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Sea snake bites in Letkokekone: a situation analysis

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Although sea snakebite occurs among fishermen in Myanmar, the incidence has not been documented. In order to determine incidence, case fatality and treatment seeking behaviour of the victims, a community-based study was conducted in fishing community of Letkokekone, Yangon Division. A house-to-house visit was conducted and structured questionnaires were asked to the victims. The cumulative incidence of sea snakebite for 4 years is 318/100000 with male preponderance (96%). The mean age of the victim was 39 yrs and 92% were fishermen. Fifty-five percent were bitten after dark. Sixty percent of them did not apply first- aid and none of them used prophylactic measure. Sixty-six percent sought treatment from traditional healers consisting of wound incision and suction, 23% home remedy (taking coconut flesh and jaggery) and 11% at hospital. Twenty-one percent of them gave a history of previous sea snakebite and sting from jellyfish. Activities like setting up, drawing and unloading stake net expose leg (77.5%) and hand (22.5%) to risk. Since only 11% sought medical treatment, the incidence based on hospital statistics is grossly underestimated. Health education on use of correct first-aid and prophylaxis at work should be promoted. Practice of harmful treatment of traditional healers and unscientific home remedy should be discouraged.

INTRODUCTION

Sea snakebite is an important occupational hazard of fishermen. Accidental bite occurs while unloading fishing net, sorting fish especially under insufficient light [1] and catching fish using net in shallow seashore. According to Reid [2] less than 20% of the sea snake bite victims are envenomed, of which 40% or more are severely envenomed. Severe envenomed cases succumbed with neuromuscular paralysis and renal insufficiency secondary to myoglobulinuria. Specific antivenom is not available in Myanmar. Only conservative treatment could be given. The incidence of sea snake bite based on hospital statistics is 0.4% [3]. The traditional practice in fishing community is referring sea snakebite cases with neurotoxic features to hospital. The fact that the true incidence of sea snakebite may far exceed the hospital data is supported by community-based study carried out elsewhere [4-8]. However, epidemiological studies on sea snakebite cases have not been carried out in Myanmar. The objective of the present study is to determine incidence and treatment-seeking behaviour of sea snake bite victims of Letkokekone, Yangon Division.

MATERIALS AND METHODS

A community-based study was conducted in four villages of Letkokekone Township namely Letkokekone, Kanyinkone, Wetkite, Kanlyal shae and Dayeboo. A house-to-house visit was undertaken by assigned midwives. Set proforma including size of the household, age and sex of sea snakebite victims within last 4 years was asked to the

head of household and the victim was identified.

Structured questionnaires designed to cover circumstances of the bite, fatality, treatment-seeking behaviour, use of first-aid and prophylaxis were asked to the victim or next of kin if the victim is dead. For children, guardians or parents were asked. Validity of the data was checked by the researcher TP and AAM. In-depth interview was carried out with two key informants from Letkokekone who have been engaged in fishing for over 10 to 18 years. In in-depth interview, incidence, circumstances of the bite, use of first-aid and prophylaxis, traditional belief in fishing community and treatment-seeking behaviour were asked. Collected data were coded and analysed using epi info 6 version (6.04d) software.

RESULTS

A total of 14777 populations residing in the 4 villages of Letkokekone were included in this study. Of them, 47 (45 males and 2 females) were bitten by sea snake in 4 years (1999-2002). Mortality and morbidity of sea snakebite by year is shown in Table 1 and demographic characteristics of the snakebite victims in Table 2. The mean age of the victims is 39 yrs (youngest 16 and the oldest 87 yr) with male preponderance (96%). Most victims (92%) were bitten while engaged in fishing. Fifty-five percent of the bites occurred after dark (7pm-6am). The bite occurred throughout the year with its peak in March and May.

Table 1. Morbidity and mortality of sea snakebite in Letkokekone by year

Year	Total popula-tions	No. of snakebite victim	No. of death	Incidence x100000	Case fatality rate %
1999	13908*	22	4	158.1	18
2000	14191*	11	-	77.5	
2001	14481*	10	-	69	
2002	14777	4	-	27	
Total	57357	47	4	331.6	8.5

*Growth rate calculated on 2%

Table 2. Demographic characteristics of the victims

Age	Mean 39 yr (16- 87yrs)
10-20yr	8.9%
21-30yr	15.6%
31-40yr	31.1%
41-50yr	24.4%
51-60yr	17.8%
61 ++	2.2%
Sex	Male 95.6%
	Female 4.4%
The bite	Throughout the year
	(peak - March and May).
Time bite	55% after dark (7pm-6am).
	45% day time (6am-7pm)
Sites of bite	81% (38) Legs
	19% (9) Hands
	0% Others
Occupation	93.4% - Fishing business
	2.2% Farmer
	2.2% Carpenter
	2.2% Hawker
Activity	82.3% Fishing
	11.1% Walking seashore
	4.4% Sitting at seashore
	2.2% Sorting fish

In-depth interview of the key informants revealed that estimated yearly incidence of the bite accounted for 10-20 bites. Recent decrease in the incidence to 10 per year were attributed to introduction of modified fish catching technique and advancement of sandbank at seashore making unfavourable condition for catching fish in shallow water. Case fatality rate also dropped from 2-3 per year to none in recent year. Accidental bite occurred while sorting fish and drawing/ unloading content of fishing net especially after dark with poor illumination. Most bites occurred in October-November and majorities were bitten on legs while setting up stake net under sea and drawing/ unloading content of the net.

Site of bite

Majority (81%) of the victims was bitten on legs (right leg 44.7% + left leg 36.2%) and 19% on hands (right hand 14.99% + left hand 4.2%). Fang marks were detected in 82% and local pain in 91%. Majority 85% (40/46) were bitten during fishing and 15% (7/46) on seashore (walking 7 + sitting 1).

One 87 yr old man was bitten while walking on seashore. There were four fatal cases (8.5%) (three treated at station hospitals and the other by a traditional healer).

First-aid and prophylaxis

Majority (60%) of the victims did not apply first aid. Wound treatments carried out by the victims include wound incision 19% (9), herbal extract to wound 11% (5), tourniquet 6% (3) and coagulation 4% (2). No prophylactic measures were taken against sea snake bites (100%).

In-depth interview of the key informants revealed that use of prophylaxis against snakebite and first-aid were not aware of and were not used in fishing community. Wound incision and suction was widely practiced until last year before the death of the reputed local healer whose specialty was wound incision and suction. Now application of herbal extract or meditated oil to the wound is often practiced.

Treatment seeking behaviour

Treatment seeking behaviour of the victims is shown in Table 3. Treatments provided by local healers are wound incision and suction (100%). Home remedy consists of advising to take coconut flesh with jaggery.

Table 3. Treatment seeking behaviour of the victims

Treatment	Cases	%	Treatment given
Traditional healer	31/47	66	Wound incision and suction
Home remedy	11/47	23	Coconut flesh and jaggery
Hospital	5/47	11	Conservative

All of the victims (9/9) from Chaungwa and 73.5% (22/30) from Letkokekone sought treatment from local healers. In Gadegone village, 6/8 victims were treated with home remedy since thus was no traditional healer around. In Letkokekone and Gadegone, 13.3% (4/30) and 25% (2/8) of the cases seek treatment at station hospitals respectively.

In-depth interview of the key informats revealed that sea snakebite occurs at or near seashore and takes 1-3hr to get ashore and treated by local healer advising to take coconut juice and jaggery. The victim is kept awake by constant arousing or talking to him. Since majority of the victims recovered with local treatment, they are reluctant to seek hospital treatment unless the victim is presented with severe neurotoxic features.

Symptoms following the bites

Time taken for development of symptoms following the bites ranges from 15 minute to 4hr. Fifty-eight percent of the cases developed symptoms within ½ to 1hr after the bite and 24% in 15 minutes. The symptoms recalled by the victims are shown in Table 4. Four out of 47 victims were fatal.

Table 4. Symptoms of the sea snakebite victims

Symptoms	Cases	%
Drowsiness	46	97.8
Limb muscle pain	30	64
Limb muscle tenderness	14	30
Heavy upper eyelids	8	17
Passing dark coloured urine*	6	13

* (Myoglobulinuria)- feature of systemic envenoming

History of previous sea snake bites and stings

History of sea snake bite in the last 5 years was recalled in 21.2% (10/47) and sting from jellyfish in 21% (10/47) of the victims.

Perception

Majority (91%) of the victims knew species of sea snake (77% three species) and believed (91%) that all were poisonous. Majority (95%) of the victims saw the snake after the bite. Knowledge of practice of prophylaxis against sea snakebite was nil.

Circumstances of the bites

Majority of the fishermen were shallow water fish/prawn catchers, who used stake net and bag net (Figure 1) for catching fish/prawns. Majority of them 77.5% (31/40) were bitten on leg and 22.5% (9/40) on hand while setting up/unloading stake net and catching prawn using a bag net. Seven victims recalled being bitten by sea snakes (6 walking and one sitting on shore).

Fig. 1. Fishing with net

In Chaungwa and Letkokekone, most were bitten while setting up stake net (57.5%), while catching fish with bag net (10%) and in a few cases while walking /sitting on shore (15%). In Gadegone village, most were bitten during drawing and unloading the fishing net (32.5%).

In-depth interview of the key informants revealed that shallow water fish catchers used stake net and bag net in catching fish. Majority of the victims were bitten on legs while setting up stake net under sea, drawing/unloading fishing net, catching fish using a bag net. Recent practice of modified fish catching technique results in decline in prevalence of sea snake bite cases.

DISCUSSION

Incidence

The study highlights that sea snake bite is an occupational hazard for fishermen. Although yearly incidence of the bite is decreasing, they are still high. Recent decrease in the incidence of the bite is attributed to use of modified fish catching technique and advancement of sand bank in seashore. Since only 11% of the victims sought medical treatment, incidence of sea snake bite based on hospital statistics is grossly underesti-mated. Emphasis on seeking early medical treatment irrespective of the severity of the bite should be made in imparting health education to the fishing community.

Prophylaxis/first-aid

The study highlights that prawn catchers of shallow water were mainly bitten on legs and some on hands while setting up stake net and catching fish using a bag net. Health education on taking precaution/wear of protective gloves while drawing/unloading the net and sorting fish should be given and promoted. Since majority of the bites occur after dark, provision of good illumination at work is essential. Two sea snakebite cases admitted to Yangon General Hospital were bitten after dark while sorting fish under insufficient light [1]. Protective boots should be worn [9] when walking along seashore. Since majority of the victims did not apply first aid, use of correct first-aid (pressure-immobilisation technique using crepe bandage) [10] recommended for neurotoxic envenoming should be promoted.

Clinical features

Usually sea snake bite is painless [2]. However, local pain present in all victims probably reflects misinterpretation of pain inflicted by local wound treatment. Clinical features are similar to those reported in sea snakebite cases [1-2]. However, if no myoglobulinuria (dark coloured urine) develops in 4 or more hours, it is unlikely that the victim will develop systemic envenoming [11]. Passing dark coloured urine was observed in fatal cases (13%). According to Reid [2], majority of sea snakebite cases are not envenomed and less than 20% are envenomed, of which 40% or more are severely envenomed.

Treatment seeking behaviour

Sea snake bite fails to envenom in 80% of the victims [2]. Most victims treated by local healers belong to this category and majority will recover without treatment. This favourable outcome has created a good impression among the community not knowing the real clinical outcome of the disease. The community should be discouraged on use of unscientific home remedy and harmful treatment of local healers. Early referral to better-equipped hospitals with capability of performing renal dialysis and assisted ventilatory support to treat renal failure and neurotoxic respiratory paralysis in severe envenomed cases should be practiced.

CONCLUSION

The study highlights that incidence based on hospital statistics is underestimated since a small proportion of the victims sought medical treatment. It is suggested that victims should be encouraged to seek medical treatment by giving health education or the disease should be made a notifiable one. Moreover the fishing community needs to be educated on clinical course, outcome of sea snake bite, use of prophylaxis and correct first aid in order to reduce the incidence and fatality following the bite.

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