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ORIGINAL ARTICLE

Health in older cat and dog owners: The Nord-Trondelag Health Study (HUNT)-3 study

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Abstract

Aim: The main objective was to compare older male and female cat, dog, and non-owners with regard to demographic and health-related characteristics. *Method*: Data in the present cross-sectional population study were drawn from HUNT-3 in Norway. A total of 12,297 persons (5631 men; 6666 women) between the ages of 65 and 101 years were included, of whom 2358 were pet owners. *Results*: The main finding was that owning a dog demonstrated several health-related characteristics to a higher positive degree than both non-pet and cat ownership among the participants. Cat owners showed higher body mass index values and higher systolic blood pressure, and reported worse general health status. They also exercised to a lower degree than the others. ***Conclusions*: As the result implies that older cat owners are negatively outstanding in many aspects of health compared with the dog owners, in the future, more focus must be put on the worse health of those. Further, there were more married male than female cat and dog owners. This probably depends on traditional cultural thinking; the man is the owner of the pet even if the woman lives with and cares about it. It is important to point out that different groups in the population might select different pets. Consequently, the findings showing a correlation between pet ownership and health may be owing to unrelated confounding factors.**

Key Words: *Dog ownership, cat ownership, health, older people, gender, psychical activity, population study, rural*

Introduction

A number of studies indicate that living with animals such as dogs and cats facilitates people's aging and benefits their health [1-3]. On the other hand, researchers have found that the association between pet ownership and health seems particularly weak among older people [2,4]. The main purpose in the present study was therefore to examine health and pet ownership in older Norwegian people.

Pets' positive effect on health has been shown in several areas, for example cardiovascular health. Pet owners have lower blood pressure compared with non–pet owners [5], have fewer instances of coronary heart disease [6], and shorten convalescence and rehabilitation time [7]. Friedmann and Thomas [8], who compared the health of dog and cat owners after a heart attack, showed that dogs are a stronger facilitator to recovery than cats.

Pet ownership may also increase physical activity [2,9]. In a study conducted by Cutt et al. [10], participants reported that their dogs were a source of motivation for physical activity; they also stressed the importance of the social interaction and support they gained by walking their dogs. Dog walking is linked to that contact with other people [1], and dog walkers reported feeling less lonely and socially isolated [11].

However, there are also studies that show negative effects on health. Parslow and Jorm [12] argued that

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there is no evidence that pets promote cardiovascular health. Instead, they found that pet owners had higher diastolic blood pressure than non-pet owners. Pet owners also had a higher body mass index (BMI) and were more likely to smoke. In addition, Thorpe [13] found that cat owners were less likely than non-pet owners to engage in walking for exercise. Furthermore, Müllersdorf et al. [14] found that pet owners perceived their mental health as poorer than that of non-pet owners. Parslow et al. [15] concluded that pets did not promote an older persons' physical and psychological health.

Moreover, some studies have recognized gender differences. Hecht et al. [16] found that male pet owners benefited more from pet ownership in terms of well-being than female pet owners did. Parslow et al. [15] found that married female pet owners in particular were vulnerable to depression and had poorer physical health.

In Norway in 2001, there were a total of 758,000 households with pets. Of these, almost 50% had a cat. In total there were 535,000 cats, or 1.4 cat per household. Approximately 44% of the households had a dog, with a total of 414,000 dogs, or 1.2 dogs per household. About 80%–85% of the cat owners were women, and nearly half of the cat owners were single [17]. However, these figures are from the population in general; nothing is known specifically about older persons. In addition, there is no Norwegian population study in this field. The present study was, therefore, the first in a series of studies based on data from a large general health study (the Nord-Trondelag Health Study (HUNT)-3 study) examining the demographics and physical and mental health of older female and male pet owners living in Nord-Trondelag County in Norway. The main objective was to compare older (≥ 65 years) male and female cat, dog, and non-pet owners with regard to demographic and health-related characteristics.

Method

Sample population

Data in the present cross-sectional population study were drawn from the HUNT in Norway, one of the world's largest population surveys, which gathered data during three periods. Nord-Trondelag County is one of 19 counties in Norway and contains 3% of its population. The county has no big cities, but is fairly representative of Norway concerning demographic and geographical factors. The first wave (HUNT-1) was carried out between 1984 and 1986, the second wave (HUNT-2) between 1995 and 1997, and the third wave (HUNT-3) between 2006 and 2008. The present study included a total of 12,297 people (5631 men; 6666 women) between 65 to 101 years of age, of whom 2358 persons (17%) were pet owners. The survey response rate was above 60%.

Measures

The data for HUNT-3, collected by means of questionnaires, interviews, clinical examinations, and collection of blood and urine samples, was ready for analysis in January 2009. In the present study, data from the questionnaires and clinical examinations, including blood pressure and BMI, will be presented.

Demographic factors

In addition to age and gender, the participants were asked for marital status (married/cohabitating or living alone).

Question about pets

In this study there was one question about pets: "*Do you have pets at home? (cat, dog, other fur-bearing animal/bird)*". Since there were just a few fur-bearing animal/bird owners (n = 53), these were excluded from the present study. The participants who had both cats and dogs were also omitted (n = 204).

Health-related characteristics

Physical activity. The effect of physical activity depends on frequency, intensity, and duration [18]. These dimensions were used in this study. Frequency consisted of five alternatives: never, seldom, once a week, 2–3 times/week, and every day. For intensity there were three alternative: taking it easy, until I'm out of breath and break, and completely exhausted. Duration was rated with four responses (less than 15 minutes, 15–29 minutes, 30 minutes–1 hour, and more than 1 hour) in line with the public health recommendation of 30 minutes per day, which is supposed to benefit health for people with a low activity level [19].

Smoking behavior. Present smoking behavior (yes or no) was also included in the survey.

BMI. BMI is measured by weight/(height × height). As reference values, a BMI < 18.5 is considered to be underweight, normal weight is a BMI of 18.5–24.9, overweight is a BMI of 25–29.9, and obesity is defined as a BMI $\geq$ 30 [20].

Blood pressure. In the clinical examinations, the participants' blood pressure was measured three times. In this analysis, data were based upon an average value from the second and third measurements. In the analysis, diastolic and systolic were separated.

Self-rated general health status. The participants' self-rated general health status was graded into four response alternatives: very good, good, poor, and very poor. For some analyses the alternatives were pooled into good (*very good* and *good*) and poor (*poor* and *very poor*) health.

Data analysis

The first step in the statistical analysis was to identify and describe differences between non-pet and cat ownership, and dog ownership, respectively, using Pearson Chi^2 statistics. To explore the interactions between pet ownership, gender, and health-related characteristics (except smoking behavior), the next step was to perform analyses of variance. For ordinal data *Z*-values were used. Finally, two logistic regression tests were carried out, one for cat ownership versus non-pet ownership, and one for dog ownership versus non-pet ownership. The computer program SPSS for Windows (version 17.0) was used and the *p*-value 0.05 was set up for all analyses.

Ethical considerations

HUNT-3 was permitted by the Norwegian Data Inspectorate and by the Regional Committee for Medical Research. All participants in HUNT-3 gave written informed consent. Moreover, the present study was approved by the Board of Research Ethics in Health Region IV of Norway, reference number 2009/813-2.

Results

Since earlier research has found some differences between dog and cat owners, pet owners were divided into these two groups.

As can be seen in Table I, the majority of the participants did not own a pet. Pet owners were more likely to have a cat than a dog in both age groups, but pet ownership decreased as age increased. The proportion of cat and dog owners was higher among men than among women. The analysis also revealed a difference between marital status and pet ownership: those who lived together were more likely to have a pet than those who lived alone.

Pet ownership and health-related characteristics

The health-related characteristics consisted of physical activity, smoking, BMI, blood pressure, and finally, self-rated general health status. In Table II percent, mean, and standard deviation values are presented for each of the participant groups. The Chi^2 test of independence shows whether there are significant differences between the groups.

Physical activity

The comparison in the variance analysis between gender and pet ownership on physical activity was measured by intensity, frequency, and duration. The results revealed significant differences of pet

Table I. Demographic factors for non-pet owners, cat and dog owners in number and percent, with Chi^2 statistics.

Demographic data	Non-pet owners *N* (%)	Cat owner *N* (%)	Dog owner *N* (%)	Chi^2
Age				
65–79	7551 (82.6)	870 (09.5)	722 (07.9)	
80–	2645 (89,7)	213 (07.2)	92 (03.1)	102.002*
Gender				
Women	5639 (86.0)	547 (8.3)	375 (5.7)	
Men	4557 (82.4)	536 (9.7)	439 (7.9)	32.644*
Marital status				
Married/cohabitant	5764 (80.3)	788 (11.0)	624 (8.7)	
Living alone	2840 (87.8)	238 (7.4)	158 (4.9)	87.875*
Married/cohabitant				
Women	2615 (81.6)	333 (10.4)	256 (8.0)	
Men	3149 (79.2)	455 (11.6)	368 (9.2)	6.341***
Living alone				
Women	2148 (88.9)	169 (7.0)	98 (4.1)	
Men	692 (84.3)	69 (8.4)	60 (7.3)	16.418*

* = $p \leq 0.001$, *** = $p \leq 0.05$

Table II. Percent, mean, and standard deviations for health-related characteristics.

Health-related characteristics	Non-pet owners	Cat owners	Dog owners	Test of independence
Physical activity				Chi²
Frequency				
Never	8.7	9.7	5.5	
< Once/week	12.9	15.8	9.4	
Once/week	17.3	21.9	13.2	128.4***
2–3 times/week	36.5	34.4	32.9	
About every day	24.6	18.2	39.0	
	100.0 (9675)	100.0 (1031)	100.0 (779)	
Intensity				
Easy	68.3	69.6	62.8	10.4*
Sweating	31.1	29.7	36.6	
Exhaustive	0.6	0.7	0.6	
Duration				
< 15 min	9.0	10.2	5.1	
15–29 min	21.9	24.8	20.7	
30–60 min	52.5	49.1	54.1	
< 1 hour	16.7	15.9	20.0	23.5***
General health status				
Bad	2.4	2.2	1.4	
Not so good	37.3	39.9	35.9	
Good	54.3	52.2	54.4	
Very good	6.1	5.7	8.2	11.4 *ns*
	M (SD)	M (SD)	M (SD)	*F*-value
BMI	26.96 (5.69)	27.88 (4.88)	27.53 (4.50)	16.3***
Blood-pressure				
Diastolic	74.10 (11.64)	75.08 (11.64)	75.25 (11.50)	5.75**
Systolic	141.58 (20.65)	142.13 (20.80)	139.17 (19.63)	5.1**

*= $p \leq 0.05$, ** = $p \leq 0.01$, *** = $p \leq 0.001$.
BMI, body mass index; *ns* =$p>0.05$.

ownership on frequency, $F(2.11479) = 45.538$, $p<0.001$, and duration, $F(2.9777) = 9.788$, $p<0.001$. That is, dog owners exercised more frequently and spent more time on each physical activity session than did either cat or non–pet owners.

There were no interactions between gender and physical activity. However, gender did affect intensity and duration, in that, regardless of pet ownership status, the intensity of the activity and time spent on exercise were lower for women than for men ($p<0.001$).

Smoking behavior

The analysis showed that significantly more female non–pet owners were smokers compared with female owners of pets: $X^2(2, N = 6561) = 10.699$, $p=0.005$. Moreover, there were gender differences in smoking behavior, showing that men with and without pets were more likely to smoke than women ($p<0.001$).

BMI

The variance analysis with gender and BMI data demonstrated differences in pet ownership: $F(2.12087) = 11.100$, $p=0.001$. The follow-up test revealed that cat owners had a significantly higher BMI value than that of the non-pet owners, $p<0.001$. Further, women were more overweigh than men ($p=0.001$), but there were no interactions between pet ownership and these variables.

Blood pressure

There was no interaction between gender and pet ownership on diastolic and systolic blood pressure. However, there was differences of pet ownership on systolic blood pressure: $F(2.10396) = 4.933$, $p=0.007$. The follow-up test showed that the dog owners had lower systolic blood pressure than both cat and non-pet owners. For diastolic blood pressure there was no significant difference of pet ownership, but compared with women, men had higher diastolic values ($p=0.001$).

General health status

The results showed disparities of pet ownership on self-rated general health: $F(2.11428) = 3.391$, $p=0.034$. The follow-up test demonstrated differences

between dog and cat owners (p =0.008): that is, those who had dogs rated their health as better. The same pattern was found between dog and non-pet ownership (p=0.024).

Furthermore, compared with men, women perceived their general health as poorer (p=0.001). Nevertheless, there was no interaction with pet ownership.

Predictions for pet ownership

Finally, from the demographic factors and the health-related aspects that showed significant outcomes in the variance testing (Chi^2 testing for smoking behavior), two logistic regression analyses were performed: one for non–pet ownership/cat ownership and one for non–pet ownership/dog ownership (see Tables III and IV).

From those analyses, it can be concluded that frequency of exercising increases the odds of correctly predicting dog owners (odds ratio of 1.63) compared with non-pet owners. In contrast, the lower the frequency of exercising, the more likely the person is a cat owner (odds ratio of 0.83) compared with non-pet owners. Both the cat owners and the dog owners are likely to be a younger-old man. Compared with non-pet owners, dog and cat owners are more likely to cohabit than to live alone. However, neither duration of physical activity, smoking behavior, body weight, systolic blood-pressure, nor the perceived general health status predict pet-ownership.

Table III. Outcome of the logistic regression analysis with cat ownership (1) versus non-pet-ownership (0) as a dependent variable.

	OR	95 CI for OR	p-value
BMI	1.009	0.990–1.028	*ns*
Systolic blood pressure	1.004	0.999–1.008	*ns*
Exercise frequency	0.832	0.743–933	0.002
Exercise duration	0.943	0.861–1.042	*ns*
Health	0.923	0.846–1.007	*ns*
Smoking (no = 0 yes = 1)	0.876	0.739–1.039	*ns*
Gender (women = 0 men = 1)	1.329	1.011–1.522	0.001
Age	0.969	0.955–984	0.000
Marital status (living alone =0 married = 1)	1.240	0.986–1.489	0.039
Constant	0.421		

OR, odds ratio; CI, confidence interval; BMI, body mass index; *ns = p>0.05*.

Discussion

In a world with an increasing proportion of older people, health promotion and health prevention are matters of great importance for public health. Since the benefits of pets have shown ambivalent results, the main objective in our study was to compare demographic and health-related characteristics of older male and female cat, dog, and non-pet owners.

The main finding was that older people owning a dog showed more positive health-related characteristics than either cat or non-pet owners. On the contrary, older cat owners showed higher BMI values and higher systolic blood pressure, and reported worse general health status. They also exercised less than the others. However, female non-pet owners smoked more cigarettes than those who had pets. Otherwise, the health-related results did not show any gender differences in relation to pet ownership. However, this HUNT study showed that compared with those without pets, it was more likely that both cat and dog owners were younger older cohabiting men. Dog owners were also likely to exercise more frequently than the others did; the converse result was shown for cat owners.

Table IV. Outcome of the logistic regression analysis with dog ownership (1) versus non-pet-ownership (0) as dependent variable.

	OR	95 CI for OR	p-value
BMI	1.014	0.993–1.036	*ns*
Systolic blood pressure	0.997	0.992–1.001	*ns*
Exercise frequency	1.629	1.425–1.862	0.000
Exercise duration	0.924	0.835–1.021	*ns*
Health	0.947	0.863–1.038	*ns*
Smoking (no = 0 yes = 1)	1.164	0.972–1.395	*ns*
Gender (women = 0 men = 1)	1.383	1.152–1.660	0.001
Age	0.913	0.896–930	0.000
Marital status (living alone = 0 married = 1)	1.419	1.128–1.785	0.003
Constant	41.572		

OR, odds ratio; CI, confidence interval; BMI, body mass index; *ns=p>0.05*.

In agreement with other studies [2,9], this study found that physical activity was higher among those who had a dog compared with cat owners and non-pet owners. Those who had a dog exercised more often and for longer periods of time. Dogs include different breeds with different behavior and needs, however, during the day all dogs should be walked and physically trained by their owners. In addition, the county in Norway, where the survey was conducted, is a typical hunting area where many dog owners may get extra activity. Training and walking the dog promotes physical health [7]. In line, the dog owners had lower systolic blood pressure than both cat and non-pet owners. The higher systolic blood pressure values that occurred in older cat owners make sense, since they had also had higher BMI, which may reflect that cats do not require walks with their owners. The higher BMI findings in this study are in accordance with Parslow and Jorms' [12] result. They also found that pet-owners smoked a lot more than those without any pet. In the present study there were more female non-pet owners that smoked than female owners of pets. Women usually suffer more stress than men do [21]. Smoking [22], as well as pets [5] are often reported to help relieve feelings of stress. This may be an explanation. Other studies found that male pet owners benefited more with respect to well-being [16] and physical health [15] than females. Except for the finding in smoking behavior, our study found no such gender difference. Instead, both male and female dog owners rated their health as better compared with cat and non-pet owners.

It is important to emphasize that our findings showing a correlation between pet ownership and health, which does not imply a causation relationship since the correlation, may be owing to self-selection into the two pet ownership groups and thus be a result of confounding background factors. Further, we examined just a limited number of demographic and health-related variables. For example, we did not examine the participants' mental health status [c.f. 14] or their perception of well-being [c.f. 16]. However, those issues will be looked at in future HUNT-3 studies. Another restriction in our study is the lack of big cities, although the county is representative for Norway. The strengths of the study, however, are its mixture of subjective and objective measures and its relatively high response rate. Thus, our results might be transferable to rural areas in other countries.

While the number of dogs is stable, cats are becoming more common as pets in European countries [23]. Accordingly, there were more cat owners than those who had dogs in our study. More men than women had pets, even if they were cohabitants. This probably depends on traditional cultural thinking; the man is the owner of the pet even if the woman lives with and cares about [cf. 24]. Traditional gender stereotypes are still prevalent in rural settings [cf. 25].

Pet ownership decreased with increasing age. Since contact with animals and nature is a basic need in humans [26], this reduction could lead to consequences for older peoples' health. Another health consequence common in older people is loneliness [27]. Moreover some older people live alone and depend on help from relatives and home health services, and do not have anyone to take care of the animal when needed [cf. 28]. *Senior citizens pet care programs* [29], and dog walking groups for older persons [30], could be an opportunity during those circumstances. Dog walking groups do not only benefit older peoples' physical activity, they also gain contacts with others [cf. 1], and may diminish feelings of loneliness [cf. 11]. Altogether there are problems with getting older and keeping one's own pet without any help services. There is a need for further research in this area.

Conclusions

Population studies in this field are rare, and except for the Swedish study there are none Scandinavian. Besides, several studies have examined dog and cat ownership but merged them into one group, pet ownership. However, from the results of our study, it is obvious that it cannot be stated without differentiation that pet ownership is positive for health in older people, without examining cat and dog ownership separately. Even if the result indicates that the owners of dogs are positively outstanding in many health-related aspects, the focus in future studies must be put on the cat owners in order to examine whether those with a cat already have worse health and owing to that acquire this kind of pet, or if the cat keeps them indoors, with poorer health as an outcome. This study was the first in a series of several based on data from HUNT-3. Our intention in future studies is to enlarge our result from this study, and examine different perspectives of physical and mental health in older cat and dog owners.

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