

**AWARENESS AND PERCEPTION OF FIRST AID MEASURES OF SNAKEBITE  
AMONG VETERINARY STUDENTS IN MALAYSIA**

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## CERTIFICATION

This is to certify that we have read this research paper entitled '**Awareness and Perception of First Aid Measures of Snakebites Among Veterinary Students in Malaysia**' by Mohammad Firdaus Bin Herman, and in our opinion, it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course DVT55204 – Research Project.



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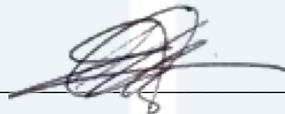
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Dear Respondents

Everyone

**THANK YOU**

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## DEDICATIONS

I write my dissertation as a tribute to my numerous friends and family. My loving parents, whose words of support and encouragement to keep going, deserve to be thanked.

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## ABBREVIATIONS

| ABBREVIATIONS | DEFINITION   |
|---------------|--|
| UMK           | Universiti Malaysia Kelantan   |
| UPM           | Universiti Putra Malaysia  |
| DVM           | Doctor of Veterinary Medicine.<br><i>Refers to undergraduates veterinary<br/>medicine students</i> |
| FPV           | Faculty of Veterinary Medicine   |

## ABSTRACT

An abstract of the research paper presented to the Faculty of Veterinary Medicine, Universiti Malaysia Kelantan, in partial requirement on the course DVT55204 – Research Project.

**Abstract:** A proper application of first aid measures in snakebite cases helps to reduce the spreading of systemic toxicity. This study aims to capture the awareness and perception of veterinary students in Malaysia regarding first aid measures of snakebites. A cross-sectional study was conducted among veterinary students in Malaysia from both veterinary schools (FPV UMK and FPV UPM). A self-administered online questionnaire was provided for 14 days (two weeks). A hundred and fifty -seven (157) respondent was recorded, and the data was collected from first year (DVM 1) to final year (DVM 5) veterinary students. Data were analysed by using Microsoft Excel and RStudio software for the relationship between respondents' demographic and their awareness and perception towards first aid measures of snakebite. The study concludes that the majority of the veterinary students (n= 122; 77.71%) are aware of first aid measures for snakebite cases. More than half of the veterinary students (n= 94; 59.87%) have a positive perception of first aid measures of snakebites. However, the notion of improper methods of first aid measures for snakebites appears to be a common find among veterinary students in Malaysia.

**Keywords:** Snakebite, First aid, Students, Veterinary, Awareness, Malaysia

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## ABSTRAK

**Abstrak:** Rawatan pertolongan cemas yang baik bagi kes gigitan ular dapat membantu mengurangkan penyebaran toksin ke dalam tubuh badan. Kajian ini dilaksanakan dengan tujuan menilai tahap kesedaran dan persepsi pelajar perubatan veterinar di Malaysia berkenaan langkah-langkah pertolongan cemas akibat patukan ular. Kajian keratan lintang dijalankan diantara pelajar perubatan veterinar di Malaysia dari kedua-dua Fakulti Perubatan Veterinar (FPV UMK dan FPV UPM). Soal selidik isi sendiri telah disebarakan selama tempoh 14 hari (dua minggu). Sebanyak 157 data responden telah dikumpul, bermula dari pelajar tahun pertama (DVM 1) hingga pelajar tahun akhir (DVM5). Data dianalisa menggunakan aplikasi Microsoft Excel dan Rstudio bagi tujuan penganalisan hubungan diantara pembolehubah demografi dan kesedaran serta persepsi terhadap langkah-langkah pertolongan cemas akibat patukan ular. Kajian ini menyimpulkan bahawa sebahagian besar pelajar perubatan veterinar (n= 122; 77.71%) mempunyai kesedaran terhadap langkah pertolongan cemas bagi kes patukan ular. Rata-rata pelajar perubatan veterinar dikatakan mempunyai persepsi positif (n= 94; 59.87%) terhadap langkah-langkah pertolongan cemas bagi kes patukan ular. Namun begitu, teknik yang salah bagi langkah-langkah pertolongan cemas terhadap kes patukan ular masih dikira sebagai kebiasaan dalam kalangan pelajar perubatan veterinar.

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## 1.0 INTRODUCTION

Malaysia is a tropical country and is home to hundreds of snake species. About 36 known snakes in Malaysia are considered medically significant (Ismail et al., 2022). Both humans and animals are equally exposed to the dangers of snakebites. Snakebite cases in animals are considered to be underreported, with a study in Nepal revealing an incidence of 42 – 2002 per 100,000 domestic animals (Alcoba et al., 2022); meanwhile, in humans, about 400 – 650 snakebite cases are reported per year for every 100,000 human population in Malaysia (Ismail, 2015).

Snakebites can be caused by either venomous or non-venomous snakes. A proper first aid measure is crucial in ensuring patient survival in cases of snake envenomation as appropriate first aid administration helps slow down the spread of venom in the body (Barnes & Trueta, 1941; Parker-Cote & Meggs, 2018). Thus adequate and appropriate knowledge of snakebite first aid is vital for the general public (Beeson et al., 2021).

Various methods of first aid measures for snakebites have been passed down and portrayed throughout the years, including lancing and suctioning the affected site, placing tourniquets, and ice or warm pack applications (Peterson, 2020; Watt, 2020). However, these measures have yet to prove their positive contributions toward the outcome of snakebites. Some of the methods mentioned are proven to be contraindicated due to their harmful effect (World Health Organization, 2010; Fry, 2018; Peterson, 2020). First aid measures for snakebite cases should be immobilising the bitten area and immediately transporting the victim to a medical facility (World Health Organization, 2010; Ismail, 2015). Even so, first aid measures are crucial, especially in Malaysia, where only a few veterinary facilities operate 24 hours. This is to increase the patient's survivability even with delayed medical intervention (Parker-Cote & Meggs, 2018).

Veterinarians are expected to grasp the fundamentals of first aid for snakebites; however, due to the lack of emphasis on first aid measures of snakebites in the curriculum, there may be discrepancies in the methods applied by these veterinarians. Hence, a study that could gauge their understanding as well as their perceptions towards available first aid measures of snakebite cases may help identify any discrepancies in the approach to snakebite's first aid

measure. The data collected may help future curriculum planning specifically regarding first aid measures approach to snakebite cases.

### **1.1 Problem Statement**

The lack of emphasis on adequate first aid for snakebites may lead to disparities in how individuals provide first aid to snakebites. These disparities in the methods of their first aid measures may also include incorporating wrong first aid measures, which may bring more harm than benefits. Currently, no studies have been conducted to assess Malaysian veterinarians or veterinary students regarding their understanding of a proper first aid measure for snakebite cases. This study aims to determine the awareness and perception of veterinary students in Malaysia regarding first aid measures of snakebites. The data collected is vital in assessing the understanding of these veterinary undergraduates regarding proper first aid measures of snakebite cases and their perception of some of the available first aid measures.

### **1.2 Research Question**

- i. What is the level of awareness of veterinary students in Malaysia on first aid measures of snakebites?
- ii. What are the perceptions of veterinary students in Malaysia towards known first aid measures of snakebites?
- iii. Do veterinary students in Malaysia know that some methods are contraindicated as a first aid measure of snakebites?

### **1.3 Research Hypothesis**

- H<sub>01</sub>: Clinical year veterinary students and preclinical year veterinary students have the same awareness on first aid measures of snakebite.
- H<sub>A1</sub>: Clinical year veterinary students are more aware of first aid measures of snakebites than Preclinical year veterinary students.
- H<sub>02</sub>: Veterinary students in Malaysia have a negative perception towards the available first aid measures of snakebites.
- H<sub>A2</sub>: Veterinary students in Malaysia have a positive perception towards the available first aid measures of snakebites.
- H<sub>03</sub>: Veterinary Students in Malaysia do not know that some methods are contraindicated as a first aid measures of snakebites

H<sub>A3</sub>: Veterinary students in Malaysia knows that some method are contraindicated as a first aid measures of snakebites

#### 1.4 Research Objective

- i. To determine the awareness of veterinary students in Malaysia regarding first aid measures of snakebites.
- ii. To assess the perceptions of veterinary students in Malaysia towards available first aid measures of snakebites.
- iii. To assess whether veterinary students in Malaysia know that some of the first aid measures are contraindicated.



## **2.0 LITERATURE REVIEW**

### **2.1 Snake Venoms**

Venom is a complex substance composed of proteins and peptides, produced by a living organism in a specialised gland, typically introduced into organisms via parenteral application using a specific apparatus such as a fang, teeth, or nematocytes (Fox & Serrano, 2007; Ismail, 2015). Venom is utilised largely to subdue and digest prey, as well as for self-defense (Wüster & Arbuckle, 2020) and at a certain dose, it is harmful to humans and animals (Ismail, 2015). Snake venoms can be categorised based on their effects on living organisms; cardiotoxin, myotoxin, and neurotoxin (Ministry of Health Malaysia, 2017). Due to its large molecular weight, many researchers agree that venom circulates in the body through the lymphatic system (Barnes & Trueta, 1941; Ismail, 2015; Fry, 2018; Parker-Cote & Meggs, 2018). However, damaged vasculature due to the mechanical effects of biting action may hasten the spread of venoms (Ismail, 2015). A study in 1941 compares rabbits with ligated lymphatic channels and a control group (no ligation) shows that the rabbits with ligation on the lymphatic channel survive longer compared to the control group when challenged with a tiger snake venom's (Barnes & Trueta, 1941). Another study in rats reveals that snake venom enters the circulation directly through the vascular system, a process assisted by lymphatic transport but not dependent on it (Helden et al., 2019).

### **2.2 Snakebite Cases in Malaysia**

Currently, there is a paucity of data presentation on snakebite incidence, morbidity and mortality in Malaysia, as well as literature on snakebite epidemiology. The three most recent epidemiological studies regarding snakebites in humans in Malaysia were published in 2004, 2006, and 2011 (Ministry of Health Malaysia, 2017). According to the Ministry of Health Malaysia (2017), the number of snakebite cases in humans in 2010, 2012 and 2014 was 3,658, 2,612 and 3,006 snakebite cases respectively, and Kedah has the highest case number, followed by Perak. However, no epidemiological statistics on snakebites in animals in Malaysia have been published.

### **2.3 Appropriate First Aid Measures for Snakebites**

First aid is one of the crucial steps in snakebite management and must be carried out immediately or very soon after the bite occurs (World Health Organization, 2010). The general recommendation for first aid in cases of snakebites is first to calm the victim, followed by moving the victim to a safe location, reduce the victim's movement and immobilise the bitten area; if the necessary equipment is available, a pressure immobilisation bandage can be administered (World Health Organization, 2010; Ismail, 2015; Parker-Cote & Meggs, 2018). The victim should be transported immediately to treatment facilities without delay (Gwaltney-Brant, 2022). The snake should also be identified to allow appropriate treatment (e.g. selection of antivenom for administration) to be carried out. An attempt to identify the snake should be made by taking photos of the snake, while attempting to kill the snake or handling the snake with bare hands is considered dangerous and should be discouraged (World Health Organization, 2010). A similar approach is applicable to animals. However, immobilising the animal can be challenging to perform; thus, rapid transport to a veterinary hospital is the best option (Peterson, 2020). If immobilisation can be done safely, the bitten area should be kept at or below the heart level (Gfeller et al., 2018). Some veterinarians suggest to disregard first aid treatment altogether and immediately bringing the victim to veterinary hospitals (Gwaltney-Brant, 2022).

### **2.4 Harmful Practice and Disproved Methods of First Aid Measures**

Traditional and popularised first aid measures of snake bite usually includes the use of a tourniquet, sucking the venom from the bite wound, wound lancing, ice or warm packing, and the use of traditional herbs are not effective and can bring more harm than good (World Health Organization, 2010; Peterson, 2020). Tourniquet application as a first aid measure for snakebite is one of the more well-known measures; however, the application of a tourniquet can be very painful and facilitate the dissemination of venom locally, causing more tissue destruction (Fry, 2018; Peterson, 2020; Watt, 2020). An inappropriate tourniquet technique can impede venous and arterial blood flow, which can lead to ischemia, and gangrene (Fry, 2018; Parker-Cote & Meggs, 2018)

## 2.5 Awareness of First Aid Measures for Snakebites

Several studies were conducted to assess the knowledge or awareness regarding first aid measures for snakebites, with most of the studies targeting medical professionals or students. A cross-sectional study conducted in Nigeria among medical professionals reveals that 283 respondents (75.7%) out of 374 total respondents have adequate knowledge (Michael et al., 2018). A study conducted to assess the knowledge of first aid methods among medical students in Gandaki Medical College, Nepal, reveals that only 29 (12.6%) preclinical students respondents (Year 1 – 3) and 49 (69%) clinical students respondents (Year 4 & 5) from the total of 302 respondents are considered to have adequate knowledge (Subedi et al., 2018). A recent study conducted, amongst medical students in 3<sup>rd</sup> year and above from Jazan University, Saudi Arabia, reveals that more than 90% of the students were aware of the essential first aid (Alqahtani et al., 2022). Both Subedi et al. (2018) and Alqahtani et al. (2022) reported that a more significant part of the respondents responded incorrectly to a question related to tourniquet application.

## 3.0 MATERIALS AND METHODS

The study was designed to assess the awareness of first aid measures of snakebites, as well as perceptions towards first aid measures for snakebites among veterinary students in Malaysia. Only two veterinary schools in Malaysia are offering Doctor of Veterinary Medicine (DVM), Fakulti Perubatan Veterinar (FPV), Universiti Malaysia Kelantan (UMK) and Fakulti Perubatan Veterinar (FPV), Universiti Putra Malaysia (UPM). As such, this study will only incorporate veterinary students from these two veterinary schools.

### 3.1 Study Population

The study population consists of undergraduates veterinary students (DVM) from FPV UMK and FPV UPM. This study involves Year 1 to Year 5 undergraduates' veterinary students, commonly referred to as DVM 1 to DVM 5. These students are divided into pre-clinical and clinical students. Pre-clinical students consist of DVM 1, DVM 2, and DVM 3, while clinical year students are from DVM 4 and DVM 5. The Faculty of Veterinary Medicine assigns DVM 3 students as para-clinical years; however, throughout the duration of the study being conducted, these students have yet to undergo their Clinical Practice (commonly referred to as

Clinical Rotation). As such, this study assigned DVM 3 students as part of the pre-clinical years.

### **3.2 Selection Criteria**

Respondents consist of only undergraduate veterinary students studying Doctor of Veterinary Medicine from UMK or UPM who are willing to participate and consent to participate in the study. Respondents must also have their means to access the self-administered online questionnaire.

#### **3.2.1 Inclusion Criteria**

Respondents must be undergraduate DVM students from either UMK or UPM who already started and are still undergoing their DVM program at any point during the period of this study being conducted.

#### **3.2.2 Exclusion Criteria**

The respondents are excluded if they have graduated or were expelled from the undergraduate study program at any point during the study being conducted. Respondents involved in pre-testing the questionnaire would also be excluded from the study.

### **3.3 Study Questionnaire**

The items in the questionnaire were designed to capture and assess the respondent's awareness of first aid measures for snake bite cases, which is based on the Guidelines for the Management of Snake-bites (World Health Organization) along with Snakebite: First Aid (Gfeller et al., 2018) and other references (Ismail, 2015; Parker-Cote & Meggs, 2018; Peterson, 2020; Gwaltney-Brant, 2022). A total of 32 items were prepared and divided into four sections, each collecting different data sets.

The first section consists of five questions regarding the demographic characteristics of the respondents (gender, current year of study, attending veterinary school, and state of origin).

The second section was a close-ended multiple-choice question about the respondents' previous encounters with snakebites, first aid administration due to snakebites, as well as their source of knowledge regarding snakebite management.

The third section was related to respondents' awareness of first aid measures of snakebites. There are eleven questions in which each question for this section was a close-ended ("Yes" /

“No”). Marks were awarded based on respondents' answers. Correct answers to a question will be awarded one (1) mark, while wrong answers are given zero (0) marks.

The fourth section related respondents' perception of first aid measures in snakebite cases. A five-point Likert scale was used for the respondents to state their agreement or disagreement (“Strongly Disagree” – “Strongly Agree”) on a given statement related to first aid measures of snakebite.

The items in the questionnaire have been tested and validated by the faculty’s epidemiologist and other academicians with related expertise.

### **3.4 Data Collection**

The data was collected from veterinary students in Malaysia through a questionnaire from 28<sup>th</sup> November until 12<sup>th</sup> December 2022 (14 days). The questionnaire was designed, administered and collected through Google Forms, an online survey administration software. Convenience sampling was employed to recruit participants in this study. The online questionnaire link was shared through various groups within FPV UMK, student association (email) and personal connections for FPV UPM.

Respondents were made aware of the study's context and objectives at the beginning of the questionnaire. Aside from that, consent statements regarding the data usage acquired from the questionnaire were also emphasised on the first page of the questionnaire. In addition, the respondents were assured that their responses (mainly personal data) would be kept strictly confidential and that the data collected would only be utilised for the completion of the study and data presentation in academic journal/s and/or conference/s.

### **3.5 Data Analysis**

The raw data collected through Google Forms were first transferred to Microsoft Excel. The further analysis of these data was done by using RStudio. The awareness categorisation was adapted from a previous study, and the respondents were categorised as ‘aware’ of first aid measures of snakebite if they managed to score at least 70% (score of eight and above), while respondents were categorised as ‘unaware’ if they scored less than 70% (score of 7 and below) (Michael et al., 2018; Subedi et al., 2018). Similar categorisation methods were adapted for perception categorisation. The respondent’s perception was categorised as “Positive” or “Negative” based on their score (Positive  $\geq 70.00\%$ ,  $\geq 35$  points; Negative  $< 70.00\%$ ,  $< 35$  points). Pearson’s Chi-square test was used to determine the significance of the association between variables.

## 4.0 RESULTS

### 4.1 Respondent's Demographic

A total of 161 response data out of 787 (20.46%) DVM students in Malaysia during the period when this study was collected. Four of the respondents' responses were excluded as they participated in testing the questionnaire (one of the exclusion criteria). Hence, 157 (19.95%) participated as a respondent during the study.

**Table 1**  
*Respondent's Demographic*

| Variables         | Number | Percentage (%) |
|-------------------|--------|----------------|
| Gender            |        |                |
| Male              | 60     | 38.00          |
| Female            | 97     | 62.00          |
| Level             |        |                |
| Preclinical       | 90     | 57.00          |
| Clinical          | 67     | 43.00          |
| Community         |        |                |
| Urban             | 103    | 65.60          |
| Rural             | 54     | 34.40          |
| Veterinary School |        |                |
| FPV UMK           | 108    | 69.00          |
| FPV UPM           | 49     | 31.00          |

*Note:* Total number of respondents n= 157

As stated in **Table 1**, the majority of the respondents were female (n= 97, 62%). More than half of the respondents describe their hometown as an urban area (n= 103, 65.60%). There were minute differences between the total respondent of pre-clinical (n= 90, 57%) and clinical year (n= 67, 43%). Year 1 students being the majority (n= 46, 29%), followed by Year 5 students, 38 (24%) respondents. The majority of the respondents are from FPV UMK (108; 69%), whereas 31% of respondents from FPV UPM.

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## 4.2 Respondent's Exposure Towards Snakebite Cases and First Aid Related

### Information

Based on the survey, as tabulated in **Table 2**, among the 157 respondents, the majority (n=130, 80.70%) of the respondents have never encountered any snakebite cases. Only 19.30% (n= 31) have encountered snakebite cases. Among those respondents that have encountered snakebite cases, about 48.40% (n= 15) respondents have encountered at least two to three snakebite cases, while 35.50% (n= 11) have only encountered it once.

**Table 2**  
*Respondent's Exposure Towards Snakebite Cases*

| Questions  | Responses                |                             |                            |
|--|--------------------------|-----------------------------|----------------------------|
| Have you ever encountered snakebite cases, regardless of whether it occurs in animal or human? | Yes<br>31<br>(19.30%)    | No<br>130<br>(80.70%)       |                            |
| *How many times have you encountered snakebite cases?  | 1 Case<br>11<br>(35.50%) | 2-3 Cases<br>15<br>(48.40%) | > 3 cases<br>5<br>(16.10%) |
| *Did you managed to apply or watch someone apply first aid measure/s in any of those cases?    | Yes<br>17<br>(54.80%)    | No<br>14<br>(45.20%)        |                            |

*Note: "\*" Indicates that the question only made available when respondent answered 'Yes'.*

The rest of the respondents (n= 5; 16.10%) have encountered more than three cases. Among 157 respondents, 70.20% (n= 113) respondents have at least been exposed to first aid measures in snakebite cases. These findings are tabulated in **Table 3**. Two sets of question (selection of multiple answers) was queried among those 113 respondents. For first set, respondent's information regarding snakebite and first aid, majority of respondents (n= 80; 70.80%) state their source of information from Social media and internet blogs. Drama, movies, cartoons, and comics were the second highest source of information regarding snakebite and first aid with 64 respondents (56.64%). Books, journal articles, conferences, and seminars came in third place amongst respondent's source of information for snakebite and first aid with 55 respondents. Only 8.32% (n= 32) respondents stated friends, family members, or strangers as one of their source of information. **Figure 1** summarised the finding from these 113 respondents. .

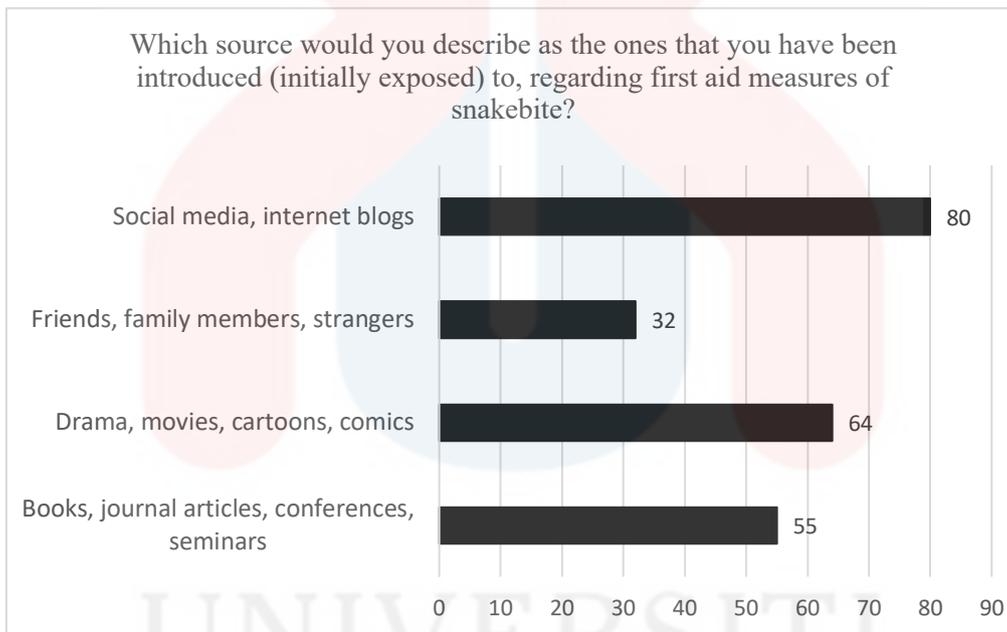
**Table 3**  
*Respondent's Exposure Towards Snakebite & First Aid Related Information*

| Questions   | Responses       |                |
|---|-----------------|----------------|
|   | Yes (%)         | No (%)         |
| Have you ever been exposed to, read or heard about first aid steps/measures in a case of a snakebite (either in human or animal)? | 113<br>(70.20%) | 48<br>(28.80%) |

*Note:* Respondents that answered 'Yes' will be presented with two other questions.

**Figure 1**

*Respondent's Source of Information Regarding Snakebite & First Aid*



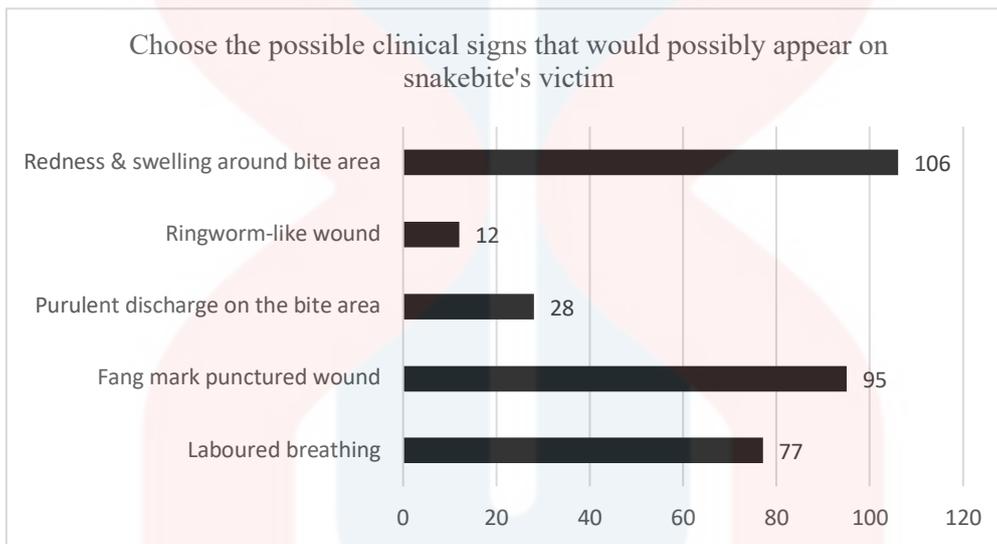
*Note:* This question will only be presented if the respondent answered 'Yes' for question on Table 3. Respondents are allowed to select more than one options.



Meanwhile the second set tested respondent’s knowledge of possible clinical signs of snakebite and majority of them managed to pick the suitable answer; however a few respondents answered ringworm-like wound (n= 12) and purulent discharge on the bite area (n= 28), which are not the possible signs of snakebite. These findings are summarised in **Figure 2**.

**Figure 2**

*Respondent's Knowledge of Possible Clinical Signs of Snakebite*



*Note:* This question will only be presented if the respondent answered ‘Yes’ for question on Table 3. Respondents are allowed to select more than one options.

**4.3 Respondent’s Awareness of First Aid Measures of Snakebite2**

**Table 4**

*Respondent's Awareness of first aid measures of snakebite*

| Variables                     | Number | Percentage % |
|-------------------------------|--------|--------------|
| <b>Respondent’s Awareness</b> |        |              |
| Aware                         | 122    | 77.71        |
| Unaware                       | 35     | 22.29        |

*Note:* Overall respondent’s awareness are categorised based on their score.

Aware ≥ 70% score (≥ 8 points)

Unaware < 70% score (≤ 7 points)

A total of 122 (77.71%) respondents from the 157 total respondents managed to score 70% and above (≥ 8 points) while 35 (22.29%) of the respondents scored below 70% (≤7 points). From this data, it was concluded that 77.71% of the veterinary students in Malaysia were aware of the first aid measures to snakebite with median score of 8 (n= 52 , 52%) as depicted by **Table 4**. Overview of respondent responses can be seen in **Table 5**.

**Table 5**  
*Awareness of First Aid Measures of Snakebite*

| Statement   | Responses |        |
|---|-----------|--------|
|   | Yes %     | No %   |
| I should suck the venom out by using mouth or suction device around the bite area   | 38.22     | 61.78* |
| I should apply tourniquet or tight bands proximal to the bite area  | 77.71     | 22.29* |
| I should try to reduce and/or restrict the victim's movement (If a cat was bitten by a venomous snake, put it in small enclosure such as pet carrier or restrain the cat) | 92.99*    | 7.01   |
| I should bring the victim to appropriate medical / veterinary hospital as soon as possible to get appropriate treatment   | 99.40*    | 0.60   |
| I should puncture or make an incision on the bite area  | 13.70     | 86.30* |
| I should try to remove the victim from the snake's striking zone  | 88.20*    | 11.80  |
| I should keep the bite wound at, or below the heart level   | 80.70*    | 19.30  |
| I should apply ice packs on the bite area   | 49.10     | 50.90* |
| All snakes that bite are venomous   | 2.50      | 97.50* |
| I should feed food and water to the victim  | 29.20     | 70.80* |
| I should try to identify the snake  | 93.80*    | 6.20   |

*Note:* The correct answers are marked by '\*'. Each respondents that managed to get correct answer were awarded with 1 point (total of maximum 11 points).

From **Table 5**, only 22.29% of the respondents were able to correctly answer the question related to tourniquet usage. About half of the respondents managed to answer question regarding usage of ice packs correctly. Aside from these two question, more than quarter of the respondent managed to choose the correct answer.

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#### 4.4 Respondent's Perception of First Aid Measures of Snakebite

**Table 6**  
*Respondent's Perception of First Aid Measures of Snakebite*

| Variables                      | Number | Percentage % |
|--------------------------------|--------|--------------|
| <b>Respondent's Perception</b> |        |              |
| Positive                       | 94     | 59.87        |
| Negative                       | 63     | 40.13        |

*Note:* Overall respondent's perception are categorised based on their score.  
Positive  $\geq 70\%$  score ( $\geq 35$  points)  
Negative  $< 70\%$  score ( $< 35$  points)

A total of 94 (59.87%) respondents from the 157 total respondents managed to score 70% and above ( $\geq 35$  points), while 63 respondents scored below 70% ( $< 35$  points). From this data, as depicted by **Table 6**, it was concluded that 59.87% of the veterinary students in Malaysia have positive perception towards first aid measures of snakebite, while 40.13% veterinary students have negative perception towards first aid measures of snakebite.

**Table 7** displays the responses towards first aid measures of snakebites. Some of the question contains negative connotation and the scores were reversed for calculation purpose. The majority of respondents (strongly-) agree with the use of tourniquets, while only 13.10% of respondents (strongly-) disagree and 10.60% of respondents were neutral towards the use of tourniquets. The majority of respondents (strongly-) disagree with the assertion that killing snakes is an effective method for snake identification, whilst about 25.50% of respondents were neutral on the issue.

**Table 7**  
*Perception of Respondents Towards Available First Aid Measures of Snakebite*

| Statement   | Responses %       |          |         |       |                |
|---|-------------------|----------|---------|-------|----------------|
|   | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| *Tourniquet application is important in first aid measures of snakebite to reduce the risk of mortality   | 5.60              | 7.50     | 10.60   | 27.30 | 49.10          |
| *Application of suction on bite area in first aid measures of snakebite helps to improve chance of survival   | 16.80             | 14.90    | 20.50   | 26.70 | 21.10          |
| The best form of first aid in small animal is to restrict the movement, keep the bite area at or below the heart level, and immediately transport the animal to nearest veterinary clinic to get treatment. | 0.60              | 0.60     | 5.60    | 20.50 | 72.70          |
| *Killing the snake and bring it to the hospital is a great way to identify the snake  | 30.40             | 19.90    | 25.50   | 11.80 | 12.40          |
| Application of appropriate first aid measures in cases of snakebites in animal helps to reduce the risk of mortality when there is no immediate access to veterinary care                                   | 0.60              | 0        | 6.80    | 32.30 | 60.20          |
| *Application of first aid measures in cases of snakebites are beneficial even when the application is incorrect   | 27.30             | 32.90    | 24.80   | 9.90  | 5.00           |
| *Application of first aid measures is one of the definitive treatments for snakebite  | 4.30              | 11.80    | 30.40   | 37.30 | 16.11          |
| *What is commonly portrayed in movies and television shows on first aid application in cases of snakebites is often correct and educational   | 19.30             | 21.10    | 39.80   | 12.40 | 7.50           |
| Application of first aid measures should be carried out by assuming every snakebites are venomous snakebites until proven otherwise   | 1.20              | 4.30     | 15.50   | 36.00 | 42.90          |
| First aid application in cases of snakebites is only a temporary measure, and the victim should get immediate treatment   | 0.60              | 1.90     | 3.10    | 12.40 | 82.00          |

*Note:* The score for ‘\*’ are reversed for calculation purpose; however the data presented still shows respondents very own stance.

#### 4.5 Relationship Between Respondent's Demographic, and Awareness and Perception of First Aid Measures of Snakebite

**Table 8**  
*Cross-tabulation between Respondent's Demographic and Awareness*

| Variables                | Number | Percentage %<br>(Overall %)* | (Chi-square)<br>$\chi^2$ . | p-Value      |
|--------------------------|--------|------------------------------|----------------------------|--------------|
| <b>Level of Study</b>    |        |                              |                            |              |
| Preclinical              |        |                              |                            |              |
| Aware                    | 69     | 76.67 (43.95)                |                            |              |
| Unaware                  | 21     | 23.33 (13.38)                | 0.0286                     | $p = 0.8657$ |
| Clinical                 |        |                              |                            |              |
| Aware                    | 53     | 79.10 (33.76)                |                            |              |
| Unaware                  | 14     | 20.90 (8.92)                 |                            |              |
| <b>Gender</b>            |        |                              |                            |              |
| Male                     |        |                              |                            |              |
| Aware                    | 46     | 76.67 (29.30)                |                            |              |
| Unaware                  | 14     | 23.33 (8.92)                 | 0.0024                     | $p = 0.9609$ |
| Female                   |        |                              |                            |              |
| Aware                    | 76     | 78.35 (48.41)                |                            |              |
| Unaware                  | 21     | 21.65 (13.37)                |                            |              |
| <b>Community</b>         |        |                              |                            |              |
| Urban                    |        |                              |                            |              |
| Aware                    | 76     | 73.79 (48.41)                |                            |              |
| Unaware                  | 27     | 26.21 (17.20)                | 2.0399                     | $p = 0.1532$ |
| Rural                    |        |                              |                            |              |
| Aware                    | 46     | 85.19 (29.30)                |                            |              |
| Unaware                  | 8      | 14.81 (5.09)                 |                            |              |
| <b>Veterinary School</b> |        |                              |                            |              |
| FPV UMK                  |        |                              |                            |              |
| Aware                    | 85     | 78.70 (54.14)                |                            |              |
| Unaware                  | 23     | 21.30 (14.65)                | 1.0059                     | $p = 0.3159$ |
| FPV UPM                  |        |                              |                            |              |
| Aware                    | 37     | 75.51 (23.57)                |                            |              |
| Unaware                  | 12     | 24.49 (7.64)                 |                            |              |

Note: '\*' Percentage when compared to total respondent (n= 157)

**Table 8** depicts the association between respondent's demographic and their awareness (aware, unaware) towards first aid measures of snakebite. There were no associations between awareness and their level of study, gender, community, and their veterinary school with most awareness association has the  $p$ -value of  $p > 0.05$ .

**Table 9**  
*Cross-tabulation between Respondent's Demographic and Perception*

| Variables                | Number | Percentage %<br>(Overall %)* | (Chi-square)<br>$\chi^2$ . | p-Value      |
|--------------------------|--------|------------------------------|----------------------------|--------------|
| <b>Level of Study</b>    |        |                              |                            |              |
| Preclinical              |        |                              |                            |              |
| Positive                 | 52     | 57.78 (33.12)                | 0.20799                    | $p = 0.6484$ |
| Negative                 | 38     | 42.22 (24.20)                |                            |              |
| Clinical                 |        |                              |                            |              |
| Positive                 | 42     | 62.69 (26.75)                |                            |              |
| Negative                 | 25     | 37.31 (15.92)                |                            |              |
| <b>Gender</b>            |        |                              |                            |              |
| Male                     |        |                              | 0                          | $p = 1$      |
| Positive                 | 36     | 60.00 (22.93)                |                            |              |
| Negative                 | 24     | 40.00 (15.29)                |                            |              |
| Female                   |        |                              |                            |              |
| Positive                 | 58     | 59.79 (36.94)                |                            |              |
| Negative                 | 39     | 40.21 (24.84)                |                            |              |
| <b>Community</b>         |        |                              |                            |              |
| Urban                    |        |                              | 2.7423                     | $p = 0.0977$ |
| Positive                 | 67     | 65.05 (42.67)                |                            |              |
| Negative                 | 36     | 34.95 (22.93)                |                            |              |
| Rural                    |        |                              |                            |              |
| Positive                 | 27     | 50.00 (17.20)                |                            |              |
| Negative                 | 27     | 50.00 (17.20)                |                            |              |
| <b>Veterinary School</b> |        |                              |                            |              |
| FPV UMK                  |        |                              | 0                          | $p = 1$      |
| Positive                 | 63     | 58.33 (40.13)                |                            |              |
| Negative                 | 45     | 41.67 (28.66)                |                            |              |
| FPV UPM                  |        |                              |                            |              |
| Positive                 | 31     | 63.27 (19.75)                |                            |              |
| Negative                 | 18     | 36.73 (11.46)                |                            |              |

Note: "\*"Percentage when compared to total respondent (n= 157)

**Table 9** depicts the cross-tabulations between respondent's demographic, and their perception towards first aid measures of snakebites. The cross-tabulations indicates that none of the demographic variables have any associations with the respondent's perception as most of the  $p$ -values are higher than  $p= 0.05$ ; with two variables (Gender and Veterinary School) are completely independent from respondents perception.

## 5.0 DISCUSSION

The present cross-sectional questionnaire based study was conducted among 157 first to final year DVM students in Malaysia to assess their awareness and perception towards first aid measures of snakebites, an important tool when dealing with snakebite cases prior to hospital treatment.

This study managed to capture responses from 157 respondents from both FPV UMK and FPV UPM veterinary school. This study consists of 69.00% (n= 108) FPV UMK respondents and 31.00% (n= 49) FPV UPM respondents. The majority of responders were FPV UMK veterinary students, which may be attributable to the sampling technique (convenience sampling) since the author is from FPV UMK. A large proportion of the respondents are from urban areas (65.60%; n= 103), while 34.40% (n= 54) are from rural areas. This is probably due to the fact that the majority of the respondents are from Selangor, Johor, Penang, and W.P. Kuala Lumpur, in which these cities are highly urbanised areas. This could also contribute to the low encounter of snakebite cases among respondents, as responses from states with considerable agricultural activity had fewer responders. A high prevalence of snakebites is frequently related to a high concentration of agricultural operations (Chippaux, 1998; Ministry of Health Malaysia, 2017).

Based on the respondents' responses to crucial questions testing their awareness, it was determined that a substantial proportion of the respondents delivered the proper responses. For example, nearly two-thirds of the respondents responded correctly to the statement, 'I should suck the venom out by using mouth or suction devices around the bite area'. A similar finding applies to the statement 'I should bring the victim to appropriate medical/veterinary hospital as soon as possible to get appropriate treatment' with the near majority responding correctly. This study also reveals the gap in awareness related to the use of tourniquets and icepacks, which may indicate that some common misconceptions related to snakebites first aid (Peterson, 2020) are still prevalent among veterinary students in Malaysia.

The majority of the students were aware of the first aid measures for snakebite as indicated by their responses to the questionnaire. This could be due to the exposure they received from their education as well as their sources of information. Half of the respondents had read about

snakebite and its first aid measures from social media and internet blogs. However, despite many of the students being considered aware of first aid measures for snakebite, the majority of the students were in favour of the use of tourniquets in snakebite first aid management. Similar findings have been reported by Alqahtani et al. (2022) and Subedi et al. (2018), suggestive to the long-standing misconception of tourniquet application in snakebite management where the use of tourniquet might help in stopping the spreading of the snake venom (Watt, 2020). The use of a tourniquet has been contraindicated as it is painful, impedes blood flow, and may lead to ischemia and tissue necrosis/gangrene, where amputation of the affected limb are required (World Health Organization, 2010; Parker-Cote & Meggs, 2018).

The respondent appears to be divided when it comes to the use of ice packs. Similar to the tourniquet application, the use of ice packs has been contraindicated by World Health Organization (2010) due to its deleterious effects. While the effects of ice packs or cold compression are not thoroughly discussed compared to tourniquet application, it is often contraindicated by many guidelines related to snakebite management (World Health Organization, 2010; First Aid Reference Centre, 2022). The effect of the suggested ice pack or cold compression was that it increases the spreading of venom due to cold-triggered vasoconstriction, which leads venom to spread more quickly in the body (Fry, 2018; First Aid Reference Centre, 2022).

A cross-tabulation between the awareness of first aid measures of snakebite and respondent's demographic reveals no significant between awareness and all four respondent's demographic variables (level of study, gender, community, veterinary school) as most of the associations have a  $p$ -value of  $p > 0.05$ , indicating there's no association between awareness and all demographic's variable. From the study, minimal differences in terms of awareness were found between the clinical year students and preclinical students, where the clinical year student have a higher awareness of the first aid measures of snakebites cases. One of the determining factors would be that most clinical year veterinary students in Malaysia were exposed more to snakebite cases or discussion through clinical practice, which could contribute to their awareness of first aid measures for snakebites.

The perception of these students are relatively reflective of their awareness. About 49.10% of respondents strongly agree with the statement about tourniquet application, while 27.30% agree with the statement. This is similar to the awareness section findings, where most respondents

considered the tourniquet application appropriate. As previously stated, the use of tourniquets in snakebite management is widespread, with many cross-sectional studies found that majority of the participants believed it to be the appropriate measure, although the method itself is improper (Michael et al., 2018; Subedi et al., 2018; Kharusha et al., 2020; Alqahtani et al., 2022).

Statements related to the use of suction or suction device appears to have divided the respondents, with about 47.80% of the respondents agreeing or strongly agreeing with the use of suction, while 31.70% of the respondents either disagree or strongly disagree with the statement; 20.50% of the respondent were neutral about the statement. This indicates that about half of the respondents do not know that using suction devices was contraindicated in the snakebite first aid management (World Health Organization, 2010).

The use of a negative pressure extraction device (extractor/suction device) is contraindicated for the use of snakebite first aid management (World Health Organization, 2010; Ismail, 2015; Fry, 2018; Parker-Cote & Meggs, 2018). A study conducted by Bush et al. (2000) using a porcine model on the effect of a suction device/extractor after artificial rattlesnake envenomation reveals that there is very minimal difference in venom load when compared to the control group. The study also found a circular lesion identical to the size and shape of the suction cup, which later necrosed, resulting in tissue loss (Bush et al., 2000). A similar study was conducted in a human model to study the effects of a suction device (Sawyer pump extractor), which reveals only a negligible amount of venom (0.04%) being extracted by the suction device, and the study also suggests that it may collapse the subcutaneous layer of the wound and remove superficial capillary blood which contains virtually none of the venom (Alberts et al., 2004)

However, more than half of respondents have a positive perception towards first aid measures of snakebites. For example, most respondents agree that restricting the victim's movements, keeping the wound below or at heart level, and transporting the victim immediately to a veterinary/medical hospital to get appropriate treatment was the best first aid. Most respondents also agree that first aid was only a temporary measure prior to getting appropriate treatment. The only definitive treatment for a snake envenomation is the administration of intravenous antivenom (Parker-Cote & Meggs, 2018).

## 6.0 CONCLUSIONS

In conclusion, this study demonstrated the lack of awareness when it comes to contraindicated methods for first aid measures toward snakebite cases, such as tourniquets, icepacks and suction of venom from the bite area. There was also little to no association between awareness and veterinary students' level of study (Preclinical and Clinical years), at least when it comes to first aid measures of snakebite. Additionally, more than half of the respondents (59.87%) have a positive perception towards most first aid measures related to snakebite, although this includes the use of a tourniquet and suction of venom from the bite area. However, it is important to note that this study only accounts for less than a quarter of veterinary students in Malaysia; thus, it is hard for this study to be considered representative of veterinary students in Malaysia. All in all, this study managed to highlight that improper first aid measures of snakebites were still common among veterinary students.

## 7.0 RECOMMENDATION

This was the first study in Malaysia to assess the awareness and perceptions of first aid measures of snakebites among veterinary students in Malaysia. Several limitations were observed when conducting the study.

First, it is hard to get responses from both veterinary schools, especially if students conducted the study. From this study, as the author is currently a veterinary student from FPV UMK, most of the responses were from the same veterinary school student. One possible solution is to conduct the survey by giving a physical handout directly to respondents. Extending the study time to more than two weeks might also increase the number of respondents from both veterinary schools.

Second, the questions / items in the questionnaire needs to be further refined as some of them were suggestive of the correct answer; hence respondents are more likely to be compelled to pick a particular answer.

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