UNIVERSITI PUTRA MALAYSIA

THE DETECTION AND RISK FACTOR OF EAR MITES, OTODECTES CYNOTIS FROM SHELTER AND PET CATS AROUND SELANGOR, MALAYSIA

LOOI SHYN EN

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FACULTY OF VETERINARY MEDICINE
UNIVERSITI PUTRA MALAYSIA
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THE DETECTION AND RISK FACTOR OF EAR MITES, *OTODECTES CYNOTIS* FROM SHELTER AND PET CATS AROUND SELANGOR, MALAYSIA

LOOI SHYN EN

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CERTIFICATION

It is hereby certified that we have read this project paper entitled “The Detection and Risk Factor of Ear Mites, *Otodectes cynotis* From Shelter and Pet Cats Around Selangor, Malaysia”, by Looi Shyn En and in our opinion, it is satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the course VPD 4999- Final Year Project.

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DR. NOR AZLINA ABDUL AZIZ

DVM (UPM), MSc (UPM), PhD (BRISTOL)

Department of Veterinary Pathology & Microbiology
Faculty of Veterinary Medicine
University of Putra Malaysia
(Supervisor)

_____

DR. CHAN WEI YEE

DVM (UPM), MVM (UPM), PhD (ADELAIDE, AUSTRALIA)

Department of Companion Animal Medicine and Surgery
Faculty of Veterinary Medicine
University of Putra Malaysia
(Co-Supervisor)

ASSOCIATE PROFESSOR DR. GAYATHRI THEVI SELVARAJAH

DVM (UPM), PhD (NETHERLANDS)
Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine
University of Putra Malaysia
(Co-Supervisor)

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Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripade keperluan kursus VPD 4999 – Projek Ilmiah Akhir Tahun

PENGESANAN DAN FAKTOR RISIKO HAMA TELINGA, *OTODECTES CYNOTIS* DARIPADA PERLINDUNGAN DAN KUCING HAIWAN DI SEKITAR SELANGOR, MALAYSIA

Oleh

Looi Shyn En

2023

Penyelia: Dr. Nor Azlina Abdul Aziz

Penyelia Bersama: Dr. Chan Wei Yee

Dr. Gayathri Thevi Selvarajah

Hama telinga (*Otodectes cynotis*) adalah salah satu daripada ektoparasit yang paling biasa diperhatikan dalam haiwan pendamping, terutamanya dalam kucing. Serangan hama telinga adalah penyakit klinikal penting dalam haiwan pendamping dan terkenal sebagai faktor penyebab otitis eksterna yang boleh menyebabkan masalah teruk seperti pekak dan juga menyumbang kepada masalah saraf daripada jangkitan sekunder jika tidak dirawat. Walaupun serangan hama telinga dalam haiwan pendamping adalah perkara biasa di Malaysia, literatur yang tersedia sangat terhad. Oleh itu, kajian ini bertujuan untuk mengesan kehadiran hama *Otodectes cynotis* di tempat perlindungan dan kucing milik dan untuk memahami faktor risiko dan pengurusan kurap *otodectic* pada kucing milik dan kucing perlindungan di Selangor. Untuk metodologi, sampel telinga swab diperolehi daripada kucing individu di tiga pusat perlindungan dan lima klinik di Selangor (Seri Kembangan, Petaling Jaya, Kajang, Kuala Lumpur, Serdang dan Hulu Langat). Swab digulung

pada slaid kaca dan setitik larutan gliserol ditambah untuk memudahkan pemeriksaan mikroskopik. Kehadiran hama telah direkodkan. Persatuan antara serangan hama telinga dan faktor risiko telah diterokai menggunakan ujian khi kuasa dua di mana $p<0.05$ dianggap signifikan secara statistik. Secara keseluruhan, 22 (11.78%) daripada 188 sampel adalah positif untuk serangan hama telinga. Peratusan yang lebih besar daripada kucing positif hama telinga adalah dewasa, baka tulen dan tinggal di kawasan luar rumah kebanyakkan masanya. Kadar pengesanan adalah jauh lebih rendah pada kucing daripada pemilik/tempat perlindungan yang mengamalkan penjagaan pencegahan ($p<0.05$). Kesimpulannya, kajian ini menunjukkan bahawa pengesanan tinggi serangan hama telinga dilihat dalam kucing peliharaan and kucing perlindungan tanpa penggunaan ubat pencegahan anti-parasit dan disyorkan untuk menggunakan penjagaan pencegahan berkala sebagai cara yang berkesan untuk mengawal serangan hama telinga serta untuk mencegah penyakit lain. serangan ektoparasit.

Kata kunci: *Otodectes cynotis*; kucing; perlindungan haiwan; kucing peliharaan, hama telinga

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of course VPD 4999 – Final Year Project.

THE DETECTION AND RISK FACTOR OF EAR MITES, *OTODECTES CYNOTIS* FROM SHELTER AND PET CATS AROUND SELANGOR, MALAYSIA

By

Looi Shyn En

2023

Supervisor: Dr. Nor Azlina Abdul Aziz

Co-Supervisor: Dr Chan Wei Yee

: Dr. Gayathri Thevi Selvarajah

Ear mites (*Otodectes cynotis*) are one of the most common ectoparasites observed in companion animals, particularly in cats. Ear mite infestation is a clinically important disease in companion animals and is well-known to be a causing factor of otitis externa which can develop severe problems such as deafness and even contribute to neurological problems from secondary infection if left untreated. Although ear mites' infestation in companion animals is common in Malaysia, there is limited literature available. Hence, this study aims to detect the presence of *Otodectes cynotis* mites in shelter and owned cats and to understand the risk factor and management of *otodectes* ear mites in cats of owned and shelter cats in Selangor. For methodology, swab ear samples were obtained from individual cats in three shelters and five clinics within Selangor (Seri Kembangan, Petaling Jaya, Kajang, Kuala Lumpur, Serdang and Hulu Langat). Swabs were rolled onto glass slides and a drop of glycerol solution was added to facilitate microscopic examination. Presence of mites were recorded. Association between infestation of ear mites and risk factors

were explored using the chi-square test where $p<0.05$ was considered statistically significant. Overall, 22 (11.78%) out of 188 samples were positive for ear mite infestation. A larger percentage of cats positive for ear mites were adults, pure breeds and have a predominantly lives outdoors. The detection rate was significantly lower in cats from owners/shelters who practise preventive care ($p<0.05$). In conclusion, this study showed that high detection of ear mite infestation is seen in both shelter cats and pet cats without anti-parasitic preventive medication application and it is recommended to employ periodic preventive care as an effective way to control ear mite infestation as well as to prevent other ectoparasites infestation.

Keywords: *Otodectes cynotis*; cats; animal shelter; pet cats; ear mite

1.0 INTRODUCTION

Parasite by definition is multicellular or unicellular eukaryotic pathogenic organism that performs parasitism which is a subtype of symbiosis that impacts the host's health negatively while the parasites benefit from the coexistence (Saari *et al*., 2019). There are two types of host-parasite relationships which could be categorised based on their location parasites reside. Ectoparasites are those confined to the exterior part of the host's body while endoparasites are those that are confined within the host's body (Bush A.O.,2001). Ear mites, *Otodectes cynotis* are one of the most common ectoparasites known to contribute to more than 50% of the feline otitis externa cases (Griffin,1993; Yang & Huang, 2016).

Domestic cats (*Felis catus)* are one of the most ubiquitous animals found living among humans. Cats were domesticated about 10,500 years ago due to the start of agriculture when humans shifted from a nomadic lifestyle to permanent human settlement. With the start of agriculture, there was an increase in food sources of cats in human settlement areas which became the catalyst to cats' domestication (Driscoll *et al*., 2009). Since then, cats have become one of the popular choices of companion animals for many people and defined as pet cats. But when pet cats get abandoned or lost, other humans rescue them and they are placed in an animal shelter until they are adopted to families and are defined as shelter cats.

Otodectes ear mites are one of the contributing factors of ear diseases in cats such as feline otitis externa and dermatitis. Cats, as companion animals, are often in close contact with humans and other animal species. With the mites being highly contagious, it is able to infest other companion animals like other cats, dogs and rabbits

as well. In rare cases, humans could also be infested with *otodectes* ear mites shown by a reported case of otitis externa in a man caused by *otodectes* ear mites (Heyning, and Thienpont, 1977) suggesting that infestation need to be prevented.

Several studies around the world reported the prevalence of *otodectes* ear mites in cats. A study from Libya showed a prevalence of 47.1% (24 out of 51 cats sampled) (Hiblu *et al.*, 2021) and another study from Taiwan mentioned that the prevalence ranges from 0.5% to 37% depending on geographical location (Yang & Huang, 2016). There are a few risk factors that are documented that contributed to the infestations of the mites such as type of ownership (Neves *et al.,* 2023), age, predominantly an outdoor lifestyle and lack of antiparasitic treatment (Souza *et al.*, 2008; Genchi *et al.*, 2021).

Currently, there is limited information on the detection of *otodectes* ear mites in pet cats and shelter cats in Malaysia. In a country where small animal companionship is increasing among the human household, it is vital to provide data regarding the prevalence of these mites in cats. These mites do cause secondary problems when left untreated and it is also a potential zoonosis threat to humans. Hence, this study is aimed to provide information regarding the prevalence of *otodectes* ear mites in pet cats and shelter cats as well as the risk factors to facilitate the management, treatment, control and client education in reducing and preventing infestations in cats.

2.0 LITERATURE REVIEW

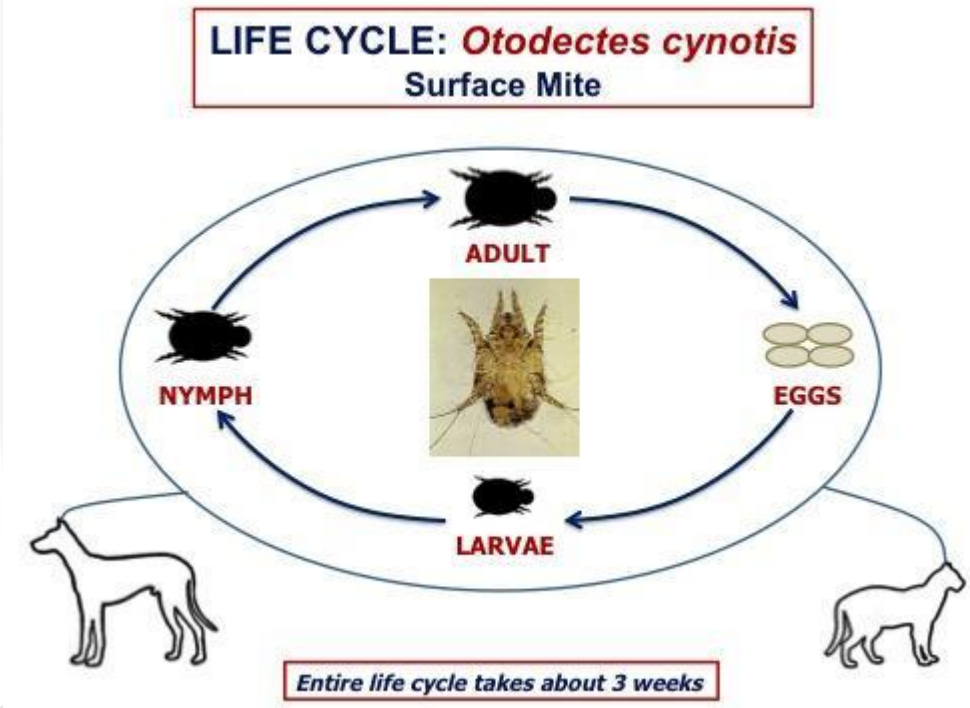
2.1 Introduction of Ear Mites, *Otodectes cynotis*

Ear mites, *Otodectes cynotis,* from the family Psoroptidae, is an ectoparasite that infest all mammals and occasional ruminants. They have a worldwide geographical distribution and normally reside in the external ear canal where all of the life stages are able to be observed in this area. However, it is not uncommon for it to be found on other parts of the body of an infested animal as well (Mullen, & Durden, 2009). It is a non-burrowing mite and it feeds on epidermal debris and tissue fluid from the superficial epidermis (Ashwini & Chetan Kumar, 2023). Microscopically, it has four pairs of long legs with short pretarsi. The males have cup-like structure on all short pedicles but only presence on the first and second pair of legs for females. The mite size ranges from 295 µm to 500 µm. (*Otodectes Cynotis - Learn about Parasites - Western College of Veterinary Medicine*, 2021). The mites spread via direct contact with infested animals.

2.2 Life Cycle

The life cycle of the *otodectes* ear mites is approximately 18 to 28 days or approximately three weeks long to complete. After oviposition, the eggs could be observed sticking to the hair in the ear canal and occasionally on the host's body. The eggs hatched on average 70 hours later (Tonn, 1961). In the six-legged larva stage, it feeds for approximately one week and develops into a protonymph which has eight legs. From the protonymph, it moults into a deutonymph which is sexually undetermined. An adult male nymph attaches to the deutonymph end to end. If a female mite is produced, she becomes egg-bearing post-copulation and if a male mite is produced after attachment, it is free to attach to another deutonymph (Campbell & Kennis, 2004). The

otodectes ear mites can survive in the environment up to 12 days depending on the surrounding temperature (Wen Yang & Huang, 2016).



Source:University of Sasketchewan

2.3 Pathogenesis

In mammals, especially in cats, the entire developmental stage of *otodectes* ear mites from egg to adult proceed in the external ear canal. The mites are non-burrowing mites that feed on the epithelial of the ear causing mechanical irritations and inflammation (known as otitis externa). The body's response is to increase sebum production and

along with blood and mites' debris, it forms the dark, brown ceruminous discharge commonly seen during physical examination of the ear (Campbell & Kennis, 2004). The ceruminous discharge eventually fills up the entire ear canal creating a conducive moist environment for secondary bacterial infection. With the proliferation of secondary bacterial infection, ear discharge is generally observed and also, the ear canal tends to be foul-smelling (Roy *et al.*, 2011). Eventually, the tympanic membrane may be damaged by the bacteria (White & Cole, 2021) Besides ceruminous discharge, infested mammals tend to have severe pruritus from the hypersensitivity reactions of the mites' saliva (Roy *et al.,* 2011) and due to the severe pruritus, the tympanic membrane could also be damaged through the constant scratching of the ear. When the tympanic membrane is involved, it might be diagnosed with otitis media and the clinical signs presented are likely to be deafness and nervous signs like Horner's syndrome and facial paralysis as the sympathetic pathway may be damaged from the constant trauma of scratching (Woodward, 2020).

2.4 Clinical signs

Clinical signs of ear mite infestation are generally intense pruritus which can be observed in about 40% of cases (Sotiraki *et al.,*2001), scratching of ears causing secondary alopecia, swelling of the external ear canal and head shaking. In more severe cases, ulceration can develop from the intense scratching and even neurological problems such as head tilt, facial nerve paralysis rooting from the development of otitis media (Woodward, 2020). Upon physical examination of the ear canal, presence of moistened, brown-black exudates giving a coffee-ground appearance are commonly noticed and occasionally, pinnal-pedal reflex can be detected when the pinna is manipulated (Campos *et al.*, 2021) or when a swab is inserted in the ear canal (Ashwini

Kumar, 2023). These mites are commonly found in the external ear canal (Mullen & OConnor, 2019). and occasionally, found on heads and tails as cats tend to sleep in a curled-up manner (Six *et al.*, 2016; Sasikala V *et al.*, 2011).

3.0 MATERIALS AND METHODS

3.1 Sampling site and Population

There are a total of three shelters, four private vet clinics around Selangor namely Seri Kembangan, Petaling Jaya, Kajang, Kuala Lumpur, Serdang and Hulu Langat and University Veterinary Hospital (UVH), UPM have been selected for my sampling collection. The selection of clinics and shelters were based on convenient sampling and agreement of respective clinics and shelters owners.

3.2 Sampling

The required number of samples expected for this study is 275 as it was estimated Malaysia's prevalence to be similar to India which is 0.234 (Yang & Huang, 2016), with precision (5%) and significance level (0.05) in the calculation according to Naing, 2003.

Using the formula: -

$$\boldsymbol{n = [\frac{(\frac{Z\ alpha}{2})^2 (P)(1-P)}{d^2}]}$$

n is the required sample size, $\frac{Z\ alpha}{2}$ is the critical value from the standard normal distribution for the chosen alpha level, P is the expected prevalence of *Otodectes cynotis* mites in shelter cats and pet cats, and d is the desired level of precision

where:

$\frac{Z\ alpha}{2}$ = 1.96 (for alpha level of 0.05)

P = 0.234 (expected prevalence)

d = 0.05 (desired level of precision)

$$\boldsymbol{n = [\frac{(1.96)^2(0.234)(1-0.234)}{0.005^2}] = 275}$$

To determine the prevalence of *Otodectes cynotis* with 5% precision and 95% confidence level, given an estimated prevalence of 0.234, a sample size of 275 samples from shelter and pet cats in Kuala Lumpur would be required. However, due to the 5-week length of the final year assignment and the limited time available, the sample size has been limited to a maximum of 60 samples only (30 samples from shelter cats and 30 samples from pet cats).

To collect the ear samples, a sterile clean cotton swab was inserted into the external ear canal, rotated 360° once and stored in a sterile tube that came along with the cotton swab. The samples were stored in room temperature until further processing using the microscopic examination was done

3.3 Microscopic Examination of Samples

A drop of glycerol was placed on the glass slide. The cotton swab was then removed from their tube and gently dab on the glycerol to place some of the sample on to the glycerol. A cover slip was then placed on the glycerol and slight pressure was applied onto the cover to flatten and break down the ear sample (Appendix 5). The slide was then examined under light microscope at 4x magnification and 10x magnification to observe the presence of *otodectes* ear mite. Any presence of ear mites (Figure 1) was considered positive while no presence of ear mites was considered as negative detection.

Figure 1: Presence of *otodectes* ear mites under light microscope

3.4 Risk factor

Some of the risk factors that have been identified and selected are ownership, age, living environment and preventive care.

Risk factor “Ownership” in this study has been defined as the type of ownership the cat has. It has been categorised under two types of ownership which is “Shelter Cats” and “Pet Cats”. “Shelter Cats” are cats that were stray and owner-less and have been placed in an environment and given the basic need of food, water and shelter. These cats tend not to have a name and live in a large colony of other cats that have a similar situation. “Pet Cats' ' are cats that have an owner, given individual attention of tender loving care and have a name.

For the risk factor of “Age” in my study, the samples collected have been categorised to “Youngs” and “Adults”. “Youngs” are cats that are one year and below while “Adults” are those that are older than one year till geriatric.

For the risk factor of “Living Environment”, the samples are categorised under “Indoor” and “Outdoor”. “Indoor” are cats that live predominantly within the house compound while “Outdoor” are cats that spend most of their time outdoors and stay in house intermittently.

Lastly but not least, risk factor “Prevention Care”. Under the “Preventive Care” factor, there are two categories which are “No Preventive Effort” and “Preventive Effort”. “No Preventive Effort” are cats that are given anti-ectoparasitic drugs topically or orally but the subsequent dose is given after more than one month or cats that do not receive any anti-ectoparasitic drugs. “Preventive Effort” are cats that are given an-ectoparasitic drug monthly.

3.5 Statistical analysis

Data was collected, arranged and analysed using Microsoft Excel version 2016. From the data tabulated, the prevalence of *otodectes* ear mites infestation was calculated with the formula of total positive case over the total number of samples collected.

$$\boldsymbol{Prevalence\ of\ otodectes\ mites\ in\ cats} = \frac{\boldsymbol{total\ positive\ samples\ of\ otodectes\ mites\ cases}}{\boldsymbol{total\ number\ of\ samples\ collected\ from\ shelter\ cats\ and\ pet\ cats}}$$

Chi square value was calculated for the possible risks that have been identified and selected which are “Ownership”, “Age”, “Preventive Care” and “Living environment”. Significance values for each possible risk were calculated and identified before conclusions were made. Null hypothesis should be rejected if the p-value is less than 0.05 because it is significant.

4.0 RESULT

The overall prevalence of *otodectes* ear mites in cats in Selangor is 11.7% (95% CI= 7.63-17.38, n = 22/188). The positive cases from shelter cats were 10 out of 63 (15.87%) shelter cats while from pet cats, it was 12 out of 125 (9.6%) indicating *otodectes* ear mites infestation. Chi square test was used to analyse the association and all of the risk factors showed no significance ($p>0.05$) difference except for risk factor "Preventive Care" ($X^2=6.0$; df=1; $p=0.0143$) where no preventive care was highly associated with prevalence of ear mites infestation in cats. (see Table 1)

Table 1 : Risk factors associated with Otodectes ear mites infestation in Cats

Possible Risk Factors	No. of cats	No of cats (%) infected with ear mites	Chi square value (X^2)	df	SIgnificant value(p)
Ownership:					
Shelter	63	10 (15.87%)	1.4997	1	0.2965
Owned	125	12 (9.6%)			
Age					
Young	48	6 (12.5%)	0.0685	1	0.7935
Adult	140	16 (11.43%)			
Living environment					
Indoor	124	14 (11.29%)	0.1556	1	0.6932
Outdoor	38	5 (13.16%)			
Preventive care					
Prevention effort	85	6(7.05%)	6.0000	1	0.0143*
No prevention effort	80	16(20%)			

*p-value < 0.05 = Significant finding

5.0 DISCUSSION

This study aims to provide an insight into the current status of *otodectes* ear mites infestation in shelter and pet cats in Selangor. In this study, the prevalence of *otodectes* ear mites infestation was 11.7%. The technique used to confirm the positive case of infestation is through microscopic examination of the ear samples collected from all the cats in this study. Due to the lack of scholarly article about the prevalence of *otodectes* ear mites infestation in Malaysia, this study's prevalence were compared to other countries and it was observed to be higher than Japan's prevalence (9.4%) while slightly lower than Iran and Israel (12%) (Yang & Huang, 2016). Malaysia is a tropical country that experiences tropical weather throughout the year unlike Japan, Iran and Israel which have temperate climate. A few studies found that the infestation rate of *otodectes* ear mites is highest during winter however seasonal study including the monsoon season could be useful to understand the situation in Malaysia (Al-Hosary, Mostafa, 2022; Fanelli *et al.,* 2020; Mosallanejad *et al.*, 2011).

During the sample collection, history taking of each shelter and cat owners were conducted to observe the management practices of the cats. Among the three shelters, Shelter 1 and Shelter 2 have an indoor management while Shelter 3 has an outdoor management that allows their cats to roam in an outdoor fenced area. Shelter 1 also has other animals in the surrounding environment as it is a mixed shelter of various animals. Shelter 2 and Shelter 3 are solely a cat shelter. All the shelters mentioned here receive preventive care of ectoparasites monthly using anti-ectoparasitic drugs commonly available in the market and for Shelter 3, they also use coconut oil as one of their preventive care methods. Shelter 1 and Shelter 3 have a history of *otodectes* ear mites infection while Shelter 2 has no history of *otodectes* ear mites infestation.

As for pet cats, four clinics and UVH were selected based on convenience. Consent was taken from pet owners before the samples were collected and management questions were asked after the sample collection. History of the cat was asked as well as the management of the cats at home. Different owners have different ways of management and all their answers were recorded accordingly. All the positive cats from the shelter and owned cats had the clinical signs of head shaking, pruritus and excessive ceruminous discharge giving a coffee-ground appearance in the external ear canal.

When comparing the prevalence of *otodectes* ear mites infestation, it was found that shelter cats have a higher prevalence as compared to pet cats which are similar to previous studies where in Italy shelter cats had a higher prevalence (17.5%) compared to pet cats (3.4%) (Genchi *et al.*, 2021). Another study performed in the city of Cuiabá, although done in dogs, observed a higher prevalence in shelter dogs (67.5%) than pet dogs (21.5%) (Rita *et al.*, 2011). Shelter cats as compared to pet cats might have financial constraints in providing the prophylaxis medicine to the cats. Most shelter cats also come from the stray population and it has been noted that *otodectes* ear mites are a common parasite in the stray population (Perego, 2014).

In this study, it was found that the “Young” have a higher prevalence compared to the “Adults”. These findings are similar to a study in Egypt where they found that cats less than one year old have a higher prevalence (87.57%) compared to cats above one year old (50%). This could be due to the playfulness of kittens interacting with other infested animals (Genchi *et al.*, 2021;), kittens contract the infestation from dams through direct contact as well as older animals generally acquired the immunity against the *otodectes* ear mites as they aged (Taenzler *et al.*, 2018).

When comparing the prevalence between indoor cats and outdoor cats, there is a higher prevalence between the outdoor cats as compared to indoor cats. It was mentioned that outdoor access has been identified as a risk factor, hence this increases the risk of getting infested (Siagian & Siregar 2022; Beugnet *et al.* 2014). This is most likely due to outdoor cats being free to roam which increases their chances of being in direct contact with animals infested with *otodectes* ear mites. Besides, there is a higher presence of the mites in the outdoor environment as compared to the indoor environment.

The efficacy duration of most commercial anti-ectoparasitic drugs is about 28 days and any re-application of the drug past that time provides an opportunity for the mites to re-infest the host. According to a study done to assess the efficacy of imidacloprid/moxidectin combination and esafoxolaner/eprinomectin/praziquantel combination respectively, has an efficacy of 100% after 30 days post treatment (*Ahn et al., 2013)* and has an efficacy of more than 97% (Tielemans *et al.*, 2021). With a re-application, the drugs would be completely able to clear the *otodectes* ear mites infestation and provide protection for the next 28 days.

6.0 CONCLUSION

The overall prevalence of *otodectes* ear mites in cats from Selangor is 11.7%. In current study, there is a higher prevalence in shelter cats, that are young, live most of their life outdoors and have no preventive care given. The risk factor of preventive care showed a significant difference as compared to non-preventive care in contracting ear mites infestation. Although *otodectes* ear mites are not a critical health threat to the cats, it can be prevented with various available anti-ectoparasitic drugs from the veterinarian.

7.0 RECOMMENDATIONS

For future studies, it is recommended to perform the sampling at more shelters and clinics with different localities for a better distribution of sampling. Next, clinic sampling could be achieved by doing more consecutive days in order to achieve a bigger sample size. Lastly, more studies can be done for example comparing the efficacy of different anti-ectoparasitic drugs against *otodectes* ear mites.

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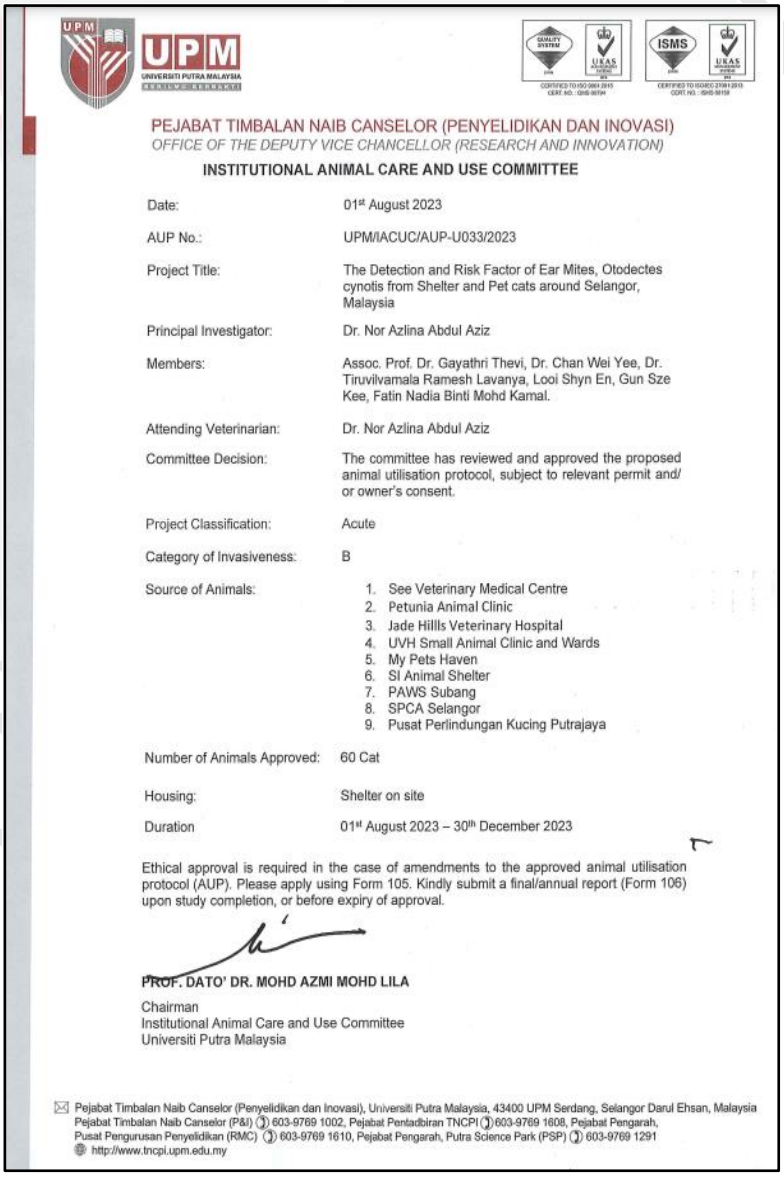
9.0 APPENDICES

Appendix 1

IACUC Approval Letter

IACUC Reference Number (UPM/IACUC/AUP-U033/2023)



PEJABAT TIMBALAN NAIB CANSELOR (PENYELIDIKAN DAN INOVASI)
OFFICE OF THE DEPUTY VICE CHANCELLOR (RESEARCH AND INNOVATION)

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

Date:	01st August 2023
AUP No.:	UPM/IACUC/AUP-U033/2023
Project Title:	The Detection and Risk Factor of Ear Mites, Otodectes cynotis from Shelter and Pet cats around Selangor, Malaysia
Principal Investigator:	Dr. Nor Azlina Abdul Aziz
Members:	Assoc. Prof. Dr. Gayathri Thevi, Dr. Chan Wei Yee, Dr. Tiruvilvamala Ramesh Lavanya, Looi Shyn En, Gun Sze Kee, Fatin Nadia Binti Mohd Kamal.
Attending Veterinarian:	Dr. Nor Azlina Abdul Aziz
Committee Decision:	The committee has reviewed and approved the proposed animal utilisation protocol, subject to relevant permit and/ or owner's consent.
Project Classification:	Acute
Category of Invasiveness:	B
Source of Animals:	1. See Veterinary Medical Centre 2. Petunia Animal Clinic 3. Jade Hills Veterinary Hospital 4. UVH Small Animal Clinic and Wards 5. My Pets Haven 6. SI Animal Shelter 7. PAWS Subang 8. SPCA Selangor 9. Pusat Perlindungan Kucing Putrajaya
Number of Animals Approved:	60 Cat
Housing:	Shelter on site
Duration	01st August 2023 – 30th December 2023

Ethical approval is required in the case of amendments to the approved animal utilisation protocol (AUP). Please apply using Form 105. Kindly submit a final/annual report (Form 106) upon study completion, or before expiry of approval.

PROF. DATO' DR. MOHD AZMI MOHD LILA
Chairman
Institutional Animal Care and Use Committee
Universiti Putra Malaysia

Pejabat Timbalan Naib Canselor (Penyelidikan dan Inovasi), Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia
Pejabat Timbalan Naib Canselor (P&I) 603-9769 1002, Pejabat Pentadbiran TNCPI 603-9769 1608, Pejabat Pengarah, Pusat Pengurusan Penyelidikan (RMC) 603-9769 1610, Pejabat Pengarah, Putra Science Park (PSP) 603-9769 1291
http://www.tncpi.upm.edu.my

Appendix 2

Questionnaire Form

UNIVERSITI PUTRA MALAYSIA

DEPARTMENT OF VETERINARY PATHOLOGY & MICROBIOLOGY
FACULTY OF VETERINARY MEDICINE

QUESTIONNAIRE

Title of study : The Detection and Risk factor of Ear Mites, *Otodectes cynotis* from Shelter and Pet Cats around Selangor, Malaysia

Section A (information related to owner / shelter)

Owner:
Gender: Female / Male
Address:

Education level:
[ ] Primary school
[ ] Secondary school
[ ] Diploma / Degree
[ ] Master / PhD

Type of shelter: [ ]Dogs [ ]Cats [ ] Others :_____
(tick those that are relevant)

Section B (information related to cats)
Total number of cats:_____ (Male) _____ (Female) _____ (Castrated) _____(Spayed)

1. Are your cats indoor, outdoor, semi-roamers or roamers?
   [ ] Indoor
   [ ] Outdoor
   [ ] Semi-roamers
   [ ] Roamers

2. Is your cat the only cat or a multi-household cat?
   [ ] only cat
   [ ] multi-household cat

3. Do you have other pets in the shelter / house? If yes, please state. _____
    a. If yes, are your other pets are indoors, outdoor, semi-roamers or roamers?
        [ ] Indoor
        [ ] Outdoor
        [ ] Semi-roamers
        [ ] Roamers

4. Do you foster other animals? Yes / No
    a. If yes, do you quarantine/isolate the fostered cat? Yes / No
        i. If yes, how long is the quarantine/isolation period? _____ days / weeks

5. Do you have a history of ectoparasite infection? Yes / No / Maybe

6. Do your cats have access to a garden/park? Yes / No

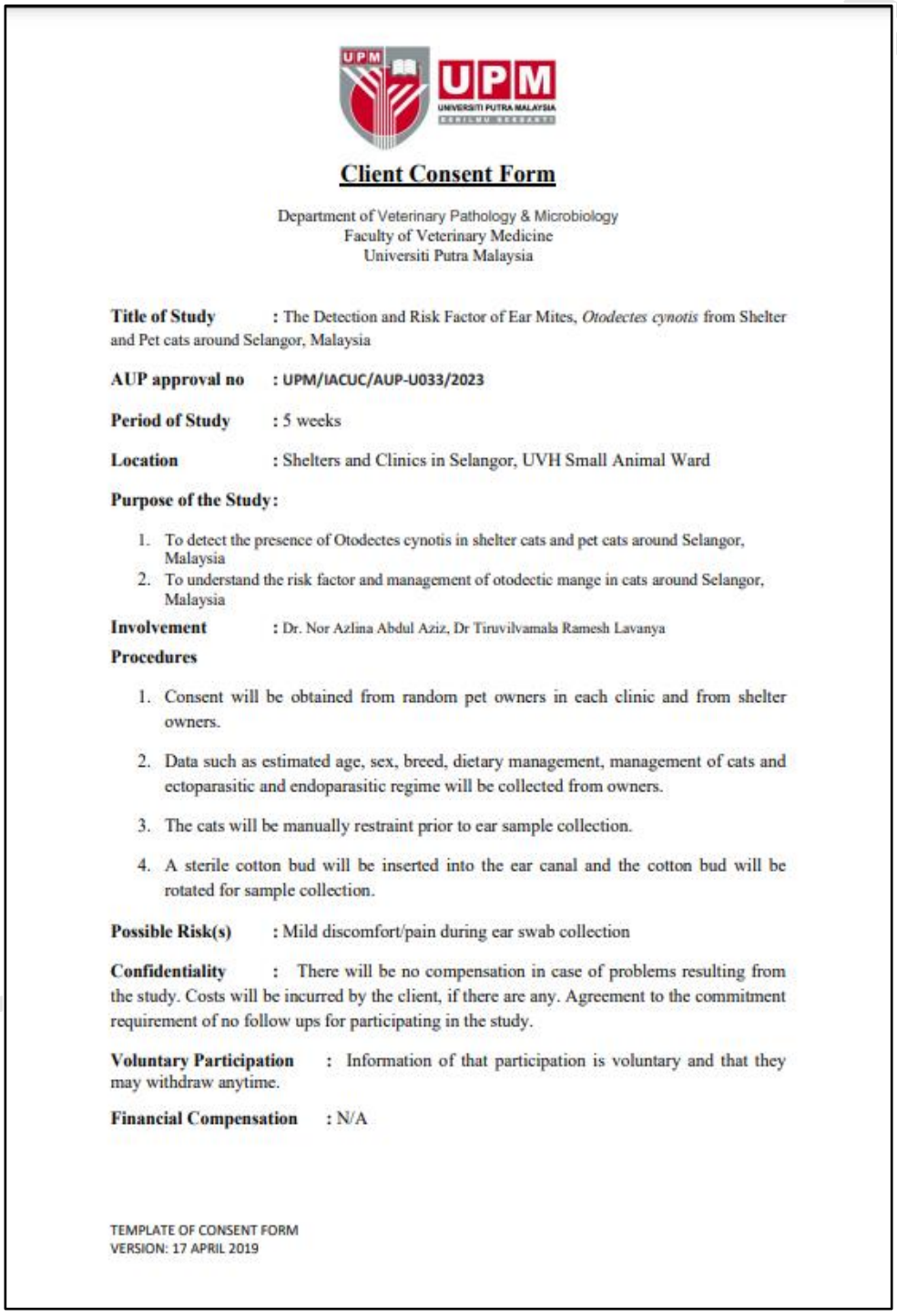
7. Do you give prevention care to your cats ? Yes / No
    a. If yes, what brand do you use?
        [ ] NEXGARD SPECTRA Spot-On Solution
        [ ] Revolution
        [ ] Advocate™
        [ ] Bravecto / Bravecto Plus Spot On
        [ ] FRONTLINE Gold for cats

    Others : _____

    b. If yes, how frequent?

Appendix 3

Owner Consent Form



Client Consent Form

Department of Veterinary Pathology & Microbiology
Faculty of Veterinary Medicine
Universiti Putra Malaysia

Title of Study : The Detection and Risk Factor of Ear Mites, *Otodectes cynotis* from Shelter and Pet cats around Selangor, Malaysia

AUP approval no : UPM/IACUC/AUP-U033/2023

Period of Study : 5 weeks

Location : Shelters and Clinics in Selangor, UVH Small Animal Ward

Purpose of the Study:

1. To detect the presence of Otodectes cynotis in shelter cats and pet cats around Selangor, Malaysia
2. To understand the risk factor and management of otodectic mange in cats around Selangor, Malaysia

Involvement : Dr. Nor Azlina Abdul Aziz, Dr Tiruvilvamala Ramesh Lavanya

Procedures

1. Consent will be obtained from random pet owners in each clinic and from shelter owners.
2. Data such as estimated age, sex, breed, dietary management, management of cats and ectoparasitic and endoparasitic regime will be collected from owners.
3. The cats will be manually restraint prior to ear sample collection.
4. A sterile cotton bud will be inserted into the ear canal and the cotton bud will be rotated for sample collection.

Possible Risk(s) : Mild discomfort/pain during ear swab collection

Confidentiality : There will be no compensation in case of problems resulting from the study. Costs will be incurred by the client, if there are any. Agreement to the commitment requirement of no follow ups for participating in the study.

Voluntary Participation : Information of that participation is voluntary and that they may withdraw anytime.

Financial Compensation : N/A

TEMPLATE OF CONSENT FORM
VERSION: 17 APRIL 2019

Declaration

I have read and understand the above explanation in regard to the procedures done.

Name of Owner: _____ Signature:

Contact no/Email: _____ Date : _____

Project Conductor: Looi Shyn En Signature:

Contact no/Email: 014-3888462 (201129@student.upm.edu.my) Date : _____

Principal Investigator: Dr. Nor Azlina Abdul Aziz Signature:

Contact no/Email: 016-3406313 (azlinaaziz@upm.edu.my) Date : 30th August 2023

For further enquiries or concerns, do contact:

1. Principal Investigator:

Principal Investigator: Dr. Nor Azlina Abdul Aziz	Department of Veterinary Pathology & Microbiology Faculty of Veterinary Medicine , Universiti Putra Malaysia	016-3406313 azlinaaziz@upm.edu.my

2. Institutional Animal Care and Use Committee (IACUC), Universiti Putra Malaysia, 43400 UPM Serdang, Selangor. Email: iacuc@upm.edu.my or contact no: +603-97691244/1605

Appendix 4

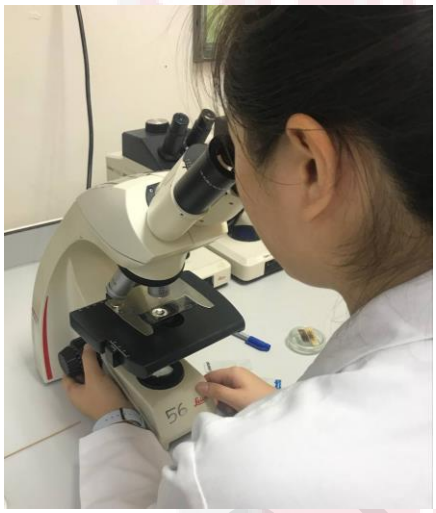
Methodology

Sample collection from a cat using a sterile cotton swab. The cat is gently but firmly restrained.

A drop of glycerol was placed on the slide.

Ear sample was scraped onto the glycerol using a cover slip.

Light pressure was applied onto the cover slip. Then, the cover slip was placed on top



Slide examination using a compound microscope.

Appendix 5

Shelters' Environment

Shelter 1

Shelter 2

Shelter 3