

KNOWLEDGE AND PERCEPTION OF MALAYSIAN PUBLIC TOWARDS BRACHYCEPHALIC BREEDS OF CATS AND DOGS

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SUMMARY

Brachycephalic cat and dog breeds have surged in popularity among pet owners. However, their growing popularity has raised awareness of potential health issues, prompting owners to learn more about their specific care needs. Thus, this study aimed to evaluate the Malaysian public's knowledge, attitudes, and perception towards brachycephalic breeds of dogs and cats and assess the implications of these factors on the animals' welfare. An online questionnaire (i.e., Google form) with 4 different sections in the survey was developed and validated. A total of 400 respondents completed the questionnaire and 54% respondents (N= 216) reported that they were aware about the health problems associated with this breed. When asked about the pet selection criteria, a total of 303 respondents (37.6%) agreed that temperament is the most important aspect regarding a cat or dog, followed by general appearance (N = 200; 24.2%) and fitness level (N = 197; 23.9%). Finding also showed there was a significant association between gender ($P = 0.023$), and occupation ($P = 0.038$) with the respondents' level of knowledge. Overall, the correlation between the level of perception and knowledge among Malaysian respondents towards brachycephalic breeds of cats and dogs was found to be non-significant and weak negative (Spearman's rank correlation, $r_s = -0.056$, $P = 0.694$). In general, education and awareness on the welfare impacts of these brachycephalic breeds should be conducted continuously.

Keywords: brachycephalic breed, animal welfare, Malaysia, veterinary education, perception study.

INTRODUCTION

Over the past year, the popularity of brachycephalic cat and dog breeds among pet owners has surged. Brachycephalic cat and dog breeds are known for their distinctive and unique features. Brachycephalic dog breeds such as the English Bulldog, French Bulldog, Boston Bull Terrier, Pug, Pekingese, and Boxer, as well as cat breeds such as the Persian, British Shorthair, Himalayan, Ragdoll, Scottish Fold, Exotic Shorthair, and Burmese, have gained significant popularity.

Brachycephalic breeds in the feline and canine world share a common trait of having shortened noses, a unique flat-faced appearance and shortened skulls (Tivers & Leech, 2021). However, it's widely recognised that these brachycephalic breeds exhibit respiratory issues linked to their skull structure, known as Brachycephalic Obstructive Airway Syndrome (BOAS) (Tivers & Leech, 2021; Ladlow et al., 2018). The term BOAS is often used in veterinary medicine to describe a respiratory condition seen in certain dog breeds with short noses and flat faces. The impacts of BOAS can range from noisy breathing and snoring to more severe respiratory distress, especially during exercise or in warm weather. In extreme cases, surgery may be required to alleviate the obstruction (Tivers & Leech, 2021). BOAS emphasises the importance of responsible breeding practices to prioritise the well-being of animals with

brachycephalic breeds (O'Neill et al., 2020), prompting owners to become more informed about the specific care and needs of these pets.

Beyond Brachycephalic Obstructive Airway Syndrome (BOAS), a growing body of evidence indicates that brachycephalic breeds are inherently predisposed to a broader range of disorders intrinsically linked to their characteristic conformations. These include various respiratory diseases, ocular abnormalities, dystocia, spinal conditions, and increased susceptibility to heat stroke and pneumonia (Fawcett et al., 2018; O'Neill et al., 2015; Packer et al., 2015; O'Neill et al., 2017; Ryan et al., 2017; Feng et al., 2017). Compounding these health challenges, brachycephalic breeds are also reported to have significantly shorter lifespans, with a median longevity of 8.6 years compared to 12.7 years for moderate and non-brachycephalic dogs (O'Neill et al., 2013). Nevertheless, many breeders and sellers, and even owners, undoubtedly care for the welfare of this breed in their care (Holland, 2019).

The surge in popularity has led to more veterinary research and awareness campaigns about the potential health issues associated with brachycephalic breeds, promoting responsible ownership. One example of a previous awareness study on brachycephalic breeds in the UK is "Unravelling the health status of brachycephalic dogs in the UK using multivariable analysis" (O'Neill et al., 2020). This study provides evidence that brachycephalic breeds are generally less healthy than their non-brachycephalic counterparts. The study highlights the health challenges associated with selective breeding for certain physical traits in dogs and emphasises the importance of responsible breeding practices to prioritise the well-being of animals.

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To date, there is a scarce study on brachycephalic cat and dog breeds in Malaysia. Therefore, this study aimed to investigate the knowledge, attitude and perception of Malaysian of brachycephalic breeds of cats and dogs.

Materials and Methods

Study Ethics and design

The research study received approval from the Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia (JKEUPM) with reference number JKEUPM-2023-464. A quantitative, cross-sectional study design was used for the current study. An online structured questionnaire was developed in English and Bahasa Malaysia in Google Forms to gather data from Malaysian participants. The inclusion criteria for targeted respondents were that the respondents must be Malaysian, residing in Malaysia, and 18 years old or above.

Research instruments

A structured and close-ended, self-administered questionnaire was employed to gather information from respondents regarding (i) general and demographics (i.e. gender, age, ethnicity, education level, state, occupation, and marital status) and the following components (ii) attitude, (iii) knowledge, (iv) perception on the brachycephalic breeds of cats and dogs and (v) educational intervention. For each component, for instance, the questions in (i) general and demographic section included gender, age, ethnicity, education level, state, occupation, and marital status. For section (ii) attitude level towards brachycephalic breeds of cats and dogs, there were a total of 10 questions in the attitude section were designed based on the 5-point Likert Scale, "1= strongly disagree", "2= disagree", "3= neutral", "4= agree", and "5= strongly agree" were used in response to the questions. The responses were graded 1 to 5 for negative and positive attitude responses, respectively. Scale 1-3 were labelled as a negative attitude with a given score of 0, while scale 4-5 were labelled as a positive attitude with a given score of 1. The total score for the attitude section was 10. Respondents were classified as having a negative attitude when the total score was <5. In contrast, they were classified as having a positive attitude when the total score was ≥ 5 . For section (iii), knowledge towards brachycephalic breeds of cats and dogs consisted of four questions. Respondents' knowledge was assessed using questions related to brachycephalic breeds. The knowledge questions were designed to give two options "yes" and "no". There are a total of three questions in the fourth section (iv), respondents' perception of brachycephalic breed cats and dogs. This section was aimed to gain insights into society's perception of brachycephalic breeds of cats and dogs, consisting of their perception on various aspects of the topic. Then followed by 2 questions that were designed based on the 5-point Likert Scale about the health association of the breeds and personal preferences to buy these breeds. 5-point Likert Scale, "1= strongly disagree", "2= disagree", "3= neutral", "4= agree", and "5= strongly agree" were used in response to the questions. For the last section, an educational intervention aimed to determine the preferred

mode of intervention that Malaysians would like to use in the future to improve their knowledge and perceptions of Brachycephalic breeds of cats and dogs.

The questionnaire underwent a thorough pilot testing phase involving 20 respondents and a few academicians and researchers, aimed at meticulously scrutinising aspects such as grammar, time requirements, and other pertinent factors. For instance, the definition of the brachycephalic breed was prepared to improve understanding of the term's use in the study. A Cronbach alpha value of more than 0.7 was achieved, and all items in the questionnaire were validated (Pallant, 2011).

Sampling method

The questionnaire was distributed through various mode of distributions, mainly social media (e.g. Facebook, Instagram). The study was conducted for two weeks, from the 21st of August 2023 to the 5th of September 2023. This study was carried out among Malaysians regardless of whether they owned cats or dogs.

Statistical Analysis

The study included several variables. The dependent variables were the knowledge, attitude and perception of Malaysian concerning brachycephalic breeds of cats and dogs. The independent variables comprised general demographic details such as gender, age, ethnicity, state, education level, occupation and marital status. Data analysis was conducted using SPSS version 29.0. Initial data entry and exploratory analysis were performed, and descriptive statistics for general and demographic characteristics were calculated in Microsoft Excel, including frequencies and percentages. Continuous variables were expressed as medians. The Chi-square test assessed associations between demographic factors and Malaysians' knowledge and perception of brachycephalic breeds, with a significance level of 0.05. Spearman's correlation determined associations between non-normally distributed variables, using the following interpretation: 0.00–0.30 = weak, 0.31–0.60 = moderate, and 0.61–1.00 = strong. A P-value < 0.01 was considered significant for correlation analysis which intended to reduce the likelihood of errors, given the importance of accurately identifying significant relationships between demographic factors and knowledge levels.

RESULTS

A total of 400 respondents completed the questionnaire. Table 1 shows the demographic characteristics of the respondents. Most of the respondents [n= 256 (64%)] were females and [144 (36%)] were males. Most of the respondents [n=281 (70.3%)] were between the age of 21-30 years old and most of them were Malays. In Malaysia, the predominant age group among internet users is 18-29 years old. The majority of the respondents were students [n=198 (49.5%)] and attended a tertiary level of education [n=361 (90.3%)]. Only small portions had their education at the level of non-formal (1.3%) and primary (0.8%). Most of the participants attended tertiary level (90.3%) followed by secondary level at 7.8%.

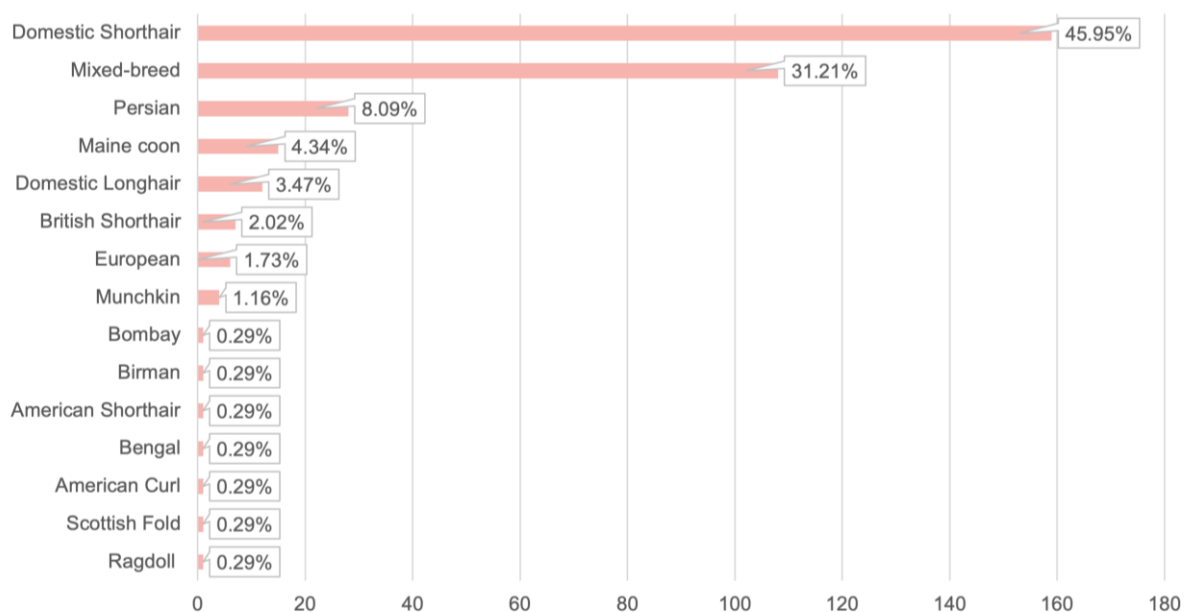
Table 1: Demographic characteristics of the respondents

Variable	Frequency (%)
Gender	
Female	256 (64.0)
Male	144 (36.0)
Age (years)	
21- 30	281 (70.3)
31- 40	49 (12.3)
18-20	31 (7.8)
41-50	24 (6.0)
More than 50	12 (3.0)
Below 18	3 (0.8)
Ethnicity	
Malay	251 (62.7)
Chinese	74 (18.5)
Indian	45 (11.3)
Others	30 (7.5)
Education Level	
Tertiary	361 (90.3)
Secondary	31 (7.8)
Non-formal	4 (1.0)
Primary	3 (0.8)
Certificate	1 (0.3)
Occupation	
Student	198 (49.5)
Private company staff	96 (24.0)
Self-employed	38 (9.5)
Government	36 (9.0)
Unemployed	22 (5.5)
Prefer not to say	10 (2.5)
Marital Status	
Single	308 (77.0)
Married	92 (23.0)

Most respondents reported owning Domestic Shorthair cats (46%, n=181), followed by mixed breed cats (31.2%, n=123) and Persian cats (8.1%, n=31) (Figure 1). For dogs, the majority had Mongrels (38.9%, n=153), followed by Poodles (19.4%, n=76) and mixed breed dogs (9.7%, n=38) (Figure 2). French Bulldogs and Pugs were also noted, each at 2.8% (n=11).

The study found that most respondents (75.0%, n=300) strongly agreed that their pets' medical history is important (Table 2). Half acknowledged the significance of knowing their pet's breed (52.5%, n=210). A total of 164 out of 400 (41.0%) agreed that brachycephalic breeds have health problems. More than half of respondents [n= 243 (60.8%)] said they were aware of the problem of respiratory disorder, epiphora, noisy breathing, heat intolerance and others associated with this breed [n= 228 (57.0%)] (Table 5). Studies showed that brachycephaly causes breathing problems and hinders thermoregulation and, thus, is not an evolutionary adaptation (O'Neill et al., 2020). While the majority of participants were also aware that the problems listed for brachycephalic breeds are due to genetic factors rather than viral or bacterial infections, more than half were neutral or likely to adopt a brachycephalic breed cat or dog (Table 4). Thus, further studies are needed to investigate the key factors influencing human decision-making, especially in cases involving the acquisition of breed-related welfare problems.

Less than half (36.7%, n=303) were agreed that temperament is the most important aspect about a cat or dog, followed by general appearance [n=200 (24.2%)], fitness level [n=197 (23.9%)], size [n=111 (13.5%)] and health status [n=11 (1.3%)]. A minority of respondents (0.4%, n=3) agreed that good companionship is important in choosing a cat or dog.

**Figure 1: A list of cat breeds dominated by Malaysian cat owners**

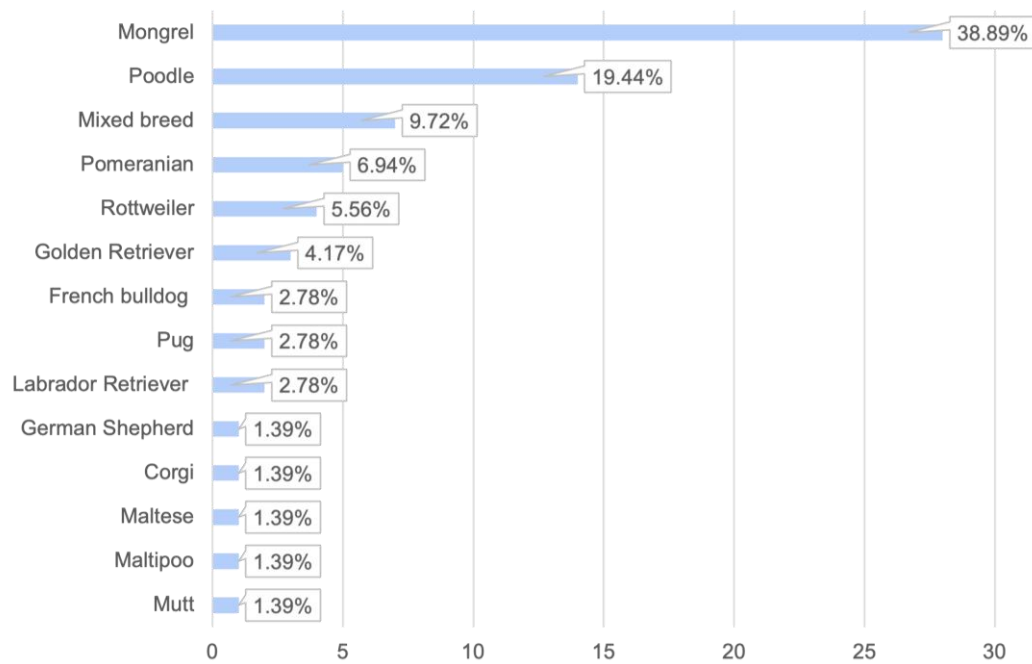


Figure 2: A list of dog breeds dominated by Malaysian dog owners

Table 2: Perception level towards brachycephalic breeds of cats and dogs

Variables	Type of responses				
	1= Strongly disagree n(%)	2= Disagree n(%)	3= Neutral n(%)	4= Agree n(%)	5= Strongly agree n(%)
I think it is important to know my cat's/dog's medical history.	4 (1.0)	2 (0.5)	20 (5.0)	70 (17.5)	300 (75.0)
I feel that it is important for me to know my cat's or dog's breed.	15 (3.8)	11 (2.8)	59 (14.8)	100 (25.0)	210 (52.5)
I feel that it is important for me to know the problems associated with the breed.	6 (1.5)	4 (1.0)	33 (8.3)	103 (25.8)	254 (63.5)
I think bringing my cat or dog for a regular check up at the vet is necessary.	3 (0.8)	10 (2.5)	50 (12.5)	104 (26.0)	233 (58.3)
If my cat or dog has respiratory disorders, I will bring them to get treatment.	3 (0.8)	2 (0.5)	18 (4.5)	77 (19.3)	300 (75.0)
If my cat or dog has ocular disorders (eye problem), I bring them to get treatment.	3 (0.8)	1 (0.3)	38 (9.5)	77 (19.3)	281 (70.3)
Cat/dog appearance is important to be a good pet.	71 (17.8)	68 (17.0)	110 (27.5)	47 (11.8)	104 (26.0)
Cat/dog behaviour is important to be a good pet.	25 (6.3)	21 (5.3)	61 (15.3)	117 (29.3)	176 (44.0)
I think that depending on supportive treatment is beneficial for my cat's or dog's life.	12 (3.0)	15 (3.8)	103 (25.8)	145 (31.3)	145 (36.3)
I am willing to adopt brachycephalic breed cats or dogs despite knowing problems associated with the breed.	56 (14.0)	79 (19.8)	118 (29.5)	77 (19.3)	70 (17.5)

Table 3: Knowledge regarding problems associated with Brachycephalic breeds

Description	Response	
	Yes n(%)	No n(%)
Do you know about problem associated with Brachycephalic breed cats and dogs	216 (54.0)	184 (46.0)
Are you aware of problem of respiratory disorder, epiphora, noisy breathing, heat intolerance and others associated with this breed?	243 (60.8)	157 (39.3)
Do you know that problems listed are due to genetic factors and not viral or bacterial infection	228 (57.0)	172 (43.0)

Table 4: Knowledge level towards brachycephalic breeds of cats and dogs

Variables	Type of responses				
	1= Very Unlikely n(%)	2= Unlikely n(%)	3= Neutral n(%)	4= Likely n(%)	5= Very Likely n(%)
Do you think there are health problems associated with brachycephalic breeds.	15(3.8%)	20(5.0%)	114(28.5%)	87(21.8%)	164(41.0%)
How likely are you to buy a brachycephalic breed.	186(46.5%)	69(17.3%)	101(25.3%)	21(5.3%)	23(5.8%)
I am willing to adopt brachycephalic breed cats or dogs despite knowing problems associated with the breed.	56 (14.0%)	79(19.8%)	118(29.5%)	77(19.3%)	70(17.5%)

A majority expressed their interest in social media platforms (31.2 %, n= 123), highlighting the appeal of these online channels for disseminating information and that information were often acquired by the general public through social media and personal experiences rather than directly from scientists (Yue et al., 2022). Additionally, a substantial portion of respondents indicated a preference for internet-based educational interventions (26.8%, N= 106), underlining the importance of web-based resources in meeting their informational needs. Another noteworthy preference was observed for pet expos and exhibitions (24.1%, n= 95). About 24.1% (n= 95) chose pet expos and exhibitions in acquiring educational insights into pet-related topics.

In this study, there was a significant relationship between gender ($P = 0.023$) and occupation ($P = 0.038$) with the level of respondents' knowledge. This study concluded that there was no statistically significant correlation between knowledge and perception towards brachycephalic breeds of cats and dogs (Spearman's rank correlation, $r_s = -0.056$, $P = 0.694$).

DISCUSSION

This study is the first conducted in Malaysia to investigate knowledge, attitudes, and perceptions of Malaysians towards brachycephalic breed cats and dogs, which is believed to contribute to the enhancement of cat and dog welfare in Malaysia. The current study findings reported a consistent results with previous works done by Zaini et al (2022) where most of the respondents (64.0%) were females, while only 36.0% were males. In this study, a greater proportion of cat or dog owners are female,

leading to female dominance in the overall cat and dog owner population. According to Czech et al., (2001) women attributed higher preservation value to nonhuman species than men did, opting for ecological importance as the primary factor when prioritizing species. In Malaysia, the predominant age group among internet users is between 18 and 29 years old, and on average, they spend approximately 7 hours and 57 minutes online each day (Mohamed et al., 2021). The results align with an earlier study examining pet ownership in the Putrajaya community (Debbra, 2019). For occupation of the respondents, most of them were students (49.5%) and private company staff (24.0%). These findings align with a study by Anseel et al. (2010), which found that student and employee populations are more likely to respond to surveys than the general population.

Our current study indicates that a significant majority of respondents value knowing their cat's or dog's breed. This emphasis on breed identity aligns with established consumer behaviour theories, where particular purebred animals can function as markers of social status or personal expression (Hirschman, 1994). However, our findings suggest a notable regional divergence in the prevalence of brachycephalic companion animals when compared to broader Western contexts. Here in Malaysia, less than 10% of surveyed cat owners reported owning brachycephalic breeds such as Persians, and fewer than 3% owned brachycephalic dogs. This contrasts sharply with their documented high popularity in countries like the UK (O'Neil et al., 2023), USA (Wilson et al., 2018), and Australia (Czerwinski et al., 2016), where breeds such as the French Bulldog and Pug have seen exponential growth, often driven by their unique appearance, perceived 'cute'

traits, and associated social cachet, power, status or financial display (Packer et al., 2017; O'Neill et al., 2020). From a Malaysian perspective, this lower adoption rate for brachycephalic breeds might be plausibly attributed to distinct socio-economic factors. It can be speculated that the substantial initial acquisition costs (e.g., Persian cats costing RM1,500-RM5,000), coupled with the considerable lifelong maintenance expenses associated with managing their breed-specific health issues (e.g., BOAS surgeries costing thousands of Malaysian Ringgit), may act as a significant financial barrier for potential owners. Further research is necessary to confirm these socio-economic and cultural speculations.

More than half of the respondents felt it was important for them to know the problems associated with the breed. Results also showed that a majority of respondents considered temperament to be the most important aspect of owning a cat or a dog. These results are followed by general appearance and fitness level. This is supported by the choice to own a brachycephalic breed, which is driven by its appearance, which is often prioritised above breed health (Packer et al., 2017), reflecting a prevalent trend where aesthetic preferences overshadow considerations for the well-being and potential health challenges associated with these distinctive physical features (Packer et al., 2017). The continued demand for brachycephalic breeds is also partly driven by the normalisation of their associated health issues, in which breed-specific traits are often conflated with acceptable clinical signs (Packer et al., 2015). This acceptance by breeders, owners, and veterinarians influences the proactive management of these conditions (Packer et al., 2015). Despite observing frequent severe symptoms, many owners do not perceive these as problems for their dogs; notably, over half are unaware of their dog's breathing difficulties (Packer et al., 2015). This critical lack of owner recognition often prevents brachycephalic dogs with BOAS symptoms from receiving veterinary attention, thereby impeding improvements in health (Packer et al., 2015; Roedler et al., 2013).

Over half of the respondents claimed that they know the problem associated with brachycephalic breeds of cats and dogs, and most of them were aware of issues such as respiratory disorders, epiphora, noisy breathing, heat intolerance, and others linked to this breed. Plus, the majority of respondents were aware that the problems listed for brachycephalic breeds in this survey are due to genetic factors, not viral or bacterial infections. However, having this knowledge and awareness was insufficient to prevent adopting this breed as a pet cat or dog. This has been shown by the current results, where they were still willing to buy or adopt brachycephalic breed cats or dogs despite knowing the problems associated with the breed. Further in-depth inquiry is critical to dissect the human decision-making processes that perpetuate the acquisition and selective breeding of dogs with exaggerated conformational traits, particularly given their inherent welfare challenges. A sole reliance on educating prospective owners about these inherited conditions may inadvertently neglect the self-sustaining cycle that connects specific breeding practices, the emphasis on pedigree selection, and the ongoing demand for such dogs. This cycle is profoundly influenced by learned

associations and powerful incentives (Zaki et al., 2011). Indeed, principles derived from Pavlovian conditioning highlight how prior experiences can significantly sway human choices (Seymour & Dolan, 2008). A compelling example lies in features often perceived as 'infant-like' (the baby schema effect)—such as a prominent forehead, large, low-set eyes, and full cheeks—which can instinctively trigger a nurturing response in observers (Archer & Monton, 2011). Furthermore, the desire for perceived ideal behavior or enhanced social standing often serves as a potent reward within human social contexts, further shaping these decisions (Zaki et al., 2011). Consequently, to genuinely alleviate the welfare issues faced by brachycephalic dogs, strategies must specifically address and alter these deeply ingrained emotional responses and habitual patterns of human choice.

A significant majority expressed their interest in social media platforms as reported in the current study, highlighting the appeal of these online channels for disseminating information. That information were often acquired by the general public through social media and personal experiences rather than directly from scientists (Zhang et al., 2022). Additionally, a substantial portion of respondents indicated a preference for internet-based educational interventions, underlining the importance of web-based resources in meeting their informational needs. Another noteworthy preference was observed for pet expos and exhibitions, which were seen as valuable means of acquiring educational insights into pet-related topics. Fewer respondents expressed an interest in television-based educational content and magazines, signalling that this conventional medium holds limited appeal for this study, and that print media were the least preferred type of educational intervention for meeting their informational needs. Magazines are selected based on their readability for the company's target customer segment. Advertisements are strategically designed to occupy a whole page within the magazine, aiming to optimise the positive impact of educational intervention initiatives (Peschel and Orquin, 2013; Pieters and Wedel, 2004).

The results of this study indicate that a significant relationship between perception and general demographic factors was not found among the respondents and that these factors do not significantly influence their perception. Their age, gender, race, ethnicity, education level, occupation, state and marital status were not associated with the level of perception towards this issue. These findings may be due to the small sample size of the respondents. Hence, further studies need to be conducted with a larger sample size and a broader range of questions to yield better results. However, for knowledge, a significant relationship with general demographic factors was found among the participants. Significant relationships were found between age and knowledge level. This study also found a significant association between occupation and participants' knowledge levels. Different findings from Bognár and Kubinyi (2023) work where they found out attitudes toward brachycephalic dogs are influenced by demographic features such as age, sex, parenthood, education, and personality. As such, it is really important to identify factors associated with people's perception and attitudes, so that this can be addressed for educational intervention targeted at participants.

The relationship between respondents' perceptions and knowledge of brachycephalic breeds of cats and dogs has yet to be critically examined, documented, or practised. This study concluded that there was no statistically significant correlation between knowledge and perception towards brachycephalic breeds of cats and dogs. Other factors not analysed further in this study can influence the findings. One study in Germany evaluated people's perceptions and knowledge of brachycephalic breeds and breed-related animal welfare problems (Steinert et al., 2019). This finding from the questionnaire is consistent with the previous study in Germany stated that is no significant correlation between the knowledge and perception of the respondents but the best predictors of participants' knowledge about breed-related welfare issues were found to be dog ownership, as well as the age and gender of the participants (Steinert et al., 2019).

CONCLUSION

In summary, this research determined that the Malaysian public's knowledge and perception of brachycephalic breeds of cats and dogs were at a moderate level. General demographic factors, such as age and occupation, influence Malaysians' knowledge levels regarding this issue. In general, apart from education and awareness to improve animal welfare for these brachycephalic breeds, understanding the key factors influencing human decision-making is needed.

There are a few limitations in conducting the current study, the primary one being its study design. The cross-sectional nature of the study rendered it challenging to discern temporal relationships and establish causality definitively. Additionally, the study utilised a self-administered, closed-ended questionnaire as its instrument, introducing the possibility of respondent bias, particularly information bias, which cannot be disregarded. This study may have focused only on areas respondents were familiar with, potentially affecting their responses and scores across different domains. Also, most respondents were from the Selangor community. Therefore, the results could be limited to the locations, and the data represented may lack representativeness. One of the suggestions for this study is to collect respondents from bigger and different geographical areas and demographic backgrounds to better compare the factors influencing the scores and responses to the knowledge and perception towards this issue.

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CONFLICT OF INTEREST

None of the authors of this paper has financial or personal relationship with other people or organisations

that could inappropriately influence or bias the content of the paper.

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