLC and above (63.4%) was seen good knowledge in comparison to below SLC (61.4%) and illiterate (58.5%). A similar study conducted by Kumar A et al in rural Bengal also showed the study population having educational level SLC and above (61.7%) was seen good knowledge in comparison to below SLC (39.06%).¹² A lower proportion of the urban participants (18%) were of the opinion that non-poisonous snakes are more common compared to one third (30%) of the rural participants. The better knowledge of the rural area participants regarding type of the snakes (poisonous or nonpoisonous) compared to urban areas is probably due to high exposure to snakes and snake bites in rural areas. Participants of study conducted by Joseph et al were also of the same opinion.¹⁰ A Community based cross-sectional study conducted in rural Maharashtra revealed that educated people had more knowledge than the uneducated people. ($p < 0.001$).¹⁹ As suggested by Mohapatra B et al, community education, and availability of appropriately trained staff can reduce mortality due to snake bites.²⁰

This study showed that the study population with Unemployed (75.0%), Farmer (66.7%) and Service Holder (61.9%) as occupation was seen good knowledge about snake bite than Housemaker & Students (57.1%), Business (54.5%) and Laborer (50%). A study conducted by Kumar A et al in rural Bengal showed that the participants having Business, Service and Retired as occupation (64.19%) was seen significantly good knowledge about snake bite than Farmers, Skilled workers (SW) and Manual Labours (ML) (28.72%).¹² A study conducted by Chincholikar SV et al in rural areas of Maharashtra, India showed the knowledge about symptoms of snake bite was higher in farmers, students as well as housewives. It was also observed that educated people had more knowledge about types of snakes as compared to uneducated ($p < 0.001$).¹⁵

The current study showed that the study population living in kaccha house (63.9%) was seen good knowledge regarding snake bite in comparison to having pucca house (60.0%). The study population having pucca house was considered as high social class and those having kaccha house considered as low social class. A similar study conducted by Kumar A et al in rural Bengal also showed that the participants belong to high social class (54.02%) had significantly good knowledge regarding snake bite in comparison to low social class (36.36%).¹²

In current study the attitude regarding snake bite among residents of Sarlahi District was found to be 92.4%. A study was done in rural Sri Lanka where the perceptions regarding snake bite among the residents was studied. Almost 90% of the study participants were aware that immobilization of the affected part was the initial first aid measure. Application of tight band (tourniquet) proximal to the site of bite was considered as an important first aid measure in 74.9% of cases. 98.3% of the individuals were suggesting that cleaning of an area, devoid of leaf litter and grass around the house was considered as an important preventive measure.¹⁷ Most experts agree that snake bite victims should be transported as quickly as possible to a medical centre where they can be clinically evaluated by qualified medical staff, and where anti venoms are available. In fact, time of transport was shown to be a crucial determinant of snake bite mortality in eastern Nepal.⁵ Studies in southern India confirmed that delayed anti venom administration was associated with an increased risk of complications.^{21,22}

CONCLUSION:

Majority of the participants had good knowledge and attitude about snake bite management. The study population with aged above 60 years, male by gender, Chhetri by ethnicity, educational level of SLC and above was seen good knowledge, and aged above 60 years, female by gender, and Brahmin by ethnicity was seen good attitude regarding snake bite management but the difference was not significant. The respondents living in kaccha house was seen significantly good attitude regarding snake bite management. There was no significant association between knowledge and attitude regarding snake bite management. Those who had good knowledge, they had positive attitude regarding snake bite management.

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