

Knowledge, attitudes and practices on bovine brucellosis among smallholder livestock keepers in Rungwe district, Tanzania



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Abstract The objective of this study was to determine the knowledge, attitudes and practices (KAP) of smallholder livestock farmers on brucellosis in Rungwe District, Tanzania. A cross-sectional study was conducted among cattle keepers practicing communal grazing in the district using a structured questionnaire. One hundred cattle keepers provided information about their KAP for brucellosis. Out of 100 participants, 12.8% did not know how the disease is transmitted in cattle, 20.5% stated mating, 37.2% stated placenta and 29.5% stated shared grazing area as the main transmission routes of the disease. Some respondents reported abortion (20.5%), bull infertility (25.6%) and weak calves (38.5%) as clinical signs in cattle, while 15.4% did not know the clinical signs. Drinking raw milk (23.1%), assisting delivery or handling placenta (16.7%), slaughtering infected animals (29.5%) and handling abortion cases (21.8%) were reported as means of brucellosis transmission to humans. A total of 11.5% of participants did not know the symptoms of brucellosis in humans, while 16.7%, 47.4% and 24.4% cited fever, headache and flu-like symptoms, respectively, as symptoms of brucellosis in humans. Most respondents had bad attitudes and practices toward brucellosis; for instance, 59.8% of respondents consumed unboiled milk. It is concluded that most livestock farmers in Rungwe district have poor knowledge of brucellosis, and their attitudes and practices put them and susceptible cattle on their farms at risk of contracting the disease. Education campaigns on the disease prevalence, socioeconomic effects, mode of transmission and control measures are recommended to control brucellosis in Rungwe District and the country at large.

Keywords: cattle, health, infectious

1. Introduction

Brucellosis is considered the most common zoonotic disease and is widely distributed in many countries of the world (Franco et al 2007; Holt et al 2006). In developing countries such as Tanzania, smallholder livestock keepers are at high risk of getting this disease due to close contact with livestock (Marcotty et al 2013; WHO 2016). Some smallholder livestock keepers lack knowledge of brucellosis and its impact on livestock and human health.

Brucellosis is characterized by abortion, reduced fertility and decreased production of milk in lactating animals. Additionally, these diseases can cause orchitis and joint problems in animals (Olsen and Tatum 2010; WHO 2016). The disease is transmitted to humans mainly through consumption of unboiled or unpasteurized milk from infected cattle and through direct contact with birth materials from infected cattle (Olsen and Tatum 2010). Brucellosis can be controlled by using various techniques, such as awareness creation among livestock stakeholders about the disease, vaccination, quarantine and testing and slaughter of positive reactors (Godfroid et al 2004; Olsen and Tatum 2010).

In Tanzania, due to the intensity and widespread outbreaks of disease in cattle, various measures have been taken to control the disease (Katandukila et al 2021). A vaccination programme has been established that involves the participation of government institutions, the private sector and farmers to control the disease [John et al 2010, Makala et al 2020]. However, many smallholder cattle keepers do not comply with the vaccination programme for various reasons, such as the availability of vaccines in their areas and poor extension services. Additionally, many of them practice communal grazing, which can create risks of transmission among cattle. Cases of brucellosis in humans are underreported and underdiagnosed in the country, as in many developing countries where brucellosis is endemic (Wojno et al 2016).



Studies on stakeholders' knowledge, attitude and practices (KAP) on brucellosis have been conducted in many countries and provide important information for the awareness level of the community towards the disease and intervention and prevention strategies for the disease (Cloete et al 2019). The KAP studies in most countries showed that there is a need for disease awareness creation among stakeholders.

Rungwe district is among the districts in the country that produce large amounts of milk and is known to be affected by brucellosis (Mfune 2015); thus, the community in the district might be at risk of contracting human brucellosis. The objective of this study was to determine the KAP of smallholder livestock farmers in the district for brucellosis.

2. Materials and Methods

2.1. Description of the study area

The study was conducted in Rungwe District, which is located in the Mbeya region in the Southern Highlands Zone of Tanzania. The district is located between latitudes 9° 00' and 9° 30' E and longitudes 33° and 34° S with a total area of approximately 2,221 square kilometers. The elevation ranges from 770 meters to 2,265 meters above sea level, with higher elevations predominating. This district was selected because it is known to have the highest production of milk in the Mbeya region, and reports show that the district is affected by bovine brucellosis. For instance, Mfune (2015) reported a seroprevalence of 8.3%. Two wards, namely, the Msasani ward (Kasyeto and Bulongwe villages) and Makandana ward (Makandana village), with high numbers of cattle, were involved.

2.2. Study design

A cross-sectional study was conducted using a structured questionnaire to investigate KAP on brucellosis among cattle keepers in the Rungwe district. The questionnaire consisted of binary, multiple selection and open-ended questions. One question had an additional subquestion. Multiple selection questions with multiple correct answers were included to assess the level of understanding the respondents had on a particular aspect of the disease. For instance, to assess their knowledge on the mode of transmission in cattle, multiple correct answers were given to assess whether a respondent knew none, some of them, or all of them.

2.3. Sample size determination and data collection procedure

A purposive sampling procedure was used to select the district, wards and villages, and a random sampling technique was used to select 100 livestock keepers for interviews. Data were collected using a questionnaire. The selected smallholder livestock keepers for interviews originated from the selected villages and ought to be aged at 18 years or above and be able to communicate verbally in swahili. Administration of the questionnaire was face to face. A smallholder livestock keeper referred to a person who owns at least three cattle or a person responsible for taking care of the cattle on behalf of the owner.

2.4. Data analysis

Descriptive statistics were computed using the statistical package for social sciences (SPSS) version 26 to generate proportions of respondents on KAP regarding brucellosis.

3. Results

3.1. Sociodemographic characteristics of respondents

The study involved 100 respondents, 79% of whom were males. A high proportion (29%) of respondents were aged 31 – 50 years, and household sizes for the majority of them (40%) were in the range of 3 – 6. Eleven percent (11%) of the respondents had no formal education, 19% had primary education, 42% had secondary education and 28% had completed tertiary education.

3.2. Knowledge of interviewees on brucellosis as a disease in cattle and humans

Out of 100 participants, 78 indicated that they had heard of brucellosis previously. They pointed out that the main sources of information were neighbours, friends or family members (28.6%); veterinary services providers (28.6%); community gatherings or talks (27.2%); and radio or television (15.6%).

Regarding the mode of transmission of brucellosis in cattle, 12.8% of respondents did not know how the disease is transmitted, and 20.5% stated mating as the source of transmission. In addition, 37.2% stated placenta and 29.5% stated shared grazing area as the main transmission routes of the disease.

Some respondents reported abortion (20.5%), bull infertility (25.6%) and weak calves (38.5%) as clinical signs of brucellosis in cattle, while 15.4% of respondents did not know clinical signs of the disease. More than half (70.5%) of respondents knew that brucellosis is a zoonotic disease. Drinking raw milk (23.1%), assisting delivery or handling placenta

(16.7%), handling abortion cases (21.8%), and slaughtering infected animals (8.9%) were reported as means of brucellosis transmission to humans. The rest (29.5%) did not know how brucellosis is transmitted in humans. Regarding symptoms of brucellosis in humans, 11.5% of participants did not know the symptoms, while 16.7%, 47.4% and 24.4% of the participants cited fever, headache, and flu-like symptoms, respectively, as symptoms of brucellosis in humans.

3.3. Attitudes towards animal health, human health and brucellosis

When asked what they used to do to ensure that new cattle were healthy before buying and introducing them in their herds, the participants' responses were as follows: 22% of them stated that they sought veterinary advice, 49% bought from people they knew or trusted and 29% relied on their own experience. When asked what action would be taken if a cow aborted, 28% of respondents indicated that they would contact an animal health professional for help, 29% did not know what to do, and 43% said they would treat the case with homemade remedies.

Concerning the action, they would take if they experienced fever or influenza-like symptoms, 21% of respondents replied that they would go to a health facility or doctor, while 15% stated that they would stay at home. Fourteen percent (14%) reported that they would do nothing, and 50% would go to traditional healers.

3.4. Practices related to milk consumption and cattle husbandry

With regard to practices related to milk consumption and cattle husbandry, the responses of interviewees were as follows: 22.2% of them consumed boiled or pasteurized milk, 23.4% consumed raw milk, 36.4% consumed raw and soured milk, and 18% consumed exclusively boiled milk.

In terms of action that would be taken if an aborted fetus was found, 8% of respondents stated that they would bury the fetus in the ground, 11% would give it to dogs, 14% would dump or throw it away, 29% would burn it, 23% would do nothing, and 15% would report to a veterinarian. Equally, regarding the action that would be taken if a placenta membrane was found, 5% of respondents stated that they would bury it in the ground, 13% would give it to dogs, 18% would dump or throw it away, 8% would burn it, 27% would do nothing, and 29% would report to a veterinarian.

With regard to who is responsible for taking care of animals, the responses of interviewees were as follows: 29% of them indicated that cattle are taken care of by the owners themselves, 26% of respondents indicated that cattle are taken care of by hired animal attendants, and 45% of them indicated that cattle are taken care of by other family members.

4. Discussion

In this study, the majority (78%) of the respondents stated that they had previously heard of brucellosis. However, the overall findings indicated that the respondents were unaware of various aspects of brucellosis and had poor knowledge of the disease. This could be attributed to a lack of education on disease transmission in livestock and humans, clinical signs in livestock and humans, control measures in livestock and humans and treatment in humans.

The KAP scores between the villages (sampling sites) were significantly different ($p = 0.002$). Furthermore, the attitude and practices scores differed significantly between the groups of participants who had heard of brucellosis previously and those who had not ($p = 0.017$), suggesting that, to a certain extent, attitude and practices may be a result of community or cultural traits that are not influenced merely by individual awareness of brucellosis. The results from this study are similar to those reported by other KAP studies in Uganda (Nabirye 2017) and Kenya (Obonyo and Gufu 2015). Brucellosis KAP studies conducted in Egypt (Holt et al 2006), Nigeria (Buhari et al 2015), Uganda (Kansiime et al 2014) and Jordan (Musallam et al 2015) showed that 83%, 93%, 99.3% and 100%, respectively, had heard of brucellosis. The main source of brucellosis information was stated as unspecified media in the study conducted in Jordan (Musallam et al 2015), community health workers in the study conducted in Kenya (Obonyo and Gufu 2015), parents in the study conducted in Nigeria (Buhari et al 2015) and friends or family members in the study conducted in Tajikistan (Lindahl et al 2015). Of particular interest in Rungwe district was that most participants had heard of brucellosis through veterinary services providers, indicating the importance of the role of government veterinary services in this regard.

The findings of this study reveal several practices and attitudes that put humans and susceptible cattle in Rungwe district at risk of contracting brucellosis. They include lack of brucellosis screening before cattle are purchased and introduced in their herds, use of communal grazing land, improper disposal of aborted fetuses and placenta, and consumption of raw milk as well as raw and soured milk. Risky practices of mixing susceptible cattle and infected cattle on communal grazing lands were also reported in Kenya (Obonyo and Gufu 2015), Nigeria (Buhari et al 2015) and Uganda (Kansiime et al 2014). Slaughtering of brucellosis-infected cattle is considered a high-risk activity, as the persons conducting slaughter and handling of contaminated meat may be infected if precautions are not taken (Galinska and Zagórski 2014; Sadler 1960).

5. Conclusion

Based on the findings of this study, it is concluded that most dairy cattle farmers in Rungwe District have poor knowledge of brucellosis, and their attitudes and practices put them and susceptible cattle on their farms at risk of contracting the disease.

6. Recommendations

Education campaigns on brucellosis prevalence, socioeconomic effects, mode of transmission both in livestock and humans, and control measures both in livestock and humans are highly recommended to control and prevent the disease in Rungwe District and the country at large.

Ethical Considerations

Verbal consent was obtained from each respondent after knowing the purpose of the study.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This study was funded by the Food and Agriculture Organization (FAO) of the United Nations.

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