KNOWLEDGE, ATTITUDE, AND PRACTICE OF FIRST AID FOR ACETAMINOPHEN TOXICITY AMONG SMALL ANIMAL OWNERS IN JOHOR, MALAYSIA

By

THUSHINTHA A/P S TANAVANTHAN

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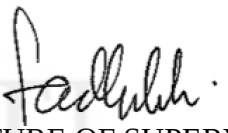

SIGNATURE OF CANDIDATE

NRIC/PASSPORT NO. 990219015318

DATE: 31/10/2024

SIGNATURE OF SUPERVISOR

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KNOWLEDGE, ATTITUDE, AND PRACTICE OF FIRST AID FOR ACETAMINOPHEN TOXICITY AMONG SMALL ANIMAL OWNERS IN JOHOR, MALAYSIA

ABSTRACT

An abstract of the research paper presented to the Faculty of Veterinary Medicine, University Malaysia Kelantan, in partial requirement of the course DVT 55204 – Research Project.

This study examines the knowledge, attitudes, and practices (KAP) of small animal owners in Johor, Malaysia, concerning first aid for acetaminophen toxicity in pets. Acetaminophen toxicity is a critical health concern for small animals such as cats and dogs, often resulting in severe complications or fatalities if not managed promptly. The study aims to evaluate the knowledge, awareness and practice level among small animal owners and explore the association between sociodemographic factors, such as employment, salary, age, sex, race, and KAP levels. Data were collected from small animal owners through structured surveys, and Chi-Square tests were used to analyse the relationships between variables. The findings reveal that employment status significantly influences the KAP, while salary significantly affects attitudes but not knowledge or practices. Other factors, including age, sex, and race, demonstrated no correlation across the KAP factors. These results highlight the importance of employment-focused interventions and public education to enhance first-aid practice for acetaminophen toxicity. This study provides valuable insights for developing targeted awareness campaigns, improving emergency responses, and informing policy to safeguard pet health in Malaysia.

Keywords: Acetaminophen Toxicity, First Aid, Knowledge, Attitudes, Practices, Small Animal Owners, Johor, Malaysia

PENGETAHUAN, SIKAP DAN AMALAN PEMILIK HAIWAN KECIL DI JOHOR, MALAYSIA MENGENAI PERTOLONGAN CEMAS UNTUK KERACUNAN "ACETAMINOPHEN"

ABSTRAK

Abstrak kertas penyelidikan yang dibentangkan kepada Fakulti Perubatan Veterinar, Universiti Malaysia Kelantan, sebagai keperluan sebahagian daripada kursus DVT 55204 – Projek Penyelidikan.

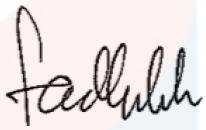
Kajian ini mengkaji pengetahuan, sikap dan amalan (KAP) pemilik haiwan kecil di Johor, Malaysia, mengenai pertolongan cemas untuk keracunan "acetaminophen" dalam haiwan peliharaan. Keracunan "acetaminophen" adalah memberikan masalah kesihatan yang kritikal untuk haiwan kecil seperti kucing dan anjing, selalunya mengakibatkan komplikasi atau kematian jika tidak dirawat dengan segera. Kajian ini bertujuan untuk menilai tahap pengetahuan,sikap dan amalan dalam kalangan pemilik haiwan kecil dan untuk mengetahui perkaitan antara faktor sosiodemografi, seperti pekerjaan, gaji, umur, jantina, dan bangsa, terhadap tahap pengetahuan, sikap dan amalan. Data dikumpul daripada pemilik haiwan kecil melalui tinjauan berstruktur, dan ujian "Chi-Square" digunakan untuk menganalisa hubungan antara pembolehubah.

Kajian menunjukkan bahawa status pekerjaan secara signifikan mempengaruhi pengetahuan, sikap dan amalan, manakala gaji secara signifikan mempengaruhi sikap tetapi bukan pengetahuan atau amalan. Faktor lain, termasuk umur, jantina dan bangsa, tidak menunjukkan perkaitan yang ketara terhadap faktor pengetahuan, sikap dan amalan. Keputusan ini menekankan kepentingan intervensi tertumpu pekerjaan dan pendidikan awam untuk meningkatkan amalan pertolongan cemas untuk keracunan "acetaminophen". Kajian ini memberikan pandangan yang sah untuk membangunkan kempen kesedaran yang disasarkan, menambah baik tindak balas kecemasan, dan memaklumkan dasar untuk melindungi kesihatan haiwan peliharaan di Malaysia.

Kata kunci: Keracunan "Acetaminophen", Pertolongan Cemas, Pengetahuan, Sikap, Amalan, Pemilik Haiwan Kecil, Johor, Malaysia

CERTIFICATION

This is to certify that we have read this research paper entitled **'Knowledge, Attitude, And Practice Of First Aid For Acetaminophen Toxicity Among Small Animal Owners In Johor, Malaysia'** by **Thushintha A/P S Tanavanthan**, and in our opinion, it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirements for the course DVT 55204 – Research Project.



_____

Prof Madya Dr. Nor Fadhilah Binti Kamaruzzaman
Senior Lecturer
Faculty of Veterinary Medicine
Universiti Malaysia Kelantan
(Supervisor)

_____

Dr. Murshidah Binti Mohd Asri
Lecturer
Faculty of Veterinary Medicine
Universiti Malaysia Kelantan
(Co-supervisor)

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Family

Thank You

DEDICATIONS

I am profoundly grateful to God for His boundless blessings, which have given me the strength, health, and perseverance to endure this experience.

I dedicate this accomplishment to my cherished parents, Mr. S. Tanavanthan S/O Sinnakannu and Mrs. Anbuvaali D/O Sahadevan. Your unwavering support, loving affection, and astute counsel have been the bedrock of my accomplishments. I will be eternally appreciative of your unwavering faith in me and the sacrifices you have made.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Panadol	Acetaminophen
TKS	Total knowledge score
TAS	Total attitude score
TPS	Total practice score
KAP	Knowledge attitude and practice
NAPQI	N-acetyl-p-benzoquinone imine
COX	Cyclooxygenase

LIST OF SYMBOLS

%	Percentage
n	Number
p	Significant level

CHAPTER 1

INTRODUCTION

Acetaminophen (paracetamol) is one of the drugs commonly used in human medicine and its widespread availability as an over-the-counter medication (Moore & Moore, 2016). It is categorized as non-steroidal anti-inflammatory drugs (NSAIDs). It is a potent analgesic and provides antipyretic effect with small or no anti-inflammatory activity (Fadel et al., 2021). Normally, in humans, it is known as first-line drug management of pain and pyrexia. Acetaminophen can be metabolised by 3 main pathways, which are glucuronidation, sulfation and the cytochrome P 450 mediated pathway. After ingesting the acetaminophen, it can either be broken down by the glucuronidation or sulfation pathway and creating non-toxic metabolites that can be eliminated by the urine and bile. Meanwhile, the P 450 pathway converts a smaller amount into NAPQI, which is usually detoxified by the glutathione (Farrell, n.d.). Nonsteroidal anti-inflammatory drugs can irritate the stomach because it blocks the cyclooxygenase (COX) throughout the body. For acetaminophen, it mostly affects the brain and spinal cord, providing selective trait which can treat pain and fever without causing stomach problems that can be caused by other non-steroidal anti-inflammatory drugs (Ohashi & Kohno, 2020). Even though acetaminophen has some benefits, it is also correlates with risk of liver damage (Lee, 2017). Acetaminophen can be dangerous in high amounts because it is metabolised by the liver into a variety of by products, one of which is NAPQI, a reactive molecule which will cause the liver to overwork and result in kidney failure (Lee, 2017).

Acetaminophen toxicity poses serious health risks for small animals. It can lead to various clinical symptoms, including depression, weakness, rapid breathing, jaundice, vomiting, low body temperature, facial or paw swelling, cyanosis, difficulty breathing, liver necrosis, and even death. Liver necrosis is more commonly seen in dogs than cats, generally becoming apparent in dogs 24–36 hours after ingestion. Ingestion of acetaminophen is toxic for cats because due to lack of glucuronyl transferase, that metabolise the acetaminophen. Because of this, they depend more on the sulfation route, which this easily blocked. So, this makes NAPQI build-up, which damages the liver cells and red blood cells. Meanwhile, for dogs, even though they can glucuronidation acetaminophen, ingesting excessive amount of acetaminophen can use up all the glutathione, which causes NAPQI to accumulate and damage their lover and also the red blood cells (Khan & Safdar, 2018). The predominant type of liver damage from acetaminophen toxicity is centrilobular necrosis (Khan & Safdar, 2018). The

toxic dose of acetaminophen for dogs is 100 mg/kg and above, while for cats dose of 10 - 40 mg/kg can cause toxicity to the animal (Safdar A.Khan, 2018).

First-aid action during acetaminophen toxicity among small animal owners should have proper storage is important to prevent accidental ingestion of acetaminophen by pets, which can lead to unwanted toxicity. However, should there be ingestion of acetaminophen, it is important to immediately remove the drug from the animal and bring the animal together with the packaging to any nearby available veterinary service. The owner should also take note of what time the animal was found to have ingested acetaminophen for better treatment decisions to be made by the veterinary staff. Do not induce vomiting or provide other medication unless instructed by a vet (Acetaminophen Toxicosis in Cats: A CVC Doodle, 2017). Keep the pet calm and hydrated but avoid giving food to develop effective educational interventions to improve emergency response and mitigate the risk of harm to pets. This study is important because it evaluates the knowledge, attitude, and practice of first-aid action during acetaminophen toxicity among small animal owners in Malaysia to develop effective educational interventions to improve emergency response and mitigate the risk of harm to pets.

1.1. Research Problem Statement

Acetaminophen toxicity is considered a common incidence that occurs in small animals. However, there is no available data on the level of knowledge, attitudes, and practices among small animal owners in Malaysia concerning first-aid for acetaminophen toxicity. Additionally, there is no data on the association between sociodemographic factors and small animal owners' knowledge, attitudes, and practices regarding first-aid for acetaminophen toxicity in Malaysia. Moreover, in Malaysia, there needs to be more knowledge and attitude among small animal owners regarding the potential toxicity of acetaminophen to their beloved animals. Despite its widespread availability as an over-the-counter medication, many small animal owners remain unaware of the serious health risks it poses to cats and dogs. This study aims to know the level of knowledge, attitude, and practice (KAP) among small animal owners in Johor, Malaysia, regarding first-aid for acetaminophen toxicity. Furthermore, this study also aims to find the sociodemographic elements associated with the KAP levels in order to determine whether educational awareness should be given to small animal owners regarding the effects of acetaminophen toxicity on cats and dogs.

1.2. Research Question

- What is the level of knowledge, attitude, and practice among small animal owners regarding first-aid acetaminophen toxicity?
- What risk factors are associated with the level of knowledge, attitude, and practice among small animal owners regarding first-aid acetaminophen toxicity?

1.3. Research Hypothesis

1.3.1. Null Hypothesis

- There is a high level of knowledge, attitude, and practice among small animal owners regarding first-aid acetaminophen toxicity.
- There is an association between the level of knowledge, attitude, and practice with the sociodemographics of the respondents.

1.3.2. Alternative Hypothesis

- There is a low level of knowledge, attitude, and practice among small animal owners regarding first-aid acetaminophen toxicity.
- There is no association between the level of knowledge, attitude, and practice and the sociodemographics of the respondents.

1.4. Research Objective

- To evaluate the knowledge, attitude, and practice of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia
- To evaluate the associated factors with the level of knowledge, attitude, and practice among the sociodemographic characters

1.5 Significant of Study

This study gives perspectives on the knowledge, attitudes, and practices (KAP) of small animal owners in Johor, Malaysia, concerning first-aid for paracetamol toxicity, highlighting substantial weaknesses in the understanding of sociodemographic factors' influence. This study enhances theoretical understanding by examining the intersection of human behaviour and awareness with animal healthcare practices, specifically in the field of toxicology. This informs targeted educational interventions aimed to enhance emergency responses and accidental acetaminophen poisoning in pets. The results will be the underlying need for strict rules on medicine labelling and the execution of public awareness campaigns, therefore supporting

policy development. Localized data produced by this study helps several parties, including veterinarians, pet owners, legislators, and animal welfare groups. It emphasizes the need for knowledge and proper pet care in preventing small animals from acetaminophen toxicity.

1.6 Scope of Study

This survey focuses into the knowledge, attitudes, and practices (KAP) of small animal owners in Johor, Malaysia, concerning first-aid for acetaminophen toxicity in felines and canines. This study shows the impact of sociodemographic factors on knowledge, attitudes, and practices (KAP) levels to identify primary determinants of first-aid behaviour among small animal owners. The research is geographically confined to Johor and focuses exclusively on small animal owners, excluding those with large animals or without pets. This study concentrates on paracetamol toxicity, gathering survey data to inform educational interventions, influence policy, and enhance awareness regarding the prevention and management of this risk in pets.

CHAPTER 2
LITERATURE REVIEW

2.1 Acetaminophen

Acetaminophen is one of the common drugs that is used for human consumption. It is clearly known as a non-opioid antipyretic and analgesic for mild and moderate pain conditions. Common brand names included Tylenol and Panadol. Acetaminophen was first made in 1878 by Harmon Northrop Morse or possibly in 1852 by Charles Frédéric Gerhardt (Eyers, 2012). Initially, acetaminophen also known as paracetamol was overshadowed by other regularly used analgesics at the moment, such as acetanilide and also phenacetin. Acetaminophen was identified as a potential safer alternative medicine when the other older medications showed major side effects, such as nephrotoxicity and methemoglobinemia (Ross-Degnan, 1993). Acetaminophen is one of the most common medicines used for pain and fever in the United States and Europe (Essentials of Emergency Medicine, n.d.). It is on the World Health Organization's List of Essential Medicines. By around 5 million prescriptions in the United States were recorded in 2022, and acetaminophen ranked as the 114th most often prescribed drug usage (Bcps, n.d.). Paracetamol was first used clinically by von Mering in 1893, but it did not become commercially available until 1950 in the United States and 1956 in Australia (Lunde, 1993).

2.2. Acetaminophen Toxicity in Pets

Acetaminophen is an analgesic and antipyretic medication widely used in human pharmacology, is without problems to be had in many households, and is frequently perceived as a secure treatment for numerous ailments (Fadel et al., 2021). However, its inadvertent ingestion through pets can bring about extreme toxicity, posing a massive risk to their health and well-being. Acetaminophen toxicity in pets, mainly cats, and dogs has emerged as a developing issue in veterinary medicinal drugs because of its ability for life-threatening problems and the demanding situations related to analysis and treatment (Khan & Safdar, 2018).

Acetaminophen toxicity in cats and dogs mainly stems from the metabolic variations among those species and human beings. While acetaminophen is generally safe for humans when used at recommended doses, in cats and dogs, it is metabolized through pathways that produce toxic metabolites (Khan & Safdar, 2018). Small animals lack the glucuronyl

transferase enzyme, the main function to conjugate acetaminophen with glucuronic acid, which is the primary pathway of detoxification in humans. Small animals instead mostly break down acetaminophen using the hepatic cytochrome P450 system, particularly the CYP2E1 enzyme. This metabolic route produces N-acetyl-p-benzoquinone imine (NAPQI), a highly reactive molecule that depletes glutathione stocks and accumulates in hepatocytes, hence generating oxidative stress and cellular damage (Savides MC, 1984).

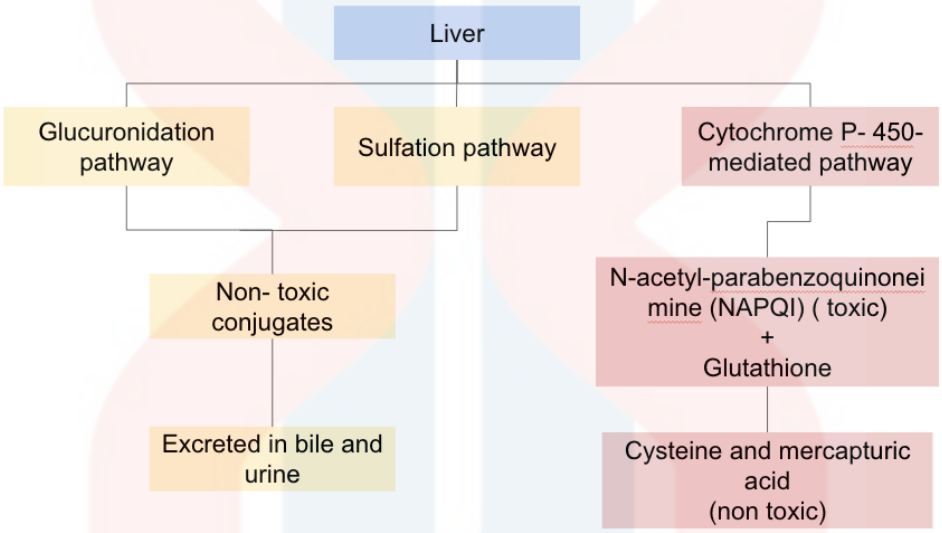

Figure 2.1: The normal metabolic way of acetaminophen metabolism

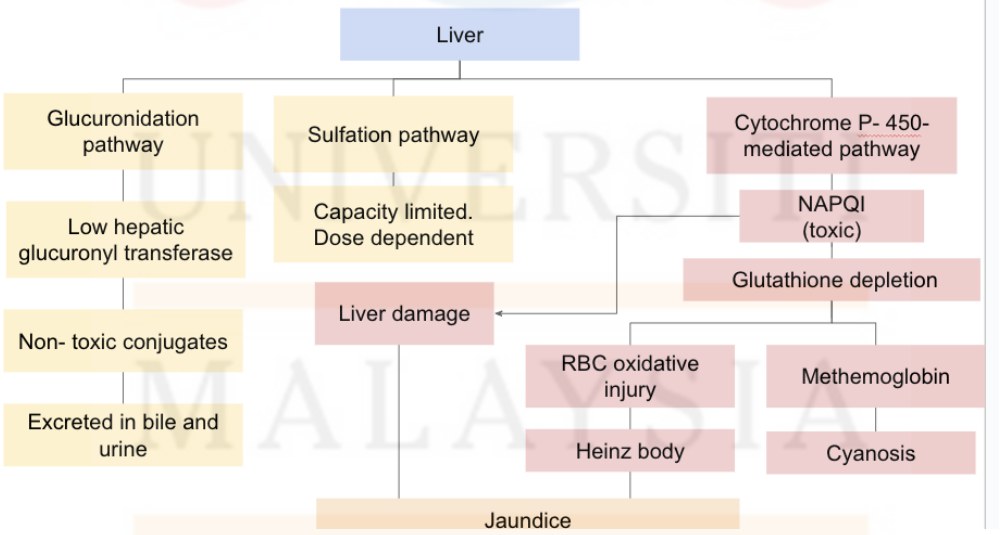

Figure 2.2: The toxicokinetic and toxicodynamic of acetaminophen in cats and dogs

Clinical signs of acetaminophen toxicity are associated with methemoglobinemia and hepatotoxicity. These signs include depression, weakness, rapid breathing (tachypnea), difficulty breathing (dyspnea), cyanosis, jaundice (icterus), vomiting, methemoglobinemia,

low body temperature (hypothermia), swelling of the face or paws, liver necrosis, and potentially death. Methemoglobinemia causes the mucous membranes to appear muddy or brown and is often accompanied by rapid heart rate (tachycardia), rapid breathing, weakness, and lethargy. The most common form of liver damage from acetaminophen toxicity is centrilobular necrosis (Khan & Safdar, 2018). It is important to note that liver necrosis is generally less common in cats compared to dogs.

The diagnosis of acetaminophen toxicity is primarily based on the history of exposure and the presentation of clinical symptoms. Confirmatory exposure is by qualitative acetaminophen plasma levels can be measured, ideally at 4 hours post-exposure, through facilities such as human hospitals. The differential diagnosis should include other causes of methemoglobinemia and potential exposure to other hepatotoxic agents. (Richardson J. A, 2000).

The primary goal in treating acetaminophen toxicity is to restore glutathione levels, convert methaemoglobin back to haemoglobin, and prevent or manage liver damage. Stabilization of the patient is crucial, and if the animal is experiencing difficulty breathing, oxygen therapy should be administered immediately (Khan & Safdar, 2018). In cases of anaemia or to enhance oxygen transport, packed red blood cell transfusions or polymerized haemoglobin solutions may be necessary. While the prognosis is favourable with prompt and aggressive treatment, animals exhibiting severe methemoglobinemia or significant liver damage face a guarded to poor prognosis (Richardson J. A, 2000). Toxicity studies indicate that ingestion of acetaminophen at doses as high as 140 mg/kg in cats can be effectively treated if therapy is initiated within four to six hours of ingestion (Anvik, 1984).

A study involving pharmacies was conducted to determine the knowledge of potential pet toxins in North Carolina, United States, in 2020. However, this type of study is not available in Malaysia. The results of this study indicate that pharmacists lack sufficient knowledge of veterinary pharmacology, especially concerning toxicology. Despite the growing number of veterinary prescriptions dispensed at community pharmacies, many pharmacists are not adequately equipped to guide toxin exposure. Considering that human medications account for a significant portion (16%) of pet poisoning incidents in the United States, it is crucial for pharmacists, particularly those working in community settings, to possess a foundational

understanding of which drug products and additives should not be administered to animals (Young at al., 2017).

Veterinarians at the Animal Poison Control Centre (ASPCA), USA, provided consultation on over 1050 cases of accidental exposure to paracetamol in dogs and cats between January 1998 and March 2000. The cases involved the drug being taken by owners or accidentally consumed. In the United States and the United Kingdom, paracetamol toxicity in small animals is the most common cause of acute liver failure, accounting for 39% of cases in 2010 (Salem et al., 2010).

CHAPTER 3

MATERIALS AND METHODS

3.1. Study Area

This study was conducted in the state of Johor, Malaysia

3.2. Study Design

A cross-sectional study was conducted among cats and dogs pet owners living in Johor, Malaysia.

3.3. Source Of Data

The primary source of data was utilized in this study.

3.4. Source Population

Cats or dogs pet owners in Johor, Malaysia that are 18 years old and above.

3.5. Selection Criteria

3.5.1. Inclusion Criteria

The following inclusion criteria were used for enrolment in the study:

- Malaysians who live in Johor, Malaysia.
- Malaysians who are 18 years of age or older.
- Malaysians who own one or more cats or dogs.

3.5.2. Exclusion Criteria

The following exclusion criteria were used for enrolment in the study:

- Malaysians who do not live in Johor, Malaysia.
- Malaysians who are less than 18 years old.
- Malaysians who do not own any cats or dogs.

3.6. Sampling Size

This study included 103 respondents. The sample size was determined using the Z-formula below, where N is the population size, Z is the Z-score, p is the sample proportion, and e is the

margin of error. It was then estimated that a minimum of 385 individuals should be involved in this study to gain a 95% confidence level, with 0.5 sample proportion and 0.05 margin error.

$$\text{Sample size, n} = \frac{\square^2 \times \square\,(1-\square)}{\square - 1 + \frac{\square^2 \times \square\,(1-\square)}{\square^2}}$$

However, due to time limitations and other external factors a random sampling of 60-100 respondents for data collection using Google form and hard copy will be sufficient for this study.

3.7. Sampling Procedure

Questionnaires are issued using Google Forms and hard copy. This questionnaire was distributed using social media such as Facebook, Instagram, WhatsApp, and Telegram.

3.8 Data Collection Tools

The data was collected by using a questionnaire made using Google Forms. The questionnaire consisted of 4 parts: A, B, C, and D. Part A collected the data on demographic details. Part B collected the data on knowledge, meanwhile part C on attitude, and part D on practices. The questionnaire was developed solely for this study as no available study was made to be adopted. The Chi-Square test was used to evaluate the association between the knowledge, attitude, and practice (KAP) levels and the socio-demographic variables. The knowledge, attitude, and practice (KAP) relationship were evaluated using the Pearson Correlation/Fisher's Exact Test parametric test and presented as a line chart. Johor pet owners ' KAP levels were rated as "good" or "poor" using Bloom's cut-off criterion (Goni et al., 2019). Data was collected online from July 2024 to early October 2024. Gender, age, and employment were included in the questionnaire. Data for the level of knowledge, attitude, and practices was collected by answering the questionnaire in parts B, C and D of the questionnaire.

CHAPTER 4

RESULT

4.1. Sociodemographic Profiles of Respondents

Part A focuses on the questionnaire about the sociodemographic profiles, which comprises the gender, age, employment status, and salary of the respondents. This data will be used to relate the level of knowledge, attitudes, and practices on acetaminophen toxicity in pets in Johor.103 respondents answered this survey, with 68.9% being female respondents and 31.1% being male respondents. Most participants, 60.2%, were aged 18–25 years, followed by 26–39 years, which is 28.2%, and smaller numbers in older age groups. Regarding race, 47.6% were Indian, 40.8% Malay, and 11.7% Chinese.

Students are the largest respondents, 60.2%, with others working in the private sector (17.5%), civil servants, self-employed, pensioners, housewives, or unemployed, at a small percentage. Meanwhile, over half (56.3%) reported no income; this is mainly due to being students. Among those with income, most earned less than RM 2,500 (Table 4.1).

This demographic data helps to explain the study's findings, as the increasing number of young students and their multiracial and employment backgrounds may impact knowledge, attitudes, and practices related to first aid for acetaminophen toxicity in small animals.

4.2. Level of Knowledge of Respondents Towards Acetaminophen Toxicity

The study demonstrated most respondents (98.1%) were familiar with the usage of Panadol, but only 61.2% understood its harmful effects on pets, highlighting a significant knowledge gap. Recognition of poisoning symptoms varied, with swollen faces (36.9%) being the most identified, while 19.4% were unaware of any symptoms. About half (53.4%) knew Panadol could be fatal to pets, but 46.6% lacked this awareness. Positively, 81.6% knew how to store Panadol safely, though 18.4% did not. These findings underline the need for educational efforts to improve awareness of acetaminophen toxicity risks and management among small animal owners in Johor.

Table 4.1: Statistical analysis of the frequency and percentage of sociodemographic of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Sociodemographic		Frequency (n)	Percentage (%)
Sex	Male	32	31.1
	Female	71	68.9
Age	18-25	62	60.2
	26-39	29	28.2
	40-59	11	10.7
	60-70	1	1.0
Race	Malay	42	40.8
	Chinese	12	11.7
	Indian	49	47.6
Employment status	Civil servant	8	7.8
	Self-employed	5	4.9
	Private sector	18	17.5
	Pensioner	4	3.9
	Housewife	3	2.9
	Student	62	60.2
	Unemployed	3	2.9
Salary	< RM 2500	23	22.3
	RM 2500 - RM 4850	11	10.7
	RM 4850- RM	7	6.8

	10,000		
	> RM 10,001	4	3.9
	None	58	56.3

Table 4.2: Statistical Analysis of the frequency and percentage of knowledge of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Knowledge		Frequency (n)	Percentage (%)
Do you know what is Panadol?	Yes	101	98.1
	No	102	2.0
Do you know the bad impact of Panadol poisoning on pets?	Yes	63	61.2
	No	40	38.8
Can you identify the common signs and symptoms of Panadol poisoning in pets?	Swollen face	38	36.9
	Swollen limbs	11	10.7
	Jaundice	34	33.0
	No symptoms	20	19.4
Do you know that Panadol will cause death to pets?	Yes	55	53.4
	No	48	46.6
Do you know how to store Panadol medicine correctly?	Yes	84	81.6
	No	19	18.4

***Panadol= acetaminophen**

4.3. The Level of Attitude of Respondents Towards Acetaminophen Toxicity

The study showed a positive attitude among small animal owners in Johor regarding first-aid for acetaminophen toxicity. Most respondents (80.6%) strongly agreed on the importance of contacting a veterinarian in cases of Panadol poisoning. Similarly, 69.9% believed bringing pets for veterinary care is worth spending money on. A significant majority (71.8%) agreed that keeping Panadol away from pets reduces the risk of accidental ingestion. Furthermore, 78.6% acknowledged the importance of consulting a veterinarian before administering human medicine to pets. Lastly, 68% emphasized the need for immediate first-aid therapy if Panadol ingestion is suspected. These results reflect a generally responsible attitude towards pet care in medical emergencies.

Table 4.3: Statistical analysis of the frequency and percentage of attitude of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Attitude		Frequency (n)	Percentage (%)
It is important to contact a veterinarian if your pet has Panadol poisoning.	1	0	0
	2	3	2.9
	3	7	6.8
	4	10	9.7
	5	83	80.6
I believe it is worth to spend money bring my pets for veterinary attention	1	0	0
	2	4	3.9
	3	8	7.8
	4	19	18.4
	5	72	69.9
I believe putting	1	0	0

away the Panadol from pets will reduce the accidents of eating	2	4	3.9
	3	10	9.7
	4	15	14.6
	5	74	71.8
It is important to consult a veterinarian before giving human medicine to my pet	1	0	0
	2	3	2.9
	3	4	3.9
	4	15	14.6
	5	81	78.6
It is important to give first-aid therapy as soon as you notice your pet ingested Panadol	1	0	0
	2	4	3.9
	3	14	13.6
	4	14	13.6
	5	70	68.0

***Panadol= acetaminophen**

4.4. The Level of Practice of Respondents Towards Acetaminophen Toxicity

According to the study, there are still knowledge gaps even if the majority of pet owners in Johor, Malaysia, follow excellent practices like giving sick pets priority veterinarian attention and storing paracetamol safely. A sizable portion only sometimes sees veterinarians or gets pet prescription drugs from human pharmacies. While a tiny percentage of respondents rely on home cures or other non-professional sources, most respondents respond appropriately to poisoning crises by promptly seeking veterinarian assistance. Educational interventions are required to bridge these gaps and enhance emergency response and general pet care procedures.

Table 4.4: Statistical Analysis of the frequency and percentage of practice of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Practice		Frequency (n)	Percentage (%)
When your pet is sick, how often do you consult a veterinarian?	Always	38	36.9
	Sometimes	51	49.5
	Rarely	10	9.7
	Never	4	3.9
Do you buy medicine for your pet from a human pharmacy?	Always	3	2.9
	Sometimes	23	22.3
	Rarely	11	10.7
	Never	66	64.1
If your pet suffers Panadol poisoning, what are your actions?	Give charcoal medicine	5	4.9
	Home remedy	11	10.7
	Bring the animal to the clinic as soon as possible	87	84.5
Who will be reaching out first if your animal has Panadol poisoning?	Veterinary clinic	89	86.4
	Pet shop	7	6.8
	Neighbour or friend	7	6.8
Where is the storage of Panadol in your house?	on the table	11	10.7
	In a first-aid box or kit	76	73.8
	Refrigerator	16	15.5

***Panadol= acetaminophen**

4.5. Bloom's Cut-Off Criterion of Knowledge, Attitude and Practice Association

Bloom's Cut-Off Criterion is to determine the percentage of the good, moderate, and poor of the associations. For associations, more than 80% it is considered as good, while associations between 25% and 79% are known as moderate and lastly, less than 24% are considered as poor.

Based on Bloom's cut-off criterion (Goni et al., 2019), this study's results highlight the levels of knowledge, attitude, and practice among small animal owners regarding first-aid for acetaminophen toxicity. Regarding knowledge, 44.3% of respondents displayed poor understanding, indicating a major gap in awareness about acetaminophen poisoning and first-aid management. While 32.1% had moderate knowledge, only 19.8% demonstrated a good understanding, emphasizing the need for education and awareness campaigns.

The findings were more positive in terms of attitude, with the majority of 85.8% of respondents exhibiting a good attitude toward managing poisoning incidents, reflecting a responsible mindset among pet owners. Only a small part of respondents shows poor attitudes, about 1.9%, whereas 8.5% show moderate attitudes, suggesting that most owners recognize the importance of taking timely and proper action during emergencies.

Regarding practice, the respondents showed good practice based on this survey, which would have a positive impact. However, moderate practices show 22.6%, which indicates inconsistent adherence to best practices. About 74.5% of respondents reported having good practices, including consulting veterinarians immediately if there is acetaminophen poisoning in dogs and cats and ensuring the safe storage of medications, which shows responsible behaviour in managing pet emergencies.

Table 4.5: Bloom's Criterion Knowledge, attitude, and practice of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Variables	Level	Score	*n* (%)
Knowledge	Poor	0-2	44.3
	Moderate	3-4	32.1
	Good	5-6	19.8
Attitude	Poor	0-12	1.9
	Moderate	13-19	8.5
	Good	20-25	85.8
Practice	Poor	0 - 8	0
	Moderate	9 - 13	22.6
	Good	14 - 17	74.5

4.6. Chi-Square of The Association Between Knowledge, Attitude, and Practice Towards Acetaminophen Toxicity

The results of the Chi-Square test reveal significant and non-significant associations between sociodemographic factors and the knowledge, attitude, and practice levels among small animal owners regarding first-aid for acetaminophen toxicity.

For knowledge, employment status demonstrates a statistically significant association ($p = 0.035$), suggesting that employment plays a key role in individuals' level of knowledge. On the other hand, pay level does not show a significant association ($p = 0.086$), indicating that income levels may not strongly influence knowledge. Additionally, sex ($p = 0.277$), age ($p = 0.207$), and race ($p = 0.577$) also do not show significant associations with knowledge levels.

For attitude, employment ($p = 0.023$) and salary ($p = 0.006$) have significant associations, suggesting that being employed and having a higher income positively influence attitudes toward acetaminophen toxicity first-aid. However, sex ($p = 0.535$), age ($p = 0.840$), and race ($p = 0.465$) do not significantly affect attitudes in this context.

For practice, employment again demonstrates a significant association (p = 0.044), highlighting that employment status impacts how small animal owners handle acetaminophen toxicity incidents. However, salary (p = 0.151), sex (p = 0.784), age (p = 0.070), and race (p = 0.463) do not show significant associations, indicating limited influence of these factors on practice.

In summary, employment status is a crucial factor influencing knowledge, attitude, and practice, while salary significantly impacts attitudes but not knowledge or practice. Other variables, including sex, age, and race, show no significant associations across all three associations. These findings underscore the importance of targeting employment-related interventions to enhance awareness, attitudes, and practices regarding first-aid for acetaminophen toxicity among small animal pet owners.

Table 4.6.1: Pearson Chi-square and p-value of the knowledge of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Knowledge	Pearson Chi-square	p value
Sex	2.571	0.277
Age	8.541	0.207
Race	2.887	0.577
Employment	22.235	0.035
Salary	13.846	0.086

***P<0.05 = significant**

Table 4.6.2: Pearson Chi-square and p-value of the attitude of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Attitude	Pearson Chi-square	p value
Sex	1.251	0.535
Age	2.746	0.840
Race	3.589	0.465
Employment	23.592	0.023
Salary	21.523	0.006

***P<0.05 = significant**

Table 4.6.3: Pearson Chi-square and p-value of the practice of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Practice	Pearson Chi-square	p value
Sex	0.075	0.784
Age	7.054	0.070
Race	1.539	0.463
Employment	12.920	0.044
Salary	6.726	0.151

***P<0.05 = significant**

4.7. Correlation Between Total Knowledge, Attitude, and Practice Score

The Spearman's rho correlation table demonstrates the relationships among knowledge, attitudes, and practices (KAP) of small animal owners in Johor, Malaysia, concerning paracetamol toxicity. A moderate positive correlation (0.314) exists between total knowledge scores (TKS) and total attitude scores (TAS), suggesting that increased knowledge levels correlate with enhanced attitudes regarding the management of paracetamol toxicity. This finding indicates that educational interventions can effectively shape the mindset of pet owners, promoting proactive attitudes toward pet care.

The weak correlation of 0.175 between TKS and total practice scores indicates a disconnect between knowledge and applying first-aid practices. This indicates that more than knowledge is needed to guarantee appropriate actions, potentially due to obstacles such as misconceptions, lack of confidence, or ambiguous medication warnings. The moderate positive correlation (0.328) between TAS and TPS indicates that attitudes significantly influence practices. This highlights the significance of promoting positive attitudes via awareness campaigns and behavioural training to enhance practical emergency responses.

These findings highlight the necessity for comprehensive strategies incorporating knowledge enhancement, attitude development, and practical training. Addressing the gap between knowledge and practice and emphasizing attitude shifts is essential for enabling pet owners to manage paracetamol toxicity effectively.

Table 4.7: Spearman's Rho correlations of knowledge, attitude, and practice of first aid for acetaminophen toxicity among small animal owners in Johor, Malaysia

Spearman's' rho Correlations	TKS (p-value)	TAS (p-value)	TPS (p-value)
TKS	1.000	0.314	0.175
TAS	0.314	1.000	0.328
TPS	0.175	0.328	1.000

4.8. Discussion

This study revealed that most small animal owners in Johor, Malaysia, know the potential risks of acetaminophen toxicity. Still, there are notable differences in their understanding of first-aid practices. The findings indicate a need for targeted educational interventions to enhance small animal owners' abilities to react effectively in emergencies.

Sociodemographic factors, knowledge, attitude, and practice were evaluated based on the results. This demographic data provides information about the study population, which can be used to interpret the levels of knowledge, attitudes, and practices related to first aid for acetaminophen toxicity in small animal owners. The results show that students are the majority of respondents, greatly impacting the overall outcomes of the study. Moreover, participants' different racial and employment backgrounds reflect a wide range of opinions, potentially influencing the level of awareness and practices among small animal owners in Johor.

As for knowledge, the data emphasize the need for targeted educational programs to address gaps in understanding the risks, symptoms, and impacts of acetaminophen toxicity. Increasing awareness could help small animal owners in Johor better prevent and deal with it.

Furthermore, attitude-wise, the findings highlight positive attitudes among the small animal owners, who mostly agreed to contact veterinarians for further acetaminophen poisoning. Besides that, spending on veterinary care, keeping acetaminophen away from pets, consulting experts before giving human medicines, and providing immediate first aid if ingestion occurs. These findings show a responsible outlook on pet care during emergencies.

Moreover, practice-wise, most pet owners show positive responses to emergencies, such as consulting a vet for poisoning cases. However, some practices, like using human medications or relying on home remedies, indicate differences in knowledge that could harm pet health. Safe storage of acetaminophen is generally practised, though a small percentage may leave it in improper places, such as on the table; this will increase the risk of accidental ingestion. There is no data was found regarding the knowledge, attitude, and practice of first aid for acetaminophen toxicity among small animal owners.

This study, following Bloom's criterion cut-off (Goni et al., 2019), clarifies the knowledge, attitudes, and practices of small animal owners concerning first-aid for paracetamol

toxicity. A substantial 44.3% of respondents needed more understanding, highlighting a considerable deficiency in awareness regarding acetaminophen poisoning and its first-aid management. Of the participants, 32.1% displayed moderate knowledge, whereas only 19.8% showed a good understanding, highlighting the necessity for educational and awareness programs.

The results regarding attitude were notably positive, with 85.8% of participants showing a positive attitude towards managing poisoning incidents, reflecting a responsible mindset among pet owners. A small percentage of participants displayed poor (1.9%) and moderate (8.5%) attitudes, suggesting that most pet owners recognize the importance of timely and appropriate emergency responses.

All respondents demonstrated satisfactory practices, which is a positive outcome. Nonetheless, 22.6% demonstrated moderate practices, signifying inconsistent compliance with optimal standards. A majority of respondents (74.5%) indicated adherence to good practices, including right-away consultation with veterinarians and secure storage of medications, reflecting responsible management of pet emergencies.

According to the results of the Chi-Square test, small animal owners' knowledge, attitude, and practice (KAP) levels about first aid for paracetamol poisoning are significantly influenced by their work status. Employment plays a crucial role as it has a strong impact on knowledge ($p = 0.035$), attitude ($p = 0.023$), and practice ($p = 0.044$). Additionally, the pay level shows a significant correlation with attitudes ($p = 0.006$), whereas there is no significant correlation with practice ($p = 0.151$) or knowledge ($p = 0.086$), as this is more than 0.05 p-value.

Other sociodemographic factors, such as age, race, and gender, do not show any significant correlation with the three associations. With wages having a secondary influence on attitudes, these findings emphasize the need to concentrate on employment-related interventions to enhance pet owners' knowledge, attitudes, and practices about first aid for paracetamol poisoning.

The findings from Spearman's rho analysis reveal that while there are some positive correlations among knowledge, attitudes, and practices (KAP), these relationships are weak to

moderate and not consistently impactful across all elements. The association between knowledge and practices is quite weak, which means that having more knowledge doesn't always lead to better first-aid actions for acetaminophen poisoning. Likewise, while attitudes have some influence on practices, the connection is not strong enough to clearly show a significant impact on behaviour.

Based on these results, the null hypothesis, which posits no significant relationship among KAP elements, is accepted. The weak correlation between knowledge and practice and the lack of a strong, consistent link among the variables support the conclusion that knowledge, attitudes, and practices function more independently than cohesively in this context. This shows that external factors, such as lack of training, misinterpretation of information, or unavailability of clear guidelines, may play a more critical role in shaping practices than KAP elements alone.

Epidemiological studies indicate that acetaminophen poisoning is a common cause of toxicosis in both species, often resulting from accidental ingestion of human medications (Cortinovis et al., 2014). A study conducted in Germany, that the increasing availability of over-the-counter acetaminophen products has led to a rise in reported cases of poisoning in pets, particularly in younger animals who may be more prone to exploratory behaviours (McFarland et al., 2017). The usage of this medicine in homes and simple availability cause some pet owners, especially dogs and cats to unintentionally give it to their animals to reduce discomfort or fever. The lack of clear labelling on prescription packaging stating that the substance should be kept away from animals is one of the elements causing this misjudgement. Unaware of the possible harm to animals, some pet owners believe that since acetaminophen is safe for humans, it may be used for their animals in the same manner. Besides that, acetaminophen is one of the cheap medicines that we can buy over the counter, which reduces pain in a short amount of time.

The study demonstrated notable findings on how respondents view acetaminophen toxicity in pets, particularly when considering employment status ($p = 0.023$) and income levels ($p = 0.006$). An intriguing finding was that the majority of participants identifying as students showed enhanced awareness. This shows that the younger generation, who frequently have greater access to educational resources and online information, is more educated about the problems connected with acetaminophen intoxication in pets.

Moreover, this group indicated an understanding of the importance of consulting vets before delivering any human medicine to animals, especially cats and dogs. Such action will reflect rising changes in appropriate pet care among the younger generation, likely encouraged by increased awareness through social media and educational programs.

In cases of suspected acetaminophen toxicity, a rapid response to the treatment is critical. The first step for pet owners is to obtain the animal's vitals, such as the amount of acetaminophen ingested, the time of intake, and its general appearance. Providing this information to the veterinarian facilitates quicker assessment and design of a supportive treatment plan, such as activated charcoal administration, intravenous fluids, and other supportive measures (Ozkan, 2017). Early management is typically the determining factor in preventing severe complications like liver damage or death.

An example from the literature indicates that even pets that consumed considerable amounts of acetaminophen survived due to early medical assistance, which stresses the necessity of awareness and rapid response (Ozkan, 2017). These findings underline the significance of education for all demographics to ensure the well-being of companion animals.

In practice, studies have identified important concerns with veterinary visits and getting medicines for pets. The results show that 36% of pet owners buy drugs for their animals from human pharmacies. This habit greatly adds to drug misadministration in companion animals; thereby, this would be one of the causes of toxicity there.

One cause for this trend is the restricted availability of veterinary clinics compared to human pharmacies in terms of numbers and accessibility. For example, there are fewer veterinary clinics around Malaysia, including public and private ones, and recently, there is the news that more veterinary graduates are needed in Malaysia ((Meikeng, 2019). However, this number looks small to the thousands of private human pharmacies nationwide. So this can justify that there are fewer veterinary clinics available in Malaysia, which causes pet owners to seek help at human pharmacies and mistreat the pets and cause toxicity to them.

In addition, veterinary clinics' operational hours sometimes correlate differently with pet owners' needs. Many surrounding area veterinarian offices close around 6:00 PM, leaving

pet owners in a difficult situation during an emergency or regular business hours. In contrast, human pharmacies often open later into the evening and occasionally 24/7, making them a more accessible choice for pet owners seeking rapid animal remedies.

This difference in availability and operation hours causes small animal owners to rely on human pharmacies as a source of first aid for their pets. Though well-meaning, this approach sometimes results in the prescription of wrong or dangerous medicine, therefore increasing the risk of toxicosis in the pets. To solve this, efforts should be made by increasing the number of veterinary clinics, extending their operating hours till night, and educating pet owners on the need to consult veterinary professionals before administering any medications.

CHAPTER 5
CONCLUSION

5.1 Conclusion

This research highlights the significant role of sociodemographic factors, such as employment and income, in shaping small animal owners' knowledge, attitudes, and practices (KAP) regarding acetaminophen toxicity in Johor, Malaysia. However, it also uncovers critical gaps, particularly in awareness and misconceptions about the safety of human medications for pets, especially acetaminophen. Addressing these to focus educational efforts and improve labelling of acetaminophen products to reduce risks to pets. Future research should consider broader populations and assess the effectiveness of interventions, emphasizing collaboration between veterinarians, policymakers, and pet owners to enhance companion animal care.

5.2 Future Recommendation

In the future, the research should explore this study in other states of Malaysia that own small animals. Moreover, it focuses on how to educate the public and also create awareness about acetaminophen toxicity in small animal owners. Studies could also examine veterinarians' educational roles and how training programs affect owners' acetaminophen toxicity reactions. To address concerns about animal safety, policymakers should explore clearer and standardized warning labels for over-the-counter drugs. Community-level programs should be improved by veterinary experts, public health agencies, and animal welfare organizations to improve pet safety and toxicological education.

APPENDICES

Acetaminophen toxicosis in pets

Hello, greetings to all pet owners!

My name is Thushintha D/O S Tanavanthan a fourth-year veterinary student from the Faculty of Veterinary Medicine, University Malaysia Kelantan.

You have been invited to participate in a simple online survey regarding first aid for acetaminophen toxicosis among pet owners in Malaysia. This survey aims to investigate the current level of knowledge, awareness and practice towards first aid for acetaminophen toxicosis among pet owners in Malaysia. You are eligible to participate in this study if you meet the following criteria as listed below:

1. Age of 18 to 70 years old

2. Resident in Johor, Malaysia

3. Owns a dog or cat

4. Able to read and understand Bahasa Melayu and English

This survey contains 5 sections:

1. Pet owner's information

2. Knowledge about acetaminophen toxicity

3. Awareness of acetaminophen toxicity and first aid for small animal pet owners

4. Practice towards first aid acetaminophen toxicity among small animal owners

Participation in this study is entirely voluntary. You have the right to refuse to participate and are free to withdraw at any time without facing coercive action. All the personal information collected will be kept strictly confidential and will be used solely for research purposes only. Your response will be very helpful for me to assess the current knowledge, awareness, and practice of FIRST AID FOR ACETAMINOPHEN TOXICITY AMONG SMALL ANIMAL OWNERS in Johor Malaysia.

If you have any questions about the study, please contact Thushintha Tanavanthan (d20b0092@siswa.umk.edu.my). By completing this survey, you are consenting to participate in this study.

Acetaminophen will be used as "PANADOL" throughout in this research

Salam sejahtera kepada semua pemilik haiwan peliharaan! Saya Thushintha A/P S Tanavanthan, pelajar tahun empat Doktor Perubatan Veterinar daripada Fakulti Perubatan Veterinar, Universiti Malaysia Kelantan.

Anda telah dijemput untuk mengambil bahagian dalam tinjauan dalam talian yang ringkas berkenaan pertolongan cemas untuk toksisiti “Acetaminophen” dalam kalangan pemilik haiwan peliharaan di Johor,Malaysia. Tinjauan ini bertujuan untuk menyiasat tahap

pengetahuan, kesedaran dan amalan semasa terhadap pertolongan cemas untuk toksikosis acetaminophen dalam kalangan pemilik haiwan peliharaan di Johor,Malaysia. Anda layak untuk menyertai kajian ini jika anda memenuhi kriteria berikut seperti yang disenaraikan di bawah:

1. Berumur 18 hingga 70 tahun

2. Warganegara Malaysia atau pemastautin Malaysia

3. Memiliki anjing atau kucing

4. Boleh membaca dan memahami Bahasa Melayu dan Bahasa Inggeris

Tinjauan ini mengandungi 5 bahagian:

1. Maklumat pemilik haiwan peliharaan

2. Pengetahuan tentang toksisiti acetaminophen

3. Kesedaran terhadap toksisiti acetaminophen dan pertolongan cemas untuk haiwan peliharaan

4. Amalan terhadap toksikosis acetaminophen pertolongan cemas di kalangan pemilik haiwan peliharaan

Penyertaan dalam kajian ini adalah secara sukarela. Anda mempunyai hak untuk menolak untuk mengambil bahagian dan bebas untuk menarik diri pada bila-bila masa tanpa menghadapi tindakan paksaan. Semua maklumat peribadi yang dikumpul akan dirahsiakan dan akan digunakan semata-mata untuk tujuan penyelidikan sahaja. Maklum balas anda akan sangat membantu saya untuk menilai pengetahuan, kesedaran dan amalan semasa PERTOLONGAN CEMAS UNTUK TOKSISIITI ACETAMINOPHEN DALAM KALANGAN PEMILIK HAIWAN KECIL di Johor Malaysia.

Jika anda mempunyai sebarang pertanyaan tentang kajian, sila hubungi Thushintha Tanavanthan (d20b0092@siswa.umk.edu.my). Dengan melengkapkan tinjauan ini, anda bersetuju untuk mengambil bahagian dalam kajian ini.

Acetaminophen akan digunakan sebagai "PANADOL" sepanjang penyelidikan ini

* Indicates required question

1. CONSENT FORM / BORANG PERSETUJUAN *

I do understand the purpose of the survey and agree to participate in this study
Saya memahami tujuan tinjauan dan bersetuju untuk mengambil bahagian dalam kajian ini.

Mark only one oval.

- ◯ Yes I agree / Ya, saya setuju

Skip to question 2

Pet owner's information / Maklumat pemilik haiwan peliharaan

2. Gender/ jantina *

Tick all that apply.

- ☐ Male/ Lelaki
- ☐ Female/ Perempuan

3. Age (Year) / Umur (Tahun) *

Mark only one oval.

- ◯ 18-25
- ◯ 26-39
- ◯ 40-59
- ◯ 60-70

4. Race/ Bangsa *

Mark only one oval.

- ◯ Malay / Melayu
- ◯ Chinese / Cina
- ◯ Indian / India

5. Employment status / Status Pekerjaan *

Mark only one oval.

- ◯ Civil servant/ Penjawat awam
- ◯ Self employed / Bekerja sendiri
- ◯ Private sector / Sektor Swasta
- ◯ Pensioner / Pesara
- ◯ Housewife / suri rumah
- ◯ Student / Pelajar
- ◯ Unemployed / Tidak bekerja

6. Salary / Pendapatan *

Mark only one oval.

- ◯ < RM 2500
- ◯ RM 2500 - RM 4850
- ◯ RM 4850- RM 10,000
- ◯ > RM 10,001
- ◯ none / Tiada

Knowledge/ Pengetahuan

7. Do you know what is Panadol? *
Adakah anda tahu apa itu Panadol?

Mark only one oval.

- ◯ Yes / Ya
- ◯ No / Tidak
- ◯ Dont Know (unsure) / Tidak Pasti

8. Do you know what the bad impact of panadol poisoning in pets? *
Adakah anda tahu apa itu keracunan panandol dalam kalangan haiwan belaan ?

Mark only one oval.

- ◯ Yes/ Ya
- ◯ No/ Tidak
- ◯ Dont know/ Tidak Tahu

9. Can you identify the common signs and symptoms of panadol poisoning in pets? *
Bolehkah anda mengenal pasti tanda dan gejala biasa keracunan panadol dalam haiwan peliharaan?

Mark only one oval.

- ◯ Swollen face/Muka bengkak
- ◯ Swollen limbs/ Kaki bengkak
- ◯ Jaundice/ kekuningan pada badan
- ◯ No symptoms/Tiada simptom

10. Do you know that panadol will cause death to pets ? *
Tahukah anda panadol akan menyebabkan kematian kepada haiwan peliharaan?

Mark only one oval.

- ◯ Yes/Ya
- ◯ No/ Tidak
- ◯ Maybe / Tidak pasti

11. Do you know how to store panadol medicine correctly? *
Adakah anda tahu penyimpanan ubat panadol dengan betul ?

Mark only one oval.

- Yes / Ya
- No / Tidak

12. Do you know how to do first aid to pets that has panadol toxicity ?
Adakah anda tahu cara melakukan pertolongan cemas kepada haiwan peliharaan yang mempunyai keracunan panadol?

Mark only one oval.

- Yes/ Ya
- No/ Tidak

Atitude/Sikap

13. It is important to contact a veterinarian if your pet has panadol poisoning. *

Adalah penting untuk menghubungi doktor haiwan jika haiwan kesayangan anda mengalami keracunan panadol.

Mark only one oval.

	1	2	3	4	5	
Very	◯	◯	◯	◯	◯	Very Important / Sangat Penting

14. I believe it is worth to spend money bring my pets for veterinary attention
Saya percaya ia berbaloi untuk membelanjakan wang membawa haiwan peliharaan saya untuk perhatian veterinar

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree /Sangat Setuju

15. i believe putting away of the panadol from pets will reduce the accidents of eating
Saya percaya letak jauh panadol daripada haiwan peliharaan akan mengurangkan kemalangan makan

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree /Sangat Setuju

16. It is important to consult a veterinarian before giving human medicine to my pet
Berunding dengan doktor haiwan sebelum memberi ubat manusia kepada haiwan kesayangan saya adalah sangat penting

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree /Sangat Setuju

17. It is important to give first-aid therapy as soon as you notice your pet ingested panadol
Memberikan terapi pertolongan cemas sebaik sahaja anda menyedari haiwan kesayangan anda termakan panadol

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree /Sangat Setuju

Practice/ latihan

18. When your pet is sick how often you consult a veterinarian ? *
Apabila haiwan kesayangan anda sakit berapa kerap anda berjumpa doktor haiwan?

Mark only one oval.

- Always/Sentiasa
- sometimes/Kadang kala
- Rarely/Jarang
- Never/ Tidak pernah

19. If your pet suffers panadol poisoning, what are your actions? *
Sekiranya haiwan kesayangan anda mengalami keracunan panadol, apakah tindakan anda ?

Mark only one oval.

- Give charcoal medicine/Memberikan ubat charcoal
- Home remedy / Remedi di rumah sahaja
- Bring animal to the clinic as soon as possible/Membawa haiwan ke klinik secepat mungkin

20. Do you buy medicine for your pet from a human pharmacy? *
Adakah anda membeli ubat untuk haiwan kesayangan anda dari farmasi manusia ?

Mark only one oval.

- Always/ Sentiasa
- Sometimes/Kadang kala
- Rarely/Jarang
- Never/Tidak pernah

21. Who will be reaching out first, if your animal has panadol poisoning? *

Siapa yang akan menghubungi terlebih dahulu, jika haiwan anda mempunyai keracunan panadol ?

Mark only one oval.

- Veterinary clinic/Klinik veterinar
- Pet shop/Kedai haiwan peliharaan
- Neighbour or friends/Jiran atau kawan

22. Where is the storage of panadol in your house? *

Di manakah tempat simpanan panadol di rumah anda?

Mark only one oval.

- on the table/Atas meja
- In first aid box or kit/Dalam peti pertolongan cemas
- Refrigerator/Peti sejuk

REFERENCES

Eyers, S. J. (2012). *The effect of regular paracetamol on bronchial responsiveness and asthma control in mild to moderate asthma*. https://ourarchive.otago.ac.nz/bitstream/10523/2454/1/EyersSallyJ2012PhD.pdf

Essentials of emergency medicine. (n.d.). Google Books. https://books.google.com.my/books?id=HnbKaRQAXOIC&pg=PA814&redir_esc=y#v=onepage&q&f=false

Ross-Degnan, D. (1993). From confrontation to Dialogue: Pharmaceutical politics in the 1990s. Health Affairs, 12(2), 208–210. https://doi.org/10.1377/hlthaff.12.2.208

Bcps, S. P. K. P. (n.d.). *The top 300 of 2022*. https://clincalc.com/DrugStats/Top300Drugs.aspx

Lunde, P. (1993). Bad Medicine. The prescription drug industry in the third world. Health Policy, 24(3), 287–288. https://doi.org/10.1016/0168-8510(93)90047-s

Farrell, S. E., MD. (n.d.). Acetaminophen toxicity: practice essentials, background, pathophysiology. https://emedicine.medscape.com/article/820200-overview?form=fpf

Ohashi, N., & Kohno, T. (2020). Analgesic Effect of Acetaminophen: A review of known and Novel mechanisms of action. Frontiers in Pharmacology, 11. https://doi.org/10.3389/fphar.2020.580289

Lee, W. M. (2017). Acetaminophen (APAP) hepatotoxicity—Isn't it time for APAP to go away? Journal of Hepatology, 67(6), 1324–1331. https://doi.org/10.1016/j.jhep.2017.07.005

Cortinovis, C., Pizzo, F., & Caloni, F. (2014). Poisoning of dogs and cats by drugs intended for human use. *The Veterinary Journal*, *203*(1), 52–58. https://doi.org/10.1016/j.tvjl.2014.11.004

McFarland, S. E., Mischke, R. H., Hopster-Iversen, C., Von Krueger, X., Ammer, H., Potschka, H., Stürer, A., Begemann, K., Desel, H., & Greiner, M. (2017). Systematic account of animal poisonings in Germany, 2012-2015. *Veterinary Record*, *180*(13), 327. https://doi.org/10.1136/vr.103973

Meikeng, Y. (2019, November 28). Animal doctors needed. *The Star*. https://www.thestar.com.my/news/nation/2018/05/06/animal-doctors-needed/

Özkan, B. (2017). Acetaminophen toxicosis in a Cat. *Journal of Istanbul Veterinary Sciences*, *1*(1), 1–4. https://doi.org/10.30704/http-www-jivs-net.295062

Ponnusamy, P. (2014, August 10). (PDF) paracetamol poisoning in a cat and its treatment. paracetamol poisoning in a cat and its treatment. https://www.researchgate.net/publication/328064093_PARACETAMOL_POISONING_IN_A_CAT_AND_ITS_TREATMENT

Young, N. W., Royal, K. D., & Davidson, G. S. (2017). Baseline knowledge of potential pet toxins: a survey of pharmacists. Pharmacy Practice (Granada. Ed. Impresa), 15(4), 1058–1058. https://doi.org/10.18549/pharmpract.2017.04.1058

Villar D, Buck WB. Ibuprofen, aspirin and acetaminophen toxicosis and treatment in dogs and cats. Vet Hum Toxicol 1998;40:156–162. https://pubmed.ncbi.nlm.nih.gov/6729821/

Savides MC, Oehme FW, Nash SL, Leipold HW. The toxicity and biotransformation of single doses of acetaminophen in dogs and cats. Toxicol Appl Pharmacol 1984;74:26–34. https://pubmed.ncbi.nlm.nih.gov/6729821/

Nash SL, Oehme FW. A review of acetaminophen's effect on methemoglobin, glutathione, and some related enzymes. Vet Hum Toxicol 1984;26:123–132. https://pubmed.ncbi.nlm.nih.gov/6375108/

Young, N. W., Royal, K. D., & Davidson, G. (2017). Baseline knowledge of potential pet toxins: a survey of pharmacists. Pharmacy Practice (Granada. Ed. Impresa), 15(4), 1058. https://doi.org/10.18549/pharmpract.2017.04.1058

ÖZKAN, B. (2017, April 13). Acetaminophen Toxicosis in a Cat. Journal of Istanbul Veterinary Sciences, 1(1), 1–4. https://doi.org/10.30704/http-www-jivs-net.295062

Diagnostic studies on acetaminophen toxicosis in Dogs. (n.d.). In Researchgate. Retrieved April 28, 2024, from https://www.researchgate.net/publication/256475517_Diagnostic_studies_on_acetaminophen_toxicosis_in_Dogs

Richardson, J. A. (2000, December). Management of Acetaminophen and Ibuprofen Toxicoses in Dogs and Cats. Journal of Veterinary Emergency and Critical Care, 10(4), 285–291. https://doi.org/10.1111/j.1476-4431.2000.tb00013.x

Anvik J. O. (1984). Acetaminophen toxicosis in a cat. The Canadian veterinary journal = La revue veterinaire canadienne, 25(12), 445–447. Retrieved from https://dergipark.org.tr/tr/download/article-file/473217.

Fadel, C. , Sartini, I. , & Giorgi, M. (2021). Paracetamol: A focus on dogs. American Journal of Animal and Veterinary Sciences, 16(4), 247–262.

Moore, R. A. , & Moore, N. (2016). Paracetamol and pain: The kiloton problem. European Journal of Hospital Pharmacy: Science and Practice, 23(4), 187–188.

KHAN.SAFDAR. (2018). Analgesics (Toxicity). Veterinary Manual; MSD VeterinaryManual. https://www.msdvetmanual.com/toxicology/toxicities-from-human-drugs/analgesics-toxicity

Acetaminophen toxicosis in cats: a CVC doodle. (2017, March 17). DVM 360. https://www.dvm360.com/view/acetaminophen-toxicosis-cats-cvc-doodle