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Behavioral Factors and Work-related Illnesses among Animal Traders in the Largest Night Market in Thailand

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Abstract

People who keep animals for trade or as pets are groups that encounter one of the highest risks for zoonotic diseases through close contact. This issue needs attention because zoonosis has been an important health problem around the world. The objective of this study was to investigate the behavioral factors associated with work-related illnesses among animal keepers and pet sellers in the largest night market of Thailand, located in Nakhon Ratchasima Province. A cross-sectional study was conducted using a questionnaire and a walk-through survey in the market during 1 Jan and 28 Feb 2015. Out of 75 animal traders, 60 responded to our questionnaire. Common injuries were animal scratches (56.7%), and bites (26.7%). Results from the multiple logistic regressions revealed a relationship between direct contact with animals and illnesses (odds ratio = 11.56, 95% CI = 1.16-115.20). Adequate education and promoting awareness among the animal traders who had prolonged exposure and direct contact with animals should be a main control strategy for prevention of work-related illnesses.

Keywords: Occupational infection, surveillance, work-related illnesses, zoonosis

Introduction

Diseases transmitted from animals to humans, zoonoses, pose a significant public health impact worldwide. More than 75% of the infectious disease epidemics around the world were transmitted from animals to humans through skin lesions, consumption or breathing.¹⁻⁵ Emerging zoonotic diseases can also occur by increasing people interaction with animals such as intruding into wildlife areas, keeping wild animals as pets, and bringing wild animals closer to domestic animals.¹ Epidemic could happen at any time as long as humans expose to infectious pets, and animals used for experiments and commercials.¹⁻⁵

Zoonotic diseases have been a challenge for both veterinarians and public health professionals in Thailand as well. People who keep animals for trade or as pets have one of the highest risks for zoonotic diseases through close contacts. Study on illnesses

caused by contact between animals and humans would be helpful for development of a surveillance system that can detect the diseases even before an outbreak occurs in the community. Therefore, this study was conducted to determine types of illnesses and factors contributing to the illnesses among pet sellers at the largest night market in Thailand.

Methods

The study was carried at a night market called "Save One Market" in Nakhon Ratchasima Province, in the northeastern region of Thailand. We conducted a cross-sectional survey using a questionnaire among animal traders who keep and sell animals in the market from 1 Jan to 28 Feb 2015.

The Institutional Review Board of the Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, approved the study and all participants

provided a written informed consent prior to participation (COA No. 144/2015, IRB No. 479/57).

Data on animal keeping and selling practices, chances of contact with animals and risk of infecting the contagious diseases between animals to humans was collected by face-to-face interview. Sick people were defined as animal sellers or care-takers who felt sick or had fever and sought medical attention for any reasons, except chronic diseases or accidents, during the previous 12 months.

Statistical Analysis

Illnesses of all respondents were described as distribution of acute illnesses, chronic illnesses and injuries from working with animals. Acute illnesses during the previous year were used as a dependent variable for further analyses. Univariate analyses were employed using logistic regression. Key variables, based on literature and biological possibility, and variables with statistical significance using alpha value equal 0.05 from the univariate analyses were included in multivariate analysis. Adjusted odds ratio (OR) and 95% confidence interval (CI) were calculated to examine the relationship between exposures and illnesses.

Results

Nakhon Ratchasima is a northeastern province in Thailand, with 2,614,552 population in 2015. There are approximately 4,000 stores in the night market on 14 hectares of land (Figure 1). Approximately 8,000 sellers and visitors were in the market every night. There were about 120 stores selling pets.

Sixty (80.0%) out of 75 animals sellers and keepers in the night market responded to the questionnaire. Median age of the participants was 37.5 years, ranged 15-75 years, and 53.3% were male. About half (51.7%) of them had been working with animals for more than five years and 35.0% of them had educated up to high school. Majority (73.3%) of them kept the animals in their own houses while others raised or stocked the

animals in rented houses (18.3%), row houses (6.7%) and apartments (1.7%). A total of 34 persons (56.7%) reported acute illness during the previous year, and most of them had dermatitis (61.8%) and acute diarrhea (61.8%) during the previous year (Table 1).

About 43.3% of participants had chronic diseases that needed continuous medication, including allergies (50.0%), hypertension (50.0%), dyslipidemia (23.1%), diabetic mellitus (11.5%) and asthma (7.7%). Most common injuries from animal attack were scratches (56.7%), followed by bites (26.7%) (Table 1).

Results from the univariate analyses showed an association between acute illnesses of animal traders and characteristics of animal keepers or sellers who worked with animals for more than five years (OR = 4.70, 95% CI = 1.38-16.45). Types of exposure that were significantly associated with illnesses include direct contact (OR = 17.47, 95% CI = 2.03-788.13), contact with sick animals (OR = 3.46, 95% CI = 1.05-11.64), and contact with animal feces (OR = 4.66, 95% CI = 1.27-18.15). Although contact with dead animals without protective equipment had a strong association, it was not statistically significant (OR = 4.18, 95% CI = 0.93-25.61). Similarly, although wearing gloves regularly when contact with animals did not show a statistically significant association, it appeared to be a factor that could promote disease prevention (OR = 0.28, 95% CI = 0.06-1.10) (Table 2).

The multiple logistic regression analysis revealed a significant relationship between direct contact with animals and illnesses (adjusted OR = 11.56, 95% CI = 1.16-115.20) (Table 3). The total number of analyzed population (n) in the final model was 60.

Discussion

Analyses of the illnesses among animal keepers and sellers showed that people who were directly exposed to animals were at higher risk of getting sick. There were incidences showing that direct exposure with animals was a primary source of infections such as in



Figure 1. Atmosphere of the "Save One Market" in Nakhon Ratchasima Province, Thailand, during 17:00 to 21:00 on 1 Jan to 28 Feb 2015

Table 1. Types of illnesses of the respondents at the “Save One Market” in Nakhon Ratchasima Province, Thailand, 1 Jan to 28 Feb 2015

Variable	Number of people	Percent
Acute illnesses during the previous year (n = 34) (Remark: some persons had more than 1 disease)		
Dermatitis	21	61.8
Acute diarrhea	21	61.8
Conjunctivitis	8	23.5
Pyrexia of unknown origin	3	8.8
Influenza-like illness	2	5.9
Pneumonia	1	2.9
Chronic diseases that needed continuous medication (n = 26) (Remark: some persons had more than 1 disease)		
Allergy	13	50.0
Hypertension	13	50.0
Dyslipidemia	6	23.1
Diabetic mellitus	3	11.5
Asthma	2	7.7
Injuries from animal (n = 60)		
Scratch	34	56.7
Bite	16	26.7
Muscle strain from handling animal	6	10.0
Jostle and stabbed	3	5.0
Gored	1	1.7

Table 2. Univariate analyses showing associations between acute illnesses and characteristics of animal keepers and sellers at the “Save One Market” in Nakhon Ratchasima Province, Thailand, 1 Jan to 28 Feb 2015

Variable	Number of sick people (%) (n=34)	Number of healthy people (%) (n=26)	Crude odds ratio	95% CI
Characteristics				
Male gender	19 (55.9)	13 (50.0)	1.27	0.40-3.99
Education lower than bachelor degree	14 (41.2)	7 (26.9)	1.90	0.56-6.80
Having a chronic disease	18 (52.9)	8 (30.8)	2.53	0.77-8.57
Working with animals for >5 years	23 (67.6)	8 (30.8)	4.70	1.38-16.45
Types of exposure with animals				
Direct contact	33 (97.1)	17 (65.4)	17.47	2.03-788.13
Contact with sick animal	22 (64.7)	9 (34.6)	3.46	1.05-11.64
Contact with dead animal without protective equipment	12 (35.3)	3 (11.5)	4.18	0.93-25.61
Contact with animal mucous or blood	15 (44.1)	8 (30.8)	1.77	0.54-6.06
Contact with animal feces	28 (82.4)	13 (50.0)	4.66	1.27-18.15
Washing and cleaning animal keeping equipment	26 (76.5)	14 (53.8)	2.78	0.81-9.80
Factors that promote disease prevention				
Wearing gloves regularly when contact with animals	5 (14.7)	10 (38.5)	0.28	0.06-1.10
Frequently using a protective mask when expose to animals	10 (29.4)	8 (30.8)	0.94	0.27-3.35
Wearing proper clothing: long sleeves, long pants	3 (8.8)	4 (15.4)	0.53	0.07-3.53
Routinely wearing boots while working	7 (20.6)	5 (19.2)	1.09	0.25-5.01
Routinely washing hands after working with animals	20 (58.8)	13 (50.0)	1.42	0.45-4.59
Sharing a drinking glass with others (compared to never share)	6 (17.6)	7 (26.9)	0.58	0.14-2.40
Inadequate zoonosis disease proficiency	26 (76.5)	24 (92.3)	3.69	0.63-38.33

an outbreak of severe encephalitis in Malaysia during 1998-1999⁷. Q fever is considered primarily as an occupational disease among workers who are in close contact with farm animals as well.⁸

Table 3. Multiple logistic regression estimating relationships between exposures and illnesses among animal keepers and sellers at the “Save One Market” in Nakhon Ratchasima Province, Thailand, 1 Jan to 28 Feb 2015 (n=60)

Factors related to illnesses	Adjusted odds ratio*	95% CI
Direct contact with animals	11.56	1.16-115.20
Duration of work >5 years	3.13	0.86-11.36
Contact with sick animals	2.10	0.57-7.73
Contact with animal feces	1.13	0.23-5.65

*Odds ratio of each variable was adjusted for all other variables in the table.

The most common injuries resulted from animal attack in animal keepers and sellers were scratches and bites. Close contact between animal keepers and sellers and animals in the market zone offers favorable conditions for transmission of diseases by both direct contact (petting, licking or physical injuries) and indirect contact through contaminated food and domestic environments.¹⁻⁵ Risk of misdiagnosis and potential development of severe infections in immune-compromised patients are also the main concern. *Bartonella* bacteremia is most frequent in stray cats, cats in shelters/catteries and young cats infested with fleas.⁹ Being bitten is potentially dangerous too because dogs and cats harbor diverse microbiota and multiple potential zoonotic pathogens in their oral cavities¹⁰.

The exposure to dead animals without wearing protective equipment significantly increased the risk of getting sick. Although this study showed strong association by crude analysis, it was not statistically significant in multiple logistic regression, which might be due to small sample size and broad definition of the illness. In addition, those who worked with animals for more than five years also had high risk in getting sick compared with those who had less experience. It might be due to inadequate use of personal protective equipment among keepers and sellers as they were being less careful or longer exposure to animals. Although the awareness on risk factors among workers increased with longer work experience, it was determined that they did not have adequate information on occupational risk factors. Prolonged and unprotected exposure to environmental factors could constitute a risk for illness.¹¹ A protective equipment, especially gloves, is

very crucial. Continuous education and training on using personal protective equipment appropriately should be a main control strategy for prevention of occupational infection among animal sellers. In addition to vaccination, standard and additional precautions (also known as universal precautions), and hand-washing should be followed. Awareness on occupational infection in people who are in close contact with animals should be increased for physicians as well.

Even though the market was orderly divided into zones, the risk of disease outbreak was still high due to crowdedness of the market. If an epidemic started at any point of the market, it could be spreading quickly throughout the market and would be difficult to control or investigate the causes. Consequently, developing a system to prevent a disease outbreak as a whole would be difficult. The group with the highest risk should be identified and tracked for early detection of the outbreaks. Furthermore, a routine animal-human health surveillance system should be developed in a population at risk, especially among those who directly expose to animals as part of the occupation to reduce or prevent outbreaks of zoonotic diseases in Thailand. Etiology of illnesses should be explored by further studies to provide basic information for the surveillance system.

Conclusion and Recommendation

Keeping or selling animals in the night market posed a high risk of getting ill through direct contact with animals. Thus, when those people were getting sick, their work information should be informed to the medical practitioner to highlight zoonosis as one of the possible causes for the illness. Wearing gloves, boots and masks while touching animals could reduce the risk of illnesses. Adequate education and promoting awareness among the sellers should prevent occupational zoonotic diseases. The information acquired from this study could be used to develop a passive surveillance system for zoonoses in both sellers and visitors to pet markets in Thailand.

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Suggested Citation

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