State of Disaster Preparedness of Pet Owners for Ensuring the Safety of their Families and Companion Animals

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Keywords: *action plan, companion animals, disaster resilience, pet ownership.*

Abstract. *Growing urbanization and the related demand for resources together with the climate change appear to be among the factors responsible for the intensified frequency and severity of disasters worldwide. At the same time, urbanization is related not only with the increasing flow of inhabitants to the big cities but also with an increase in the number of pet ownership in seeking social, psychological and health benefits. But when a disaster strikes, companion animals are affected as much as humans. Their survival depends on the preliminary preparedness of their guardians for disaster response and recovery. For this purpose, the present study investigated the level of disaster preparedness among 335 pet owners in Bulgaria through an anonymous written questionnaire. The results showed that 64.86% of the participants in the survey were women, 52.24% of all respondents were 19–24 years old and 75.45% were keeping pets at the moment of filling in the survey.*

The study found that 87.16% of the respondents were well-informed about the likelihood of disaster hazards in their residential area. Pet owners were prepared to approach the relevant public health authorities (89.55% of them), respectively the animal health services (82.88%) in case of emergency. Only 36.72% of all pet keepers had a prepared disaster family plan, with another 28.96% of the respondents having developed a disaster pet action plan for their animal companions. If emergency evacuation is needed, more than 66% of the respondents would take their pets with them during relocation. This intention was statistically significant in women and those pet owners who were familiar with the potential disaster hazards.

Introduction

As per the general classification of the International Disaster Database (EM-DAT) maintained by the Centre for Research on the Epidemiology of Disasters – CRED, disasters are distributed in two main groups – natural and technological (EM-DAT, 2020). Data records (CRED, 2020) show that worldwide during the last decade the frequency of natural disasters has increased, with the rise of hydrometeorological (floods, storms, heat waves) and climatological disasters (droughts, wildfires) rather than geophysical ones (earthquakes, volcanic eruptions) (Anonymous, 2015). This trend together with multiple factors like soil erosion and deforestation (UNEP, 2014; Olsson et al., 2019), informal and poorly planned urban settings (Di Martire et al., 2012; Brown et al., 2014) and coastal or low-lying cities (UNEP, 2010) lead to increased vulnerability of people and their livelihoods to environmental hazards.

Under the terms of the Sendai Framework for Disaster Risk Reduction 2015–2030 (United Nations Office for Disaster Risk Reduction – UNDRR, 2015), people's vulnerability to disasters could be overcome through a comprehensive approach which includes the following four priorities: understanding disaster risk; strengthening disaster risk governance to manage disaster risk; investing in disaster risk reduction for resilience; enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction (UNDRR, 2015).

Disaster resilience of the community is highly dependent on the awareness, preparedness, communication and education of people from all societal groups. Low levels of disaster preparedness were found to lead to failure in household evacuation (Heath et al., 2001a), thus threatening the health and lives of all family members, including animals, emergency responders and the general public as well (Bernard et al., 2010; Smith et al., 2015; Trigg et al., 2015b; Baker et al., 2018). Human casualties were even reported in fatal attempts for saving 'stock, property or pets' in disasters (Coates, 1999; Thompson, 2013).

At the same time, inclusion of non-human animal companions in pre-disaster planning activities was argued to impact positively the latter animal owners' response to safety measures as evacuation, shelter boarding, well-being, etc. (Farmer et al., 2016; Thompson et al., 2017; Farmer & De Young, 2019) due to the established strong human-non-human animal bond (Nusbaum et al., 2007; Travers et al., 2017).

At the international level, guidelines on disaster

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management and risk reduction in relation to animal health, animal welfare and veterinary public health were issued by the World Organisation for Animal Health (OIE, 2016). Within the guidelines, it was assumed that, due to recent disaster events, a particular need has aroused to bring all components of disaster management together in cohesive response plans at both national and international levels using a multidisciplinary (thus, multi-agency) approach to achieve optimal efficiency and effectiveness (OIE, 2016). Still, local communities are further apart from achieving such goals, sometimes due to limited access to the resources required, like enough housing options for people and their animals, lack of pre-disaster planning of animal owners, poor coordination between the emergency services for humans and animals, unwillingness for evacuation (Taylor et al., 2015; Yamazaki, 2015; Squance, 2018). However, when a disaster strikes it usually causes huge losses in livelihoods and the communities have no choice but to respond and cope with the event (Wood et al., 2013).

Although there is still a gap in logistics, coordination and even legislation in some countries, research has confirmed the widely recognized need for a joint approach by householders, emergency responders and animal rescue teams (Mcclure & Kerr, 2011; Taylor et al., 2014; Glassey, 2018) in order to relocate the whole family, including pets. This necessity provoked our scientific interest to investigate the present level of disaster preparedness among the pet owners in Bulgaria with a focus on their familiarity with the most probable disasters in their residential area, knowledge in the local emergency services, preparation of emergency family and pet action plans and supplies, and evacuation decisions.

Materials and Methods

Design of Survey

Fifth-year veterinary students at Trakia University – Stara Zagora and their families and friends participated voluntarily in the survey in the period April 2019 – June 2020. Each student willing to participate was given a paper multiple-choice questionnaire to fill it in anonymity with additional four more questionnaires for distribution to family members and relatives. All filled questionnaires were returned to the author (n = 335), representing heterogenous respondents throughout Bulgaria. This study did not need ethics approval.

The questions were distributed in several sections. Briefly, the first section (questions 1–4) contained questions on the participant's demographic data, such as age, gender, residence (capital city, city-administrative centre, small town, village), previous or current experience with pet animals. The second section (questions 5–8) focused on the respondents' awareness and knowledge about the main hazards and potential disasters, as well as the relevant structures and institutions responsible for the public health and animal health in their residential area. For the purpose of the study, within the Public Health Services were included the main institutions and organizations responsible for protection of human health like emergency call centre 112, fire departments, police, town hall, medical centres and hospitals, Emergency Department, Red Cross Committee, etc. Similarly, under the Animal Health Services were gathered state and private institutions and enterprises in the field of animal health and welfare protection like veterinary authorities, veterinary clinics and dispensaries, animal shelters, animal hotels, etc.

The third section (questions 9–11) contained statements about the pet owners' preparedness for disastrous events, i.e. a developed action plan for their families and for their companion animals with provision of the most needed supplies for survival in the first hours after the event. The last question studied the respondents' intention to evacuate with or without their pets in case the rescue team could not evacuate the animals at the same time with the people.

The filled questionnaires were returned to the author filled and coded with numerical values; thus, each text answer was converted into a number for easier data analysis.

Statistical Analysis

Data received were statistically processed (IBM SPSS-Inc., 2019, SPSS Reference Guide 26 SPSS, Chicago, USA). The study parameters were analyzed through descriptive statistics (frequency distribution tables), correlation analysis (Pearson correlation coefficient) and Student t test. A two-sided $p < 0.05$ was considered significant. The results afterwards were presented on diagrams (Excel, Windows 10).

Results

Respondents' demographics varied in age and residence (Table 1). Most of the participants in the survey were women (64.86%), aged 19–24 (52.24%), graduated from a high school (66.77%) and studying for their university degree (58.21%). The majority of the respondents were with urban background, living in the capital city and administrative cities throughout the country (85.63% in total), while only 14.37% of them came from rural settings. Regarding the participants' relationship with companion animals, the study found that the majority of them were taking care for pets at that moment (75.45%), while 24.25% of them had owned pets previously.

Depending on the environmental and infra-structural characteristics of their residential area, the respondents had to answer whether they were familiar with the most common hazards and potential disasters (flood, fires, storms, etc.) (Figure 1). The majority of them, 87.16%, stated they were aware of the disasters which could occur in the area. Another

Table 1. Demographic profile* of pet owners in the survey

Respondents' Demographics	Count	Percentage
Age (years)		
1) ⩽ 18	7	2.09
2) 19–24	175	52.24
3) 25–29	64	19.10
4) 30–60	82	24.48
5) 61–64	5	1.49
6) 65+	2	0.60
Gender		
1) Male	117	35.14
2) Female	216	64.86
Residence		
1) Capital city	14	4.19
2) City–Regional administrative centre	189	56.59
3) City–Municipal administrative centre	78	23.35
4) Town	5	1.50
5) Village	48	14.37
Pet keeping experience		
1) Previous experience	81	24.25
2) Current experience	252	75.45

*Values may not total 100% for each variable because of non-responders and rounding of values

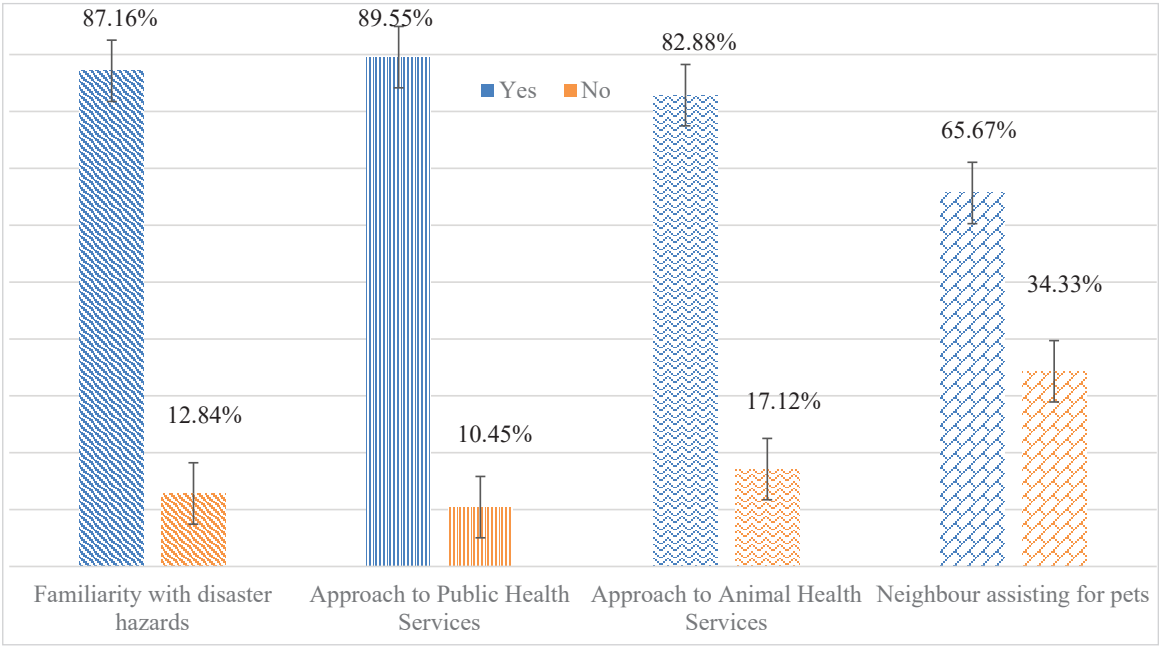

Figure 1. Respondents' distribution regarding their knowledge on disaster hazards and preparedness to contact health authorities or neighbours for help; with Std. Error presented on the error bars

proportion of 89.55% of the respondents declared they had knowledge where and how to approach local Public Health Services (emergency call centre 112, fire departments, police, town hall, hospitals, Emergency Department, Red Cross Committee, etc.) for assistance in case of disastrous event. A similar share of 82.88% of pet owners stated they could approach the Animal Health Services for the safety of their pets if needed (veterinary authorities, veterinary clinics and dispensaries, animal shelters, animal hotels, etc.). Asked to provide additional information on the preparation for their companion animals evacuation in disasters, another 65.67% of the participants in the survey said they could rely on the help of a neighbour (the neighbour had a key for the house, knew the location of the evacuation exits from the building, knew the animals and they were familiar with him/her, etc.).

Even though weak, a positive correlation was established between the age of the participants in the survey and their knowledge on the relevant institutions for public ($r = 0.1857$; $p = 0.001$) and animal health in the region ($r = 0.1294$; $p = 0.023$) supposing that elder respondents were better prepared to contact the authorities. A negative correlation was found between the pet owners' residence and the possible neighbour's help in a disaster situation, i.e., residents from big cities were less likely to rely on such assistance for their pets ($r = -0.1208$; $p = 0.033$).

The study found significant differences between the group of respondents who were familiar and prepared to contact the Public Health Services, respectively Animal Health Services, and gender, in favour of women being more prepared ($t[333] = 7.9506$, $p < 0.001$ for public health institutions; $t[333] = 5.3989$, $p < 0.001$ for animal health structures). The same statistically significant differences were found for urban residents (from cities-administrative centres) who appeared to be better prepared to approach health authorities to ensure their own and family safety, respectively the wellbeing of their pets ($t[334] = 24.8488$, $p < 0.001$ for public health institutions; $t[334] = 23.2836$, $p < 0.001$ for animal health structures). Those respondents who were taking care of pets at the moment of filling in the survey were found significantly to rely on a neighbor's assistance for evacuation of their animals ($t[334] = 11.8462$, $p < 0.001$).

The state of disaster preparedness of companion animal owners was investigated with regard to the availability of a developed disaster action plan (Figure 2). Approximately one-third or 36.72% of the respondents stated that they had prepared a disaster family plan and a backpack with the most needed supplies for survival in the first hours after the event, together with a list of contacts for emergency cases. A smaller share of 28.96% of the participants had developed a disaster plan for evacuation and survival of their pets. However, the Student *t* test found significant differences between the absence of disaster plans for family members and the current status of pet-keeping by the respondents ($t[334] = 3.4890$, $p = 0.0005$), which indicated that present pet owners seemed not to arrange disaster family plans. A weak positive correlation was found between the prepared action plans for family members and the respondents' awareness on disaster hazards in the area ($r = 0.2098$; $p < 0.001$). Again, a positive correlation was established between the available disaster plans for pets and the respondents' familiarity with the local animal health structures ($r = 0.1839$; $p = 0.001$).

Adequate disaster preparedness among the population affected their decision-making for evacuation in case of disaster outbreak. The majority of the respondents, 66.06%, stated that if a safety evacuation was ordered they would take their pets with them. On the other hand, 33.94% of the participants in the survey would leave without their companions if the rescue team could not evacuate the animals at the same time as people (Figure 3).

A negative correlation was found between the decision for evacuation and the female respondents ($r = -0.1621$; $p = 0.004$) indicating that women were more likely to take the animals with them.

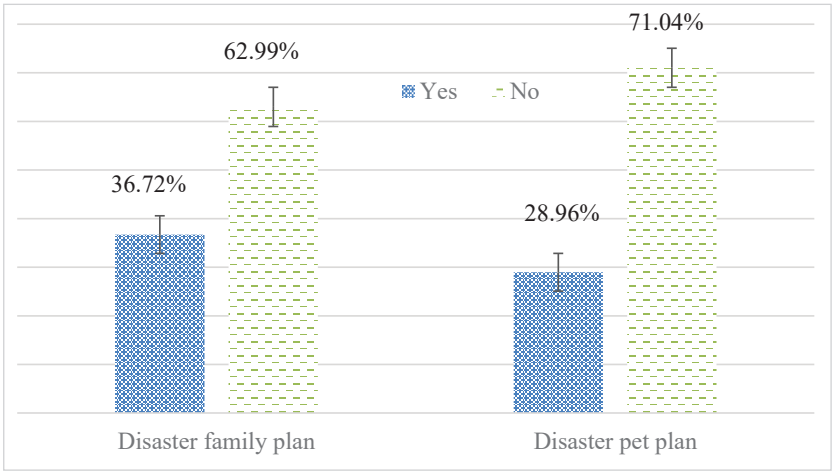

Figure 2. Availability of disaster action plans for the respondents' families and pets

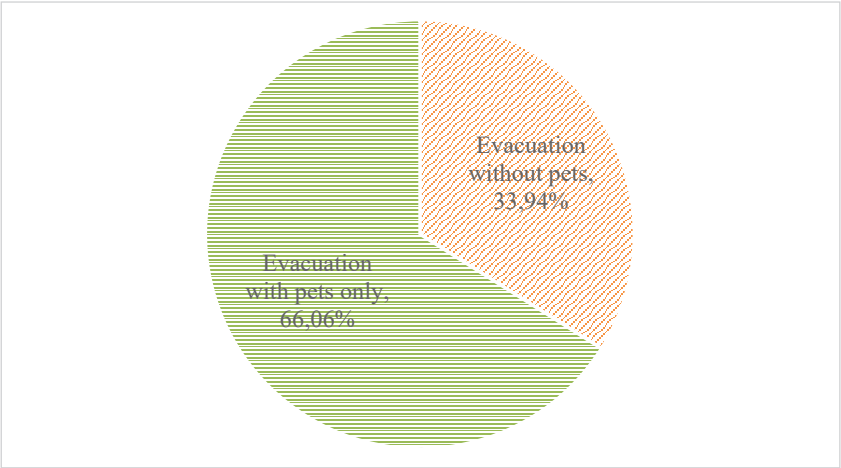

Figure 3. Respondents' decision for evacuation in case of disaster outbreak

This gender difference was confirmed by the *t* test as women showed a statistically significant intention not to abandon their pets during evacuation ($t[333] = -8.3612$, $p < 0.001$). Also, respondents who indicated their familiarity and awareness on the potential disaster hazards in the region were found to choose evacuation with their animals ($t[335] = -16.7364$, $p < 0.001$).

Discussion

Pet-keeping is reported to have increased in the last decades, as ten years ago approximately 60% of all US households owned at least one pet (Case, 2011) compared with 67% at present, according to the 2019–2020 National Pet Owners Survey (APPA, 2020). For Europe, an increase in the number of companion animals is also confirmed since 2010 (FVE Report, 2018). In our study, the share of the respondents who take care of pets at home at the present moment appeared to be 75.45%.

Many animal guardians consider their pets to be a part of their families (Case, 2011; Farmer et al., 2016) and form a strong emotional and psychological bond with them (Trigg et al., 2015a) with a significant positive impact on the human comfort and wellbeing (Hunt et al., 2012; Nusbaum et al., 2007; Travers et al., 2017).

At the same time, there is not a clear understanding among the public about the primary responsibility for safeguarding non-human animal companions during disasters and emergencies (Travers et al., 2016; Travers et al., 2017). As main caregivers, animal owners have to provide all necessary resources for the wellbeing of their pets but this engagement is found to be highly dependent on the extent of pet attachment (Shore et al., 2005). Meanwhile, in emergency events, animal guardians could be incapable to adhere to evacuation orders, due to various reasons as lack of housing options (Chadwin, 2017), lack of knowledge / a chaotic approach of the relevant emergency services (Garde et al., 2013), or emotional issues (Taylor et al., 2015). However, the results from our study showed that pet owners' preparedness to approach the public and animal health authorities was in a positive correlation with their age, indicating elder respondents to be better informed whom to contact ($p < 0.05$).

Research on the evacuation behaviours of pet owners who experienced a range of natural disasters found that 30% of them turned to neighbours and friends for assistance and another 8% called the emergency services (Taylor et al., 2015). In comparison, our study found that pet owners' disaster preparedness in hypothetic disaster situations was connected to a great extent to a call to the relevant local public and animal health authorities, as declared by the majority of the respondents (89.55% for public health and 82.88% for animal health services), or to seeking an assistance by a neighbour for 65.67% of the pet owners. Neighbour support and debrief for animals have also been cited among the measures during the recovery phase after the disaster event (Thompson et al., 2014). At the same time, Decker et al. (2010) identified a lack of preparedness in the local communities coupled with underutilization of the emergency agencies and non-human animal shelters as a resource. Indirectly, the ineffective use of disaster preparedness resources within communities is confirmed by Heath et al. (2001b) who reported that 90% of owners made housing arrangements for their pets for evacuation purposes without assistance. However, our study found a weak positive correlation between the respondents' familiarity with the local animal health structures and their disaster planning for pets ($p < 0.05$).

A step forward in improving public response to disasters is development of legislation which would require animals to be included in the community disaster plans. Some arguments in favour of this idea are given by Irvine (2007) and Farmer et al. (2016) who have provided information on law development regarding evacuation of pets and made suggestions for inclusion of animals in the state/local disaster mitigation plans. Furthermore,

householders are also encouraged to develop a written action plan that includes pets and animals and to relocate themselves and their animals before the disastrous event (Thompson et al., 2017). In line with these recommendations, our study found that approximately one-third of the respondents (36.72%) had a prepared disaster family plan but a smaller share of them (28.96%) included a part for evacuation of pets. These values appeared to be lower than those reported by Yamazaki (2015) who found that less than 50% of animal owners were engaged in different types of pet-related disaster preparations at the time of the Fukushima earthquake.

Pre-disaster planning with a priority on pet evacuation is found to be among the risk factors which influence the successful household evacuation and disaster response. Research indicates that animal owners may delay evacuation due to concern for their companions (Baker et al., 2018; Travers et al., 2017; Graham & Rock, 2018) which could result in a failure in household relocation (Heath et al., 2001c; Hunt et al., 2012). Heath et al. (2001a, 2001b) reported that during a hazardous event or disaster approximately 50% of the households evacuated without their pets. For comparison, Yamazaki (2015) reported that 41.2% of animal owners were able to evacuate with their pets during a disastrous earthquake, thus indicating a failure in companion animal evacuation for the rest 58.8% of the householders. However, results differ when preliminary intentions of the animal owners for relocation are investigated. Our study found that 66.06% of the respondents would take their pets with them if emergency evacuation was ordered, while 33.94% of the respondents stated that they would leave without their pets if it was not possible to evacuate together. In anticipated disasters, other studies have found even higher percentage – around 70% (Taylor et al., 2015); and overall 74.5% (Hesterberg et al., 2012) of the animal owners declared that they had planned to keep all their pets with them if evacuated. Furthermore, we found that this statement was gender dependent as our respondents-women showed a statistically significant intention not to abandon their pets during evacuation ($p < 0.05$).

Although pet ownership was not found to be a statistical risk factor for evacuation failure (Hunt et al., 2012), animal guardians have been reported to behave in a way that may compromise their own safety in disaster situations (White, 2012; O'Dwyer & Thompson, 2018). Taking into consideration the established strong human-animal bond and its impact on the decision-making for evacuation by the pet owners, some authors recommend the inclusion of animal ownership as a factor in the disaster mitigation and preparedness plans (Squance et al., 2018; O'Dwyer & Thompson, 2018). As a result, communities could cope better during disasters when companion animals receive protection alongside with their human families (Mcclure & Kerr, 2011; Travers et al., 2016).

Conclusion

The demographic profile of pet owners in the present study was represented mainly by young women in their university undergraduate degrees, as well as by residents with an urban background. The majority of the respondents were currently caring for pets. A very high proportion of the pet keepers were aware of the most likely disasters in their residential area, indicating a high level of preparedness to contact the relevant authorities in emergency events, which correlated positively with their age.

Regarding the pre-disaster planning activities, only one-third of the respondents had a prepared disaster family plan in advance, fewer of them included their pets in such an action plan and made provisions for the animal evacuation and survival. However, the majority of pet owners stated their intention to relocate with their animals in case evacuation orders were issued. This intention was gender dependent as women were found statistically significantly determined not to abandon their non-human companions during evacuation. The same decision was statistically confirmed among the respondents who were better informed about the likelihood of the disaster hazards in the area.

The established level of disaster preparedness among the pet owners in Bulgaria indicated the necessity of further development of the emergency management at national and regional levels with recommendations to general public for preparations of a disaster family plan with inclusion of provisions for pet animals and defined responsibilities among authorities for pet evacuation and relocation.

Acknowledgment

The author expresses her gratitude to all the participants who filled in the questionnaire.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Received 6 January 2022
Accepted 8 February 2022