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1 **Neutering of cats and dogs in Ireland; pet owner self-reported perceptions of enabling**
2 **and disabling factors in the decision to neuter.**

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16 **Abstract**

17 **Background:** Failure among pet owners to neuter their pets results in increased straying and
18 overpopulation problems. Variations in neutering levels can be explained by cultural
19 differences, differences in economic status in rural and urban locations, and owner
20 perceptions about their pet. There are also differences between male and female pet owners.
21 There is no research pertaining to Irish pet owner attitudes towards neutering their pets. This
22 paper identified the perceptions of Irish cat and dog owners that influenced their decisions on
23 pet neutering.

24 **Methods:** An interview-administered survey questionnaire and focus group discussions were
25 conducted for the study. Data was coded and managed using Nvivo 8 qualitative data analysis
26 software

27 **Results:** Focus groups were conducted with 43 pet (cats and dogs) owners. Two major
28 categories relating to the decision to neuter were identified: (1) enabling perceptions in the
29 decision to neuter (subcategories were: controlling unwanted pet behaviour; positive
30 perceptions regarding pet health and welfare outcomes; perceived owner responsibility; pet
31 function; and the influence of veterinary advice), and (2) disabling perceptions in the decision
32 to neuter (subcategories were: perceived financial cost of neutering; perceived adequacy of
33 existing controls; and negative perceptions regarding pet health and welfare outcomes).

34 **Discussion:** Pet owner sense of responsibility and control are two central issues.
35 Understanding how pet owners feel about topics such as pet neutering, can help improve
36 initiatives aimed at emphasising the responsibility of population control of cats and dogs.

37 Introduction

38 Companion animal overpopulation causes significant costs to humans and governments every
39 year (Olson et al., Apr 1; Olson & Johnston, 1993). Evidence suggests there is a connection
40 between the neutering status of pets and levels of pet straying, with low levels of neutering
41 related to higher levels of straying in pet behaviour (Hsu, Severinghaus & Serpell, 2003;
42 Diesel, Brodbelt & Laurence, 2010). The problem of overpopulation may be attributed to
43 numerous factors that are intertwined including; a failure among pet owners to neuter their
44 pets (Hsu, Severinghaus & Serpell, 2003; Natoli et al., 2006; Soto et al., 2006; Weng et al.,
45 2006), failure to implement early neutering of cats and dogs (Ortega-Pacheco et al., 2007;
46 Farnworth et al., 2013) and poor management of stray populations (Marston & Bennett, 2009;
47 Stavisky et al., 2012) . Therefore there is a responsibility for pet owners to prevent pet
48 pregnancies and to neuter their pets, with welfare organisations encourage pet owners to be
49 responsible in neutering their pets to help reduce the stray/feral dog and cat populations
50 (Dogs Trust, 2009; Dublin Society for Prevention of Cruelty to Animals, 2010).

51 There are marked differences in neutering rates across the globe. These differences can be
52 explained by variations in cultural differences and attitudes towards neutering, and
53 differences in economic status in rural and urban locations (Berthoud et al., 2011; Torres de
54 la Riva et al., 2013). Differences in the rate of neutering have been reported between the
55 United States and Europe (Trevejo, Yang & Lund, 2011; Torres de la Riva et al., 2013). One
56 US study reported the prevalence of castration at 82% in cats and 64% in dogs (Trevejo,
57 Yang & Lund, 2011). In the United Kingdom, one study reported that among 431 dog
58 owners, 54% of dogs were neutered, and there were regional differences between north and
59 south (Diesel, Brodbelt & Laurence, 2010). Reported levels are similar in Hungary (Kubinyi,
60 Turcsán & Miklósi, 2009), but much lower in Sweden (Sallander et al., 2001) and Ireland
61 (Downes, Canty & More, 2009).

62 Perceptions owners have about their pet are also important. Owners are more likely to neuter
63 their pet if they consider it a companion rather than a working animal (Franti et al., 1980;
64 Faver, 2009). Increased awareness about the benefits and harms of sterilization of female cats
65 and dogs was shown to impact positively on the decision to neuter (Faver, 2009). Perrin
66 (Perrin, 2009) reported that owners of 'mostly indoor pets' believed that neutering was not
67 necessary. Reasons for not neutering include believing the process to be unnecessary, and
68 wanting to use the pet for breeding. The cost of neutering also presents a barrier (Blackshaw

69 & Day, 1994; Faver, 2009).

70 There are differences in neutering levels between cats and dogs, with cat owners more likely
71 to neuter than dog owners (Franti et al., 1980; Leslie et al., 1994; Poss & Bader, 2007;
72 Downes, Canty & More, 2009; Faver, 2009; McKay, Farnworth & Waran, 2009). Referring
73 to neutering among pet dogs, concerns are expressed about neutering aged dogs and the
74 possible impact on increasing the dog's weight (Blackshaw & Day, 1994). There are also
75 differences in belief and attitudes between male and female owners (Blackshaw & Day,
76 1994). Male owners equate neutering with removing the maleness of the dog, and were of the
77 opinion that neutering can change the personality of the pet (male and female). Some 61% of
78 male owners and 47% of female owners would not proceed with neutering their dog if they
79 had the choice again (Blackshaw & Day, 1994). There are implications for the veterinary
80 profession in the pet care recommendations it offers clients around neutering (Scarlett, Sep
81 15). Veterinarians can play an important role in addressing problems related to neutering and
82 overpopulation, and counselling pet owners to take appropriate action (Voith, 2009).
83 However, there are challenges to achieving the full potential of this role. For example, Diesel
84 et al.(Diesel, Brodbelt & Laurence, 2010) reported that there is often variation in the
85 veterinarian advice offered to clients – for example, there was little agreement between
86 veterinary practices on the appropriate stage to neuter bitches, with 16.9% of practices
87 recommending that a bitch should have a first heat before neutering, in comparison to 20.6%
88 not recommending neutering at all (Diesel, Brodbelt & Laurence, 2010). .

89 **Pet ownership and neutering in Ireland**

90 There is no research pertaining to the opinions and perspectives of Irish pet owners towards
91 pet neutering. This reflects the wider lack of research on pet ownership and pet care. Downes
92 et al. (Downes, Canty & More, 2009) reported that some 35% of households in Ireland have
93 one or more pet dogs, and 10.4% of households have one or more pet cats. Of these, 47.3% of
94 pet dogs and 76.1% of pet cats were neutered. Females (in both cats and dogs) were more
95 likely to be neutered than males (Downes, Canty & More, 2009). Low levels of pet neutering
96 in Ireland, along with the uncounted number of strays reproducing, means that it is difficult to
97 control overpopulation of cats and dogs in Ireland.

98 **Study objectives**

99 Given the lack of information on pet owner perspectives on neutering in Ireland, the aim of
100 this study is to identify the self-reported perceptions of Irish cat and dog owners that
101 influenced their decisions on pet neutering.

102 **Material and methods**

103 **Study design**

104 Research ethical approval was granted by the University College Dublin (UCD) Human
105 Research Ethics Committee. Participants were required to sign a written form of consent. For
106 the methodology, qualitative research methods - focus groups - were used. Focus groups
107 allowed participants to openly discuss their feelings on neutering, and to indicate their own
108 decisions around neutering their pets.

109 **Participant recruitment**

110 Pet owners were recruited through six different private veterinary practices (three city
111 practices; two in regional towns; and one in a rural area). The practices selected were a
112 convenience sample to ensure compliance and each of these practices agreed to participation
113 in the study. Participants were recruited by the practices, where fliers and posters were put in
114 place and the staff was asked to highlight the research project, to encourage participants to
115 volunteer. Participants were offered a voucher to the value of €50 for the practice where they
116 were recruited from. Seven focus groups were conducted with 43 participants in total; three
117 to nine participants in each group.

118 **Data collection and analysis**

119 A survey was administered prior to the commencement of the focus groups, to collect
120 information on pet owner profile (age, location, type of dwelling, and household
121 composition) and pet profile information (type and number of pets in participating
122 households). Table 1 presents the participant socio-demographic profile.

123 **Table 1: Socio-demographic profile for participating pet owners (N = 43)**

Socio-demographic variable		Frequency (%)
Age	18–24	3 (7.0)
	25–34	7 (16.3)

	35–44	5(11.6)
	45–54	8 (18.6)
	55–64	14 (32.6)
	65+	6 (14.0)
	Total	43 (100.0)
Gender	Female	30 (69.8)
	Male	13 (30.2)
	Total	43 (100.00)
House Type	Apartment	1 (2.3)
	Detached	18 (41.9)
	Semi detached	13 (30.2)
	Terraced house	9 (20.9)
	Missing	2 (4.6)
	Total	43 (100.00)
Household Composition	Lone parent with children	3 (7.0)
	Married or Cohabiting couple	11 (25.6)
	Married or Cohabiting couple with children	13 (30.2)
	Mixed non-family household	8 (18.6)
	One person	8 (18.6)
	Total	43 (100.0)
Marital Status	Cohabiting	3 (7.0)
	Divorced or Separated	2 (4.7)
	Married	18 (41.9)
	Single	20 (46.5)
	Total	43 (100.0)
Urban/Rural Location	Rural	15 (34.9)
	Urban	28 (65.1)
	Total	43 (100.0)

124 **Bold** = most frequent category

125 An interview topic guide was used to direct all of the focus groups. Questions guided the
 126 focus groups to explore reasons for pet ownership and pet choice; views and decisions on pet
 127 neutering; feeding and weight control; and pet exercise:

- 128
- Why do you have a pet?
 - 129 • Why did you choose that type of pet?
 - 130 • What are your views on neutering dogs and cats?
 - 131 • What influenced your decision to have your pet neutered or not?
 - 132 • What are your views on pet diets, both homemade and commercial?
 - 133 • What factors influence the weight of your pet?

- 134
- How do you feel about exercising your pet?

135 All focus groups were audio-recorded and transcribed. The coding and the analysis process
136 were assisted using Nvivo 8 (© QSR International Pty Ltd 2007) qualitative data analysis
137 software.

138 Focus group data were grouped together using codes and themes in accordance with the
139 technique described by Attride-Stirling (2001). Minor thematic codes were developed
140 inductively as the transcripts were reviewed, allowing the data collected to dictate the
141 categories for analysis. After coding, the first two authors mutually agreed on the categories
142 that were to be used in the analysis. Two major categories related to the decision to neuter
143 were identified: (1) Enabling perceptions in the decision to neuter (five subcategories); and
144 (2) Disabling perceptions in the decision to neuter (three subcategories). The subcategories
145 are as follows:

- 146
1. Enabling perceptions in the decision to neuter
 - 147 a. Controlling unwanted pet behaviour
 - 148 b. Positive perceptions regarding pet health and welfare outcomes
 - 149 c. Perceived owner responsibility
 - 150 d. Pet function
 - 151 e. The influence of veterinary advice
 - 152 2. Disabling perceptions in the decision to neuter
 - 153 a. Perceived financial cost of neutering
 - 154 b. Perceived adequacy of existing controls
 - 155 c. Negative perceptions regarding pet health and welfare outcomes

156 **Results**

157 **Profile of neutering status**

158 Forty three participants took part in the study. Of these, 81.4% (35) neutered at least one of
159 their pets. For one of the focus groups, three participants did not turn up leaving only three
160 participants available for the focus group; however this did not impact on the quality of the
161 data collected from this focus group. Though sample sizes are small; more owners had
162 neutered cats than dogs, relative to the sample size. Eight pet owners neutered some of their

163 pets, and the same number did not neuter their pets. Table 2 details the profile of neutering
164 among pet owners in the study.

165 **Table 2: Profile of neutering (for cat, dogs, and both) among pet owners (N = 43)**

Neutering status	Cat	Dog	Both cat and dog	Total for neutering status
	n (%)	n (%)	n (%)	N (%)
Yes	8 (29.6)	9 (33.3)	10 (37)	27 (62.8)
Some	1 (12.5)	2 (25)	5 (18.5)	8 (18.6)
No	-	5 (62.5)	3 (37.5)	8 (18.6)
Total	9 (20.9)	16 (37.2)	18 (41.9)	43

166

167 **Enabling perceptions in the decision to neuter**

168 **Controlling unwanted pet behaviour**

169 For pet owners, neutering provided a means of controlling pet behaviour and reducing the
170 propensity for unwanted and undesired behaviours for the pet owner. Animal behaviours that
171 were identified as unfavourable included fighting between pets, and straying. Neutering
172 reduces the attraction of other cats and dogs to the pet owners' home, and prevents unwanted
173 pets.

174 *'It's a case of health issues and trying to keep the cats out of fights.... I think if they're*
175 *not neutered, they want to be out more. Especially at night and that's putting them at*
176 *risk from the traffic'*

177 *'My dog is neutered... he's a cocker spaniel and they have a reputation for being*
178 *hyper. Neutering will calm him down. I don't know what happens when dogs go into*
179 *heat but I do know that the males go mad so I just thought it would be safer, as we*
180 *walk him [with]out the lead. I'd be petrified if he ran off. I wouldn't know what to do,*
181 *so I would agree with neutering'.*

182 *'I think with cats, you want them there, and a neutered cat stays around the house,*
183 *they don't wander'.*

184 *'One tabby was neutered when I got it and I decided to neuter the others because*

185 *they would mark their territory and probably fight more. So they are all neutered.'*

186 **Positive perceptions regarding pet health and welfare outcomes**

187 Much discussion was had on the health consequences of neutering for pets. Pet owners
188 referred to the beliefs of others, and their own:

189 *'People said he'd [pet dog] be sluggish, he'd be lethargic, and he'll put on weight. I*
190 *never saw any change. He was a young happy dog. There are these myths going*
191 *around that [neutering] will change your dog's character. I've never seen that'.*

192 Pet owners, in favour of neutering, regard neutering as an effective way of ensuring good
193 animal health for their pets. In addition to controlling the pet's behaviour and reducing the
194 propensity for unwanted pet behaviours, neutering pets was seen as a way of reducing the risk
195 of the spread of disease, infections, and harm caused by fighting (and mating) between
196 animals. For these reasons, neutering was seen as a way of prolonging the life span of the pet.

197 *'With the cats, it's a case of health issues, to avoid the risk of Feline AIDS. They can*
198 *pick up so much if they're out and fighting'.*

199 *'A male cat, I had him neutered because I didn't want him to catch feline AIDS'*

200 *'It will prevent them [cat] having infection or uterine cancer... or mammary cancer'.*

201 Both cat and dog owners refer to neutering as increasing the life span of the pet.

202 *'If you have the dog neutered, the bitch neutered, it can extend her life because they*
203 *don't have to go through the ordeal of giving birth, pups. That can actually add*
204 *another year or two to the bitch's life span, so that's why I got my present dog*
205 *neutered'.*

206 *'Neutering prolongs the males' [cat] life. They're not fighting and spreading*
207 *disease'.*

208 *'They are pets, it can increase their lifespan because of cancer and diseases, I*
209 *wanted them [dogs] to live a couple of years longer, it may be selfish, they may have*
210 *had some great experiences, but I'll hang onto them as long as possible'.*

211 **Perceived owner responsibility**

212 Owner sense of responsibility was apparent in the statements of pet owners who are in favour
213 of neutering. Owners felt a responsibility to reduce unwanted pregnancies, and prevent over-
214 population of unwanted cats and dogs.

215 *‘A dog yes, you don't want to be responsible for your pet creating a litter of pups or*
216 *kittens’.*

217 *‘Every time you hear figures, how many pets - dogs and cats - that have to be put*
218 *down every year, because they can't be kept, the shelters are all overrun with them.*
219 *It's just the thought of it going on, is just horrible’.*

220 *‘I don't want the responsibility of having kittens or having to find homes. So it is the*
221 *responsible thing to do’.*

222 *‘Neutering is more responsible and there are too many puppies around. I have cats*
223 *and I let them outside. I would hate to have it on my conscience that they were the*
224 *cause of some other cat having a litter’.*

225 Pet owner comments reflect an emotional perspective on the problem of overpopulation, and
226 not wanting to deal with the implications of finding homes for unwanted kittens and pups, or
227 the implications at an emotional level for the owner.

228 **Pet function**

229 Keeping a pet (dogs were specifically mentioned in this study) for breeding purposes was
230 identified as a reason for deciding not to neuter.

231 *‘[Dogs] should be neutered unless there is a good reason for breeding from them’.*

232 *‘I had my cat neutered and I can see no point not to, unless you particularly want to*
233 *breed from the animal for some reason’.*

234 Only one pet owner indicated that they were breeding from their pet dog, and therefore,
235 decided against neutering. There was no reference made to other functional related reasons
236 for owning a pet, e.g., working animal, companionship, etc. .

237 **The influence of veterinary advice**

238 Only four pet owners referred specifically to the role of veterinary advice in informing their
239 decision to neuter. There was general consensus among the groups that neutering would be
240 complied with if medically required. Two of these pet owners noted they were not in favour
241 of neutering, but complied with medical advice. There were mixed opinions on this decision,
242 with reference being made to a loss of perceived control over the decision:

243 *‘So the advice was that medically I should do it [neuter the pet dog], so I did it and I*
244 *didn't really think about the rights and wrongs of it at all really’.*

245 *‘The vet would make the decision for us; she did say the female was quite small to*
246 *have pups’.*

247 *‘My decision ended up having to be taken from me... the real decision was that she*
248 *then got a false pregnancy and the vet said to me this can be a precursor of cancer*
249 *type of thing and really I'd be better off doing it’.*

250 The influence of media featured very little in the focus groups, but pet owners made reference
251 to information on the number of injured, unhealthy and euthanized cats and dogs.

252 **Disabling perceptions in the decision to neuter**

253 **Perceived financial cost of neutering**

254 Financial cost was identified as a barrier to improving the prevalence of neutering of pet cats
255 and dogs. This barrier was identified by five participants; though all five had their pet
256 neutered. Instead, concern was raised that the financial costs of neutering would prevent
257 others from neutering their pets.

258 *‘I think the cost in Ireland is extremely high.... I had my two dogs done at the same*
259 *time eight years ago and it was about £350 to get them neutered by the vet’.*

260 *‘For the two [cats]... that was my bill when I went to pick them up. That’s an awful*
261 *lot of money... there are people who genuinely can’t afford it...’*

262

263 **Perceived adequacy of existing controls**

264 There was an overwhelming perception among those who did not have their pets neutered
265 that adequate control measures were in place, or that neutering was not necessary because the
266 pet was always indoors, or within sight of the owner. These measures include keeping the pet
267 inside a controlled environment, such as the owners' house.

268 *'The dog we have at the moment is not neutered. It depends on the dog and the*
269 *environment which it lives, whether you have a garden, whether other people are*
270 *home during the day, whether the dog is taken out on the lead only'.*

271 *'When we got the dog, she was not neutered simply because she was always under*
272 *control and there was no one living near us. So all of us made sure she was tied, up in*
273 *her pen'.*

274 *'No, he's [pet dog] not neutered. He's around us all the time. He's under strict*
275 *control around the house'.*

276 *'One pet which is completely indoors - She's a total house dog. Someone's always*
277 *with her if she's outside, there's no need for her to be neutered'.*

278 *'[Neutered dogs] get too fat and lazy and it's not hard to lock up a bitch for a month*
279 *twice a year. I have dogs and bitches at home and I can cope with it... if you've a bitch*
280 *in heat, you lock her up. I don't agree [with] neutering'.*

281 Specific reference was made to dogs; dogs were perceived as easier to control than cats.

282 *'I didn't neuter the dog but he was never loose outside. There was never any chance*
283 *he was going to get himself into trouble, because he was either inside with us or*
284 *outside with one of us, but I did neuter both of the cats. I did that because I didn't*
285 *want the male to get himself in to trouble in other peoples gardens'.*

286 *'I can understand with cats [the need to neuter] because they're out wandering and*
287 *stuff, but with a dog and you know where they are all the time.'*

288 In this instance, the cats and a male dog are neutered. However, the decision was made not to
289 neuter the female dog:

290 *'All my cats are neutered and only one male is neutered... cats get diseases when*
291 *they're out and around whereas the dogs are more home birds'.*

292 **Negative perceptions regarding pet health and welfare outcomes**

293 As with the decision to neuter, concerns pertaining to animal health were also influential in
294 the decision not to neuter. These concerns reflect pet owners' beliefs regarding the
295 consequences and outcomes of neutering.

296 *'When you get them [cats] neutered, they are inclined to put on a lot of weight, and*
297 *they lose their shape'.*

298 *'It is nice to leave them [pets] and not play around with them too much... just leave*
299 *them as their natural self'.*

300 Statements point to the belief that neutering is unnatural for the pet. Among some owners of
301 neutered bitches, concern was expressed about the invasiveness of the procedure, how sick it
302 had made their pet, and contributed to weight gain. Given this experience, these owners
303 expressed reluctance to neuter future pets.

304 **Discussion**

305 **Overview**

306 In this study, a significant proportion of the participant group had neutered their pets (62.8%).

307 Self-reported perceptions were organised into those that were i) enabling (i.e. supported the
308 decision to neuter) and ii) disabling (i.e. were against the decision to neuter). All pet owners
309 in favour of neutering had neutered their pets. A minority of those against neutering also had
310 their pets neutered, in compliance with medical advice. Enabling perceptions that supported
311 the decision to neuter included: a desire to control unwanted behaviours (such as straying and
312 fighting); concerns over animal health; a perceived sense of owner responsibility; pet
313 function; and because of veterinary advice. Disabling perceptions that influenced the decision
314 not to neuter included: the perceived financial cost of neutering; the adequacy of existing
315 controls; and concerns over animal health. It is hoped that, in addition to encouraging further
316 research for an Irish context, the results in this paper will contribute to a better understanding

317 of pet owner behaviour, and contribute to informing veterinary advice and support for
318 adequate pet care.

319 **Discussion of key findings**

320 The health benefits of neutering for pets included decreased risk of cancer, and increased
321 longevity (Michell, 1998). In this study, there was a clear connection between the desire to
322 control pet behaviours (such as straying and fighting), perceived perceptions regarding pet
323 health and welfare outcomes, and the objective of preventing inconvenient implications for
324 the pet owner (such as dealing with unwanted kittens). Neutering was described as
325 prolonging the life span of the pet. This may suggest that owners' decisions are influenced by
326 information beyond their own experiences, such as from a veterinarian (Faver, 2009);
327 however, explicit reference to veterinary advice was made by only a small number of pet
328 owners. For those in favour, neutering was generally considered a matter of responsibility,
329 with reference being made to the need for cat and dog population control. This suggests a
330 level of awareness among these pet owners not only of the health related benefits of
331 neutering, but also the wider problems associated with overpopulation.

332 The importance of normative beliefs and perceived ability are important in explaining the
333 relationship between responsibility and behaviour among pet owners (Rohlf et al., 2010).
334 Recent welfare organizations marketing strategies emphasise the responsibility of population
335 control on pet owners (Dogs Trust, 2009; Dublin Society for Prevention of Cruelty to
336 Animals, 2010). The results show that responsibility and control are two central issues. Pet
337 owners in favour of neutering commented on their sense of responsibility – reflecting an
338 emotional component and an awareness of the implications for the wider cat and dog
339 population if they did not neuter their pets. These pet owners also talked about not wanting to
340 have to respond to unwanted offspring. This reflects their sense of control and responsibility
341 over their pet's behaviour. Neutering provides a means of controlling this behaviour and
342 emotionally reassuring the pet owner. Those against neutering emphasised the adequacy of
343 existing control measures – suggesting a high level of perceived control over the behaviour of
344 their pet, the pet's environment, and the owner's own ability to keep the pet under
345 observation. This is similar to the findings of Perrin (2009) who reported that owners of
346 'indoor' pets believed that neutering was not necessary. Owner responsibility was not
347 mentioned by those not in favour of neutering – though pet-related health concerns were
348 emphasised – with pet owners expressing concerns about the invasiveness of the operation,

349 and the risk of pet obesity. Differences were recorded in opinions towards neutering of cats
350 and dogs. Cats were regarded as wanderers, less easy to control and more prone to picking up
351 infection and disease. Dogs were seen as easier to control, and therefore, control measures
352 (such as keeping the dog in a controlled environment, such as indoors) were regarded by
353 some as adequate.

354 Though financial concerns did not feature strongly in the results, the research literature does
355 show that the cost of neutering can present a barrier to pet owners (Blackshaw & Day, 1994;
356 Faver, 2009). At the time of research, the economic climate in Ireland has resulted in less
357 disposable income for people. Pet owners may regard neutering as less of a priority, and
358 instead, implement measures to keep the pet indoors. Recent media coverage has highlighted
359 a growing problem of dog and cat abandonment, associated with a weak economic climate
360 (for example, an article in The Irish Times '*Overcrowded animal centre in urgent appeal for*
361 '*responsible*' owners after rise in abandoned pet' (The Irish Times, 2012) and an article in the
362 Irish Examiner '*Abandonment on rise during recession*' (Irish Examiner, 2012).

363 **Implications for veterinary advice on neutering**

364 Understanding how pet owners feel about topics such as neutering gives veterinary services
365 the knowledge and understanding to improve their relationship and communication with pet
366 owners (Perrin, 2009). It has been suggested that veterinary practitioners need to
367 communicate more effectively with pet owners around the time of neutering, to ease the
368 burden of neutering on the pet and the owner and to encourage owners to neuter future pets
369 (Blackshaw & Day, 1994). Diesel, Brodbelt & Laurence (2010) however, found variations
370 between veterinarian recommendations to pet owners on neutering. This may suggest a lack
371 of consistency in approach and gaps in information on best practice, within the veterinary
372 profession. Though, in this study, the veterinarian did not feature strongly in perceptions of
373 neutering, there is value in considering the role that veterinarians play in working with pet
374 owners. Often the decision to neuter was made by the veterinarian, and some pet owners
375 spoke of the decision being made for them. Effective communication is central. Coe, Adams
376 & Bonnett, (2008) emphasises the importance of educating clients, providing choices, and
377 using two-way communication. These are important factors that need to be considered by
378 veterinarians when advising on neutering.

379 Various initiatives have been launched in Ireland. The Irish Society for the Prevention of

380 Cruelty to Animals (ISPCA) issued an information leaflet ‘*It pays to spay or neuter your pet*’
381 (Irish Society for Prevention of Cruelty to Animals) which presents information on neutering,
382 and clarification around neutering myths. Another example - the Dogs Trust launched the
383 “it’s nicer to neuter” campaign (Dogs Trust, 2009), in an effort to reduce the number of
384 unwanted dogs that are euthanized annually. However, behavioural change cannot be
385 attributed to information alone; attitudinal changes are also required (Ajzen, 1991). The
386 promotion of owner responsibility within the wider community (outside of the confines of the
387 owners home) is one area that can be targeted by neutering initiatives. In addition, the results
388 clearly suggest that pet health is important for pet owners (those for and against neutering).
389 Given the centrality of health concerns for pet owners, attempts to promote neutering should
390 take into account the role of veterinary support and advice in adequately informing pet
391 owners on the health benefits of neutering (Faver, 2009).

392 **Limitations in the study design and recommendations for future research**

393 Future research pertaining to an Irish population should seek to differentiate differences in
394 belief and levels of neutering between male and female owners. The sample was not stratified
395 by gender, and there was an over representation of female owners. There is evidence in the
396 research that shows differences in belief and attitudes between male and female pet owners,
397 with male owners expressing concern over a change to the pet’s personality as a result of
398 neutering (Blackshaw & Day, 1994). The sample was not stratified by socio-economic group,
399 though different geographical locations, urban and rural, were chosen to minimise this bias.

400 The recruitment of pet owners took place through private veterinary practices. Therefore, it is
401 probable to suggest that participants were more engaged in their pet’s health, and could
402 afford to avail of veterinary health care services. Also it was highlighted how veterinary
403 advice is important in the decision to neuter, however in populations that don’t visit a
404 veterinarian veterinary advice cannot influence the decision to neuter. This serves to highlight
405 how important it is to promote owner responsibility within the wider community.

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