Perception of Farmers regarding Brucellosis at Kalyobia Governorate

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Abstract: Brucellosis is an important zoonotic disease caused by gram-negative bacteria that is pathogenic for a wide variety of animals and human. **The aim:** of this study was to assess perception of farmers regarding Brucellosis at Kalyobia Governorate. **Research design:** A descriptive research design was used in carrying out this study. **Setting:** The study was conducted in sixteen (16) veterinary health units at Kalyobia Governorate. **The sample:** A simple random sample technique was used to select 320 farmers in direct contact with animals from total (3200). **Tools:** A structured interviewing questionnaires to assess the socio-demographic characteristics of studied sample, family history of Brucellosis infection, their knowledge and attitude regarding Brucellosis and observational checklist to assess practices and home environment of studied sample regarding Brucellosis. **Results:** 79.4% of studied sample were males, 43.4% aged from 30 to less than 40, and 31.6 % of them were illiterate. 77.2% of studied sample had poor knowledge, 69.4% of them had indifferent attitude while 51.2% of them had unsatisfactory practices regarding Brucellosis. **Conclusion:** Slightly more than three quarters of studied sample had poor knowledge and more than two third had indifferent attitude regarding Brucellosis while slightly more than half of studied sample had unsatisfactory practice regarding Brucellosis. There were a highly statistically significant correlation between total knowledge and both total practices and total attitudes of the studied sample related to Brucellosis. **Recommendations:** Health education program should be given for farmers about Brucellosis, its causes, mode of transmission, signs and symptoms, and methods of prevention at veterinary units.

Key words: *Brucellosis, Zoonotic, Farmers*, Knowledge, Practice & Attitude, Nurse

Introduction

Brucellosis is one of the most common zoonotic infections globally, which is also known Mediterranean fever, Malta fever, Bang's disease and undulant fever ***(WHO, 2014).*** Brucellosis caused by small gram- negative coccobacilli of the genus brucella. Four species are known to cause human disease, each having their own specific animal host:

Brucella.melitensis (goat, sheep and camel), B. suis (pig), B. abortus (cattle) and B. canis (dog). Currently B. melitensis remains the principal cause of human Brucellosis worldwide ***(Mohammed, 2014).***

Humans are commonly infected through ingestion of raw milk, cheese, meat, or through direct contact with infected animals, products of conception or animal discharges (e.g., among shepherds, farmers and veterinarians), and through inhalation of infectious aerosols (e.g., by workers in abattoirs and microbiology laboratories) ***(El-Koumi et al., 2014).***

Human Brucellosis can be an acute or a chronic febrile illness and presents with a variety of manifestations after an incubation period, which can vary from 1 to 6 weeks or several months. Brucellosis may be difficult to distinguish clinically from a number of other infections such as typhoid fever, tuberculosis, infective endocarditis, and acute rheumatic fever. The symptoms of acute illness are fever, chills, headache, muscle and joint pains, malaise, nausea, night sweats and loss of appetite persisting 3 to 6 weeks. Brucellosis shows multisystem involvement ***(Roushan et al., 2014).***

In animals, the disease is mainly characterized by abortion, still birth or weak calves and show decrease in milk yield. Death may occur as a result of acute metritis, followed by retained fetal membranes. In males, Brucellosis may manifested as unilateral or bilateral orchitis and sterility, while in all age groups, hygromata involving one or more leg joints may be observed ***(Abd El-Fatah, 2014).***

Brucella infection causes major economic losses in livestock and serious impact on public health. The disease causes great economic losses for livestock breeders through interference with the breeding programmes and decrease in milk yield. More than 70% of Egypt's total livestock population is owned by farmers, who keep a few cows and buffalo in their household as a source of milk and dairy products for home consumption or to sell, often unpasteurized in local markets ***(Nassar, 2013).***

The control of this disease in animals, and thus prevention of the disease in humans, depends mainly upon the use of efficient diagnostic procedures. These measures include pasteurization or boiling of milk for human consumption, cooking all food stuffs derived from animal sources, vaccination of cattle against Brucellosis, isolation and slaughtering of seropositive reactors for Brucellosis and providing protective clothing for humans dealing with infected cattle ***(El- Ashmawy, 2013).***

Community health nurse has important role in preventing and control of Brucellosis through providing health education about the disease its causes, mode of transmission, signs and symptoms, and methods to control of infection ***(Lundy et al., 2009).*** However health is a difficult and extremely complex task. It can't be regarded as effective if specific considerations referring to the community aren't taken into account. These include: culture, beliefs, traditions, educational level, social status, occupation, age, etc. Hence, health education programmes should be aimed at targeted social group as farmers who may not be fully aware of the problem. They should be directed not only at specific measures but should also emphasize the responsibility of individuals for safe guarding and improving their own health and that of the community ***(Nassar, 2013).***

Significance of the study:

Worldwide, Brucellosis remains a major source of disease in humans and domestic animals. It is more prevalent in western parts of Asia, India, Middle Eastern, southern European and Latin American countries. Human Brucellosis is found to have significant presence in rural/ nomadic communities where people live in close association with animals. Worldwide reported incidence of human Brucellosis in endemic areas varies widely from less than 0.01 to greater than 200 per 100.000 populations. It has been estimated that the true incidence may be 25 times higher than the reported incidence, due to misdiagnosis and underreporting ***(Parthasarathy, 2013).***

In Egypt, Brucellosis is still remaining one of the major disease problems that affect animal industry as well as human health and is

still an endemic serious disease among domestic animals and humans in spite of attempts that were implemented to control the disease through bilateral projects with some agencies or international organization. It has been recorded in Egypt since 1939, and the estimated annual economic losses due to Brucellosis were about 60 million Egyptian pounds yearly ***(Kaoud et al., 2010).***

Aim of the study:

This study aims to assess perception of farmers regarding Brucellosis at kalyobia governorate through:

- Assessing farmers' knowledge regarding Brucellosis.
- Assessing farmers' attitude regarding Brucellosis.
- Assessing farmers' practices regarding Brucellosis.

Research Questions:

To achieve the aim of this study the following research questions were formulated:

1- What is the farmers' knowledge level about Brucellosis?

2- Is there a relationship between socio demographic characteristics of farmers and Brucellosis?

3- Is there relation between farmers' knowledge, attitude and their practices toward Brucellosis?

Subjects and method:

Research design:

A descriptive research design was utilized to conduct this study.

Setting:

The study was conducted in sixteen (16) veterinary health unites (Tahanob, Senhera, Ramada, Nawa, Sandabeis, Kalyobe, Meet Halva, Tanan, Bahteim, El Shemot, Meet Radii, Kafr Tasfa, Marsafa, Kafr Shoker, Kaha, El Hesa). The previous settings were selected by simple random sample and it was represent 25% from total 64 veterinary health units at kalyobia governorate. Then home visit was used to assess studied group practice.

Sampling:

A simple random sample was used in this study. The total numbers of farmers attending at the selected veterinary health unites last year was 3200, 10% were chosen randomly. The total sample were included (320) farmers who are in direct contact with animals and attending at the selected veterinary health unites.

Tools for Data Collection: Three tools were used for data collection.

Tool I: A structured interviewing questionnaire: It was developed by investigator, based on reviewing related literatures, and written in Arabic language: It comprised of two parts to assess the following:

First part: - Socio-demographic characteristics of the studied sample. This part included two items:

A- Socio-demographic characteristics of farmers. It consisted of eight questions related to age, gender, educational level, occupation, marital status, family size, income; type of animals the farmer raise.

B- Family history of Brucellosis infection. It consisted of three questions such Brucellosis infection of a family member, recovery, frequency of Brucellosis infection.

Second part: It was designed to assess farmers' knowledge regarding Brucellosis, which included eleven questions about meaning of Brucellosis, animals affected with Brucellosis, clinical manifestation in human, clinical manifestation in animal, mode of transmission to human, mode of transmission to animal, high risk people, complications in human, complications in animal, prevention and sources of information.

- Scoring system:

Knowledge score for each answer was given as follows:

2 = **Good knowledge**

1 = **Average knowledge**

0 = **Poor knowledge**

Total scores of knowledge = 22

The total knowledge scores were considered good if the score of the total knowledge > 65 % (> 14), considered average if it is equals 50-65% (11-14), and considered poor if it is less than 50% (<11).

Tool II: It was designed to assess the farmers' attitudes toward Brucellosis, which included twelve questions about the danger of disease, fearing from drinking unpasteurized milk, fearing from eating meat, eating cheese made from unpasteurized milk cause Brucellosis, eating ice cream made from unpasteurized milk cause Brucellosis, wearing protective equipment, necessary of diseased animals eradication, the measures that the country follow, follow up the news of the disease, need information about the disease, notification of a suspected case if present, following the preventive measure.

- Scoring system:

A score for each answer on questions of attitude was given as follow:

2 = **Always**

1 = **Sometimes**

0 = **Rarely**

Total score of attitude = 24

The attitude was considered positive if the score of total attitudes > 75 % (> 18), considered indifferent if it equals 50-75 % (12-18) and negative if it is < 50% (< 12).

Tool III: An observational checklist was used to observe:

A- Practices of farmers regarding Brucellosis which included twenty- nine questions included 2 items before direct dealing with animals, 3 items after dealing with animals, 3 items before milking, 7 items after milking, 7 items about preparing food, 2 items before cleaning the barn, 4 items after cleaning the barn and vaccination of animals.

B- Home environment of farmers. It consists of seventeen questions used to assess home environment such as rooms number, presence of separate kitchen, permanent water supply, source of water supply, ventilation in the house, lighting, raise all animals in the same place, place of raising animals, cleanliness of barn, ventilation in the barn, lighting of the barn, person cleaning the barn, frequency of cleaning in winter and summer, distance of the barn, presence of sanitary sewage and kind of sanitary sewage.

- Scoring system:

Practice score for each practice was given as follows:

1 = **Done**

0 = **Not done**

Total scores of practices = 29

The total practice were considered satisfactory if the score of the total practices equals ≥ 50 % (≥ 15), and considered unsatisfactory if it is less than 50% (< 15).

Content validity:

The tools validity was done by 5 of Faculties' Staff Nursing experts from the community health nursing specialties.

Ethical consideration:

Permission has been obtained orally from each farmer before conducting the interview and given them a brief orientation to the purpose of the study. They were also reassured that all information gathered would be treated confidentiality and used only for the purpose of the study.

Pilot study:

The pilot study was carried out on 23 farmers who were excluded from the study sample. The pilot study was to assess the tools feasibility, clarity, and applicability and time needed to fill each sheet. Necessary modifications were done. Each sheet lasted about 30 minutes to be filled.

Field work:

The data was collected from farmers who were in direct contact with animals and were attendant the selected veterinary health units at kalyobia governorate. The study was conducted at a period of 7 months which started from October 2014 to end of April 2015 and attended two days/week for each unite from 9.00 Am to 2 Pm and also another two days were visited of the studied sample inside the home to assess their practice. The data was collected through an interviewing with each farmer from 15 to 30 minutes depending up on understanding and response of them.

Administrative design:

Permission for conduction this study was obtained by submission of official letters issued from dean of faculty of nursing, Benha University to the director of the veterinary health unites in the selected villages. The title and objectives of the study had been explained to them to obtain their permission and help in the conduction of the study and to facilitate data collection.

Statistical design:

Computerized data entry and statistical analysis were fulfilling scored using statistical package for social science (SPSS) version18.

Descriptive statistic was first applied (frequency, percentage) then other statistical tests such as T test, and using mean and standard deviation.

Statistical significance was considered at:

P- Value > 0. 05. Not significance

P- Value < 0. 05. Significance

P- Value < 0.001. Highly significant

Result:

Table (1):- **Distribution of the studied subjects according to their demographic characteristics (n=320).**

Socio-demographic characteristics	No	%
Age / years :		
Less than 20	15	4.7
20-	76	23.7
30-	139	43.4
More than 40	90	28.1
Mean ±SD 30,391± 6,168		
Gender		
Male	254	79.4
Female	66	20.6
Educational level:		
Illiterate	101	31.6
Basic education	60	18.7
Secondary	26	8.1
Technical	99	30.9
University	34	10.6
Occupation:		
Farmers only	199	62.2
Working beside farming	121	37.8
Marital status:		
Single	29	9.1
Married	259	80.9
Divorced	8	2.5
Widowed	24	7.5
Family size:		
< 3	65	20.3
3 - 5	127	39.7
>5	128	40.0

Family income:		
Enough and saving	127	39.7
Enough	144	45.0
Insufficient	49	15.3

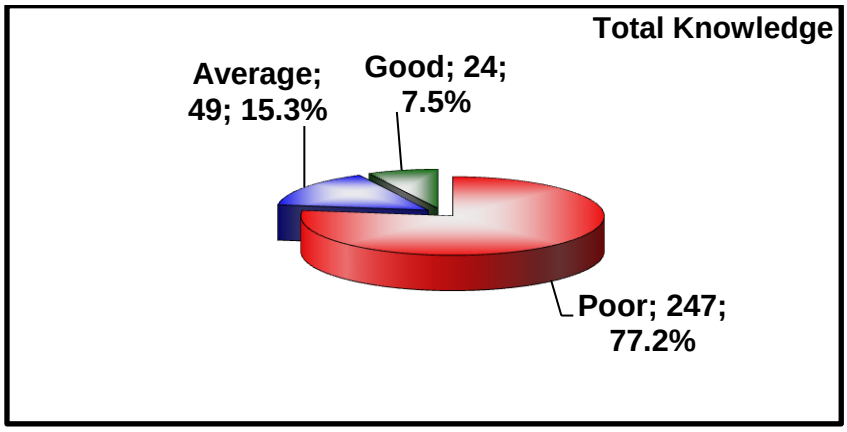
Table (1): Shows that, 43.4% of the studied sample aged from 30 to < 40 years old, 79.4% of them were males, 31.6% were illiterate, 62.2% were farmers and 80.9% were married. Also this table shows that, 40% of the studied sample had big family members (more than 5), and 45% of them had enough family income per month.

Table (2): **Distribution of the studied sample regarding their family history of Brucellosis infection, (n=320).**

Items	No	%
Brucellosis infection of a family member:		
Yes	31	9.7
No	289	90.3
Recovery of a family member from Brucellosis		
Yes	31	100.00
No	0	0.00
Frequency of Brucellosis infection		
Once	31	100.00

Table (2): Shows that 90.3% of the studied sample didn't have family history of Brucellosis infection while 9.7% have Brucellosis. The recovery from the disease was 100% and the frequency of Brucellosis infection was once for all infected cases.

Figure (1): **Distribution of the total knowledge of the studied sample related to Brucellosis, (n=320).**



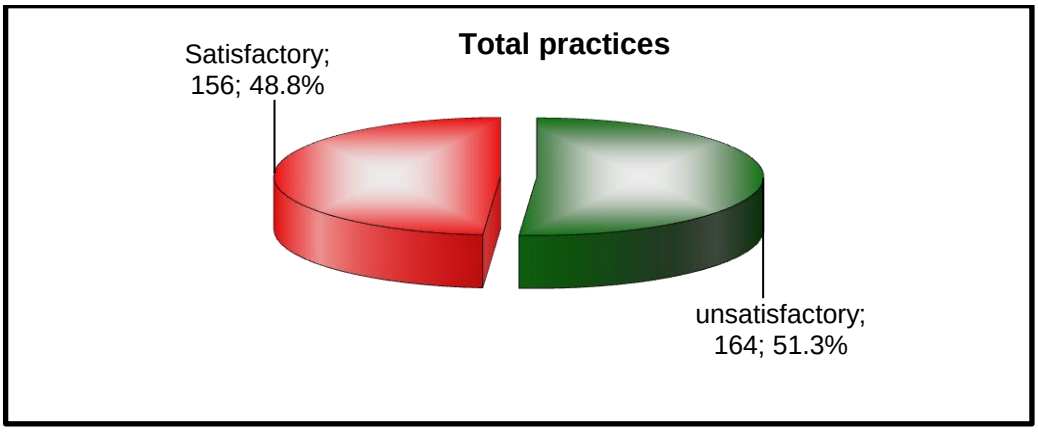
This figure shows that, 77.2% of studied sample had poor knowledge regarding Brucellosis and 15.3% had average knowledge, while 7.5% had good knowledge regarding Brucellosis.

Table (3): **Distribution of the total attitude of the studied sample regarding Brucellosis, (n=320).**

Attitude (score level)	Total	
	No	%
Positive	35	10.9
Indifferent	222	69.4
Negative	63	19.7
Total	320	100.00

Table (3): Reveals that, 69.4% of the studied sample had indifferent attitude and 19.7% of them had negative attitude towards Brucellosis, while 10.9% of them had positive attitude towards Brucellosis.

Figure (2): **Distribution of the total practice of the studied sample related to Brucellosis, (n=320).**



This figure shows that, 51.3% of studied sample had unsatisfactory practice regarding Brucellosis, while 48.8% had satisfactory practice.

Table (4): **Relation between socio- demographic characteristics of studied sample and Brucellosis, (n=320).**

Socio-demographic characteristics	Family history of brucellosis infection						Significance test	
	Yes		No		Total			
	No.	%	No.	%	No.	%	X^2	*p*-value
Age:								
Less than 20	0	0.0	15	4.7	15	4.7		
20-	7	2.2	69	21.6	76	23.8	4.433	0.218
30-	17	5.3	122	38.1	139	43.4		
More than 40+	7	2.2	83	25.9	90	28.1		
Gender:								
Male	21	6.6	233	72.8	254	79.4	2.568	0.109
Female	10	3.1	56	17.5	66	20.6		
Educational level:								
Illiterate	8	2.5	93	29.1	101	31.6		
Basic education	3	0.9	57	17.8	60	18.7	6.320	0.176
Secondary	1	0.3	25	7.8	26	8.1		
Technical	14	4.4	85	26.6	99	30.9		
University	5	1.6	29	9.1	34	10.6		
Occupation:								
Farmer	20	6.2	179	55.9	199	62.2	0.080	0.778
Working beside farming	11	3.4	110	34.4	121	37.8		
Marital status:								
Single	1	0.3	28	8.7	29	9.1		
Married	27	8.4	232	72.5	259	80.9	1.952	0.582
Divorced	1	0.3	7	2.2	8	2.5		
Widow	2	0.6	22	6.9	24	7.5		
Family size:								
< 3	5	1.6	60	18.7	65	20.3		
3 - 5	6	1.9	121	37.8	127	39.7	9.078	0.011*
>5+	20	6.2	108	33.7	128	40.0		
Income:								
Enough and saving	15	4.7	112	35.0	127	39.7	1.068	0.586

Enough	12	3.7	132	41.2	144	45.0		
Insufficient	4	1.2	45	14.1	49	15.3		

p<0.001 (High statistical significant).

p>0.05 (No statistical significant).

Table (4): Reveals that, there were no statistically significant difference between socio-demographic characteristics of the studied sample as age, gender, educational level, occupation, marital status, income and Brucellosis infection while there was a significant relation between family size and Brucellosis infection.

Table (5): **Correlation between the studied sample total knowledge and both total practices and total attitudes related to Brucellosis, (n=320).**

Parameter	**Total Knowledge**	
	R	**P**
Total practices	0.585	<0.001*
Total attitudes	0.308	<0.001*

p<0.001(High statistical significant).

Table (5): Shows that there were a highly statistically significant correlation between total knowledge and both total practices and total attitudes of studied sample related to Brucellosis (P<0.001).

Discussion:

Brucellosis is a global zoonotic disease associated with significant morbidity that can lead to increased rates of spontaneous abortions in livestock and also in humans. The disease is widely distributed throughout the developing world, considered to be a serious problem in at least 86 countries. Brucellosis is a severe zoonosis in North African countries and the Near East causing economic and livestock losses and affecting industrial production. Consumption of unpasteurized milk and milk products from cows, small ruminants or camels is considered to be the main route of infection as well as an occupational hazard ***(Ahmed et al., 2010).***

This study aimed to assess perception of farmers regarding Brucellosis at kalyobia governorate. The aim was achieved through; assessing the farmers' knowledge regarding Brucellosis, assessing the farmers' attitude regarding

Brucellosis, and assessing the farmers' practices regarding Brucellosis through observational checklist.

Socio-demographic characteristics of farmers (table1).

According to general characteristics of the farmers; current study revealed that: the sample consists of 320 farmers, their age ranged from ≤ 20 to >40 years old with the mean age of 30.391 ± 6.168. Less than half aged from 30 to 40 years old, slightly more than three quarter of them were male (table1). These results were in the same line with ***Abd El -Hameed et al. (2012),*** who performed a study of awareness of personnel in direct contact with animals regarding Brucellosis, reported that the most of the farmers who are in direct contact with animals were aged 20 to 40 years old and the majority of them were male.

Regarding the educational levels of farmers, the present study revealed that, slightly less than one third of the farmers were illiterate and only tenth were highly educated. This finding was in agreement with ***Joshi (2013),*** who performed a study of zoonoses and food hygiene news, reported that less than one third of the farmers were illiterate and slightly more than tenth were with college education. However this finding was incongruent with ***Lindahl et al. (2015),*** who reported that the majority of farmers had secondary education and the minority was illiterate. In addition to ***Diez &Coelho (2013),*** who reported that three quarter of the studied sample had primary education and the minority had high school education. High level of illiteracy among farmers reflected a low educated community which put them at risk of exposure to brucella infection.

Regarding to occupation, the present study showed that, slightly less than two third of studied sample were farmers only and more than one third of them working besides farming. This finding was in agreement with ***Hasanin (2012),*** who reported that less than two thirds of them were farmers only and more than one third of them were farmers besides having another work. This finding might be due to the studied sample were living in rural areas.

Concerning marital status, the current study revealed that, the majority of studied sample were married (table1). This finding was in the same line with the study of ***Abd El Hameed et al. (2012),*** who reported that the majority of studied sample were married.

As regards to number of family and income, less than half of studied sample had more than 5 members in the family and had enough income. These findings were in agreement with ***Kansiime et al. (2014),*** who reported that half of farmers had 6-10 members in their households and enough family income.

As regards to family history of Brucellosis infection, the present study revealed that the minority of studied sample had a history of Brucellosis infection and all recovered from the disease without any complications (table2). These findings were in agreement with ***Alsubaie et al. (2005),*** who reported that two thirds of studied sample had a previous history of Brucellosis infection and all recovered from the disease without squeals, one patient relapsed. In addition to ***Sofian et al. (2013),*** who reported that the minority of studied sample had a previous history of Brucellosis infection. This might be due to occupational exposure to Brucellosis infection and close contact with animals.

Concerning total knowledge of studied sample regarding Brucellosis, about three quarters of studied sample had poor knowledge regarding Brucellosis (figure1). This finding was consistent with ***Jergefa et al. (2009), & Joshi (2013),*** who reported that the most of farmers had poor knowledge regarding Brucellosis. In addition to ***Hezekiah et al. (2013),*** who

reported that two thirds of studied sample had poor knowledge regarding Brucellosis. However this finding contradicted with ***Holt et al. (2011),*** who reported that the majority of studied sample had good knowledge regarding Brucellosis. In addition to ***Tebug et al. (2014),*** who found that the knowledge of zoonoses amongst dairy farmers was high.

Concerning total attitude of studied sample regarding Brucellosis, the current study revealed that, slightly more than two thirds of studied sample had indifferent attitude regarding Brucellosis (table3). This finding was incongruent with ***Lindahl et al. (2015),*** who clarified that the majority of studied sample had positive attitude toward Brucellosis and reported that half of studied sample wanted more information about Brucellosis and the majority preferred to receive it through an educational booklet.

Concerning total practices of studied sample regarding Brucellosis. The present study showed that, slightly more than half of studied sample had unsatisfactory practice regarding Brucellosis (figure2). This finding was in agreement with result of ***Joshi (2013),*** who found that about half of studied sample had poor hygienic practices.

Relation between socio-demographic characteristic of studied sample and Brucellosis, the present study revealed that there was no statistically significant relation between socio-demographic characteristic of studied sample and Brucellosis infections of a family member (table 4). This finding was in agreement with ***Saeed (2013),*** who found that there was no significant difference between employees of the government, farmers and Brucellosis. In addition to ***Diez &Coelho (2013),*** who found that age, gender and education did not influence the presence of Brucellosis. However this finding disagreed with ***Al-Shamahy (2000),*** who found that humans diagnosed with Brucellosis were more likely to have a lower educational level. As well to ***Sanodze et al. (2015),*** who found there was association between gender and Brucellosis infection. The overall male to female ratio was about 8:1 and explained that, this high gender disparity may be due to occupational exposure differences, since males usually work on the farms and in the care and management of farm animals.

The current study showed that, there was a highly statistically significant relation between total knowledge of studied sample and their educational level ($p=0.000$). On the other hand there was no statistical significant difference between total knowledge of studied sample and their gender ($p= 0.257$). This finding was in agreement with ***Lindahl et al. (2015),*** who found that there was a highly statistically significant relation between total knowledge of studied sample and their educational level as studied sample with lower educational level of education were less likely to have knowledge of Brucellosis compared to those who attended technical college or university ($p= < 0.001$) and reported that there was no difference in knowledge about Brucellosis between men and women since they do the same farm work.

The present study showed that, there was a highly statistically significant relation between total knowledge of studied sample and their family size. This might be due to studied sample talked about animal health issues with their family members.

Correlation between the studied sample knowledge & their practices and attitude (table 5). The current study revealed that there were a highly statistically significant correlation between total knowledge and both practices and attitudes of studied sample related to Brucellosis. This finding was in agreement with ***Devi (2011),*** who performed a study assessment of the knowledge, attitude and practices regarding prevention of transmission of selected zoonotic diseases among

housewives of rural areas, reported that there were correlation between knowledge, attitude and practices of studied sample regarding Brucellosis. This might be due to poor knowledge leaded to unsatisfactory practice and indifferent attitude.

Conclusion

Slightly more than three quarter of studied sample had poor knowledge, more than two third of them had indifferent attitude and slightly more than half of them had unsatisfactory practice regarding Brucellosis. There was no statistical significant relation between socio-demographic characteristic of studied sample and family history of Brucellosis infection. There were a highly statistically significant correlation between total knowledge and both practices and attitudes of studied sample related to Brucellosis.

Recommendations:

According to results of the current study, the following suggestions are recommended:

1) Health education program should be given for farmers about Brucellosis, its causes, mode of transmission, signs and symptoms, and methods of prevention.

2) Increasing public awareness and knowledge about the disease, its symptoms, and the correct methods of pasteurization of milk and dairy products, in addition to proper ways of handling raw meat at home through the use of gloves are important measures for effective containment and control.

3) Collaboration between public health and veterinary medical managements to train both the physicians and veterinary doctors to increase the health awareness through written guidelines, not only giving them just knowledge but learning them the sound practices through training courses.

4) Prevention campaigns that targets persons on rural privately owned farms with livestock. Prevention messages should be delivered through the mass media and focus on use of protection methods (e.g., wearing protective clothes, especially when assisting in delivery; not permitting children to have contact with animals; and having sick animals checked by a veterinarian) during contact with animals and adherence to adequate sanitary standards (e.g., boiling or pasteurizing) when processing milk and milk products.

5) Brucellosis health education brochures should be distributed to high risk people, at infectious disease hospitals and local clinics.

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