

Mothers' Beliefs, Concerns and Preventive Practices regarding Pet Infection among their Children

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Abstract

Background: Parents and pet owners typically have lack knowledge about zoonotic infectious diseases from pets and their effect on their children. **Aim:** Assessing mothers' beliefs, concerns and preventive practices regarding pet infection among their children. **Design:** A descriptive cross-sectional study design. **Setting:** This study was conducted at two medical centers and five maternal and child health care (MCH) centers at Tanta city. **Subjects:** A convenient sample of 250 mothers who had at least one child less than 18 years old and one or more pet animal in their homes. **Tool:** A Structured Interview Schedule was developed by the researchers contains six parts: mothers' socio-demographic data, history of pet ownership and contact, previous receiving information about pet infection, mothers' concerns, beliefs and reported preventive practices regarding pets' infection. **Results:** 20.8% of studied mothers were very concerned about attracting pets' infection by their children, 69.6% of them had unsatisfactory preventive practices while, less than two thirds of them had positive believes toward pets' infection. **Conclusion:** less than two thirds of the studied mothers had positive believes regarding pets' infection. More than two thirds of them had unsatisfactory preventive practices. One quarter and one fifth of mothers were somewhat and very concerned that their children could catch a pet disease respectively. **Recommendations:** There is a need for health education on preventive practices of pet infection for pet-owning mothers with children at higher risk of infection.

Keywords: *Pet infection, Mothers' Beliefs, Concerns, Practices, Children.*

Introduction

Most human infectious diseases are zoonotic in origin; consequently, many infections can pass between pets and people. The scope of the problem is not well understood because many zoonotic diseases are underdiagnosed or not reportable to health authorities. Zoonotic diseases (ie, zoonoses) are diseases transmitted between animals and humans which result in numerous persons becoming ill. Inadequate understanding of disease transmission and animal behavior can increase the likelihood of infectious diseases, rabies exposures,

injuries, and other health problems especially among children^(1,2).

These diseases can affect humans in many ways. They're of greatest concern to young children, infants, pregnant women, and people whose immune systems have been compromised by illness or disease. Infants and children are at risk because their immune systems are still developing, and some infections that might make an adult just mildly sick can be more serious for them^(3,4).

Human contact with cats, dogs, birds and other pets' results in several million infections each year, ranging from self-limited skin conditions to life-threatening systemic illnesses. *Campylobacter*, cat scratches, *rabies*, *toxoplasmosis*, *ringworm*, *Rocymountain spotted fever*, *salmonella*, *toxocariasis*, *avian flu* and *Cryptococcosis* infections are some examples to pets' infections^(5, 6). A study investigating the presence of SARS-CoV-2 infection in dogs and cats of humans diagnosed with COVID-19 in Rio de Janeiro, Brazil 2021 have been identified the presence and persistence of SARS-CoV-2 infection in dogs and cats from households with human COVID-19 cases recommended that, people with COVID-19 should avoid close contact with their pets during the time of their illness⁽⁷⁾.

Toxoplasmosis is one of the most common pet-related parasitic infections. Although toxoplasmosis is usually asymptomatic or mild, it may cause serious congenital infection if a woman is exposed during pregnancy, particularly in the first trimester^(4, 5).

Children tend to love dogs and often feel very emotionally attached to their dogs. Children are considered to be the group that is most at risk of getting rabies since they tend to spend more time with animals than adults usually do. Rabies transmission through contact with saliva on mucosal membranes is possible, which can make young children at risk of getting the disease if they are licked in the face by a rabid dog. Most deaths from rabies arise due to lack of awareness and poor access to proper health services. It is estimated that around half of the global human population lives in canine

rabies-endemic countries and is at risk of exposure^(8, 9)

Because cases often go unreported, it is agreed that official records vastly underestimate the true burden of rabies⁽⁸⁾. According to WHO 2021, rabies infection causes tens of thousands of deaths every year, mainly in Asia and Africa. Globally rabies causes an estimated cost of US\$ 8.6 billion per year. The global burden of rabies was estimated at 3.7 million disability-adjusted life years (DALYs). In addition, 40% of people bitten by suspect rabid animals are children less than 15 years⁽¹⁰⁾.

Prevention of pets' infection involves common sense measures such as adequate hand washing, proper disposal of animal waste, and ensuring that infected animals are diagnosed and treated. Increased communication between primary care physicians and veterinarians could improve treatment and prevention of these conditions. Preventive healthcare involves a multi-faceted approach that includes veterinary evaluation of the pet's overall health and risks of disease or other health problems. Consequently, veterinarian will provide pet owner with recommendations for pet's nutrition, dental care, vaccinations and heartworm/flea/tick prevention, as well as the pet's health status and risk factors^(11, 12)

Pet owners especially parents typically lack knowledge about the different modes of transmission of pets diseases (zoonotic infectious diseases). Pediatricians identifies the importance of anticipatory guidance about health hazards associated with owning pets. However, only 5% of them reported that they educate families or/and patients

about pet-associated toxoplasmosis or salmonellosis on regular base^(2, 12).

Nurses in primary health care settings have a vital role as they can advise parents, pet owners and their children, about the importance of preventive measures to avoid such illness. Simple and purposive advice includes avoiding direct contact with animals and their environments and hand-washing frequently and proper disposal of animal waste. Always [washing hands](#), especially after handling pet's food, touching pet, or cleaning pet's cage, tank, when cleaning pets wastes from surrounding environment. If having a bird, wearing a dust mask over the nose and mouth when cleaning the cage is essential to prevent inhaling fecal particles. As the infections can transmitted through saliva, avoid touching or kissing the pet with mouth is also essential. Keep pet's living area clean and free of waste. Prepare and handle foods in areas away from pets^(3, 13).

Nurses and other health care professionals should remind pet owners about considering the health and age of their kids before getting a pet. Young children always should be supervised closely when in contact with animals to reduce the possibility of injury. This is especially when transmission of enteric pathogens from a pet is a risk, including young ruminants, young poultry, reptiles, rodents, amphibians, and animals that are ill. Also, matching the size and temperament of a pet to the age and behavior of their infant or child and educating all children about appropriate human-animal interactions is so important^(13, 14). So community health nurses as a health educator play a vital role in the prevention and control of such infections

Aim of the study is to:

Assessing mothers' beliefs, concerns and preventive practices regarding pet infection among their children

Subjects and method

Subjects

Research design:

A descriptive cross-sectional study design was used in the present study.

Setting:

This study was conducted at two medical centers and five maternal and child health care (MCH) centers at Tanta city.

Subjects:

A convenient sample of 250 mothers who attended the previously mentioned settings for any reason was included in this study. The inclusion criteria are:

- The mother who had at least one child (less than 18 years old),
- The mother who has one or more pet animal in her home and
- The mother who accept to participate in the study.

The sample size was calculated using Epic-Info software statistical package created by World Health Organization (WHO) and center of diseases control and prevention (CDC), Atlanta, Georgia, USA version 2002(Andrew G 2002). The criteria used for the sample size calculation were as following: the study design is cross sectional, 95% confidence limit with a margin of error 10%. The sample size is based on the previously mentioned criteria was found at $n > 150$. The total study sample was increased to be 250 mothers to increase validity of the results and to compensate the missed information and improving the quality of the collected data.

Tool of the study:

A Structured Interview Schedule was used to collect the required data for this study. It was developed by the researchers after a reviewing of the related literatures ⁽²⁻⁷⁾ to assess mother's beliefs, concerns and their preventive measures about pet's infection for their children. It contained **six** parts:

Part one: Socio-demographic data of the mothers which included:

Age, sex, occupation, education, residence, family numbers, family income, number of their children and duration that child stay at home.

Part two: Mothers history of pet ownership and animal Contact as:

Presence of pets at home, having a child ever caught a disease from a pet or bitten or scratched by dog or cat, numbers of bitten or scratched children.

Part three: Mothers' previous receiving information about pet infection and sources of getting this information.

Part four: Mothers concerns toward catching of their children to a pet disease:

It included: mothers' orientation about examples of diseases that can be transmitted researchers from pets and their concerns that their children could catch a pets' disease.

Part Five: Mothers' beliefs about pets' infection in which mothers asked to give their responses regarding their beliefs toward pets' infection on five point Likert scale ; strongly agree (1) Somewhat agree (2) Unsure (3) Somewhat disagree (4) Strongly disagree (5).

Total belief score was categorized as follows:-

-Positive belief (> 65% of total score)

-Negative belief (≤ 65% of total score)

Part Six: - Mothers' reported preventive practices for pets' infection:-

In which the mothers asked about different preventive practices for preventing pet infections for their children such as: examined animal by an official veterinarian before buying it, cleaning and disinfect the pet's living area, buried or bagged and disposed feces of in the trash, thoroughly wash hands after the contact with the pet and after handling pet waste, teaching the children the importance of washing hands to prevent infection, and using protective equipment when dealing with pet animals.

Total practice score was categorized as follows:-

-Satisfactory practices (> 70 % of total score)

-Unsatisfactory practices (≤ 70 % of total score)

Method

1. An official permission to conduct the study was obtained from the responsible authorities (mangers of MCH centers).

2. Ethical and legal consideration:

- Approval of ethical committee of the Faculty of Nursing was obtained to conduct the study.

- Informed consent for participation in the study was obtained from the studied mothers after explanation the purpose of the study.

- Nature of the study does not cause any harm and/or pain for the entire sample

- Confidentiality and privacy were taken into consideration regarding the data collected.

- The right of each woman to withdraw at any time is respected.

3. Developing the tool:

- Structured interview sheet was developed by the researchers based on relevant

literature reviewed⁽²⁻⁷⁾. Then the study tool was tested for face and content validity by a jury of five expertise in the field of community health nursing and pediatric nursing.

4. Pilot study: A pilot study was carried out on 10% of students (25 mothers) for testing the clarity and applicability of the study tool. Those mothers were excluded from study sample. The study tool was tested for its **reliability** based on the result of the pilot study using Cronbach's Alpha test based on standardized items. It was (0.834) which indicated highly reliable tool.

5. Collecting the data:

- The data were collected by the researchers over a period of three months from July to September 2020.

- At the beginning of the interview the researcher informed each mother about the purpose of the study.

- The researchers conducted the interview with the mothers to collect the needed data using the study tool in the waiting area or a suitable place in each center.

- The time consumed for collecting the data from each mother was ranged from 20 to 30 minutes.

6. Data analysis:

The collected data was organized, tabulated and statistical analyzed using SPSS software statistical computer package version 23. Categorical variables were presented as number and percent. For quantitative data, the range, mean and standard deviation were calculated.

Results

Table (1) demonstrates socio-demographic characteristics of the studied mothers. It reveals that, the age of the studied mothers ranged from 18-55 years

with a mean age 33.92 ± 7.115 years. Less than half (46%) of them their ages ranged from 30 to < 40 years and it ranged from 20 to < 30 years for 40 % of them

Regarding the mother's level of education, more than one third (36.8 %) of them had high education, while about one quarter (24.8 % & 23.6%) of them had illiterate or read and write or secondary education. More than three fifths (62.4%) of them were housewives and 37.6% of them had a work.

Concerning mothers' residence, rural areas were the residence for about three quarters (74.8%) of the mothers, while urban areas were the residence for about one quarter (25.2 %) of them. The family income was enough for about three fifths (60.4%) of the mothers, while it was enough and save for more than one quarter (26.8%) of them.

The table shows also that 38.8% of the studied mothers have three children and 30.4% of them have two children. Regarding the duration of children' staying in the home, more than half (56%) of the children stay in the home full-time, and more than one third (36%) of them stay in the home part-time (at least 50% of the time).

Table (2) demonstrates the percent distribution of the studied mothers according to history of pet ownership and animal contact. It shows that less than three quarters (70%) of the studied mothers had pet birds, 46.4% had pet cats, 22.8% had pet dogs and 16% of them had pet rabbits. The majority (96%) of the mothers reported that their children had not caught a disease from a pet.

As well, the majority (83.6%) of the mothers reported that during the past 12 months of the study, no one of their children had been scratched or bitten by a cat or a dog. Only

7.2% of mothers reported that their children had been scratched or bitten by a cat or a dog.

Table (3) demonstrates the distribution of the studied mothers according to previous receiving information about pet infection and sources of getting this information. It shows that about one half (50.8%) of the studied mothers did not receive information regarding pet infection from any source while, 49.2% of them received information. From those who received information, television and newspaper were the source of information for 61.7% of the mothers. More than one quarter (26.8%) of them received their information from friends and relatives. As well, veterinarian and public health personnel were the source of information for 24.4% of the mothers. The source of information for 21.9% and 21.1% of the mothers was specialist physician and internet respectively. Nursing staff were the source of information for only 13% of the mothers. The received information found to be useful for more than one half (52.4%) of the mothers.

Table (4) demonstrates the distribution of the studied mothers according to their awareness about examples of diseases that can be transmitted from pets and their concerns that their children could catch a pet disease. It shows that more than one half (52%) of the studied mothers reported that rabies is a disease which can be transmitted from pets to their children. Furthermore, 42.8%, 32.8%, 21.6%, 15.2% and 12.8% of them reported that distemper, intestinal worms, infectious diarrhea, ringworm and hepatitis can be also transmitted from pets to their children.

As regards the level of mothers' concerns that their children could catch a disease from household pets, 23.2% of them were somewhat concerned. About one fifth (20.8%) of them were very concerned, 18% were concerned, 10% were minimally concerned and only 7.2% were not concerned at all. About one fifth (20.8%) of the mothers reported that their children do not have contact with pets.

Table (5) demonstrates the mean scores of the studied mothers' beliefs about pet infection. It shows that the highest mean score of the mothers' beliefs was related to her belief that people in her household would negatively affected by the removal of one or more of her pets from the house. This followed by the belief that the benefits that may had from owning a pet are greater than any the health risks that associated with owning a pet then the belief that pets are important part of the family.

Table (6) demonstrates the distribution of the studied mothers according to their reported preventive practices of pets' infection. It shows that the majority (87.2% and 82.8%) of the studied mothers reported that animal was not examined by an official veterinarian before buying it and they have not taken the animal(s) to a veterinarian in the past 12 months respectively. The table revealed also that about two thirds (66.8%, 64%, and 68.8%) of mothers reported that they are cleaning and disinfecting the pet's living area at least once a week, buried or bagged and disposed pets' feces in the trash and that their hands are thoroughly washed after the contact with the pet respectively. Nearly three quarters (72.0%, 79.6%, 74.0% and 72.0%) of the mothers reported that they wash their hands after handling pet waste,

they do not allow children to play in areas that are contaminated with feces of pet or other animal, teaching the children prevention of infection is depend mainly on washing hands and teaching the children that it is dangerous to eat dirt or soil respectively. In addition, the table revealed that slightly more than one third (40.8% and 38.8) of the mothers reported washing the hands with soap and warm water after playing with pets and before handling food and equipment used in contact with animals are cleaned and disinfected before be used on another animal respectively. More than three quarters (76%) of them did not wash protective clothing at 60 °C as minimum before next contact.

Table (1): Percent distribution of the studied mothers according to their socio-demographic characteristics

Variables	Number (n=250)	%
Mother's age (in years):		
20 - < 30	100	40.0
30 - < 40	115	46.0
40-	35	14.0
Range	18-55	
Mean \pmSD	33.92 \pm 7.115	
Mother's level of education:		
Illiterate or read and write.	62	24.8
Essential education.	37	14.8
Secondary education.	59	23.6
High education.	92	36.8
Mother's occupation:		
Work	94	37.6
Housewife	156	62.4
Residence:		
Rural	187	74.8
Urban	63	25.2
Family income:		

Table (7) represents levels of reported preventive practices of pets' infection among the studied mothers.

It shows that more than two thirds (69.6%) of them had unsatisfactory preventive practices. Only 30.4% of them had satisfactory practices. Total practices' mean score of the studied mothers was 7.288 ± 3.507 .

Table (8) represents levels of believe of the studied mothers regarding pets' infection.

It shows that less than two thirds (60.8%) of the mothers had positive believes while, more than one third (39.2%) of them had negative believes. The total believes' mean score was 15.628 ± 5.449 .

Enough and save	67	26.8
Enough	151	60.4
Not enough	32	12.8

Table (2): Percent distribution of the studied mothers according to their history of pet ownership and animal contact

Variables	Number (n=250)	%
Pets which are currently present in the mother's household: (more than one answer was allowed)		
1- pet birds	175	70.0
2- Pet cats	116	46.4
3- Pet dogs	57	22.8
4- Pet rabbits	40	16.0
5- Reptiles (e.g., snake, lizard, turtle)	10	4.0
6- Pet amphibians (e.g., frog, toad, salamander)	6	2.4
7- Pet fish	5	2.0
8- ferrets, hedgehogs, or rodents (such as gerbils, hamsters, guinea pigs, mice, and rats)	2	0.8
Has a child ever caught a disease from a pet		
Yes	10	4.0
No	240	96.0
During the past 12 months, number of the mother' children who had been bitten or scratched by dog or cat, where the skin was broken?		
Yes	18	7.2
No	209	83.6
do not know	23	9.2

Table (3): Distribution of the studied mothers according to previous receiving information about pet infection and sources of their information

Variables	Number (n=250)	%
Receiving previous information regarding pet infection:		
Yes	123	49.2
No	127	50.8
Sources of mother's information: (more than one answer was allowed)		
Television/newspaper	76	61.7
Friends/relatives	33	26.8
Veterinarian	30	24.4
Public health personnel	30	24.4
Specialist physician	27	21.9
Internet	26	21.1
Nursing staff	16	13.0
Pet store	7	5.7
Animal breeder	7	5.7
Books	7	5.7
Family physician	4	3.3
Usefulness of the received information:		
Useful	64.5	52.4
Not useful	4.4	3.6
Can't remember	54.1	44.0

Table (4): Distribution of the studied mothers according to their awareness regarding examples of diseases that can be transmitted from pets and their concerns that their children could catch a disease:

Examples of diseases that can be transmitted from pets to people: (more than one answer was allowed)	(n=250)	%
Rabies	130	52.0
Distemper	107	42.8
Intestinal worms	82	32.8
Infectious diarrhea	54	21.6
Ringworm	38	15.2
Hepatitis	32	12.8
HIV/AIDS	29	11.6
Salmonella	28	11.2
Measles	19	7.6

Giardia	16	6.4
Level of mothers' concerns that their children could catch a disease from their pet(s):	(n=250)	%
Very concerned	52	20.8
Concerned	45	18.0
Somewhat concerned	58	23.2
Minimally concerned	25	10.0
Not at all concerned	18	7.2
Children do not have contact with pets	52	20.8

Table (5): Mean scores of the studied mothers' beliefs about pet infection (n=250)

Domains of mothers' beliefs	Range	Mean ± SD
- I feel that pets are an important part of the family	(1-5)	3.10 ± 1.627
-I feel that the benefits of that may associated with owning a pet are greater than any health risks that might occur with owning a pet	(1-5)	3.20 ± 1.582
-I feel that household people might negatively affected by the removal of one or more pets from house	(1-5)	3.24 ± 1.512
-I feel comfort with my understanding level that possible diseases can occur as a result of pet contact	(1-5)	2.98 ± 1.386
- I feel comfort with my understanding level about methods of reducing diseases that can occur as a result of pet contact	(1-5)	3.09 ± 1.319
Total beliefs' mean score	(5-25)	15.61±7.426

Table (6): Distribution of the studied mothers according to their reported preventive practices of pets' infection

Mothers' preventive practices of pets' infection	(n=250)		%	
	Yes	%	No	%
-Examined animal by an official veterinarian before buying it	32	12.8	218	87.2
-Have the animal(s) taken to a veterinarian in the past 12 months.	43	17.2	207	82.8
- Cleaning and disinfect the pet's living area at least once	167	66.8	83	33.2

a week.				
- Feces be buried or bagged and disposed of in the trash.	160	64.0	90	36.0
- Hands are thoroughly washed after the contact with the pet.	172	68.8	78	31.2
-Washing her hands after handling pet waste.	180	72.0	70	28.0
- Prohibit children from playing in areas that are soiled with feces of pet or other animal.	199	79.6	51	20.4
- Washing the hands with soap and warm water after playing with pets and before handling food.	102	40.8	148	59.2
7- Teaching the children the importance of washing hands to prevent infection.	185	74.0	65	26.0
8- Teaching the children that it is dangerous to eat dirt or soil.	180	72.0	70	28.0
9- Using boots or another footwear in dealing with the animal.	143	57.2	107	42.8
10- Using protective clothing at the holding of the pet.	136	54.4	114	45.6
11- Washing protective clothing at 60 °C as minimum before next contact.	56	22.4	192	76.
12- Equipment used in contact with animals be cleaned and disinfected before use on another animal.	97	38.8	153	61.2

Table (7): Levels of reported preventive practices of pets' infection among the studied mothers

Total preventive practices' score	NO	%
satisfactory	76	30.4
unsatisfactory	174	69.6
Range	0 - 14	
Mean / SD	7.288 ± 3.507	

Table (8): Levels of believes of the studied mothers regarding pets' infection

Total believes' score	No	%
Positive	152	60.8
Negative	98	39.2
Range	5- 25	
Mean / SD	15.628 ± 5.449	

Discussion

Many factors increase the chance of attracting zoonotic diseases especially the reduced proximity between humans and animals^(15, 16). Mainly reducing the transmission of such diseases is dependent on following preventive behaviors. Perceptions and awareness of zoonoses and pet infection have a significant impact on the willingness and increased adoption of preventative behaviors⁽¹⁷⁻¹⁹⁾. So, the aim of this study is to assess mothers' beliefs, concerns and preventive practices regarding pet infection of their children.

People can acquire pet-associated infections through animal bites, scratches and contact with animal saliva, urine and other body fluids or secretions, ingestion of animal fecal material, inhalation of infectious aerosols or droplets⁽²⁰⁾. In the present study, the majority of the mothers reported that no one of their children had been bitten or scratched by a dog or cat during the past 12 months of the study. This could be explained that less than three quarters of the studied mothers had pet birds which their bites are not considered as serious one. The present study reported also that less than one half of mothers had pet cats, only less than one quarter had pet dogs and small number of them had pet rabbits (**table 2**). In the same context, **Stull et al., (2013)**, demonstrated that households reported ownership of dogs (68%), cats (48%), fish (13%), exotic mammals (7%), such as hamsters, and reptiles and birds (each 6%)⁽²¹⁾.

Healthcare providers are in the best position to provide information about pet ownership and disease prevention in collaboration with veterinarians.

Veterinarians play a key role in communicating and providing information about risk reduction of zoonoses because they are considered a trusted source of information for many pet owners^(20, 22). In the present study, about one half of the studied mothers did not receive information regarding pet infection from any source while, 49.2% of them received information (**table 3**). **Stull et al., (2012)**, were nearly in the same line where most respondents (64%) indicated that they had never received information regarding pet-associated disease risks⁽²³⁾. This may be attributed to the characteristics of the studied women where more than three fifths of them were housewives, only more than one third of them had high education and about three quarters of them were from rural areas. All of these factors can play a role to give less opportunity for mothers to receive enough information regarding pet infection. However, increased educational attainment has been linked to increased access to human healthcare⁽²⁴⁾.

From those who received information, television and newspaper were the source of information for 61.7% of the mothers. More than one quarter of them received their information from friends and relatives. As well, veterinarian and public health personnel were the source of information for 24.4% of the mothers. The source of information for 21.9% and 21.1% of the mothers was specialist physician and internet respectively (**table 3**). In the same context, **Steele et al., (2021)**, revealed that more pet owners become oriented by zoonosis through their veterinarian rather than their physicians (38% compared with 10%)⁽²²⁾. **Hill et al.,**

(2012), also reported that greatest number of pet owners would consult their veterinarian about zoonoses rather than those who would consult their physician, which also reflects previous study⁽²⁵⁾.

These findings emphasize the need to access preventive veterinary medicine services. A report from the Access to Veterinary Care Coalition has shown that 23% of pet owners in the United States face difficulties accessing preventative veterinary care, primarily due to financial restraints⁽²⁶⁾.

A key element of disease prevention is making sure that people are aware of the risk of contact with animals. According to the review, people at high risk for pet-associated disease may not be aware of the risks associated with high-risk pet practices⁽²⁰⁾. In the present study, more than one half of the studied mothers reported that rabies is a disease which can be transmitted from pets to their children. Furthermore, 42.8%, 32.8%, 21.6%, 15.2% and 12.8% of them reported that distemper, intestinal worms, infectious diarrhea, ringworm and hepatitis can be also transmitted from pets to their children (**table 4**). The relatively low levels of awareness of zoonoses and pet infection among mothers highlight the need for further education to fill the knowledge gap. Regarding the level of mothers' concerns that their children could catch a disease from household pets in the current study, 23.2% of mothers in the present study were somewhat concerned. About one fifth of them were very concerned, 18% were concerned, 10% were minimally concerned and 7.2% were not concerned at all (**table 4**). In this context, **Powell et al., (2020)**,

concluded that almost half of the participants were extremely or somewhat uncomfortable at the prospect of having a SARS-CoV-2-positive pet in their home. Approximately one-quarter were neither comfortable nor uncomfortable, and a similar proportion were either somewhat or extremely comfortable with having a SARS-CoV-2-positive pet in their home⁽²⁷⁾.

The level of mothers' concerns in our study could be attributed to their age as well as their educational level. Where 36.8 % of them had high education, while about one quarter of them had illiterate or read and write or secondary education. And less than half of them their age ranged from 30 to < 40 years and it ranged from 20 to < 30 years for 40 % of them (**table 1**). This is supported by **Powell et al., (2020)**, who found that participants' concern about zoonotic diseases were associated with age and education. participants aged over 40 were less likely to be concerned about contracting zoonotic disease from their pets than those under the age of 30⁽²⁷⁾.

It is also so important to determine the mothers' beliefs regarding pets' infection. In this study, less than two thirds of the mothers had positive beliefs while, more than one third of them had negative beliefs (**table 8**). This is in the same line with **Laorujisawat et al., (2022)**, who found that 89% of primary school students had favorable attitudes regarding preventive behaviors for rabies risk situations⁽²⁸⁾. On the other hand, **Bissong et al., (2022)**, found that most participants showed poor risk perception on zoonotic diseases. Majority did not consider coming in contact with bird's blood/body fluid or

apparently healthy birds to be a risk of infection⁽²⁹⁾.

These results of high percentage of positive beliefs could be attributed to the long stay and attachment of the mothers and their children with their pets where more than half of the children in our study stay in the home full-time and more than one third of them stay in the home part-time (at least 50% of the time) (**table 1**). This is supported by **Hawkins et al., (2017)**, who reported that the majority of children are strongly attached to their pets, which is facilitated by compassion and caring and pet-directed friendship behaviors and that attachment to pets significantly predicts positive attitudes towards animals⁽³⁰⁾.

In addition, the highest mean score of the mothers' beliefs in this study was related to her belief that removal of one or more of her pets would negatively affect people in her household followed by the belief that the benefits of owning a pet are greater than any health risks that occur with owning a pet then the belief that pets are important part of the family (**table 5**). This may be referred to the socio-demographic characteristics of the studied mothers where more than three fifths of them were housewives that give them enough time to stay and care with their pets. As well, about three quarters of the mothers were from rural areas and the family income was enough for about three fifths of them that could have no burden, problems or difficulties in caring with animals. Another justification, that some people believe that pets have significant benefits for them and can influence their health. This is supported by **Koohsari et al. (2022)**, who

concluded that dog ownership and dog walking have been found to promote physical and mental health in several ways⁽³¹⁾

Furthermore, perceiving the health benefits of pet ownership and the reluctance to give up the pets highlights the importance to follow specific precautions and preventive practices to reduce the transmission of zoonotic pathogens from pets to people at high risk especially the children⁽²⁰⁾. In the current study, it was found that more than two thirds of the studied mothers had unsatisfactory preventive practices regarding pets' infection. And only 30.4% of them had satisfactory practices (**table 7**). This is in accordance with **Bissong et al. (2022)**, who found that most participants showed poor prevention/control practices on zoonotic diseases⁽²⁹⁾. While, **Laorujisawat et al., (2022)**, found that 52.1% of primary school students exercised proper preventive behaviors for rabies risk situations⁽²⁸⁾. This may be because there is often disconnect between people's intentions, beliefs and their true behaviors.

Specifically, the majority of the studied mothers in this study reported that animal was not examined by an official veterinarian before buying it and they have not taken the animal(s) to a veterinarian in the past 12 months respectively (**table 6**). This is nearly in the line with **Powell et al., (2020)**, who found that approximately 20% of the participants had pet insurance and the majority of them that they were concerned with up to date vaccinations for their pets⁽²⁷⁾. The reason that owners faced increased difficulties accessing veterinary

care may be due to limited availability of veterinary services and/or limited provision of emergency/sick appointments⁽²⁴⁾

In addition, more than two fifths of the studied mothers reported that they were using boots or other footwear in dealing with the animal and they were using protective clothing at the holding of the pet (**table 6**). In the same context, **Mason et al.,(2015)**, revealed that the most common protective practices against zoonotic infections among rural and slum communities from South Central Chile was the use of boots (51.9 %), followed by wearing gloves (23.6 %) and preventive veterinary care (19.7 %) ⁽³²⁾. **Bissong et al. (2022)**, also reported that most participants neither used protective

Conclusion

Based on the findings of this study, it can be concluded that less than two thirds of the studied mothers had positive beliefs regarding pets' infection while, more than one third of them had negative beliefs. More than two thirds of them had unsatisfactory preventive practices. As regards the level of mothers' concerns that their children could catch a disease from household pets, 23.2% of them were somewhat concerned, about one fifth of them were very concerned and 18% were concerned.

Recommendations

Based on the findings of this study the following recommendations are suggested:

- 1- Great emphasis is needed to all pet owner women to address the importance of access to veterinary medicine for care of their pets.

- 2- There is a need for health education on preventive practices of pet infection for pet-owning mothers with children at higher risk of infection.
- 3- Stress on decreasing the gap between beliefs of mothers as pet owners about pet infection and their preventive practices for their children.
- 4- Further research is needed to determine the role of education in altering higher risk pet practices of mothers with their children.

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