



**KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ASSOCIATED WITH
BRUCELLOSIS AMONG HERDERS IN AIN SHAMS AREA OF MAKKAH, SAUDI
ARABIA**

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ABSTRACT

Background: Promotion of knowledge, attitudes and practices among herders could have a significant impact on the decrease of many zoonotic infections such as brucellosis. This cross-sectional descriptive study was conducted from July 2016 to July 2017. The main objective is to study knowledge, attitudes and practices regarding prevention of Brucellosis among the Herders in Ain Shams area of Makkah AlMukarramah, Saudi Arabia.

Method: To achieve the objective of the study, 35 herders were interviewed using a questionnaire with questions about demographic characteristics, knowledge, attitudes and practices associated with brucellosis spread and prevention. The collected data were reviewed and coded and then analysed using SPSS version 22 Software.

Results: More than half of herders have low education level (51.4% Illiterate, 20% primary) and all of them have low economic status. Most of them (65.7%) don't use preventive measures when milking and more than two-third (68.6%) don't have places to isolate sick animals. The competent authorities don't provide to herder any educational information about the disease (85.7%). We recommend the necessity of cooperation between the Ministry of Agriculture and the Ministry of Health to intensify health education programs to raise health awareness towards brucellosis and milking according to the health requirements with the need to use preventive measures during the milking by the technician in collaboration with the owners of farms.

KEYWORDS: KAP, prevention of Brucellosis Herds men, Shams, Makkah.

INTRODUCTION

Brucellosis is a zoonotic disease that is acquired by direct contact with infected materials from animals or indirectly by ingestion of animal products or by inhalation of airborne agents.^[1] Brucellosis is a public health concern worldwide as it affects the world's economy. The disease is endemic in countries of the Arabian Gulf including Saudi Arabia, Mediterranean basin and the Indian subcontinent. There are many factors that contribute to spread of brucellosis in Saudi Arabia, such as the social customs, dietary habits of its people, uncontrolled importation of poorly screened animals, lack of legislation for proper control of the marketing and movement of animals, husbandry practices, poor animal quarantine procedures and poor cooperation and exchange of information between veterinary and health services.^[2] Although many developed countries have been able to control this disease, but it remains endemic in Saudi Arabia. For example, a study conducted in Jazan province to determine sero-prevalence of brucellosis reported it to be 13.4%. Prevalence was significantly higher among rural

than urban populations, in Saudis than non-Saudis and in males than females.^[3] Factors that are associated with spreads of brucellosis include consumption of raw milk and milk products, keeping of livestock, milking of livestock, animal contact, butchering of raw meat, handling parturient animal and contact with placenta membrane. The prevalence of brucellosis among livestock which were selected randomly was estimated at 17.4%.^[4] Brucella organisms are small aerobic intracellular *coccobacilli*, localize in the reproductive organs of host animals are shed in large numbers in the animal's urine, milk, placental fluid, and other fluids.⁵ Human-to-human transmission of brucellosis is very rare.^[5] However, socioeconomic factors that can lead to the spread of the disease include drinking of unpasteurized milk and derivatives such as cheese, direct contact with the animals without taking the necessary precautions, keeping the animals nearby of populated communities, and non-use of preventive vaccines by the competent authorities and eating undercooked meat.^[6] Slaughterhouse workers, meat-packing employees, veterinarians have been found to cause increase in the

spread of the disease to public.^[7] Movement of infected sheep or goats can contaminate pastures and spread brucellosis to other animals as this has been documented as a major risk factor for failure of brucellosis eradication programs.^[8]

This study aimed to examine the knowledge, attitudes and practices associated with brucellosis among herders in Ain Shams area, Makkah AlMukarramah, Saudi Arabia in order to determine the risk factors that contribute to spread of the disease.

METHODOLOGY

This cross sectional descriptive study was conducted to examine the knowledge, attitudes and practices associated with brucellosis among herders farmers in Ain Shams, Makkah, KSA during July September 2016 to July 2017. Ain shams, a desert area covering about 136 km² and away from Makkah about 26 km at latitude 21°36'29.4228 N and longitude 39°44'20.4972 E. Ain shams is a place filled with animal in Makkah and located in the northern part of the Makkah. All the 35 herders in the study area were included in the study.

Data collection

All the thirty-five herders in the area were asked to complete questionnaire and checklist. The informed written consent was taken from all participants prior to involvement in the study. Data collected was facilitated by staff of Municipality. The questionnaire consists of questions related to demographic variables such as age, gender, education level, monthly income, and nationality. Other questions relating to safety consciousness and preventive measures were also added.

Knowledge questionnaire

The knowledge part was designed to evaluate the knowledge of herders about brucellosis and the route of transmission. Also knowledge about the risk factors for acquiring brucellosis such as drinking unpasteurized milk and eating raw meat were accessed.

Attitude questionnaire

In this section, questions examined attitudes like how to deal with birth waste and the level of cleanliness of the animal farm were asked.

Table 2: Exposure to risk factors.

Risk factor	N	%
preventive measures when milking (n=35)		
Yes	12	34.3
No	23	65.7
Consumption of unpasteurized milk (n=35)		
Yes	3	8.6
No	32	91.4
Consumption of raw or under cook meat (n=35)		
Yes	3	8.6
No	32	91.4
Handle the placenta with naked hands (n=35)		
Yes	10	28.6

Practice check-list

Practices such as how to deal with infected animals were examined.

Statistical analysis

Data from questionnaires and check-list were analysis by using SPSS version 22.0.

RESULTS

Demographic characteristics of herders

The demographic characteristics of the herders are presented in Table 1. The age group of study sample ranges between 18 and 65 years. The duration of working experience of herders is between 1 and 30 years. All of them were males and all are of low economic status. About half of herders (51.1%) were illiterate while majority (71.4) was Sudanese.

Table 1: Demographic profile of the workers.

Characteristic	N	%
Sex (n=35)		
Male	35	100
level of economic status (n=35)		
Less than 2000 SAR	35	100
level of education (n=35)		
Illiterate	18	51.4
Primary	7	20
Secondary	5	14.3
High school	5	14.3
Nationality of worker (n=35)		
Ethiopian	6	17.1
Yemeni	3	8.6
Sudanese	25	71.4
Bangladeshi	1	2.9

Risk factors

Information about exposure to risk factors is presented in Table 2. All workers use manual method in milking while more than half (65.7%) don't use preventive measures at all. Nearly a third (28.6%) of the herders handled the animal placenta with naked hands. Majority 31 out of 35 (88.6%) don't slaughter the animals in the farm.

No	25	71.4
Hygiene of milking Place (n=35)		
Yes	11	31.4
No	24	68.6
place of isolation sick animals (n=35)		
Yes	32	91.4
No	3	8.6
Slaughter in the farm (n=35)		
Yes	4	11.4
No	31	88.6

KNOWLEDGE

Table 3 presents knowledge regarding brucellosis. Majority of the herders (97.1%) heard about brucellosis

before and majority 22 (62.9%) believed brucellosis is an infectious disease. Majority (85.7%) reported not getting competent information about the disease.

Table 3: Knowledge about brucellosis.

Question	N	%
Have you heard of the disease Brucellosis? (n=35)		
Yes	34	97.1
No	1	2.9
Don't know	0	0.00
Do you think that the brucellosis is infectious diseases?(n=35)		
Yes	22	62.9
No	5	14.2
Don't know	8	22.9
Do you think that the brucellosis disease transmitted from animals? (n=35)		
Yes	26	74.3
No	2	5.7
Don't know	7	20
Can human be infected with Brucellosis? (n=35)		
Yes	30	85.7
No	1	2.9
Don't know	4	11.4
Were you provided with any educational information about brucellosis by a competent authority (e.g. Ministry of Agriculture)? (n=35)		
Yes	3	8.6
No	30	85.7
Sometimes	2	5.7
Do you know if there exists any vaccination for Brucellosis in camels/sheep/goats? (n=35)		
Yes	20	57.1
No	10	28.6
Don't know	5	14.3
Do you need/would you like more information on brucellosis? (n=35)		
Yes	29	82.9
No	6	17.1

Knowledge of herders about the route of transmission of brucellosis

Figure 3 illustrates the knowledge of herders about the route of transmission of brucellosis. Majority (60%) believed *Brucella* spp. can be transmitted to humans through drink raw milk while nearly half (48.6%) thought it can be transmitted through consuming dairy products made from milk of infected animals. About half of the herders (57.1%) believed it can be transmitted

through contact with infected people with the same number (57.1%) believing it can be transmitted through physical contact with infected animals.

Table 4 shows attitudes of herders about brucellosis. All herders (100%) believed they would separate sick animal from the herd. Most of them 28 (80%) consider brucellosis as a serious disease.

Table 4: Attitudes about brucellosis.

Question	N	%
How will you deal with the remains of childbirth or abortion?		
Bury	14	40
Discard	8	22.9
Burn	7	20
Feed to dogs	6	17.1
If you have an animal infected with brucellosis, will you separate the animal from the rest of the herd?		
Yes	35	100
No	0	0
If an animal in your farm is known to be infected with Brucellosis, how serious do you consider this to be?		
Quite serious	28	80
Very serious	6	17.1
Not serious	1	2.9
Observed levels of cleanliness of animals on site?		
High	17	48.6
Middle	18	51.4
Low	0	0

DISCUSSION

This is the first study of KAP associated with brucellosis among herders in Ain Shams area, Makkah Al Mukarramah, Saudi Arabia. The results revealed that herders have good awareness about brucellosis. This may decrease the prevalence of brucellosis among herders. This result agrees with the study conducted by^[9] in which the results showed that 100% of the interviewed livestock keepers were aware of brucellosis. In our study, herders have low education and low income. These can lead to decrease knowledge and awareness of herders toward infectious diseases such as brucellosis. This result means that low income leads to inability to pay for treatment of brucellosis costs and this may contribute to the further spread of brucellosis. It agrees with study carried out by^[10] in which low socioeconomic status and the other factors such as consumption of raw milk, and milk products, the keeping of livestock, milking of livestock, animal contact, butchering of raw meat, handling parturient animal and contact with placenta membrane were found to be associated with spreads of brucellosis.

The Socioeconomic factors that were found to be factors in the spread of brucellosis in elsewhere are drinking unpasteurized milk and derivatives such as cheese, also direct contact with the animals without taking the necessary precautions, keep the animals nearby of populated communities, and non-use of preventive vaccines by the competent authorities and also transmitted through eating undercooked meat.^[11]

Low-income countries are especially vulnerable to the spread of disease more than high-income countries. In low-income countries the monetary value of animals and animal products are less than it is in high-income countries. These indirect effects of the disease affect other sectors such as tourism. Brucellosis is endemic in

low-income countries. It has multiple effects on agriculture and public health sectors of economic and social development in low-income countries. There is much less public investment in health services and veterinary, weak oversight and operational capacity, and lack of access to technology that will help to improve the fight against the disease.^[6]

Herders were found to have practices that can expose them to brucellosis infection. High numbers of herders (65%) do not use protective measures at milking, 68.6% of herders don't have hygiene of milking place while 28.6% were dealing with the placenta with naked hands and without protection. These are high risk behaviours which may increase transmission of brucellosis and can contribute to the further spread of brucellosis. This agrees with the outcome of Arif et al^[9] finding from Pakistan where it was found that all farmers performed at least one risky practice on a regular basis for brucellosis transmission from animal to human.^[9] Very high numbers (91.4%) of herders in our study don't consume unpasteurized milk or raw or under cook meat. Unlike our results, Arif et al^[9] found majority (66%) of the farmers' families consuming raw milk.

Also, our results showed that 97.1% of the herders heard about brucellosis but surprisingly, 62.2% did not think it's an infectious disease. This means that their knowledge is defective. It is perhaps acquired from incompetent persons. So there is probably a lack of health awareness campaigns for brucellosis by the Ministry of Agriculture and the Ministry of Health. More than three quarter of herders (82.9%) would like information on brucellosis. The results show almost all farmers (97%) were not aware of the modes of transmission of brucellosis relating to risk.

CONCLUSION & RECOMMENDATIONS**CONCLUSION**

The study shows gaps between the knowledge, attitudes and practices among the herders in the population which call for dissemination of correct awareness programme among the herders if meaningful prevention and control of Brucellosis will be achieved.

Recommendations

Based on our results we strongly recommend the following:

5.2.1) Cooperation between the Ministry of Agriculture and the Ministry of Health to intensify health education programs to raise health awareness towards brucellosis.

5.2.2) Increasing the vaccination coverage against Brucella for herd animals to reduce the prevalence of brucellosis by the Ministry of Agriculture.

5.2.3) Banning of slaughtering animals inside the farms and enforcing this by the appropriate authority.

5.2.4) Establishing a joint surveillance system for Brucella by the Ministry of Agriculture and the Ministry of Health.

5.2.5) Enforcing of high standard of hygiene by farm owners while handling animals to reduce the risk of contamination.

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