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Factors affecting the success of rehoming dogs in the UK during 2005

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Abstract

In the UK, welfare organisations care for several thousand dogs each year. The successful rehoming of these dogs is a difficult process resulting in some of them being returned to rehoming centres. There have been very few studies examining the underlying mechanisms in the UK. Therefore, this study was conducted to determine those factors which affect the success of rehoming dogs.

A prospective cohort study was conducted using a sample of 5750 dogs rehomed by Dogs Trust, a UK based dog welfare charity, during 2005. Dogs were followed up for a period of 6 months after adoption to determine if these dogs were still in their placement home. There was a 78% response rate to the follow-up postal questionnaires sent to the new owners, giving information on 4500 owners. Fourteen percent of adoptions failed. The results showed that behavioural problems are an important factor in the success of adoption such that if dogs had shown aggression towards people and the owners had not sought advice, they had 11.1 times the odds (95% CI: 6.6, 18.8) of being returned compared to those dogs without behavioural problems. Attending training classes significantly decreased the chance that the adoption would be unsuccessful (OR 0.3, 95% CI: 0.2, 0.4). It was shown that those owners who found that the effort and work involved in looking after their dog to be more than they had expected, had 9.9 (95% CI: 4.1, 24.6) times the odds of returning their dog than those who found the effort required to be less than they had expected.

The results of this study show that there are many factors involved in a successful adoption and it is important that the new owners are informed of what to expect are encouraged to attend training classes and are prepared to work at any behavioural problems that their dog may have.

Keywords: Rehoming; Dog; Adoption; Welfare shelter

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1. Introduction

Every year thousands of dogs are cared for and rehomed by animal shelters or welfare centres throughout the UK. During 2004 it was estimated that the local authorities and dog warden service handled 105,000 stray dogs in the UK, 22% of which were passed onto welfare organisations for rehoming (Anon., 2004). These organisations also take on dogs from people who can no longer look after them. The rehoming of these dogs to new owners is not always successful, resulting in some dogs being returned to the rehoming centres, which is stressful for both the dog and the owner. The success of the adoption is considered to be dependent upon the dog, the previous owner, the potential owner and the staff at the welfare centre (Posage et al., 1998).

Studies have found that the proportion of dogs which are unsuccessfully rehomed varies depending on the country or area in which the study was done and on the welfare centre policies. In the USA, Posage et al. (1998) and Patronek et al. (1995) found that over 10% and 18.8% of adoptions were returned, respectively. Of all the dogs adopted in a 1 year study of Australian centres, 7.2% were returned (Marston et al., 2004). A study carried out through the Blue Cross in Oxfordshire (an animal welfare charity), UK, found that 81.4% of dogs that had been adopted during the year prior to the study interview were still in their original placement home, 8.2% were euthanased for medical reasons, died of old age or medical conditions or returned for non-behavioural reasons and 10.4% were returned, euthanased or rehomed by the owner for behavioural reasons (Bailey et al., 1998). A recent study in Italy found that 58% of the adopted dogs were returned due to behavioural problems (Mondelli et al., 2004).

Previous studies have shown that there are many risk factors for the return of dogs to kennels after adoption. It has been suggested that large dogs are more likely to be returned (Posage et al., 1998; Marston et al., 2004). Behavioural problems appeared to be an important factor as was shown in a study in Northern Ireland where 89% of those dogs returned was due to behaviour problems (Wells and Hepper, 2000). Kidd et al. (1992a) also showed that the expectations of the owners could have a major impact on the success of rehoming a dog and showed that veterinary clients had more realistic expectations, resulting in a lower risk of their dogs being returned to kennels compared to non-veterinary clients. Similar findings were shown in a study in the USA (Patronek et al., 1996). However, other studies have found that owners that had previously owned a dog were more likely to return their newly adopted dog (Stafford et al., 2003). A study carried out in the USA showed that when a puppy sleeps on the bed with the owner and attends socialisation classes, it is also more likely to be adopted successfully (Duxbury et al., 2003).

Previous studies have shown conflicting results for factors which affect the success of rehoming and have highlighted differences between the countries in which they were conducted. The objective of the current study was to estimate the risk of the return of dogs and determine the factors associated with the return of dogs post-adoption in the UK.

2. Materials and methods

A 1-year prospective cohort study was conducted using dogs which were rehomed from Dogs Trust kennels throughout the UK between 1 January 2005 and 1 January 2006. Dogs Trust is the largest dog welfare charity in the UK and had 14 rehoming centres included in the study. A sample of dogs was selected by the staff at the centres each month when they were adopted using stratified systematic sampling, stratified by rehoming centre and whether the dog was relinquished or was a stray. The target sample size was 5000 dogs, sufficient to detect an odds

ratio of 1.5 at 95% confidence level and 80% power, assuming a 14% return to kennel proportion. Every dog which was relinquished was included in the study and every second stray dog that was adopted was included in the study. For the purposes of this research ''relinquished'' refers to dogs for which we have a completed relinquishment questionnaire from the previous owner and ''stray'' refers to any dog without this information. The Dogs Trust's rehoming centre in Leeds was excluded from this study as it was not using computerised records at the start of the study.

When the dog was adopted the new owners were informed about the study and asked if they would complete the questionnaire which would be sent to them 2 months after the adoption. Once a dog was selected by the staff at the centres, copies of its veterinary record, behavioural assessment and handover form (if the dog was relinquished) were made and sent to Dogs Trust's head office. This information, along with further information collected from the Dogs Trust database, was then entered into a relational database (Access 2003, Microsoft). This database used data entry forms with data entry checks and validation rules to minimise data entry errors. The data were automatically coded as they were entered to minimise errors that could occur during recoding of the data.

The veterinary record and behavioural assessments used in this study were those used routinely by the Dogs Trust centres. The handover forms and postal questionnaires were designed at the start of the study. They consisted of a combination of questions taken from the handover form that was already used by Dogs Trust at the start of the study and additional questions aimed at obtaining more detailed information about the home environment. It was decided to use closed questions to simplify categorising the data with an open question at the end to allow the respondents to add more information if they felt it was needed (O'Cathain and Thomas, 2004). The questionnaires were pre-tested using owners relinquishing their dogs during December 2004 at 3 Dogs Trust centres (questionnaire available from the corresponding author upon request).

Approximately 6–8 weeks after the dog was adopted the new owners were sent a postal questionnaire with a pre-paid reply envelope. The questionnaires were sent at this time in order to reduce recall bias in relation to the questions about the dog's health immediately after adoption, to allow time for the dog to adjust to its new surroundings and thus to allow the owners to get a more accurate picture of the dog's behaviour. At 6 months after adoption a follow-up telephone call was made to a random sample of new owners to determine if they still had their dog. The sample size of 700 phone calls was based on an expected prevalence of 2% of people no longer having the dog at a 95% confidence level and an accepted error of +/−1%. Dogs Trust requests that if a new owner is no longer able to care for the dog, that they should return the dog to one of the Dogs Trust centres and therefore the number of dogs rehomed privately was expected to be very small. Dogs Trust bases their estimate of a successful adoption on whether they are still with their new owner up until 6 months post-adoption. The postcode information which was available for all previous owners and all new owners was used to classify all the owners into consumer classes (data not shown) based on a system called Mosaic (Experian Micromarketing[1]). It classifies all postcodes into 61 types aggregated into 11 groups in terms of their socio-demographics, lifestyle, culture and behaviour. The system uses 400 variables from demographics, socio-economics and consumption, financial measures, property characteristics, property value and location to enable the classification.

All analyses were carried out using Stata version 9.0 (Stata Corp, College Station, TX, USA). Descriptive and univariable analyses were conducted using cross-tabulations, χ^2 tests for association and the calculation of odds ratios using univariable logistic regression. Those

[1] Mosaic UK is available from Experian Micromarketing (http://www.business-strategies.co.uk/).

variables that had a p-value less than 0.1 were put forward for evaluation in a multivariable model (a p-value of 0.1 was used due to the high power of the study due to the large dataset). The multivariable logistic regression model was developed using manual forward stepwise variable selection, assessing the statistical significance of the addition of each variable using likelihood ratio tests ($p \leq 0.05$). The model was tested for interactions between pair-wise combinations of all remaining variables. The data were correlated as some dogs were rehomed, returned and rehomed again, in some cases several times, and therefore it was checked whether there was any need to account for this in the model by comparing a model of the data with the dog-id as a random effect and a model without this. These models were compared using Akaike's Information Criterion. The fit of the model without the random effect was assessed using a ROC curve and Hosmer Lemeshow goodness-of-fit test. Hosmer Lemeshow goodness-of-fit was used instead of Pearson goodness-of-fit due to the small number of observations per covariate pattern. The Pearson residuals, deviance residuals and deviance χ^2 were used to assess the model for outliers. Delta-betas and leverage were calculated and there were no covariate patterns that had particularly high values (delta-beta > 1, leverage $> 2(k/n)$ where k = number of predictor variables, n = number of observations) (Hosmer and Lemeshow, 2000), indicating that there were not any individual covariate patterns that had a large influence on the model.

Estimates of population attributable risk (PAR) were calculated using odds ratios from the logistic regression model output (Cox, 2006; Stafford et al., 2007; Weng et al., 2006).

A Cox regression model was also developed assessing those factors affecting the time from adoption to return. All variables assessed in the logistic regression univariable screening were also screened for inclusion in the final Cox model using univariable Cox regression. The multivariable model was developed using the same variable selection methods as for the logistic regression model. The proportional hazards assumption for all variables was assessed using Schoenfeld's residuals and where any variables violated this assumption they were treated as time-varying covariates. A frailty model was run; however, the final model did not use this approach as accounting for the dependence of observations did not significantly improve the model fit.

3. Results

3.1. Descriptive statistics

A total of 5750 dogs were recruited into the study of which 2185 were relinquished dogs. There was a 78% response rate to the follow-up postal questionnaire sent to new owners shortly after adoption giving results on 4500 dogs. Seven hundred follow-up phone calls were made to new owners 6 months after adoption, and it was found that two owners had rehomed the dogs themselves (0.3%). There was a 14.7% failed adoption proportion (662 out of 4500 dogs) during the 6-month follow-up period. Of those dogs that were returned within the 6-month follow-up period, 39.1% (259 out of 662 dogs) were returned within 2 weeks of adoption.

Table 1 shows the frequency with which different reasons were given for returning a dog within 6 months of adoption and it can be seen that the most common reason given was behavioural problems.

3.2. Univariable analysis

Ninety-three variables were included in the analysis and grouped as follows: characteristics of dog (7), information from previous owner (19), care of dog by previous owner (8), behaviour of

Table 1
Reasons given by owners for return of dog post-adoption in the UK during 2005 ($n = 662$ dogs)

Reason given for return of dog	Dogs returned no. (%)
Behavioural problems	388 (58.6)
Needs more attention	103 (15.5)
Landlord	63 (9.5)
Allergies	22 (3.4)
Grown bigger than expected	18 (2.7)
Relationship break-up	15 (2.3)
Owner ill	12 (1.9)
Other pet not happy	10 (1.5)
Cost	3 (0.4)
Child scared	2 (0.3)
Owner died	1 (0.1)
No reason given	25 (3.8)
Total	662 (100.0)

dog with previous owner (10), behavioural assessment in kennels (10), rehoming process (5), information from new owner (15), care of dog by new owner (11) and behaviour of dog with new owner (8). In the univariable analysis, 40 variables had a p-value of less than 0.1 and were put forward for evaluation in the multivariable model. These variables-related to the characteristics of dog (3), information from previous owner (2), care of dog by previous owner (1), behaviour of dog with previous owner (1), behavioural assessment in kennels (4), rehoming process (4), information from new owner (9), care of dog by new owner (8) and behaviour of dog with new owner (8). Table 2 shows all variables assessed in the study with those variables that had a p-value < 0.1 in the univariable analysis highlighted.

3.3. Multivariable logistic regression

The results of the multivariable logistic regression analysis are shown in Table 3 suggesting that behavioural problems, not attending training classes and a new owner finding the effort involved in caring for their dog to be more than they had expected were associated with unsuccessful adoption. It was also found that large dogs and dogs adopted by young adults or families with children aged 13 years or less were more likely to be adopted unsuccessfully. There was a difference in rehoming success between rehoming centres, in that, centres B, E and H had statistically significantly lower odds ratios for rehoming being unsuccessful compared to centre A. The interaction between ''sick after adoption'' and ''owner expectation'' was significant ($p = 0.009$); such that if a dog was not sick after adoption and the owners still found the effort involved in caring for the dog to be more than they had expected, this resulted in the highest odds of unsuccessful rehoming.

Inclusion of dog-id as a random effect did not improve the model fit, as Akaike's information criterion without the random effect (1764.6) did not decrease when the random effect was included (1764.7). Therefore the random effect was excluded from the final model. The area under the ROC curve for the final model was 0.86 (95% CI: 0.83, 0.88). The Hosmer Lemeshow goodness-of-fit test was significant ($p = 0.001$), indicating lack of fit, and therefore further diagnostics were performed. Pearson and deviance χ^2 were calculated and it was found that seven

Table 2
List of variables assessed in a study on success in rehoming 4500 dogs in the UK, 2005

Variable group	Variable name
Characteristics of dog	**sex**, **size**, **age**, breed, cross-bred, colour, neutered on arrival at kennels
Information from previous owner	**owner expectations, how long owned**, why given up dog, age obtained, had dog before, where obtained, why obtained, how much planning, advice before obtained dog, home type, garden, is home busy, adult age, children age, adult sex, children sex, do children visit, how often children visit, mosaic code
Care of dog by previous owner	**where dog slept**, time interacting, time exercising, time alone, vaccinated, visit vet in last year, long term treatment, special nutrition
Behaviour of dog with previous owner	**behaviour with children**, reported behavioural problems, behaviour with visitors, behaviour with cats, behaviour with dogs, behaviour with livestock, behaviour with other pets, behavioural advice, training classes, phobias,
Behavioural assessment in kennels	**behaviour with people, behaviour with cats, behaviour with toys, training needed**, behaviour with vet, behaviour with dogs, exercise required, behaviour with food, ideal owners, ideal children
Rehoming process	**rehoming centre, rehomed with disclaimer, stray or relinquished, number of previous visits to kennels**, rehomed on trial
Information from the new owner	**how much planning, owner expectations, had a dog before, garden, adult age, children age, adults sex, children sex, do children visit**, is home busy, mosaic code, how often children visit, home type, where obtained, why obtained
Care of dog by new owner	**dog sick soon after adoption, long term treatment, special diet, where dog slept, time interacting, time exercising, time alone, training classes**, what was problem after adoption, did you visit vet, repeat vet visits
Behaviour of dog with new owner	**behaviour with children, behaviour with visitors, behaviour with cats, behaviour with dogs, behaviour with livestock, behaviour with other pets, phobias, behavioural problem**

Variables in bold were significant at $p = <0.1$ in the univariable logistic regression.

covariate patterns, each containing one observation appeared to be outliers and did not fit the model well. These seven observations were removed from the dataset and the model re-runs. This made almost no difference to the model's coefficient estimates, but when the Hosmer Lemeshow goodness-of-fit was re-run using this model the result was not significant ($p = 0.46$) indicating that the model represented a good fit to the data. As the removal of these seven outliers did not result in changes to the coefficient estimates, it was decided to keep the observations in the final model.

Population attributable risk (PAR) is a measure of the increased risk of a failed rehoming of a dog in the entire population that can be attributed to a specific variable or factor, and therefore, a negative PAR indicates that the factor has a protective effect. PAR for attendance at training classes was estimated as minus 2.3% with the current attendance rate being 18.1% of the population. However, if the attendance was increased to 50% of the population, a PAR of minus 8.6% could be expected. For the expectations of the new owner, the PAR for the category of work and effort being more than expected was 8.9%. PAR estimates for dogs that had shown aggression towards people and the owners had or had not sought advice were 2.9% and 4.8% of dogs returned, respectively.

3.4. Cox regression analysis

Fig. 1 shows the distribution of time from adoption to return during the follow-up period, with the median time being 27 days (95% CI: 23, 32). In the univariable Cox regression 29 variables

Table 3
Results of multivariable logistic regression analysis of factors associated with unsuccessful adoption of dogs in the UK during 2005

Variable name Variable category	Odds ratio	95% CI	*p*-value of factor[a]
Size			
Small (<10 kg)	1.0		0.003
Medium (10–25 kg)	1.8	1.2–2.6	
Large (>25 kg)	2.1	1.3–3.3	
Centre			
A	1.0		0.001
B	0.2	0.1–0.6	
C	0.6	0.2–1.9	
D	0.6	0.2–2.1	
E	0.5	0.3–0.8	
F	1.3	0.8–2.0	
G	0.4	0.1–1.9	
H	0.4	0.2–0.8	
I	1.0	0.5–1.9	
J	0.8	0.5–1.2	
K	0.8	0.4–1.5	
L	0.7	0.4–1.3	
M	0.8	0.5–1.3	
N	0.6	0.3–1.1	
Behavioural problem reported by owner[b]			
No behavioural problem	1.0		<0.001
Aggression towards people, got advice	5.6	3.4–9.4	
Aggression towards people, no advice	11.1	6.6–18.8	
Destructive, got advice	2.1	1.3–3.5	
Destructive, no advice	2.1	1.3–3.2	
Other problems, got advice	1.7	1.1–2.8	
Other problems, no advice	1.9	1.3–2.7	
Owner[b] effort compared to expected			
Less	1.0		<0.001
Same	1.8	0.7–4.3	
More	9.9	4.1–24.6	
Dog sick soon after adoption			
No	1.0		<0.001
Yes	3.2	0.9–11.7	
Owner's[b] age			
>50 years	1.0		<0.001
35–50 years	1.3	0.9–1.9	
25–34 years	1.9	1.3–2.9	
<25 years	2.9	1.7–5.0	
Owner's[b] children			
None	1.0		0.002
<13 years	1.8	1.3–2.5	
13 years or more	1.0	0.7–1.5	
Place dog sleeps			
In house	1.0		0.002
On family members bed	0.6	0.4–0.8	

Table 3 (*Continued*)

Variable name Variable category	Odds ratio	95% CI	*p*-value of factor[a]
Outside (kennel/garage)	0.3	0.1–1.5	
Did owner[b] attend training classes			
No	1.0		<0.001
Yes	0.3	0.2–0.4	

(3746 observations used in final model).

[a] Likelihood ratio.

[b] "Owner" refers in this table to the new owner.

had a p-value < 0.1 and were put forward for evaluation in the multivariable Cox regression. Four of the variables (centre, sick after adoption, training classes and behavioural problems) violated the proportional hazards assumption and were therefore treated as time-varying covariates. The results of the multivariable Cox regression are not shown as the significant variables were the same as those found during the logistic regression. However, the variable "presence of phobias" was also found to be a statistically significant factor (HR 0.6, 95% CI: 0.5, 0.8).

4. Discussion

The study has been able to identify several factors affecting the likelihood of successful adoption of a dog. The results agree with previous studies in showing that factors relating to the dog, the new owner and the welfare centre are important factors (Patronek et al., 1996; Posage et al., 1998). There was only little evidence that factors relating to the previous owner or previous home environment also influenced how successful an adoption would be. However, factors relating to the previous owner are likely to play an important part in the behaviour of the dog and therefore could be masked by the variables relating to behaviour.

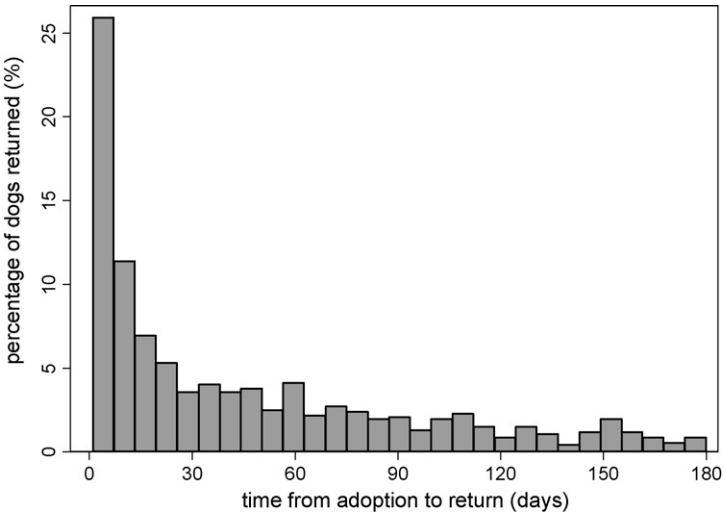

Fig. 1. Distribution of time from adoption to return within 6 months of rehoming among 662 dogs, UK, 2005 (each bar indicates 7 days).

4.1. Risk of return

In this study, it was found that 14.7% of all rehomed dogs were returned to the rehoming centres within 6 months of adoption. Behavioural problems were the most common reason for the return of dogs, with almost 60% of the dogs returned for this reason. The second most common reason was that owners felt they were unable to give the dog the attention that it needed. However, it is important to note that these reasons were given by the owners and in some cases owners may have given what they consider to be more ''socially acceptable'' reasons for returning their dog rather than the true reason. In a study at Blue Cross in Oxfordshire, UK, examining the retention of 355 dogs adopted from their rehoming centre during 1995, 81.4% of dogs were in their original placement home 1 year after adoption, 8.2% were euthanased for medical reasons, died of old age or medical conditions or returned for non-behavioural reasons and 10.4% were returned, euthanased or rehomed by the owner for behavioural reasons (Bailey et al., 1998). In comparison, a study in Sao Paulo, Brazil, found that of the dogs that were adopted from the city shelter between 4 years and 3 months before the study, only 40.9% were still with the owner, which is much less than the current study. However, it should be noted that in this study the follow-up time varied from 3 months to 4 years after adoption. Thirty-five percent had died, 15% had been given to other people, 4.3% had run away and 3.2% had been returned. Of the 741 dogs that were adopted only 279 dogs were able to be traced and followed-up (Soto et al., 2005). However, the city shelter in Sao Paulo made no effort to match dogs to owners and no behavioural testing was performed, in contrast to what is routinely done at Dogs Trust. A study in Melbourne, Australia, found that of 4405 dogs that were adopted only 7.2% were returned of which 26.4% were returned due to owner problems, 22.3% for dog-related factors (size, health) and 22% for behavioural problems. Forty percent of the dogs returned were euthanased. Most dogs with problems with an existing pet were returned within 1 week of adoption while those returned for owner-related factors, (for example: accommodation issues, owner health, financial problems, too much time and effort to care for dog or other personal reasons) or behavioural problems were returned within 1 month (Marston et al., 2004).

In Milan, Italy, a study investigating returns of adopted dogs looked at a 6-year period during which 2830 dogs were adopted and 15.2% were returned. Out of those returned only 71.2% completed a questionnaire. More males were returned than females, 7% of dogs were returned more than once, returns were due to: 39% misbehaviour (barking, chewing, inappropriate elimination), 15% aggression and 40% management problems (no time, small house, personal problems). Length of adoption ranged from a few hours to 9 months, but 40% returned the dog within 1 week, mostly due to behavioural problems. Again, no attempt was made at these shelters to match dog and owner, and no behavioural assessment was carried out (Mondelli et al., 2004). In the current study it was found that 39% of the dogs that were classified as being adopted unsuccessfully were returned within 2 weeks of adoption. Whereas, Shore (2005) found in a study in the USA that 54% of returns occurred within the first 2 weeks of adoption. When asked about the problem which resulted in them returning the pet, 50.6% of owners responded that the problem developed within the first 24 h of obtaining the dog and a further 16.9% within the first week. The most common reasons for return were: did not get along with other pets and not good with children. Shore (2005) claimed that returning a dog which was only recently adopted from a welfare centre may be very different from the relinquishment of a pet which has been owned for many years, as with a recently adopted animal the length of ownership is short and therefore the bond between the dog and owner may not be fully developed. It was also discussed that returning a recently adopted dog may result in the owner feeling ''disappointment and a sense of failure''.

From these studies, it can be concluded that the return rates vary greatly between countries and welfare centres. Nonetheless, it should also be noted that the specific policies of welfare centres are likely to have a large impact on the return rates. Dogs Trust carries out behavioural assessments and attempts to match the owner with each dog hoping that this will result in fewer returns. However, Dogs Trust also has a non-euthanasia policy which means that they tend to work with and try to rehome more difficult dogs which many other welfare centres would euthanase. This is likely to result in a higher return rate at Dogs Trust. In addition to this they also encourage owners who can no longer care for their dog to return the dog to one of their rehoming centres rather than attempt to rehome the dog by finding a new owner themselves.

4.2. Risk factors

4.2.1. Size of dog

The multivariable models suggest that the size of the dog was a significant variable with large-sized dogs being more likely to be returned to the rehoming centres after adoption compared to small-sized dogs, a result also found in previous studies (Posage et al., 1998; Marston et al., 2004). This is most likely because larger dogs require more exercise, they are more expensive to keep and can cause more damage than smaller dogs if they have destructive tendencies and what appears a small problem with a smaller dog can be quite a big problem in a larger dog and more difficult to control.

4.2.2. Behavioural problems

As can be expected, behavioural problems were an important factor in the success of adoption with those dogs showing aggression towards people and the owner not getting advice having 11.1 times the odds of being returned to the rehoming centre compared with those dogs without behavioural problems. It was found that if the dog had shown aggression towards people and the owners had called the rehoming centre for advice they then only had 5.6 times the odds of returning the dog. Assuming a causal association, the PAR was 4.8% for those dogs where the owner had not sought advice when the dog had shown aggression, whereas for those dogs where the owners had sought advice it was 2.9%. This suggests that owners should be encouraged to seek advice in relation to management of aggression as soon as the problem is noticed, as this may reduce the number of dogs that are being returned for that reason. Those dogs that showed destructive tendencies had 2.2 times the odds of being returned. However, if they sought advice from the rehoming centres, it seemed to have no additional effect on the likelihood that the dog would be returned. The results of the Cox regression show very similar results to the logistic regression. This may be the result of the relatively short follow-up time of 6 months. Other studies have shown that behavioural problems are often the most common reason for a dog to be returned. A previous study found that 17.4% of dogs were returned, with boisterousness (16.9%), aggression towards other dogs (7.7%) and aggression towards people (19.2%) being the most common reasons (Ledger and Baxter, 1997). Eighty-nine percent of the people who returned a dog to a shelter in Northern Ireland did so because of behavioural problems. Studies have shown that more male dogs and strays showed undesirable behaviours compared to females and relinquished dogs, respectively. Puppies were less likely to have behavioural problems than juveniles or adults (Wells and Hepper, 2000).

4.2.3. Owner expectations

The logistic regression model suggests that the expectations of the new owner played an important role in how likely a dog is to be returned, with those who found the work and effort in

looking after their dog to be more than they expected having 9.9 times the odds of being returned. If one assumes a causal association, the proportion of dogs returned to kennels in the study population that could have been prevented and successfully adopted by educating owners and providing more advice to ensure that they have realistic expectations is 8.9%. Kidd et al. (1992b) showed that veterinary clients rejected significantly fewer pets as compared to owners who adopted pets from welfare centres. The authors proposed that this was due to the fact that veterinary clients may be less likely to have unreasonable expectations and have access to more advice before obtaining a pet. However, the veterinary clients were older than the shelter adopters which may have confounded the results (Kidd et al., 1992b). A study in the USA found that owners realising that caring for the dog required more effort than they had expected were 4.3 times more likely to return the dog (Patronek et al., 1996). Stafford et al. (2003) noted that the second dog a person owns is more likely to not meet their expectations than the first. This has been especially demonstrated with police dog handlers and with guide dogs, and it can often result in a dog being returned (Stafford et al., 2003). An Italian study showed that people who had previously owned a dog were less tolerant of behavioural problems than new owners and were therefore more likely to return a dog (Mondelli et al., 2004). However, Kidd et al. (1992a) showed that those people who had previously owned a pet were more likely to have successfully adopted a dog. Shore (2005) reported that 85% of the people who were returning a dog had previously owned a pet. In the current study it was found that whether the owner had previously owned a dog appeared important on univariable logistic analysis but was not included in the final multivariable model as it did not reach statistical significance.

4.2.4. Owner family structure

Young adults, those aged less than 25 years, were much more likely to return a dog post-adoption compared to those older than fifty. Families with children < 13 years were also more likely to return the dog compared to those families without children. These results are similar to those found by Kidd et al. (1992a), who showed that parents rejected pets more than non-parents. A study in the USA reported that families with children were more likely to relinquish a pet. They suggested that this may be because behavioural problems were more common in homes with children (Miller et al., 1996). However, it is also likely that families with children have less time to spend working with a dog with behavioural problems or the adverse impact of behavioural problems could be greater in households with children.

4.2.5. Place dog slept

Where the dog slept also influenced how likely it was that a dog would be returned. Those owners who allowed the dog to sleep in a family member's bed were less likely to return the dog. This is possibly an indication of the bond or attachment between the owners and the dog, and may also indicate a certain level of tolerance to behavioural problems. A similar result was found where a study showed that puppies which slept on or near the owner's bed were more likely to be adopted successfully (Duxbury et al., 2003). It was also interesting to note that those who kept their dog outside, in kennels or the garage were also slightly more likely, although this was not a significant difference, to keep the dog as compared to those who kept the dog in the house but not in the bedroom. This could be due to behavioural problems of the dog having had a lower impact on the owner.

4.2.6. Attending training classes

Attending training classes significantly reduced the likelihood that a dog would be returned to kennels. This is probably due to the owner having better control and understanding of their dog,

possibly resulting in a closer bond with the dog and it behaving better. It may also be due to these owners having a stronger commitment to adopting the dog successfully. Other studies have shown similar results. A study in the USA examining the adoption of puppies showed that there was a higher retention of dogs in the home if the puppy had attended socialisation classes wore a head-collar as a puppy and was handled frequently as a puppy (Duxbury et al., 2003). A study examining factors associated with relinquishment of a pet found that those attending training classes shortly after acquiring the dog were five times more likely to keep the dog (Patronek et al., 1996). In the current study, it was estimated that attending training classes could have potentially reduced the number of dogs returned to kennels by 2.3%. This is quite a small population impact considering the strength of association reflected in the relatively high odds ratio. This is due to only 18.1% of new owners attending training classes. By increasing the number of new owners who attend training classes to 50%, it may be possible to further reduce the percentage of dogs returned to kennels by 6.3%. This is likely to be economically beneficial as the cost of running training classes would be relatively small in comparison to the costs of housing the dogs that are returned and it would reduce the risk of stress for both the dog and the owner. However, the above effect could have been confounded by other factors relating to the owner which were not assessed during the study. For example, those owners who attend training classes may be owners who are willing to try their best for the dog whilst those owners who do not attend training classes may be less willing to try and deal with problems.

4.2.7. Rehoming centre

The rehoming centre from which a dog was rehomed also played an important role in how likely a dog was to be returned. This could be due to the staff at the centre and how much effort they invest into matching a dog with an appropriate owner, and in the pre-adoption talks for preparing the owner. It could also influence the level of post-adoption care, for example the advice given if the owner phoned with any problems after adoption. It may also be due to differences in surrounding populations, although socio-demographic classification was not included in the final logistic regression model. Shore (2005) found that the most common suggestion given by failed adopters was that people should very carefully consider the responsibilities associated with an adoption and secondly that adopting a pet from a shelter was an uncertain process. During the matching process between guide dogs and their user, Lloyd et al. (2000) found that owners felt that more emphasis should be placed on lifestyle changes, family dynamics and other pets. Therefore, it is important that the staff at the rehoming centres is aware of these factors in order to properly advise the owners.

Further work needs to be done in this area to assess whether improved methods for matching potential owners to dogs can be developed thereby reducing the number of dogs which are unsuccessfully adopted.

5. Conclusion

It was found that out of those dogs rehomed by Dogs Trust during 2005 there was a 14.7% failed adoption proportion during the 6-month follow-up period. This study showed that several factors affected the likelihood of a dog being successfully rehomed. Those factors which increased the risk of a dog being rehomed unsuccessfully included: large sized dogs, the dog having behavioural problems (in particular aggression), the dog having health-related problems soon after adoption, younger aged owners, the owner having children aged less than 13 years and those owners that found the effort involved in caring for their dog to be more than expected.

However, it was found that those owners that attended training classes and those that received advice were less likely to return their dogs. Therefore rehoming centres may wish to consider requiring all owners to attend a minimum number of training classes which also provides the owners with an opportunity to ask for behavioural advice.

Conflict of interest statement

None of the authors (G. Diesel, D.U. Pfeiffer and D. Brodbelt) has a financial or personal relationship with other people or organisations that could inappropriately influence or bias the paper entitled ''Factors affecting the success of rehoming dogs in the UK during 2005''.

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