AN EPIDEMIOLOGICAL STUDY OF POISONOUS SNAKE BITE IN AND AROUND MADURAI FROM DECEMBER 2009 TO DECEMBER 2010

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CERTIFICATE

This is to certify that this dissertation titled "**AN EPIDEMIOLOGICAL STUDY OF POISONOUS SNAKE BITE IN AND AROUND MADURAI FROM DECEMBER 2009 TO DECEMBER 2010"** is a bonafied research work of **DR.MAGESH.B,** a student in M.D. Branch I General Medicine, in partial fulfillment of the requirements for the award of MD degree by Tamilnadu Dr.M.G.R. Medical University.

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DECLARATION

I**, DR.MAGESH.B,** solemnly declare that the dissertation titled "**AN EPIDEMIOLOGICAL STUDY OF POISONOUS SNAKE BITE IN AND AROUND MADURAI FROM DECEMBER 2009 TO DECEMBER 2010"** has been prepared by me. This is submitted to **The Tamilnadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of MD degree (Branch I) General Medicine.

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INTRODUCTION

"The snake with its many unique and, in some ways contradictory attributes has been worshipped, feared, puzzled over, hated, loved, exploited, exterminated, studied and even petted. It has been used in magic, witchcraft, religion, medicine, war, torture, sports, science, commerce and entertainment. On the one hand, it has been a symbol of procreation, health, longevity, immortaling, and wisdom, on the other; it has represented death, disease, sin, lechery, duplicity, and temptation. It is a paradox… Mankind has seldom ignored it".

- Ramona & Desmond Morris
  (Men & Snakes)

Snake bite is a major public health problem throughout the world especially in tropical and subtropical countries. Snake venom is probably the oldest known poison to mankind and has been described in old medical writings and myths. Frayer in his study of Thanatophidia of India estimated that about 1 in 10,000 population died due to snake bite.[1]

Snakes have formed an object of awe and curiosity at all levels. They have been associated with mysticism apart from being objects of

fear. Venomous snake bites account for much of the morbidity and mortality world wide. Venomous snakes are estimated to inflict 4 lakh bites annually and approximately 40,000 of these victims die. The actual numbers are much larger, as in India itself it was calculated to be 2, 00,000 bites annually.[2]

In India snake bite is an occupational hazard of farmers in rural area and an estimated 15,000 to 20,000 people die each year from snake bite. The high mortality in India is due to climatic factors, rural predominance of population and their agricultural dependence.

Of the more than 2,700 species of snakes, about 500 belong to the four families of venomous snakes and only 200 species have caused morbidity in humans. India has always been known as the land of exotic snakes.

In India there are about 216 species of snakes of which about 52 are venomous and of these, only 5 varieties of snakes are commonly encountered as the cause of snake bite poisoning.[3] They are

Russell's viper	-	Doboia ruselli
Cobras	-	(Common cobra – Naja Naja)
Krait	-	Bungarus Caeruleus

Saw scaled viper - Echis Curinatus

- Pit Viper[4]

Based on their morphological characteristics including arrangement of scales, dentition, sensory organs etc. snakes are categorized into families. The families of venomous snakes are :

1) Atractaspididae 2) Elapidae 3) Hydrophidae and 4) Viperidae.

Viperidae group causes hemorrhagic syndrome. Elapidae group causes neuromuscular paralysis leading to flaccid paralysis and death by respiratory failure.

REVIEW OF LITERATURE

The word 'snake' is derived from the Anglo-Saxon word "Snaca" meaning "creeping[5]".

Nearly 240 million years ago there were fifteen orders of these reptiles and now only five have survived. Ophidians are the creeping animals commonly known as snakes.[6]

Dr. Patrick Russel[7] the "Father of Indian Ophiology" gave the earliest reference to Indian Snakes. The credit for distinguishing the venomous from the non-venomous snakes goes to him. It was he who focused attention on the viper Vipera Russelli, which was appropriately named after him.

Sir J.B.Fayrer[8] (1873) was a physician cum surgeon who turned to an ophiologist. He had carried out detailed investigations on the physiology of venom of Indian snakes. He wrote a book entitled "Thanatophidia of India" in 1874. Joseph Ewarts[9], (1878) book on the poisonous snakes of India was also an invaluable publication.

Several medical personnel have conducted investigations on the venomous snakes of India and the properties of their venom. The list of such workers is long and exhaustive, nevertheless, mention should be

made of the pioneering work carried out in recent times by Ahuja and Gurkripal Singh[10] (1954). Deoraj[11] (1963-1971) and Whitaker[12] (1978), Daniel[13] (1983) have given detailed facts and figures about the venom of the common venomous snakes. Murthy[14] (1985) has discussed the common venomous snakes of India and has also given an account of these snakes for the benefit of the layman.

Detailed information on the clinical aspects of snake bites in India and Southeast Asia has been given by Alistair Reid H[15] (1963) Likewise, Banerjee RN and Siddiqui ZA[16] (1974) OF Safdarjung Hospital, New Delhi conducted a micro study of snake bites, which includes every aspect of envenomation. Sawai et al[17] (1974) of Japan Snake Institute published a statistical data on snakebite and historical records of the patients from different states in India during his visit to India from October to December 1972.

The review of the progress of snake venom research in India will be incomplete without paying tributes to the services rendered by three famous institutes namely, the Haffkine Institute, Mumbai, for Training, Research & Testing, The Madras Snake Park, The Calcutta Snake Part and the Central Research Institute, Kasauli which served as catalysts for the dissemination of knowledge related to venomous snakes of

India and their venom, preparation of anti snake venom sera and the treatment of snake bites.

Subhadeep Sarkar, Parthasaratho Mitra and Kunal Bhattacharya observed that Russel's viper is responsible for 60 percent of the deaths from snakebite that occurs in India every year. Death following snake bite is the cumulative effect of all the toxic reactions that venoms produce in the body of the victim. They say we are looking at just one aspect[18]. Manjunath B et al reported a case of snakebite, where a young boy succumbed to death due to delay in hospitalization owing to the lack of awareness.[19]

Snake bite global scenario[20]

Since reporting is not mandatory in many regions of the world[20], snakebites often go unreported. Consequently, no accurate study has ever been conducted to determine the frequency of snakebites on the international level. However, some estimates put the number at 5.4 million snakebites, 2.5 million envenomation, resulting in perhaps 1,25,000 deaths. Others estimate 1.2 to 5.5 million snakebites, 421,000 to 1.8million envenomation, and 20,000 to 94,000 deaths. Many people who survive bites nevertheless suffer from permanent tissue damage caused by the venom, leading to disability.[21]

Indian Scenario

Indian subcontinent, being tropical, harbors a variety of venomous and non-venomous snakes. The major families of snakes in India are Elapidae, Viperidae and Hydrophidae (Bawaskar, 2004). The four major venomous biting species "The BIG FOUR" are Cobra (Naja Naja), Krait (Bungarus Caeruleus), Russell's viper (Vipera russelli), and Saw – scaled viper (Echis carinatus). The former two belong to the Elapidae and the latter two belong to the Viperidae family[22]. Based on an epidemiological field survey of 26 villages with a total population of nearly 19,000 individuals in Burdwan district of West Bengal state in India, Hati et al worked out an annual incidence of 0.16% and mortality rate of 0.016% per year[23.] Maharashtra, one of the states in India, with the highest incidence of snake bites reported, 70 bites per 1, 00,000 population and mortality of 2.4 per 1,00,000 per year[24]. The commonest cause of snake bite envenomation in Jammu was Viperine Snake bite, accounting for 310 cases in years 1968 to 1971[25]. The other states with a large number of snake bite cases include West Bengal, Tamil Nadu, Uttar Pradesh and Kerala[26].

Swaroop reported about 2, 00,000 bites and 15,000 deaths in India due to snake bite envenomation as far back as 1954[27]. In Sri Lanka the

overall annual mortality from a single venomous species ranges from 5.6 per 1, 00,000 to as high as 18 per 1, 00,000 in some areas[28]. It has been estimated that 150 to 200 snake bite related deaths occur annually in Nepalese hospitals[29]. It has been reported that in most developing countries up to 80% of individuals bitten by a snake, first consult traditional practitioners before visiting a medical centre and owing to the delay, several victims die during transit to the hospital[30].

Host Factor

Among the host factors, people involved in occupations and or life style requiring movement in dense undergrowth or undeveloped land, are the worst affected. These include farmers, herders, hunters and workers on development sites[31].

Snake bite has been observed in all age groups. But majority (90%) are males and aged between 11-50 years. Paul reported an incidence of 7.15% in children less than 10 years.[32] Another study reported 37% incidence in the second decade of life.[33] The sex ratio seems almost uniform all over, with males being affected twice or thrice commoner than females. The preponderance of male victims suggests a special risk of outdoor activity. For obvious reasons, bite is maximal in lower limbs with 40% occurring in feet alone.[34]

Causative Factor

One or the other species of this reptile is seen in almost all the countries of the world. The dangerous ones are prevalent in tropical and subtropical countries, but they are not seen over 3,000 feet above sea level. Snakes are not found in extremely cold climate. The majority of them are harmless to humans in temperate climate. In England, for example, there were only 14 deaths due to snake bite in the past 100 years (Warrell).[35]

There are a few countries in the world that do not seem to harbor them and these are Madagascar, New Zealand, Azores, Canary Islands, Haiti, Puerto Rico, Ireland and Iceland.

Every state in India, Pakistan and Bangladesh has poisonous snakes. They are particularly a source of great danger in the low lying areas along the great rivers. The experience of Bhat in Jammu Kashmir in treating snake bite envenomation in the very north and that of ours in the very south was different by the fact that in our patient's mortality and morbidity were considerably higher. The cold climatic conditions of Jammu Kashmir probably account for this favourable outcome in the north.

Morbidity and mortality resulting from snake bite envenomation also depends on the species of snake involved, since the estimated "fatal dose" of venom varies with the species. In the Indian setting almost 2/3 of bites are attributed to Saw scaled viper (as high as 95% in some areas like Jammu), [36] and about ¼ to Russell's viper and smaller proportions to Cobra and Kraits[37]. In Srilanka, Doboia russelli accounts for 40% of bites and Naja Naja for another 35%[38] , Daboisa russelli alone accounts for 70% of bites in Myanmar. Among the various species, the average yield of venom per bite in terms of dry weight of lyophilized venom is

60 mg for Cobras

63 mg for Russell's viper

20 mg for Krait and

13 mg for Saw scaled viper

The respective fatal doses are much smaller viz. 12mg, 15mg, 6mg and 8mg[91]. However, clinical features and outcome are not as simple to predict because every bite does not result in complete envenomation[92].

Environmental Factors

Nearly 75% cases of snake bite are encountered in out door areas with a rural incidence ranging from 75-90%. Snake bites are common during day time in South India, contrary to high incidence of nocturnal bites in few parts of North India.

Snake activity is least in winter season when incidence of bites is at its lowest. Rainy season is the period of activity for snakes, when busy agricultural work coincidentally doubles the risk. Few studies show a distinct seasonal pattern[39] with a peak in warm and rainy months which compel the reptiles to come out of their shelter.

Snakes are predominantly nocturnal in habit. Nocturnal bites of any snake are likely to be more venomous than bites by day time. This higher night time envenomation may be due to their clearer vision at night. Some of the poisonous snakes are very timid, shy and docile in morning hours, and enter the bed of humans probably due to thermophilic factors and inflict spontaneous bites. One of the problems with nocturnal bite is the difficulty in identification of the snake species.

Irritable species that strike readily when disturbed include E. Carinatus, makyan pit-viper, most species of rattle snakes, lance headed viper and cobras.

Snakes

Snakes are reptiles which belong to the order ophidian. Fewer that one tenth of the nearly 3000 known species of snakes are venomous. The poisonous varieties belong to five families. [40]

a. Elapidae	-	Cobras, Kraits and Coral snakes (found all over the world except Europe)
b. Viperidae	-	Russell's viper, saw scaled viper (Found all over the world except America).
c. Hydrophidae	-	Sea snakes
d. Crotolidae	-	Pit vipers (found in Asia and America)
e. Colubridae	-	Bird Snake (found commonly in Africa)

Characteristics of Snakes

They have got an elongated body divided into head, body and tail. There are no external appendages except some rudimentary structures seen in some non-poisonous varieties like Typholps. The body of snake is covered by scales which are imbricate in primitive

snakes and form a distinctive covering in other snakes. Special scales are developed on the head and helps in identifying different snakes. Exuvia is formed over the scales periodically and sloughed off by the snake periodically. The snakes grow throughout its life. There are around 200-300 vertebrae in the snakes and all except for the first two and the tail, have ribs.

The snakes have eyes with vertical pupil but no eye lids. They have a pair of primitive internal ears without external appendages.[41]

The lower jaw in the snakes is a pair of bones connected centrally in front by a firm elastic ligament and it does not articulate with the maxilla as in mammals.

The snakes have a row of teeth on either side of the premaxilla and the mandible. In poisonous varieties there are modified teeth, usually two in number and occasionally more than one pair, called fangs, which are present on the premaxilla and not on the mandible. The fangs have channels for pouring the venom either in the form of gutter, as in cobras or hollow with a tiny opening at the pointed end like a hypodermic needle, as seen in Russell's viper. At the base of the fangs opens the duct of the poison gland one on either side of the jaw below the orbit. Anteriorly the gland opens into a narrow venomous

duct which ends in an ampulla like dilatation at the base of the fangs. Snakes are provided with an alimentary digestive system, respiratory system, urogenital system, circulatory and central nervous system.

Habitat of snakes[41]

Snakes are cold blooded animals as they do not have an efficient thermo regulating organ, except for certain species like saw scaled viper (Echis carnatus). Snakes prefer a tolerable amount of humidity, darkness and quietness. Snakes live mainly on insects, smaller snakes, frogs, lizards, mice and rats. The range of vision in snakes is limited and is mainly confined to a very close range and is more active on the moving objects in the immediate vicinity.

Classification

Snakes are broadly classified into two groups. Poisonous and non poisonous. The poisonous snakes are further classified on the basis of poison secreted by them into 3 main types.

1. Neurotoxic – Secreting Neurotoxic venom (Elapids)
2. Vasculotoxic – Secreting Vasculotoxic venom (Viper)
3. Myotoxic (Sea Snakes)

The differentiating features of poisonous and non poisonous snakes' are[42]

TABLE1 : POISONOUS AND NON POISONOUS SNAKE BITES

NO.	FEATURES	POISONOUS	NONPOISONOUS
1	Belly scales seen by turning the snake with belly upwards	Large and cover width of the belly.	Small like those on the back or moderately large but they do not cover the entire breadth.
2	Head scales	Small (viper) or may be large and wide	Large with exception of pit viper, cobra and Krait.
3	Fangs	Two long grooved or canalized fangs like hypodermic needles.	Multiple, short and solid teeth.
4.	Tail	Compressed	Not much compressed
5	Habits	Usually nocturnal	Not so
6	Bite mark	Two fang marks with or without small mark of other teeth	A number of small teeth marks in a row.

TABLE 2: COMMON POISONOUS SNAKES IN INDIA

(WHITAKER 1978)

Name	Distinctive Features	Average Length	Distribution	Habitat	Common Prey	Type of Toxicity
Indian Cobra (Naja Naja)	Medium size to large, smooth, shiny scales	1m, At birth 25cm male 2m	Throughout India sea level upto 4000m	Common in Rice growing Areas	Small Snakes, Insects, Lizards.	Neurotoxic
Common Krait (Bungarus Caeruleus)	Medium sized, smooth, glossy scales	1m, At birth 25cm, male 1.75m	Most of India Sea level up to 1700m	Sandy soil, Termite mounds Piles of brick	Mainly snakes Lizards & rodents	Neurotoxic
Russell's viper (Vipera russelli)	Medium size to Large, strongly keeled scales	1m, At birth 24cm male 1.8m	Hills & Plains of India. Sea level up to 3000m	Common in houses present in hill areas	Snakes, Lizards, Mice, Land crabs	Hemorrhagic
Saw-scaled viper (Echis Carinnatus)	Small, Strongly keeled scales, dull colour	South India: 30cm North India: 50cm At birth : 8cm, Max.80cm	Throughout India, mostly plains, upto 2000m above sea level and in hills.	Not found in the heavily forested areas and hills	Mice, Lizard, Frogs	Hemorrhagic

Snakes of Medical Importance in Tamil Nadu – Distinguishing features[43]

A great deal is written concerning the problem of how to identify medically significant species from non significant ones. A large amount of space is devoted, in both medical and toxicology textbooks, to the problem of how to identify venomous snakes. The problem with this information is that it is complex (involves counting of scales) and not definitive (the identification of pre or post maxillary teeth) and of no use to a doctor in a medical situation. On the question of description, it is worth remembering that the least reliable means of identifying a particular species of snake is to use color. Virtually every species of venomous snakes have a huge range of color manifestations and even the markings can be subject to major variations. What is important therefore is to focus on the key aspects of identification that enable the medical professional to rapidly identify whether they are dealing with a venomous species, and what that species might be.

There are six medically important species in Tamil Nadu shown in Fig.3.

Russell ’s viper (*Daboia russelii*)

The Russell’s viper is a stout bodied snake, the largest of which grows to approximately 1.8 meters in length. Like all the vipers it is a nocturnal snake, but unfortunately for humans, during the daytime it rests up under bushes, at the base of trees and in leaf litter. It is therefore frequently encountered by rural workers, as they are carrying out general agricultural activities.

There are two key identification features that are worth noting. The first is a series of chain-like or black edged almond shaped marks along the snakes back and flanks. The second distinguishing mark is a white triangular mark on the head with the apex of the triangle pointing towards the nostrils.

Saw scaled Viper (*Echis carinatus*)

The southern Indian Saw Scaled Viper is a small snake, usually between 30 and 40 cm long. The northern Indian species (*Echis sochureki*) is much larger, with an average size of 60 cm. It inhabits mainly dry arid climates but can also be found in scrubland.

One of the key identification features of this species is the posture it adopts when it is agitated. It moves its body into a figure of eight like arrangement with its head at the centre. It rapidly moves its coils against each other and produces a hissing like sound which gives

its name ‘Saw Scaled’. In addition, there are often wavy hoop like markings down both sides of the Saw Scales body. On the head, there is usually a white or cream arrow shaped mark, pointing towards the front of the head, often compared to the shape of a bird’s foot.

The Hump-nosed Pit viper (*Hypnale hypnale*)

The Hump-nosed pit viper is one of India’s tiniest venomous snakes, its total length ranging from 28.5 to 55cm. Its distinctive features include the presence of five large symmetrical plate scales on the top of the head in addition to the smaller scales typical of all vipers. There are heat sensitive pits between the nostril and the eye.

Spectacled Cobra (Naja naja)

The Spectacled Cobra is probably India’s most well recognized snake. The hood markings of the spectacle like mark, distinguishes this snake from other species, and its habit of rearing up when alarmed makes it distinctive but not definitive as other species do this, notably the Trinket Snake. The Cobras coloration may vary from pale yellow to black.

Common Krait (*Bungarus caeruleus*)

The Common Krait is a nocturnal snake which usually grows to approximately 1.0 to 1.2 meters in length. Its primary diet is other snakes. It can be found all over Peninsular India and often seeks

habitation near human dwellings. During the day it rests up in piles of bricks, rat burrows or other buildings. The Common Krait is the most poisonous snake in India and its venom is pre-synaptic neurotoxic in nature.

There are a number of key identifiers which are worth remembering. The Krait is black, sometimes with a bluish tinge, with a white belly. Its markings consist of paired white bands which may be less distinct anteriorly. These paired white bands distinguish the snake from another black nocturnal snake, the Common Wolf Snake.

The Wolf Snake's white bands usually are thicker and are singular bands equidistant from each other. The second useful distinguishing feature is a series of hexagonal scales along the top of the snakes back. This feature is really useful if the dead snake has been brought to the hospital and examined.

King Cobra (*Ophiophagus hannah*)

The King Cobra is the least medically significant of the venomous snakes in India in terms of both bites and fatalities.

Venon Apparatus[44, 45]

The Venom glands are surrounded by compressor muscles and are situated behind or below the eye. The venom duct opens the fang canal during the act of biting. The venom glands are squeezed by the

contraction of the compressor muscle and the venom is expressed through the grooved fangs. The snakes can inject doses of venom lethal to their natural prey in each up to 10 or more consecutive strikes. The quantity of venom injected is highly variable with no evidence that it can be adjusted according to the size of the prey or the intention of the snake.

Venom composition:

Snake venom is a mixture of several compounds. These includes (90% enzymatic proteins)

1) Neurotoxins
2) Cholinesterase
3) Fibrinolysins
4) Proteolysins
5) Haemolysins
6) Thromboplastin
7) Agglutinins
8) Cardiotoxins
9) Coagulase, hyaluronidase, lecithinase etc,

Biogenic amines such as histamine and 5 hydroxytryptamine may be partly responsible for the pain of snake bite.

Table 3: Snake venom neurotoxins and their targets in the CNS.[90]

Types of neurotoxin	Functional target	Source
Short-chain neurotoxins	Post-synaptic toxin; high affinity to skeletal and Torpedo nAChR; bind to neuronal α7 nAChR with lower affinity or none.	Elapids and hydrophids (cobras, sea snakes, kraits, Australian elapids)
Long-chain neurotoxins	Post-synaptic toxin; comparatively higher affinity for neuronal α7 nAChR than the skeletal receptors.	Elapids and hydrophids (cobras, sea snakes, kraits, Australian elapids)
Weak neurotoxins	Post-synaptic toxin; weak affinity to both the skeletal and neuronal nAChRs	Elapids (cobras, kraits, Australian elapids)
Taipoxin	Presynaptic toxin; binds specifically to neuronal plasma membranes especially at the neuromuscular junction.	Australian elapid (taipan)
β-Bungarotoxins	Presynaptic toxin; presynaptic voltage dependent K^+ channel	Elapids (kraits)
Muscarinic toxins	Specific to mAChR subtype and bind with high affinity	Elapids (mamba, kraits and cobras)

nAChR, nicotinic acetylcholine receptor, mAChR, muscarinic acetylcholine receptor.

Table 4: Adhesion Molecule Recognition Motifs in Snake Venom Disintegrins[70]

Motifs recognized by adhesion molecules	Amino acid sequences	Physiological target	Examples source
RGD	Arginine-glycine-aspartate	Blocks the GPIIb/IIIa receptor and binds to integrins αIIbβ3, α8bβ1, αvβ5 and or a5b1	Trigramin (trimeresures gramineus); contortrostain (Agkistrodon contortrix contortrix)
KGD	Lysine-glycine-aspartate	Binds specifically to integrin αIIbβ3	Barbuorin *(Sistrurus m.barbouri)*
MVD	Methionine – valine-aspartate	Potent inhibitor of both collagen – and ADP-stimulated platelet aggregation	Atrolysin-E/D *(Crotalus atrox)*
MGD	Methionine-glycine-aspartate	Potent and selective inhibitor of α5β1	EMF10- *(Eristocophis macmahoni)*
WGD	Tryptophan-glycine-aspartate	Potent inhibitor of the RGD-dependent integrins α5β1, αvβ3, and αIIbβ3,integrins	CC8 (*Cerastes cerastes*)
MLD	Methionine-leucine-aspartate	Binds α4β1, α4β7, α9β1, α5β1 and αIIbβ3 integrins	EC5 (Echis carinatus sochureki), VLO5 (*Vipera lebetina obtusa*)
KTS	Lysine-tryptohan-serine	Selective integirn α1β1 inhibitors	Obtustatin (*Vipera lebetina obtuse*)
RTS	Arginine-tryptophan-serine	Selectively blocks integrin 1 α1	Jerdostatin (*Trimeresurus jendonii*)

Clinical Features of Snake Bite

The evolution of symptoms and signs of envenomation depends on the nature of the venom, the dose and the site of injection[46]. The clinical features of snake bite can be divided into local and systemic.

Local manifestation: Local pain is the commonest symptom and usually starts within minutes of the bite. During the next few hours it intensifies, spreads towards the trunk and becomes localized in the lymph nodes draining the bite site. Some patients complain of vague abdominal or epigastric pain within six hours of bite. Local swelling at the site of bite or beyond is greatest around 1 to 4 days after bite (minutes to 48-72hrs). Both local pain and swelling is more in viper bite[47]. This is followed by edema, swelling and appearance of bullae which can progress rapidly to involve the trunk[48]. Tingling & numbness over the tongue, mouth, scalp and paraesthesia around the wound occur mostly in viper bites, local bleeding including petechial and ™™™or purpuric rash is seen most commonly with this family[49]. The local area of bite may become devascularized with features of necrosis predisposing to onset of gangrenous changes. Generally Elapid bites result in early gangrene usually wet type where as vipers cause dry gangrene of slower onset (over weeks). It is caused mainly by direct cytotoxic venom effect.

There are two case reports of Raynaud's phenomenon and gangrene in a limb other than that bitten by the snake, both bites were by Russell's viper[50]. Secondary infection including tetanus and gas gangrene may also result[51].

Systemic Manifestations

The most common and earliest symptom following snake bite is fright because of the risk of losing one's life. Many patients present with symptoms which are the direct result of fright irrespective of whether it is a poisonous or non poisonous bite. Patients may complain of sudden onset of weakness, difficulty in breathing or swallowing, syncopal attack etc. These symptoms have to be differentiated from that of neurotoxicity[52].

The time of onset of envenomation is different in different species; Cobra produces symptoms as early as 6 to 8 minutes after the bite. Vipers take 6 to 15 minutes, however symptoms may be delayed for several hours, Sea snake bites almost always produce myotoxic features within 2 hours. Elapid venom are best known for their paralytic effect but cobra bite commonly cause severe local pain, swelling, blistering and tissue necrosis. Onset of paralysis may be delayed for 7-12 hrs after bite. These victims often present with

preparalytic symptoms like vomiting, heaviness of the eyelids, blurred vision, drowsiness and tingling sensation around the mouth. Paralysis first appears as bilateral ptosis and external ophthalmoplegia and then spreads to involve muscles of the palate tongue, jaw, larynx, neck and finally respiration. Later there is generalized flaccid paralysis. Consciousness is maintained provided there is no cardiac or respiratory failure.

In general the viperidae venoms are best known for their severe local manifestations, haematotoxic effects, renal failure and cardiac involvement. In none of the studies done in other countries was the presence of neurological manifestation or myalgia recorded[53]. Occasionally Russell viper's systemic envenomation may develop in the absence of local reactions. Spontaneous systemic bleeding result from haemorrhagins which damage vascular endothelium and the blood does not coagulate due to consumption coagulopathy, Russell viper venom activate factor V and X and cause fibrionolysis, Certain venoms cause defibrinogenation by activating endogenous fibrinolytic system[54,55]. All these effects result in bleeding from gum, nose (epistaxis), GIT bleeding (Haematemesis and malaena), kidney, urinary bladder (haematuria) and also from fang marks and

venepunture sites and even as multiple petechiae and purpura[56]. Subarachnoid hemorrhages and cerebral hemorrhage have also been reported. Hypotension and shock mainly result from hypovolemia resulting from massive hemorrhage or extravasation of fluid from the vascular compartment into the swollen limb. Vasodilatation and a direct action on the myocardium is mainly seen in viper bites. Almost every species of snakes can cause renal failure. It is fairly common following Russell's Viper bite and is a major cause of death. Mechanism of renal damage include ischemia (from hypotension, renal vasoconstriction or disseminated intravascular coagulation), hemorrhage, direct nephrotoxicity or pigment nephropathy associated with massive intravascular haemolysis, generalized rhabdomyolysis and associated electrolyte disturbances. Acute interstitial nephritis due to snake venom have also been observed[57]. Cardiotoxic features include tachycardia, hypotension and ECG changes include sinus tachycardia, ischemic non specific ST-T changes and atrioventricular blocks. This cardiotoxicity is seen in 25% of Viperine bites[54]. Myalgic features are the most common presentation of bites by sea snakes. Muscle necrosis may also result is myoglobinuria. Rare systemic manifestations including hypopituitarism[59] and bilateral thalamic haematoma[60] have also been reported.

Late-onset envenomation[43]

The patient should be kept under close observation for at least 24 hours. Many species, particularly the Krait and the Hump-nosed pit viper are known for the length of time it can take for symptoms to manifest. Often this can take between 6 to 12 hours.

Late onset envenomation is a well documented occurrence. This is also particularly pertinent at the start of the rainy season when snakes generally give birth to their young. Juvenile snakes measuring 8-10 inches long, tend to bite the victim lower down on the foot in the hard tissue area, and thus any signs of envenomation can take much longer to appear.

Overlapping symptoms and signs[43]

Russell's viper envenomation can also manifest with neurotoxic features. This can sometimes cause confusion and further work is necessary to establish how wide this might be. Development of neurotoxic features in Russells Viper bite is believed to be pre synaptic or Krait like in nature. It is for this reason that a doubt is expressed over the response of both species to Neostigmine.

TABLE 5: SNAKES, CLINICAL RESPONSE AND THERAPEUTIC ASPECT[43]

Features	Cobras	Kraits	Russells Viper	Saw Scaled Viper	Hump Nosed Viper
Local Pain/Tissue Damage	YES	NO	YES	YES	YES
Ptosis / Neurological Signs	YES	YES	YES	NO	NO
Haemostatic abnormalities	NO	NO	YES	YES	YES
Renal Complications	NO	NO	YES	NO	YES
Response to Neostigmine	YES	NO	NO	Not applicable	Not applicable
Response to ASV	YES	YES	YES	YES	NO

MANAGEMENT[64]

1. Do not send the patient away to another centre without first aid, especially if it is far away.
2. Do not give sedatives to calm the patient.
3. Do not tie a tourniquet above the site of bite.[61]
4. Do not use ice packs, or incise, or perform suction at the site of bite.
5. Do not elevate the limb unless antivenom is available immediately.
6. Do not use antivenom unless specifically indicated.[62,63]

The mnemonic **RIGHT** gives the initial steps to be taken in a hospital or primary health care facility[65] .

R—Reassure the patient. Snake bite understandably causes great fear in the patient. Seventy per cent of all snake bites are non-venomous. Even in bites by venomous snakes, envenomation occurs in only 50% of cases.

I—Immobilize in the same way as you would a fractured limb, using splint and bandage. This goes a long way in slowing the spread of the venom in the body.

G—Grade the degree of envenomation. This will help in assessing the need for dose of antivenom and the quantity of the initial dose.

H—Admit the patient to the hospital even if your hospital is not equipped for such cases. Correct initial steps will ensure stabilization of the patient while transport is being organized.

T—Take a blood sample.

After the initial stabilization, which also includes assessment of the airway, breathing, and circulation, locally clean the wound, give

tetanus toxoid vaccine if the immunization is incomplete and insert a large bore intravenous line. A sample should be collected for Blood grouping. This should be done immediately before coagulopathy starts after which typing may be impossible.[69]

Severity of envenomation[67]

Grade 0—No envenomation—No local signs by six hours and no systemic signs by 24 hours.

Grade 1— Minimal envenomation—Local swelling and pain without progression, with no systemic or lab abnormalities needs only pain control and careful observation.

Grade 2—Moderate envenomation—Swelling, pain, or ecchymosis progressing beyond site of injury; mild systemic signs of nausea, vomiting, perioral and scalp paraesthesias and fasciculations, or lab manifestations in the form of evidence of coagulopathy. Antivenom should be given.[68]

Grade 3—Severe envenomation—Marked local response with development of vesicles and bullae, systemic findings as in moderate plus hypotension, shock, bleeding diathesis and respiratory distress and

evidence of coagulopathy plus anemia and metabolic acidosis. Antivenom should be given.

A progression of local swelling is best recognized if the circumference of bitten limb is taken every 15 minutes and a demarcation line is drawn on the upper limit of the initial swelling or the fang marks.

Most envenomations become symptomatic in minutes and almost always within six hours. Delayed signs of envenomation have been reported in some species of snakes, especially kraits, so all patients with presumed dry snake bite should be admitted to hospital and observed for at least 24 hours.

Antivenom

In a setting with scarce antivenom, poor transport facilities, and inadequate laboratories, administration of antivenom is guided by the 20 minute whole blood clotting test and clinical symptoms[69]. Perform the test every six hours. The protocol in the table is best suited for primary care facilities.

TABLE 6: PROTOCOL FOR PRIMARY CARE

Frequency of evaluation	Clotting time and neurotoxicity	Antivenom in 1 hour (ml)
Hourly	>20min or presence of neurotoxicity or both	80-100(first dose)
Second hour from first dose	Worsening neurotoxicity	80-100
Sixth hour from first dose and subsequently every six hours	Still >20min	80-100 and subsequently every six hours till clotting time is normal

Dilute antivenom in 100-500 ml of isotonic fluid or 5% dextrose. In case of neurotoxic bites, further worsening after two doses will require mechanical ventilation. Antivenom may not help at this stage[70]. In viperine bites repeat antivenom every six hours until coagulopathy is corrected.

Adverse reactions to antivenom

Fear of anaphylactic reactions to antivenom is common among clinicians. These reactions are easily handled even in the smallest hospital if proper precautions are taken and healthcare workers are aware of the signs of anaphylaxis – urticaria, itching, fever, shaking chills; nausea, vomiting, diarrhea, abdominal cramps, tachycardia, hypotension, bronchospasm and angioedema. In cases of anaphylactic reactions stop giving antivenom. Give 0.5mg of 1:1000 adrenaline intramuscularly. To provide protection against delayed anaphylactic

reaction give 100mg (2mg/kg) of hydrocortisone intravenously, and give 0.2mg / kg of the H_1 antihistamine chlorpheniramine maleate intravenously. If the symptoms do not improve in the next 10-15 minutes, give another intramuscular dose of 0.5mg adrenaline. A third dose may also be given if necessary. Once the patient has recovered, antivenom can be restarted slowly for 10-15 minutes under close observation. Normal drip rate may then be resumed. Anaphylaxis to antivenom is not a contraindication to further administration of antivenom. Sensitivity test to antivenom has been abandoned. They have no predictive value in anaphylactic or late serum reactions and may pre sensitize the patient to the serum.

Supportive treatment[71]

The following supportive treatments may be needed.

- Blood or blood products for disseminated intravascular coagulation.
- Ventilator support for respiratory failure.
- Use of ant cholinesterase agents for reversal of paralysis (0.5 mg neostigmine intramuscularly every half hour up to six doses and 0.6 mg atropine intravenously, if the patient visibly improves

after the first dose. This should be started with the first evidence of neurotoxicity.

- Peritoneal dialysis in case of renal failure.
- Surgery if compartment syndrome develops.

Patients receiving antivenom should be followed up for several days because delayed reactions can occur and their frequency is proportional to the amount of antivenom given. Even without immediate access to tertiary healthcare facilities, much can be done to improve patient's chances of survival. Proper first aid, availability of antivenom, determining the severity of envenomation, and overcoming the fear of anaphylaxis are four of the major areas which must be addressed.

AIMS AND OBJECTIVES

To analyze the epidemiological and management aspects of poisonous snake bites admitted at GRH Madurai involving

1) Snake bite
2) Treatment behavior
3) Symptoms and complication analysis
4) Management aspects
5) Economic burden

MATERIALS AND METHODS

The study was conducted from December 2009 to December 2010 with permission from the Department of Medicine, Government Rajaji Hospital, Madurai Medical College, Madurai.

SOURCE OF DATA

129 cases of snake bite admitted in Govt. Rajaji Hospital

INCLUSION CRITERIA

1) History of snake bite with/without fang marks with clotting time more than 20min
2) History of snake bite with/without fang marks with neurological symptoms/signs

EXCLUSION CRITERIA

1) History of snake bite without signs/ symptoms of envenomation and clotting time less than 10 min.
2) Patients who got discharged against medical advice

Symptoms of envenomation included

A. Hemotoxic- bleeding manifestations from skin and mucous membrane in the form of frank hemorrhage to ecchymosis or petechae, abdominal pain.

B. Neurotoxic- any form of motor weakness, respiratory effort weakness, altered neurological state.

Signs of envenomation included

a. CT more than 20min, progressive cellulitis, skin and/or mucous membrane bleeding manifestations and neurological deficits.

METHODS

A detailed history of bite including time of bite, site of bite, type of snake, first aid history, immediate manifestations and history of treatment received from outside were taken from each patient and from the witness. A detailed clinical examination of every patient was done with a standard proforma.

A set of investigations like complete blood count, BT, CT, urea, creatinine, electrolytes and ECG were done for each patient, All investigation were repeated to evaluate the progress during and after treatment. Clinical progress was assessed every day. All the patients received antisnake venom according to the grading and progression of signs and symptoms. All patients received prophylactic antibiotics and surgical intervention like fasciotomy was done for patients who had severe local edema with compartment syndrome.

Patients were subjected to CT brain if intracranial hemorrhage was suspected. Those who developed ARF underwent hemodialysis until recovery.

RESULTS

TABLE 7: AGE AND SEX CROSS TABULATION

AGE	SEX		TOTAL
	FEMALE	MALE	
13-22	11 42.3%	15 57.7%	26 100.0%
23-32	10 37.0%	16 59.3%	27 100.0%
33-42	10 38.5%	16 61.5%	26 100.0%
43-52	8 32.0%	17 68.0%	25 100.0%
53-62	9 39.1%	14 60.9%	23 100.0%
63+	0 0%	2 100.0%	2 100.0%
Total	48 37.2%	80 62.0%	129 100.0%

The incidence of snake bite among females was maximum in the age group of 13-22years (42.3%) and minimum in the 43-52(32%) age group. Among males the maximum incidence was observed in the 43-52(68%) age group and minimum in the 63+years (100%) age group.

Although the percentage distribution among males and females did not show wide disparity in their respective age groups, the frequency distribution was maximum(11) in the 13-22years age group for females and (17) for males in the 43-52years age group.

TABLE 8: OCCUPATIONAL DISTRIBUTION

OCCUPATION	FREQUENCY	PERCENT
Farmer	69	53.5
Others	60	46.5
Total	129	100

The study showed that 53.5% of the bites occurred in the farming community. The remaining was among people of other professions.

TABLE 9: TYPE OF SNAKE BITE

TYPE	FREQUENCY	PERCENT
Haemotoxic	117	90.7
Neurotoxic	9	7.0
Not available	3	2.3
Total	**129**	**100.0**

The incidence of haemotoxic snake bites was 90.7% and neurotoxic was 7%. Another 2.3% was unknown

TABLE 10: SITE OF BITE

SITE OF BITE	FREQUENCY	PERCENT
Forearm left	1	.8
Left foot	49	37.7
Left hand	8	6.2
Left leg	11	8.5
Forearm Right	1	.8
Right foot	40	30.8
Right hand	9	6.9
Right leg	9	6.9
Shoulder	1	.8
Total	**129**	**100**

Maximum number of bites was noted in the lower extremities 89(68.5%). The left foot bite incidence was 49(37.7%) being marginally more than the right 40(30.8%). Other sites in decreasing order were left leg (11%), right hand and leg being (9%), left hand (8%) and left forearm, right forearm, and shoulder being 1%

TABLE 11: BITE SITE TO HOSPITAL DISTANCE

DISTANCE(Km)	**FREQUENCY**	**PERCENT**
<25	58	45.0
25-49	38	29.5
50-74	6	4.7
75-99	6	4.7
100-124	10	7.8
175+	2	1.6
Total	**129**	**100.0**

The study showed that the mean distance travelled by patients to reach the hospital was 37.61Km with the median being 30Km. It was observed that the maximum frequency distribution was below the 25Km mark.

TABLE 12: TIME OF SNAKE BITE

TIME GROUP(Hrs)	**FREQUENCY**	**PERCENT**
< 3:00	2	1.6
3:00 - 5:59	6	4.7
6:00 - 8:59	20	15.5
9:00 - 11:59	13	10.0
12:00 - 14:59	19	14.7
15:00 - 17:59	12	9.3
18:00 - 20:59	41	31.8
21:00 - 23:59	16	12.4

Eight categories were made on the basis of three hourly intervals and the incidence of snake bite was analyzed. It was found that there were two peaks in the frequency curve. The maximum incidence of snake bite was observed between 6-9pm (31.8%) followed by 6-9am (15.5%).

TABLE 13: SEASONAL INCIDENCE

MONTH	FREQUENCY	PERCENT
1	14	10.9
2	8	6.2
3	12	9.3
4	7	5.4
5	7	5.4
6	12	12.4
7	9	7.0
8	8	6.2
9	7	5.4
10	8	6.2
11	18	14.0
12	15	11.6
Total	**129**	**100.0**

The study showed the peaking of the incidence during the months of November, December and January (14%, 11.6% and 10.9% respectively). Another peak was observed in the month of June (12.4%) coinciding with the monsoon rains.

TABLE 14: TREATMENT SEEKING BEHAVIOR

ATTRIBUTES	PERCENTAGE	FREQUENCY
Traditional healer	11.6	15
Traditional medication	12.4	16
Tourniquet	63.6	82

It was observed that 11.6% of the patients were taken to traditional healers before admission to the hospital. Another 12.4% consumed traditional medication before seeking help from tertiary referral center.

Tourniquet application was observed in 63.6% of the cases. None of the patients were immobilized before admission for lack of awareness.

TABLE 15: BITE TO NEEDLE TIME

TIME (Hrs)	**FREQUENCY**	**PERCENT**
<3.00	26	20.0
3.00 – 5.99	39	30.0
6.00 - 8.99	30	23.9
9.00 - 11.99	15	11.5
12.00 - 14.99	5	3.8
15.00 - 17.99	8	6.2
18.00 - 20.99	4	3.1
21.00 - 23.99	1	.8
24.00+	1	.8
Total	**129**	**100**

The study showed that the average bite to needle time was 6.9 hours with a median time of 5.5 hours. The maximum frequency distribution was in the 3-6 hour class interval.

BITE TO NEEDLE TIME AND ITS IMPLICATIONS ON THE OUTCOME

To analyze the significance of bite to needle time with respect to its prognosis, the available frequency data of the time interval between the bite and anti snake venom administration was grouped into three hourly intervals. The prognosis in terms of the occurrence of major and minor complications was analyzed among the individuals in the three hourly intervals. Major complications included respiratory failure, ARF, ICH, DIC and fasciotomy.

The analysis showed that there was a significant increase in the rate of complications both major and minor in those who had bite to needle time more than 6 hours Neurological complications in particular showed significant increase in complication rates.

TABLE 16(A): SYMPTOMS COMPARISON < & > 6Hrs BITE TO NEEDLE TIME

SYMPTOMS	<=5.931(Hrs) (%)	>=5.931(Hrs) (%)
Dyspnea	4.6	10.9
Hemoptysis	1.5	3.1
Ptosis	1.5	9.4
Dysphagia	1.5	7.8
Dysphonia	1.5	7.8
Diplopia/Vision disturbance	1.5	9.4
Confusion	1.5	4.7
Hematuria	16.9	25.0
Hematemesis	3.1	3.1
Gum bleed	3.1	1.6
Malena	10.8	10.9
Hemolysis	1.5	3.1
Oliguria / anuria	15.4	21.9
Malena	6.2	10.9

TABLE 16(B) : SIGNS COMPARISON < & > 6HRS BITES TO NEEDLE TIME

SIGNS	<=5.931(Hrs) (%)	>=5.931(Hrs) (%)
Cellulitis	87.7	82.8
Regional lymphadenitis	70.8	71.9
Compartment syndrome	9.2	6.3

Cellulitis, regional lymphadenitis and compartment syndrome did not show any significant difference with respect to bite to needle time being more than or less than six hours.

TABLE 16(C) : COMPLICATIONS COMPARISON < & > 6hrs BITE TO NEEDLE TIME

COMPLICATIONS	<5.931(hrs) (%)	>5.931(hrs) (%)
ARF	15.4	23.4
Fasciotomy	6.2	7.8
Respiratory Failure	1.5	7.8
ICH	1.5	100.00
DIC	100.0	1.6

Major complications like ARF, fasciotomy, respiratory failure, ICH and DIC were significantly higher in those individuals in whom the bite to needle time was more than six hours.

TABLE 17: VIALS OF ASV ADMINISTERED

NO. OF VIALS	PERCENT
< 5	17.1
6-10	38.0
11-15	24.0
16-20	13.2
21-25	3.9
26+	3.9
Total	**100.00**

The average requirement of ASV was found to be 12.8 vials with maximum frequency distribution in the 6-10 class interval.

TABLE 18 : PROPHYLACTIC EFFECTIVENESS OF CPM

SYMPTOMS	CPM ABSENT	CPM PRESENT	CHI SQUARE TEST	SIGNIFICANCE
Vomiting	24.1%	78.6%	.008	Significant
Headache	31.6%	68.4%	.023	Significant
Paraesthesia	43.8%	56.3	.244	Not Significant
Abdominal Pain	27.3%	72.7%	.052	Not Significant
Giddiness	50.0%	50.0%	.478	Not Significant

The casual use of chlorpheniramine maleate and its rationale was assessed in the study. Applying the chi square test, it was found that the relative increase in symptoms as noted in the table above did not have any relation to the administration of CPM.

However vomiting and headache symptoms were significantly higher in those who were administered CPM.

TABLE 19 : CPM AND ANAPHYLAXIS

ATTRIBUTES	CPM ABSENT	CPM PRESENT
No Anaphylaxis	53.5%	46.7%
Anaphylaxis	42.9%	57.1%
Chi-square	0.439	**NOT SIGNIFICANT**

The study showed that administration of CPM did not have any significant relation with the occurrence of anaphylaxis.

TABLE 20: HEMODIALYSIS

No. of cycles of HD	Frequency	Percent
3-5	11	8.5
6-8	8	6.2
9-11	4	3.1
39+	1	8

The maximum distribution of frequency was in the 3-5 class interval. Majority of the patients going in for ARF recovered with 3-5 cycles of hemodialysis.

OUTCOMES

Of the 129 cases studied, five died and the others improved. Three out of the five deaths were due to septicemia and another two form metabolic complications.

TABLE 21 : EXPENDITURE TO REACH HOSPITAL

	RUPESS	FREQUENCY	PERCENT
Valid	< 500.00	68	52.7
	500.00 - 999.00	22	17.1
	1000.00 - 1499.00	14	10.9
	1500.00 - 1999.00	7	5.4
	2000.00 - 2499.00	4	3.1
	2500.00+	4	3.1
	Total	119	92.2
Missing	System	10	7.8
Total		**129**	**100.0**

It was observed that patients spent an average of Rs.609 to reach the hospital. The median being Rs.310 and maximum expenditure being Rs. 5000.

TABLE 22 : LOSS OF PAY TO PATIENT

AMOUNT IN RUPEES PER DAY	PERCENT
< 100	36.4
100-199	26.9
200-299	4.6
300-399	0.0
400+	3.1

The study revealed that the mean loss of pay to the patient per day was Rs. 146 and the median was Rs. 90. The loss of pay was in the range of Rs. 20-600.

TABLE 23 : LOSS OF PAY TO THE ATTENDEES'

	AMOUNT IN RUPEES PER DAY	FREQUENCY	PERCENT
Valid	< 150.00	52	40.3
	150.00 - 299.00	56	43.4
	300.00 - 449.00	11	8.5
	450.00 - 599.00	5	3.9
	600.00 - 749.00	1	.8
	750.00+	2	1.6
	Total	127	98.4
Missing	System	2	1.6
Total		**129**	**100.0**

The study showed attendees' of the patient lost on an average Rs. 183.85 per day with a median of Rs. 150 and the maximum loss being Rs. 2500.

TABLE 24 : DAILY EXPENDITURE

AMOUNT IN RUPEES PER DAY	FREQUENCY	PERCENT
< 150.00	62	48.1
150.00 - 299.00	43	33.3
300.00 - 449.00	16	12.4
450.00 - 599.00	5	3.9
600.00 - 749.00	2	1.6
900.00+	1	.8
Total	**129**	**100.0**

The in hospital stay cost the patient on an average Rs. 173 per day with median of Rs. 150. The maximum spending was Rs. 1000 .

TABLE 25 : GOVERNMENT SPENDING

Amount in Rupees	Frequency	Percent
< 5000.00	21	16.2
5000.00 - 9999.00	68	52.3
10000.00 - 14999.00	30	23.1
15000.00 - 19999.00	8	6.2
25000.00+	2	1.5
Total	**129**	**99.2**

The average spending by the health department per snake bite patient was Rs. 8640 with a median of Rs. 8238. The maximum expenditure being Rs. 27,428.

Statistical Methods : Chi-square and Fisher Exact test has been used to find the significance. Odds ratio has been used to find the strength of relationship between the parameters of interest**.**

1. Chi-Square Test

   $\chi^2 = \sum \frac{(Oi - Ei)^2}{Ei}$, Where Oi is observed frequnecy and Ei is Expected frequency

2. Fisher Exact Test

	Class 1	**Class 2**	**Total**
Sample 1	a	B	a + b
Sample 2	c	D	c+d
Total	**a+c**	**b+d**	**n**

$$\text{Fisher Exact Test Statistic} = \sum p = \frac{(a+b)!\,(c+d)!\,(a+c)!\,(b+d)!}{n!} \cdot \frac{1}{\sum a!b!c!d!}$$

Statistical software : The Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

DISCUSSION

Snake bite is one of the greatest public health problems in the tropics. It is an occupational hazard of agricultural workers and hunters in many tropical countries. Snake bite mortality in India is about 15,000 per annum, whereas the world mortality is estimated at 1, 50,000 per annum. It is difficult to ascertain the correct incidence of snake bites as large number of cases go unregistered.

Indian subcontinent, being tropical, harbors a variety of venomous and non-venomous snakes. The major families of snakes in India are Elapidae, Viperidae and Hydrophidae (Bawaskar, 2004). The four major venomous biting species "The BIG FOUR" are Cobra (Naja naja), Krait (Bungarus caeruleus), Russell's viper (Vipera russelli), and Saw-scaled viper (Echis carinatus). The former two belong to the Elapidae and the latter two belong to the Viperidae family[16].

AGE

In the present study, most of the male victims were in the 43-52 age group (68%) whereas the female victims where in the 23-32 age group (37%). Both put together, the maximum number of victims were in the 23-32 age group. A similar study conducted by Virmani SK and Dutt

OP[36] in Jammu showed maximum incidence in the age group of 21-30 years.

In a similar study conducted in JIPMER, Pondicherry, majority of the victims were in the age group of 15-60 years[73,] whereas the study in Safdarjung Hospital, New Delhi and Sawai et al showed majority of the victims were in the age group of 10-30 years[17].

The results of the present study are in accordance with the above mentioned studies which showed a rapid decline in the incidence of snake bite poisoning after the 5th decade of life.

Sex

The present study showed a male female ratio of 5:3 consistent with the report from the study conducted at JIPMER, Pondicherry[73] and Safdurjung Hospital, New Delhi and one another study conducted by Banerjee RN[74].

Occupation:

Consistent with the studies conducted at JIPMER, Pondichery, Safdarjung Hospital, New Delhi, the present study also showed that the incidence of snakebite poisoning was more among people employed in the agriculture sector (30%) compared to other occupations. The characteristics of snakebite have been attributed to the risk of exposure

of these people to the snakes during their activities. This also shows that the high-risk group is the low socioeconomic section of the population.

Domicile:

Rural people comprised the largest group of victims (92% cases), as the snakes are in abundance in the rural areas and the people living are closer to the latters habitat.

This study correlates with the study of Bhat RN (92%) and Kularatana SAM (96%), thereby indicating that snakebite poisoning remains a major public health problem among rural population.

TYPE OF SNAKE BITE

The present study showed hemotoxic(viperidae) snake bites contributing 117(90.7%) of the cases and only 9 (7%) of the cases were neurotoxic in nature. This is contrary to the reports from studies done at Safdurjung[77] which showed a higher incidence of neurotoxic snake bites. This probably is attributed to the varying snake species distribution in south india. In our study most of the patients identified the type of snake whether belonging to viperidae or elapidridae group. About 3% of the patients could not identify the type of snake.

SITE OF BITE

Maximum number of bites was noted in the lower extremities 89(68.5%). The left foot bite incidence 49 (37.7%) was marginally more than the right 40 (30.8%). Other sites in decreasing order were left leg (11%), right hand and leg being (9%), left hand (8%) and left forearm, right forearm, and shoulder being 1%.

These findings suggest that the site of snakebite is predominantly determined by accidental or inadvertent contact of the reptile during human activities. These findings are similar to that of Virmani SK[36], Dutt OP and Bhat RN[76].

TIME OF SNAKE BITE

Our study showed that the maximum number of snake bites occurred between 6 pm to 9 pm (31.8%) and 6am to 9 am (15.5%).

A similar study conducted by Sawai et al1[17] showed a maximum incidence of snake bites between 6 PM and midnight.

SEASONAL INCIDENCE

This study proves the fact that there is a definite seasonal pattern in snakebite incidence. About 36% of cases were reported in the months of November, December and January and another 12%

reported in June. This is due to the fact that these are the monsoon months with rainfall forcing the snakes to venture out of their water-filled pits, as well as there is increased human activity in the fields, being the sowing season. A similar trend was observed by Viramani SK and Dutt OP[36].

TREATMENT SEEKING BEHAVIOR

Our study showed that 11.6% of the patients were taken to traditional healers before admission to the hospital. Another 12.4% consumed traditional medication before seeking help from tertiary referral center.

Tourniquet application was observed in 63.6% of the cases. None of the patients were immobilized before admission for lack of awareness. A similar study conducted by Atta Muhammad chandio et al[89] in sindh Pakistan revealed a similar practice of tourniquet application and seeking local treatment before reaching tertiary centers. In the present study the practice of incising the bite site was not prevalent as reported in the study conducted by Atta Muhammad chandio et al[89] or by Bhat RN[76].

CLINICAL FEATURES

HEMATOLOGICAL MANIFESTATIONS

Bleeding manifestations such as gum bleeding was observed in 3 cases(2.3%), hemoptysis in 3 cases(2.3%), hematuria in 27 cases(20.9%), hematemesis in 4 cases(3.1%), malena in 14 cases(10.9%), ICH in 1 case and DIC in 1 case Virmani S.K.[36] in his study reported haematuria as the commonest (67.2%) presentation followed by bleeding gums (36.2%), bleeding from injection site (39.7%) haemoptysis (18.1%), haemetemesis (28.4%), malena (25.4%) and epistaxis (12.5%). In out study epistaxis was not observed in any of the cases.

NEUROTOXIC MANIFESTATIONS

Neurotoxic manifestations observed were as follows. Paraesthesia in 27 cases(20.9%), headache in 34 cases (26.4%), dyspnea in 10 cases (7.8%), ptosis in 7 cases (5.4%), dysphagia in 6 cases (4.7%), dysphonia in 6 cases (4.7%) diplopia and vision disturbance in 7 cases (5.4%) and respiratory paralysis in 6 cases (4.7%). Convulsions were not observed in any of the cases in the study.

COMPLICATIONS

Fasciotomy was done in 9 cases (7%), ARF in 24 cases (18.6%), cellulitis in 110 cases (85.3%), compartment syndrome in 10 cases (7.8%) and anaphylaxis in 7 cases (5.4%).

BITE TO NEEDLE TIME

Time interval between snakebite and administration of ASV carries a prognostic importance. Lesser the time interval better the prognosis. The delay in seeking medical help is mainly due to time spent in administering home remedies and getting treatment from traditional practitioners and also lack of transport facilities especially during nights.

Early hospitalization (below 6 hours) was shown to reduce the incidence of mortality, morbidity and the duration of hospital stay.

To analyze the significance of bite to needle time with respect to its prognosis, the available frequency data of the time interval between the bite and ASV administration was grouped into three hourly intervals. The prognosis in terms of the occurrence of major and minor complications was analyzed among the individuals in the three hourly intervals.

The analysis showed that there was a significant increase in complications rates in those who had bite to needle time more than 6 hours. Neurotoxic snake bites in particular showed significant increase in complication rates. These findings are similar to the observation made by Vijeth SR et al[81] and Ash T et al[82].

ASV REQUIREMENT

In the present study the majority of the cases required between 6-10vials of ASV compared to the previous conventional high dose regimen.

A study conducted at RNT Medical College[83]. Udaipur Rajasthan concluded that low dose continuous infusion is an effective and economical mode of treatment. Christian Medical College[84]and Hospital Vellor and Baptist Hospital, Bangalore too concluded that the low dose regimen is as effective as the conventional one.

One more study at JIPMER, Pondichery by Vijeth SR[81] et al suggested, initial dose of ASV should be between 150-200 ml if blood is found coagulable at the time of admission. Any patient subsequently developing incoagulable blood should be given 100 ml of ASV.

Another study at JSS Medical College[86], Mysore suggested that the dose depends on clinical effects, rather than on age or weight.

PROPHYLACTIC EFFECTIVENESS OF CPM IN PREVENTING ANAPHYLAXIS

Patients who were administered prophylactic CPM and those who were not, were analyzed for the incidence of symptoms and complications. The chi-square analysis of symptoms showed significance with respect to symptoms of vomiting and headache but showed no association with paraesthesia, giddiness or abdominal pain.

Anaphylactic reactions were noted in 7 cases (5.4%) with a mortality of 1 which was resistant to treatment. Banerjee RM et al[87] also reported anaphylactic reactions in 3% of cases with no mortality.

The other significant result the study showed was that there was no association with the prophylactic use of CPM and prevention of anaphylaxis. A similar sequential randomized and double blind trial using histamine blocker promethazine, for the prophylaxis against early anaphylactic reactions to antivenom for bothrops snake bites by Hui Wen Fan[88]showed the absence of effectiveness of prophylactic use of H_1 blockers in preventing anaphylactic reactions.

COMPLICATIONS AND OUTCOME

In the present study, three patients developed respiratory failure and received ventilator support for a mean period of three days and twenty four patients underwent hemodialysis for acute renal failure. The morbidity was more for hemotoxic snake bites developing renal failure as the hospital stay increased by an additional five days on an average requiring about 3-5 cycle of HD. Of the five patients who died, three were due to ARF with sepsis and another two encountered sudden death probably due to metabolic causes.

ECONOMIC BURDEN

Money spent by a victim to reach the hospital on an average was less than Rs. 200. The average distance travelled to reach the hospital was about 25Km. Majority of the victims used the public mode of transport. Others were brought by 108 ambulance service or private transport. Victims in the age group of 43-52 yrs constituted the most number of cases and about 53.5% of them were involved in farming and related activities. The average in hospital stay was 4.5 days thereby incurring a wage loss of Rs.150-300 to the patient.

The economic burden was also shared by the attendees' who themselves where daily wage earners in the range of Rs. 150-300.

The daily expenses in terms of food and miscellaneous expenditure was about Rs. 150. With the average stay in the hospital being 4.5 days, the total expenditure amounted to Rs. 2925.

Government spending

The average spending by the health department per snake bite patient was Rs. 8640 with a median of Rs. 8238. The maximum expenditure being Rs. 27428. The cost of ASV accounted for the most part of the expenditure. Those patients who developed ARF cost the government an additional Rs5000-7000.

SUMMARY

This study was conducted at Government Rajaji Hospital, Madurai Medical College, Madurai between December 2009 to December 2010. A total of 129 poisonous snake bite cases were analysed. Following points of each patient was noted – name, age, sex, occupation, address, date and time of bite, time interval between bite and ASV administation, site of bite, and first aid measures given.

Each patient was examined for local as well as systemic signs of envenomation, Each patient was subjected to the following investigations: Hb%, TLC, DLC, Bleeding time, cloting time, blood urea, serum creatinine, serum electrolytes ECG and other investigations whenever required.

Treatment measures included:

1. General: Inj. Tetanus toxoid, antibiotics, steroids, IV fluids, analgesics.
2. Specific: ASV, neostigmine, atropine, blood transfusion, assisted ventilation, diuretics and dialysis.

The following were noted in the study

1) The incidence of snake bite among females was maximum in the age group of 13-22 (42.3%) and minimum in the 43-52 (32%) age group category. Among males the maximum incidence was observed in the 43-52(68%) age group and minimum in the 63+years (100%) age group.

Although the percentage distribution among males and females did not show wide disparity in their respective age groups, the frequency distribution was maximum(11) in the 13-22years age group for females and 17 for males in the 43-52years age group.

2) The study showed that 53.5% of the bites occurred in the farming community. The remainder was among people of other professions.

3) The incidence of haemotoxic snake bites was 90.7% and neurotoxic was 7%. Another 2.3% was unknown.

4) Maximum number of bites was noted in the lower extremities 89(68.5%). The left foot bite incidence was 49(37.7%) being marginally more than the right 40(30.8%). Other sites in decreasing order were left leg (11%), right hand and leg (9%), left hand (8%) and left forearm, right forearm, and shoulder being 1%.

5) Mean distance travelled by patients to reach the hospital was 37.61Km with the median being 30Km. It was observed that maximum frequency distribution was below the 25Km mark.

6) The maximum incidence of snake bite was observed between 6-9pm (31.8%) followed by 6-9am (15.5%) and 12-3pm (14.7%).

7) Peak incidence of snake bite was in the months of November, December and January (14%, 11.6% and 10.9% respectively). Another peak was observed in the month of June (12.4%).

8) It was observed that 11.6% of the patients were taken to traditional healers before admission to the hospital. Another 12.4% consumed traditional medication before seeking help from tertiary referral center. Tourniquet application was observed in 63.6% of the cases. None of the patients were immobilized before admission for lack of awareness.

9) Average bite to needle time was 6.9 hours with a median time of 5.5 hours. The maximum number of victims were in the range of 3-6 hours.

10) The study showed that complications, symptoms and signs especially with neurotoxic snake bites were significantly more and severe when the bite to needle time exceeded the crucial 6 hours.

11) Prophylactic use of CPM did not reduce the incidence of anaphylactic reactions although there was associated reduction in some of the minor symptoms.

12) Majority of patients who had developed ARF recovered within 3-5 cycles of HD.

13) In the study 5 cases died, three due to septicemia and another two due to probable metabolic causes.

14) The economic burden to the patient including charges to reach the hospital, daily expenses, loss of pay to the attendees' and patient amounted to Rs. 2925 for an average stay of 4.5 days.

15) The government spending per case of snake bite amounted to Rs. 8640 on an average.

CONCLUSION

Snake bite is a major cause of mortality and morbidity in India. This has significant socio-economic repercussions within the rural population, as more than 90% of the bites are reported from rural India with 54% of them being directly involved in farming.

About 90% of poisonous snake bites are hematotoxic and the average bite site to tertiary center distance being 37Km. Individuals are usually bitten between 6-9pm, with more than 90% of the bites on the feet while venturing into the wilderness. Snake bites are more common in the months of June, November, December and January when the monsoon rain in this part of the county forces the snakes to come out of their habitat.

Victims usually identify and bring the snake to the hospital with easy access to either public or private transport. Bite to needle time delay is determined by the distance travelled and time spent in getting local and traditional medication. This delay when more than 6 hours increased morbidity and mortality significantly.

The low dose regimen of 100 to 150ml ASV was as effective as the older high dose regimen and prophylactic medication to prevent

anaphylaxis proved to be ineffective. Timely ventilator support and hemodialysis significantly reduced mortality.

Finally the Economic burden borne by the patient, care givers and health department continues to remains a major problem of snake bite in India.

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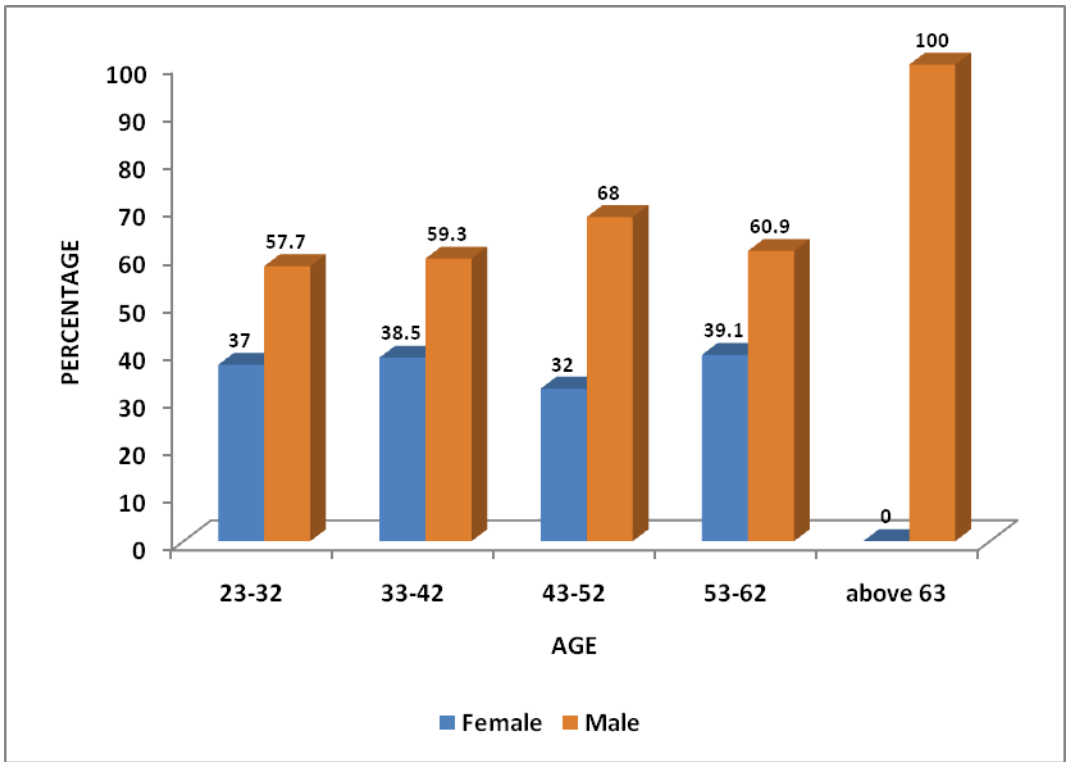
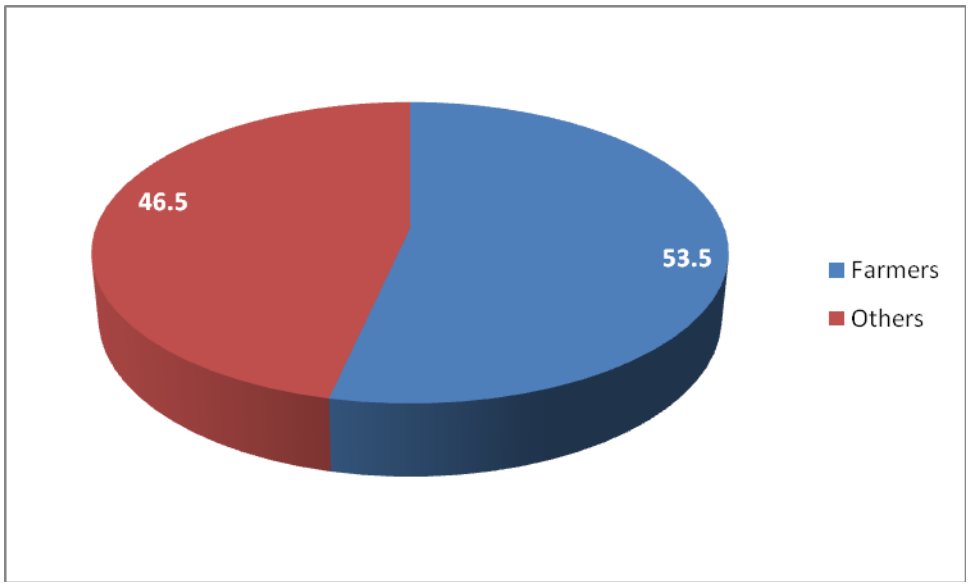
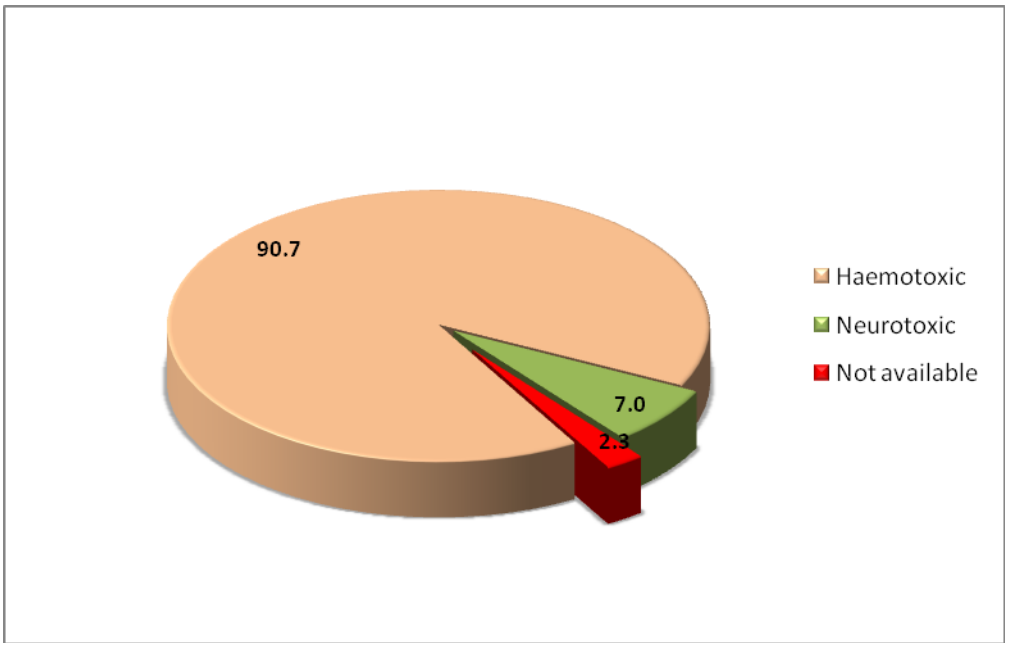
GRAPH 1: AGE AND SEX CROSS TABULATION



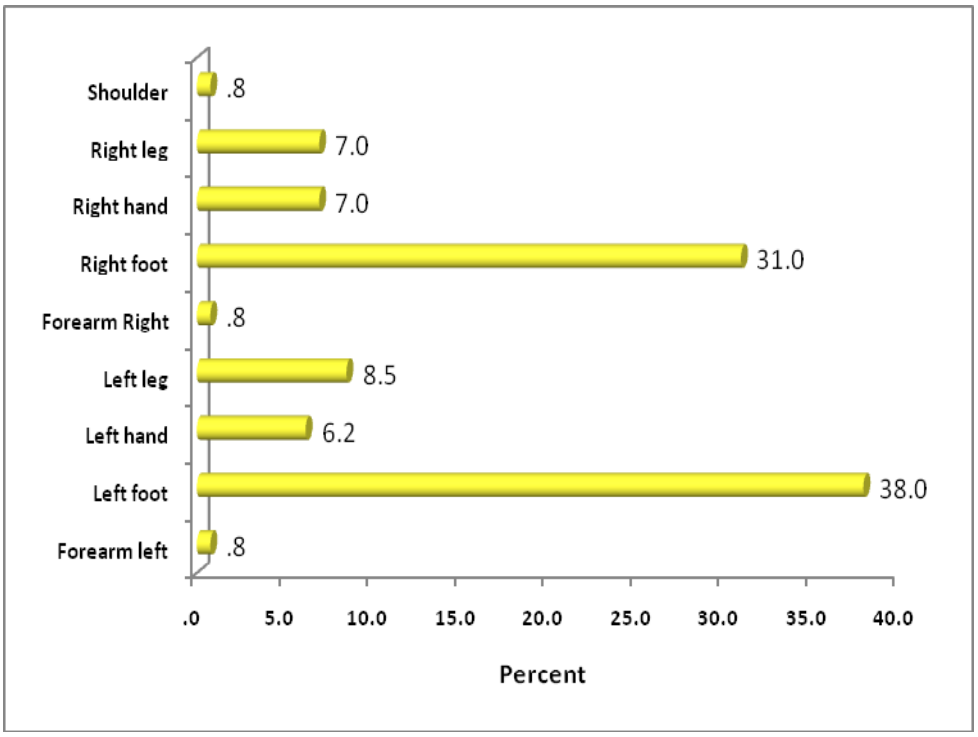
GRAPH 2: OCCUPATIONAL DISTRIBUTION (%)



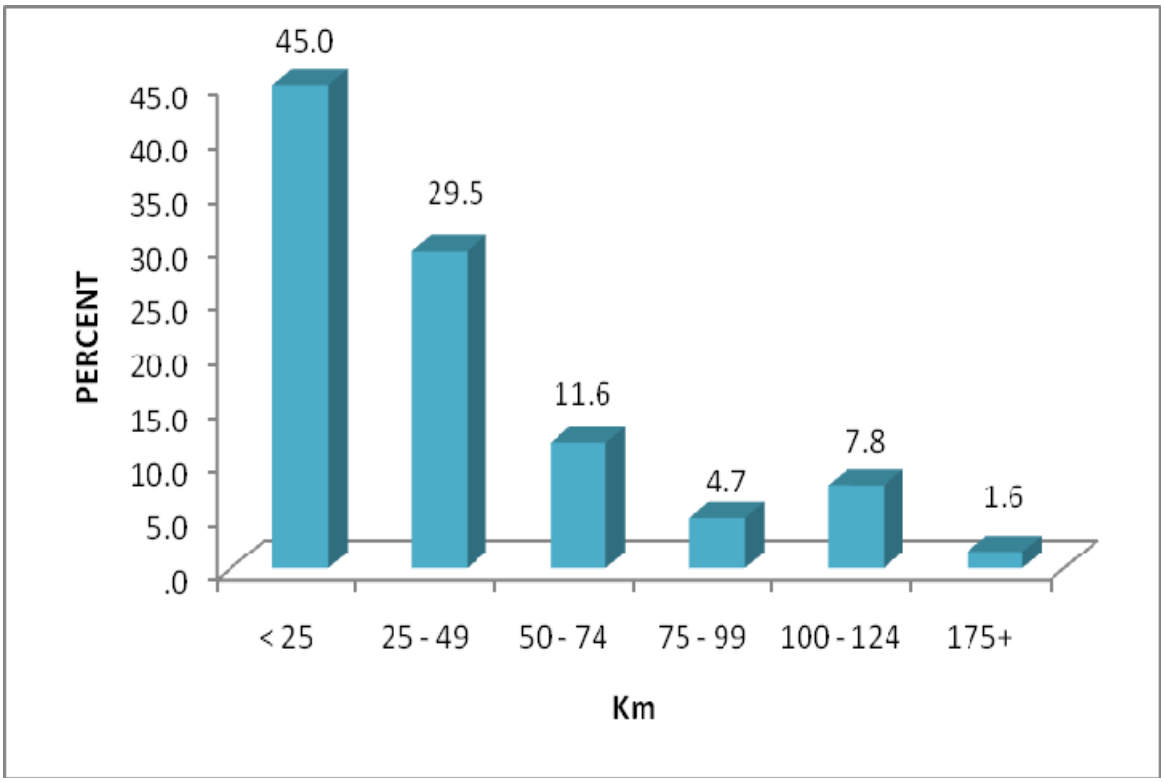
GRAPH 3: TYPE OF SNAKE BITE (%)



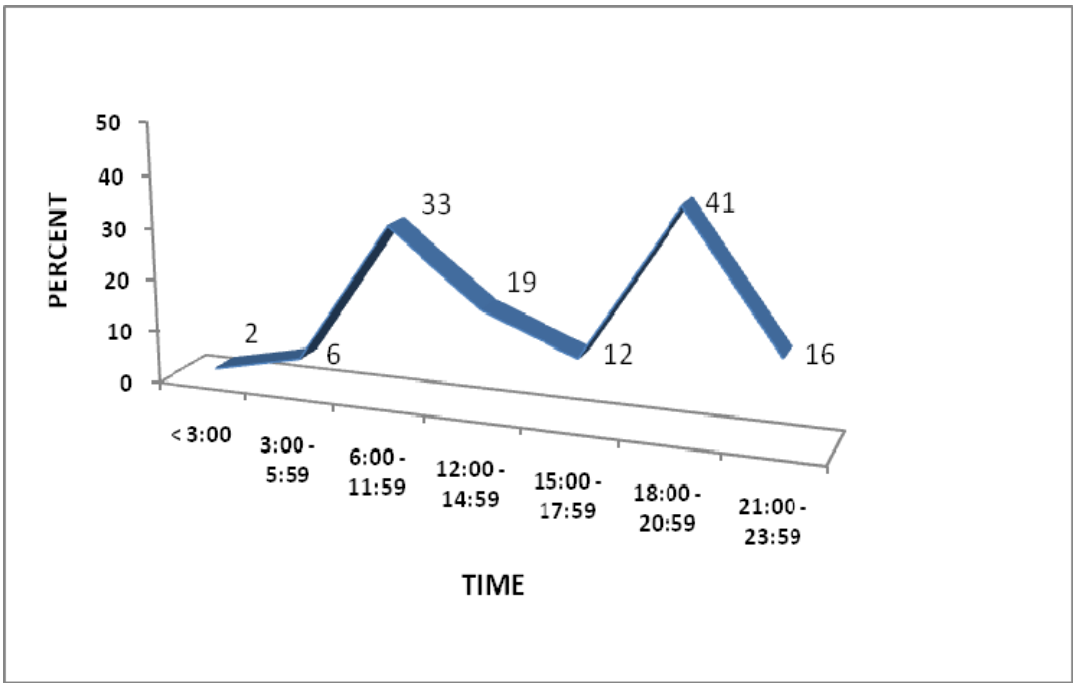
GRAPH 4: SITE OF BITE (%)



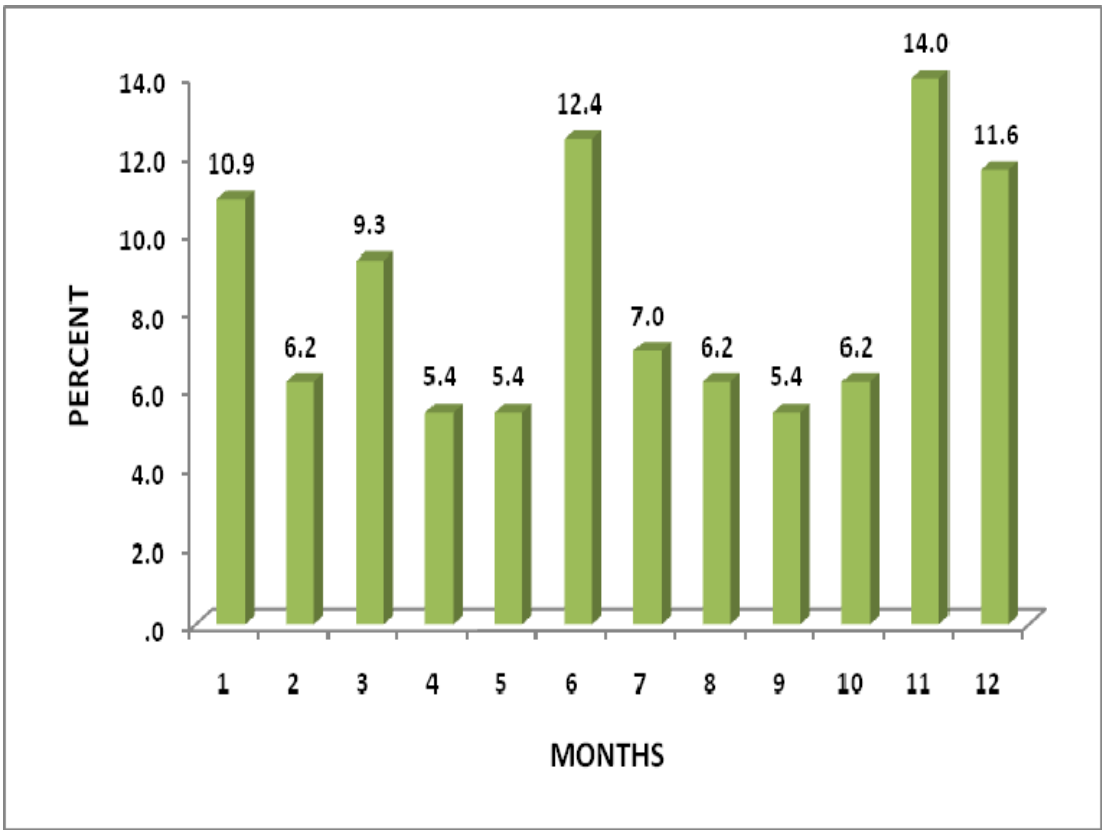
GRAPH 5: BITE SITE TO HOSPITAL DISTANCE



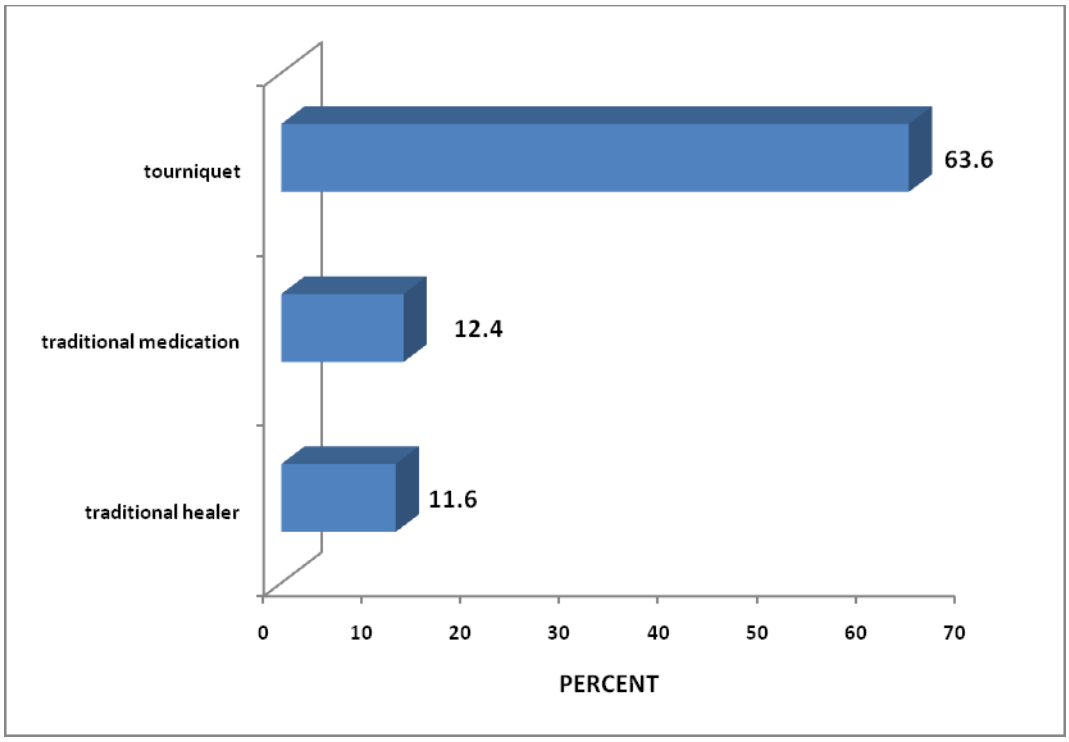
GRAPH 6: TIME OF SNAKE BITE



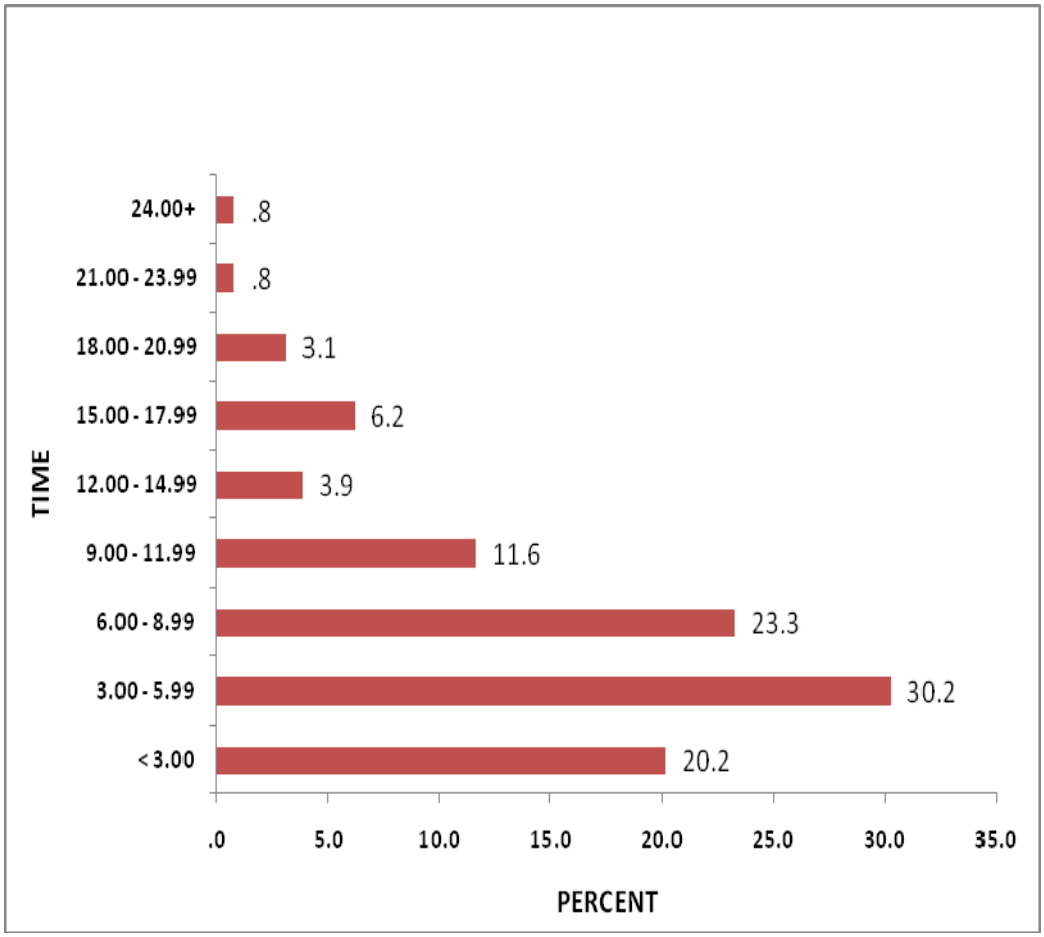
GRAPH 7: SEASONAL INCIDENCE



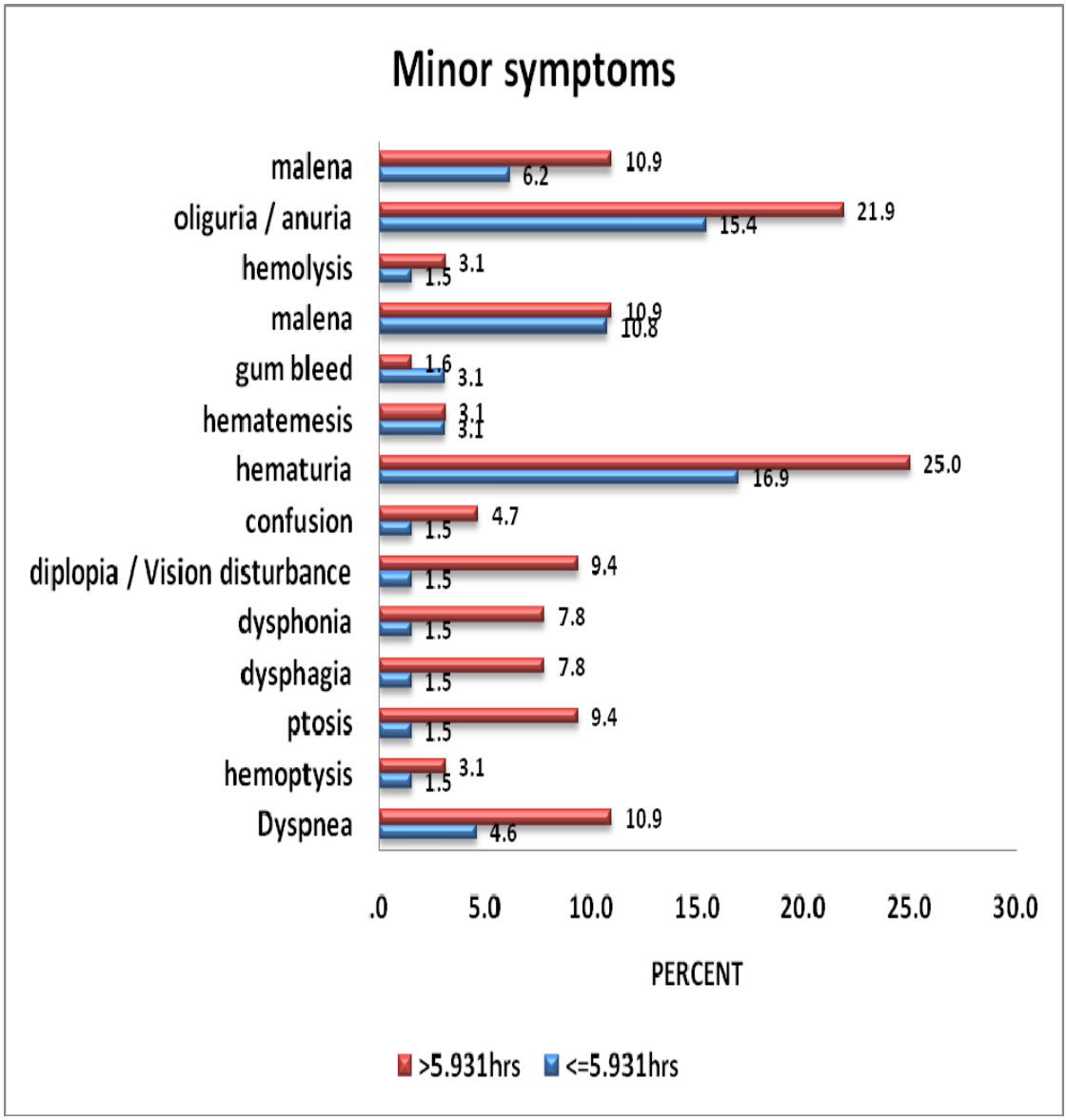
GRAPH 8: TREATMENT SEEKING BEHAVIOR



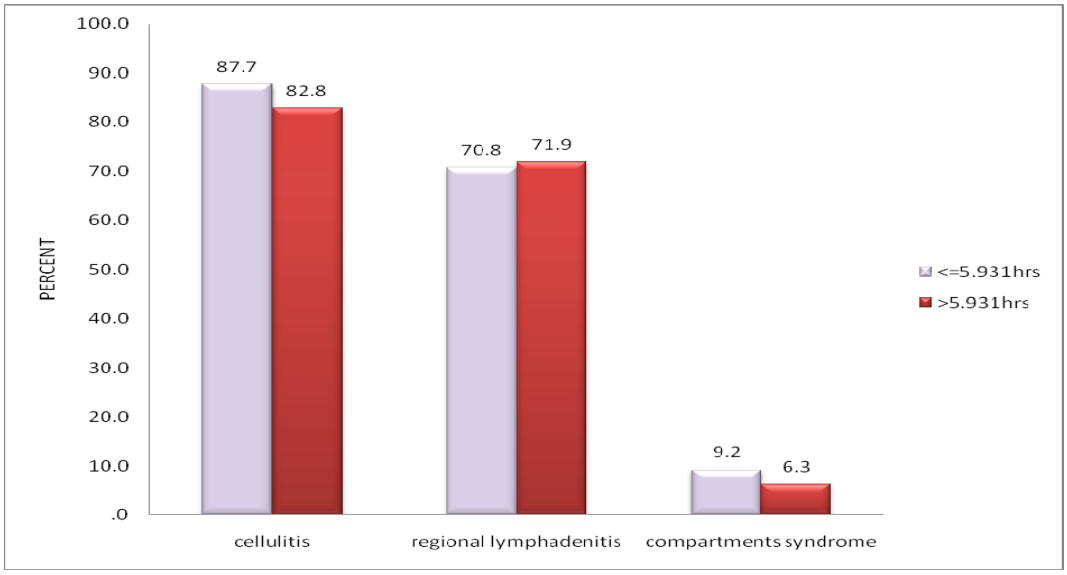
GRAPH 9: BITE TO NEEDLE TIME



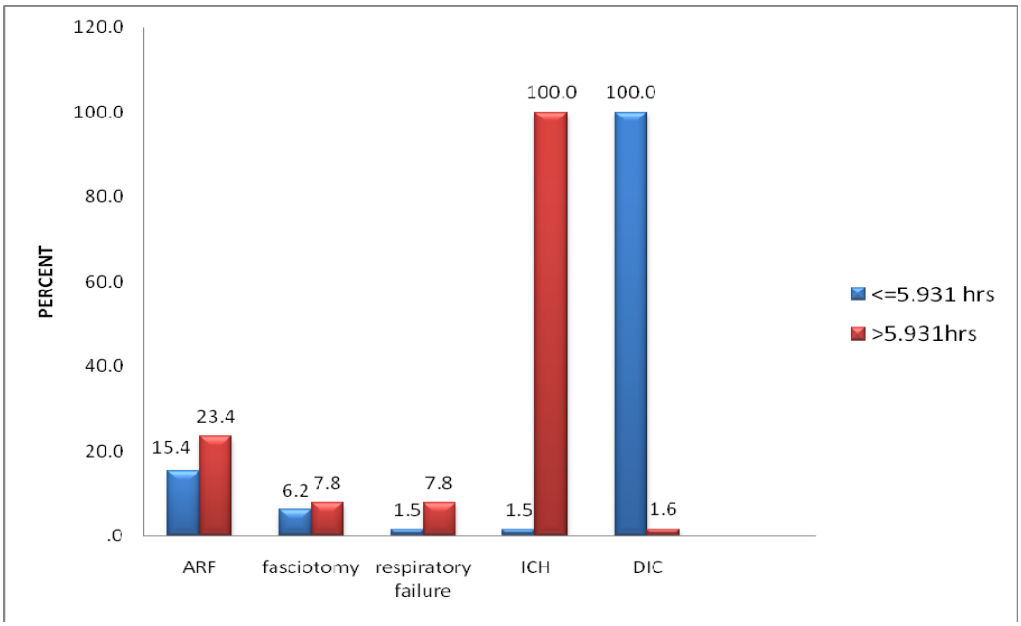
GRAPH 10(A): SYMPTOMS COMPARISON < & > 6Hrs BITE TO NEEDLE TIME



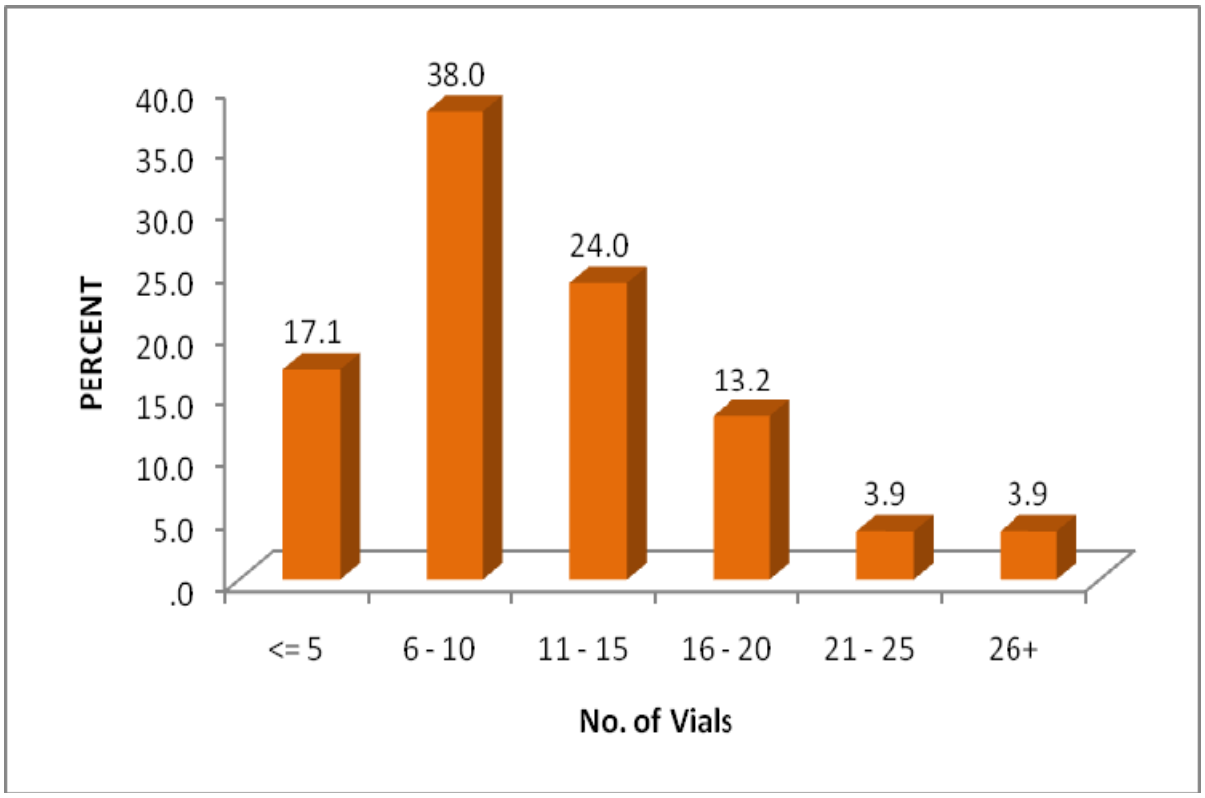
GRAPH 10(B) : SIGNS COMPARISON < & > 6Hrs BITE TO NEEDLE TIME



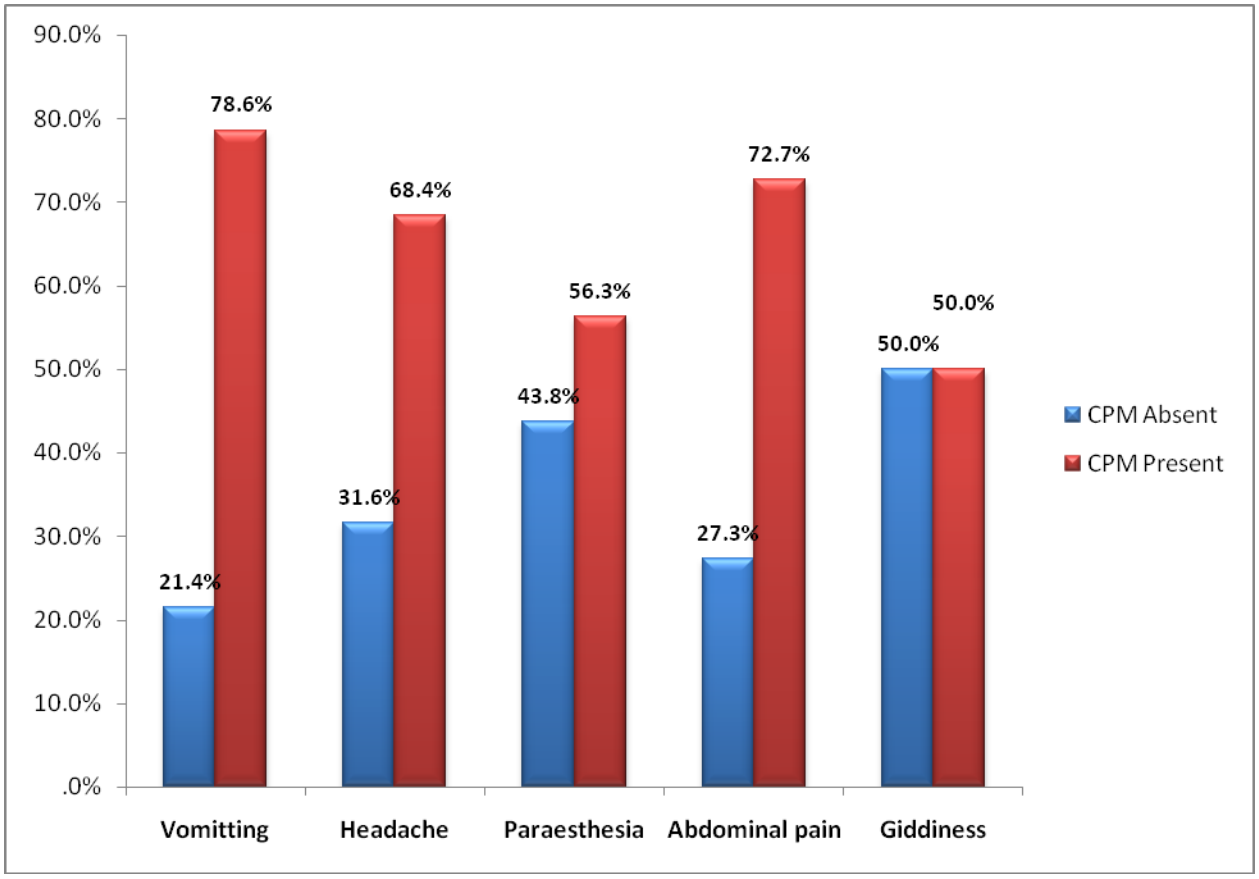
GRAPH 10(C): COMPLICATIONS COMPARISON < & > 6Hrs BITE TO NEEDLE TIME



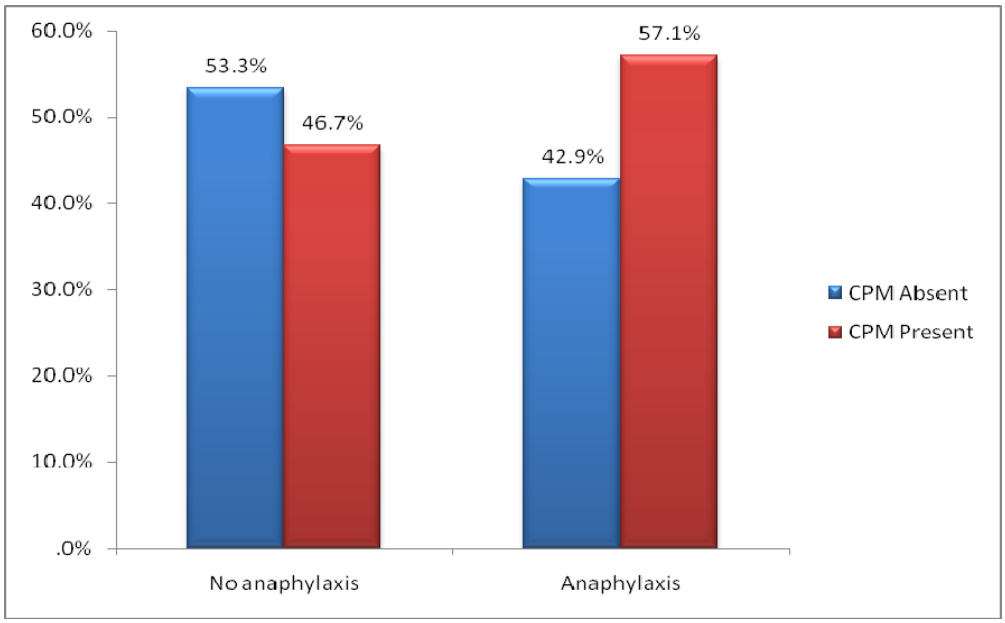
GRAPH 11: VIALS OF ASV ADMINISTERED



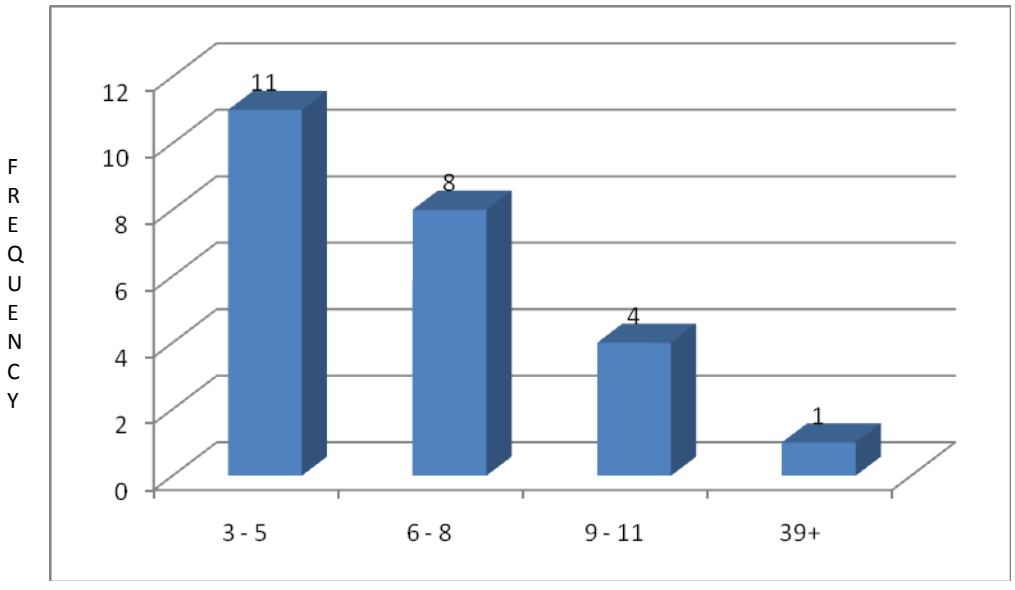
GRAPH 12: PROPHYLACTIC EFFECTIVENESS OF CPM



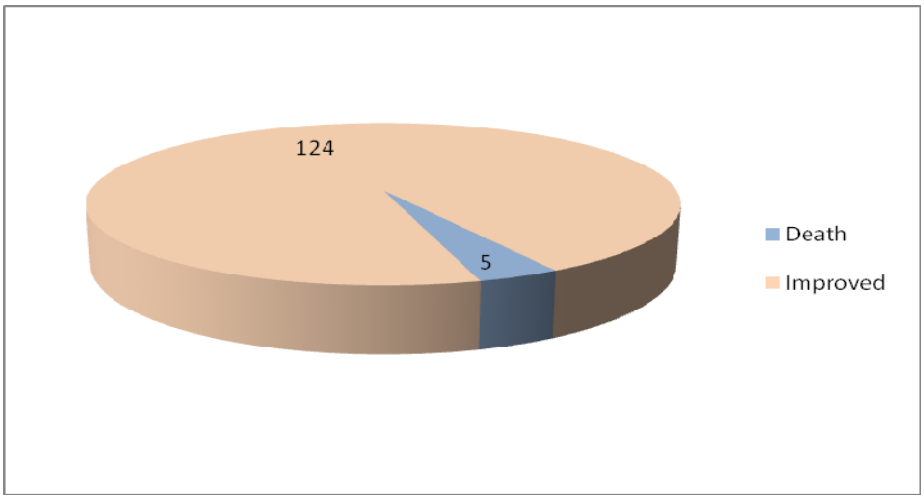
GRAPH 13: CPM AND ANAPHYLAXIS



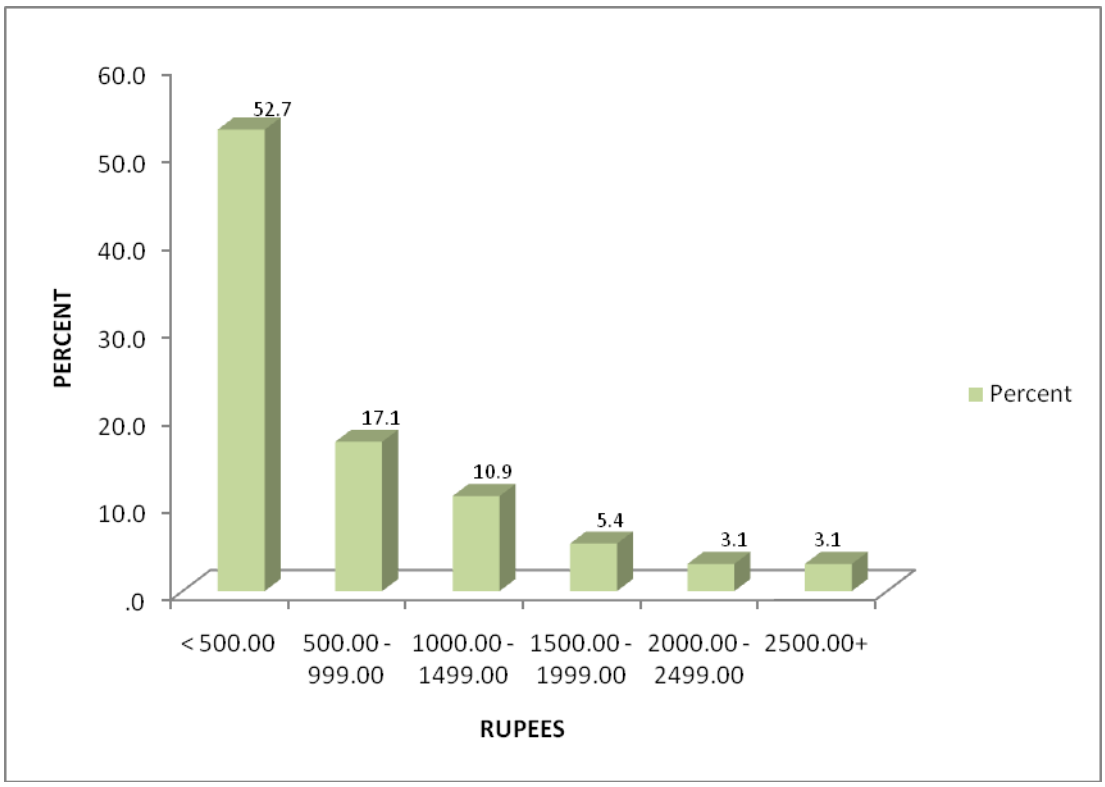
GRAPH 14: HEMODIALYSIS



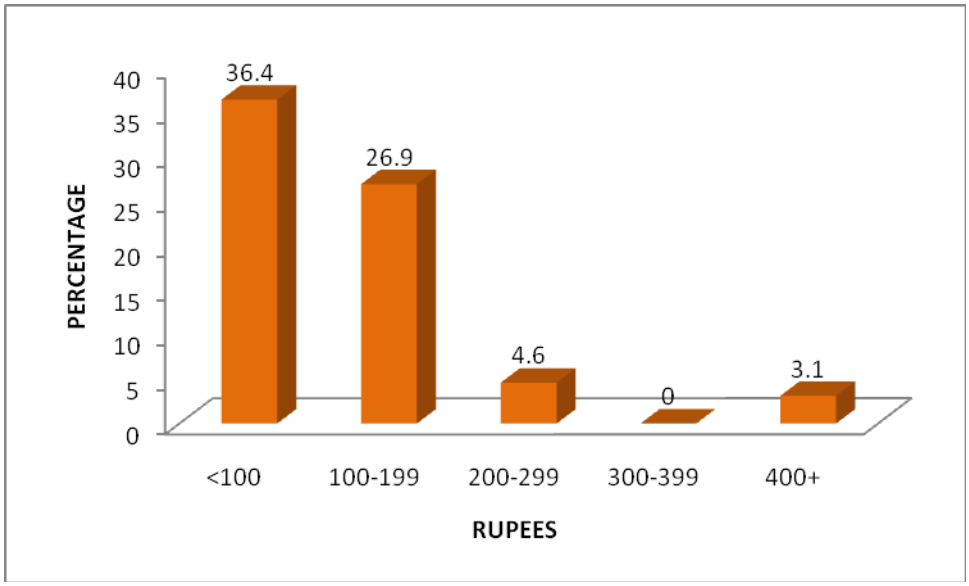
GRAPH 15: OUTCOMES



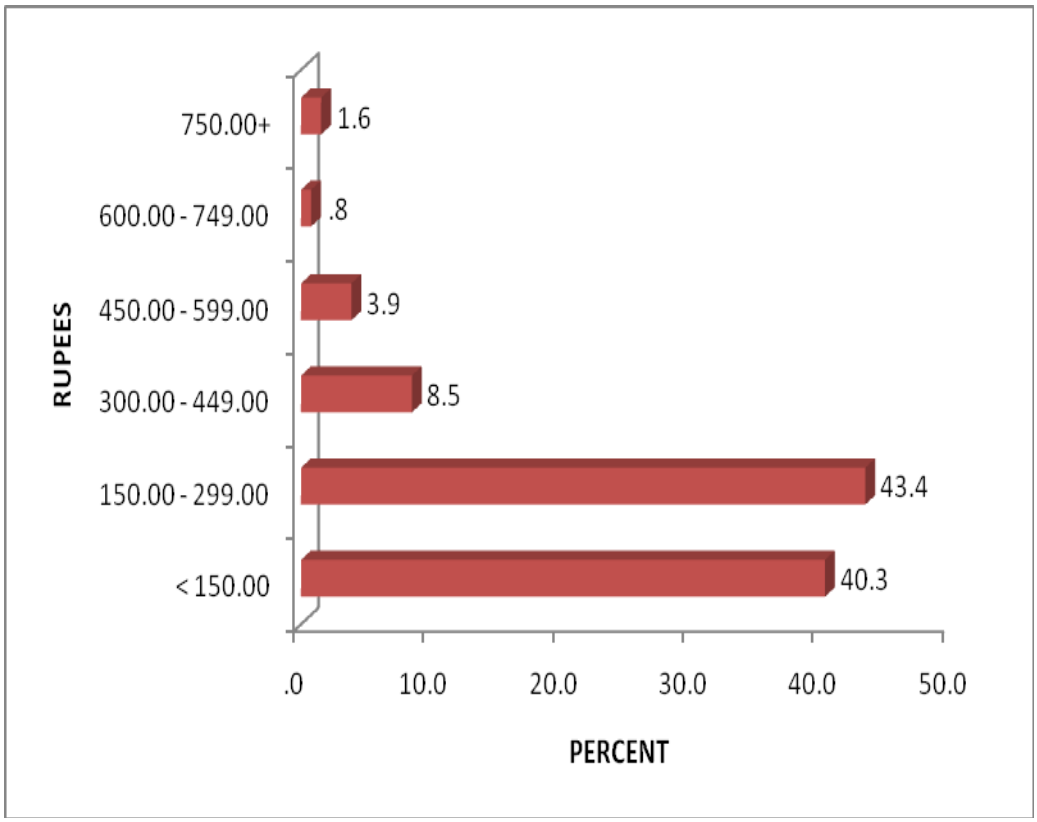
GRAPH 16: EXPENDITURE TO REACH HOSPITAL



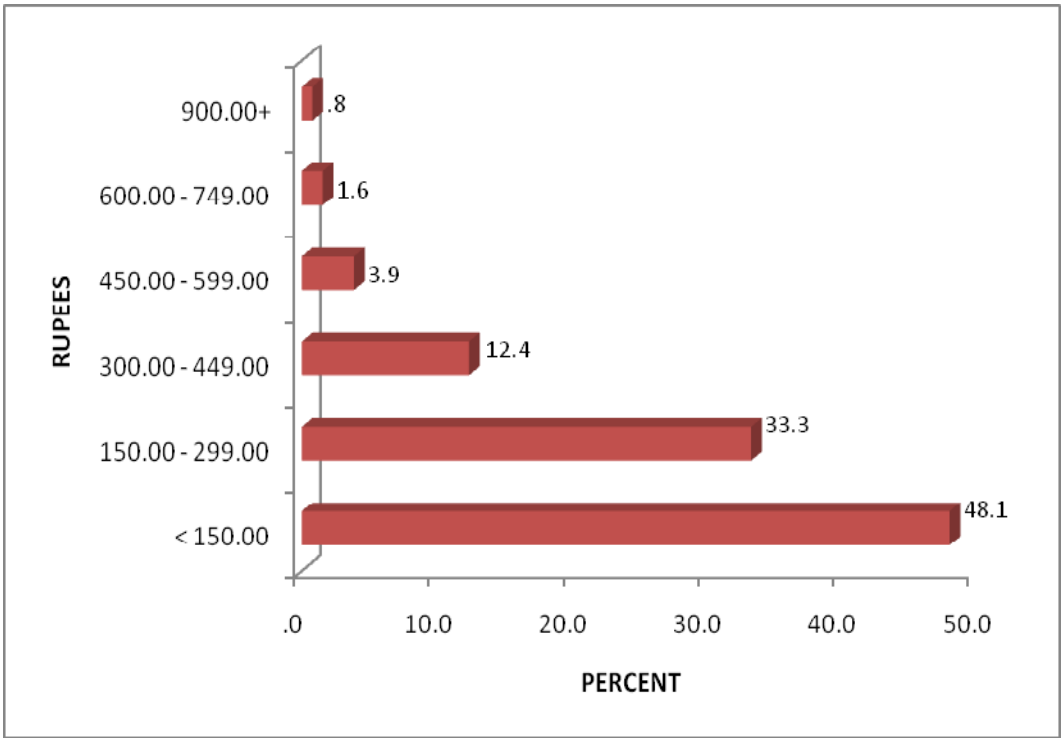
GRAPH 17: LOSS OF PAY TO PATIENTS



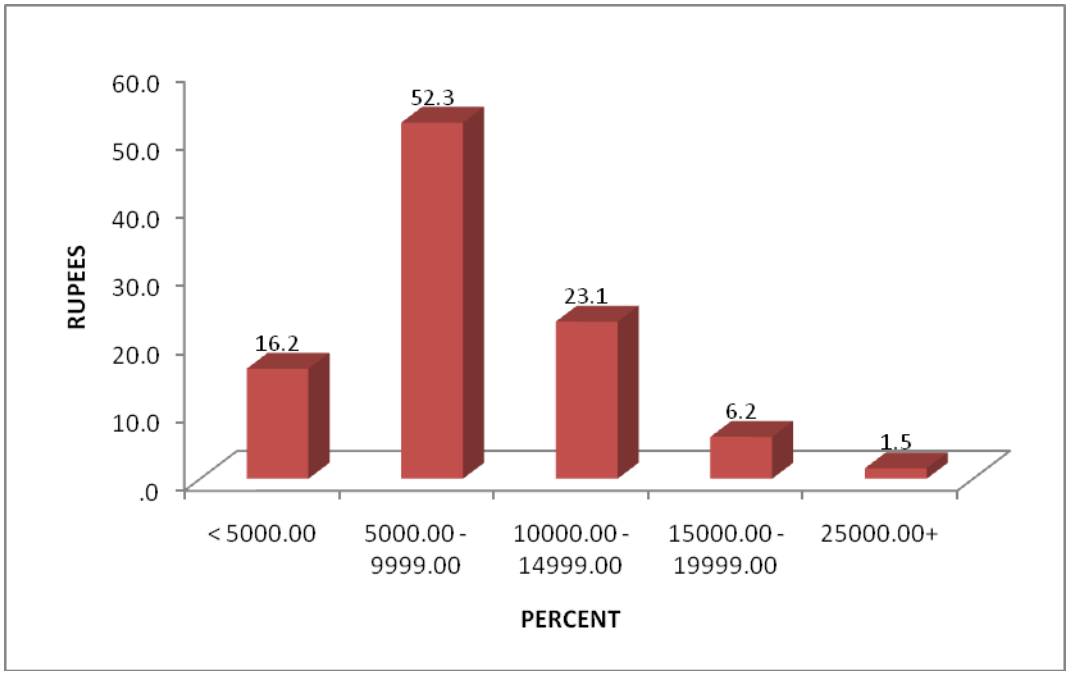
GRAPH 18: LOSS OF PAY TO THE ATTENDEES'



GRAPH 19 : DAILY EXPENDITURE



GRAPH 20: GOVERNMENT SPENDING



Sl. No.	age	sex	Days of Hosp. stay	occupation	Neurotoxic bite	Hemotoxic snake bite	place of bite	Site of bite	Bite site to hosp. distance	Immobilisation	time of bite	No of vials of ASV	Days of Hosp. stay	time of ASV adm.	ARF	No. of cycles of HD	fasciotomy	respiratory failure	ICH	DIC	vomiting	Paraesthesia	Headache	Abd. Pain	giddiness	Dyspnea	hemoptysis	ptosis	dysphagia	dysphonia	diplopia/Vision disturbance	confusion	hematemesis	gum bleed	malena	hemolysis	oliguria/anuria	malena	cellulitis	regional lymphadenitis	compartments syndrome	traditional healer	traditional medication	tourniquet	Anaphylasis	CPM	Rs- to reach hosp.	Rs-daily expenditure	Rs- Loss of pay to pt.	Loss of pay to attender	govt. spending	outcome
1	28	M	3	C		H	FIELD	LF	40	A	20:30	20	3	2:00	A		A	A	A	A	P	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	1000	300	250	250	10116	I
2	21	F	3	TAILOR	NA	NA	FIELD	LF	7	A	10:30	10	3	16:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	310	300	120	300	5616	I
3	14	M	4	STUDENT	NA	NA	School	RH	15	A	13:30	5	4	20:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	P	P	600	300	NIL	NIL	3738	I
4	45	F	4	C	N		FIELD	RF	30	A	15:00	8	4	22:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	1000	150	50	50	5088	I
5	27	N	5	F		H	FIELD	LF	12	A	11:45	15	5	15:00	A		A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	70	300	150	150	8610	I
6	58	M	6	F		H	FIELD	RF	0.5	A	21:30	10	6	2:50	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	200	100	NIL	200	6732	I
7	15	M	4	STUDENT	NA	NA	FIELD	LF	35	A	19:00	10	4	23:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	200	200	NIL	170	5988	I
8	22	M	6	STUDENT		H	FIELD	LF	15	A	23:00	15	6	5:00	A		A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	200	200	NIL	150	8982	I
9	13	F	3	STUDENT		H	HOME	LF	25	A	6:00	10	3	11:00	A		A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	350	150	NIL	150	5616	I
10	30	F	5	HOUSE WIFE		H	HOME	RF	100	A	22:00	15	5	15:30	A		A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	P	A	P	A	A	A	P	P	A	A	A	A	A	P	2500	300	NIL	60	8610	I
11	60	F	3	C		H	FIELD	RH	35	A	16:00	15	3	18:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	P	P	500	175	NIL	200	7866	I
12	18	M	5	C		H	FIELD	LH	8	A	16:30	18	5	18:00	A		A	A	A	A	P	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	P	A	150	100	150	170	9960	I
13	35	M	4	C		H	FIELD	RH	24	A	7:10	8	4	11:10	A		A	A	A	A	P	p	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	200	100	120	150	5088	I
14	20	M	4	LABOURER		H	FIELD	RF	20	A	4:00	8	4	9:15	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	30	300	150	200	5088	I
15	30	F	4	F		H	HOME	RH	25	A	20:00	5	4	16:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	A	P	A	P	500	100	50	50	3738	I
16	40	F	4	LABOURER		H	FIELD	L.F./	15	A	18:00	15	4	23:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	P	P	A	A	400	100	50	50	8238	I
17	18	M	3	SHOP KEEPER		H	FIELD	LF	0.5	A	19:30	5	3	22:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	NIL	60	150	100	3366	I
18	35	M	7	LABOURER		H	HOME	LH	70	A	0:30	23	7	11:00	A		P	A	A	A	P	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	P	A	P	650	300	90	150	12954	I
19	17	M	4	STUDENT		H	HOME	RL	50	A	20:00	15	4	3:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	300	200	NIL	100	8238	I
20	54	M	6	F	N		HOME	R.F.	30	A	23:00	15	6	13:00	A		A	P	A	A	A	P	A	A	P	P	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	1100	600	120	100	8982	I
21	50	M	4	F		H	FIELD	RF	80	A	14:30	15	4	21:00	A		A	A	A	A	A	A	A	A	P	A	A	A	A	A	p	P	A	A	A	A	A	A	P	P	A	A	A	P	P	P	1300	50	100	50	8238	I
22	52	M	4	F		H	FIELD	LF	40	A	19:00	15	4	2:00	A		A	A	A	A	P	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	700	200	70	50	8238	I
23	31	M	7	F		H	FIELD	RF	50	A	8:45	15	7	17:00	A		A	A	A	P	A	A	P	A	A	A	P	A	A	A	A	A	P	P	P	A	A	P	P	A	A	A	P	P	A	1000	150	200	250	9354	I
24	25	M	7	DRIVER		H	FIELD	LF	70	A	23:30	20	7	3:00	A		P	A	A	A	A	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	A	P	1600	300	150	150	11604	I
25	29	M	7	F		H	FIELD	LF	50	A	20:00	30	7	1:30	A		A	A	A	A	A	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	700	150	200	100	16104	I
26	60	F	10	C		H	FIELD	LF	25	A	23:00	20	10	1:30	A		P	A	A	A	A	P	P	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	P	P	P	A	A	A	A	A	0	100	100	150	12720	I
27	13	F	4	STUDENT		H	FIELD	RF	10	A	21:45	15	4	0:30	A		A	A	A	A	P	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	50	75	NIL	40	8238	I
28	38	F	4	HOUSEWIFE		H	FIELD	LF	20	A	19:00	11	4	21:00	A		A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	700	50		NIL	6438	I
29	48	M	4	C		H	FIELD	LF	25	A	6:00	15	4	21:00	A		A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	500	100	150	175	8238	I
30	31	F	3	HOUSEWIFE		H	FIELD	LF	45	A	10:30	15	3	21:00	A		A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	P	100	100	150	200	7866	I
31	31	M	3	C		H	FIELD	LH	35	A	9:00	10	3	11:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	200	120	130	100	5616	I
32	56	M	4	F		H	HOME	LF	14	A	19:00	10	4	0:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	200	200	200	300	5988	I
33	23	M	3	C		H	FIELD	LF	3	A	20:30	5	3	23:40	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	A	A	50	25	200	250	3366	I
34	25	M	3	C		H	FIELD	RL	40	A	23:30	5	3	2:35	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	600	100	100	130	3366	I
35	45	F	16	F		H	FIELD	RH	200	A	9:00	15	16	20:15	P	6	A	A	A	A	P	P	A	P	A	A	A	A	A	A	A	A	A	A	P	A	P	P	A	A	A	P	A	P	2500	300	50	220	14802	I
36	20	F	3	C		H	FIELD	LH	50	A	9:00	18	3	13:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	100	150	100	150	9216	I
37	58	F	16	F		H	FIELD	LL	20	A	13:00	10	16	23:30	P	7	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	P	A	A	A	A	A	A	P	P	A	P	P	P	A	A	600	120	150	200	12902	I
38	50	M	12	F	N		FIELD	LL	79	A	5:20	33	12	0:00	A		A	P	A	A	A	P	A	A	P	P	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	840	1000	100	160	19314	I
39	18	F	5	C		H	HOME	LF	30	A	14:30	10	5	16:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	300	100	50	50	6360	I
40	27	F	5	C		H	FIELD	LF	30	A	7:00	10	5	10:00	A		A	A	P	A	A	P	A	P	A	A	A	A	A	A	A	P	A	A	A	A	A	A	P	P	A	P	P	A	A	P	450	500	50	390	6360	D
41	49	F	6	F		H	FIELD	RF	45	A	9:00	18	6	16:00	A		A	A	A	A	A	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	250	150	150	95	10332	I
42	45	F	8	C		H	FIELD	RH	35	A	12:30	18	8	23:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	200	20	35	80	11076	I
43	42	M	4	F		H	FIELD	RF	25	A	3:00	10	4	10:15	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	P	P	A	P	150	100	150	90	5988	I
44	50	F	5	C		H	FIELD	RL	50	A	20:00	10	5	1:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	2000	200	30	180	6360	I
45	35	F	6	C		H	FIELD	RL	30	A	17:00	30	6	23:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	P	P	A	A	350	150	50	200	15732	I

Sl. No.	age	sex	Days of Hosp. stay	occupation	Neurotoxic bite	Hemotoxic snake bite	place of bite	Site of bite	Bite site to hosp. distance	Immobilisation	time of bite	No of vials of ASV	Days of Hosp. stay	time of ASV adm.	ARF	No. of cycles of HD	fasciotomy	respiratory failure	ICH	DIC	vomiting	Paraesthesia	Headache	Abd. Pain	giddiness	Dyspnea	hemoptysis	ptosis	dysphagia	dysphonia	diplopia/Vision disturbance	confusion	hematemesis	gum bleed	malena	hemolysis	oliguria/anuria	malena	cellulitis	regional lymphadenitis	compartments syndrome	traditional healer	traditional medication	tourniquet	Anaphylasis	CPM	Rs- to reach hosp.	Rs-daily expenditure	Rs- Loss of pay to pt.	Loss of pay to attender	govt. spending	outcome
46	40	F	5	F		H	FIELD	RF	40	A	4:00	15	5	9:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	P	A	A	P	P	A	A	A	1300	200	50	240	8610	I
47	24	M	4	DRIVER		H	ROAD	RF	30	A	20:30	15	4	0:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	300	200	150	200	8238	I
48	60	M	5	F		H	FIELD	LF	100	A	17:30	17	5	19:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	P	P	A	A	1400	300	100	360	9510	I
49	17	F	4	C		H	FIELD	LF	40	A	16:00	10	4	22:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	2000	300	100	460	5988	I
50	40	F	14	F		H	FIELD	LH	20	A	13:00	10	14	19:00	P	4	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	A	A	A	A	A	A	500	180	130	160	11108	I
51	25	F	9	F	N		FIELD	LF	40	A	20:00	10	9	15:00	A		A	P	A	A	A	P	A	A	A	P	A	P	P	P	P	A	A	A	A	A	A	A	P	P	A	P	P	P	A	A	500	200	200	700	7848	I
52	40	M	5	C		H	FIELD	LF	14	A	20:30	10	5	22:15	A		A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	400	200	150	150	6360	I
53	42	M	15	LABOURER	N		HOME	SHO	40	A	23:00	15	15	7:00	A		A	P	A	A	A	P	P	A	A	P	A	A	P	P	P	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	1500	250	150	900	12330	I
54	23	M	3	C		H	HOME	LH	120	A	18:00	10	3	3:00	A		A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	1300	250	80	340	5616	I
55	30	M	5	F		H	FIELD	LF	30	A	18:40	10	5	21:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	50	80	150	150	6360	I
56	50	M	3	C		H	FIELD	RF	15	A	8:00	12	3	11:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	NIL	50	100	80	6516	I
57	52	M	4	WASHERMAN		H	FIELD	LF	3	A	18:00	10	4	9:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	NIL	150	150	150	5988	I
58	60	F	6	F		H	FIELD	LL	90	A	19:00	20	6	4:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	1700	150	80	160	11232	I
59	45	F	15	LABOURER		H	FIELD	RF	17	A	17:30	20	15	21:00	P	3	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	P	P	A	P	P	A	P	1000	150	100	300	15630	I
60	26	M	16	LABOURER		H	FIELD	LF	14	A	19:00	5	16	1:00	P	5	A	A	A	A	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	P	P	A	A	A	A	P	300	150	100	500	9952	I
61	61	M	15	F		H	FIELD	LF	90	A	20:00	10	15	6:00	P	4	A	A	A	A	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	P	P	A	A	P	A	P	1000	150	200	400	11480	I
62	45	M	16	F		H	FIELD	LF	55	A	19:00	10	16	20:30	P	6	A	A	A	A	P	A	A	P	P	A	P	A	A	A	A	A	A	P	A	P	P	P	A	A	A	A	P	A	P	500	100	100	100	12552	I
63	35	F	24	F		H	FIELD	RF	70	A	10:15	10	24	11:50	P	40	A	A	A	A	P	A	A	P	P	A	A	A	A	A	A	A	A	A	A	P	A	P	A	P	P	P	A	A	P	A	P	1000	500	100	100	27428	I
64	35	F	21	F		H	FIELD	LF	20	A	14:00	10	21	20:15	P	7	A	A	A	A	P	A	A	P	P	A	A	A	A	A	A	A	A	A	P	A	P	A	P	P	P	A	A	P	A	A	NIL	100	100	150	14762	I
65	54	M	6	F		H	FIELD	RF	45	A	8:00	18	6	19:00	A		P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	P	200	100	150	300	10332	I
66	29	M	15	F		H	FIELD	RF	75	A	20:00	23	15	18:30	P	9	P	P	A	A	P	P	P	P	P	P	A	P	A	A	P	P	A	A	A	A	P	P	P	P	P	A	A	P	A	P	750	500	50	500	13500	D
67	18	F	18	F		H	FIELD	LF	16	A	12:00	15	18	13:15	P	6	A	A	A	A	P	A	A	P	P	A	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A	A	A	P	A	A	100	150	50	100	15546	I
68	18	M	13	STUDENT		H	FIELD	RL	8	A	17:00	15	13	20:00	P	10	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	P	A	A	A	P	A	A	60	500	NIL	450	15086	I
69	45	M	15	F		H	FIELD	RF	90	A	9:00	10	15	12:15	P	4	A	A	A	A	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	A	P	P	P	A	A	1500	700	150	230	11480	I
70	13	M	13	STUDENT		H	FIELD	RF	120	A	22:00	12	13	10:00	P	8	A	A	A	A	P	A	P	P	A	A	P	A	A	A	A	A	A	A	P	P	P	P	P	P	A	A	P	A	A	A	600	350	NIL	130	13036	I
71	45	M	12	F		H	FIELD	LF	100	A	8:30	15	12	15:30	P	5	A	A	A	A	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	A	A	A	P	A	A	350	120	150	150	12964	I
72	36	M	14	F		H	FIELD	LF	180	A	16:00	10	14	19:20	P	9	A	A	A	A	P	A	P	P	P	A	A	A	A	A	A	A	A	A	A	P	P	P	P	P	P	A	A	A	P	A	A	5000	100	40	60	12858	I
73	22	F	8	F		H	FIELD	RF	30	A	10:30	10	8	18:30	P	3	A	A	A	A	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	P	P	A	A	A	P	A	A	35	50	50	140	8526	D
74	15	M	13	STUDENT		H	FIELD	LF	110	A	19:00	13	13	19:30	P	7	A	A	A	A	P	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A	A	A	P	A	P	2000	200	NIL	300	13136	I
75	24	F	12	F		H	FIELD	LF	35	A	21:00	40	12	6:00	P	9	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A	A	A	P	A	P	300	150	40	50	25614	I
76	28	F	13	F		H	FIELD	LF	65	A	19:00	5	13	1:00	P	6	A	A	A	A	P	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A	A	A	P	A	P	700	150	50	200	9186	I
77	45	M	10	F		H	FIELD	RF	40	A	7:30	23	10	11:00	P	5	A	A	A	A	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	A	P	P	A	A	A	P	P	P	2500	360	60	100	15820	D
78	55	M	3	F		H	HOME	RF	30	A	20:30	10	3	21:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	500	50	100	50	5616	I
79	58	M	4	C		H	FIELD	LF	4	A	20:15	10	4	21:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	20	80	120	100	5988	I
80	55	F	4	F		H	FIELD	RF	20	A	12:00	5	4	20:10	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	P	A	P	NIL	100	50	100	3738	I
81	18	F	5	WENDOR		H	FIELD	LL	5	A	9:00	15	5	12:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A		P	P	A	A	A	P	A	P	100	150	100	200	8610	I
82	45	F	4	F		H	FIELD	LF	50	A	14:30	15	4	5:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	100	50	250	250	8238	I
83	62	F	11	F		H	FIELD	RH	70	A	22:00	13	11	15:00	P	3	A	A	A	A	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	P	A	A	A	P	A	A	1500	60	150	300	9942	D
84	58	F	8	F		H	FIELD	RF	10	A	13:00	10	8	23:30	P	4	A	A	A	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	P	A	A	A	P	A	P	100	50	100	100	8876	I
85	56	M	5	F		H	FIELD	LF	45	A	21:00	20	5	2:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	400	100	50	150	10860	I
86	18	M	4	F		H	FIELD	RF	2	A	22:30	5	4	1:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	30	150	100	100	3738	I
87	50	M	7	F		H	FIELD	LL	10	A	18:30	20	7	20:00	A		P	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	A	A	120	100	100	150	11604	I
88	27	M	3	F		H	HOME	RH	5	A	13:00	5	3	14:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	200	100	250	250	3366	I
89	55	M	3	F	N		FIELD	RL	55	A	10:30	5	3	2:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	200	100	200	150	3366	I
90	19	M	4	STUDENT		H	HOME	RF	23	A	19:00	10	4	23:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	450	75	100	150	5988	I

Sl. No.	age	sex	Days of Hosp. stay	occupation	Neurotoxic bite	Hemotoxic snake bite	place of bite	Site of bite	Bite site to hosp. distance	Immobilisation	time of bite	No of vials of ASV	Days of Hosp. stay	time of ASV adm.	ARF	No. of cycles of HD	fasciotomy	respiratory failure	ICH	DIC	vomiting	Paraesthesia	Headache	Abd. Pain	giddiness	Dyspnea	hemoptysis	ptosis	dysphagia	dysphonia	diplopia/Vision disturbance	confusion	hematemesis	gum bleed	malena	hemolysis	oliguria/anuria	malena	cellulitis	regional lymphadenitis	compartments syndrome	traditional healer	traditional medication	tourniquet	Anaphylasis	CPM	Rs- to reach hosp.	Rs-daily expenditure	Rs- Loss of pay to pt.	Loss of pay to attender	govt. spending	outcome
91	40	M	14	F		H	FIELD	RF	24	A	20:00	10	14	21:30	P	3	A	A	A	A	P	P	P	P	A	P	A	A	A	A	A	A	A	A	A	A	P	A	P	P	A	A	A	P	A	A	P	200	100	100	250	12858	I
92	46	M	5	F		H	FIELD	LF	40	A	17:30	15	5	21:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	A	300	100	150	100	8610	I
93	63	M	3	F		H	FIELD	RF	12	A	19:00	5	3	10:30	A		A	A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	150	100	150	100	3366	I
94	35	F	5	F		H	FIELD	RF	40	A	12:00	13	5	20:00	A		A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	P	56	50	100	150	7710	I
95	20	F	6	C		H	FIELD	RL	20	A	20:00	20	6	3:00	A		P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	A	A	150	70	100	150	11232	I
96	47	M	3	C		H	FIELD	RF	30	A	9:00	5	3	16:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	P	A	A	600	70	150	100	3366	I
97	21	M	4	F		H	FIELD	LL	20	A	4:00	10	4	12:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	P	A	A	100	100	150	150	5988	I
98	65	M	3	F		H	FIELD	RF	10	A	19:30	5	3	22:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	100	70	120	100	3366	I
99	35	M	11	F	N		FIELD	RH	15	A	2:10	15	11	7:00	A		A	P	A	A	A	P	A	A	A	P	A	A	P	P	P	A	A	A	A	A	A	A	A	A	A	A	P	A	A	300	160	160	560	10842	I
100	52	M	3	F		H	FIELD	LF	10	A	17:00	10	3	19:00	A		A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	150	100	75	175	5616	I
101	28	F	8	F	N		FIELD	RL	100	A	14:00	20	8	0:00	A		A	A	A	A	P	P	P	P	P	P	A	P	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	1500	200	100	150	11936	I
102	25	M	4	F		H	FIELD	LF	20	A	18:30	15	4	23:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	150	100	80	100	8238	I
103	55	M	6	F		H	FIELD	RF	1	A	13:30	25	6	16:45	A		A	A	A	A	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	NIL	100	250	250	13482	I
104	40	M	5	SHEPARD		H	HOME	LL	25	A	19:15	35	5	22:00	A		P	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	A	A	P	1000	300	100	50	17610	I
105	38	M	7	F		H	FIELD	RF	7	A	20:15	10	7	22:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	200	100	150	150	7104	I
106	41	M	6	F		H	FIELD	RF	10	A	6:15	10	6	9:15	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	700	100	100	100	6732	I
107	47	M	7	F		H	FIELD	LL	9	A	12:00	20	7	13:00	P	3	A	A	A	A	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P	A	A	A	P	A	P	100	150	90	160	12054	I
108	60	M	3	F		H	FIELD	LF	13	A	10:30	10	3	15:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	100	50	20	50	5616	I
109	40	M	3	F		H	FIELD	LF	20	A	7:00	5	3	14:00	A		A	A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	P	A	A	100	50	50	50	3366	I
110	33	M	4	SUPREVISOR		H	FIELD	LF	8	A	21:30	10	4	11:40	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	200	150	150	100	5988	I
111	45	M	3	F	N		FIELD	LL	41	A	9:00	5	3	11:00	A		A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	NIL	200	100	40	3366	I
112	60	M	4	F		H	FIELD	LL	100	A	19:00	10	4	4:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	1800	150	100	200	5988	I
113	16	F	3	STUDENT		H	FIELD	LF	100	A	14:00	5	3	22:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	2000	50	NIL	100	3366	I
114	35	M	4	C		H	FIELD	RF	13	A	11:00	5	4	13:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	NIL	100	250	100	3738	I
115	40	F	6	C		H	FIELD	LF	12	A	9:30	10	6	15:30	A		A	A	A	A	P	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	NIL	70	50	50	6732	I
116	47	M	7	F		H	FIELD	RF	14	A	12:00	25	7	23:00	A		A	A	A	A	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	600	200	100	200	13854	I
117	60	M	3	F		H	FIELD	RF	15	A	6:00	10	3	10:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	P	A	P	100	150	150	100	5616	I
118	25	F	3	C		H	HOME	LF	50	A	22:30	8	3	1:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	180	50	80	100	4716	I
119	50	F	3	F		H	FIELD	RF	40	A	11:00	5	3	16:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	1000	150	600	900	3366	I
120	25	F	3	C		H	FIELD	RF	15	A	19:00	5	3	22:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	100	50	50	50	3366	I
121	39	M	4	ELECTRICIAN		H	HOME	LF	18	A	3:00	5	4	23:00	A		A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	P	300	100	500	175	3738	I
122	13	M	5	STUDENT		H	FIELD	RF	30	A	19:00	10	5	1:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	24	200	NIL		120	6360	I
123	35	M	2	WEAVER		H	HOME	LH	3	A	10:30	15	2	3:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	26	100	90	90	7434	I
124	30	M	3	DRIVER		H	FIELD	LF	9	A	17:00	10	3	9:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A	P	A	P	114	400	200	410	5616	I
125	30	M	4	F		H	FIELD	LF	18	A	18:00	10	4	22:30	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A	A	A	A	14	100	100	250	5988	I
126	60	F	5	F		H	FIELD	LL	12	A	8:00	10	5	10:45	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	A	A	A	P	A	A	NIL	150	40	140	6360	I
127	35	F	6	F		H	FIELD	RF	10	A	19:30	10	6	5:50	A		P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	A	A	P	P	P	P	A	A	P	A	P	100	300	60	100	6732	I
128	60	F	6	F		H	FIELD	LH	100	A	13:00	5	6	21:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	P	P	A	A	A	P	A	A	500	20	60	160	4482	I
129	13	M	6	STUDENT		H	FIELD	RL	50	A	11:30	18	6	1:00	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	P	P	P	A	P	1200	500	NIL	200	8100	I