

**YANGON UNIVERSITY OF ECONOMICS  
MASTER OF PUBLIC ADMINISTRATION PROGRAMME**

**A STUDY ON KNOWLEDGE, ATTITUDE AND PRACTICE  
ON SNAKEBITE PREVENTION AND TREATMENT IN  
RURAL AREA  
(CASE STUDY IN NGAZUN TOWNSHIP)**

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This thesis is submitted in partial fulfillment to the requirements for the  
Master of Public Administration (MPA) Degree

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## **Abstract**

The study of knowledge, attitude and practice on snakebite treatment and prevention in rural area was conducted in Nga Zun Township among farmers, plantation workers, odd workers and fire woods cutters. The main objectives of the study are to examine awareness and perception and practices to analyze KAP of snakebite prevention and treatment by rural peoples in Nga Zun Township. The secondary data collected from Township Hospitals and Ministry of Health and Department of health and information and so on. The simple random sampling method is used for primary data collection which has done in Nga Zun Township. A survey was conducted with a total of 231 respondents in Nga Zun Township. The standard scores of minimum and maximum are 0 to 23 respectively. The respondent's knowledge level determined the range score to low knowledge is up to 8 and equal 8, medium knowledge level is between 9 to 17 and high knowledge is above 17. Respondents rated their level of attitude are designed are also based on standard scores, minimum score is 0 and maximum score is 25. Then, determined the range scores of low attitude is up to 13 and equal to 13, high attitude is above 13. The questionnaire of practice on snakebite prevention was shown by frequency distribution in this survey. The respondent's knowledge level findings are medium knowledge level of ninety-two percent and high attitude have eighty-one percent and ninety-two percent have good practice. Education has positive relationship to rural people knowledge, attitude and practice. Consequently, the findings have great results because of low percentage of illiterate rate in Nga Zun Township. But there are still having some weaknesses in practice and attitude on snakebite prevention and treatment. The reasons are misconception handed down from generation to generation, traditional believe and culture lead to wrong attitudes. Therefore, community mobilization is important for Nga Zun Township snakebite protection and safety development.

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## LIST OF ABBREVIATION

|       |                                                              |
|-------|--------------------------------------------------------------|
| ASV   | Anti Snake Venom                                             |
| AV    | Antivenom                                                    |
| BHS   | Behavioral Health Services                                   |
| GDP   | Gross Domestic Product                                       |
| GMP   | Good Manufacturing Practice                                  |
| HA    | Health Assistance                                            |
| IEC   | Information, Education and Commission                        |
| INGO  | International Non-Governmental Organization                  |
| KAP   | Knowledge, Attitude and Practice                             |
| MAIHD | A Joint Myanmar – Australia Institute for Health Development |
| MSF   | Médecins Sans Frontières                                     |
| NGO   | Non-Governmental Organization                                |
| PIB   | Pressure Immobilization Bandage                              |
| RHC   | Rural Health Center                                          |
| SRHC  | Sub Rural Health Center                                      |
| TMO   | Township Medical Officer                                     |
| WHO   | World Health Organization                                    |

# **CHAPTER I**

## **INTRODUCTION**

### **1.1 Rationale of the Study**

Snakes are remarkable animals, successful on land, in the sea, in forests, in grasslands, in lakes, and in deserts. Snakebite was an ignored public health topic in many tropical and subtropical countries. Snakebites cases occur about 5.4 million each year, causing in 1.8 to 2.7 million cases of envenoming's (poisoning from snake bites). There are among 81410 and 137880 passing away and around three times as many amputations and further permanent disabilities each year.

The available evidence shows that it is in the world's poorest economies that the burden of snakebite mortality is the greatest, and survival is no guarantee of a full recovery, with many thousands of victims being left permanently disabled and emotionally destroyed by their injuries.

The World Health Organization added snakebite to the list of Neglected Tropical Diseases in 2009 but made no provision to seek global funding to do anything about the problem.

Like all endeavours, global health is highly politicized, and it wasn't long before snakebite was downgraded by WHO under a sub-definition: "Other Neglected Conditions". Snakebite is a major health issue that affects many people, particularly young poor farmers in developing countries in the tropics. Many patients suffer poor outcomes due to inadequate or delayed access to effective treatment.

A large number still use traditional healers. Often patients visit traditional healers before accessing formal health care; thus, incurring delays in receiving antivenom (AV) needed to treat envenoming. In other cases, traditional healing methods may themselves cause complications.

In Myanmar, while most patients now access formal medical care, many also use traditional healers. Communities in rural areas in the Mandalay region and found that the reasons for using traditional healers include difficulties with transportation

cost, inadequacy of AV in the formal health sector, and trust in traditional healing within the context of longstanding tradition.

Snakebite treatment according to the biomedical management protocol includes AV, which is essential and the only antidote for envenoming, and supportive treatment such as airway management, treatment of hypotension and shock, treatment of acute kidney injury, management of hemostatic shock and treatment of the bitten site with antibiotics if needed. In Myanmar, government doctors and paramedical staff are trained to provide treatment with AV and supportive treatment.

In Myanmar, treatment of snakebite is impaired by problems with the supply of AV, and by shortage of adequately trained staff, particularly in rural areas. These limitations may contribute to the persisting use of traditional methods.

Use of the healthcare system in Myanmar is dependent on several factors, including cost, previous experience, fear of surgery, and belief in religious or spiritual healers. Additionally, in some cases AV causes adverse reactions. Hence, the communities may also fear of biomedical treatment.

With the continued use of traditional healing practices, it is important to develop a better understanding of the nature of healing practices, the communities' reasons for and views about its use, and the interface between traditional and biomedical components of the health system.

In many snakebite-affected countries, an envenomed victim may need to walk (or be carried) for many miles to reach a primary health post. As part of a larger community and health services development project in Myanmar, the aim of this participatory action research was to engage with rural communities to learn from their perspectives, their health knowledge, and reasons for healthcare-seeking practices.

## **1.2 Objective of the Study**

The main objectives of the study are to examine awareness and perception and practices on snakebite prevention and treatment by rural peoples in Nga Zun Township.

## **1.3 Method of Study**

In this study, required secondary data are obtained from the Ministry of Health, Township Medical Officer, health staff and nurses in Nga Zun Township health department. The descriptive method is used. Primary data collected from a

survey conducted in Nga Zun Township and based on structured questionnaires with Township Medical Officer and health staff. A total of 231 respondents of 10 villages in Nga Zun Township with proportional allocation of 5 per cent households, especially farmers, field workers and so on who are potential risk of snakebite. The selected villages were higher morbidity of snake bite rate according to the data of last three years Nga Zun Township hospitals records. The respondents were selected randomly from given household list per each village. These structured questionnaires were composed of three main parts: socio-demographic characters, knowledge, attitude, and practices on snakebite prevention and treatment and respondent' concerned on snakebite insurance. The survey has attempted to study the knowledge, attitude and practice of snakebite prevention and treatment in Nga Zun Township. The questionnaire and score system are presented as attachment in Appendix (A to F).

#### **1.4 Scope and Limitation of the Study**

This study focuses only on 10 rural villages in Nga Zun Township and these villages are higher morbidity of snake bite rate and emphasizes the knowledge on snakebite prevention works in that township. The criteria of respondents are age between 15 to 60 years old and their regular occupation is on the potential risk of snakebite. Methodology essentially carried out by a KAP (Knowledge, Attitude and Practice) survey which is widely used to gather information for planning public health programs. The survey was conducted for the period of 9 February to 9 March.

#### **1.5 Organization of the Study**

This study is organized with five chapters. The first chapter I presents the introductions including rationale of the study, objectives, and methods of the study, scope and limitation and organization of the study. Chapter II includes the literature review on the nature of snakebite incidence. It presents about nature and characteristics of the snake, Treatment and Prevention from snakebite, Programs of snakebite Prevention and Situation of snakebite in worldwide. Chapter III present poisonous snake, Snakebite Incidence, The Situation of Snakebite and Control project and so on. Chapter IV consists of the survey profile and survey design and survey profile. Chapter V concludes with findings and recommendations.

## **CHAPTER II**

### **LITERATURE REVIEW**

Snake can live in every corner of the world, successful on land, in the sea, in forests, in grasslands, in lakes, and even in deserts except Antarctica. Snakebite is an injury caused by the bite of a snake. The symptom of snakebite is the presence of two puncture wounds from the animal's fangs. The results are in redness, swelling, and severe pain at the area, which may take up to an hour to appear. Vomiting, blurred vision, tingling of the limbs, and sweating can result. Snakes bite because of hunting and of protection.

#### **2.1 Nature and Characteristics of the Snake**

In a large group of long reptiles greatly include snakes. On our planet there are over 2,900 different species of snakes and 375 species of snakes are venomous. Snakes can unremarkably live in a wide variety of habitats including forests, swamps, grasslands, deserts and in both fresh and salt water. Snakes are found on every region of the world except Antarctica where it is too cold for them to survive. There are also no snakes found on Iceland, Ireland or New Zealand. The most venomous snakes and the biggest snakes can easily find in tropical climates for example rainforests.

Snakes appearances look like a long, narrow body with scales covering their skin. Snakes do not have eyelids, external ear openings and legs. But some of a few snakes for example boa constrictors and pythons have vestigial hidden hind legs which are tiny, clawed digits known as 'anal spurs' which are used to hold during mating. As they grow, snakes shed their old skin and the film that covers their eyes regularly. Snakes are also cold-blooded animals like other reptiles.

Snakes were modern-day reptiles compared to the dinosaurs and existed in during dinosaur's period. Snakes start appeared the late dinosaur period during about 146 million years ago. Snakes diets are warm-blooded mammals and they have ability to see potential prey is either warm or cold blooded.

In the world the smallest snake is Brahminy blind snakes and their measurement are two inches in length. The largest snake is probably Anaconda and their measurement can reach lengths of 38 feet.

Snakes must regulate their own body temperature like most reptiles. Snakes relax in the sun to warm them up and transfer to cooler places to cool them down. Snakes hide and hibernate during the winter months.

Snake vision has ability to detect movement. Some snakes, like the Asian vine snake, they used both eyes together. In most snakes, the lens can move back and onward within the eyeball to focus. In addition to their eyes, some snakes (pit vipers, pythons and some boas) have infrared-sensitive receptors in deep grooves between the nostril and eye which let them to actually see radiated heat.

Snakes have no external ears; however, they do have a bone called the 'quadrate' under the skin on either side of the head and their sense of hearing is most sensitive to frequencies around 200 – 300 Hz.

A snake smells by using its forked tongue and gives them a sort of directional sense of smell. The direct contact with the surface of the ground body part is very sensitive to vibration so that a snake has ability to sense other creatures upcoming.

All snakes are carnivorous (meat-eaters). Snakes are predators and eat rodents and variety of animals also including birds, reptiles, fish, amphibians, insects and eggs. Some types of venomous snake like cobras, vipers and rattlesnake kill or paralyze their prey by injecting poison through their hollow fangs. Venomous snakes paralyze the nervous system, causes heart and lung failure, or causes internal bleeding of their prey.

Some types of snakes like boas and the anacondas kill their prey by squeezing it to death. By squeezing their prey can prevent prey from breathing and suffocates it. Snakes just swallow their food as a whole and they don' chew and bite their prey into a piece.

When snake digest their food, they become inactive. After the consumption of very large prey digestion is an intensive activity. Their entire intestine enters a reduced state between meals to conserve energy and the digestive system is 'up-regulated' to full capacity within 48 hours of prey consumption. So much metabolic energy is involved in digestion include a lot of metabolic energy for example the Mexican rattlesnake, an increase of body heat rises to as much as 14 degrees Celsius above the surrounding atmosphere. That why if a snake disturbed after recently eating

will often regurgitate its prey because they want to escape the perceived threat. But when they are undisturbed after recently eating, the digestive process is highly effective, melting and absorbing everything but hair and claws, which are excreted along with uric acid waste. Snakes can sometimes die from trying to swallow an animal that is too big for them to handle. Snake digestive fluids can't digest most plant substance.

Snakes reproduction is not the same. Some snakes lay eggs, and some give birth to live young. The eggs and young are not cared for by their parents except Python snake species.

Some snake's species retain the eggs within their bodies until they are almost ready to hatch. It has been recently confirmed that several species of snake such as the green anaconda nourish their young, but it is highly unusual among most reptiles. Retention of eggs and live birth are commonly but not in the cold environments. In the retention of the young state, the female allows her to control their temperature more effectively than if the developing young were outside eggs.

Snakes are estimate believed to live for more than 20 years in the wild, but some snake species can live as long as 50 years.(AnimalCorner,n.d)

### **2.1.1 Characteristics of Venomous Snakes**

Venomous snakes that are capable of producing venom and they use their venom for killing prey, for defense, and to assist with digestion of their prey. The venom is typically delivered by injection using hollow or grooved fangs. Common venomous snakes include the families Elapidae, Viperidae, Atractaspididae, and some of the Colubridae. The toxicity of venom is mainly indicated by murine LD50.9 Murine LD50 means testing especially with rats, mice and LD50 means cause death of 50% of a group of test animals. LD50 is one way to measure toxicity of a subjects.10 So that multiple factors are measured to judge the possible threat to human being. Other important factors for threat calculation include the possibility that a snake will bite, the amount of venom transported with the bite, the effectiveness of the transfer well-developed fangs, and the place of a bite on the body of the victim. Snake venom can have neurotoxic and hemotoxic properties.

Venom is a combination of proteins, enzymes, and other molecular substances. These toxics substances effort to destroy cells, disrupt nerve impulses. Snake venom works by breaking down cells and tissues, which can lead to paralysis,

internal bleeding, and death for the snake bite victim. But to get venom result, it must be injected into tissues or transfer into the bloodstream. Although snake venom is venomous and can cause death, investigators also use snake venom components to improve medicines to treat human illnesses.

Snake venom first component include protein. These proteins are toxics which make the snake venom have harmful and dangerous effects. Snake venom also includes enzymes which help to speed up chemical reactions that break chemical bonds between large molecules. These enzymes help in the breakdown of carbohydrates, proteins, phospholipids, and nucleotides in prey or victims. These enzymes also have ability to worsen blood pressure, destroy red blood cells, and block the muscle control. (Regina Bailey, 2018)

Throughout the world snake poisons there are estimate 20 types of toxic enzymes that people know. But all snakes don't have all of these toxins; most snakes own six to twelve of these enzymes in their venom. It's own special function. Some support in their digestive process and others function in paralyzing the prey. The followings are a list of various toxins enzymes that have been identified in snake venom. They are:

- a. Phosphomonoesterase
- b. Arginineesterhydrolase ester hydrolase
- c. Phosphodiesterase
- d. Thrombin-likeenzyme enzyme
- e. Acetylcholinesterase
- f. Collagenase
- g. RNase
- h. Hyaluronidase
- i. DNase
- j. PhospholipaseA2(A)
- k. 5'-Nucleotidase
- l. PhospholipaseB
- m. L-Amioacidoxidase
- n. Lactatedehydrogenase
- o. Adenosine triphosphatase and Proteolytic enzymes.

### **2.1.3 Venomous and Non-Venomous Snakes**

The first group of venomous snakes is from the Elapidae family, including the western and eastern coral snakes and the yellowbelly sea snake, all of which inhabit humid, subtropical areas. Although coral snakes look like innocuous size and appearance, but they mostly nourish on other snakes. Coral snake venom is very dangerous and deadly. Other includes the cottonmouth, copperhead, the sidewinder and various different rattlesnakes, including the eastern and western diamondback and the timber rattlesnake known as *Crotalus horridus*. (Laurie Brenner, 2018)

The Elapid Family also includes the cobras of Asia and Africa; the mambas of Africa; the kraits of Asia; the coral snakes of the Americas; and the Australian elapids, which include the coastal taipan, tiger snakes, king brown snake, and death adders. Extremely venomous sea snakes are closely related to the Australian elapids. Numerous species of cobra can spit their venom saliva for one meter or more towards the eyes of perceived enemies. (Moe Kyaw, 2013) Vipers belong to the Viperidae family, known as pit vipers for a distinctive small angular pit that appears slightly below the eye and between the nostrils. Among all of rattlesnakes, the Mojave rattlesnake has the most powerful venom. (Laurie Brenner, 2018) The Viper Family includes the rattle snakes (Western diamondback rattlesnake and timber rattlesnake), moccasin, and lance-headed vipers of the America; the saw-scaled vipers of Asia and Africa; the Russell's viper of Asia; and the puff adder and Gabon viper of Africa. (Moe Kyaw, 2013)

### **2.1.4 Main Differences between Poisonous and Non-Poisonous Snakes**

Except for the red, black and yellow-banded coral snake that populates the Carolinas, Florida, Georgia, Alabama, Louisiana and Mississippi; all venomous snakes have an angular, wedge-shaped head. Non-venomous snakes characteristically have long, slim bodies and vertical heads; however some non-venomous king and garden snakes can rise fairly thick. Venomous snake eyes have vertical, cat-eye slits for pupils. Non-venomous snake's eyes have the round ones. The coral snake is the only round-pupil snake among venomous snakes. Vipers have a smooth cap on their head between their eyes to their nose.

Non-venomous snakes have longer, vertical heads and a smooth cap that extends far beyond the round-pupil eyes to their nose. But again, except the coral snake has that larger cap among venomous snakes. Again, on the underside of viper

tails there is undivided and similar scales compared with nonvenomous snakes. Unlike venomous snakes, most nonvenomous snakes cannot bite through clothing. Some types of non-venomous snakes have a lot of little teeth. These tiny teeth will make superficial cuts similar to briar scratches. If you are bitten by a nonvenomous snake, the bite will look like a horseshoe of tiny scratches. Many times, people kill snakes such as the young black or gray rat snake and the young racer snake, confusing that they are copperheads. It was such a mistake because rat snakes and others do no harm and help keep the rodent and insect population down. The rattlesnakes, copperhead, and cottonmouth are pit vipers.

They are characterized by a pit between and slightly below the eye and nostril, long movable fangs, a vertically oval “cat’s eye” pupil, undivided scales on the underside of the tail, and a large triangular-shaped head that has a small, smooth, shiny cap over the nose. Nonvenomous snakes have round pupils, a large smooth cap over the top of the head past the eyes, divided scales on the underside of the tail, no pits and no long fangs.(Laurie Brenner,2018)The Cobras aggressive characteristics are they spread a hood, they rear and hiss, make repeated strikes towards the target. Russell’s vipers have large white and dark-rimmed annular (ring) spots are distinctive. The banded Krait has alternating black and yellow circumferential bands are also distinctive. The voice of Russell’s viper blowing hiss and the granting rasp of the saw-scaled viper are warning and identifying sounds. (Moe Kyaw, 2013)

## **2.2 Treatment and Prevention from Snakebite**

### **2.2.1 Symptoms of Venomous Snakebite**

Snakes bite occurs to capture prey and for self-defense. As snakes can control the amount of venom they discharge, some bites can be "dry" and called “dry bite”. Only 50% to 70% of venomous snake bites can cause in envenoming and facing life risk. The symptoms of venomous snakebite vary from the type of snake involved. Similar symptoms reactions are the following:

- a. Two puncture wounds at the area of the bite. Other teeth marks can also be existing.
- b. A sharp, throbbing pain at the place of the bite. However, pain is not always a sign. For example, a bite from a coral snake can be nearly painless at first but still deadly.
- c. Redness, swelling and damaged tissue in the area of the bite

- d. Abnormal blood thickening and bleeding
- e. Lower blood pressure and shock
- f. Nausea and vomiting
- g. Trouble breathing, or in severe cases cannot able to breathe at all
- h. Blurred vision
- i. Greater than before production of saliva
- j. Heavy sweating
- k. Numb sensation in the face or limbs. (Cleveland Clinic,2014)

### **2.2.2 Treatment of Snakebite**

Early accesses to medical care in a health facility require. And capable of analyzing snakebite envenoming is important. A health center should need the basic requirements of resources needed to provide immediate emergency treatment needs, including the administration of antivenom and other therapy.

If a person is bitten by venomous snake, they should be transported to a health facility as soon as possible without delay. First aid should be applied. Traditional medicines and other treatments such as wound incision or excision, suction, or application of “black stones” must be avoided because they can prevent when actual treatment time.

### **2.2.3 First Aid for Snakebite**

- a. Immediately move away from the area where the bite occurred. Using a stick or tool if the snake is still attached.
- b. Around the bitten part of the body should not have anything especially anything that is tight (e.g.: rings, anklets, bracelets) as these can cause damage if swelling happens.
- c. Reassure the victim. Some snake bites are non-venomous snakebites. And even after most venomous snake bites can’t occur death immediately.
- d. Make sure do not move the patient completely. Splint the limb to keep it still.
- e. Never use a tight arterial tourniquet.
- f. The Australian Pressure Immobilization Bandage (PIB) Method is only recommended for bites by neurotoxic snakes that prevent local swelling.
- g. Applying pressure at the bite spot with a pressure pad may be appropriate in some cases.

- h. Avoid traditional first aid methods, herbal medicines and other unproven or unsafe forms of first aid.
- i. Transport the person to a health facility as soon as possible
- j. Paracetamol may be given for local pain (which can be severe).
- k. Vomiting may occur, so place the person on their left side in the recovery position.
- l. Closely monitor airway and breathing and be ready to resuscitate if necessary.

Many people die every year on the way to a health facility because of being transported lying flat on their backs and having their upper airway clot by vomit. To reduce this risk keep them on their left side with mouth turned down.

All snakebite cases are very critical so health facilities should treat all snakebite patients as emergencies as possible and give first urgency to evaluating these patients and starting treatment without delay.

Improving the evaluating outcomes for the victims of snake bite needs much more than just access to safe antivenoms. Intravenous access should be achieved early, hydration state determined and corrected if needed, and vital signs must be closely monitored. The early administration of an adequate dose of effective antivenom to patients with signs of envenoming is crucial. If antivenom is not available, transfer to a center which has supplies should be planned and undertaken speedily. If this is not possible then symptomatic treatment including support of airway patency and breathing, maintenance of circulation and control of bleeding, and the treatment of local wounds should be firstly arranged as appropriate.

Administered first, antivenoms are not just life-saving, but can also extra additional patients some of the suffering caused by necrotic and other toxins in snake venom, leading to quicker recovery, less time in hospital and an additional rapid transition back to a productive life in their societies. But the truth for many patients is that early access to antivenom is simply not possible for a mass of reasons. As a consequence, these patients do not receive the full possible benefit of antivenom, and some of the effects of the snake venom may not be disappear effectively, causing to prolonged illness, slower recovery and greater risk of disability. Some patients bitten by snakes with venom that affects normal blood thickening may have an advanced risk of inside bleeding into the brain and other organs, and those affected by dermonecrotic toxins will experience more severe local tissue damage.

#### **2.2.4 Anti-snake venom**

Anti-snake venom (ASV) are immunoglobulin's arranged by immunizing horses with the venom of poisonous snakes and afterward pull out and purifying the horses' serum. They are the only current efficient antidote for snake venom. There are two type of Antivenoms, they may be effective for specific particular type (monovalent/monospecific) or may be effective for numerous types (polyvalent/polyspecific). Antibodies raised against the venom of single species may have cross-neutralizing activity against other venoms, and usually it is from closely connected species. This is known as par specific action. According to WHO, the most effective treatment for snakebite is the administration of monospecific ASV; however, this therapy is not always accessible to snakebite sufferers because of its higher charge, frequent absence of accessibility, and the struggle in correctly recognizing the type of snake.

- a. WHO recommends that if an adequate cold chain is in place, antivenoms should be ready in the liquid form, since this decreases production expenses and avoids the possible opposing physicochemical alterations to the product sometimes brought about by lyophilization. If the integrity of the cold chain cannot be certain, antivenoms should be lyophilized to keep stability.
- b. Several antivenom preparations are accessible worldwide. In India, polyvalent antivenom prepared by Central Research Institute, Kasauli (HP) is effective against the most common Indian species. Antivenom produced at the Haffkine Corporation, Parel (Mumbai) is effective against the venom of even more species lists ASV producers in India, not only the public but also the private sector. (J Emerg Trauma Shock, 2008)

#### **2.2.5 Barriers to Early Antivenom Access**

Delayed for antivenom treatment includes:

- a. If people are bitten find the nearby health facility with antivenom.
- b. Cultural barriers persuading health-seeking behavior.
- c. Absence of transportation; many sufferers have to walk far distances which can cause more delaying treatment and accelerating venom effects.
- d. Nonexistence of cold-chain storage for antivenoms and other pills in rural health facilities.
- e. Stock absences or deficiency of any stock at all.

- f. Usage restrictions that prevent antivenom from being administered in primary health centers, forcing sufferers to look for treatment somewhere else.
- g. Higher costs of antivenoms can lead to delays while family members look for moneys. (WHO,n.d)

### **2.2.6 Expectation after treatment for a snake bite**

- a. In most cases, it is necessary to stay in the hospital for up to 24 hours because to monitor blood pressure and overall health. If blood pressure has fallen, intravenous fluids (through a needle in the arm) may be essential. If there has been a great loss of blood, a blood transfusion may be required.
- b. A period of monitoring is also required because some people can advance a severe allergic reaction after getting antivenom. Because of this danger, antivenom should be given only by a skilled medical expert.
- c. The period necessary for whole recovery will depend on the types of snake bite. In most cases, children can recover from an additional time in one to two weeks. Most adults will take more than three weeks for full recovery but 25% will require one to nine months.
- d. Aching and inflammation are common long-lasting effects in the zone of the body where the bite happened. (WHO,n.d)

### **2.3 Programs of Snakebite Prevention**

Programs of snakebite prevention should be actively promoted through a wide variety of global programs, especially in the areas where the high rate of snakebites, for example rural areas based on agriculture activities. The involvement of society is important to address the problem of snakebite. Based on local cultural, socioeconomic and political conditions should be including in snakebite prevention programmed. If these requirements are ignored, this can lead to the unsuccessful projects and mechanism. Individual attention must be given to weakness and excluded groups such as indigenous and native peoples who are often the poorest peoples and the most facing snakebite problems because of their hunter-gatherer and subsistence agriculture for their living life and yet who do not often advantage from official public health programs. Local leaders and community organizations must be including in awareness and educational platform (Health Sectors) for prevention and management of snakebites. Local organizations of several sources, i.e. health committees, youth

organizations, school-based groups, local political groups, minority associations, etc. should be encourage to particular attention to address this issue.

This should be needed to understand the design of program, the way in which individual communities or populations perceive the problem and the effective ways with which to confront it. Particular interesting should have in the communication among local traditional healers in order to improve partnerships that this reason is to reduce the harmful interventions users, to prevent delays in curing effective treatment and prevent obstacles in transportation for medical treatment centers. To get more participation and interactive, culturally-based approach should be included in rural community's health intervention programs. Therefore, creating a situation in which affected population is actively include in the implementation of preventive and educational activities associated with the basic priority health care.(Moe Kyaw,2013)

- a. Be careful about hands and feet because avoid reaching into places, holes, or underneath objects without clearly seeing and not sure a snake is not hiding below.
- b. Do not lay down or sit down in zones where snakes might be existed.
- c. Wear high-top leather boots when walking through or working in regions of a lot of plants.
- d. Do not try to arrest, handle, or keep venomous snakes.
- e. Camp only in areas away from swamps, streams, dense foliage, and other places that snakes are known to live.
- f. Avoid touching several snakes that is nencountered. (Cleveland Clinic,2014)

#### **2.4 Situation of Snakebite in the Worldwide**

Snakebite was an ignored public health topic in many tropical and subtropical countries. Snakebites cases happen about 5.4 million each year, causing in 1.8 to 2.7 million cases of envenoming's (poisoning from snake bites). There are among 81 410 and 137 880 passing away and around three times as many amputations and further permanent disabilities each year. These occur most in Africa, Asia and Latin America. In Asia up to 2 million people are envenomed by snakes each year, while in Africa there are predictable 435 000 to 580 000 snake bites annually that necessity treatment. Snakebite most affects women, children and farmers in poor rural communities in low- and middle-income countries. The highest problem happens in countries where health systems are weakest and medical resources lower. (WHO, 2018)

The majority of snake bites happen in heavily populated zones of sub-Saharan Africa, South Asia and South-East Asia, where humans and snakes often come into contact. Poor, rural populations are at particular risk from snake bites, as they often have deficiency access to antidotes or may turn to traditional treatments in the lack of latest medical facilities. Many of the worst affected countries do not have their own facilities for creating antivenoms, which must be quickly directed to prevent or halt the damage caused by venoms. The world health frame will now improve a global plan of action to tackle the issue, which will include providing cheaper antidotes and training. Snake bites are nowadays a "global health priority" according to a new resolution approved by the World Health Organization (WHO). The resolution aims to guarantee that countries follow a common scheme in dealing with such attacks. The World Health Assembly's new resolution will guarantee that countries follow a common scheme in the prevention, treatment and management of snake attacks. (BBC NEWS, 2018)

In sub-Saharan Africa, snakebites are a major public health concern. Approximately one million envenomation (when venom is injected into one animal by another) cases happen affecting more than 10,000 permanent disabilities and 20,000 deaths each year. Although the problem is being investigated, it still remains largely ignored both by international organizations and administrative and health authorities including health personnel. It was calculated that using appropriate care and proper antivenom, up to 80% of disabilities and deaths could be avoided. Africa situation is crucial because it requires relevant analysis of available epidemiological data is needed and there are no antivenom manufacturers in Africa with the exception of two companies respectively in South Africa and Egypt that don't export their products. As a result, contrary to Asian and American countries that manufacture their own antivenoms, those for Africa must be imported leading to extraordinary restrictions and expenses. Also training is no longer accessible on envenomation and the potential treatments in medical or nurse schools in Africa.

Therefore, the distribution of antivenoms is limited for numerous reasons explaining the vicious circle of the unreachability of antivenoms. (Dr. Jean-Phillipe Chippaux, 2016). Although Médecins Sans Frontières (MSF) cures numerous thousand people free of charge in its facilities yearly, most people who are bitten in sub-Saharan Africa live in rural areas and receive no treatment with antivenom (the only validated treatment for the disease), or receive substandard treatment because

overpriced prices put quality treatment out of reach. WHO will introduce a motivated roadmap to reduce snakebite-induced death and disability. The roadmap will find the ways to address the lack of access to effective, quality antivenom treatment. Treating people in areas such as South Sudan, Central African Republic and Ethiopia are one of the main obstacles MSF encounters (Antivenoms are medications derived from plasma of horses that are 'hyperimmunised' with the snake venoms). People bitten by snakes receive antivenom intravenously. The severity of snakebite envenoming determines the dosage of antivenom administered or the number of vials each person needs. Most African countries, patients need to pay for treatment out-of-pocket, making it practically unreachable in impoverished rural settings where most persons at risk live. An effective, quality antivenom treatment often costs quite a lot of times what individuals earn in the whole year. Because of higher prices of quality antivenoms, people are frequently persuaded into purchasing cheaper goods that are of questionable quality, safety and effectiveness, additional contributing to the high rate of passing away and disability from snakebite.

WHO roadmap is needed at the national, regional and global levels to enable substantial improvement in access and availability of effective quality antivenoms. Antivenoms must be accessible to people free of charge or at a very low price to help those affected by this deadly syndrome. In Africa accessing any antivenom treatment (including ineffective treatment) is very low. The high price of antivenoms can cause most snake bite victims going to the traditional healers (cheaper) before going to the hospital, although there are none of the traditional methods that can be treated snakebite effectively. If quality treatment was accessible for free or at a very low value, snake bite victims would be more likely to search for effective care sooner.

The African market has been dominated by a few substandard antivenom products because their unit price is lower than that of effective quality products. If quality antivenom products are subsidized by WHO member states, making them available for free or at a very low price for those who need it, the production of substandard alternatives will not remain a viable business. The use of poor-quality products has made healthcare workers and communities undecided to use antivenom for treatment as many circumstances of ineffective products have been reported. Better access to effective, quality treatment options is important to restore people's trust that treatment using antivenoms is the best treatment for snakebites. People do not receive the recommended dosage of antivenom because they can only afford part

of the treatment course. People need the dosage that will prevent disability and death, not simply the dosage they can afford. African antivenom market has fluctuated over time. A lot of suppliers of effective quality antivenom have stopped production because their market shares dropped or decayed.

If the supply and convenience of effective quality antivenoms was subsidized, securing an economically viable price for the producers, demand for effective quality treatment would rise. The WHO is now assessing a number of remaining antivenoms planned for use in sub-Saharan Africa as a first stage towards determining what makes effective, quality antivenom, and identifying which antivenoms available on the market are not effective and should be phased out. The development of an international financing mechanism for global procurement and supply of affordable, quality assured antivenoms should be the following stage. To save lives, countries and donors necessity act currently by encouraging an international financing mechanism for antivenoms and by containing snakebite treatment in worldwide health coverage policies.

To make sure a strong universal response to snakebite, the WHO countries and donors should support research and development of innovative and heal their snakebite treatments and diagnostic tools, develop preparation for healthcare professionals and community awareness of snakebite first aid and prevention, build greater distribution of snakebite cases in different regions and to control the quality of antivenom products. (MSF Access Campaign, 2018)

At World Health Assembly in May 2016 in Geneva, the organization of a Technical Briefing on snakebite and antivenoms requested by various international organizations like Global Snakebite Initiative, Health Action International and Doctors without Borders, has been strongly supported by the ASV (Anti Snake Venom). That meeting aims were first to develop epidemiological information to assess the quantitative and qualitative therapeutic necessities, second to improve training of health staff in the management of envenomation third to reinforce drug policy supporting the use of effective and harmless antivenom and to share the cost between the stakeholders in order to improve antivenom accessibility for the patients the salaries of which are mostly low.( Dr.Jean-Phillipe Chippaux,2016)

South Asia is the high population density, widespread agricultural activities, numerous venomous snake species and lack of functional snake bite control programs because of these South Asia is the world's most severely affected region. The

administration of antivenoms that do not cover all of the important venomous snakes of the region. Care-givers need better preparation and supervision. Poorly informed rural populations often apply incorrect first-aid measures and vital time is gone before the victim is transported to a treatment center, where cost of treatment can constitute an additional hurdle. The insufficiency of snake bite management in South Asia is multi-causal and requires joint cooperative hard work from researchers, antivenom manufacturers, policy makers, public health authorities and international funders. Since ancient times, snakes have been prayed to, feared, or loathed in South Asia. And snake bite victims don't have enough access to quality treatment, and in many countries, both morbidity and mortality due to snake bites are very high.

India has the highest number of deaths due to snake bites in the world with 35,000–50,000 people dying per year according to World Health Organization (WHO) direct estimates. In Pakistan, 40,000 bites are reported annually, which cause in up to 8,200 fatalities. In Nepal, more than 20,000 cases of envenoming occur each year, with 1,000 recorded deaths. In Sri Lanka, around 33,000 envenomed snake bite victims are reported yearly from government hospitals. A postal survey conducted in 21 of the 65 administrative districts of Bangladesh estimated an annual incidence of 4.3 per 100,000 population and a case fatality of 20%. Surveys in rural Sri Lanka showed that hospital data record less than half of the deaths due to snakebite. In Nepal, a review of district hospital records showed that national figures underestimated the incidence of snake bite by one order of magnitude. The highest figures reported in Asia so far come from a community-based survey conducted in southeast Nepal in 2002, which revealed annual incidence and mortality rates of 1,162/100,000 and 162/100,000, respectively.

Snake bite cases cause mostly in farmers, plantation workers, herders, and fishermen. Open-style occupation and the habit of sleeping on the floor also cause a lot of people to bites from nocturnal snakes. Bites are more frequent in young men and occur on lower limbs. Snake bites incidence is higher during the rainy time of year and during periods of focused agricultural activity. Snake bite incidence and mortality furthermore rises during extreme weather happenings such as floods. In 2007 monsoon flood disaster in Bangladesh, snake bite was the second most common cause of death, after drowning, eclipsing mortality from diarrheal and respiratory diseases and these proving that snake bite problems are more important than compared to other health problems.

In reality, strategies to control snake populations and to prevent snake bites are nonexistent in South Asian countries. A lot of bites could be avoided by educating the people knowledges. Sleeping on a higher bed area (rather than on the floor) and under bed nets decreases the risk of nocturnal bites in Nepal. The snakes prefer places like rubbish, termite mounds, and firewood should be removed and place far away from human housing areas. This attempt can be made to prevent the proliferation of rodents in the domestic and per domestic area. Snakes favored hiding places like thatched roofs and mud and straw walls should be checked and clean regularly. A lot of snakebites cases occur when people walking barefoot or wearing only sandals accidentally step on a snake. Using a flashlight when walking on footpaths at night and wearing boots and long trousers during agricultural activities could significantly decrease the incidence of bites. Many areas where snake bite envenoming occurs are relatively unapproachable by road, especially during the rainy season, and in some areas transport to a health center takes more than 24 hours. In Nepal, a programmed for fast transportation for snake bite patients with motorcycle volunteers to the treatment center can significantly reduce the risk of deadly outcome.

While sub-Saharan Africa faces an intense crisis in antivenom production and supply, a lack of antivenom is not the most problem in South Asia. So, it is estimated that India produces around one million vials of antivenom every year. Despite these large volumes of production, several challenges persist that prevent appropriate management of snake bite victims in South Asia. Poor access to inadequately equipment and staffed medical centers in countryside areas, high charges of treatment, and inadequate use of antivenoms are major fears. So, these increased attention by researchers, funding agencies, pharmaceutical industries, public health authorities, and supranational organizations, all of these contributed to supporting about this is an important public health condition problem alike a truthfully ignored disease.(Janaka de Silva, 2010)

## **2.5 Reviews on Previous Study**

Moe Kyaw (2013) have talented an assessment on community awareness of snakebite prevention in rural areas of Hlegu Township regarding to 200 villagers. It was found that education status was strongly influence and need to improve education status of villagers. In additional, that study pointed out the requirement of improving

the social and economic status of rural community will lower morbidity and mortality of snakebite and also reduce the burden of snakebite.

Dr. Yi Yi Khine (2018) have pointed out “collaborative snakebite control project MOHS & WHO”. It was included snakebite is global burden and history background of snakebite control project, plan and challenges. In addition, included number of snakebite case and deaths by regional and tips of first-aid treatment shown by Ministry of health and variety of common snakes in Myanmar and also production of anti-venom in Myanmar and price compare to india. Therefore, it pointed out to cooperate with international agencies, NGOs, foundations and research institution to strengthen snakebite management strategies.

Eliza Schioldann (2018) stated on journal “Why snakebite patients in Myanmar seek traditional healers despite availability of biomedical care at hospitals?” It pointed out community perspectives reasons for the use of traditional healing and shortage of adequately trained staff in rural areas and belief in religious and lack of funds to go to the hospitals and treatment and difficulties in transportation.

## CHAPTER III

### OVERVIEW OF SNAKEBITE SITUATION IN MYANMAR

#### 3.1 Venomous Snakes

No fewer than 44 species of dangerously venomous snakes are currently known to inhabit Myanmar and the adjacent coastal waters. Of these, 18 are sea snakes and except for two, *Laticauda colubrine* and *Laticauda laticauda*, none voluntarily come onto land (occasionally, obligate marine species may be carried onto shore during severe weather by wave action or enter river deltas in brackish water). Of the remaining 26 species, all are terrestrial in the sense that none voluntarily enters coastal waters. And, of the terrestrial forms, several, such as *Trimeresurus albolabris*, favor arboreal habitats and are usually found resting on tree limbs.

All of the terrestrial species can swim, and some are occasionally found swimming in the rivers and streams as well as in flooded rice paddies. Two families of dangerously venomous snakes are represented in the Myanmar herpetofauna: Elapidae (cobras, kraits, and coral snakes [subfamily Elapinae], and sea snakes and Australian elapids [subfamily Hydrophiinae]), and Viperidae (true vipers [subfamily Viperinae], pitvipers [subfamily Crotalinae], and Azemiops [subfamily Azemiopinae]). Known mildly venomous snakes found there, mostly referred to the very large snake family Colubridae, include the rear-fanged snakes of the Asian vine or whip snake genus *Ahaetulla*, the cat-eyed snakes (genus *Boiga*), the genus *Psammodynastes*, and the aquatic and semi-aquatic snakes of the genera *Enhydris*, *Cerberus*, *Cantoria*, *Fordonia*, and *Bitia*. In a like manner, several of the supposedly nonvenomous colubrids have been shown to have toxic salivas and some should be considered mildly if not dangerously venomous. Amon-Tg these are members of the genera *Xenochrophis*, *Amphiesma*, and *Rhabdophis*. (Sources from Ministry of Health)

### 3.2 Snakebite Incidence

In Myanmar, snakebite cases occur in almost all the regions especially in Mandalay, Bago, Sagaing, Ayeyarwaddy and Yangon Divisions. Seventy percent of the bites are caused by Russell's vipers. Mortality from snakebite is quite high (10%) in Myanmar.(Moe Kyaw,2013)

Snakes, primarily Russell's Vipers and Cobras, bite thousands of people in Myanmar every year and lead to hundreds of deaths. They are a major concern in rice growing regions along the country's biggest river the Irrawaddy. While not as deadly as some Australian snakes, Russell's viper is a particularly dangerous snake because of the devastating impact its venom can have on the kidneys. Up to 70 per cent of acute kidney failure in Myanmar is due to snakebite, placing a major strain on the country's underdeveloped health system. Dominated by rice, agriculture is Myanmar's major industry, accounting for about 40 per cent of GDP and 60 per cent of employment. Rats and mice are attracted to the crops, which in turn attract the snakes. Although the majority of snakebites occur in rural farming areas and many victims seek help from traditional healers rather than through the official health system, data has previously only been collected at major hospitals in Myanmar. Myanmar farmers should wear boots and seek help quickly from health care workers rather than relying on traditional healers could make a significant difference.( The Lead, 2017)

Snakebite incidence is historically high in Myanmar (15.4/100,000/yr). 70% of Myanmar's population resides in rural areas with heavy reliance on subsistence agriculture. Agriculture is a major occupational risk exposing farmers to snakebites. Most venomous bites in Myanmar are attributed to Russell's viper, envenoming by which can cause local pain and swelling, coagulopathy, life-threatening hemorrhage, shock, and acute renal failure. Overall, the annual number of snakebite cases, as reported in the national data of snakebite victims who seek care at the government hospitals or health centres fluctuates between 15,000 and 20,000. A large proportion of these snakebites occur in six high incidence regions i.e. Mandalay, Sagaing, Bago, Magwe, Ayeyarwady and Yangon. According to these health services data, in 2016 there were 16,767 snakebites in Myanmar, out of which 2,566 bites were in Mandalay region. These numbers are probably an underestimation of the magnitude of this important public health issue, as they do not include those victims who use traditional healers only and those who die before seeking care at the government health care

centres or hospitals. Hospital in Mandalay region admission records and clinical information informed that 965 snakebite victims were admitted in 2016; 68.5% of these 965 suffered from coagulopathy, 63.2% suffered acute kidney injury, 31.5% required dialysis and 12.4% died. These points to the significance of this neglected public health issue.

**Table (3.1) Number of Snakebite Cases and Death by State and Regional**

| Region and States | 2015  |       | 2016  |       | 2017  |       |
|-------------------|-------|-------|-------|-------|-------|-------|
|                   | Cases | Death | Cases | Death | Cases | Death |
| Kachin            | 59    | 0     | 63    | 1     | 58    | 1     |
| Kayah             | 38    | 0     | 32    | 0     | 36    | 0     |
| Kayin             | 242   | 12    | 341   | 14    | 252   | 17    |
| Chin              | 36    | 2     | 45    | 0     | 45    | 3     |
| Sagaing           | 1711  | 60    | 1563  | 40    | 1806  | 57    |
| Tainintharyi      | 54    | 1     | 53    | 0     | 92    | 2     |
| Bago              | 1597  | 75    | 1349  | 69    | 1168  | 40    |
| Magway            | 1402  | 64    | 1406  | 107   | 2237  | 92    |
| Mandalay          | 1407  | 55    | 1195  | 61    | 1441  | 76    |
| Mon               | 212   | 15    | 304   | 32    | 361   | 39    |
| Rakhine           | 91    | 0     | 90    | 1     | 34    | 1     |
| Yangon            | 737   | 45    | 675   | 36    | 550   | 37    |
| Shan(South)       | 144   | 3     | 197   | 5     | 172   | 4     |
| Shan(North)       | 36    | 1     | 46    | 1     | 28    | 1     |
| Shan(East)        | 22    | 1     | 4     | 0     | 15    | 0     |
| Ayeyarwady        | 1099  | 165   | 1354  | 212   | 1114  | 177   |
| Naypyitaw         | 158   | 9     | 163   | 7     | 47    | 4     |
| Union             | 9045  | 508   | 8880  | 586   | 9467  | 551   |

Source: Ministry of Health (2015-2017)

### 3.3 Myanmar Snakebite Treatment Situation

Snakebite treatment according to the biomedical management protocol includes AV, which is essential and the only antidote for envenoming, and supportive treatment such as airway management, treatment of hypotension and shock, treatment

of acute kidney injury, management of hemostatic shock and treatment of the bitten site with antibiotics if needed. In Myanmar, government doctors and paramedical staff are trained to provide treatment with AV and supportive treatment.

In Myanmar, treatment of snakebite is impaired by problems with the supply of AV, and by shortage of adequately trained staff, particularly in rural areas. These limitations may contribute to the persisting use of traditional methods. Use of the healthcare system in Myanmar is dependent on several factors, including cost, previous experience, fear of surgery, and belief in religious or spiritual healers. Additionally, in some cases AV causes adverse reactions. Hence, the communities may also harbour fears of biomedical treatment.

Many traditional healing methods, such as local incision, herb ingestion, application of snake stones, and tattooing, are ineffective, and in some cases, harmful. Their use can cause infection, bleeding, gangrene and other problems. In this way, the use of traditional healing may further delay or complicate necessary biomedical treatment.

With the continued use of traditional healing practices, it is important to develop a better understanding of the nature of healing practices, the communities' reasons for and views about its use, and the interface between traditional and biomedical components of the health system. In many snakebite-affected countries, an envenomed victim may need to walk (or be carried) for many miles to reach a primary health post. Gutiérrez and colleagues assert that 'studies of the circumstances that delay the access of people bitten by a snake to health centres are of great value and that the studies should include in-depth analyses of the cultural characteristics of the communities, the way snakes and snakebites are perceived, the cultural background of local healer.

As part of a larger community and health services development project in Myanmar, the aim of this participatory action research was to engage with rural communities to learn from their perspectives, their health knowledge, and reasons for healthcare-seeking practices. (Eliza Schioldann, Mohammad Afzal Mahmood, Dale Halliday, Khin Thida Thwin, Robert Cumming, David Bacon, Sam Alfred, Julian White, David Warrell, Chen Au Peh.,2018)

**Table (3.2) Yearly (2012-2017) Antivenoms Sales Record in Myanmar**

|    | Item              | 2012-<br>2013 | 2013-<br>2014 | 2014-<br>2015 | 2015-<br>2016 | 2016-<br>2017 | 2017-<br>2018 |
|----|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1. | Viper<br>(Liquid) | 25220         | 50475         | 53695         | 62653         | 52413         | 42371         |
| 2. | Viper (F/D)       | 2             | 2060          | 1418          | 16158         | 20150         | 50864         |
| 3. | Cobra<br>(Liquid) | 4281          | 4242          | 5625          | 7417          | 9770          | 12029         |
| 4. | Cobra (F/D)       | 594           | -             | -             | 10            | 1292          | 6105          |
|    | Total             | 30097         | 56777         | 60738         | 86238         | 83625         | 111369        |

Source: Dr. Yi Yi Khine, 2018

There are two types of ASV in Myanmar. They are Freeze-Dried Form and Liquid Form. The advantages of Freeze-Dried Form are long term use and can keep in normal room temperature so that it is convenient in rural areas which don't have fridge and electricity. Liquid form sale price is around 45000 kyats and Freeze-Dried Formed sale price is around 48000 kyats. (Dr. Yi Yi Khine, 2018)

### 3.4 Snakebite and Control Project in Myanmar

In Myanmar, snakebite control project started by Ministry of Health 1994 and collaborated with WHO since 1996. WHO gives financial support in the form of Bi annum budget. First project manager was Professor May Mya Win (1994 to 2004). Second project manager was Professor Khin Thida Thwin (2004 to 2017). Current project manager is Dr. Yi Yi Khine. The objectives are to strengthen the the prevention, early referral and effective management of snakebite through community based approaches. To enhance snakebite prevention and management through training of BHS and through appropriate IEC to the community regarding first aid, timely referral and improving community case management skills in health facilities. 2018-2019 Bi annum activities are to determine the knowledge gap among snakebite victims to develop proper communication strategy and capacity building of basic health staff for snakebite control. (Dr. Yi Yi Khine, 2018)

Another project is "A Joint Myanmar – Australia Institute for Health Development (MAIHD)". That project (2014-2018) completed. Myanmar Snakebite Project, a four-

year project aimed at saving the lives of people who die each at the hands of venomous snake bites in Myanmar. Successfully complete the project, progress in production of anti-venom and save the lives of snakebite victims. Myanmar, which used to import anti-venom due to insufficiency of the life-saving injection, has achieved in production of quality antivenom not only for local distribution but also for export. The project that aided snakebite victims in Myanmar by upgrading care facilities and the quality and availability of antivenom and offered future cooperation in research and development in the sector.

During the Myanmar Snakebite Project 2014-2018, Myanmar could produce antivenom meeting GMP guideline with the aid of Australia experts. According to statistics in 2016, about 10,000 snakebite incidents occur every year across the country, especially in rural areas, with a mortality rate of 10 per cent. (The Global New Light of Myanmar,2017). The Myanmar Snakebite Project began in late 2014 when the Australia Department of Foreign Affairs and Trade awarded the University of Adelaide \$2.3 million for a three-year project, which is a partnership between Australian Government and the Myanmar Ministries of Industry & Health.

The project has so far focused in the region of Mandalay, the biggest rice growing region and one of the worst affected by snakebite. Horses are used in Myanmar to produce antibodies to make anti-venom for Russell's Viper and Cobra bites leading to Australian veterinary, horse husbandry experts and top-tier antivenom producer Seqirus being called on to provide advice. Since the snakebite project started, horse mortality has been reduced by 90 per cent while antivenom production has more than doubled to almost 100,000 vials a year. Thirty solar-powered fridges have been purchased to store antivenom in remote areas in Myanmar and thousands of rural families have been educated about how to avoid being bitten and what to do if they are. (The Lead, 2017)

### **3.5 The Incidence of Snakebite in Nga Zun Township Hospital (2016-2018)**

According to the current data from Nga Zun Public Hospital, the morbidity of snakebite cases is as in Table (3.3). Nga Zun Public Hospital is a main treatment center for snakebite cases in Nga Zun Township. Although Mandalay General Hospital is a biggest hospital in Mandalay region, there are three main hospitals in Nga Zun Township. They are (1) Nga Zun Township Hospital, (2) Myo Thar Regional Hospital and (3) Nga Myarr Gyi Regional Hospital. Although Nga Zun Hospital is the

main and biggest hospital in Nga Zun Township but among these three hospitals most of the snakebite patients in Nga Zun Township are go to the nearest hospitals depend on location.

**Table (3.3) Morbidity in Nga Zun Township Hospital (2016-2018)**

| Year | Morbidity |      |       |
|------|-----------|------|-------|
|      | Female    | Male | Total |
| 2016 | 32        | 50   | 82    |
| 2017 | 32        | 49   | 81    |
| 2018 | 48        | 64   | 112   |

Source: Nga Zun Township Hospital

**Table (3.4) Morbidity in Myo Thar Regional Hospital (2016-2018)**

| Year | Morbidity |      |       |
|------|-----------|------|-------|
|      | Female    | Male | Total |
| 2016 | 2         | 9    | 11    |
| 2017 | 6         | 15   | 21    |
| 2018 | 10        | 18   | 28    |

Source: Myo Tharr Regional Hospital

**Table (3.5) Morbidity in Nga Myarr Gyi Regional Hospital (2016-2018)**

| Year | Morbidity |      |       |
|------|-----------|------|-------|
|      | Female    | Male | Total |
| 2016 | 15        | 19   | 34    |
| 2017 | 13        | 20   | 33    |
| 2018 | 8         | 22   | 30    |

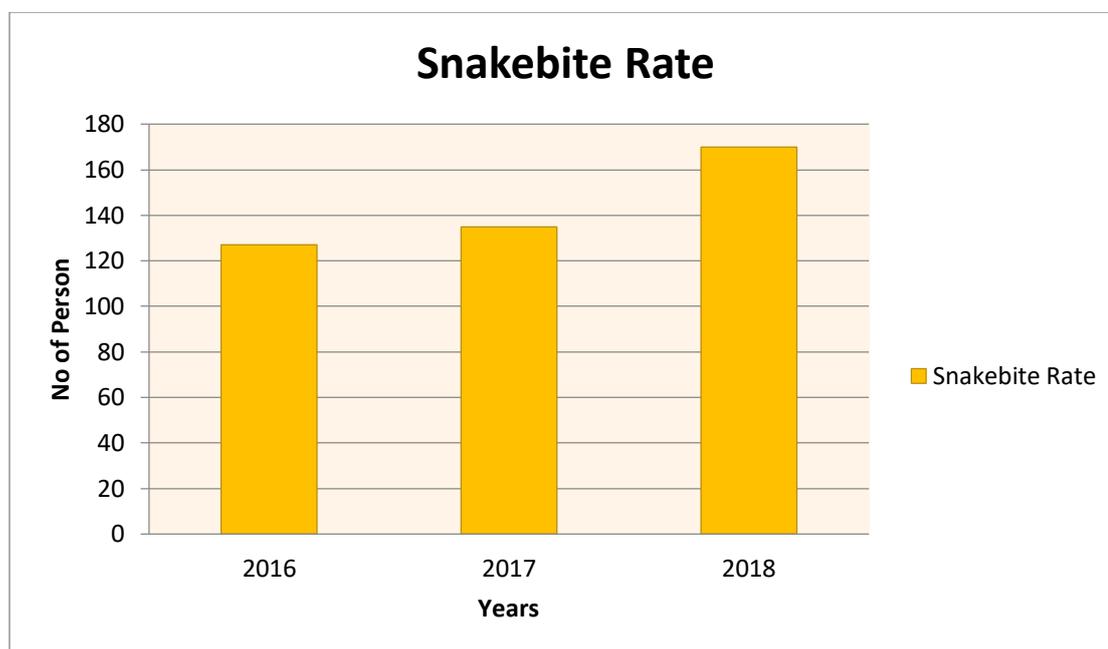
Source: Nga Myarr Gyi Regional Hospital

**Table (3.6) Annual Morbidity of Snakebite in Nga Zun Township(2016-2018)**

| Years | Female | Male | Total |
|-------|--------|------|-------|
| 2016  | 49     | 78   | 127   |
| 2017  | 51     | 84   | 135   |
| 2018  | 66     | 104  | 170   |
| Total | 166    | 266  | 432   |

Source: Nga Zun Township Hospitals

**Figure (3.1) Annual Morbidity of Snakebite in Nga Zun Township(2016-2018)**



Source: Nga Zun Township Hospitals

According to the Township snakebite data, the snakebite morbidity rate was highest in 2018 and lowest in 2016 and middle in 2017. The victims of snakebite are found increased on male than female in every year because male were working in the field more than female.

## **CHAPTER IV**

### **SURVEY ANALYSIS**

#### **4.1 Survey Profile**

Nga Zun Township is a township of Myingyan District in the Mandalay Division of Myanmar. Ngazun Township is 355.991 Sq-Km and 21 miles for east to west and 20 miles for south to north are long. The north side of Ngazun Township has Myin Muu Township exist and 10 miles to reach Ngazun Township and at east side Tatarr Oo Twonship exist and 14 miles to reach and at south side Nyorr Htoe Gyi Township exist and 19 miles away and at west side Myingyan Township exist and 21 miles away. Nga zun Township exist at Myanmar center of Ayeyarwaddy river vally so that generally wide and even physical features of the land. Township south and east has a few high rock ground. Ngazun Township is scarce stream and river area and Ayeyarwaddy river is east to west flowing and 21 miles long. There is only one stream in the Township east name Mee Pyan stream and that stream is south to north flowing and 20 miles long. Nga Zun Township exists above the sea level 227 measure. Total populations of 141183 are Burma race and 100% of population are Burma race.

Township has 158 villages. Most of the people were engaged in agriculture and livestock. 85% of the rural populations were farmers. Some of the people are working as daily wages earners and factory workers. Major products are pulses, bean, sunflower, tobacco leaf and etc.

99.6 % of Ngazun Township populations are literacy and only 4% is illiterate. At the higher education level, there are 13 State High Schools and 21 Middle Schools and 93 State Primary Schoold in Ngazun Township and 5 Kindergarten School and 10 monastery led-education schools. There are total 115 libraries and high school graduated rate is 35.09 % and the school enrolment rate is 100% of schooling age. There are three main hospitals in Nga Zun Township. They are (1) Nga Zun Township Hospital, (2) Myo Thar Regional Hospital and (3) Nga Myarr Gyi Regional Hospital. And there are total 5 police offices and 77 staffs to be covered for the whole population.

## 4.2 Survey Design

This survey is mainly focuses on the rural areas of Nga Zun Township, Mandalay Division. The total 231 respondents from 10 villages were selected out of total 158 villages of Nga Zun Township. The selected villages were based on the suggestion of Township Medical Officer (TMO), Health Assistant (HA) and Nurses from Nga Zun Township Health Department. These villages are led as higher morbidity of snake bite cases among villages of Nga Zun Township. The household's population proportional allocations of 5 per cent were randomly from given household list per each village which was officially issued by local authorities. The criteria of respondents are age between 15 to 65 years old and their regular occupation is on the potential risk of snakebite. The ratio of respondents were male is higher than female as male were working in the paddy field or other snakebite potential areas. Survey started from February 9 to end of March 9 in 2019.

For the collection of information from villagers, structured questionnaires were used to face to face interview in this survey. These structured questionnaires were composed of three main parts: socio-demographic characters, knowledge, attitude and practices on snakebite prevention and treatment and respondent' concerned on snakebite insurance. All the structures of questionnaires were consulted with health staff and snakebite controlled project staff.

The first section of the questionnaire is to set to inquire the socio demographic characters. It includes questions regarding personal information including sex, age, education, occupation.

The second section is the question about knowledge, attitude and practices on snakebite prevention and treatment. This section included nineteen questions concerning respondent' knowledge, attitude and practice on snakebite prevention and first-aids treatment. Respondents rated their level of knowledge are designed based on the standard scores.

The standard scores of minimum and maximum are 0 to 23 respectively. Determined the range score to low knowledge is up to 8 and equal 8, medium knowledge is between 9 to 17 and high knowledge is above 17.

Respondents rated their level of attitude are designed are also based on standard scores, minimum score is 0 and maximum score is 25. Then, determined the range scores of low attitude is up to 13 and equal to 13, high attitude is above 13. The

questionnaire of practice on snakebite prevention was shown by frequency distribution in this survey.

The last section of questionnaires set to study the knowledge on the snakebite insurance, particularly focuses on knowledge about snakebite insurance ticket of Myanmar insurance.

The survey data were collected from the following villages in Nga Zun Township.

**Table (4.1) Respondents List of Survey**

| <b>Sr</b> | <b>Village's Name</b> | <b>Total Household Population</b> | <b>No. of Respondents</b> |
|-----------|-----------------------|-----------------------------------|---------------------------|
| 1         | Sat Pyar Kyinn        | 375                               | 18                        |
| 2         | Than Knone            | 602                               | 30                        |
| 3         | Tharr Kyin            | 813                               | 40                        |
| 4         | Tha Pyay Thar         | 136                               | 6                         |
| 5         | Nyaung Lay Pin        | 308                               | 15                        |
| 6         | Ka lar Ywar           | 760                               | 38                        |
| 7         | Ywar Hla Khone        | 121                               | 6                         |
| 8         | Ma Gyi                | 319                               | 15                        |
| 9         | Mya Tharr (West)      | 584                               | 29                        |
| 10        | Nat Gyi               | 686                               | 34                        |
|           | Total                 | 4704                              | 231                       |

Source: Nga Zun Township Hospitals

### 4.3 Survey Findings

#### 4.3.1 Socio-Demographic Characteristics of Respondents

In this survey, the socio-demographic characteristics of respondents are as following.

**Table (4.2) Socio-Demographic Characteristics of Respondents**

| Socio- Demographic Charecteristics | Frequency | Percentage(%) |
|------------------------------------|-----------|---------------|
| Age                                |           |               |
| 15-25                              | 32        | 14            |
| 26-35                              | 44        | 19            |
| 36-45                              | 51        | 22            |
| 46-55                              | 47        | 20            |
| 56-65                              | 56        | 24            |
| Gender                             |           |               |
| Male                               | 127       | 55            |
| Female                             | 104       | 45            |
| Educational Level                  |           |               |
| Illiterate                         | 3         | 1             |
| Able to read, write                | 66        | 29            |
| Primary level                      | 55        | 24            |
| Middle school level                | 68        | 29            |
| High school level                  | 30        | 13            |
| University                         | 9         | 4             |
| Occupation                         |           |               |
| Farmer                             | 139       | 60            |
| Plantation                         | 40        | 17            |
| Odd Job Worker                     | 31        | 13            |
| Others                             | 21        | 9             |

Source: Survey data, 2019

According to the Table(4.2), the majority of repondents ages are 56-65 (24%) and 36-45(22%) respectively. The respondents ages of 26-35(19%) are not very much different from the ages of 46-55(20%). The respondents ages of 15-25 (14%) are the

minimum percentage. So that according to age distribution, the survey result can have equally from age to age because of there is no big difference percentage.

The majority of respondents are males which make up 55% (127 persons) and females make up 45% (104 persons) of all respondents. Male respondents are more risky of snakebite than female respondents as they are mostly working in the field or plantation.

The majority of respondents are able to read and write and middle school level which represent 29% of the sample villagers. There is the significant number of primary level that show 24% and followed by high school level 13% of the respondents. The two lowest are university level that show 4% and illiterate that is only 1%. Therefore, education system in Nga Zun Township is medium level and it is not very poor level compare to Myanmar others villages.

139 participants (60%) are farmers, 40 participants (17%) are plantation, 31 participants (13%) are odd job workers and 21 participants (9%) are others. According to the table, the majority of respondents are farmers and it represents 60% and followed by plantation workers 17%.

#### 4.3.2 Transportation of Nga Zun Township

Nga Zun Township is quite small, transportation is easy and the common transportation uses are as follows.

**Table (4.3) Transportation of Nga Zun Township**

| Sr.No | Ways        | No. of Respondents | Percentage(%) |
|-------|-------------|--------------------|---------------|
| 1     | By foots    | 1                  | 0             |
| 2     | Cart        | 0                  | 0             |
| 3     | Mortorcycle | 166                | 72            |
| 4     | Car         | 62                 | 27            |
| 5     | Others      | 2                  | 1             |
|       | Total       | 231                | 100           |

Source: Survey data, 2019

According to the table, there are 166 respondents 72% use mortorcycle to reach the hospital, 62 respondents 27% use car and only 1% (2) respondents use others way. In Nga Zun Township, common transportation is only mortorcycles and cars.

#### **4.3.3 The time of snakebite occur the most in a day**

In Nga Zun Township, the time of snakebite occur the most in a day are as following in table.

**Table (4.4) The time of snakebite occur the most in a day**

| Sr.No | Time          | No. of Respondents | Percentage(%) |
|-------|---------------|--------------------|---------------|
| 1     | Early Morning | 195                | 84            |
| 2     | Afternoon     | 36                 | 16            |
| 3     | Evening       | 0                  | 0             |
|       | Total         | 231                | 100           |

Source: Survey Data, 2019

In Nga Zun Township according to the survey data table, snakebite occur the most in early morning 84% and afternoon 16% occur and completely fall down 0% to the evening.

#### **4.3.4 Types of Nearest Health Care Personnel in Nga Zun Township**

In Nga Zun Township, types of nearest health care personnel are following.

**Table (4.5) Types of Nearest Health Care Personnel in Nga Zun Township**

| Sr.No | Types Of Health Care Personnel                | No. of Respondents | Percentage(%) |
|-------|-----------------------------------------------|--------------------|---------------|
| 1     | Primary Health Staff by authorized Government | 210                | 91            |
| 2     | Traditional Herbal Praditioner                | 3                  | 1             |
| 3     | Tranditional Healers                          | 3                  | 1             |
| 4     | Non-Government doctor                         | 13                 | 6             |
| 5     | Others                                        | 2                  | 1             |
|       | Total                                         | 231                | 100           |

Source: Survey data, 2019

In Nga Zun Township, there are a lot of health care centers. The 91% of respondents go to the primary health staff authorized by government, 1% go to the traditional herbal practitioner, 1% go to the traditional healers and 6% cure the non-government doctors and 1% do the others type.

#### 4.3.5 Snakebite Cases Happen in Nga Zun Township

The township has a lot of snakebite cases but there are still the areas that snakebite cases did not happen. The results are following:

**Table (4.6) Snakebite Cases Happen in Nga Zun Township**

| Sr.No | Snakebite cases | No. of Respondents | Percentage(%) |
|-------|-----------------|--------------------|---------------|
| 1     | Happen          | 195                | 84            |
| 2     | Not Happen      | 36                 | 16            |
|       | Total           | 231                | 100           |

Source: Survey data, 2019

According to Table (4.6) there is a lot of snakebite happen in Nga Zun Township according to the survey result.

#### 4.3.6 Area of Snakebite Cases

The most area that happen the most snakebite cases are following table:

**Table (4.7) Area of Snakebite Cases**

| Sr.No | Area                         | No.of Respondents | Percentage |
|-------|------------------------------|-------------------|------------|
| 1     | In the compound              | 21                | 9          |
| 2     | Near the house               | 6                 | 3          |
| 3     | In the farm or field         | 182               | 79         |
| 4     | On the path from public road | 21                | 9          |
| 5     | Others                       | 1                 | 0          |
|       | Total                        | 231               | 100        |

Source: Survey data, 2019

Table (4.7) shows that among 231 respondents, 182 respondents (79%) said that the highest cases of snakebite occurs on farm or in the field and only 1(0%) respondents said that others cases. Then, 21 respondents (9%) said that the cases of snakebite occur in the compound and while walking along the path in the village. The 6 respondents (3%) said that the snakebite cases occur near the house.

#### 4.3.7 Occurrences of Highest Snakebite Cases by Season

The occurrences of the highest snakebite cases by seasons are show in the following table. It can be found that the different rate of morbidity are occurs depends on season.

**Table (4.8) Occurrences of Highest Snakebite Cases by Season**

| Sr.No | Seasons | No. of Respondents | Percentage (%) |
|-------|---------|--------------------|----------------|
| 1     | Rain    | 148                | 64%            |
| 2     | Summer  | 54                 | 23%            |
| 3     | Winter  | 29                 | 13%            |
|       | Total   | 231                | 100%           |

Source: Survey data, 2019

Table (4.8) said 148(64%) respondents mostly choose raining season so it is same as worldwide mostly snakebite season.

#### **4.3.8 Snakebite Knowledge Levels of Respondents**

The result of knowledge levels of respondents are as following:

**Table (4.9) Snakebite Knowledge Levels of Respondents**

| Knowledge | No. of Respondents | Percentage (%) |
|-----------|--------------------|----------------|
| Low       | 1                  | 0%             |
| Medium    | 212                | 92%            |
| High      | 18                 | 8%             |
| Total     | 231                | 100%           |

Source: Survey data, 2019

Knowledge levels of respondents were categorized into low, medium and high level. From this table, it can be seen that most of the respondents 212 participants (92%) have medium knowledge level, 18 participants (8%) have high knowledge level and only 1 participant (0%) have low knowledge level. So knowledge is positive result with education because Nga Zun Township is 99.6% are literacy.

#### 4.3.9 Relationship between Age group and Knowledge Level

The relationship between age group and knowledge level of snakebite prevention and treatment are shown in table(4.10).

**Table (4.10) Relationship between Age group and Knowledge Level**

| Age Group | Knowledge |          |        | Total     |
|-----------|-----------|----------|--------|-----------|
|           | Low       | Medium   | High   |           |
| 15-25     | 1(3%)     | 30(91%)  | 2(6%)  | 33(100%)  |
| 26-35     | 0(0%)     | 41(93%)  | 3(7%)  | 44(100%)  |
| 36-45     | 0(0%)     | 45(88%)  | 6(12%) | 51(100%)  |
| 46-55     | 0(0%)     | 43(91%)  | 4(9%)  | 47(100%)  |
| 56-65     | 0(0%)     | 53(95%)  | 3(5%)  | 56(100%)  |
| Total     | 1(0%)     | 213(92%) | 18(8%) | 231(100%) |

Source: Survey data, 2019

According to the above table, most of the respondents have medium knowledge level. The age growth 36-45 have 12% (6) of respondents had high knowledge level than among other age growths. Only in age growth 15-25, 3% (1) of respondents have low knowledge level on snakebite treatment and prevention among 33 respondents of that age range. One point need to consider is energetically participated labor force (persons in the age range 26-35 and 36-45) should have enough understanding level that is high knowledge level in order to form additional protected status.

#### 4.3.10 Relationship between Education and Knowledge level

The relationship between respondent's education and knowledge level are categorized as follow.

**Table (4.11) Relationship between Education and Knowledge level**

| Education              | Knowledge |          |        | Total     |
|------------------------|-----------|----------|--------|-----------|
|                        | Low       | Medium   | High   |           |
| Illiterate             | 1(33%)    | 3(67%)   | 0(0%)  | 4(100%)   |
| Able to read and write | 0(0%)     | 64(97%)  | 2(3%)  | 66(100%)  |
| Primary                | 0(0%)     | 48(87%)  | 7(13%) | 55(100%)  |
| Middle                 | 0(0%)     | 61(90%)  | 7(10%) | 68(100%)  |
| High                   | 0(0%)     | 29(97%)  | 1(3%)  | 30(100%)  |
| University             | 0(0%)     | 8(89%)   | 1(11%) | 9(100%)   |
| Total                  | 1(0%)     | 213(92%) | 17(7%) | 231(100%) |

Source: Survey data, 2019

From table, the majority of respondents' education level are middle school level and 90% of respondents have medium, knowledge level among 68 respondents of that level. Second majority of respondents' education level are able to read and write and 97% of respondents have medium knowledge level among 66 respondents of that level. Low knowledge level on snakebite treatment and prevention are found in illiterate level of 33% .High knowledge level are mostly on primary level of 13% and middle level of 10%. So that this point out education level and knowledge have positive relationship and because Nga Zun Township respondents and all villagers are averagely high in medium education level and low in illiterate level so that the survey result of repondents are high in medium knowledge level and low in low knowledge level. Although knowledge level is not high because of overall education status is not very high but to extend higher knowledge level should be to promote more in education level can surely have positive result.

#### 4.3.11 Relationship between Occupation and Knowledge Level

The knowledge level of respondents are difference depend on their occupation.

**Table (4.12) Relationship between Occupation and Knowledge Level**

| Occupation         | Knowledge |          |        | Total     |
|--------------------|-----------|----------|--------|-----------|
|                    | Low       | Medium   | High   |           |
| Farmers            | 0(0%)     | 128(92%) | 11(8%) | 139(100%) |
| Plantation Workers | 0(0%)     | 34(85%)  | 6(15%) | 40(100%)  |
| Odd job Workers    | 0(0%)     | 30(97%)  | 1(3%)  | 31(100%)  |
| Others             | 1(5%)     | 20(95%)  | 0(0%)  | 21(100%)  |
| Total              | 1(0%)     | 213(92%) | 18(8%) | 231(100%) |

Source: Survey data, 2019

Among 139 respondents of farmers, 128(92%) have medium knowledge level, 11(8%) have high knowledge level. The numbers of other jobs workers 21 are the least proportion among 231 respondents in which, 20 (95%) have medium knowledge level and 1 respondent have low knowledge level. It is found that depend on working atmosphere experiences they have a lot of knowledge and they normally do not make careless manners in their workplace.

#### 4.3.12 Source of Snakebite Prevention Awareness

The sources of snakebite prevention awareness of respondents are shown in the Table (4.13).

**Table(4.13) Source of Snakebite Prevention Awareness**

| Sr.No | Sources of Awareness     | No. of Respondents | Percentage(%) |
|-------|--------------------------|--------------------|---------------|
| 1     | Health Education Section | 28                 | 12            |
| 2     | Poster/Pamphlet/Magazine | 43                 | 19            |
| 3     | Television Program       | 27                 | 12            |
| 4     | Radio Talk               | 9                  | 4             |
| 5     | Word of mouth            | 124                | 54            |
|       | Total                    | 231                | 100           |

Source: Survey data, 2019

In Nga Zun Township, 124 (54%) respondents have awareness by word of mouth. Word of mouth are more effective to get better snakebite prevention awareness in that township.

#### 4.3.13 Attitude on Snakebite Treatment and Prevention

Attitude on snakebite treatment and prevention are shown in the following table.

**Table(4.14) Attitude on Snakebite Treatment and Prevention**

| Attitude Level | No. of Respondents | Percentage(%) |
|----------------|--------------------|---------------|
| Low            | 45                 | 19            |
| High           | 186                | 81            |
| Total          | 231                | 100           |

Source: Survey data, 2019

The attitudes of respondents are categorized only two groups, low attitude and high attitude. According to the table, it can be seen 19% have low attitude and 81% have high attitude.

#### 4.3.14 Relationship between Age Group and Attitude Level

The relationship between respondents' age group and attitude level on snakebite treatment and prevention are shown in the following table.

**Table(4.15) Relationship between Age Group and Attitude Level**

| Age Group | Attitude |          | Total     |
|-----------|----------|----------|-----------|
|           | Low      | High     |           |
| 15-25     | 2(6%)    | 31(94%)  | 33(100%)  |
| 26-35     | 13(30%)  | 31(70%)  | 44(100%)  |
| 36-45     | 8(16%)   | 43(84%)  | 51(100%)  |
| 46-55     | 13(28%)  | 34(72%)  | 47(100%)  |
| 56-65     | 9(16%)   | 47(84%)  | 56(100%)  |
| Total     | 45(19%)  | 186(91%) | 231(100%) |

Source: Survey data, 2019

In the age group of 15-25, 26-35, 36-45, proportion to low attitude are 6%, 30% and 16% respectively. In the age group of 46-55 and 56 to 65, low attitude are 28% and 16%. In rural areas, the older with valuable experiences are in high attitude about such dangerous cases and convey their attitude to younger generation. Therefore, relationship between age and attitude is one of the preventive signs to avoid dangerous events.

#### **4.3.15 Relationship between Education and Attitude**

The relationship between respondents' education and attitude level on snakebite treatment and prevention are shown in the following table.

**Table(4.16) Relationship between Education and Attitude**

| Age Group              | Attitude |          | Total     |
|------------------------|----------|----------|-----------|
|                        | Low      | High     |           |
| Illiterate             | 1(33%)   | 2(67%)   | 3(100%)   |
| Able to read and write | 12(18%)  | 54(82%)  | 66(100%)  |
| Primary school level   | 10(18%)  | 45(82%)  | 55(100%)  |
| Middle school level    | 14(21%)  | 54(79%)  | 68(100%)  |
| High school level      | 6(20%)   | 24(80%)  | 30(100%)  |
| University             | 2(22%)   | 7(78%)   | 9(100%)   |
| Total                  | 45(19%)  | 186(91%) | 231(100%) |

Source: Survey data, 2019

According to the above table, the illiterate level has 33% low attitude and 67% high attitude. Able to read and write level has 18% of respondents have low attitude and 82% of respondents have high attitude. Primary school level has 18% of respondents have low attitude and 82% of respondents have high attitude. Middle school level has 21% have low attitude and 79% have high attitude. High school level has 20% of respondents have low attitude and 80% of respondents have high attitude. At university level has 22% have low attitude and 78% have high attitude. The attitude is not depending on education level it depend on environment and experiences.

#### **4.3.16 Relationship between Occupation and Attitude**

The relationship between respondents' occupation and attitude level on snakebite treatment and prevention are shown in the following table

**Table (4.17) Relationship between Occupation and Attitude**

| Occupation         | Attitude |          | Total     |
|--------------------|----------|----------|-----------|
|                    | Low      | High     |           |
| Famers             | 19(14%)  | 120(86%) | 139(100%) |
| Plantation workers | 13(32%)  | 27(68%)  | 40(100%)  |
| Odd job workers    | 8(26%)   | 23(74%)  | 31(100%)  |
| Others             | 5(24%)   | 16(76%)  | 21(100%)  |

Source: Survey data, 2019

According to the table the high attitude level of farmers, plantation workers, odd job workers and others have 86%,68%,74% and 76% respectively. Low attitude level of farmers, plantation workers, odd job workers and others have 14%,32%,26% and 24% respectively. So that the survey result on occupation and attitude have positive relationship results because the most potential occupation like farmers have high attitude because of their experiences. Like the above, the attitude depends on the experience and occupation environment.

#### **4.3.17 Wrong Attitude of Respondents on Snakebite**

There are a lot of wrong attitude about snakebite cases in rural areas of Myanmar. The results of Nga Zun Township about wrong attitude on snakebite are as following table.

**Table (4.18) Wrong Attitude of Respondents on Snakebite**

| Sr No | Statements                                                                                                             | No of Respondents |          | Total     |
|-------|------------------------------------------------------------------------------------------------------------------------|-------------------|----------|-----------|
|       |                                                                                                                        | NO                | YES      |           |
| 1     | When the snakebite, reciting mantras                                                                                   | 66(29%)           | 165(71%) | 231(100%) |
| 2     | When the snakebite, incision of the wound                                                                              | 108(47%)          | 123(53%) | 231(100%) |
| 3     | When the snakebite, burning the wound                                                                                  | 172(74%)          | 59(25%)  | 231(100%) |
| 4     | When the snakebite, swallowing the tail                                                                                | 132(57%)          | 99(43%)  | 231(100%) |
| 5     | When the snakebite, drinking alcohol                                                                                   | 180(78%)          | 51(22%)  | 231(100%) |
| 6     | There is no danger (envenomation) if the pregnant women was bitten                                                     | 174(75%)          | 57(25%)  | 231(100%) |
| 7     | There is no envenomation if the person had tattoo which is meant for prevention of snakebite                           | 54(23%)           | 177(77%) | 231(100%) |
| 8     | Sucking the wound                                                                                                      | 121(52%)          | 110(48%) | 231(100%) |
| 9     | Pressing and squeezing the wound                                                                                       | 54(23%)           | 177(77%) | 231(100%) |
| 10    | Smaller snakes are not dangerous compare to bigger snakes                                                              | 191(83%)          | 40(17%)  | 231(100%) |
| 11    | If smaller snake bite cases happen no need to cure                                                                     | 204(88%)          | 27(12%)  | 231(100%) |
| 12    | Bite of a snake that far recently bitten and killed another person or one that has been recently fed is less dangerous | 135(58%)          | 96(42%)  | 231(100%) |
| 13    | If the victim without urination should be encourage to take amount of liquid(water)                                    | 86(37%)           | 145(63%) | 231(100%) |
| 14    | There is no envenomation if the victim ate chillis(spicy)                                                              | 113(49%)          | 118(51%) | 231(100%) |

Source: Survey data, 2019

According to the survey data, 71% respondents believe on reciting mantras, 53% believe on incision of the wound, 25% believe on burning the wound, 43% believe on swallowing the tail, 22% believe on drinking alcohol, 25% believe on there is no danger (envenomation) if the pregnant women was bitten, 77% believe on there is no envenomation if the person had tattoo which is meant for prevention of snakebite, 48% believe on sucking the wound, 77% believe on pressing and squeezing the wound, 17% believe smaller snakes are not dangerous compare to bigger snakes, 12% believe on if smaller snake bite cases happen no need to cure, 42% believe on bite of a snake that far recently bitten and killed another person or one that has been recently fed is less dangerous, 63% respondents believe on if the victim without urination should be encourage to take amount of liquid(water), 51% of respondents believe on there is no envenomation if the victim ate chillis(spicy). Therefore, although respondents knowledge level is not bad because the positive effect of respondents education but there is still some weakness in villagers attitude because of generation to generation trusts, culture and traditional. During face to face interview survey, some villagers said their experience of snakebite treatment, they try to use as much as they could to save their life by both traditional and modern ways of treatment to make sure their life is not in danger. They still believe if they use old traditional ways for example eating some kind of grasses in Myanmar name “Pink Ku Htate Paik” to reduce the snake venom and others so many believes. In this way, the use of traditional healing may further delay or complicate necessary biomedical treatment. But it is hard to reduce believes and trusts. Therefore, with the continued use of traditional healing practices, it is important to develop a better understanding of the nature of healing practices, the communities’ reasons for and views about its use, and the interface between traditional and biomedical components of the health system.

#### **4.3.18 Practices of Respondents on Snakebite Prevention**

The proper and improper practices on snakebite prevention of respondents are shown in following table

**Table (4.19) Practices of Respondents on Snakebite Prevention**

| No | Statements                                                      | No of Respondents |          | Total     |
|----|-----------------------------------------------------------------|-------------------|----------|-----------|
|    |                                                                 | YES               | NO       |           |
| 1  | Wear proper shoes or boots when going out and in fields.        | 223(97%)          | 8(3%)    | 231(100%) |
| 2  | Bring the torch, lamp or flash light when going out in the dark | 228(99%)          | 3(1%)    | 231(100%) |
| 3  | Use a stick or making sound when going out.                     | 226(98%)          | 5(2%)    | 231(100%) |
| 4  | Keep the compound free from bushes, rubbish, tall grass.        | 226(98%)          | 5(2%)    | 231(100%) |
| 5  | Keep the domestic animals such dogs, cats and etc.              | 188(81%)          | 43(19%)  | 231(100%) |
| 6  | Offer the guardian spirt of the field                           | 156(68%)          | 74(32%)  | 231(100%) |
| 7  | Check the cot before going to bed                               | 221(96%)          | 10(4%)   | 231(100%) |
| 8  | Tattooing or keeping some powerful traditional things           | 110(48%)          | 121(52%) | 231(100%) |

Source: Survey data

In table(4.19), proper and improper practices on snakebite prevention are categorized by eight statements for respondents. As the result of table, only 3% of respondents don't wear proper shoes or boots when going out and in the field.97% wear proper shoes or boots. The majority of respondents 99% are bring the torch, lamp or flash light when going out in the dark, 98% keep the compound free from brushes, rubbish and tall grass. 81% keep the domestic animals such as dogs, cats and etc. The significant amount of respondents 98% are use a stick or making sound when they going out and 96% check the cot before going to bed. Besides, 48% of respondents are believes on tattooing or keeping some powerful traditional thing that prevent from snakebite and the high amount of respondents 68% are offer the guardian spirit of the field because this is their traditional beliefs. Although the result of practices are mostly good but there are still traditional wrong practices to reduce.

#### 4.3.19 Summarize Results upon Knowledge, Attitude and Practice of the Respondents

The level of respondents' knowledge, attitude and practice on snakebite treatment and prevention are summarizing in Table (4.20).

**Table (4.20) Summarize Results upon Knowledge, Attitude and Practice of the Respondents**

| Sr. | Description                                     | Explanation |                |
|-----|-------------------------------------------------|-------------|----------------|
|     |                                                 | Level       | Percentage (%) |
| 1   | Knowledge on snakebite treatment and prevention | Low         | 0              |
|     |                                                 | Medium      | 92             |
|     |                                                 | High        | 8              |
| 2   | Attitude on snakebite treatment and prevention  | Low         | 19             |
|     |                                                 | High        | 91             |
| 3   | Practice on snakebite treatment                 | Improper    | 8              |
|     |                                                 | Proper      | 92             |

Source: Survey data, 2019

#### 4.3.20 Knowledge on the Snakebite Insurance and Policy

The respondents' concern and knowing on the snakebite insurance ticket and policy are as follow:

**Table (4.21) Knowledge on the Snakebite Insurance and Policy**

| Sr. | Statement                                           | Respondents |          |           |
|-----|-----------------------------------------------------|-------------|----------|-----------|
|     |                                                     | Yes         | No       | Total     |
| 1   | Know about the snakebite insurance ticket or policy | 39(17%)     | 192(83%) | 231(100%) |
| 2   | Snakebite insurance ticket or policy holder         | 4(2%)       | 227(98%) | 231(100%) |

Source: Survey data, 2019

The 192(83%) respondent's do not know the snakebite insurance and policy. 227(98%) don't have snakebite insurance. Consequently, the snakebite insurance and policy are weak in Nga Zun Township.

## **CHAPTER V**

### **CONCLUSION**

#### **5.1 Findings**

This study mainly focuses on villagers who live in rural areas. The results of the survey are to provide highlight on the awareness of snakebite treatment and prevention of villagers and to improve practice on snakebite prevention in rural areas.

When analyzing the socio-demographic characteristics, majority of respondent age were between 56 to 65 years old, 29% of the respondent's education were middle school level and able to read and write level, most of the respondents were farmers 60%. Therefore, the respondents of this targeted area refer to the basic stratum of rural community and their education is somewhat middle and low in present situation.

This study found that the highest cases of snakebite occur in farms or fields where their main function is taken in farming area. And also among three seasons, most of the cases occur in raining season.

According to knowledge level, 92% of respondents are in average knowledge level and this is quite a large amount. So, this average level tends to positive indicators for such kind of community and also acceptable result for each and every villager. When relationship between age and knowledge, it was found that actively participated workforce (persons in the age range 36-45) have sufficient knowledge level high knowledge level) in order to build more secure status. When analyzing about sources of knowledge, most of the respondents 54% were get the knowledge of snakebite treatment and prevention from generation to generation, from family members, their relative, elder person and neighbor. 19% of respondents get knowledge from poster, pamphlet and magazine and etc. Only 4% were getting from radio talk.

In this study, 19% of respondents have low attitude and 81% of respondents have high attitude on snakebite treatment and prevention when ration on the overall attitude. The low attitude and high attitude of respondents are quite different. This may be due to their culture, custom and traditional believes which have been accepted for a long time and influence on their attitude in that area.

Wrong attitudes leading to delay in treatment seeking such as reciting mantras and swallowing the tail of the snake are 71% and 43% respectively. Wrong attitude leading to repaid spread of venom and can lead to death such as incision of wound, burning the wound and alcohols drinking after snakebite are 53%, 25% and 51%. Misbelieves such tattooing can prevent snakebite, there is no danger if pregnant woman was bitten are 77% and 57%. From these finding, proportion of the respondents having wrong attitudes and misbelieves are amazingly large although most of the respondents have the knowledge to wear boots, to consult with health personnel if bitten by snake and ASV is effective. This is because although the respondents know what is right and what should be done, they cannot change their attitude and beliefs already accepted readily. Practice and prevention methods shows that 92% were doing proper practice. It is quite a large amount and only 8% were doing proper practice. But surprisingly, most of the respondents still practice and believes tattooing and keeping some powerful traditional things and offer the guardian spirit of the field by 48% and 68% respectively.

Government provides the snakebite insurance with low price of 500 kyats per person per year for villagers especially for risky people in rural. But, according to this survey, the majority 83% didn't know about the snakebite insurance ticket and only 17% know. And only 2% bought snakebite insurance ticket. It is because the less knowledge and traditional misbelieve.

## **5.2 Recommendation**

The respondent' 60% are farmers that mean prevention and first-aid treatment are very important. According to the survey, the majority of respondents were middle school level and second majority is able to read and write level. Education level is not low compare to others but to upgrade overall knowledge, attitude and practice of snakebite prevention and treatment, the township education level should be develop. Because education influences upon living standard and can be prevent risk and improve critical thinking.

According to the survey, the respondents snakebite knowledge level is medium level and there is only 18 respondents out of 231 were high knowledge level. To upgrade overall safety, a lot of knowledge sharing programs should do in the Nga Zun Township.

The majority of respondents' occupations are on the potential risk of snakebite, so that Township people should have knowledge to differentiate between venomous snake and non-venomous snake. And should have knowledge of the symbols after snakebite occurred because if there are different venomous snakebite so the symbols after snakebite also different. The symbols can guess what kind of snakebite happen. There are some of the farmers who do not do the prevention even know to wear long boots and bring torch and clean brushes and etc. because thinking that it is extra and thinking that it is not comfortable wearing long boots during hot weather. So hope that the knowledge sharing programs can help and persuade a lot of people and a lot of treatment of hospital more easy in the Nga Zun Township.

The villagers think that both traditional and modern treatment can treat snakebite and do wrong practice before going to the hospitals because they have to make sure to prevent envenomation. For example eating some type for leaves or applying some kind of roots before going to hospital and think that to make sure to reduce envenomation. This belief is generation to generation belief. To prevent this, regular occupation is on the potential risk of snakebite persons should be more focus and train detail about snakebite prevention and treatment and with the help of this villagers and knowledge sharing by each other in the village can hopefully reduce this generation to generation wrong beliefs.

There are two types of ASV in Myanmar. They are Freeze-Dried Form and Liquid Form. There are enough ASV liquid form in township hospital and patient don't need to pay the full price of ASV and patient only need to pay they can afford because government support the ASV in that Township. But problem is some of the people don't know because of low knowledge and afraid that if they go to the hospital they think that they have to pay a lot. So some of the people avoid the hospital and go to the traditional healers and occurring delays in receiving proper treatment.

And some of the villages are far away from hospital and delays in receiving proper treatment. To avoid that unfortunate situation, government or NGOs should support enough Freeze-Dried Form of ASV in each village. The advantage of Freeze-Dried form is it can keep in normal temperature so that it is convenient in rural areas which don't have fridge and electricity. By keeping enough Freeze-Dried Form of ASV in each village, patients can treat effectively as soon as snakebite occurred and prevent delay treatment and avoid the traditional healing trust.

Another concern is misbelieve trust in traditional healers about traditional tattooing and believe that if a person has snake venom prevent traditional tattooing even snakebite occur there is no envenomation. The true facts is that tattooing ink include a little bit of snake venom and so if that tattooing person have snakebite occur that person can a little bit look like no envenomation than normal persons. The side effect is that after long term because of snake venom that person suffers nerve pain and destroys kidneys. To solve this problem, there should be knowledge, attitude and practice training about snakebite for traditional healers and support them can reduce misbelieve action.

Myanmar is the agriculture country. Agriculture is a major occupational risk exposing farmers to snakebites. Farmers are mostly bitten in Myanmar. Dominated by rice, agriculture is Myanmar's major industry, accounting for about 40 per cent of GDP and 60 per cent of employment. Rats and mice are attracted to the crops, which in turn attract the snakes. Although the majority of snakebites occur in rural farming areas and many victims seek help from traditional healers rather than through the official health system, data has previously only been collected at major hospitals in Myanmar. Myanmar farmers should wear boots and seek help quickly from health care workers rather than relying on traditional healers could make a significant difference.

This study pointed out the nature of rural villagers in Nga Zun Township and also revealed socio-demographic characters and awareness upon snakebite prevention and first-aid treatment. To change generation to generation misbeliefs is very important and prevention and treatment and their knowledge also important. So that villagers can have safety during working. Based on the findings of the study, recommendation is highlighted to upgrade overall situation of rural areas. The main emphasis in this issue is knowledge, attitude and practice training and sharing programs support by government or NGO or INGO or LNGOs are need to prevent dangerous event in rural areas.

In Myanmar, there are still poor in health care system so that to create overall development of country, health sector play the important role because better health tend to have better overall productivity of country. This survey want to pointed out by rural area health care system and safety knowledge in working life because in Myanmar 70 percent of population are living in rural area. Therefore, by promoting the rural area health care system and safety knowledge in working life can contribute to successful improvement country.

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## **APPENDIX (A)**

### Questionnaires

1. Name
2. Age
3. Sex
4. Education
  - (1) Illiterate
  - (2) Able to read and write
  - (3) Primary school level
  - (4) Middle school level
  - (5) High school level
  - (6) University/College/Graduate
5. Occupation
  - (1) Farmer
  - (2) Plantation worker
  - (3) Fire wood cutter
  - (4) Odd job worker
  - (5) Others
6. Type of nearest health centre
  - (1) Nga Zun Hospital
  - (2) Myo Tharr Hospital
  - (3) Nga Myarr Gyi Hospital
7. Time taken to this centre (in minutes)
8. Mean of transport
  - (1) On foot
  - (2) Cart
  - (3) Bicycle
  - (4) Car
  - (5) Boat
  - (6) Other
9. Type of health care personal
  - (1) Primary health staff by authorized Government
  - (2) Traditional Herbal practitioner

- (3) Traditional Healer
- (4) Non-Government doctor
- (5) Others

11. Is there any case of snakebite in your area?

- (1) Yes
- (2) No

12. At which time of the day does snakebite usually occurs?

- (1) Early morning
- (2) Afternoon
- (3) Evening

13. Where snakebite does usually occurs in your area?

- (1) In the compound
- (2) In the house
- (3) On farm
- (4) While walking along the path
- (5) Others

14. In which season is the snakebite common?

- (1) Rainy
- (2) Summer
- (3) Winter

## APPENDIX (B)

### Knowledge Question

#### 15. Complications of snakebite are

- (a) Shock
  - (1) Yes            (2) No
- (b) Renal Failure
  - (1) Yes            (2) No
- (c) Bleeding disorders
  - (1) Yes            (2) No
- (d) Amputation
  - (1) Yes            (2) No
- (e) Malignant transformation of skin cancer
  - (1) Yes            (2) No
- (f) Death
  - (1) Yes            (2) No

#### 16. Methods of prevention of snakebite are

- (a) To wear proper shoes or boots and long trousers when walking in dark or Undergrowth
  - (1) Yes            (2) No
- (b) To use light (torch, flash light, lamp) when walking at night or in the dark
  - (1) Yes            (2) No
- (c) Making sounds or using a stick when going out especially early morning And in the evening
  - (1) Yes            (2) No
- (d) Keep the compound of house free brushes, tall grass, rubbish heap, etc.
  - (1) Yes            (2) No
- (e) Handel, Threaten, Attack or Trap when you encounter snake
  - (1) Yes            (2) No
- (f) Putting on unprotected hand down a burrow or hole in the ground or of large Trees
  - (1) Yes            (2) No
- (g) Check the cots before you go to bed
  - (1) Yes            (2) No

(h) Keeping cats and dogs at home

(1) Yes            (2) No

(i) To keep eagles, owls, mongoose, peacock which are natural enemies of snakes

(1) Yes            (2) No

17. When the snakebites, following should be done

(a) Reciting mantras

(1) Yes            (2) No

(b) Incision of wound

(1) Yes            (2) No

(c) Pressing and squeezing

(1) Yes            (2) No

(d) Burn with flam

(1) Yes            (2) No

(f) Local pad compression

(1) Yes            (2) No

(g) Tight tourniquet application

(1) Yes            (2) No

(h) Alcohol drinking

(1) Yes            (2) No

(i) Swallowing of snake tail

(1) Yes            (2) No

(j) Application of local remedies

(1) Yes            (2) No

(k) Wash with available water

(1) Yes            (2) No

(l) Immobilization of affected limb

(1) Yes            (2) No

(m) Transport to nearest health center and hospital as early as possible

(1) Yes            (2) No

## APPENDIX (C)

### Attitude Question

18. Snakebite is fatal

- (1) Yes            (2) No

19. Is snakebite preventable?

- (1) Yes            (2) No

20. Smaller snakes are less dangerous than larger ones of same species

- (1) Yes            (2) No

21. So, bite by small snakes does not need any treatment

- (1) Yes            (2) No

22. Bite of a snake that far recently bitten and killed another person or one that has been recently fed is less dangerous

- (1) Yes            (2) No

23. There is no danger (envenomation) if the pregnant women were bitten

- (1) Yes            (2) No

24. There is no envenomation if the person had tattoo which is meant for prevention of snakebite

- (1) Yes            (2) No

25. There is no danger if the victim was bitten by second time

- (1) Yes            (2) No

26. If the person wears protective boots during working in the field, the guardian Spirits of the field are disappointed

- (1) Yes            (2) No

27. The victim without urination should be encouraged to take large amount Liquid (water)

- (1) Yes            (2) No

28. There is no envenomation if the victim ate chillis (spicy)

- (1) Yes            (2) No

29. First aid treatment should be trained to farmers

- (1) Yes            (2) No

30. Protective footwear should be trained to farmers

- (1) Yes            (2) No

31. If there is snakebite case

- (a) Should consult with traditional healers
    - (1) Yes            (2) No
  - (b) Should consult with traditional practitioner
    - (1) Yes            (2) No
  - (c) Should consult with health personnel
    - (1) Yes            (2) No
  - (d) No treatment is necessary
    - (1) Yes            (2) No
  - (e) After first-aid treatment finish, go to the nearest hospital as soon as possible.
    - (1) Yes            (2) No
  - (f) The patient can go to the hospital by himself/herself such as walking.
    - (1) Yes            (2) No
  - (g) Bitten part should be immobilized.
    - (1) Yes            (2) No
  - (h) Only treatment with ASV is effective.
    - (1) Yes            (2) No
32. Where do you know the snakebite prevention and first aid treatment?
- (1) Health care school
  - (2) Magazine, Journal, Newspaper, Pamphlets and etc.
  - (3) TV
  - (4) Radio
  - (5) Telling each other

## APPENDIX (D)

### Prevention Questions

33. Methods of prevention of snakebite are

(a) To wear proper shoes or boots and long trousers when walking in dark or

Undergrowth

(1) Yes            (2) No

(b) To use light (torch, flash light, lamp) when walking at night or in the dark

(1) Yes            (2) No

(c) Making sounds or using a stick when going out especially early morning

And in the evening

(1) Yes            (2) No

(d) Keep the compound of house free brushes, tall grass, rubbish heap, etc.

(1) Yes            (2) No

(e) Handel, Threaten, Attack or Trap when you encounter snake

(1) Yes            (2) No

## APPENDIX (E)

### Practice Questions

34. Methods of prevention of snakebite are

(a) To wear proper shoes or boots and long trousers when walking in dark or Undergrowth

(1) Yes (2) No

(b) To use light (torch, flash light, lamp) when walking at night or in the dark

(1) Yes (2) No

(c) Making sounds or using a stick when going out especially early morning And in the evening

(1) Yes (2) No

(d) Keep the compound of house free brushes, tall grass, rubbish heap, etc.

(1) Yes (2) No

(e) Handel, Threaten, Attack or Trap when you encounter snake

(1) Yes (2) No

(f) Offer the guardian spirit of the field

(1) Yes (2) No

(g) Check the cots before you go to bed

(1) Yes (2) No

(h) Tattooing or keeping some powerful traditional thing

(1) Yes (2) No

### Snakebite insurance knowledge Question

35. Do you know the snakebite insurance?

(1) Yes (2) No

37. According to the environment snakebite insurance can be effect the income?

(1) Agree

(2) Not Agree

(3) Don't Know

37. Do you have snakebite insurance?

(1) Yes (2) No

## APPENDIX (F)

Score for knowledge, Attitude and Practice used in Medical Research

|    |                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------|
| 1. | <b><u>Scores for Knowledge questions</u></b><br>Minimum Score=0<br>Maximum Score=23<br>Low<8<br>Medium 9 to 17<br>High>17 |
| 2. | <b><u>Score for Attitude questions</u></b><br>Minimum Score=0<br>Maximum Score=25<br>Low<12<br>High>12                    |
| 3. | <b><u>Score for Practice question</u></b><br>Minimum Score=0<br>Maximum Score=8<br>Improper<5<br>Proper>5                 |

Source: Thesis, M Med Sc (Public Health), University of Medicine 2, Yangon