



## Knowledge, attitudes, and practices of pet owners toward animal welfare: A scoping review

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### Abstract

Pet welfare has gained increasing attention in the context of the rapid growth in companion animal ownership, along with the associated challenges related to public health, caregiving practices, and owner responsibility. This study aims to systematically synthesize existing evidence on pet owners' knowledge, attitudes, and practices (KAP) regarding animal welfare, and to identify research trends and knowledge gaps in this field. A scoping review approach was adopted, with a comprehensive literature search conducted across the Scopus, Web of Science, and PubMed databases. Following the application of predefined inclusion and exclusion criteria, 38 eligible studies were included in the analysis. The findings indicate that most pet owners demonstrate relatively positive levels of knowledge and attitudes toward pet welfare, particularly regarding basic care and preventive veterinary health. However, a substantial gap persists between knowledge, attitudes, and actual practices, especially in areas related to behavioral and psychological welfare, reproductive management, and antibiotic use. Individual characteristics, socio-economic conditions, cultural context, caregiving experience, and access to veterinary services were identified as key factors influencing pet owners' welfare-related practices. This review highlights the need for behavior-change-oriented educational interventions that are tailored to specific caregiving contexts and underscores the central role of veterinarians in promoting sustainable pet welfare practices. Integrating pet welfare considerations within the One Health and One Welfare frameworks is proposed as an important direction for future research and policy development.

**Keywords:** Animal welfare, pet ownership, knowledge, attitudes and practices (KAP), Companion animals

### Introduction

The rapid global increase in companion animal ownership has brought renewed attention to the growing importance of animal welfare in modern societies, where pets are no longer regarded merely as property but increasingly as family members. Animal welfare is a multidimensional concept encompassing physical health, psychological well-being, and the ability to express natural behaviors within human-controlled environments<sup>[1]</sup>. For companion animals, welfare outcomes are directly shaped by how owners perceive, evaluate, and implement daily care practices. Consequently, understanding how pet owners conceptualize, assess, and act upon animal welfare is crucial for enhancing the quality of life for companion animals. Surveys conducted across diverse national contexts consistently indicate that, although many pet owners demonstrate strong emotional attachment and generally positive attitudes toward their animals, substantial deficiencies remain in welfare-related knowledge and everyday caregiving practices that may negatively affect welfare outcomes<sup>[2, 8]</sup>.

In animal welfare research, the Knowledge-Attitude-Practice (KAP) framework is widely applied to examine the relationships between individuals' levels of understanding, ethical perspectives, and actual caregiving behaviors toward animals. KAP studies consistently demonstrate that pet owners' knowledge of the physiological and behavioral needs of companion animals is closely associated with their attitudes toward animal welfare, which in turn influences everyday care practices such as vaccination, nutrition, behavioral management, and disease prevention<sup>[9, 10]</sup>. Beyond cognitive factors, a growing body of literature highlights the role of social and structural determinants in shaping the welfare of companion animals. Owner

education level, cultural context, socioeconomic status, and access to veterinary services have been shown to significantly influence the extent to which animals' physical, behavioral, and psychological needs are adequately met<sup>[11, 12]</sup>.

Existing studies consistently report gaps in owners' understanding of preventive healthcare, behavioral needs, environmental enrichment, and the welfare consequences of uncontrolled breeding, free roaming, and low neutering rates, even among owners who regard their pets as family members<sup>[13]</sup>. At the same time, pet ownership has been shown to foster greater empathy toward animals and more favorable attitudes and consumption intentions in support of animal welfare, highlighting a complex bidirectional relationship between the human-animal bond and welfare-related behaviors<sup>[7, 14]</sup>. The literature emphasizes the importance of targeted educational initiatives, responsible ownership frameworks, and the central roles of veterinarians and animal welfare organizations in narrowing the gap between positive attitudes and optimal welfare practices<sup>[15, 16]</sup>. Owner-focused interventions must therefore account for demographic and cultural diversity, financial constraints, and established principles of behavior change in order to achieve meaningful and sustained improvements in companion animal welfare outcomes<sup>[8, 11]</sup>.

This review was conducted as a scoping review to systematically map and synthesize existing evidence on pet owners' knowledge, attitudes, and practices (KAP) related to animal welfare. Given the substantial heterogeneity in study designs, populations, and measurement instruments, a scoping review approach is particularly appropriate for identifying overarching patterns and key research gaps within the literature. The novelty of this review lies in its

integrative synthesis of KAP studies across multiple domains of companion animal welfare, thereby elucidating the persistent gaps between knowledge, positive attitudes, and actual caregiving practices, particularly with respect to behavioral and psychological welfare. By providing a comprehensive overview of current evidence, this review contributes to a clearer understanding of where and why welfare-related practices fall short and offers a foundation for future research, policy development, and behavior-oriented interventions.

## Methods

### Search strategy

A comprehensive literature search was conducted across the major international scientific databases Scopus, Web of Science, and PubMed, following approaches commonly adopted in recent systematic and scoping reviews on animal welfare, human–animal interactions, and KAP in veterinary research<sup>[17]</sup>.

The search strategy focused on studies examining pet owners' knowledge, attitudes, and practices (KAP) related to animal welfare, encompassing both quantitative studies (e.g., cross-sectional surveys and observational studies) and qualitative research (e.g., interviews and focus group discussions). Key search terms and their variants were applied in English and combined using Boolean operators (AND, OR). Examples of search strings included:

- 'animal welfare' AND ('pet owner\*' OR 'companion animal\*')
- ('knowledge' OR 'attitude\*' OR 'practice\*' OR 'KAP') AND ('dog\*' OR 'cat\*')
- 'pet owner\*' AND ('antimicrobial resistance' OR 'antibiotic use')

In addition, the search strategy incorporated terms related to theoretical frameworks and models, motivations and barriers (e.g., motivation, barrier, facilitator), and the linkages between caregiving practices and welfare outcomes (e.g., behavior, welfare outcome, management) to ensure broad coverage of relevant literature.

### Eligibility criteria

The eligibility criteria were developed based on an expanded PICO framework adapted for KAP research in the context of animal welfare<sup>[18]</sup>:

**Population:** Studies were eligible if they involved owners of companion animals, primarily dogs and cats, including community-based pet owners, clients of veterinary clinics, and respondents to online surveys.

**Exposure/Intervention:** Eligible studies examined educational programs, communication initiatives, policy-related interventions, or the existing status of pet owners' knowledge, attitudes, and practices regarding animal welfare, caregiving, medication use, disease prevention, behavior management, and living environments of companion animals.

**Outcomes:** Outcomes considered in this review included: (i) KAP-related indicators, such as knowledge, attitude, and practice scores, proportions of correct/incorrect responses, and levels of agreement, Caregiving and management behaviors, including nutrition, vaccination, parasite control, neutering, roaming management, human–animal interactions, and environmental enrichment, and (iii) Animal welfare or behavioral indicators, where available (e.g., problem behaviors, stress-related outcomes, or health-related indicators).

**Study design:** Eligible study designs included cross-sectional studies, observational cohort studies, educational intervention studies, and reviews (systematic, narrative, or scoping) that assessed KAP or owners' perceptions related to companion animal welfare.

**Exclusion criteria:** Studies were excluded if they: (i) focused exclusively on non-companion animals (e.g., production animals or wildlife), did not address pet owners' knowledge, attitudes, practices, or perceptions related to animal welfare or caregiving, (iii) consisted of opinion pieces, commentaries, letters, or case reports without empirical data, or (iv) lacked accessible full texts in English.

### Study selection process

The screening of titles, abstracts, and full texts was conducted independently by two reviewers. Any discrepancies arising during the selection process were resolved through discussion until consensus was reached. The study selection procedure followed the PRISMA framework adapted for scoping and narrative reviews (Figure 1).

### The screening process consisted of four stages:

- **Stage 1:** The initial database search identified 1,002 records.
- **Stage 2:** After automated duplicate removal and manual screening of titles and abstracts, 247 records were retained for full-text assessment.
- **Stage 3:** Full-text articles were assessed against the predefined inclusion and exclusion criteria, resulting in 162 articles deemed potentially eligible.
- **Stage 4:** Following the exclusion of studies with overlapping content, excessively narrow scope, or insufficient data on KAP or animal welfare, a total of 38 studies were included in the final synthesis.

The included studies comprised KAP surveys addressing general animal welfare and caregiving practices, antimicrobial use and antimicrobial resistance, risk perception and public health considerations, as well as broader surveys and reviews focusing on the welfare of dogs and cats.

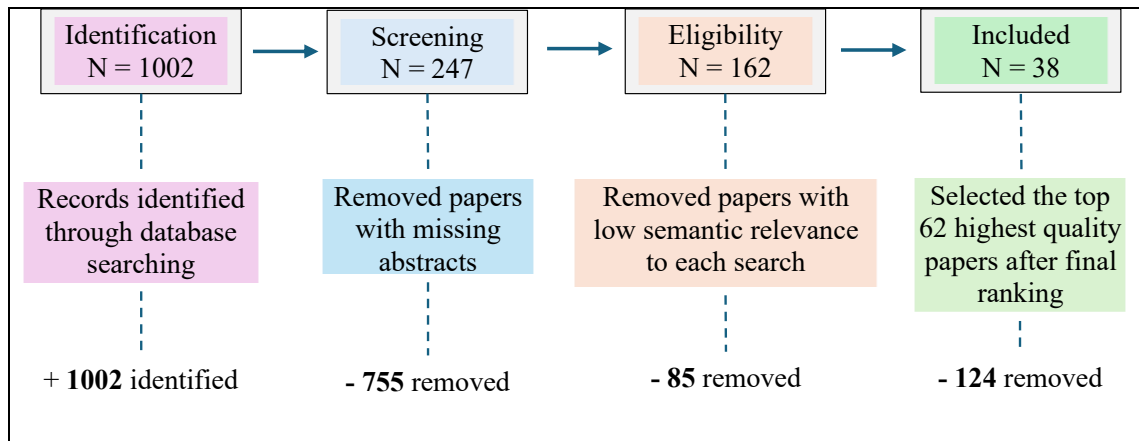


Fig 1: PRISMA-ScR flow diagram illustrating the literature search and study selection process

**Data extraction and synthesis**

Data were systematically extracted from each included study using a predefined data-charting framework. Extracted information covered study characteristics (country, year of publication, study design, sample size, and study population), measurement instruments (questionnaires, KAP frameworks, scales, and behavioral or welfare indicators), and key findings. The extracted outcomes included levels of pet owners’ knowledge, attitudes, and practices, determinants influencing KAP (e.g., demographic characteristics, caregiving experience, and contextual factors), and reported associations between KAP and animal welfare or behavioral indicators, where available. Studies were synthesized along the three core KAP dimensions, enabling comparison and identification of common patterns across different contexts and countries.

**Quality appraisal**

Consistent with the nature and objectives of a scoping review, this study did not conduct a formal risk-of-bias or methodological quality assessment of the included studies. Nevertheless, limitations related to cross-sectional study designs, self-reported data, and heterogeneity in measurement instruments were carefully considered in the interpretation and discussion of the findings.

**Results**

**Characteristics of included studies**

A total of 38 studies met the eligibility criteria and were included in this scoping review. The included studies demonstrated substantial heterogeneity in terms of geographical settings, study populations, study designs, and animal welfare domains. The main characteristics of the included studies are summarized in Table 1. Most studies employed cross-sectional survey designs using self-administered KAP questionnaires, which were distributed either online or through veterinary clinics [2, 5, 20]. Geographically, the literature was predominantly derived from North America, Europe, and Asia, with notable clusters of studies conducted in New Zealand, Portugal, Sweden, Turkey, China, India, Thailand, Malaysia, Indonesia, and the Philippines [2, 4, 5, 20, 22].

The primary study populations consisted of dog and cat owners, although several studies focused on more specific subgroups, such as indoor cat owners, dog owners participating in rabies vaccination campaigns, or caregivers of pets with chronic conditions [21, 23]. Across most samples, female and younger participants were overrepresented, and respondents generally reported relatively high educational attainment (bachelor’s degree or higher) [5]. Additionally, many participants reported forming strong emotional bonds with their pets [20]. These sample characteristics may have contributed to the generally higher KAP scores observed across the included studies.

Table 1: Characteristics of studies included in the scoping review

Author (year)	Country/Region	Study design	Study population	Primary focus
Adamakopoulou <i>et al.</i> (2023) [8]	Global	Text analysis	Scientific literature	Dog and cat welfare themes
Alemayehu <i>et al.</i> (2022) [31]	Ethiopia	Cross-sectional	Animal owners	KAP on animal welfare
Bard <i>et al.</i> (2017) [37]	United Kingdom	Qualitative	Veterinarians	Communication and behavior change
Basir <i>et al.</i> (2025a) [30]	Malaysia	Instrument development	Dog owners	Rabies prevention education
Çelik <i>et al.</i> (2025) [111]	Türkiye	Cross-sectional	Pet owners	Care, nutrition, and welfare
Contreras & Vanderstichel (2024) [34]	International	Educational descriptive study	Veterinary students	Welfare and behavior training
Csiplo & Popescu (2025) [13]	Europe	Cross-sectional	Pet owners	Welfare during veterinary visits
Das <i>et al.</i> (2025) [19]	Global	Scoping review	Dog owners	KAP on rabies prevention
Dias <i>et al.</i> (2024) [25]	Portugal	Cross-sectional	Pet owners	KAP on antibiotic use
Forrest <i>et al.</i> (2023a) [2]	New Zealand	National survey	Dog and cat owners	Caregiving practices
Forrest <i>et al.</i> (2023b) [4]	New Zealand	Cross-sectional	Pet owners	Attitudes and perceptions
Grigg & Kogan (2019) [5]	United States	Cross-sectional	Cat owners	KAP and feline behavior
Hirsch <i>et al.</i> (2022) [22]	Sweden	Cross-sectional	Cat owners	Attitudes and housing conditions
Jose <i>et al.</i> (2021) [21]	Philippines	Cross-sectional	Pet owners	Responsible pet ownership
Kang & Lee (2025) [16]	South Korea	Scoping review	Dog owners	Owner education
Küeper & Merle (2021) [38]	Germany	Structural equation modeling	Pet owners	Relationship-centered care

Khor <i>et al.</i> (2025) <sup>[23]</sup>	Malaysia	Cross-sectional	Cat owners	KAP on chronic kidney disease
Liang <i>et al.</i> (2024) <sup>[14]</sup>	China	Cross-sectional	Students	Animal welfare attitudes
McGreevy <i>et al.</i> (2020) <sup>[35]</sup>	International	Review	Veterinary education	One Welfare
Mohammad Basir <i>et al.</i> (2025b) <sup>[27, 30]</sup>	Malaysia	Cross-sectional	Dog owners	KAP on rabies prevention
Novack <i>et al.</i> (2023) <sup>[36]</sup>	International	Review	Multidisciplinary	Animal welfare concepts
Overgaauw <i>et al.</i> (2020) <sup>[7]</sup>	International	Review	Pet owners	One Health
Powdrill-Wells <i>et al.</i> (2025) <sup>[15]</sup>	Australia	Intervention study	Community members	Behavior change
Prata (2020) <sup>[24]</sup>	Portugal	Survey	Pet owners	Care practices and information needs
Premashthira <i>et al.</i> (2021) <sup>[26]</sup>	Thailand	Cross-sectional	Dog owners	KAP and socio-economic factors
Philpotts <i>et al.</i> (2024) <sup>[3]</sup>	United Kingdom	Cross-sectional	Dog owners	Pre-purchase behavior
Salgado-Caxito <i>et al.</i> (2023) <sup>[6]</sup>	Chile	Cross-sectional	Pet owners	Preventive care
Scarborough <i>et al.</i> (2021) <sup>[29]</sup>	Australia	Cross-sectional	Pet owners	Antibiotic use and communication
Siano <i>et al.</i> (2024) <sup>[10]</sup>	Brazil	Cross-sectional	Dog owners	Welfare perceptions
Singh <i>et al.</i> (2025) <sup>[28]</sup>	India	Cross-sectional	Dog owners	Reproductive KAP
Wulandari <i>et al.</i> (2024) <sup>[20]</sup>	Indonesia	Cross-sectional	Cat owners	Welfare levels

### Knowledge of animal welfare

Across the reviewed studies, pet owners generally demonstrated a relatively good understanding of animals' basic biological needs (Table 2). In New Zealand, more than 90% of dog and cat owners considered adequate housing, deworming, ectoparasite control, and vaccination to be essential components of animal welfare<sup>[2, 4]</sup>. Similarly, in Portugal, the majority of owners reported routinely implementing basic preventive care practices, including regular vaccination, internal and external parasite control, and the use of commercial pet food<sup>[24]</sup>. In more specific health domains, such as chronic kidney disease in cats, over 80% of owners were aware of disease risks and demonstrated a reasonable level of knowledge regarding long-term treatment and management requirements<sup>[23]</sup>.

However, knowledge gaps were consistently reported with respect to more advanced or less tangible aspects of animal welfare. Studies from the United States indicated that cat owners frequently lacked awareness of environmental enrichment needs, species-specific behaviors, and the welfare risks associated with insufficient mental stimulation. Many cats were provided with only minimal enrichment, while signs of stress and anxiety were often misinterpreted or overlooked by owners<sup>[5]</sup>. In Indonesia, 59% of cat owners were classified as having low knowledge of the Five Freedoms framework and the role of veterinary professionals, with particularly poor understanding of the freedoms related to 'freedom from pain, injury, and disease' and 'freedom to express normal behavior'<sup>[20]</sup>. Knowledge limitations were also evident in technically complex domains. Although nearly 98% of pet owners in Portugal reported familiarity with the concept of antibiotics, approximately one-quarter incorrectly believed that antibiotics could be used to treat viral or fungal infections. Moreover, more than half of the respondents did not recognize the direct link between antibiotic use in veterinary medicine and human health within a One Health framework<sup>[25]</sup>. Overall, while basic welfare knowledge among pet owners appears relatively high, substantial gaps persist in understanding stress indicators, psychological and behavioral needs, and technically demanding topics such as antibiotic use, rabies prevention, and reproductive management.

### Attitudes toward animal welfare

Most of the reviewed studies reported generally positive attitudes among pet owners toward animal welfare, accompanied by high levels of emotional attachment to their animals (Table 2). In New Zealand and Türkiye, the majority of owners perceived pets as family members, emphasizing the importance of providing good care, avoiding pain or harm, and viewing practices such as vaccination and parasite control as moral responsibilities of ownership<sup>[2, 11]</sup>. Surveys addressing rabies prevention in Thailand and Malaysia similarly documented strong owner support for vaccination and rabies control measures, although attitudes toward free-roaming dogs and perceptions of owner responsibility varied across sociocultural contexts<sup>[19, 26, 27]</sup>. In some settings, positive attitudes also extended to issues of responsible reproduction. In India, most dog owners expressed support for sterilization and ethically oriented breeding practices, even though their knowledge of advanced reproductive technologies, such as artificial insemination or semen cryopreservation, remained limited<sup>[28]</sup>.

Despite these generally favorable attitudes, positive perceptions did not consistently translate into appropriate caregiving behaviors. Several KAP studies on rabies prevention and responsible pet ownership have indicated that, although owners often demonstrate good knowledge and positive or moderately positive attitudes, their practices frequently remain at a moderate level. This discrepancy was particularly evident in areas such as completing vaccination schedules, managing free-roaming dogs, and complying with registration or microchipping requirements<sup>[19, 26]</sup>. In Sweden, a substantial proportion of cat owners perceived cats as largely self-sufficient and questioned the effectiveness of training in preventing behavioral problems. Such beliefs may reduce motivation for early intervention and potentially compromise long-term feline welfare<sup>[22]</sup>. Beyond direct caregiving, attitudes toward animal welfare were also reflected in consumer-related domains. In China, university students who currently owned or had previously owned pets demonstrated more humane attitudes and a greater willingness to pay for animal welfare-certified products, suggesting a broader attitudinal spillover from pet ownership to general welfare concerns<sup>[14]</sup>.

**Pet care practices**

The evidence indicates a clear differentiation between pet owners’ adherence to basic physical care practices and their engagement with practices addressing psychological and behavioral welfare needs (Table 2). In New Zealand, most dog and cat owners reported relatively high compliance with core practices such as vaccination, deworming, ectoparasite control, and regular feeding. However, complementary practices, including routine veterinary check-ups, regular grooming, and microchipping, were less consistently implemented, particularly among cat owners [4]. Similarly, in Portugal, pets were commonly kept indoors, fed commercial diets, and vaccinated or dewormed intermittently, whereas compliance with microchipping and registration with local authorities was notably low [24]. In the Philippines, dog owners demonstrated better practices than cat owners with respect to vaccination, feeding, and movement management (e.g., leashing and avoidance of free roaming), while feline care practices generally remained at a moderate level [21].

In contrast, practices related to psychological interaction, environmental enrichment, and behavioral management were frequently inadequate. A study conducted in the United States found that many cats were provided with only minimal forms of enrichment, such as limited access to toys,

opportunities for climbing, hiding spaces, or structured human–animal interaction. These deficiencies were associated with a higher prevalence of owner-reported behavioral problems [5]. Owners with higher levels of knowledge were more likely to employ positive reinforcement, less likely to use punishment, and reported fewer behavioral issues. Conversely, those holding persistent misconceptions (e.g., beliefs that cats are fully independent and do not require play) or perceiving enrichment as costly were more inclined to rely on punitive approaches and less likely to seek professional support.

In the context of specialized veterinary care, such as the management of chronic kidney disease (CKD) in cats, higher knowledge levels were generally associated with better treatment adherence. Nevertheless, a subset of owners continued to exhibit suboptimal practices due to financial constraints, limited caregiving experience, or insufficient continuity of veterinary guidance [23]. Practices related to antimicrobial use and rabies prevention were similarly inconsistent across settings. Although most owners recognized the risks of antimicrobial resistance and the importance of vaccination, inappropriate antibiotic use and substantial variation in rabies vaccination coverage persisted between regions and countries [25].

**Table 2:** Synthesis of pet owners’ knowledge, attitudes, and practices across animal welfare domains

Animal welfare domain	Knowledge level	Attitudes	Practices	Representative studies
General welfare	Moderate–high	Positive	Moderate	Siano <i>et al.</i> (2024) <sup>[10]</sup> , Wulandari <i>et al.</i> (2024) <sup>[20]</sup>
Behavioral and psychological welfare	Low–moderate	Positive	Low	Grigg & Kogan (2019) <sup>[5]</sup> , Hirsch <i>et al.</i> (2022) <sup>[22]</sup>
Preventive healthcare	Moderate	Positive	Moderate–high	Salgado-Caxito <i>et al.</i> (2023) <sup>[6]</sup>
Antimicrobial use	Moderate	Positive	Inconsistent	Dias <i>et al.</i> (2024) <sup>[25]</sup> , Scarborough <i>et al.</i> (2021) <sup>[29]</sup>
Rabies prevention	Moderate	Positive	Context-dependent	Premashthira <i>et al.</i> (2021) <sup>[26]</sup> , Das <i>et al.</i> (2025) <sup>[19]</sup>
Pet reproduction	Low	Neutral	Low	Singh <i>et al.</i> (2025) <sup>[28]</sup>

**Note:** Levels were qualitatively synthesized from the included studies.

**Factors influencing knowledge, attitudes, and practices**

The key factors influencing pet owners’ knowledge, attitudes, and practices (KAP) are summarized in Table 3, highlighting the concurrent roles of individual characteristics, socio-economic conditions, cultural norms, and veterinary service systems. Across the included studies, educational attainment and access to information emerged as the most consistent and influential determinants of KAP. Higher levels of education were generally associated with better knowledge and more appropriate practices related to animal welfare, rabies control, antimicrobial use, chronic disease management in cats, and awareness of the Five Freedoms framework [28]. More highly educated owners also tended to seek, understand, and value evidence-based veterinary advice to a greater extent [29].

Pet ownership experience, years of ownership, and the strength of the human–animal bond were also important, though their associations with KAP were not strictly linear. Longer ownership experience was often linked to higher knowledge levels, however, it did not always translate into more positive attitudes. In some rabies-related studies, longer ownership duration was paradoxically associated with less favorable attitudes toward vaccination or control measures [30]. In contrast, a strong emotional bond with pets was consistently associated with more frequent veterinary

visits and greater concern for animal welfare, particularly in studies conducted in Portugal [24].

Income, affordability, and broader socio-economic context were identified as key structural determinants, especially for welfare-related practices. Higher income levels and urban residence were commonly associated with increased uptake of vaccination, parasite control, routine veterinary check-ups, and neutering, whereas financial constraints were repeatedly reported as major barriers in low-income communities [11]. Urban–rural disparities further influenced KAP through differences in access to veterinary services and animal health information [21].

Access to reliable information sources, particularly veterinarians, had a positive effect on both knowledge and practices. Veterinarians were widely recognized as trusted sources of information on nutrition, welfare, parasite control, and antimicrobial use, nevertheless, many owners continued to rely primarily on informal sources such as the internet or social networks [20]. Participation in targeted educational interventions (e.g., rabies awareness programs or workshops on chronic kidney disease) was consistently associated with substantially higher knowledge scores and improved practices [30].

Finally, demographic characteristics and socio-cultural factors played a significant role in shaping KAP. Gender,

age, occupation, number of pets, geographic region, and prevailing cultural norms, such as attitudes toward neutering, free-roaming dogs, or beliefs that ‘cats can take care of themselves’, were all shown to influence owners’ intentions and behaviors [11, 21]. Across multiple contexts,

women, younger individuals, and owners with higher educational attainment tended to exhibit more positive welfare attitudes and engage more frequently in responsible ownership practices [20].

**Table 3:** Key factors influencing pet owners’ knowledge, attitudes, and practices related to animal welfare

Factor category	Specific attributes	Primary influence pattern	Representative studies
Individual	Educational level, scientific literacy	$K \rightarrow A \rightarrow P$	Grigg & Kogan (2019) [5]
Socio-economic	Income, affordability of veterinary care	$A \rightarrow P$	Prata (2020) [24], Premashthira <i>et al.</i> (2021) [26]
Ownership experience	Years of ownership, strength of attachment	$A \rightarrow P$	Salgado-Caxito <i>et al.</i> (2023) [6]
Cultural	Norms and beliefs related to pet keeping	A	Jose <i>et al.</i> (2021) [21]
System-level	Access to veterinary services	P	Dias <i>et al.</i> (2024) [25]
Communication	Veterinary advice and trust in veterinarians	$A \rightarrow P$	Bard <i>et al.</i> (2017) [37]

**Note:** K = Knowledge, A = Attitudes, P = Practices. Influence patterns indicate the dominant direction of association reported across the included studies.

**Discussion**

The findings of this scoping review suggest that positive knowledge and attitudes do not automatically translate into appropriate welfare-related practices, particularly in domains related to psychological and behavioral welfare, such as environmental enrichment, positive human–animal interactions, and recognizing stress and discomfort. This pattern is consistent across KAP studies in both companion and production animal contexts, where knowledge and attitude scores are frequently higher than practice scores, highlighting a persistent knowledge–practice gap. Evidence from KAP research in animal welfare more broadly supports this observation. For example, among livestock owners in Ethiopia, 35.7% of respondents achieved a ‘desirable’ level of knowledge, compared with only 24.6% demonstrating desirable practices, despite statistically significant positive correlations among knowledge, attitudes, and practices [31]. Similarly, a study of cattle farmers in Indonesia reported relatively high levels of knowledge and positive attitudes but found no significant association with actual husbandry practices, suggesting that factors such as age, educational level, and herd size exert a stronger influence on behavior than knowledge alone [32].

In the context of companion animals, studies from the United States indicate that while many cat owners possess a reasonable understanding of normal feline behavior, a substantial proportion of cats are provided with only minimal levels of environmental enrichment. Higher levels of owner knowledge have been associated with fewer reported behavioral problems and a lower reliance on positive punishment, however, such knowledge does not consistently ensure that cats are kept in environments that fully meet their behavioral and psychological needs [5]. Similarly, national surveys in New Zealand have shown that most dog and cat owners place high importance on vaccination, parasite control, and adequate housing, yet exhibit notable knowledge gaps regarding routine veterinary health checks and the welfare implications of selecting for extreme physical traits through breeding practices [2]. These findings reinforce the view that structural and contextual barriers, including time constraints, financial limitations, housing conditions, cultural routines, and a prevailing focus on physical health over mental and behavioral welfare, constrain the translation of knowledge into optimal welfare

practices. This tendency to prioritize tangible, medically oriented aspects of care may partly explain why behavioral and psychological welfare remains a persistent blind spot in companion animal ownership, even among owners who report high levels of concern for their pets’ well-being.

In addition, the measurement approaches used to assess KAP may contribute to an overestimation of owners’ knowledge and attitudes. Several studies relied on self-developed questionnaires that primarily capture declarative or theoretical knowledge (e.g., awareness of the importance of water provision, nutrition, or health check-ups), rather than owners’ ability to apply this knowledge in specific, real-life caregiving situations [32]. In contrast, the lack of standardized and validated KAP instruments in companion animal welfare research complicates the estimation of the true magnitude of the knowledge–practice gap and limits cross-study comparability. Addressing this methodological limitation represents an important priority for future research, particularly in efforts to evaluate the effectiveness of educational and behavioral interventions [33].

Given the persistence of the knowledge–practice gap, education and communication strategies explicitly oriented toward behavior change emerge as central pillars for improving companion animal welfare. Studies involving cat owners in the United States and dog and cat owners in New Zealand consistently emphasize the need for enhanced education on normal species-specific behavior, environmental enrichment requirements, the welfare risks associated with practices such as declawing and extreme selective breeding, and the importance of routine veterinary health checks [2]. A scoping review of the broader literature on dog and cat welfare further indicates a strong research focus on housing conditions, stress, and the perceptions of owners and veterinarians. In contrast, human–animal interactions within the household context remain comparatively underexplored, suggesting a critical content gap in current educational and intervention frameworks [8]. Evidence suggests that mass communication campaigns relying primarily on one-way information provision often have limited effectiveness in changing welfare-related knowledge or intentions. An evaluation of the RSPCA’s #DogKind campaign revealed that, although the campaign successfully targeted the intended age group, it did not result in a significant increase in awareness of separation-related behaviors in dogs, nor did it improve intentions to

seek help from trusted sources. The addition of illustrative video content similarly failed to enhance campaign effectiveness<sup>[3]</sup>. These findings highlight the limitations of information-based messaging when not embedded within broader behavior change frameworks. In contrast, structured educational programs grounded in behavioral change theory and delivered through formal training pathways appear more likely to generate sustained impacts. For example, an animal welfare and behavior course delivered to first-year veterinary students resulted in a significant increase in welfare concern scores that were maintained over a 2.5-year follow-up period<sup>[34]</sup>. Similarly, evaluations of the One Welfare educational portal for veterinary students indicate that learners place a high value on 'Day One' welfare competencies, sometimes even higher than faculty members, particularly in relation to companion animals and shelter medicine. This pattern suggests that formal education can foster intrinsic motivation and professional norms that support welfare-positive practices over the longer term<sup>[35]</sup>.

These findings suggest that educational strategies targeting pet owners should shift their focus from the transmission of abstract or academic knowledge to prioritizing practical, context-sensitive components. First, education should provide specific and feasible guidance tailored to urban living conditions, such as designing effective environmental enrichment for cats in small apartments or establishing realistic play and exercise routines for dogs. Second, interventions need to address cognitive and emotional barriers by correcting common misconceptions, such as beliefs that cats are inherently independent and require little interaction, or that dogs must be treated harshly to fulfill a protective role. Third, owner education should emphasize the development of observational skills, including the ability to recognize behavioral cues, interpret signs of stress or discomfort, and assess welfare using simple, actionable indicators aligned with the three core functional domains of animal welfare: physiological functioning, expression of natural behaviors, and affective (emotional) state<sup>[12, 36]</sup>. Focusing on these competencies may enhance owners' confidence and capacity to translate positive attitudes into sustained welfare-supportive practices within everyday caregiving contexts.

Veterinarians occupy a central role as 'welfare leaders' and are increasingly expected by international professional organizations to act as key advocates for companion animal welfare<sup>[12]</sup>. Research on veterinary communication indicates that directive, didactic communication styles remain common and may undermine clients' motivation to adopt behavior change<sup>[37]</sup>. In contrast, relationship-centered care, characterized by shared decision-making and respect for owners' self-directed learning, has been suggested to improve compliance and quality of care when supported by targeted communication skills training and effective use of reliable online information sources<sup>[38]</sup>. Combining personalized, face-to-face counseling with written materials, short instructional videos, and trusted online resources may facilitate repeated reinforcement and help consolidate positive welfare-related habits over time.

Despite providing important insights into patterns and gaps in the KAP literature on companion animal welfare, this scoping review has several limitations that should be considered when interpreting the findings. First, heterogeneity in KAP measurement tools across studies limits comparability. Second, the predominance of cross-

sectional, self-reported designs restricts causal inference and may introduce social desirability bias. Third, the limited representativeness of the sample and its geographic coverage, often skewed toward urban, highly educated populations, constrain generalizability. Additionally, the reliance on English-language sources may have led to the omission of relevant studies. These limitations highlight the need for standardized KAP instruments and more longitudinal and intervention-based research across diverse contexts.

## Conclusion

This scoping review indicates that although pet owners generally report positive knowledge and attitudes toward animal welfare, these do not consistently translate into appropriate caregiving practices, particularly in relation to behavioral and psychological welfare. The knowledge–attitude–practice (KAP) gap consistently emerges across various contexts, underscoring the influence of structural factors, including educational level, economic constraints, cultural norms, and access to veterinary services. These findings highlight the need for behavior–change–oriented, context-sensitive educational interventions and emphasize the central role of veterinarians in promoting sustained improvements in companion animal welfare.

## Author Contributions

Conceptualization, Pham Van To Nhu Y and Bui Hai Phong, Methodology, Pham Van To Nhu Y, Nguyen Duc Dat, and Nguyen Thi Huong Giang, Validation, Nguyen Duc Dat and Tran Xuan Minh, Formal analysis, Pham Van To Nhu Y and Nguyen Thi Huong Giang, Data curation, Pham Van To Nhu Y and Tran Xuan Minh, Writing-original draft preparation, Pham Van To Nhu Y, Writing-review and editing, Bui Hai Phong, Nguyen Duc Dat, Nguyen Thi Huong Giang, and Tran Xuan Minh, Supervision, Bui Hai Phong, Project administration, Bui Hai Phong. All authors have read and agreed to the published version of the manuscript.

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## Institutional Review Board Statement

Not applicable.

## Informed Consent Statement

Not applicable.

## Data Availability Statement

Data was not generated in this study.

## Conflicts of Interest

The authors declare no conflict of interest.

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