

## Frequency of Neurotic Symptoms Shortly after the Death of a Pet

Yuya KIMURA<sup>1)\*</sup>, Hidenobu KAWABATA<sup>2)</sup> and Masaji MAEZAWA<sup>3)</sup>

<sup>1)</sup>Hatogaya Animal Hospital, 3-31-15 Sakashita-cho, Kawaguchi, Saitama 334-0003, Japan

<sup>2)</sup>Department of Medical Education, Graduate School of Medicine, Hokkaido University, N15 W7, Kita-ku, Sapporo, Hokkaido 060-8638, Japan

<sup>3)</sup>Himawari Clinic Kyougoku, 316 aza-Kyougoku, Kyougoku-cho, Abuta, Hokkaido 044-0101, Japan

(Received 7 May 2013/Accepted 27 November 2013/Published online in J-STAGE 11 December 2013)

**ABSTRACT.** Some individuals manifest psychosomatic symptoms after the death of their pets. A survey was conducted at four public and commercial animal cremation service centers in Japan. In each center, a questionnaire was distributed to 100 individuals (400 in total). The questionnaire consisted of the 28-item version of the General Health Questionnaire (GHQ28), the social readjustment rating scale (SRRS) and a series of questions regarding demographic information and the circumstances of their pet's death. In total, 82 returned questionnaires were available for analysis. GHQ28 proved the existence of neurotic symptoms in 46 responses (56.1%; 95% confidence interval: 44.7%–67.0%). Analysis of the responses using the GHQ28 subscales with a Likert scoring system demonstrated more somatic dysfunction in females (GHQ-A:  $P=0.04$ ). Furthermore, significant correlations were identified among the following factors: owner's age (GHQ-A:  $\rho=-0.60$ ,  $P=0.01$ ; GHQ-B:  $\rho=-0.29$ ,  $P=0.01$ ; GHQ-C:  $\rho=-0.32$ ,  $P<0.01$ ; GHQ-D:  $\rho=-0.42$ ,  $P<0.01$ ), SRRS score (GHQ-A:  $\rho=0.32$ ,  $P<0.01$ ; GHQ-B:  $\rho=0.25$ ,  $P=0.02$ ; GHQ-D:  $\rho=0.30$ ,  $P=0.01$ ) and animal's age (GHQ-D:  $\rho=-0.26$ ,  $P=0.02$ ). The death of indoor pets caused deeper depression (GHQ-D:  $P=0.01$ ) than that of outdoor or visiting pets. The results revealed neurotic symptoms in almost half of the pet owners shortly after their pet's death.

**KEY WORDS:** bereavement reaction, grief, neurotic symptoms, pet loss.

doi: 10.1292/jvms.13-0231; *J. Vet. Med. Sci.* 76(4): 499–502, 2014

The death of a pet is inevitable. All pet owners must eventually face the loss of their beloved animals. Such a loss can cause the following symptoms: disturbed sleeping patterns, eating disorders, decreased social activity, job-related difficulties, loss of motivation, stress, self-harm, depression, anxiety, worry, pining, loneliness, guilt pangs, flashbacks and feelings of emptiness [16]. Although many of these symptoms are easily resolved, others require professional intervention.

In North America, approximately 30% of bereaved owners experience severe grief due to the loss of their pets [1, 25], although the associated symptoms are milder than those that are experienced after the loss of a close relative [3, 21]. A few quantitative studies [9, 23, 27] have reported the symptoms that are associated with the loss of pets in the Japanese population. However, recall bias may have affected the results, because these studies focused on previous loss. Moreover, the scales that were used in these studies were unique; therefore, these results are not comparable with those of other surveys.

The scales that are commonly used for the assessment of depression in Japan include the Hamilton Rating Scale for Depression, the Zung Self-rating Depression Scale, the Beck Depression Inventory, the General Health Question-

naire (GHQ) and the Center for Epidemiological Studies Depression Scale (CES-D) [18]. Of these, the usefulness of the 28-item version of GHQ (GHQ28) [7, 17] and CES-D have been confirmed in bereaved pet owners [12]. GHQ28 has been validated as a screening tool for suspected neurosis, and its subscales provide detailed information regarding mental health condition. Thus, it may be effective as a scale for measuring severe grief due to the death of a beloved pet.

Quantitative evaluations of bereavement with validated scales also allow for a discussion of influential factors. Previous studies have included gender [4, 15, 20, 25, 29], age [1, 15, 25, 28], cause of loss [5, 6, 15, 19] and animal species [1, 19, 20, 25] as potential influential factors. Life events, which can be classified either as positive or negative stressors, can also play a role in the way a person handles loss. The loss of pets can have effects that are similar to those that are caused by the loss of other various objects, including spouse, child, health or jobs, that are listed in the social readjustment rating scale (SRRS) [10, 14]. Indeed, bereaved pet owners who experienced more life events have reported more severe grief than those who had experienced fewer life events [8, 25].

The present study aimed to determine the frequency of neurotic symptoms, such as severe grief, shortly after the death of a pet. The factors that influenced grief were also explored. These findings may help in advocating preventive interventions in the health care system in Japan.

### MATERIALS AND METHODS

From September 2009 to August 2010, a survey was conducted at public animal cremation services centers in Hokkaido and Gifu and the commercial animal cremation

\*CORRESPONDENCE TO: KIMURA, Y., Hatogaya Animal Hospital, 3-31-15 Sakashita-cho, Kawaguchi, Saitama 334-0003, Japan. e-mail: kimunari@gmail.com

©2014 The Japanese Society of Veterinary Science

This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives (by-nc-nd) License <<http://creativecommons.org/licenses/by-nc-nd/3.0/>>.

services centers in Tokyo and Aichi (Fig. 1). In each center, a questionnaire was presented to 100 individuals who had recently suffered the loss of a pet (400 in total). The purpose of the study was stated on the cover page. The participants who agreed to complete the questionnaire were asked to return it within 2 weeks. Of the respondents who answered within 21 days of the death of a pet, those without missing values in GHQ28 were included in the analysis. Finally, a total of 111 pet owners returned the questionnaire. However, seven respondents later withdrew from the study. Then, the questionnaires of the 10 respondents whose pets died more than 21 days before and the 12 who missed the return deadline were excluded. Thus, 82 returned questionnaires were available for analysis (final response rate:  $82/400=20.5\%$ ).

The questionnaire was comprised of three parts: the cover page, which outlined the purpose of the survey and contained a consent form; the questions, which included those from GHQ28 regarding outcome, those from SRRS for recording stressful life events during the previous 3 months and a series of questions regarding demographic information and circumstances of the pet's death; and finally, a pet-loss hotline number that was provided by a self-help group named Pet Lovers Meeting in order to aid the participants with their recalled grief. Furthermore, a revocation form for withdrawal from the study was attached.

According to the GHQ scoring system (experiencing symptoms: not at all=0, same as usual=0, rather more than usual=1 or much more than usual=1), respondents with scores of six or higher were classified as the neurotic-symptom group. On the basis of the hypothesis of binomial distribution, 95% confidence intervals (95% CIs) of the frequency of neurotic symptoms were determined. A Likert scoring system (0–3) was used for recalculating the scores on the four subscales of GHQ28. These subscales were as follows: GHQ-A, which measured somatic dysfunction; GHQ-B, which examined anxiety and insomnia; GHQ-C, which examined social dysfunction; and GHQ-D, which investigated depression. Correlations were then identified between the scores on these subscales and candidate factors.

Statistical analyses were performed using the Mann–Whitney U-test for two-group comparisons, the Kruskal–Wallis test and post-hoc Mann–Whitney U-test with adjustment by Holm's method for three-group comparisons and the Spearman's rank correlation coefficient test for continuous variables. All analyses were performed with R-2.12.0 (The R Project: <http://www.r-project.org/>). A significance level of  $P<0.05$  was adopted.

The study design was approved by the institutional review board. The completed questionnaires were kept locked in a cabinet, and only the first author (YK) was permitted access to them.

## RESULTS

Followed the study design, 82 valid questionnaires were analyzed. They were completed in an average of 4.0 days after the death of the pets [interquartile range (IQR): 6.0]. Using the GHQ scoring system, the median score on GHQ28



Fig. 1. Location of the survey. The animal cremation service centers in Hokkaido and Gifu are public facilities, whereas those in Tokyo and Gifu are commercial enterprises.

was 8.0 (IQR: 10.5). Of the 82 respondents, 46 were classified as the neurotic-symptom group (56.1%; 95% CI: 44.7–67.0%; Fig. 2). The categorical variables are summarized in Table 1. On the Likert scoring system, female pet owners exhibited more somatic dysfunction than male owners (GHQ-A:  $P=0.04$ ). The owners ranged in age from 22 to 89 (median: 49.0 years, IQR: 20.0). Younger owners reacted more severely than older owners. Mild-to-moderate correlations were observed between respondent age and the neurotic symptoms (GHQ-A:  $\rho=-0.60$ ,  $P=0.01$ ; GHQ-B:  $\rho=-0.29$ ,  $P=0.01$ ; GHQ-C:  $\rho=-0.32$ ,  $P<0.01$ ; GHQ-D:  $\rho=-0.42$ ,  $P<0.01$ ). The median score on SRRS was 37.5 (IQR: 85.3). Higher scores on SRRS, greater somatic dysfunction (GHQ-A:  $\rho=0.32$ ,  $P<0.01$ ), anxiety and insomnia (GHQ-B:  $\rho=0.25$ ,  $P=0.02$ ), and depression (GHQ-D:  $\rho=0.30$ ,  $P=0.01$ ) were observed.

The recently deceased pets included dogs, cats, chickens, parakeets, rabbits and hamsters. All dogs had been housed indoors. Among cats, 26 were kept indoors, 10 lived both indoors and outdoors, and the remaining 10 were fed outdoors. The death of indoor pets resulted in deeper depression than that of outdoor pets (GHQ-D:  $P=0.01$ ). The causes of the deaths of the dogs were old age ( $n=8$ ), disease ( $n=15$ ) or accident ( $n=2$ ), at a median age of 14.0 years (IQR: 5.0 years). Cats died of old age ( $n=17$ ), disease ( $n=26$ ) or accident ( $n=3$ ), at a median age of 16.0 years (IQR: 11.3 years). The median age at which the other animals died was 2.5 years (IQR: 4.8 years). Four of five accidental deaths occurred to indoor animals. Although no differences in the neurotic symptoms were observed with regard to the cause of death, a modest correlation was identified between the age of the deceased pets (median: 13.8, IQR: 9.0) and depression (GHQ-D:  $\rho=-0.26$ ,  $P=0.02$ ).

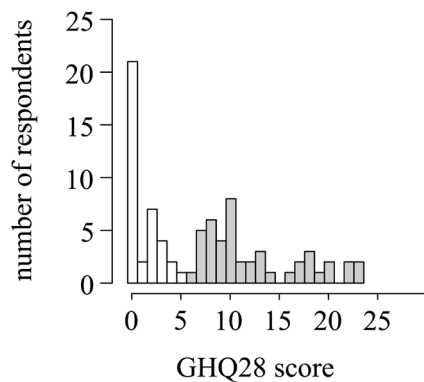


Fig. 2. Histogram of GHQ28 scores with the GHQ scoring system. Gray area indicates that they scored more than 5 points. They were classified as neurotic-symptom group.

## DISCUSSION

Although the World Health Organization has reported that 24.4% Japanese individuals suffer from any mental disorders over the course of their entire lives [11], the results of our cross-sectional survey revealed that 56.1% (95% CI: 44.7–67.0%) of bereaved pet owners experienced neurotic symptoms shortly after the death of their pets. This high frequency seems to be similar to that observed with spousal loss; Sakaguchi *et al.* [22] have shown with GHQ28 that 76 of 123 (61.8%) widow(er)s have mental health problems during the 10 to 30 months after their loss.

The results of this study were considered to be similar to the true frequency, because GHQ28 can be validated; its sensitivity, specificity and diagnostic error rate have been reported as 90%, 86% and 11.4%, respectively [17]. However, because GHQ is only a screening tool, an in-depth consideration through medical interview is needed to make it clear.

Although no consensus has been reached on the disease entity of pathological grief [24], the diagnostic criteria of major depression and post-traumatic stress disorder that are specified in the Diagnostic and Statistical Manual of Mental Disorders [2] have suggested that a bereaved person is less likely to be diagnosed with serious problems even if certain symptoms persist for 1–2 months after the loss of the object. Because the current survey was limited to bereaved owners within 21 days after the loss of their pet, most of the symptoms that were reported may be classified as part of a normal grief reaction. A follow-up study over a period of several months is required in order to detect the presence of any disease.

The statistical analyses identified five influential factors that were associated with the neurotic symptoms: female gender, young age, recent experience of stressful life events, death of an indoor pet and death of a young animal.

Some previous studies have reported similar findings with regard to the gender [4, 15, 20, 25, 29] and age [1, 15, 25, 28] of bereaved owners. However, Quackenbush and Glickman [20] have suggested the presence of more severe symptoms

Table 1. Demographics and GHQ subscales with Likert scoring system

Factor	n	GHQ-A	GHQ-B	GHQ-C	GHQ-D
<b>Location</b>					
Hokkaido	20	6.0 (8.5)	8.0 (8.5)	7.0 (3.5)	1.0 (7.0)
Tokyo	18	11.0 (5.0)	11.0 (4.0)	9.5 (3.0)	3.0 (9.0)
Aichi	20	5.5 (7.5)	8.0 (5.0)	7.0 (2.0)	4.0 (7.0)
Gifu	24	6.0 (6.5)	10.0 (7.0)	8.0 (3.0)	2.0 (5.5)
<b>Type of service</b>					
Public	44	6.0 (8.0)	8.5 (7.5)	8.0 (3.0)	1.5 (6.0)
Commercial	38	9.0 (8.0)	10.0 (6.0)	8.5 (4.0)	3.5 (7.0)
<b>Owner gender</b>					
Male	17	4.0 (8.0) <sup>a)</sup>	9.0 (8.0)	8.0 (3.0)	3.0 (7.0)
Female	65	8.0 (7.0) <sup>a)</sup>	10.0 (6.0)	8.0 (3.0)	2.0 (6.0)
<b>Animal species</b>					
Dog	26	8.5 (7.0)	8.5 (6.0)	7.5 (5.0)	2.0 (6.0)
Cat	46	7.0 (9.0)	9.0 (7.0)	8.0 (3.0)	2.0 (7.0)
Other	10	7.0 (5.0)	11.5 (8.0)	8.5 (3.0)	5.5 (7.0)
<b>Reared place</b>					
Indoor	60	7.5 (7.5)	9.0 (6.5)	8.0 (4.0)	3.0 (6.5) <sup>b)</sup>
Outdoor	12	4.0 (8.0)	7.5 (8.5)	7.5 (4.0)	0.0 (1.5) <sup>b)</sup>
Half	10	9.0 (7.0)	10.0 (7.0)	9.0 (3.0)	2.0 (11.0)
<b>Cause of death</b>					
Old age	31	5.0 (8.0)	8.0 (5.5)	8.0 (3.5)	1.0 (4.5)
Disease	45	8.0 (8.0)	10.0 (8.0)	8.0 (3.0)	3.0 (8.0)
Accident	5	11.0 (7.0)	9.0 (4.0)	9.0 (1.0)	3.0 (1.0)

Each value is median (inter quartile range). GHQ-A, somatic dysfunction; GHQ-B, anxiety and insomnia; GHQ-C, social dysfunction; GHQ-D, depression. Statistical differences are shown in a) and b) pairs.

in the elderly, which may imply the involvement of other factors. For example, many lonely elderly people may suffer symptoms after the loss of a companion animal. In addition, family ties may be important in coping with grief [6, 15, 25]. Furthermore, as the age of the respondents in our study ranged from 22 to 89, conclusions of bereaved owners outside this age range are outside the purview of consideration. Although Hamano [9] has confirmed the development of the concept of death in children aged 3–6 years old, the grieving process in this age group and the type of desired care for them remain unclear.

The accumulation of stressful life events within a short period of time was evaluated with SRRS in the study. A high score on SRRS indicated deteriorated somatic dysfunction, the presence of anxiety and insomnia and exacerbated depression. These findings suggested that bereaved pet owners might suffer from severe symptoms if he/she has experienced many events simultaneously, e.g., changes in family structure, health problems or problems at work. Coincidentally, the loss of a loved animal is also thought to be a significant life event.

Many pets of Japanese owners still stay outside [26]. The influence of housing style has not been reported and should be considered. The results of our survey first showed that the death of an indoor pet resulted in deeper depression. Indoor pets might be more closely connected to daily life, and therefore, their deaths may have a greater impact on the bereaved owner.

A correlation was observed between the death of a young

animal and depression. Younger animals may have died unexpectedly of unnatural causes. Although the results of studies of the significance of the causes of death have been inconsistent [5, 6, 15, 19], the duration that the pet lived with an owner before death may be important in accepting its death, as Lindemann [13] has suggested.

Finally, although the respondents were not evaluated for any psychosomatic symptoms prior to the loss of their pets, a high frequency of neurotic symptoms was observed shortly after the loss. Future longitudinal studies may explore additional factors that influence the development of neurotic symptoms in bereaved pet owners. They might be conducive to a provision for the care of bereaved pet owners.

**ACKNOWLEDGMENTS.** The authors declare no conflicts of interest. We thank the staff of the four animal cremation service centers and the bereaved owners who participated in the study despite their grief. Finally, we extend thanks to the Pet Lovers Meeting for caring for the participants.

## REFERENCES

- Adams, C. L., Bonnet, B. N. and Meek, A. H. 2000. Predictors of owner response to companion animal death in 177 clients from 14 practices in Ontario. *J. Am. Vet. Med. Assoc.* **217**: 1303–1309. [Medline] [CrossRef]
- American Psychiatric Association 2003. Major Depressive Episode. pp. 339–346. In: Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), Igaku-Shoin Ltd, Tokyo (in Japanese).
- Archer, J. and Winchester, G. 1994. Bereavement following death of a pet. *Br. J. Psychol.* **85**: 259–271. [Medline] [CrossRef]
- Brown, B. H., Richards, H. C. and Wilson, C. A. 1996. Pet bonding and pet bereavement among adolescents. *J. Couns. Dev.* **74**: 505–509. [CrossRef]
- Davis, H., Irwin, P., Richardson, M. and O'Brien-Malone, A. 2003. When a pet dies: religious issues, euthanasia and strategies for coping with bereavement. *Anthrozoös* **16**: 57–74. [CrossRef]
- Gerwolls, M. K. and Labott, S. M. 1994. Adjustment to the death of a companion animal. *Anthrozoös* **7**: 172–187. [CrossRef]
- Goldberg, D. P. and Hillier, V. F. 1979. A scaled version of the General Health Questionnaire. *Psychol. Med.* **9**: 139–145. [Medline] [CrossRef]
- Gosse, G. H. and Barnes, M. J. 1994. Human grief resulting from the death of a pet. *Anthrozoös* **7**: 103–112. [CrossRef]
- Hamano, S. 2008. Studies on young children's concept of death of pet and on the changes in the view of life after experiencing pet-loss: The concept of death in early childhood related experiencing pet-loss. *Human Developmental Research* **22**: 23–36.
- Holmes, T. H. and Rahe, R. H. 1967. The social readjustment rating scale. *J. Psychosom. Res.* **11**: 213–218. [Medline] [CrossRef]
- Kessler, R. C., Angermeyer, M. C., Anthony, J. C., De Graaf, R., Demyttenaere, K., Gasquet, I., De Girolamo, G., Gluzman, S., Gureje, O., Haro, J. M., Kawakami, N., Levinson, D., Medina Mora, M. E., Oakley Browne, M. A., Posada-Villa, J., Sleijn, D. J., Aguilar-Gaxiola, S., Alonso, J., Heeringa, S., Pennell, B. E., Berglund, P., Petukhova, M., Chatterji, S. and Ustün, T. B. 2007. Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* **6**: 168–176. [Medline]
- Kimura, Y., Kawabata, H. and Maezawa, M. 2011. Psychiatric Investigation of 18 Bereaved Pet Owners. *J. Vet. Med. Sci.* **73**: 1083–1087. [Medline] [CrossRef]
- Lindemann, E. 1944. Symptomatology and management of acute grief. *Am. J. Psychiatry* **101**: 141–148. [Medline]
- Masuda, M. and Holmes, T. H. 1967. The social readjustment rating scale: a cross-cultural study of Japanese and Americans. *J. Psychosom. Res.* **11**: 227–237. [Medline] [CrossRef]
- McCutcheon, K. A. and Fleming, S. J. 2002. Grief resulting from euthanasia and natural death of companion animals. *OMEGA* **44**: 169–188.
- Morley, C. and Fook, J. 2005. The importance of pet loss and some implications for services. *Mortality* **10**: 127–143. [CrossRef]
- Nakagawa, Y. and Daibou, I. 1985. Japanese version of the General Health Questionnaire, Nihon Bunka Kagakusha, Tokyo. (in Japanese).
- Okumura, Y., Kameyama, A., Katsuya, N. and Sakamoto, S. 2008. A review of methods in depression research in Japan from 1990 to 2006. *Jpn. J. Personal.* **16**: 238–246. [CrossRef]
- Planchon, L. A., Templer, D. I., Stokes, S. and Keller, J. 2002. Death of a companion cat or dog and human bereavement: psychosocial variables. *Soc. Anim.* **10**: 93–105. [CrossRef]
- Quackenbush, J. and Glickman, L. 1983. Social work services for bereaved pet owners: a retrospective case study in a veterinary teaching hospital. pp. 377–389. In: New Perspectives on Our Lives with Companion Animals (Katcher, A. and Beck, A. eds.), University of Pennsylvania Press, Philadelphia.
- Rajaram, S. S., Garrity, T. S., Stallones, L. and Marx, M. B. 1993. Bereavement-loss of a pet and loss of a human. *Anthrozoös* **6**: 8–16. [CrossRef]
- Sakaguchi, Y., Kashiwagi, T. and Tsuneto, S. 2001. The relationship between coping patterns and mental health after spousal loss. *Jpn. J. Psychosom. Med.* **41**: 439–446.
- Sasaki, M. and Matsuda, T. 2003. A study of grief after death of pet. *Bull. Hiroshima Shudo Univ.* **43**: 134–144.
- Setou, N., Maruyama, S. and Murakami, N. 2005. Issues of diagnosis of pathological and nonpathological grief in DSM: Diagnostic and Statistical Manual of Mental Disorders. *Jpn. J. Psychosom. Med.* **45**: 833–842.
- Stallones, L. 1994. Pet loss and mental health. *Anthrozoös* **7**: 43–54. [CrossRef]
- Sugita, H. 2010. The dog ownership rate and the demographic background of dog owners from 2001 to 2006: from keeping dogs outside to inside. *The review of the Osaka University of Commerce* **5**: 71–86.
- Takeshita, H. 2006. The study of pet loss: examination of the factors related to grief and shock. *Clinical & Developmental Psychology* **5**: 3–12.
- Templer, D. I., Lavoie, M., Chalgujian, H. and Thomas-Dobson, S. 1990. The measurement of death depression. *J. Clin. Psychol.* **46**: 834–839. [Medline] [CrossRef]
- Wrobel, T. A. and Dye, A. L. 2003. Grieving pet death: normative, gender, and attachment issues. *OMEGA* **47**: 385–393.