

## **1. Introduction**

The pet animals are kept by a significant number of people all over the world irrespective of their social status. As a country to witness the rapid spread of urbanization in the world the tradition of rearing dogs and cats or even different exotic creature is increasing day by day and becoming an integral part of modern nuclear family of Bangladesh. Having pets bring a lot of benefits, such as psychological support, companionship and even good health practices to the owners. In many western countries pets have become the substitutes for childbearing and child care. Pet animals contribute to physical, social and mental wellbeing of children too (H et al., 2007). Dogs and cats have significant benefits to the society like security, alerting the owner from an adverse condition, gift to the special ones and economic purposes (Parvez, 2014). Dogs are not only serving as a companion but also act as workers (Singh et al., 2014). They have proven to be invaluable member of family with different roles including guide dogs for blind person, provide assistance to the disable, sniffers dogs used by police and customs and farm dogs used as shepherd.

Dogs and cats may be the most frequent household pets around the world, but there are also many other vertebrates that share our household environment (Bruno and Chomel, 1992). Therefore, rearing of pet animals is becoming popular in urban cities of Bangladesh day by day. Although pet dogs and cats are living together and sharing the same environment with their owners, they have been found to play a direct role in transmitting zoonotic infections (Stull et al., 2014). In particular, they are harboring a number of infective stages of disease causative agents transmissible to man and other domestic animals (Rahman et al., 2017). Pets can also be carriers of infectious agents like parasites, bacteria, fungi and viruses despite appearing to be healthy (ID et al., 2000). Therefore, close bonding between pets and humans remains a major threat to public health.

Skin is the largest organ of human body which acts as a first line of protection for entering of microorganism and harmful exposures. Breaking skin from scratching and biting of pets may facilitate the entering of zoonotic infection into the body. Most importantly, these zoonotic pathogens may have a significant impact on public health,

particularly for children whose usually play with pets (CN, 2013). However, the pet owners do not have sufficient knowledge about the diseases of pet animals and the risk of zoonoses. In Bangladesh, there is no particular study regarding pet rearing and skin diseases caused by pet and related risk factors. Therefore, the study was designed to identify common skin diseases of owners caused by their pets.

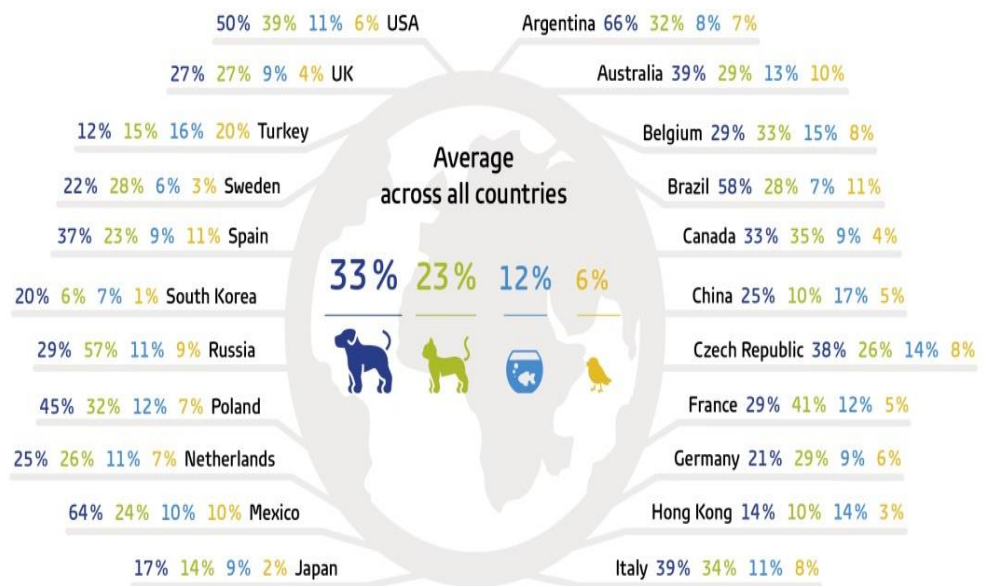
**Objectives:** The objectives of present study were as follows:

1. To estimate the demographic pattern of pet ownership in Chattogram metropolitan areas.
2. To estimate the occurrence of skin injuries among pet owners
3. To study the patterns of affected skin lesion.

## 2. Review of Literature

### 2.1 Rearing pet is a global trend

Pets are integral part of the family in the majority of households around the world. More than half of people globally have a pet in their home. According to a global report, 66% Argentines, 64% Mexicans, and 58% Brazilians own a dog. However, people in Asia are least likely to own a pet. In Hong Kong, for example, just 14% own a dog compared to half of Americans (50%) and more than one third (39%) of Italians(Statista, 2020b). Noticeably, one third (33%) of households globally have a dog, making it officially people’s best friend. Cats are the second most popular choice and account for less than one quarter (23%) of pet ownership. Fish are the third most popular pet with ownership at 12%. Only 43% of respondents have no pets in their household(Statista, 2020a).



**Figure 1:** Percentages of people living with different pets in 22 countries. Source: GFK survey among 27,000+ internet users (ages 15+) in 22 countries- multiple answers possible- rounded.

## **2.2. Pet animals commonly reared by Bangladeshi**

The tradition of keeping animal as pet is increasing day by day or even exotic creatures. Pets have become an integral part of the family and often considered to be extended family. The pet animals are kept by a significant percentage of people all over the world irrespective of their social status including Bangladesh.

Dogs and cats may be the most frequent household pets around the world, but there are also many other vertebrates that share our household environment (Bruno and Chomel, 1992). Several kinds of pet animals (e.g. dog, cat, rabbit etc.) have been importing from abroad and are selling at Katabon Market at Dhaka city and at Riazuddin Bazar at Chattogram of Bangladesh. Therefore, rearing of pet animals particularly dog, cat and rabbit are becoming popular in urban cities of Bangladesh day by day.

## **2.3. Demography of pet owners**

Human demographic and socioeconomic characteristics associated with the number of owned pets have been extensively investigated worldwide (Endenburg et al., 1990; Leslie et al., 1994; Downes et al., 2009; Murray et al., 2010). Although the evaluated variables and associations differ greatly among studies, factors such as age, gender, income/social class, marital status, rural/urban residence and household type may be associated with pet ownership (Marx et al., 1988; Endenburg et al., 1990; Leslie et al., 1994; Downes et al., 2009). Characteristics of pet owner such as age, gender, income/social class, marital status, rural/urban residence and household type have been shown to be associated with the number of owned pets. Several studies have been conducted in Southern and Southeastern Brazil in an effort to estimate the number of owned dogs and cats in urban centers (Serafini et al., 2008; Nunes et al., 1997; Lima Júnior, 1999; Dias, 2001; Paranhos, 2002; Dias et al., 2004; Alves et al., 2005). These estimates have been used to accurately plan and monitor government investments in public health services, such as rabies and animal control. Besides being lower than estimates of the World Health Organization for developing countries, human:dog ratios vary greatly among different areas of the country (3:1–13:1 for owned dogs) (Serafini et al., 2008; Nunes et al., 1997; Lima Júnior, 1999; Dias, 2001; Paranhos, 2002; Dias et al., 2004; Alves et al., 2005). The

same variation has been observed among different owned cat populations (7:1–86:1 for owned cats); however, fewer studies have been undertaken on them cats when compared to dogs (Paranhos, 2002; Dias et al., 2004; Garcia, 2009). It is likely that various demographic and socioeconomic characteristics of the human population in different regions may be associated with and influence the number of owned dogs and cats.

#### **2.4. Pet-owner companionship**

Historically, humans have domesticated animals mainly for their instrumental value (that is, as property, food, and the provision of labour and fibres) (Walsh 2009). At the same time, there is a long history of the use of animals as companions. The Ancient Egyptians had a penchant for cats, monkeys, and falcons. The Ancient Greeks kept dogs as household pets (Kisling 2000). Certainly, over the course of history, animals have become increasingly important as companions for humans. In many cases, animal companionship has become a human need, never more so than now in large urban centres. The urban population of the world has grown rapidly, from 751 million in 1950 to 4.2 billion in 2018, and by 2050, 68% of the world's population will live in urban areas (Department of economics and social affairs 2018). Such a major population shift has significant consequences on our well-being. In particular, urbanization seems to have contributed to the reduction in marriage rates and increased rates of childlessness, resulting in smaller household sizes. Consequently, for many people, the breadth of their social networks has been reduced both in terms of their size and their capacity for intimacy (Holt-Lunstad 2017). These demographic changes seem to have contributed to increased rates of social isolation and loneliness among both young (Matthewst et al., 2019)] and older people (Malcolm et al., 2019). A further outcome of these societal changes has been the development of a more sedentary lifestyle (Vancampfort et al., 2019), a state of affairs which can have adverse effects on both the physical and psychological well-being of individuals. As a result of the increasing rate of global urbanization, in particular the spread of mega-cities in the last decades, the role of animals as companions in enhancing human physical and psychosocial well-being has become a shared interest among animal welfare advocates, animal owners, and the individuals and organizations whose areas of interest and expertise lie within this field of

study (Shapiro and Demello 2010). Whilst acknowledging that studies on the interaction between humans and companion animals are limited, what has emerged from the studies is a general support for the notion that owning a companion animal has positive influences on the physical, psychological, and social well-being of human beings (Beck and Katcher 2003). Physically, ownership of companion animals has been associated with higher survival rates from cardiovascular diseases (Friedmann et al., 1980; Friedman et al., 1983), lower cholesterol and blood pressure levels (Anderson et al., 1992; Xie et al., 2017) fewer reports of minor health problems such as headaches, colds, and dizziness(Headey 1999), and fewer doctors' consultation sessions (Headey and Grabka 2007). In the long term, animal companionship has the propensity to reduce the community's healthcare costs (Headey 1999; Headey and Grabka 2007; Clower and Neaves 2019). Psychosocially, ownership of companion animals is associated with a higher level of self-esteem and the development of autonomy in children. It is claimed that it is a protective factor against the onset of loneliness among the elderly (Antonacopoulos and Pychyl 2010; Goldmeier 1986; Banks and Banks 2002). It can result in the reduction of anxiety, the adoption of a more positive outlook on life, and a greater perceived competence on the part of senior members in society (Shiloh et al., 2003). Despite this general consensus with respect to the benefits of owning or having access to a companion animal, it needs to be taken into account that the relationship between companion animal ownership and the enhanced well-being of individuals is a complex phenomenon and can be influenced by a significant number of factors, all of which can cause variance in the nature and extent of these benefits. In the literature published to date on this issue, the gender, age, marital and socio-economic statuses, type of dwelling, and availability of social support of the owners have been identified as common confounders (Endenburg et al., 1990), challenging prevailing beliefs about the value and nature of ownership of companion animals. For instance, in a cross-sectional web-based survey on the association between companion animals and depression, it was found that principally, marital status and gender were the factors which affected the depression score of the participants. Furthermore, the protective effect of having either a dog or a cat was only valid for unmarried women. In fact, unmarried men with a dog or cat were reported to have the highest level of depression symptoms (Tower and Nokata,

2006). Again, an increase in age on the part of the owner of a companion animal has also been found to be negatively associated with the owner's well-being, possibly due to their diminishing ability to take care of the animal and their fear of loss and separation (Needell and Mehta-Naik 2016; Parslow et al., 2005). Companion animal owners' who have high level of social support have been found to benefit more from animal ownership than those with a lower level of support (McConnell et al., 2011).

## **2.5. Zoonotic diseases from pet animals**

Pet ownership can have health, emotional and social benefits; however, pets can serve as a source of zoonotic pathogens. One large, regional survey reported more than 75% of households having contact with a pet (Stull et al., 2012) and close, intimate interactions with pets (e.g., sleeping in beds with owners, face licking) are common (Stull et al., 2013). Additionally, surveys suggest that the general public and people at high risk for pet-associated disease are not aware of those risks or recommendations to reduce risk; for example, 77% of households that obtained a new pet following a cancer diagnosis acquired a high-risk (Stull et al., 2014). This statistic is not surprising- studies suggest physicians do not regularly ask about pet contact, nor do they discuss the risks of zoonotic diseases with patients, regardless of the patient's immune status (Stull et al., 2012; Stull et al., 2014; Hill et al., 2012).

People may acquire pet-associated zoonotic infections through bites, scratches or other direct contact of the skin or mucous membranes with animals, contact with animal saliva, urine and other body fluids or secretions, ingestion of animal fecal material, inhalation of infectious aerosols or droplets and through the bite of arthropods and other invertebrate vectors (Mani and Maguire 2009). Through these mechanisms, companion animals are a potential source for more than 70 human diseases (Stull et al., 2013; Mani and Maguire 2009; Chomel 2014) but this number is likely an underestimate given the molecular and epidemiologic evidence of the interspecies exchange of pathogens, such as multidrug resistant bacteria (Morris et al., 2012). Patient surveys and epidemiologic studies on the topic suggested that the occurrence of pet associated disease is low overall (Stull et al., 2012; Glasser et al., 1994). Owing to a relative absence of reportable pathogens and complicating factors (e.g., non-pet exposure pathways, frequent subclinical shedding by

pets), the proportion of human disease attributable to pets is unknown, and any reported frequency of such infections is likely underestimated. Yet, pet contact has been identified as a risk factor for many diseases, with case–control studies and molecular typing data strongly supporting pet sources for bacterial (e.g., *Campylobacter*, *Salmonella*), fungal (e.g., dermatophytes), parasitic (e.g., *Toxoplasma gondii*) and viral pathogens (e.g., lymphocytic choriomeningitis virus) (Chomel 2014; Mughini et al., 2013; Younus et al., Mermin et al., 2004; Whitten et al., 2014). Although pets do not typically directly transmit arthropod-borne diseases to people (e.g., Lyme borreliosis, ehrlichiosis, and anaplasmosis), they do bring the zoonotic disease vectors — ticks and fleas — in close proximity to people, potentially increasing disease risk.

Despite the small role pets are likely to play in the overall transmission of pathogens, disease risk is not uniform; pet (e.g., species, age), management (e.g., housing) and patient factors influence risk. Based on cohort and case–control studies, young children (age < 5 year) and older adults (age  $\geq$  65 yr), patients who are immune-compromised and pregnant women are at increased risk for zoonotic diseases, may have more severe disease, may have symptoms for a longer duration, or may have more severe complications than other patients (Hung et al., 2007; Gradel et al., 2009; Kourtis et al., 2014). The immune-related mechanisms for increased disease risk are incomplete immune development, waning immune response, temporary hormone-induced immune suppression, such as in pregnancy, or congenital or acquired immune-deficiencies (e.g., metabolic diseases and cancer) (Mani and Maguire 2009). In addition, children (notably those aged 3–5 yr) and some people with developmental disabilities may have suboptimal hygiene practices or higher risk contacts with animals that further increase risk (Stull et al., 2013). Furthermore, the specific immune deficiency may increase risk for particular pathogens; for example, newborn infants may be at increased risk of invasive salmonellosis, and pregnant women may be more likely to acquire lymphocytic choriomeningitis. However, this area is poorly understood (Meyer et al., 2013).



## **2.6 Pathogens associated with pet animals**

Although many pathogens can be transmitted from pets to people, the pathogens of particular concern are less numerous. The pathogens of greatest concern are described below:

### **2.6.1 Bacteria**

#### ***Bartonella* species**

Bartonellosis often induces lymphadenopathy and fever in patients with competent immune systems. More severe disease (e.g., bacteremia, endocarditis, neuroretinitis and proliferative lesions on the skin, liver or spleen) can occur in high-risk patients (Breitschwerdt, 2014). Cats (especially juveniles) are the reservoir for *Bartonella clarridgeiae* and *Bartonella henselae*, with transmission most commonly occurring from a cat scratch (claws can become contaminated with feces from infected fleas) or flea bite (Breitschwerdt, 2014).

#### ***Campylobacter jejuni***

Self-limiting diarrhea, vomiting and fever are common in *Campylobacter jejuni* infection. In high-risk patients, septicemia and diarrhea (with relapses) may be seen. Several pet species can transmit *C. jejuni*, most notably dogs and cats, passing infectious organisms in their feces. Juvenile dogs and cats are more likely to shed *Campylobacter* species than their mature counterparts, and recent acquisition of a puppy or kitten is associated with the highest risk of transmission (Mughini et al 2013).

#### ***Capnocytophaga canimorsus* and *Pasteurella multocida***

These organisms are common commensals in the oral cavity of dogs and cats. Transmission generally occurs through the bite of an infected or colonized animal or contact with saliva (such as by licking) on mucous membranes or an open wound. In patients at high risk, severe wound infections, sepsis, disseminated intravascular coagulation or death can occur. Patients with no spleen, older adults and people with

alcohol dependence are at particularly increased risk for infection with *Capnocytophaga canimorsus* (D Boer et al., 2007).

### ***Salmonella* species**

In immunocompetent people, salmonellosis most often results in self-limiting gastrointestinal disease, although serious disease can develop. The disease can be more severe in patients at high risk, resulting in bacteremia or serious systemic and localized infections, such as meningitis (in newborns) and osteomyelitis (in patients with sickle cell anemia). Although many pet species have been implicated in human disease, amphibians, reptiles, exotic animals, rodents and young poultry pose the greatest risk. Reptiles and amphibians are estimated to be responsible for 11% of all sporadic *Salmonella* infections among patients less than 21 years of age, and direct contact with such animals is not required for zoonotic transmission. In one study, 31% of reptile-associated salmonellosis cases occurred in children less than 5 years of age and 17% occurred in children aged 1 year or younger; these findings highlight the heightened risk in children and the potential for reptile-associated *Salmonella* to be transmitted without direct contact with the animal or its enclosure (Whitten et al., 2014). Outbreaks of pet-associated salmonellosis involving hedgehogs, rodents, young poultry, frogs and turtles have recently been reported, in which children accounted for a high proportion of cases (35%–70%) (Centers for disease control and prevention 2014). In addition, various animal foods (e.g., raw meat, raw eggs and raw treats such as pig's ears) are commonly contaminated with *Salmonella* species. The feeding of these products are well-established risk factors for salmonellosis in pets, and associated human outbreaks have been identified (Leonard et al., 2011; MMWR et al., 2006).

### **2.6.2 Parasites**

#### ***Cryptosporidium* species and *Giardia duodenalis***

Subclinical or self-limiting diarrhea is generally observed with cryptosporidiosis and giardiasis, with weight loss and chronic diarrhea in high-risk patients. For cryptosporidiosis, symptoms may vary with the species or genotype of infection. Although most *Giardia* assemblages are species-specific, several are found in both

animals and people with documented zoonotic transmission. Several pet species may harbor zoonotic *Cryptosporidium* and *Giardia*, including dogs and cats, which can pass the organisms in feces.

### ***Toxocara* species**

*Toxocara* (roundworm) infection in humans typically involves subclinical or self-limited disease, but ocular or visceral larva migrans disease may develop in a small subset of patients. The highest risk is in young children owing to an increased likelihood of high inoculum after the ingestion of dog or cat feces containing ova (Lee et al., 2014). Because most household pets are regularly dewormed and larvae require two to three weeks after being passed in feces to become infective, the risk of exposure is highest after contact with soil contaminated with waste from untreated or stray animals, such as in sandboxes, gardens or playing fields (Stull et al., 2013; Lee et al., 2014).

### ***Toxoplasma gondii***

Subclinical or self-limited febrile illness and lymphadenopathy are the most commonly reported symptoms after infection with *Toxoplasma gondii* in immunocompetent patients. Toxoplasmosis is of greatest concern in previously non-immune pregnant women and immunocompromised patients, regardless of exposure status; in such patients, congenital defects and encephalitis or meningitis can occur (Mani & Maguire 2009; Glasser et al., 1994). Cats serve as the definitive host for *T. gondii*; however, food and the environment are the main sources of infection for humans.

## **2.6.3 Fungus**

### **Dermatophytes**

*Microsporiumcanis* and *Trichophyton mentagrophytes* (e.g., ringworm) are the principal dermatophyte species of zoonotic importance. Severe disease is uncommon in immunocompetent patients, but disseminated infections can occur in immunocompromised patients.

### **3 Materials and Methods**

#### **Study design:**

This cross-sectional study was conducted among pet owners of Chattogram metropolitan areas. Chattogram is the second largest city of Bangladesh possessing modern societies who have reared pets. A convenient sampling technique had used in this study and eligible population was invited to participate in this online survey. Participation in this study was fully voluntary and proceeds to the main parts of questionnaire upon informed consent. No incentives were given to any respondent.

#### **Data collection:**

Data were collected in between February to April 2021. We developed a survey questionnaire using Google form consulting with experienced veterinarians and epidemiologists. Though the questionnaire was developed in English, it had translated into the Bengali-mother tongue of participants. The survey link was distributed through different social networks and personal email to target participants. Total 480 persons were contacted for this survey and finally 350 complete responses were collected. Most of the questions were multiple choice checkbox type with “Yes” and “No” options. However, ‘I do not know’, ‘not sure’, and ‘other’ options were also included. Open ended short answer type questions were also provided. The aim and objectives of the study were clearly explained at the beginning of the survey.

#### **Data analysis:**

The obtained information was imported and stored using Microsoft Excel sheet directly from Google form. The dataset was checked for consistencies and incomplete responses were deleted from the final dataset. Then the final dataset was coded, entered and analyze using the Statistical Packages for Social Sciences Software (SPSS). Frequencies were calculated for categorical variables. On the other hand, mean and standard deviation were measured for continuous variables. Finally, Chi square test was performed to represent the association of variables with the occurrence of skin injury.

**Ethical approval:**

This work obtained ethics approval from the Chattogram Veterinary and Animal Sciences University ethics committee with memo no: CVASU/Dir(R&E)EC/2019/126(8) dated 29/12/2019. All research participants were assured that the data would be kept private and use for research purposes only. Moreover, each participant had the right to leave the interview of this study at any time.

#### 4. Results

Among the total participants (n=350), female was comparatively higher (58.3%) than the male (41.7%). Most of the pet owners were young aged ranges from 18 to 26 years (43.4%) followed by 27 to 35 years (30.9%). More than half of the owners were graduates (55.4%) whereas 20.9% were college level students and 10% were studying in secondary schools. Most adopted pets were found to be cat (58.3%) and then dogs (30.1%). However, 5.2% were reared different pet birds among the participants. Participants mostly reared pet within 6 months (42.4%) to 4 years (40.3%) age range (Table 1).

**Table 1:** Demographic characteristics of pet owners participated in the study

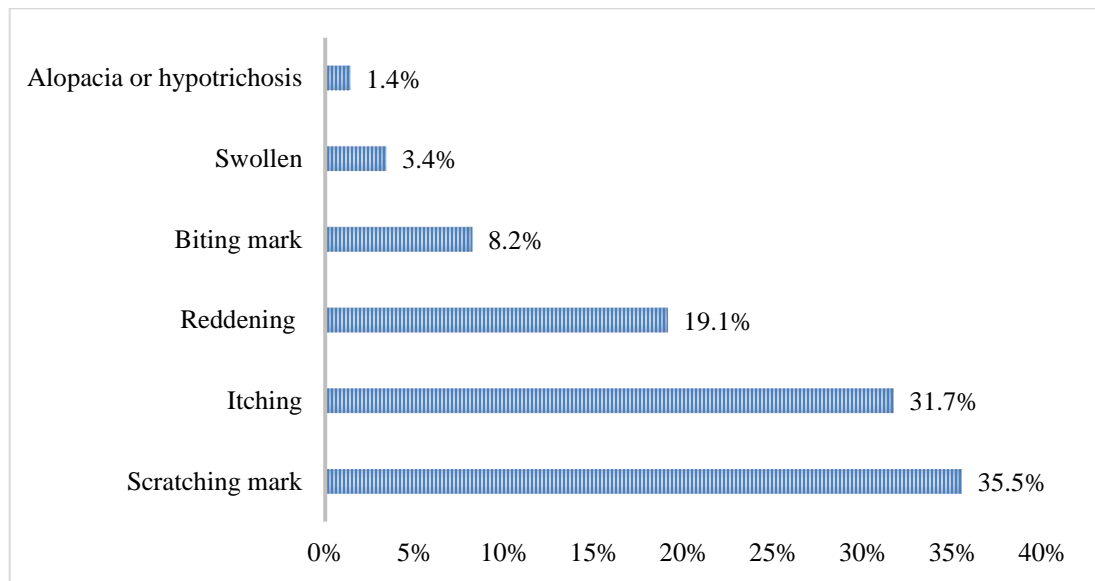
	Categories	Frequency	Percent
Type of pet	Dog	104	30.1
	Cat	201	58.3
	Dog & Cat	22	6.4
	Bird	18	5.2
Age of pet owner	Below 18 years	27	7.7
	18 to 26 years	152	43.4
	27 to 35 years	108	30.9
	36 to 44 years	35	10
	45 years to above	28	8
Sex	Male	146	41.7
	Female	204	58.3
Education	Secondary school	35	10
	College	73	20.9
	Graduate	194	55.4
	Post graduate	48	13.7
Age of pet	<6 month	28	8.2
	6 months to <2 year	144	42.4
	2 years to <4 year	137	40.3
	4 years to above	31	9.1

Table 2 presents different factors associated with the skin injuries of pet owners' and their treatment patterns. More than fifty percent, (53.9%) of the participants had the record of any skin injury by their pet. Among the total injured participants, 51.7% were affected by scratching of dog or cat and 15.5% were from biting. However, 24.1% had no idea on how they got injured. The lesions of skin injury had suddenly observed by 67.1% of owners and gradually seen in 32.9% of cases. Among infected owners, 36.9% were required to visit doctor for their injury. Higher number of injuries (59.52%) was reported in hands of owners followed by legs (23.81%). The sign of injury existed for average 9.07 days with minimum 1 day to maximum 90 days.

**Table 2:** Profile of skin injury of pet owner and management history

	Categories	Frequency	Percentage
Skin injuries by pet	Yes	188	53.9
	No	161	46.1
Type of injuries	Scratch	90	56.6
	Bite	27	16.98
	Don't know	42	26.4
Onset of skin lesion	Suddenly	110	67.1
	Gradually	54	32.9
affected body parts	Hand	100	59.52
	Leg	40	23.81
	Mouth	14	8.33
	Other body parts	14	8.33
Needed to consult with a doctor	Yes	59	36.9
	No	101	63.1
Use of any ointment	Yes	53	55.2
	No	43	44.8
How long time the problem had existed?	Minimum: 1 day Maximum: 90 days Mean: 9.07 days Standard deviation: 9.27		

Participants recognized different symptoms of their injured skin which are depicted in Figure 2. The most commonly reported symptom was scratching mark on the injured skin (35.5%) followed by itching phenomenon (31.7%) and reddening of the affected site (19.1%). Moreover, biting mark (8.2%) swollen (3.4%) and alopecia or hair loss in the affected site (1.4%) was also reported in this study.



**Figure 2:** Common lesions of affected skin reported by the participants.

Type of pet animal has no significant association with the injury of skin. On the other hand, type of injury and the affected body parts shows statistically significant association with the species of pet animal. Cats were mostly injured mouth (71.4%) and hands (63.9%) whereas, dog mostly affect legs of the owner (52.5%) (Table 3).



**Table 3:** Association of skin injuries with the type of pet animals

	Dog (%)	Cat (%)	Dog and Cat (%)	Bird (%)	P value
Skin injury by pet					
Yes	52 (28.1)	115 (62.2)	13 (7)	5 (2.7)	0.077
No	52 (32.7)	85 (53.5)	9 (5.7)	13 (8.2)	
Type of injury					
Scratching	25 (27.8)	60 (66.7)	5 (5.6)	0	0.003
Biting	12 (44.4)	9 (33.3)	5 (18.5)	1 (3.7)	
Don't know	11 (27.5)	20 (50)	3 (7.5)	6 (15)	
Onset of lesion					
Suddenly	29 (27.1)	63 (58.9)	11 (10.3)	4 (3.7)	0.417
Gradually	21 (38.9)	28 (51.9)	3 (5.6)	2 (3.7)	
Affected body parts					
Hand	25 (25.8)	62 (63.9)	8 (8.2)	2 (2.1)	0.000
Leg	21 (52.5)	17 (42.5)	1 (2.5)	1 (2.5)	
Mouth	2 (14.3)	10 (71.4)	1 (7.1)	1 (7.1)	
Other parts	2 (14.3)	5 (35.7)	4 (28.6)	3 (21.4)	
Needed to consult with a doctor					
Yes	24 (40.7)	28 (47.5)	5 (8.5)	2 (3.4)	0.292
No	27 (27.6)	60(61.2)	6 (6.1)	5 (5.1)	

Effect of different lifestyle related factors of owners on the occurrence of injury have represented in the Table 4. However, no variable shows significant effect on the occurrence of skin disease of pet owner. Among infected owners, 54.4% were not regularly provided anthelmintic to their pet and 53.8% were shared their sleeping bed with their beloved pet.

**Table 4:** Association of life style and occurrence of skin injury

	No injury	Got injury	P value
Do you wash your hand after handling pet animal?			
No	4 (36.4)	7 (63.6)	0.366
Yes	157 (46.4)	181 (53.6)	
Do you share your food with pet?			
No	148 (45)	181 (55)	0.065
Yes	13 (7)	7 (35)	
Do you share your bed with your pet?			
No	83 (46.1)	97 (53.9)	0.54
Yes	78 (46.2)	91 (53.8)	
Do you clean your house using disinfectant?			
No	38 (49.4)	39 (50.6)	0.304
Yes	123 (45.2)	149 (54.8)	
Do you administer anthelmintic on regular basis?			
No	62 (45.6)	74 (54.4)	0.479
Yes	99 (46.5)	114 (53.5)	
Do you vaccinate your pet?			
No	31 (55.4)	25 (44.6)	0.086
Yes	130 (44.4)	163 (55.6)	
Do you regularly trim the nail of your pet?			
No	29 (53.7)	25 (46.3)	0.143
Yes	132 (44.7)	163 (55.3)	

## **5. Discussion:**

More than 50% of the participants had the record of any sorts of skin injury by their pet. Many breeds of dogs have been involved in fatal or nearly fatal attacks on humans, the majority of cases involve pit bull-type dogs, Rottweilers, and German Shepherds, most of whom were unrestrained on their owner's holdings (Abuabara 2006; Ellis and Ellis, 2014). A year-round study in Pennsylvania, USA reported 16,000 animal bites in which 75% were associated with dog and the highest incidence of dog bite was among children less than 5 years old (John EB and Luanne F, 2015). In Sweden, 3 in 1000 citizens are injured by animals each year. A cat bites 1 in every 170 people each year, and 80% of these bites become infected (John EB and Luanne F, 2015). None of such study found to be conducted before in Bangladesh.

In this study, among the total pet owners (n=350), female was comparatively higher in percentage than the male which was supported by some previous studies where they have found that, cat bites are more common in women than the male (Matter and Sentinella 1998, Palacio 2005). Biting cats are typically stray females, and most human victims are female (John EB and Luanne F, 2015). However, some studies also reported opposite findings like men have higher incidence than the female (McBean et al., 2007, Hon et al., 2007). Most of the pet owners were young aged ranges from 18 to 35 years. Individuals aged under 20 years are associated with a higher incidence of injury (McBean et al., 2007, Hon et al., 2007). Among the total injured participants, 51.7% were affected mostly by scratching and biting. Cats are more likely to scratch than to bite, and with those scratches comes the risk of cat-scratch disease.

In this study we have found that, 36.9% injured owners were required to visit doctor for their injury. This finding is supported by a previous study conducted in the United States they have shown that, three-quarters of injured persons had to receive wound treatment, and one-half antimicrobials (John EB and Luanne F, 2015). A review of eight randomized controlled trials found that the use of prophylactic antibiotics was not effective for cat or dog bites, except in the case of bites to the hand. studies recommend the use of prophylactic antibiotics only for high-risk wounds or patients. Five percent of

dog bite victims and 29% of cat bite-scratch victims returned with complications, mostly cellulitis or lymphangitis (Kizer 1979).

Among infected owners, a significant number were not regularly provided anthelmintic and vaccine to their pet. Strategically anthelmintic treatments for dogs and cats have been recommended as an important tool for the control of parasites (Clower and Neaves, 2015). A study of Bugg et al., observed that, a high percentage of owners had wormed their dogs by giving fewer doses of anthelmintics than recommended. More than half of the owners were shared their sleeping bed with their beloved pet. Type of injury had significant association with the species of pet animal. Literature stated that roughly 60% of animal bites are related to dogs, with 10–20% attributed to cats. Moreover, affected body parts shows significant association with the species of pet animal. Cats mostly injured in mouth and hands whereas, dog mostly affect legs of owner. Cat bites are most likely to involve the upper extremities and face (Kravetz and Federman 2002).

## **6. Limitations of the study:**

1. Small size of dataset limits different variables to be significant and to represents the effect more precisely.
2. This study used online based data collection approach which caused the incomplete responses.
3. Lack of literature on similar studies restricted the proper interpretation of discussion points. Previous studies were on pet animal diseases in Bangladesh mostly diseases and disorders of pet dogs.
4. Specific skin disease of owners caused by pet animals could not clearly demonstrate by the study.
5. Social factors of pet owners were not clearly revealed.
6. Another general research problem is that causality cannot be inferred because the study was cross-sectional.

## **7. Conclusion:**

Pet owners are often unaware of the potential for transmission of skin diseases from their canine and feline companions. Alike many other countries, pet bite injuries are an emerging cause of injury in Bangladesh, particularly in children. Bites to the hands, fore arms, neck, and head have the potential for the highest morbidity. Pet associated skin injuries are preventable via early recognition, education of owners, and simple precautions. Therefore, health educational program should be introduced for pet owners.

## **8. Recommendations**

This study recommended to conduct a further in-depth study to depict the broader aspect of the issue. Awareness campaign should be taken for regular deworming, vaccination, and health checkup of pet animal. Health educational program should be introduced for pet owners involving veterinarians and physicians.

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