

## Selangor Public Perceptions of Neutering and Preventive Health Measures for the Health of Cats and Dogs

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### ABSTRACT

The well-being of companion animals is heavily dependent on public understanding and adoption of preventive health measures, such as neutering, vaccination, and antiparasitic treatments. This study investigated the knowledge and perceptions of Selangor residents regarding these practices and identified the demographic factors influencing their views. A cross-sectional survey was conducted using online and paper-based questionnaires, which covered demographic details, pet management practices, knowledge and perception on veterinary care, and educational intervention. Data were analysed using the IBM SPSS Statistics, employing descriptive statistics and inferential analysis (e.g., Linear Regression and Spearman's correlation). A total of 381 Malaysians residing in Selangor participated in this survey. Findings showed that most respondents were female (n=281, 74.5%) and aged between 21-30 years old (n=172, 45.1%). Most respondents were also pet owners (n = 351, 92.1%), with the majority having cats (n = 306, 87.2%). Results showed that

97.4% agreed that pets should be vaccinated, and 96.9% of respondents were aware of the importance of neutering, despite 79.5% (n = 303) being concerned about pain after neutering. Furthermore, although 74% (n = 282) of respondents were aware of recommended antiparasitic regimens, adhering to these practices was inconsistent. Age ( $p = 0.045$ ) and education level ( $p = 0.006$ ) revealed significant influence towards knowledge on preventive healthcare, meanwhile gender ( $p = 0.010$ ) showed significance regarding the

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perception on neutering and preventive healthcare. Selangor residents showed a moderate level of knowledge regarding pet preventive healthcare. Given that most respondents rely on veterinarians as their primary information source, future educational campaigns led by veterinary professionals are essential to improving animal health and welfare in Malaysia.

*Keywords:* Animal welfare, antiparasitic treatments, knowledge, Malaysia, neutering, preventative healthcare, vaccination

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## INTRODUCTION

Cats and dogs have been increasingly popular as pets, specifically in Malaysia, making them the top two most abundant terrestrial animals among Malaysian pet owners, with over 402,500 and 795,000 dogs and cats, respectively, being cared for in 2018 (Munir et al., 2023). Owning pets entails taking responsibility for their physical and mental welfare, including ensuring a high quality of life through therapeutic and preventive healthcare (Ho et al., 2021; Meier & Maurer, 2022). However, there are also negative aspects associated with rising levels of pet ownership, which include the rise of pet overpopulation, transmission of infectious diseases (e.g., zoonotic diseases and venereal diseases), and pet neglect. To mitigate these issues, veterinary associations such as the American Veterinary Medical Association and American Animal Hospital Association (AVMA & AAHA, 2020) have come up with a recommended neutering and preventive healthcare guideline, which will aid in providing the best care for animals.

According to AAHA and AVMA (2020), preventive healthcare is a multi-faceted approach to screen cats and dogs and provide them with vaccination, deworming, and ectoparasite control to prevent and manage disease outbreaks (AVMA & AAHA, 2020). Responsible pet ownership emphasizes on prevention of diseases for cats and dogs for their welfare and well-being. According to the guidelines proposed by AAHA and AVMA (2020), it is stated that cats and dogs should receive at least an annual checkup, with vaccinations, deworming and flea control according to the recommended schedule. Vaccination is crucial in developing cats and dogs' immune systems and providing herd immunity towards transmissible infectious diseases (Dodds, 2021); therefore, it is of importance in improving pets' overall quality of life. However, a significant gap exists in the Malaysian literature regarding this topic, as comprehensive studies on public adherence to these guidelines have yet to be carried out.

In countries such as the United Kingdom, preventive healthcare is one-third of the reasons for visits to veterinary practices, and this shows the perception of UK pet owners regarding the health of pets (Evason, 2021). Meanwhile, in New Zealand, the majority of pet owners believed that all cats and dogs deserve important pet care practices such as adequate housing, regular worming and ectoparasite treatments, microchipping, and vaccinations (Forrest, 2023).

In contrast, this level of awareness regarding animal welfare and health has yet to be realised in Malaysia. The control of parasites (e.g., fleas, mites, and ticks) and endoparasites (e.g., heartworm) is important as a preventive method from parasite-induced pathologies. In fact, according to a report by the Veterinary Research Institute, Malaysia (Masrin et al., 2019) indicated that up to 16% of pet dogs and 76% of stray dogs harbour ectoparasites and endoparasites such as *Ancylostoma sp.*, *Giardia sp.*, and *Demodex sp.*, which can spread rapidly through horizontal transmission. Furthermore, certain parasites such as *Toxoplasma sp.*, are also known to be zoonotic and can be transmitted to pregnant females, which can lead to foetal loss (Masrin et al., 2019).

Despite significant research available on preventive healthcare and neutering among cats and dogs (McKenzie, 2010; Oliveira-Martins et al., 2023), there remains insufficient data and knowledge in the Malaysian context, specifically involving the public's perception. Studies from countries like New Zealand and the United Kingdom show a positive attitude and perception, which is due to support from having high levels of public education regarding animal welfare and health (Downes et al., 2014; Forrest et al., 2023). Neighbouring Southeast Asia countries, such as Singapore, also highlight positive pet ownership values, with the help of effective public education targeting pet owners (Gunaseelan et al., 2013). These measures (e.g., neutering, vaccination, and antiparasitic control) have been extensively implemented among small animal practitioners worldwide (Mueller et al., 2018). However, there are still a few barriers in providing sufficient pet care (e.g., lack of commitment, resources) that need to be explored. These include the ethical views, socioeconomic status, and the understanding of animal welfare (Munir et al., 2023; Zaini et al., 2023).

In comparison to other regions, limited research has been conducted to properly understand the values and perspectives that Malaysians, especially citizens of Selangor, hold regarding animal healthcare. A study conducted in Putrajaya, Malaysia, revealed that there are poor vaccination rates and infrequent veterinary visits among pet owners (Debbra et al., 2019). However, there is not yet any research that studies the factors and barriers influencing these trends. According to a study conducted by Tan et al. (2021), Southeast Asian countries have less public awareness regarding animal welfare and also limited access to veterinary care in comparison to Western countries such as the United Kingdom (Tan et al., 2021).

Consequently, in an urban state such as Selangor characterised by a diverse population and socioeconomic values, this research provides insight into the current situation regarding Malaysians' perspectives on animal healthcare. This study aims to determine the knowledge, perception and practice of the Selangor public regarding neutering and preventive health measures, as well as the demographic factors influencing their perception, for the health and well-being of cats and dogs.

## MATERIALS AND METHODS

### Ethical Approval and Consent

Ethical approval was granted by the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) on 9th May 2024 (Reference number: JKEUPM-2023-805).

### Questionnaire Development

A cross-sectional, questionnaire-based study was conducted during a period of 5 weeks from 28<sup>th</sup> July 2024 until 1<sup>st</sup> September 2024 to assess the perception and knowledge of the Malaysian public regarding preventive healthcare for cats and dogs in Selangor, Malaysia. The questionnaire was developed and adapted from previous studies and modified according to the suitability and purpose of this study. The questionnaire consists of five sections (Table 1), (i) demographic details (e.g., gender, age, education level, profession, household income, and pet ownership details) (ii) knowledge on preventive healthcare and neuter, (iii) pet management practice (e.g. frequency of bringing pets to the veterinary clinic for preventive healthcare), (iv) perception on preventive healthcare and neutering, and (v) educational intervention in order to gauge the most preferable medium of approach to educate the Malaysian public.

The questionnaire underwent a thorough pilot testing phase, involving a total of 20 respondents and several academicians and researchers, aimed at meticulously scrutinising aspects such as grammar, time requirements, and other pertinent factors. For instance, the definition of neutering was prepared to improve the understanding of the word's use in the study.

Table 1  
*Summary of questionnaire*

Section	Question (Summary)	Type of Question
Demographic details	Gender, age, education level, profession, household income, and pet ownership details	Multiple choice (single answer) question
Knowledge on preventive healthcare and neuter	Questions relating to vaccination, deworming, flea control and neuter (i.e., schedule, roles for each stated preventive healthcare)	Multiple choice (single answer) question
Pet management practice	Pet management style, frequency of bringing pets to the veterinary clinic for preventive healthcare	Multiple choice (single answer) question
Perception on animal management	Perception on preventive healthcare and neutering	Participants rated 9 questions on a 1-5 Likert scale (Strongly Disagree to Strongly Agree)
Educational intervention	The most preferable medium of approach to educate the Malaysian public	Multiple choice (multiple answer) question

Reliability analyses were conducted, and the Cronbach's alpha value was  $\alpha = .87$  indicated high reliability; thus, no items were removed prior to the main study.

### **Participants Recruitment**

A total of 381 respondents voluntarily participated in this study by convenience sampling. Participants' criteria include pet owners and non-pet owners, current residents of Selangor, Malaysia, and able to understand Bahasa Malaysia and English. The questionnaire was available physically (paper-based) and digitally on Google Form and distributed through online social media platforms (e.g., WhatsApp, Telegram, Facebook, Instagram).

### **Statistical Analysis**

Data collected from the questionnaires were tabulated into Microsoft Excel and were analysed using IBM SPSS Version 29. The Kolmogorov-Smirnov Test was done to check the normal distribution of the dataset, which shows that it is not normally distributed. Descriptive analysis was done to obtain the frequency, median, and standard deviation of the data, and inferential analysis, such as Linear Regression and Spearman's correlation, was utilised to interpret the relationship between the demographic variables, knowledge, and perception of the public regarding this study. Multiple Linear Regression analysis was conducted to evaluate the impact of demographic factors on knowledge scores. Despite the non-normal distribution of the raw scores, the regression model was deemed appropriate given the sample size ( $N = 381$ ), which satisfies the assumptions of the Central Limit Theorem for the normality of residuals (Pek et al., 2018).

## **RESULTS**

### **Demographic Details**

A total of 381 respondents from Selangor, Malaysia, participated in this questionnaire. Results showed that most respondents are female (74.5%,  $n = 281$ ) and aged between 21 to 30 years old (45.1%,  $n = 172$ ). The majority of the respondents had a bachelor's degree (57.5%,  $n = 219$ ), worked as a private company staff (38.6%,  $n = 147$ ), resides in a terrace house (54.1%,  $n = 206$ ), and comes from a B40 household (59.6%,  $n = 227$ ) (Table 2).

### **Pet Management Status**

Table 3 represents data on pet ownership status, where out of 381 total respondents, up to 92.1% were pet owners. Most respondents owned cats (87.2%,  $n = 306$ ), followed by dog owners (9.1%,  $n = 32$ ), and lastly both cat and dog owners at 3.7% ( $n = 13$ ) (Table 3). Out of the 351 pet owners, more than half had more than 5 years of experience in pet care, with most preferring to keep their pets fully indoors, and the majority stated that their pets had been neutered.

Table 2  
*Descriptive statistics of demographic details of respondents*

	Frequency (n)	Percentage (%)
<b>Age</b>		
Below 18	3	0.8
19 - 20	40	10.5
21 - 30	172	45.1
31 - 40	92	24.2
41 - 50	46	12.1
>50 years old	28	7.3
<b>Gender</b>		
Female	281	74.5
Male	96	25.5
<b>Education Level</b>		
No formal education	2	0.5
Secondary school	64	16.8
Diploma	74	19.4
Bachelor's degree	219	57.5
Postgraduate	22	5.8
<b>Profession</b>		
Student	97	25.5
Government staff	43	11.3
Private company staff	147	38.6
Self-employed	56	14.7
Retired	5	1.3
Unemployed	33	8.7
<b>Household Income</b>		
B40 (below RM4850/ month)	227	59.6
M40 (RM4851-10970/ month)	128	33.6
T20 (more RM 10971/ month)	26	6.8
<b>Type of Residence</b>		
Apartment	121	31.8
Terrace	206	54.1
Bungalow	28	7.3
Other	26	6.8

Table 3  
*Pet ownership status and pet management details*

	Frequency (n)	Percentage (%)
<b>Own Pets</b>		
Yes	351	92.1
No	30	7.9
<b>Type of Pet</b>		
Cat	306	87.2
Dog	32	9.1
Both	13	13.0

Table 3 (continued)

	Frequency (n)	Percentage (%)
<b>Pet Management Style</b>		
Fully indoor pet(s)	175	49.9
Outdoor pet(s)	33	9.4
Semi-roamer pet(s)	143	40.7
<b>Years of Experience</b>		
No experience	4	1.1
Less than a year	11	3.1
1-2 years	48	13.7
3-4 years	70	19.9
>5 years	218	62.1
<b>Pet Neuter Status</b>		
My pet is neutered	188	53.6
My pet is not neutered	30	8.5
I intend to neuter my pet(s)	53	15.1
Some of my pet(s) is neutered while some are not	80	22.8

### Knowledge on Preventive Healthcare and Neutering

More than 96% of respondents displayed knowledge and awareness of the importance of neutering and vaccination for their pets' health (Table 4). A significant number of pet owners also stated that they are aware of the recommended preventive healthcare programme, such as vaccination, deworming, and flea control schedules. As for neutering, the majority agreed that the main purpose is to control and decrease the overpopulation of stray, however as for their concerns regarding neutering and spaying, 35.4% of respondents were concerned about pain during the procedure, followed by 26.2% were worried regarding postoperative wound complications after the ovariohysterectomy or orchietomy surgery.

Table 4

*General knowledge and awareness on preventive healthcare and neuter*

	Frequency (n)	Percentage (%)
<b>Awareness on Neutering and Spaying</b>		
I know what neutering and spaying is	369	96.9
I don't know what neutering and spaying is	11	2.9
<b>Awareness on Vaccination</b>		
Pets should be vaccinated	371	97.4
Pets do not need to be vaccinated	10	2.6
<b>Knowledge of Vaccination Schedule</b>		
I am aware about vaccination schedule	299	78.5
I am not aware about vaccination schedule	79	20.7
<b>Knowledge of Deworming and Flea Control Schedule</b>		
I am aware of the deworming and flea control schedule	282	74.0
I am not aware of the deworming and flea control schedule	95	24.9

Table 4 (continued)

	Frequency (n)	Percentage (%)
<b>Knowledge of the Purpose of Neutering<sup>a</sup></b>		
Decrease the overpopulation of strays	340	36.5
Decrease transmissible diseases	223	23.9
Decrease aggressiveness and inappropriate behaviour	212	22.7
Reduce chances of tumour	157	16.8
<b>Concerns Pertaining to the Neutering Procedure<sup>a</sup></b>		
Pain	303	35.4
Wound complications	224	26.2
Pet's mood will change	71	16.6
Pet will become lazy or inactive	75	8.8
Pet will get fat	41	8.3
Unable to express normal behaviour	142	4.8

\*<sup>a</sup> Question allows for more than one answer choice

### Knowledge on the Frequency of Bringing Pets for Preventive Healthcare

In terms of awareness and knowledge on the suggested frequency of bringing their pets to the veterinary clinic for health check-ups, deworming, and flea control, the majority answered that the recommended visit is every three months (Table 5). In assessing the awareness of vaccination frequencies, the results showed a division in respondents' knowledge. While 48%(n=183) indicated a three-month interval, this may reflect a focus on the primary vaccination series required for young animals to complete their initial boosters. In contrast, the 30% (n=80) chose “other” as their answer, where the majority noted “once a year” or “annually” demonstrated awareness of long-term maintenance protocols for adult pets. This part measures theoretical knowledge of the required schedule rather than the owners' actual adherence or current practice.

Table 5

*Knowledge on the recommended frequency of bringing pets for preventive healthcare*

Variables	Type of Responses				
	No need N (%)	Once in a month N (%)	Once in 3 months N (%)	When sick N (%)	Other N (%)
How often should you bring your pets to the vet for a health check-up	3 (0.9%)	35 (10.0%)	195 (55.6%)	102 (29.1%)	16 (4.6%)
How often should you bring your pets to the vet for vaccination	7 (1.8%)	40 (10.5%)	183 (48.0%)	41 (10.8%)	80 (30.0%)
How often should you bring your pets to the vet for deworm	8 (2.3%)	69 (19.7%)	212 (60.4%)	38 (10.8%)	24 (6.8%)
How often should you bring your pets to the vet for deflea	9 (2.6%)	87 (24.8%)	193 (55.0%)	40 (11.4%)	22 (6.3%)

A multiple linear regression analysis was conducted to evaluate the influence of demographic factors on knowledge scores regarding neutering and preventive healthcare. Table 6 showed that age and education level were identified as significant predictors of knowledge ( $P < 0.05$ ). The results indicated a positive correlation, suggesting that respondents within the 21-30 age group and those holding bachelor's degree demonstrated significantly higher knowledge scores compared to other demographic factors. This suggests that young adults with tertiary education are more informed regarding pet health requirements in Selangor.

### Perception of Preventive Healthcare and Neutering

In general, the Selangor public showed a moderate perception on preventive healthcare and neutering [Low perception: 4 to 9; Moderate perception: 10 to 14; High perception: 15 to 20]. Using Likert-scale type questions, only 31% to 42% of respondents strongly agreed with statements regarding neutering or spaying. Despite the majority being cat owners, only 19.1% are strongly confident that they are knowledgeable about proper cat care (Table 7).

Table 6  
*Linear regression test on demographic variables and knowledge*

	R-squared value	Unstandardised B	Significant (P-value)
Age		-0.190	0.339
Gender		0.236	0.554
Race		-0.119	0.596
Education Level	0.014	0.347	0.121
Profession		0.137	0.369
Household Income		0.148	0.638

Table 7  
*Perception of preventive healthcare and neutering*

	Mean $\pm$ Standard Deviation (SD)	P-value
"Neutering cats or dogs can reduce the risk of infectious diseases between cats or dogs" <sup>a</sup>	4.02 $\pm$ 0.977	$P < 0.05$
"Cat or dog neuter can reduce the desire to mate" <sup>a</sup>	4.05 $\pm$ 0.988	$P < 0.05$
"Cats that are neutered will be more docile" <sup>a</sup>	3.83 $\pm$ 1.021	$P < 0.05$
"I am knowledgeable about cat care" <sup>a</sup>	3.55 $\pm$ 1.008	$P < 0.05$
"I am knowledgeable about dog care" <sup>a</sup>	2.47 $\pm$ 1.327	$P < 0.05$
"Cats can take care of themselves" <sup>a</sup>	3.20 $\pm$ 1.110	$P < 0.05$
"Dogs can take care of themselves" <sup>a</sup>	3.03 $\pm$ 1.146	$P < 0.05$
"A dog that is trained will be more docile" <sup>a</sup>	3.56 $\pm$ 1.254	$P < 0.05$
"Vaccination protect cats or dogs from contracting any diseases" <sup>a</sup>	4.14 $\pm$ 0.977	$P < 0.05$
"Having a cat or dog is expensive" <sup>a</sup>	3.48 $\pm$ 1.184	$P < 0.05$

\*<sup>a</sup> Question allows for more than one answer choice

### Practice regarding Healthcare and Neuter

Regarding the actual practice of bringing pets to the veterinary clinic for preventive healthcare, most pet owners revealed that they only seek professional help for health checkups when their pets are sick. As for the frequency of getting their pets dewormed, defleaed, and vaccinated, similar answers were seen as stated previously in the knowledge section, where the majority responded with a visit every three months. Table 8 shows the descriptive statistics on pet owners’ practice of bringing their pets to the veterinary clinic for preventive healthcare.

### Association between Knowledge, Perception, and Practice of Pet Owners regarding Neutering and Preventive Healthcare

To study the relationship between the knowledge, perception, and practice of the Selangor public regarding neutering and preventive healthcare, Spearman’s correlation was carried out. As shown in Table 9, the correlation coefficient between all three variables yields a positive correlation (Spearman’s rank correlation,  $r_s = 0.665, 0.168, 0.150, P < 0.001$ ) with a *P*-value showing a statistically significant relationship between knowledge, attitude, and perception.

### Education Intervention

Table 10 shows respondents’ preferred method of educational intervention on preventive healthcare and neuter in the future. Most respondents chose veterinarians as their primary source of education regarding pet healthcare, followed by online sources such as Google (25.2%, *n* = 235), and social media platforms such as Facebook, Instagram, and TikTok (20.9%, *n* = 195).

Table 8  
*Pet owners’ practice on preventive healthcare*

Variables	Type of Responses				
	No need N (%)	Once in a month N (%)	Once in 3 months N (%)	When sick N (%)	Other N (%)
How often do you bring your pets to the vet for health check-up	22 (6.3%)	28 (6.8%)	97 (27.6%)	199 (56.7%)	9 (2.5%)
How often do you bring your pets to the vet for vaccination	29 (8.3%)	36 (10.3%)	123 (35.0%)	64 (18.2%)	99 (28.2%)
How often do you bring your pets to the vet for deworm	27 (7.7%)	64 (18.2%)	168 (47.8%)	52 (14.8%)	40 (11.4%)
How often do you bring your pets to the vet for flea control	28 (7.9%)	81 (23.1%)	152 (43.3%)	55 (15.4%)	35 (9.9%)

Table 9

*Spearman's correlation test for knowledge, perception, and practice*

Variables	Correlation Coefficient, r	P-value
Knowledge and Perception	0.168	0.001
Knowledge and Practice	0.665	<0.001
Perception and Practice	0.150	0.005

Table 10

*Preferred educational intervention*

	Frequency (n)	Percentage (%)
Education intervention <sup>a</sup>		
Veterinarian	275	29.5
Online sources (e.g., Google)	235	25.2
Friends and family	147	15.8
Pet care books, magazines, etc.	80	8.6
Social media platforms (e.g., Facebook, Instagram, TikTok, X, YouTube)	195	20.9

\*<sup>a</sup> Question allows for more than one answer choice

## DISCUSSION

This study demonstrates that the public's perspective and actions regarding the health and welfare of pets are still not on par with their knowledge levels. According to a 2023 study conducted in the United States, there has been a decrease in the frequency of veterinary visits compared to the previous years, which coincides with the increasing use of social media that hosts plenty of pet care information provided by unqualified personnel (AVMA, 2023; Evason, 2021). Thus, the present study specifically focuses on the residents of the most densely populated and racially diverse state in Malaysia, aiming to determine the public's current knowledge, perception and practices to inform effective educational intervention.

The current findings reveal that most respondents were female at nearly double the rate of males. These results are consistent with a study by Debbra et al. (2019) and Zaini et al. (2025) which noted that in Malaysia, females (64%) were more inclined to participate in survey-based research than males (36%) (Zaini et al., 2025). This questionnaire also garnered the most responses from participants aged 21 to 30 years old. While the survey was distributed both physically and online, the majority of responses came from the latter. This outcome aligns with findings by Mohamed et al. (2021), stating that the predominant age group among internet users in Malaysia is between 18 to 29 years old.

The findings of this study indicate that while the public possesses a moderate level of knowledge regarding pet preventive healthcare, this awareness is not reflected in their self-reported practice. For example, a majority of respondents stated that vaccinations are

administered every three months, which does not reflect the actual vaccination guidelines and protocol according to the World Small Animal Veterinary Association (WSAVA) guidelines (Squires et al., 2024). Core vaccinations for cats and dogs are typically administered monthly for the first three months, followed by annual boosters. Specifically, these core protocols protect dogs against canine distemper virus (CDV), canine adenovirus (CAV), and variants of canine parvovirus type 2 (CPV-2), while guarding cats against feline parvovirus (FPV), feline calicivirus (FCV), and feline herpesvirus-1 (FHV-1). This ensures that cats and dogs achieve optimal herd immunity, which is not only beneficial for themselves but also controls the transmission of infectious and highly communicable diseases within the community (Day et al., 2016).

In addition to vaccination awareness, respondents identified that “once a month” or “once every three months” as the typical frequency for parasite control, which aligns with the application instructions for most commercial products. According to the European Scientific Counsel Companion Animal Parasite (ESCCAP, 2021), adult cats and dogs are recommended to be dewormed against intestinal parasites such as roundworm, heartworms, tapeworms, hookworms, and whipworms at least once a month, specifically for pets with outdoor access or those that hunt prey. For strictly indoor pets, deworming every three months or four times a year is sufficient, with regular faecal examinations conducted to monitor for active infestation (ESCCAP, 2021). As for heartworm prevention, the American Heartworm Society (AHS, 2024) guidelines state parasiticide should be administered once a month as a protection from *Dirofilaria immitis* using FDA-approved active ingredients such as macrocyclic lactones (AHS, 2024).

It is noted that the statement “*bringing pets for a checkup at the veterinarian only when they are sick*” received the highest level of agreement among respondents. This highlights a significant gap in adherence to preventive healthcare guidelines devised by AAHA and AVMA (2020), which recommend annual health checkup aid in the early detection of underlying health diseases, especially in geriatric animals (Chowdhury, 2023). Comprehensive health screening, including taking blood chemistry profiles, diagnostic imaging, and oral health assessments are essential for identifying incidental findings such as neoplasia, diabetes mellitus, and periodontal diseases before they become clinically advanced.

Approximately 90% of respondents showed a good understanding of neutering, with the majority also exhibiting a moderate to high perception of the subject. This indicates that the Selangor population maintains a positive view of the ovariohysterectomy (spaying) and castration of cats and dogs, which aligns with a previous study conducted in Klang Valley, Selangor (Munir et.al., 2023). Low-cost neutering programmes such as “Potong-Royong<sup>TM</sup>”, alongside the dissemination of information via social media, have shown to be effective in educating the public about the importance of neutering not only

for their household pets, but also as a critical strategy for mitigating stray overpopulation and reducing the transmission of communicable diseases (Munir et al., 2023).

An important issue identified in this study relates to pet owners' concerns regarding the neutering procedure. Most respondents stated that post-operative pain is of huge concern, influencing their decision to neuter. According to Gunaseelan et al. (2013), who noted that pet welfare concerns, specifically the perception of pain, play a more significant role in decision-making than the availability of low-cost services. As a result, veterinarians must employ more effective communication strategies to address these concerns, providing reassurance regarding modern analgesia to avoid misconceptions that can deter owners from adopting this practice.

The current findings also revealed that the most preferred method of educational intervention was through veterinarians, followed by online search engines and social media. In accordance with this, a more targeted approach would be more effective in educating the public on preventive healthcare and neutering for cats and dogs. Taking into example the situation in Singapore, the public exhibits a positive attitude on this matter, which is attributable to the education initiated by organisations in the country, as well as the government's efforts in educating the public on pets' wellbeing. According to a study by Gunaseelan et al. (2013), Theory of Planned Behaviour (TPB) was applied to illustrate the relationship on how knowledge can affect practice and perception, such as frequent visits to the veterinary clinic, routine vaccinations and deworming, and getting their pets neutered. The theory of human behaviour in this context also demonstrated that by increasing knowledge of the public by constantly providing information through credible sources, such as veterinarians during clinic visits, or online infographics on social media by reliable organisations such as the DVS or Malaysian Veterinary Medical Association (MAVMA), acts as a catalyst for improved practices. By addressing cognitive barriers and providing accessible information, pet owners are more likely to adopt proactive healthcare routines, including routine vaccination, deworming and neutering. This framework serves as a vital template for Malaysia to seek responsible pet ownership amidst a growing pet population.

## LIMITATIONS AND RECOMMENDATIONS

A primary limitation of this study is the restricted sample size area and geographical scope, which may not fully represent the total population of Selangor. This limitation introduces potential bias and may undermine the generalizability of the findings. The majority of respondents consists of cat owners, which leads to over-representation of this group and under-representation of dog owners. Consequently, the findings may not accurately reflect the attitudes and practices related to dogs. Additionally, the data collection relied on convenience sampling via social media and localised physical distribution, specifically at the SPCA during the "Potong-Royong<sup>TM</sup>" programme. This methodology

excluded pet owners without social media were not able to participate, which could have garnered a different outcome for this study. To enhance the validity for future research, it is recommended that participants be recruited from a broader range of districts across Selangor (i.e., urban areas and rural areas) to ensure a more representative sample. Future studies should also implement a stratified sampling approach to maintain a balanced ratio between cat and dog owners, thereby avoiding demographic skew. Then, translating the survey instruments into additional languages, such as Tamil and Mandarin, is encouraged to accommodate Malaysia's multicultural socioeconomic landscape and yield more comprehensive results.

## CONCLUSION

In conclusion, the Selangor public showed a moderate level of knowledge and perception regarding neutering and preventive healthcare for the well-being of cats and dogs. However, a significant discrepancy was observed between participants' knowledge and their actual practice in pet care. This gap suggests that knowledge alone is insufficient to drive action, indicating that various internal and external factors influence the translation of awareness into behaviour. These findings highlight the necessity of incorporating psychological constructs- such as Human Behaviour Change Model- into future studies to better understand the mechanisms of human behavioural change. Thus, more extensive, evidence-based interventions delivered through targeted mediums are needed to emphasise the importance of preventive healthcare and ultimately enhance the welfare of cats and dogs in Selangor.

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