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Yamazaki, S. (2015). A survey of companion-animal owners affected by the East Japan Great Earthquake in Iwate and Fukushima Prefectures, Japan. WBI Studies Repository.

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This article has been accepted for publication in Anthrozoös, published by Taylor & Francis.

Survey on the Situation of and Support for Pets Affected by the East Japan Great Earthquake in Iwate and Fukushima Prefectures, Japan

PREPRINT

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Abstract

The unprecedented East Japan Great Earthquake impacted many humans as well as animals. To date, only national surveys that do not necessarily focus on the heavily impacted areas have been administered, and there is a lack of data on the situation of pets and their owners in heavily impacted areas. This survey administered on impacted pet owners in Iwate (N = 140) and Fukushima (N = 149) Prefectures in north-eastern Japan, areas both heavily affected by the disaster, explored the types of preparation for pets engaged in by pet owners, the situation on evacuation with pets, the use of and needs for pet-related support after the disaster, and the associations between pet attachment and disaster-related behaviors of pet owners. In total, 41.2% (N = 119) of all respondents were able to evacuate with their pets, and evacuation rates were especially low in Fukushima Prefecture. With the exception of preparation of pet food and other supplies less than 50% of respondents engaged in various pet-related preparations. The rate of utilization of support was also low with less than 50% of respondents utilizing each types of support in both prefectures. Needs for support were generally higher during the initial phase compared to the current phase with difference in needs between the initial and current phases only significant for certain types of needs in Fukushima. Bivariate analysis indicated that pet attachment was

associated with disaster preparedness, but results for other disaster-related behaviors were inconsistent. Implications for future disaster prevention measures are discussed.

Keywords: animal relief, disaster, pet attachment, pet-related support

Introduction

Magnitude of Impact on Animals

The unprecedented East Japan Great Earthquake struck the northern Tohoku Area of Japan on March 11th, 2011 (hereon referred to as the 3.11 disaster). The 9.0 magnitude earthquake also created a tsunami which swallowed most coastal townships in Fukushima, Miyagi, and Iwate Prefectures. In addition to natural disasters Fukushima also suffered the nuclear accident at Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company, and an exclusion zone was established around the power plant. The disaster killed over 15,000 people[1] and affected many animals as well. There are no official records on the exact number of companion animals that were affected by the disaster, but for dogs, estimates may be made using the number of dogs registered under the Rabies Prevention Act, a mandatory registration system for all dog owners. In Iwate Prefecture as of March 2010 there were 81,022 dogs registered (Ministry of Health, Welfare and Labour (MHLW) 2011), and from the registrations and the records of vaccinations, it was estimated that approximately 4,000 dogs died because of the disaster (no author 2012). In Fukushima Prefecture, there were 118,072 dogs registered as of March 2010 (MHLW 2011), and there were 5,800 dogs registered in the areas later designated as the exclusion zone when the disaster struck (no author 2011).

For other types of companion animals it is difficult to estimate the damage since there are no official registration systems or records. However, estimates made from rates of pet ownership[2] suggest that tens of thousands of companion animals were impacted in some way by the disaster.

Past Literature

In the past, a couple of surveys on pet owners' awareness on disaster prevention have been administered in Japan, and since the 3.11 disaster a couple of surveys regarding pet owners' situation during the onset of the disaster have also been administered. However, surveys administered after the 3.11 disaster are mainly national surveys that do not target exclusively the areas heavily impacted by the 3.11 disaster (Irisoyama, Inc. 2012; Pet & Family Small-Amount Short-Term Insurance Company 2012; Pet Office, Inc. 2012; Japan Association for Promoting Harmonization Between People and Pets (HAPP) 2011). Nevertheless, in conjunction with past academic literature, these surveys offer insights into how companion animals have been addressed during disasters.

1) Pet Evacuation

The Ministry of the Environment (MOE) reports that in Fukushima Prefecture, only 300 pets have evacuated with their owners (MOE 2012), but surveys not limited to

respondents from heavily impacted areas have reported that as high as 82% of pet owners have actually evacuated with their pets when the 3.11 disaster struck (Irisoyama, Inc. 2012). Generally, similar to surveys administered in other countries (Hesterberg, Huertas and Appleby 2012) and those administered in Japan indicate that many pet owners have the desire to evacuate with their pets but may not necessarily have concrete plans to prepare them for the actual evacuation. For example, a national internet survey administered by HAPP (2011) reports that approximately 80% of the surveyed pet owners would evacuate with their pets in case of a disaster. In contrast, an internet survey of Pet & Family Small-Amount Short-Term Insurance Company (2012) reports that an overwhelming majority of the surveyed pet owners did not know whether their local evacuation centers admitted pets despite the fact that the survey was administered after the 3.11 disaster.

Past literature indicates that keeping multiple animals, dogs kept outdoors, and not having carriers for cats have been reported as risk factors that hinder evacuation of pet-owning households (Heath et al. 2001b). Having multiple animals was also given as a reason by Japanese pet owners for not evacuating with their pets (HAPP 2011).

2) Preparation for Disasters

Results of Japanese surveys suggest that many pet owners in Japan have only

prepared for disasters by stocking food, water, and supplies for their pets (Anicom Insurance, Inc. 2009) and that many pet owners impacted by the 3.11 disaster found preparation of such supplies to be useful (Pet Office, Inc. 2012). In addition, while some surveys do not report any changes in disaster preparedness of pet owners after the 3.11 disaster (Pet & Family Small-Amount Short-Term Insurance Company 2012) others suggest that the 3.11 disaster has generally boosted disaster prevention awareness among Japanese pet owners (HAPP 2011) or have prompted owners to start preparing for future disasters (Irisoyama, Inc. 2012).

3) Use of and Needs for Support/Services

No surveys have yet been published regarding the use of support/services during the aftermath of the 3.11 disaster. In relation to needs for support/services difficulties such as procuring pet food, drinking water, and pet supplies have been reported by owners as actual primary needs that were experienced during the first month after the 3.11 disaster (Irisoyama, Inc. 2012).

4) Pet Attachment and Disasters

There seems to be no published empirical studies in Japan that examine the association between pet attachment and disaster-related behaviors such as evacuation behaviors. Past non-Japanese studies report mixed results regarding the association

between pet attachment and evacuation behaviors. Low attachment and commitment (Heath et al. 2001a) have been associated with failure of evacuation with pets. High commitment to pets has been associated with human evacuation failure (Brackenridge et al. 2012) while others report that both commitment and attachment are unassociated with human household evacuation (Heath et al. 2001b). As pointed out by Irvine (2009) circumstances and behaviors during the onset of a disaster are shaped by many different factors including but not limited to the human-animal bond, and the case-by-case combination of other factors, such as government policies and the availability of resources, may possibly have more influence over evacuation decisions.

Purpose and Hypothesis

In order to fill in the gap of data from pet owners in areas heavily affected by the 3.11 disaster this survey collected first-hand data from pet owners in Iwate and Fukushima Prefectures, both heavily impacted areas. The purpose of this survey was to grasp the general situation of these owners and pets, but it especially aimed to collect data on the use of and needs for pet-related support since past surveys only offer a limited data related to these topics. The purpose of the survey was as summarized into the following four points: 1) to outline the situation related to how owners prepared for disasters and evacuation with pets, 2) to outline the situation regarding the use of

support by owners and their pets, 3) to explicate the needs for support during the initial phase immediately after the disaster and the current phase, and 4) to examine the association between preparation for disasters, use of and needs for support, evacuation with pets, and pet attachment.

Since this was an exploratory survey, only broad hypotheses were developed as follows. Firstly, consistent with past literature, it was hypothesized that pet owners engaged in very little preparation and that they utilized a lot of support after the disaster, because they were unprepared. Secondly, it was hypothesized that needs for support would be higher during the initial phase compared to the current phase when affected owners would have likely settled down. Lastly, it was hypothesized that pet owners with higher pet attachment would evacuate with their pets, use more support, and demand more support.

Method

Respondents

Respondents of the survey were disaster affected pet owners in Iwate and Fukushima Prefectures, prefectures that were heavily impacted by the 3.11 disaster. Respondents qualified for the survey if they owned pets when the 3.11 disaster struck,

but the magnitude of damages suffered by the respondents was not taken into account.

In Iwate respondents were recruited via Save Animals in Iwate (SAI), a private organization that offers subsidies for veterinary care of disaster affected pets. The survey was distributed during their events targeting disaster impacted pets and their owners where relief supplies were distributed and free animal-related consultation services were provided (distributed N = 132) and to clients who applied to the subsidies of SAI at their member veterinary hospitals[3] (distributed N = 109). The events were held in Miyako City (June 2012) and Ofunato City (November 2012), both coastal cities in Iwate which were heavily damaged by the tsunami. The member veterinary hospitals where the surveys were distributed were 7 of the 10 member veterinary hospitals of SAI that consented to participating – 5 from coastal cities hit by the tsunami and 2 in inland cities that have temporary housing communities.

In Fukushima the survey was distributed to residents of temporary housing communities of evacuees who owned pets at the time the disaster struck (distributed N = 169). Upon selecting temporary housing communities, Namie-machi, the most populated town in Futaba County which constitutes the majority of the exclusion zone, was targeted.[4] Approval for the administration of the survey was obtained from the town office as well as a list of the heads of the residents' associations. The majority of the

residents of Namie-machi have evacuated, and a little over 50% of them live in temporary housing communities in Nihonmatsu City, Fukushima City, and Minamisoma City. For reasons related to the efficiency for administration temporary housing communities in Nihonmatsu City was targeted, and these communities in Nihonmatsu City were chosen randomly so that both large and small communities would be reached. Residents in the selected communities who owned pets at the time the disaster struck were found through a separate unpublished survey administered by CHEERS Co., Ltd. In addition to residents of Namie-machi animal-related stakeholders in Fukushima were consulted to reach out individually to those who were living in other local authorities included in the exclusion zone.

Instrument

This survey used the "Questionnaire Regarding Disasters and Pets," developed for this study. The questionnaire consisted of the following items: 1) items regarding the overall situation of pet-keeping (types of pets, places where they are kept, spaying/neutering, registration and vaccination of dogs), 2) assessment scale of pet attachment (Sugita 2003[5]; maximum score of 32 points with higher scores indicating stronger attachment), 3) items regarding evacuation with pets from the disaster in general and from the nuclear accidents for respondents in Fukushima, 4) items

regarding preparation for disasters, 5) items regarding the use of support after the disaster, and 6) needs for support during the initial and current phases. For 4) preparation for disasters 8 items that owners can do to prepare for disasters were extracted from materials for pet owner education (Shinjuku Ward Health Center and Shinjuku Branch of the Tokyo Veterinary Medical Association 2008; Japan Pet Care Association 2011; MOE 2011). For 5) use of support after the disaster 7 items on support provided after disasters were developed by reviewing animal relief efforts during past earthquakes in Japan.[6] For items on preparation and use of support respondents were asked to rate each item for its usefulness using a 4-point likert scale ("it was very useful" to "it was not useful"). For 6) needs for support the same items were used for 5) use of support after the disaster, and respondents were asked to check the items that they wanted/want to use but could not/cannot use and the reasons why the support was not used.

For items regarding preparation for disasters and the use of and needs for support, points were allotted to each item to develop a disaster preparedness scale (maximum of 8 points, higher scores indicate more preparedness), a scale for the degree of utilization of support (maximum of 7 points, higher scores indicate more use of support), and a scale for the needs for support (maximum of 14 points, higher scores indicate higher

needs) respectively.

Procedure and Analysis

In Iwate, the survey was a self-administered, collective survey at events and member veterinary hospitals of SAI. Surveys were directly handed out to respondents and collected at these scenes. In Fukushima, with the consent from the heads of residents' associations of selected temporary housing communities self-administered surveys were either posted on gates or mailed with return-mail envelopes to houses of respondents. Returned surveys were checked for their completeness, and follow-up was conducted for respondents with incomplete/incorrect responses. Telephone surveys were used for those who could not be reached with the aforementioned procedures. For both Iwate and Fukushima, surveys were distributed with an explanation of the survey. The explanation included terms on the protection of respondents' privacy. Since the administration of the survey in Fukushima was not in conjunction with any provision of support 300-JPY prepaid cards were distributed to respondents as incentives after filling out the surveys.

Differences in needs for support during initial and current phases were examined using t-tests. Spearman's rank correlation and t-tests were used to analyze the

association between attachment to pets and other variables. For statistical analysis, SPSS for Windows 17.0 was used, and the significance level was set at $p < 0.1$.

Results

Demographics of Respondents

A total of 410 surveys (Iwate: N = 241; Fukushima: N = 169) were distributed. The collection rate for all respondents was 73.2%, and the valid response rate was 70.5% (N = 289). In Iwate, the collection rate was 61.4%, and the valid response rate was 58.1% (N = 140). In Fukushima, the collection rate was 89.9%, and the valid response rate was 88.2% (N = 149).

For all respondents, 65.4% (N = 189) were females. For Iwate and Fukushima 72.9% (N = 102) and 58.4% (N = 87) were females, respectively. For all respondents, 21.5% (N = 62) were in their 40's, and 59.9% (N = 173) were in their 50's or over. For Iwate, 26.4% (N = 37) were in their 40's, and 44.3% (N = 62) were in 50's or over. For Fukushima, 16.8% (N = 25) were in their 40's, and 74.5% (N = 111) were in their 50's were over.

Situations of Pet Keeping

The most frequently owned pets were dogs and cats. For all respondents, 65.7% (N = 190) owned dogs and 33.2% (N = 96) owned cats. For Iwate, 81.4% (N = 114) owned dogs and 27.1% (N = 38) owned cats; for Fukushima, 51.0% (N = 76) owned dogs and 38.9% (N = 58) owned cats. The rates of ownership for other animals were low for respondents in both Iwate and Fukushima (table 1).

A majority of the respondents who lived with their pets at the time the survey was administered kept all of their animals indoors. For all respondents 68.0% (N = 174), for Iwate 81.4% (N = 114), and for Fukushima, 51.7% (N = 60) kept their pets indoors (table 2).

For all respondents 38.5% (N = 101) of dog and cat owners spayed/neutered all of their animals. For Iwate and Fukushima 33.6% (N = 47) and 44.3% (N = 54) of dog- and cat-owning respondents spayed/neutered all of their animals, respectively (table 3).

Over 80% of respondents who owned dogs registered and had vaccination certificates issued for all of their dogs. For all respondents, 87.4% (N = 166) and 88.9% (N = 169) registered and had vaccination certificates issued for all of their dogs, respectively. For Iwate 89.5% (N = 102) registered and 93.0% (N = 106) had vaccination certificates issued for all of their dogs. For Fukushima 84.2% (N = 64) registered and 82.9% (N = 65) had vaccination certificates issued for all of their dogs

(table 4).

Evacuation with Pets

When examining all of the respondents, 41.2% (N = 119) were able to evacuate with all of their pets during the onset of the 3.11 disaster. In Iwate, 65.7% (N = 92) of the respondents were able to evacuate with all of their pets. In Fukushima, 18.1% (N = 27) and 17.4% (N = 26) were able to evacuate with all of their pets from the earthquake/tsunami and the nuclear accident, respectively (tables 5 and 6).

Preparation for Disasters

The types of pet-related preparations engaged in by the respondents are as shown on table 7. For all respondents, Iwate, and Fukushima preparations most often engaged in were "storing extra supplies of pet food" (all respondents: 61.2%, N = 177; Iwate: 67.1%, N = 94; Fukushima: 55.7%, N = 83) and "preparing extra supplies for pets" (all respondents: 57.4%, N = 166; Iwate: 74.3%, N = 104; Fukushima: 41.6%, N = 62).

Table 8 shows the mean scores of the usefulness of each type of preparation. For all respondents the mean score for all types of preparation ranged from approximately 2.5 to 3.3, and "socializing/obedience training pets" (3.08, SD = 1.02), "securing temporary boarding for pets" (3.26, N = 1.09), and "participating in evacuation drills"

(3.18, SD = 0.66) were rated with scores over 3.0. For Iwate the mean scores ranged from approximately 2.7 to 3.5, and all types of preparation except for “providing for ID for pets” and “preparing photographs of pets in case they get lost” were rated with scores over 3.0 with “securing temporary boarding for pets” scoring the highest (3.50, SD = 0.91). For Fukushima, the mean scores ranged from approximately 1.2 to 3.0; no types of preparation were rated with mean scores over 3.0, but the three most highly rated types of preparation were “socializing/obedience training pets” (2.94, SD = 1.16), “storing extra supplies of pet food” (2.80, SD = 1.17), and “securing temporary boarding for pets” (2.77, SD = 1.30).

For all respondents, the mean score for the disaster preparedness scale was 2.32 (SD = 1.84, range = 0 - 8). For Iwate and Fukushima the mean scores were 3.06 (SD = 1.87) and 1.62 (SD = 1.52) respectively. Kolmogorov-Smirnov tests indicated non-normal distribution for all scores (all respondents: $Z = 2.32$, $p < 0.01$; Iwate: $Z = 1.67$, $p < 0.01$; Fukushima: $Z = 2.11$, $p < 0.01$).

Support Used After the Disaster

The types of support used after the disaster by the respondents are as summarized in table 9. For all respondents, the types of support that were used most often were “provision of pet food” (42.6%, N = 123) and “provision of veterinary care” (36.0%, N

= 106). For Iwate, the most often used support was “provision of pet food” (56.4%, N = 79) and “provision of veterinary care” (52.9%, N = 74). For Fukushima, the most often used support was “search and rescue of pets” (35.6%, N = 53) and “provision of pet food” (29.5%, N = 44).

Table 10 outlines the mean scores for the rated usefulness of the support used by the respondents. For all respondents, Iwate, and Fukushima all of the support was rated with a mean score over 3.0.

For all respondents, the mean score for the scale for the degree of utilization of support was 1.64 (SD = 1.65, range = 0 - 7). For Iwate the mean score was 1.96 (SD = 1.74); for Fukushima the mean score was 1.35 (SD = 1.51). Kolmogorov-Smirnov tests indicated non-normal distribution for all scores (all respondents: $Z = 3.55$, $p < 0.01$; Iwate: $Z = 1.67$, $p < 0.01$; Fukushima: $Z = 2.96$, $p < 0.01$).

Needs for Support

The needs for support for all respondents are as outlined in table 11. During the initial phase the type of support with the highest needs was “provision of pet food” (42.9%, N = 124), and needs for different types of support ranged from approximately 30% to 40%. During the current phase, “provision of pet food” still had the highest needs (29.1%, N = 84), but needs for all types of support ranged from approximately

20% to 30%. For all types of support, there were significantly higher needs during the initial phase compared with the current phase.

Similarly in Iwate, the type of support with the highest needs during the initial phase was “provision of pet food” (46.4%, N = 55), and needs during the initial phase ranged from approximately 25% to 45%. “Provision of pet food” still had the highest needs during the current phase (30.0%, N = 42), but needs during this phase ranged from approximately 15% to 30%. There were significantly higher needs during the initial compared with the current phase for all types of support with the exception of “search/rescue for displaced pets” (table 12).

In Fukushima, the type of support with the highest needs during the initial phase was “provision of pet food” (39.6%, N = 59), and needs during this phase ranged from approximately 25% to 40% depending on the type of support. During the current phase, “provision of veterinary care” had the highest needs (32.2%, N = 48), and the needs during this phase ranged from approximately 25% to over 30%. With the exception of “provision of pet food” and “temporary boarding for pets” there were no significant changes in the level of needs between initial and current phases for different types of support (table 12).

Regarding the reasons given for not being able to use the support that respondents

wanted/want to use, the most often given reason for all areas and all phases was that the "support was/is not provided."

The mean scores for the scale for the needs for support for all respondents, Iwate, and Fukushima were 4.20 (SD = 4.65, range = 0 - 14), 4.11 (SD = 4.68), and 4.28 (SD = 4.64), respectively. Kolmogorov-Smirnov tests indicated non-normal distribution for all scores (all respondents: $Z = 3.71$, $p < 0.01$; Iwate: 2.73, $p < 0.01$; Fukushima: $Z = 2.51$, $p < 0.01$).

Attachment to Pets

The mean score for pet attachment for all respondents was 27.8 (SD = 4.44; range = 12 - 32; Cronbach's alpha = 0.88). The mean scores for Iwate and Fukushima were 28.9 (SD = 3.70; range = 15 - 32) and 26.8 (SD = 4.81; range: 12 - 32), respectively. Kolmogorov-Smirnov tests indicated non-normal distribution for all scores (all respondents: $Z = 2.93$, $p < 0.01$; Iwate: $Z = 2.41$, $p < 0.01$; Fukushima: $Z = 1.68$, $p < 0.01$). The association between pet attachment and other variables is as summarized in table 13. For all respondents, pet attachment was positively correlated with the disaster preparedness scale ($\rho = 0.22$, $p < 0.01$) and the scale for the needs for support ($\rho = 0.11$, $p < 0.1$), and respondents who were able to evacuate with all of their pets had significantly higher pet attachment scores ($t = 2.23$, $df = 249$, $p < 0.05$). In Iwate,

pet attachment was only positively correlated with the disaster preparedness scale (ρ = 0.15, $p < 0.1$). In Fukushima, pet attachment was correlated with the disaster preparedness scale (ρ = 0.14, $p < 0.05$), the scale for the degree of utilization of support (ρ = 0.20, $p < 0.05$), and the scale for the needs for support (ρ = 0.18, $p < 0.05$).

Discussion

Discussion on Situation of Disaster Stricken Pet Owners in Iwate and Fukushima

Respondents of this survey were mostly dog and/or cat owners. More than 50% of the respondents in both areas kept all of their pets indoors, but only 40-50% of them spayed/neutered all of their pets. Rates of registration of dogs and issuance of vaccination certificates were high for the dog owning respondents of this survey with 80-90% registered and vaccinated. However, as discussed later, respondents in Iwate recruited for this survey may have higher levels of awareness in responsible pet keeping, and thus the results in Iwate may not necessarily reflect the situation of the average impacted pet owner in the area.

As for disaster-related behaviors of pet owners although in Iwate more than 60% of respondents responded that they were able to evacuate with their pets, the rate of

evacuation with pets was generally low as hypothesized. The rate of preparation for disaster was also low as hypothesized with the exception of preparation of pet food and supplies. Contrary to the hypothesis, the rate of utilization of support was under 50% for most types of support in both areas. Needs for all support during the initial phase ranged roughly from 30% to 40%, and needs during the current phase ranged from approximately 20% to 30%. Generally, consistent with the hypothesis there were more needs for support in both areas during the initial phase compared to the current phase, but in Fukushima, the difference in needs between the initial and current phases were not significant for all types of support.

For evacuation with pets, especially in Fukushima less than 20% of the respondents were able to evacuate with their pets. When evacuation orders related to the nuclear accident were issued authorities did not encourage residents to evacuate with their pets, and many pet owners thought that the evacuation would only last a couple of days. In all, only 40% of all surveyed respondents were able to evacuate with all of their pets suggesting that pet owner education on evacuation is needed in conjunction with concrete measures to encourage and support evacuation with pets once a disaster strikes.

In both Iwate and Fukushima, generally, as hypothesized many respondents had

not engaged in preparations for disaster with the exception of preparation of extra materials such as pet food and other pet supplies. This suggests that further pet owner education is needed to encourage owners to be thoroughly prepared. Different types of preparation were rated as useful in Iwate and Fukushima. In Iwate most types of preparations were highly rated showing that most types of preparation helped in some way. In Fukushima, ratings were rather low with "socializing/obedience training pets," "storing extra supplies of pet food," and "securing temporary boarding for pets" rated the highest among the different types of preparation showing that these were more helpful. Such results imply that the helpfulness of conventional preparation measures during the onset of disasters may depend on the situation of the local area and how the area was impacted by the disaster. In Fukushima where an unprecedented nuclear accident occurred after the earthquake, some of the conventional types of preparation may not have been as useful. For all respondents, "socializing/obedience training pets," "securing temporary boarding for pets," and "participating in evacuation drills" were highly rated, and with the exception of evacuation drills that applied to very few respondents in Fukushima results suggest that these types of preparation may be helpful to an extent in every situation.

As for the types of support used, in Iwate, provision of pet food and veterinary care

were the most often used support, and in Fukushima, provision of pet food and search and rescue of pets were the most often used support. The high rate of utilization of veterinary care seen in Iwate may be due to a selection bias as later discussed – respondents in Iwate were selected under the cooperation of SAI, an organization that subsidizes veterinary care of disaster impacted pets, so respondents who have used support related to veterinary care may have been selected disproportionately. Search and rescue of pets were used often particularly in Fukushima most likely because many pet owners were unable to evacuate with their pets and thus needed to have their pets rescued from the exclusion zone. Contrary to the hypothesis, generally, most types of support were utilized by less than 50% of the entire respondents suggesting that not many respondents made use of pet-related support. As discussed later, this perhaps indicates the failure to efficiently deliver the available support and related information to those in need. However, for the support used, all types of support in both Iwate and Fukushima were highly rated suggesting that from the perspective of pet owners the types of support that were actually utilized were all helpful.

As hypothesized, the needs for support were higher during the initial phase compared to the current phase in both Iwate and Fukushima, and for all respondents there were high needs for provision of pet food during the initial phase. Such results

imply that providers of support should develop strategies to reach out to those in need especially during the initial onset of the disaster and that during this phase, provision of relief supplies may have high demands in various situations. However, in Fukushima, there were only two types of support for which the level of needs were significantly different from the initial to the current phase implying that there are continuing needs for pet-related services. This likely reflects the situation in Fukushima where the communities are still far from complete recovery and where pet owners are still experiencing various difficulties living with their animals due to the impact of the nuclear accident.

The reason given most often for not being able to use the support that respondents wanted/want to use for all types of support, phases, and areas was that the "support was/is not provided." Such results suggest that providers of support need to engage in outreach to deliver support to those in need. In addition, there were approximately 5% of the respondents who wrote on the margins of the survey that "they did not know that support was provided" or that "they did not have the information." Thus, outreach should be complimented with information dissemination of where appropriate support is provided and pet ownership education from ordinary times on how and where to get the necessary information in case of emergencies.

Results on the association between pet attachment and disaster preparedness, utilization of support, and needs for support were inconsistent across Iwate, Fukushima, and all of the respondents. Only the correlation between pet attachment and disaster preparedness were significant across all respondents. Such results suggest that pet owners who are more attached to their pets are more likely to be prepared for disasters, but further investigation using multivariate analysis should be conducted in the future.

Limitations

One major limitation of this survey is that there was an obvious selection bias for the respondents in Iwate who were selected from clients applying for subsidies from SAI or during events hosted by SAI. Since respondents were all owners who had sought some kind of support on their own, it is highly likely that these respondents are those with higher awareness and that the data for this survey in Iwate do not necessarily reflect the situation of average owners in the area. This may have skewed responses in general pet keeping situations[7] such as registration and issuance of vaccination certificates of dogs as well as those regarding disaster-related behaviors. Furthermore, because SAI provides veterinary care related services this may have skewed the results on the use of support related to veterinary care in Iwate.

In addition, although the procedure in Fukushima allowed for higher return and

valid-response rates there were also higher possibilities of socially desirable responses. Such risks were countered by distributing letters to all respondents explaining the terms for protection of their privacy, but nevertheless respondents in Fukushima may have been more prone to responding in a socially desirable manner.

Also, for this survey, only bivariate analyses were conducted to examine associations between pet attachment and different variables. Multivariate analysis should be conducted to further examine the associations between different disaster-related behavior of pet owners and pet attachment.

Despite the above limitations since most Japanese surveys on pets and disasters since the 3.11 disaster are internet surveys and/or national surveys that do not necessarily target the heavily impacted areas the results of this survey serve as a meaningful step to grasp the situations of pet owners in areas most affected by the 3.11 disaster.

Implications and Future Challenges

The results indicated different characteristics on the situations of preparation and the use of and needs for support in Iwate and Fukushima. In addition, there were more needs during the initial compared to the current phase. Thus, pet owner education for disaster preparedness and post-disaster support should be catered to disasters that the

local area is prone to and should be tailored to the situation of the local community. Also, differing needs between initial and current phases suggest that providers of support should give consideration to timings when providing animal-related support. Furthermore, the fact that for both areas the use of support was relatively low despite the fact that there was a certain level of needs suggests that strategic outreach is necessary to provide support and/or to disseminate information related to support.

Notes

1 As of November, 2013 (National Police Agency 2013).

2 Japan Pet Food Association (2010). In Tohoku Area, 11.7% had cats, 1.6% had small animals, 1.9% had birds, 3.0% had turtles, and 15.3% had fish when the survey was administered in October 2010.

3 When applying to subsidies provided by SAI, clients must fill out a form notifying their address before and after the 3.11 disaster and must present their victim's certificate upon request.

4 According to the national census, the population of Namie-machi was 20,905 (Statistics Bureau 2011); the current population of the town is estimated to be 18,862 (Fukushima Prefecture 2013).

5 Created based on a pet attachment scale used in the study of Staats et al. (1996).

6 The following materials regarding the Hanshin Earthquake and the Chuetsu Earthquake were reviewed to examine the aid/support provided for animals and their owners during these earthquakes: Hyogoken Nanbu Jishin Dobutsu Kyuen Honbu Katsudo no Kiroku Henshu Iinkai (1996), Japan Animal Welfare Society (2005), Higuchi (2006), Niigataken Bosai Kaigi (2010), Japan Pet Care Association (n.d.), Kobe City Veterinary Medical Association (n.d.), MOE (n.d.), and Niigata Veterinary Medical Association (n.d.).

7 For example, in Iwate the official rate for the issuance of vaccination certificate is 84.6% in fiscal year 2011 (MHLW 2011) versus 93.0% in this survey.

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Table 1 – Types of Pets Kept (multiple answers allowed)

	Iwate % (N)	Fukushima % (N)	All % (N)
Dogs	81.4% (114)	51.0% (76)	65.7% (190)
Cats	27.1% (38)	38.9% (58)	33.2% (96)
Small Animals	0.7% (1)	0.7% (1)	0.7% (2)
Birds	3.6% (5)	2.7% (4)	3.1% (9)
Reptiles/Amphibians	0% (0)	1.3% (2)	0.7% (2)
Fish	0% (0)	2.0% (3)	1.0% (3)
No pets owned currently (had pets when disaster struck)	0% (0)	16.8% (25)	8.7% (25)

Table 2 – Places Where Pets are Kept

	Iwate % (N)	Fukushima % (N)	All % (N)
All pets kept indoors	81.4% (114)	51.7% (60)	68.0% (174)
Pets kept both indoors and outdoors	9.3% (13)	10.3% (12)	9.8% (25)
All pets kept outdoors	7.1% (10)	17.2% (20)	11.7% (30)
None of the above apply	2.1% (3)	6.9% (8)	4.3% (11)
No response	0% (0)	13.8% (16)	6.3% (16)

*excludes pets being temporarily boarded, for only respondents who currently own pets, All: N = 256; Iwate: N = 140; Fukushima: N = 116

Table 3 – Spaying/Neutering of Pets

	Iwate % (N)	Fukushima % (N)	All % (N)
All cats/dogs spayed/neutered	33.6% (47)	44.3% (54)	38.5% (101)
Only some cats/dogs spayed/neutered	12.1% (17)	13.1% (16)	12.6% (33)
None of cats/dogs spayed/neutered	52.1% (73)	40.2% (49)	46.6% (122)
No response	2.1% (3)	2.5% (3)	2.3% (6)

*For only dog/cat owners, All: N = 262; Iwate: N = 140; Fukushima: N = 122

Table 4 – Rates of Registration of Dogs and of Issuance of Vaccination Certificates

	Iwate % (N)	Fukushima % (N)	All % (N)
Rate of Registration of Dogs			
All dogs have been registered	89.5% (102)	84.2% (64)	87.4% (166)
Only some dogs have been registered	3.5% (4)	2.6% (2)	3.2% (6)
None of the dogs have been registered	1.8% (2)	9.2% (7)	4.7% (9)
Situation of registration unknown	2.6% (3)	2.6% (2)	2.6% (5)
No response	2.6% (3)	1.3% (1)	2.1% (4)
Rate of Issuance of Vaccination Certificates			
All dogs have certificates issued	93.0% (106)	82.9% (63)	88.9% (169)
Only some dogs have certificates issued	2.6% (3)	2.6% (2)	2.6% (5)
None of the dogs have certificates issued	1.8% (2)	9.2% (7)	4.7% (9)
Situation of issuance of certificates unknown	1.8% (2)	3.9% (3)	2.6% (5)
No response	0.9% (1)	1.3% (1)	1.1% (2)

*For only dog owners, All: N = 190; Iwate: N = 114; Fukushima: N = 76

Table 5 – Evacuation with Pets from Earthquake/Tsunami

	Iwate % (N)	Fukushima % (N)	All % (N)
Evacuated with all pets	65.7% (92)	18.1% (27)	41.2% (119)
Evacuated with some pets	4.3% (6)	11.4% (17)	8.0% (23)
Could not evacuate with any pets	22.1% (31)	68.5% (102)	46.0% (133)
No response or N/A	7.9% (11)	2.0% (3)	4.8% (14)

Table 6 – Evacuation with Pets from Nuclear Accident (for Fukushima only)

	% (N)
Evacuated with all pets	17.4% (26)
Evacuated with some pets	10.7% (16)
Could not evacuate with any pets	70.5% (105)
No Response or N/A	1.3% (2)

Table 7 – Preparation for Disasters: Execution Rate

	Iwate % (N)	Fukushima % (N)	All % (N)
Storing extra supplies of pet food	67.1% (94)	55.7% (83)	61.2% (177)
Preparing extra supplies for pets	74.3% (104)	41.6% (62)	57.4% (166)
Providing ID for pets	14.3% (20)	7.4% (11)	10.7% (31)
Preparing photos of pets in case they get lost	37.1% (52)	26.8% (40)	31.8% (92)
Preparing health records for pets	19.3% (27)	6.7% (10)	12.8% (37)
Socializing/obedience training pets	39.3% (55)	14.1% (21)	26.3% (76)
Procuring places to temporarily board pets	33.6% (47)	8.7% (13)	20.8% (60)
Participating in evacuation drills	22.1% (31)	2.0% (3)	11.8% (34)

Table 8 – Preparation for Disasters: Rated Usefulness

	Iwate Mean Score (SD)	Fukushima Mean Score (SD)	All Mean Score (SD)
Storing extra supplies of pet food	3.14 (1.13)	2.80 (1.17)	2.97 (1.16)
Preparing extra supplies for pets	3.20 (1.03)	2.64 (1.27)	2.99 (1.16)
Providing ID for pets	2.92 (1.26)	1.25 (0.71)	2.29 (1.35)
Preparing photos of pets in case they get lost	2.79 (1.26)	2.30 (1.21)	2.52 (1.25)
Preparing health records for pets	3.21 (1.08)	2.00 (1.20)	2.85 (1.23)
Socializing/obedience training pets	3.15 (0.94)	2.94 (1.16)	3.08 (1.02)
Securing places to temporarily board pets	3.50 (0.91)	2.77 (1.30)	3.26 (1.09)
Participating in evacuation drills	3.25 (0.64)	2.50 (0.71)	3.18 (0.66)

Table 9 – Use of Support: Utilization Rate

	Iwate % (N)	Fukushima % (N)	All % (N)
Provision of pet food	56.4% (79)	29.5% (44)	42.6% (123)
Provision of pet supplies	30.7% (43)	18.8% (28)	24.6% (71)
Provision of veterinary care	52.9% (74)	20.1% (30)	36.0% (106)
Management of hygiene of pets	25.7% (36)	6.0% (9)	15.6% (45)
Temporary boarding of pets	16.4% (23)	22.8% (34)	19.7% (57)
Search and rescue of pets	7.1% (10)	35.6% (53)	21.8% (63)
Consultation on pet troubles	7.1% (10)	2.0% (3)	4.5% (13)

Table 10 — Use of Support: Rated Usefulness

	Iwate Mean Score (SD)	Fukushima Mean Score (SD)	All Mean Score (SD)
Provision of pet food	3.76 (0.59)	3.55 (0.70)	3.68 (0.64)
Provision of pet supplies	3.67 (0.70)	3.59 (0.64)	3.64 (0.67)
Provision of veterinary care	3.65 (0.55)	3.74 (0.45)	3.67 (0.52)
Management of hygiene of pets	3.77 (0.43)	3.67 (0.50)	3.75 (0.44)
Temporary boarding of pets	3.89 (0.32)	3.79 (0.41)	3.83 (0.38)
Search and rescue of pets	3.25 (1.04)	3.31 (0.96)	3.30 (0.96)
Consultation on pet troubles	3.00 (1.10)	3.00 (1.00)	3.00 (1.00)

Table 11 – Needs for Support (initial versus current phase, for all respondents)

	Initial Phase		Current Phase	
	Rate of Owners Who Wanted to Use the Support but Could Not % (N)	Reasons for Not Being Able to Use Support [a]	Rate of Owners Who Want to Use the Support but Cannot % (N)	Reasons for Not Being Able to Use Support [a]
Provision of pet food**	42.9% (124)	Not provided 63.7%	29.1% (84)	Not provided 72.6%
Provision of pet supplies**	37.7% (109)	Not provided 67.9%	27.0% (78)	Not provided 80.8%
Provision of veterinary care†	36.0% (104)	Not provided 61.5%	28.7% (83)	Not provided 73.5%
Management of hygiene of pets*	36.3% (105)	Not provided 70.5%	27.0% (78)	Not provided 79.5%
Temporary boarding of pets*	35.3% (102)	Not provided 67.6%	24.2% (70)	Not provided 75.7%
Search and rescue of pets†	29.1% (84)	Not provided 60.7%	22.5% (65)	Not provided 72.3%
Consultation on pet troubles*	28.4% (82)	Not provided 79.3%	21.1% (61)	Not provided 83.6%

[a] The number of respondents who responded that “they wanted/want to use the support” was counted as 100%, and the most common reason given was listed.

**$p < 0.01$

*$p < 0.05$

† < 0.1

Table 12 – Needs for Support (initial versus current phase, for Iwate and Fukushima)

	Initial Phase		Current Phase	
	Rate of Owners Who Wanted to Use the Support but Could Not % (N)	Reasons for Not Being Able to Use Support [a]	Rate of Owners Who Want to Use the Support but Cannot% (N)	Reasons for Not Being Able to Use Support [a]
Iwate				
Provision of pet food*	46.4% (65)	Not provided 55.4%	30.0% (42)	Not provided 52.4%
Provision of pet supplies**	42.9% (60)	Not provided 63.3%	25.0% (35)	Not provided 65.7%
Provision of veterinary care*	36.4% (51)	Not provided 45.1%	25.0% (35)	Not provided 57.1%
Hygienic care of pets*	39.3% (55)	Not provided 60.0%	26.4% (37)	Not provided 67.6%
Temporary boarding for pets*	35.0% (49)	Not provided 65.3%	23.6% (33)	Not provided 66.7%
Search/Rescue of pets	25.0% (35)	Not provided 62.9%	17.1% (24)	Not provided 70.8%
Consultation on pet troubles*	30.7% (43)	Not provided 67.4%	17.9% (25)	Not provided 68.0%
Fukushima				
Provision of pet food*	39.6% (59)	Not provided 72.9%	28.2% (42)	Not provided 92.9%
Provision of pet supplies	32.9% (49)	Not provided 73.5%	28.9% (43)	Not provided 93.0%
Provision of veterinary care	35.6% (53)	Not provided 77.4%	32.2% (48)	Not provided 85.4%
Hygienic care of pets	33.6% (50)	Not provided 82.0%	27.5% (41)	Not provided 90.2%
Temporary boarding for pets*	35.6% (53)	Not provided 69.8%	24.8% (37)	Not provided 83.8%
Search/Rescue of pets	32.9% (49)	Not provided 59.2%	27.5% (41)	Not provided 73.2%
Consultation on pet troubles	26.2% (39)	Not provided 92.3%	24.2% (36)	Not provided 94.4%

[a] The number of respondents who responded that “they wanted/want to use the support” was counted as 100%, and the most common reason given was listed.

**$p < 0.01$; *$p < 0.05$

Table 13 – Associations Between Pet Attachment and Other Variables

	Iwate	Fukushima	All
Evacuation with pets	n.s.	n.s.	Evacuated with all pets = 28.4 (SD = 4.29) Could not evacuate with any pets = 27.1 (SD = 4.55)*
Disaster preparedness scale	ρ = 0.15 †	ρ = 0.14*	ρ = 0.22**
Scale for the degree of utilization of support	n.s.	ρ = 0.20*	n.s.
Scale for the needs for support	n.s.	ρ = 0.18*	ρ = 0.11 †

**p < 0.01
*p < 0.05
† < 0.1