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Original Article

A Knowledge and Practices study of health hazards among animal handlers in zoological gardens

Abstract:

Background: Close association with animals makes zookeepers a high risk group for suffering from various zoonotic diseases. Thus, it is important that they are able to protect themselves from these diseases and injuries through prevention awareness. **Objective:** To study the knowledge, attitude and practices regarding health hazards among animal handlers in zoological gardens. **Methods:** A questionnaire based cross-sectional study conducted in the National Zoological Park, New Delhi, India involving all 66 employees, including 49 who were directly involved in taking care of animals. **Result:** About 86% of the total participants perceived a risk of suffering from disease or injury due to animal handling. Allergies, tuberculosis and bird flu were commonly perceived risks from animal handling. Majority (69.7%) suggested isolation of animals with infectious diseases. About 65% and 37% were vaccinated for tetanus and rabies respectively. Headache (83.3%), itching (80.3%) and vomiting (77.3%) were the most commonly stated symptoms of zoonotic diseases. While handling animals 59.2% had at least once got injured, after which they were mostly taken to the doctor (79.3%). Only 24.5% had attended training program on zoonotic diseases. **Conclusion:** There were many lacunae in the knowledge and practices of animal handlers regarding prevention, control and treatment of zoonotic disease and injuries due to animal handling. Training sessions for prevention of zoonotic diseases and injuries are absent. It is important that these issues are addressed promptly and adequately. Also, such study must be conducted in other zoos as situation analysis activity to plan training programmes.

Key Words: Animal Handlers; Knowledge; Practices; Zoonotic diseases; Tuberculosis.

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Introduction

A zookeeper is responsible for feeding, maintaining, cleaning of the animals, diet preparation, behavioral observation, record keeping, exhibit maintenance and, providing environmental enrichment for the animals in their care [1]. Certainly, such close association with animals makes zookeepers a high risk group for suffering from various zoonotic diseases for example rabies, dengue, anthrax, brucellosis, plague etc. and injuries while handling the animals. For prevention of such health hazards to the animal handlers, one of the prime steps is to understand their perception of such potential risk and a quantitative assessment of the risk; so that it can be utilized for reduction of such risks.

Studies in this field are very limited throughout the world making it one of the least studied areas. There are a few studies conducted in western countries studying the prevalence of some specific zoonotic diseases among zookeepers [2, 3, 4, 5, 6, 7]. Similarly, a few researchers have also tried to explore the knowledge and practices of the animal handlers relating to prevention of transmission of zoonotic diseases and injuries [8, 9, 10]. In a study conducted in USA, the authors have discussed numerous hazards encountered by animal control officers as well as employees of zoo and aquarium facilities and suggested protocols for ensuring a safe workplace were presented [9].

Methods

The study was a cross-sectional study conducted in a zoological park in New Delhi, India. The zoological park had 49 employees directly involved in taking care of animals and 17 support staff in office and ministerial jobs. All employees of the zoo were invited to participate in the study; hence no selective sampling was done. A questionnaire was developed by the researchers for collecting the information. The questionnaire was developed in Hindi and was pre-tested in a small group of respondents and the necessary corrections were made before administering it to the others. All the respondents were personally interviewed.

Information was collected about socio-demographic profile,

occupational profile and specific tasks performed at the zoo. Knowledge regarding occupational hazards associated with animal handling was assessed with the help of questions pertaining to zoonotic diseases, animal and bird related allergic manifestations and injuries. Practices regarding prevention of potential health hazards and injuries at work place were also assessed using appropriate questions in the questionnaire.

Risk perception was assessed by administering questions related to the knowledge about zoonotic diseases and the perceived possibility of contacting diseases while caring for the animals. Risk assessment was carried out by enquiring about incidents of injury and past history of zoonotic diseases among the zoo keepers.

Data thus collected was converted into a digital spread sheet using MS Excel® and descriptive tables were prepared using SPSS® V 20.0

This is the first of its kind of study among zookeepers in India hence no standardized data collection tools were available. For the same reason, the findings of this study could not be compared to those of other zoos in India as there has been no such study in the past.

Results

A total of 66 participants took part in the study of which 49 came in direct contact with animals. The age of the participants ranged from 22 to 61 years with a mean of 44.36 ± 9.26. Of all the participants, 61 (92.4%) were male. Eight (12.1%) participants had received no formal education. The average duration of employment of the respondents at the zoo was 21.4 years.

About 86% of the participants perceived a risk of suffering from disease or injury due to animal handling, 7(10.6%) said there was no risk and 2(3%) said they did not know. As given in Table I, majority (65.15%) perceived there was a risk of being attacked by the animals.

Table I Perception of risk of zoonotic disease among the respondents

Possible infection/injury	No. of respondents	%
Attack	43	65.1
T. B.	37	56.0
Asthma	10	15.1
Allergy	7	10.6
Eye irritation	5	7.5
Infection	3	4.5
Diarrhoea	2	3.0
Anthrax	2	3.0
Rabies	2	3.0
Brucellosis	1	1.5
Ingesting insects	1	1.5
Others	10	15.2

The respondents were asked about specific diseases that could be caused due to animal contact. Allergies, tuberculosis and dengue were considered to be caused by animal contact by 56 (84.8%), 53(80.3%) and 43(65.2%) respondents respectively (Table II).

Table II Knowledge about diseases caused due to animal handling

	Yes (%)	No (%)	Don't know (%)
Allergies	56(84.8)	0(0)	10(15.2)
Tuberculosis	53(80.3)	1(1.5)	12(18.2)
Ringworms	49(74.2)	3(4.5)	14(21.2)
Dengue fever	43(65.2)	9(13.6)	14(21.2)
Bird flu	39(59.1)	1(1.5)	26(39.4)
Rabies	36(54.5)	0(0)	30(45.5)
Cholera/Diarrhoea	34(51.5)	16 (24.2)	16(24.2)
Plague	26(39.4)	1(1.5)	39(59.1)
Helminths	21(31.8)	5(7.6)	40(60.6)
Hydatid cyst (Echinococcosis)	16(24.2)	8(12.1)	42(63.6)
Anthrax	12(18.2)	1(1.5)	53(80.3)
Cat scratch disease	7(10.6)	0(0)	59(89.4)
Brucellosis	4(6.1)	0(0)	62(93.9)
E.Coli O157:H7	4(6.1)	1(1.5)	61(92.4)
Borrelia(Lyme disease)	4(6.1)	1(1.5)	61(92.4)
Toxoplasmosis	4(6.1)	0(0)	62(93.9)
Cowpox	4(6.1)	0(0)	62(93.9)
Cryptosporidiosis	3(4.5)	0(0)	63(95.5)
Psittacosis(parrot fever)	3(4.5)	1(1.5)	62(94)
Salmonellosis	3(4.5)	1(1.5)	62(94)
Leishmaniasis	3(4.5)	0(0)	63(95.5)
Leptospirosis	3(4.5)	1(1.5)	62(94.0)
Trichinosis	2(3.0)	0(0)	64(97)

Almost all the respondents (94%) knew that it was necessary to know where an animal is before entering an enclosure or back area and 89.5% said that there was a need to notify other keepers before moving an animal. If an animal escapes, 40 (60.6%) said they should try to catch the animal and 30(45.4%) said they should inform the authority.

When asked whether it was necessary to wear protective gears while working, 59(89.5%) said yes for gloves and mask.

Regarding need for vaccination, 62 (94%) and 57 (86.4%) of the respondents knew about vaccination against tetanus and rabies respectively.

Almost all (95.5%) respondents believed that it was necessary to have regular check-up for tuberculosis with the frequency

varying between once a year to four times a year with a maximum (53%) saying twice a year. Similarly, 57 (86.4%) said it was necessary to have annual testing for parasitic diseases. In case of common injuries, until emergency services arrive, majority (33.3%) said they should tie a bandage or cloth followed by 30.3% saying it was appropriate to apply pressure by hand. Respondents were asked to list the common symptoms and signs of zoonotic diseases. Headache (83.3%), itching (80.3%) and nausea and vomiting (77.3%) were the most commonly stated symptoms of diseases transmitted by animals.

As given in Table III, 65.3% of those who came in contact with animals were vaccinated for tetanus and 38.7% for rabies.

Table III Vaccination status of the workers

Diseases considered for vaccination	Received Vaccine		Don't know (%)
	Yes (%)	No (%)	
Rabies	19(37.8)	28(58.2)	2(4.0)
Tetanus	32(65.3)	16(32.7)	1(2.0)
Hepatitis B	8(16.3)	37(75.6)	4(8.1)
Lyme disease	0(0)	42(85.8)	7(14.2)
Plague	1(2.0)	43(87.8)	5(10.2)
Bird flu	1(2.0)	46(94.0)	2(4.0)

Three (6.1%) workers had blood test for dengue and 1(2%) had a stool test for parasitic diseases last year. Twenty-nine (59.2%) had at least once got injured while handling animals. In the most recent incident, majority of them got superficial scratches (37.9%) followed by deep wound (34.4%), animal bite (17.2%) and others (10.3%). On getting injured, the workers were mostly taken to the doctor (79.3%). The others applied first aid themselves (13.7%) or used home remedy (7%).

In case of outbreak of an infection in any zoo animal, about 96% respondents said that the animal was kept in quarantine and 98% said it was treated. Also, 94% said that the animal was never killed and zookeepers were not allowed near the sick animal. When asked if they had ever been given anti-venom serum for the bite of any creature, none of them could recall any such incidence. Of the total 49 animal handlers, only 12(24.5%) had taken training or attended workshop regarding prevention of zoonotic diseases and injuries due to animal handling, of which 7 (14.3%) had done so in the zoo itself. None of the workers had ever been told by a physician if he/she was suffering from a disease due to animal handling.

Discussion

This study aimed at finding out the perceptions of disease risk from animal handling and assessing practices followed by animal handlers that could put them at risk of zoonotic diseases and injuries.

Of the total 66 respondents, 9 (13.6%) either did not know or perceived no risk of suffering from any disease or injury due to animal handling. Even those who did perceive a risk, the concern about suffering from important zoonotic diseases like rabies, anthrax, hydatid cysts disease and brucellosis was less. The major concerns were of being attacked by the animal and suffering from conditions such as tuberculosis, allergy and asthma. People also had a false notion that diseases such as tuberculosis, HIV, cancer and hypertension could be caused due to animal handling. More than half of the total respondents considered tuberculosis to be caused by animal contact. From our discussion with the respondents, we found that tuberculosis was widely prevalent among the staff, but majority of them believed that tuberculosis was due to animal handling. They did not have knowledge about human to human transmissibility of TB and were not aware of bovine tuberculosis as an entity.

On enquiring about individual diseases, the respondents were found to have fair idea about diseases like allergies, ringworm, dengue, rabies, cholera, plague and helminthiasis. They had little knowledge about important zoonoses such as anthrax, toxoplasmosis, psittacosis, brucellosis, cat-scratch disease, leptospirosis and trichinosis which nevertheless are potential threats to the health of those working in close proximity to animals.

Although most of the respondents considered it important to wear personal protective devices during work, only a few actually practiced it. Wearing shoes while handling animals was practiced by about 80% of the respondents. But, use of other personal protective devices such as gloves, mask, goggles and jumpsuits was almost non-existent. In case an animal suffered from an infectious disease, the zookeepers were allowed near the animal for the purpose of feeding and taking care of the animal. However, the zookeepers did so without use of personal protection that puts them at a high risk of disease transmission. On being enquired about reasons for non-use, majority were ignorant about its usage and a few said that these were not available. Similarly, a divergence was also found in the awareness about need of vaccination against zoonotic diseases and the actual vaccination status of the employees. Every one out of 4 respondents did not know about need for Hepatitis B vaccination and one in five did not know about vaccination against bird flu.

Since the animal handlers constitute a high risk group for suffering from zoonotic diseases, it is important that they undergo periodic health check-ups for early diagnosis and treatment of diseases. The only disease for which screening services are provided is tuberculosis, the reason for its high prevalence is associated with factors other than animal handling, and hence in spite of being a good practice, it does not contribute to prevention and control of zoonotic diseases. However, all injuries were promptly acted upon and most of the workers were either taken to the doctor or given first-aid which is a good practice.

In case an animal suffered from an infectious disease, majority

said that the animal should be quarantined and treated. This response is in conformity with what is actually done in the zoo and with what should ideally be done in such a situation.

Ignorance about signs and symptoms of zoonotic diseases was widely prevalent. Almost none knew about signs and symptoms that are sine qua non of zoonotic diseases. Signs and symptoms enumerated by the respondents were non-specific like fever, headache, vomiting etc. and could not be of any help in early diagnosis of zoonotic conditions. Paradoxically, respondents also wrongly attributed some symptoms etc. to zoonotic diseases. For example, some respondents considered bowing of legs and night blindness to be associated with zoonotic diseases. Thus, it can be said that risk perception was inadequate regarding zoonotic diseases. Knowledge about the need of anti-venom was also inadequate. They did not have a clear idea about the bite of which creature called for a use of anti-venom and which did not. Training sessions and awareness programmes for prevention of zoonotic diseases and injuries are minimal.

Conclusion

Animal handlers at zoological gardens are an important work force across the world. Our study, though restricted to only one of the largest zoo in India, highlights the existing lacunae in their knowledge about health hazards of animal handling and less than adequately safe practices in terms of saving them from hazards. It highlights the need for looking after the animal handlers' health and mitigating risk of contacting zoonotic diseases.

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