RESEARCH ARTICLE

An Assessment of the Knowledge, Attitude and Practices (KAP) of Dog Owners regarding Pet Reproduction

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Abstract

An *ex-post facto* study was designed to investigate the knowledge, attitude and practices (KAP) of the dog owners visiting the Multi-Speciality Veterinary Hospital, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India). A total of 102 dog owners were investigated purposively to assess their socio-economic profiles, knowledge, attitude, and practices regarding pet reproduction with major focus on breeding management and artificial insemination. On analysis, results revealed that majority of the respondents were young (19-35 years), and belonged to low-income category (earning less than Rs. 3.00 lakh annually). A substantial portion of dog owners had low experience in pet rearing, with a majority owning large breed dogs. The study highlighted gaps in knowledge related to reproductive management, with only 40.20% of respondents aware of semen storage temperatures and 49.02% familiar with semen cryopreservation. However, 86.27% of the respondents knew the average litter size, and 84.31% were aware of the appropriate age for female dogs to begin breeding. Overall, 50.98% of respondents demonstrated a high level of knowledge, which was positively correlated with higher education levels. Majority of the respondents (57.84%) exhibited a favourable attitude toward pet reproduction practices, particularly neutering. However, only 48.04% maintained breeding records, and 64.71% provided adequate care for pregnant or whelping dogs. The findings emphasize the need for improved awareness and education on advanced reproductive technologies and ethical breeding practices.

Keywords: Artificial insemination, KAP, Pet breeding, Reproduction

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Introduction

India, recognized as the fastest-growing economy in the world, is experiencing a notable transition towards nuclear family structures, which has led to a rise in the adoption of companion animals. This socio-cultural shift has transformed attitudes towards pet ownership, with pet owners now expecting more and seeking timely, accurate information on how to care for and manage their pets (Basarajappa, 2013). The practice of dog breeding, which involves mating selected dogs to preserve or create specific traits, has become increasingly popular. Those who engage in this practice are referred to as dog breeders (Bir *et al.,* 2016). Breeds such as the German Shepherd, Rottweiler, Golden Retriever, Labrador Retriever and Great Dane are among the most commonly bred. As pet owners gain more knowledge, they are posing more questions to veterinarians and expect a greater level of personal involvement in their pets' care (King *et al.,* 2012).

The dog breeding industry offers a valuable opportunity to tackle unemployment among recent veterinary graduates. Thus, it is essential to assess this industry and understand the factors that contribute to success, guiding prospective graduates and others interested in dog breeding (Ishola *et al.,* 2016). Knowledge, Attitude and Practices (KAP) surveys are commonly employed to evaluate housing and breeding management practices for pet dogs. Moreover, the behavioural traits, *viz.,* knowledge, attitude and practices pose an imminent need to be studied for providing the breeders with better services and technology transfer (Singh *et al.,* 2018). These assessments are based on the idea that improving knowledge can lead to better management practices, ultimately resulting in enhanced pet health and well-being (Ishola *et al.,* 2016). The KAP analysis conducted in the current investigation can play a crucial role in identifying gaps in KAP that may impede proper pet management, especially reproduction and breeding. They also help in creating targeted awareness campaigns to educate pet owners about best practices, providing essential baseline data for planning, implementation, and evaluation of programs aimed at raising pet care standards, instrumenting clinical protocols, rendering public services, etc.

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Materials and Methods

The current investigation was conducted deploying an *ex-post facto* research design in which 102 dog owners visiting the Multi-Speciality Veterinary Hospital (MSVH) of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab (India) were selected purposively to meet the need of the study. The data were collected using pre-tested semi-structured interview schedule on pet reproduction. The schedule was developed so as to collect data focusing on pet breeding management and artificial insemination. The data were statistically analysed with tools such as frequency, percentage, standard error, correlation and regression for interpretation using Statistical Package for Social Sciences (SPSS).

Results and Discussion

Age of Respondents

Data were analysed for understanding the age groups of respondents. The results revealed that the majority (69.61%, 71/102) of the respondents were from the young age group (19 to 35 years), followed by the middle-aged group (23.53%, 24/102), and the old age group (6.86%, 7/102). This suggests that younger individuals are more actively involved in dog-rearing activities compared to other age groups. The findings aligned with previous research showing that young adults are frequently engaged in dog breeding and management (Ishola *et al*., 2016). The dog breeding industry presents a viable business opportunity, especially for unemployed young adults or recent veterinary graduates seeking self-employment (Basarajappa, 2013; House *et al*., 2021).

Land Holding

A comparison of the different categories of pet dog owners revealed that 34.31 % (35/102) had semi-medium land holding (5-10 acres), followed by small (31.37%, 32/102), marginal (18.63%, 18/102), medium (11.76%, 12/102), and large (3.92%, 4/102) land holding of 2.5-5.0, <2.5, 10-25, >25 acres, respectively. This may be due to their greater purchasing power and the freedom to keep dogs in their own homes, unlike those residing in rented accommodations. Homeowners also do not face the potential risks associated with transporting pets when relocating, as is often the case for renters (Balan *et al.,* 2015). These findings are in concurrence with findings reported by Basarajappa (2013) and partially with observations of Hadge *et al.* (2009) and Sawaimul *et al*. (2009), that most dog owners had their own homes.

Breeds of Dog Owned

This study found that the majority of respondents reared large breed dogs (40.00%, 41/102), followed by medium-sized breeds (32.73%, 33/102) and small-sized breeds (27.27%, 28/102). The present findings are similar to previous studies that found Alsatians and Rottweilers, classified as large breeds, to be the most commonly reared in Ibadan, Nigeria (Ogbu *et al.,* 2021). However, Smith (2016) identified the Labrador Retriever as the most popular and large breed in the United States. The studies conducted in Indian metro cities have similarly shown that most dog owners prefer medium to large breeds such as German Shepherds, Labradors, Dobermans, Boxers, Golden Retrievers, and Great Danes (Shibu and George, 2012). Nearly two-third of dog owners in the Puducherry region kept large breeds such as Labradors, German Shepherds, Dobermans, Great Danes, Rottweilers, Chippiparai, Rajapalayam, Dalmatians, Golden Retrievers, and Boxers (Radhakrishan *et al.,* 2017), while the current study showed that only 18.63% (19/102) of pet owners reared indigenous dogs followed by crossbreds (31.37%, 32/102) and exotoic breeds (50.00%, 51/102). About one-third of dog owners reared Labradors, followed by those who kept Pugs, Spitz, German Shepherds, Dobermans, Great Danes, Dachshunds, and other breeds (Radhakrishnan *et al.,* 2017). Moreover, studies have demonstrated that larger and giant breeds with larger litter sizes enhance the productivity of commercial dog breeding (Ravindranath *et al.,* 2022).

Annual Income

The results pertaining to annual income of the respondents evident that in the sampled respondents, 53.92% (52/102) belonged to the low-income group, with annual earnings of less than Rs. 3.00 lakh, followed by 38.24% (39/102) in the medium-income group, earning between Rs. 3.00 and 6.00 lakh, and 7.84% (8/102) in the high-income group with earnings above Rs. 6.00 lakh. The results of the present study are in line with those reported by Ravindranath *et al.* (2022) in which majority of respondents had medium income level ranging from Rs. 2.00 to 5.00 lakh. Similarly, in another study, 57.92% of respondents had low income of less than Rs. 5.00 lakhs annually (Sharma and Pathak, 2008).

Experience in Pet Rearing and Management

Majority of respondents (53.92%, 55/102) had low experience of 0-5 years in pet rearing, followed by medium (37.25%, 38/102) and high (8.82%, 9/102) levels of 5-15 and 15-30 years of experience in pet rearing and management. The results are in accordance with those reported by Ravindranath *et al.* (2022) in which majority of the pet owners (51.66%) had over 15 years of experience, 26.66 % had up to 10 years, and 21.66 % had 10 to 15 years of experience. Similarly, dog owners in Karnataka had an average of 11.2 years of dog-rearing experience (Sakshi, 2015).

Knowledge regarding Pet Reproduction

The itemized responses regarding questions on pet reproduction are provided in Table 1, whose perusal shows that a relatively low percentage of respondents (40.20%) knew the correct temperature for storing semen to preserve

its viability. This indicates a gap in understanding the technical aspects of semen handling and cryopreservation, which are critical for successful artificial insemination and breeding programs to safeguard progeny. Nearly half of the respondents (49.02%) were familiar with semen cryopreservation, a process essential for preserving genetic material for future breeding. A higher percentage of respondents (64.71%) were aware of artificial insemination. While this indicates a moderate understanding, it also shows that a significant portion still may not be familiar with this common breeding method, potentially limiting their breeding options or success rates. Just under 60% of respondents knew the appropriate age for spaying female dogs. Spaying at the right age is critical for both animal health and reproductive control. The moderate percentage suggests that some dog owners or breeders may not be following best practices, which could affect the long-term health of female dogs (Hart, 1995). A strong majority (71.57%) of respondents understood the length of time female dogs remain in heat. Breeders need to understand this fundamental knowledge, as vaginal cytology confirms the importance of timing in female dog breeding for effective results (Arlt, 2018). A very high percentage (86.27%) knew the average litter size of female dogs, indicating a solid understanding of reproductive management. The high percentage indicates that most respondents are well-equipped to handle natural breeding timing. Recognizing heat signs is critical for breeders to ensure timely mating and a successful pregnancy. Similarly other attributes of knowledge are highlighted in the Table 1 below.

Table 1: Distribution of respondents on the basis of knowledge in pet reproduction (n=102)

Knowledge Item	Correct Answer	Frequency (%)
What is the gestation period in dogs?	62 days	86 (84.31)
At what age female dog can be bred?	Approx. 1 year	86 (84.31)
At what age male dog can be used for breeding?	Approx 1 year	77 (75.49)
How many times a female can be bred during its whole life?	Approx 20	67 (65.69)
Pregnancy diagnosis can be done after how many days of breeding a female dog?	X-Ray 45 days USG-30 days	64 (62.75)
Which is the mating seasons for dogs?	March-May Sept-Nov	45 (44.12)
How can you identify that the female dog is in heat?	Signs/Cytology	90 (88.24)
An average litter size of a female contains how many pups?	6-8	88 (86.27)
For how many days female dog stays in heat?	9 days	73 (71.57)
What is the ideal age for spaying in female dogs?	Approx 8 months	61 (59.80)
What is artificial insemination?	Definition	66 (64.71)
What is semen cryopreservation?	Definition	50 (49.02)
At what temperature, the semen must be stored to maintain its viability?	-196°C	41 (40.20)

Overall Knowledge and Education Level of Respondents regarding Pet Reproduction

The study revealed that the majority of respondents (50.98%, 52/1020) possessed a high level of knowledge of 10-13 years, followed by 36.27% (37/102) with medium knowledge of 5-9 years and 12.75% (13/102) with low knowledge of 0-4 years. The study found that most pet dog owners, across different categories, possessed a high level of overall knowledge. This suggests that dog owners with better educational backgrounds had a stronger preference for ownership, likely due to their enhanced comprehension of dog management practices (Balan *et al.*, 2015). Researchers noted that nearly half of dog breeders in Kerala were graduates, and 22.50% had qualifications equivalent to a high school diploma (Ravindranath *et al.*, 2022). Similar findings were revealed by Moliya (2019) and Ishola *et al.* (2016) that the majority of dog breeders in Maharashtra, India, and Nigeria were also graduates.

In terms of education qualification, a significant portion of respondents (26.47%) had at least graduate level education (Table 2). The educational status of dog owners is a critical factor, as it allows them to adopt more scientific dog-rearing practices (Roopa *et al.*, 2018). Findings of this study are consistent with the results that most dog owners had completed a graduate-level education or higher (Jadhav *et al.*, 2009). Similarly, Yimer *et al.* (2012) observed that a large portion of dog owners (34.4%) were illiterate, but in our study, only 6.86% of dog owners were illiterate (Table 2). The social and economic profile of dog owners indicated that individuals with a higher level of education demonstrated a stronger preference for owning pet dogs. These results could have been obtained due to the growing interest and increasing knowledge of pet owners (Patra *et al.*, 2021).

Table 2: Distribution of respondents on the basis of education level

Educational qualification	Frequency (n=102)	Percentage
Illiterate	7	6.86
Primary	17	16.67
Secondary	20	19.60
Senior Secondary	31	30.39
Graduate and above	27	26.47

Attitude regarding Pet Reproduction

The various statements related to attitude of respondents on dog breeding, management, reproduction, and animal welfare, etc. were categorized into three responses, viz., "unfavourable", "neutral", and "favourable". It is evident from the perusal of Table 3 that the majority of the respondents were favourable towards neutering as a better management tool, though there was some neutral sentiment and a small unfavourable stance, with over half in favour, indicating positive support for mating practices that involve quality male studs. Some respondents (39.22%) showed unfavourable view, while others (48.04%) were neutral on the idea that neutering is against the pet's welfare, indicating a strong belief that neutering does not harm the pet's welfare. Half the respondents were neutral, while a quarter were either in favour or unfavourable of artificial insemination in comparison to natural mating. The highest respondents (49.02%) were neutral, showing that many are unsure about whether artificial insemination leads to better conception. The remainders were nearly evenly split between favourable and unfavourable opinions. Similarly, other attitude statements have been described in Table 3. The results reported by Srinivas *et al.* (2017) were suggestive of the fact that a majority (54.16%) of dog owners chose to neuter their dogs, while 45.84% kept their dogs intact for breeding purposes. According to the reports of Basarajappa (2013) and Bhadesiya and Raval (2014), many owners were unaware of the potential reproductive tract diseases that can develop in intact females if they do not breed regularly. These findings aligned with the current study. Further, Sushma *et al.* (2024) reported that most of the respondents considered both physical examinations by a veterinarian and ultrasound scanning to be reliable methods for accurate pregnancy diagnosis and confirmation.

Table 3: Distribution of respondents on the basis of attitude regarding pet reproduction (n=120)

Attitude Statement	Frequency (Percent)		
	Unfavourable	Neutral	Favourable
Neutering a dog helps in better management	15 (14.71)	32 (31.37)	55 (53.92)
Neutring a pet is against its welfare	40 (39.22)	49 (48.04)	13 (12.75)
Mating female with good quality stud leads to better litter production	2 (1.96)	18 (17.65)	82 (80.39
Artificial insemination is better than natural mating	27 (26.47)	48 (47.06)	27 (26.47)
Artificial insemination leads to better conception	34 (33.33)	50 (49.02)	18 (17.65)
Semen cryopreservation must be undertaken for preservation and sale of good quality semen	27 (26.47)	48 (47.06)	27 (26.47)
Pets should be bred in isolation so that general public may not get affected	6 (5.88)	37 (36.27)	59 (57.84)
Pets should be given a free choice for breeding and to exhibit their natural tendencies	15 (14.71)	50 (49.02)	37 (36.27)
The male and female dogs must be bred only after they attain sexual maturity	5 (4.90)	28 (27.45)	68 (66.67)
Proper assistance must be provided to female dogs during whelping	3 (2.94)	28 (27.45)	71 (69.61)
Pet breeding is good business to invest in	8 (7.84)	43 (42.16)	51 (50.00)
Understanding a dog behaviour is benefitting for its breeding	12 (11.76)	27 (26.47)	63 (61.76)
Ultrasonography is the best method for pregnancy diagnosis	6 (5.88)	41 (40.20)	55 (53.92)

Overall Attitude Level of Respondents regarding Pet Reproduction

Analysing the overall attitude of dog owners towards pet reproduction, it was found that 57.84% (59/102) of owners exhibited a favourable attitude, 39.22% (40/102) had a neutral stance, and only 1.96% (2/102) had an unfavourable attitude. These results are in line with findings of Shibu and George (2012) in which it was reported that 59.00% of dog owners had a favourable attitude, 40% held a neutral attitude, and just 1.00% expressed an unfavourable attitude towards dog rearing.

Practices regarding Pet Reproduction

The results regarding the practices undertaken by the respondents for pet reproduction are provided in Table 4. In terms of record-keeping, 48.04% of owners maintained proper breeding records for their dogs; a notable improvement from a previous study found that only 19.4% of respondents kept such records (Patra *et al.,* 2021). When it came to pet reproduction practices, 64.71% of owners ensured proper care by providing separate spaces and bedding for pregnant or whelping dogs. Exposure to extreme temperatures during pregnancy and lactation was recognized as a cause of physical stress, which could negatively affect both the mother and her puppies (Sakshi *et al.,* 2023). Around 46.08% of respondents fed their dogs supplementary rations during pregnancy and lactation, though many were aware that additional nutrients were necessary during these stages. The supplementary feeding is essential to meet the heightened nutritional needs of pregnant and lactating dogs (Sakshi *et al.,* 2023). Interestingly, only 11.76% of owners had knowledge or experience with checking hormone levels before mating. Awareness about using hormones to control estrus or terminate pregnancies was very low, with just 3.2%

of respondents reporting they had used hormones as a contraceptive (Patra *et al.,* 2021). This contrasts sharply with findings from Western countries, where the prolonged use of hormonal contraceptives or therapeutic doses has been linked to an increased risk of conditions like CEH-pyometra (Hagman, 2018). Similarly, the other scientific practices undertaken by the respondents are provided in the Table 4 hereunder.

Table 4: Distribution of respondents on the basis of practices undertaken regarding pet reproduction (n=102)

Practice Undertaken	Frequency (%)
Notice signs of oestrus in female dogs	68 (66.67)
Undertaking vaginal cytology before breeding	31 (30.39)
Getting hormonal profile checked before mating	12 (11.76)
Natural breeding	74 (72.55)
Artificial insemination	23 (22.55)
Method of artificial insemination	17 (16.67)
Weaning of puppies at proper time	58 (56.86)
Record keeping of breeding	49 (48.04)
Pregnancy diagnosis method	40 (39.22)
Nutrition for pregnant dog	47 (46.08)
Vaccination during pregnancy	25 (24.51)
Care during whelping	66 (64.71)
Care of pups	70 (68.63)

Overall Level of Scientific Pet Rearing Practices

The present study concluded that 41.18% (42/102) of respondents were involved in medium-level scientific pet-rearing practices of 5-9 years, 40.20% (41/102) had a low level of 0-4 years, and 18.63% (19/102) practiced high-level of scientific pet-rearing practices of 10-13 years. These findings contrast with the study, which reported that 77.07% of dog owners had low experience in dog rearing, ranging from 2 to 18 years (Sharma and Pathak, 2008). Several factors, including the growing number of nuclear families, a passion for dogs, the fondness of young children for pets, and heightened awareness of the benefits of pet ownership through print and electronic media, contribute to the increasing rate of pet ownership (Ravindranath *et al.,* 2022).

Conclusion

The study highlights a moderate level of knowledge, positive attitudes, and varied practices among pet owners regarding artificial insemination and breeding management in dogs. This can be explained by the respondents' relatively higher educational qualifications and the widespread availability of information through the internet. The correct understanding of scientific dog management practices is a key factor in improving profitability, as it enables owners to implement more effective breeding, health care, and general management strategies. This highlights the importance of continued education and access to reliable information in promoting responsible and profitable pet ownership. However, the respondents falling in the low to medium categories can be brought to higher category by targeted education and awareness programs to bridge knowledge gaps and promote best practices in pet reproductive management.

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