A QUANTITATIVE INVESTIGATION OF KNOWLEDGE AND PRACTICES OF HUMAN BRUCELLOSIS IN KAJIADO COUNTY, KENYA

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ABSTRACT. Human brucellosis, a neglected zoonosis is endemic in Kajiado County in both man and livestock. The Kajiado County community's main livelihood is livestock-keeping which puts it at risk. The study objective was to determine the community's knowledge and practices, and the association between the two in relation to brucellosis. Results revealed three predictors of practices the community undertook that put them at risk of contracting brucellosis. The predictors were respondent's education status (p=0.002 [CI 0.272-0.749] OR 0.451), knowledge of importance of pre-purchase livestock breeding soundness (p=0.007 [CI 1.207-3.356] OR 2.013), and knowledge that livestock abortions could result in human disease (p=0.027 [CI 1.070-2.974] OR 1.783). This meant that respondents without formal education were nearly half less likely to undertake practices that prevented transmission of brucellosis than those with formal education. Respondents who knew that livestock examination was important for breeding soundness were twice more likely to engage in practices that prevented brucellosis transmission than those who did not know. Respondents who knew that livestock abortions could lead to diseases in man were nearly twice more likely to engage in practices that prevented transmission of brucellosis than those who did not know that livestock abortions could lead to diseases in man. It was concluded that the community's knowledge and practices that promote brucellosis were inadequate. Two key recommendations were drawn. There was need to create awareness in the community on the risk factors and practices that contribute to occurrence of human brucellosis. There was need for using qualified animal health providers to mitigate the disease in animals.

Keywords: Kenya, brucellosis, knowledge, practices, Kajiado, association

INTRODUCTION

Human brucellosis, a communicable zoonotic disease caused by bacteria of the genus *Brucella* is the world's most common bacterial zoonosis (Franco *et al.,* 2007). Brucellosis has great public health and economic significance. It is a neglected

zoonosis that is endemic in Kenya, more so in Kajiado County. Its endemicity in man in Kajiado County is more so due to the community's main livelihood as livestock-keeping. The occurrence of brucellosis in humans is largely dependent on the animal reservoir. The burden of the disease appears to remain greatest, and yet most under-prioritized globally amongst pastoral people (Plumb *et al.,* 2013). Brucellosis is among the seven neglected diseases termed so, because despite their widespread distribution and effects on multiple species, they have not been prioritized by national and international health systems (FAO, 2010). The risk factors for human brucellosis include the consumption of raw milk and contact with livestock aborted fetuses, fetal membranes and infected neonates (Akbarmehr, 2011). Human brucellosis has a high morbidity burden, yet the affected communities have a poor understanding of the disease. Furthermore, the true burden of disease is unknown, and thus the global incidence is assumed to be 10-25 times higher than the reported figures (WHO, 1997). The global incidence is thought to be 500,000 infections/year (Franco *et al.*, 2007), while the regional incidence is >200 per 100,000 people (Holt *et al.,* 2011).

The prevalence of human and animal brucellosis in Kajiado North Sub-County, Kajiado County is high at 14.1% and 3.4% respectively (Ogola *et al*., 2014). The prevalence of animal brucellosis is higher in pastoralist systems at 10%, compared to zero-grazing systems at 2% (Kang'ethe *et al.,* 2000). It thus follows that human brucellosis is more common where pastoralist systems predominate, and as long as the disease persists in animals, transmission to humans continues (Kang'ethe *et al.,* 2000). There is a strong correlation between prevalence of brucellosis and the practice of moving animals from one place to another for grazing purposes. Intermingling of flocks which is common under pastoral husbandry is also a catalyst of the spread of the disease (European Union, 2001).

The main objective of the study was to determine the link between the knowledge and practices related to human brucellosis in a rural community in Kajiado County, Kenya. The objectives of the study were to determine the practices that predispose the Ewaso Kedong rural community to brucellosis, to determine the community's knowledge regarding the disease and to identify the association between these practices and knowledge.

MATERIALS AND METHODS

Study Design

A cross-sectional study design using systematic sampling was employed. Data on the practices and knowledge related to brucellosis were collected simultaneously.

Study Setting

The study was conducted in Ewaso Kedong Ward, 1°9'0" N and 36°34'0" E (Getamap.

net, 2013), in Kajiado Sub-County, Kajiado County, Kenya. Ewaso Kedong Ward is generally dry and hot with an annual rainfall of less than 700 mm (ALLPRO Report, 2007). The key economic activities in the area are a combination of livestock production (44.1%), agricultural production (29.4%) and off-farm income sources (26.4%) (NCAPD, 2005). Most of the land (92%) is non-arable; only 8% can support subsistence farming and hence livestock-keeping is the predominant economic activity (KDDP, 2009). The type of livestock production system practiced is pastoralism (NEMA, 2013).

Study participants

Kajiado North sub-county is one of the five sub-counties in Kajiado County. The sub-county was chosen due to its high prevalence of human and animal brucellosis in comparison to the other sub-counties. A second reason for choosing it was the pastoralist livelihood of the community that brings the community close to their livestock, hence putting them at risk of brucellosis. Ewaso Kedong Ward, one of the four wards in Kajiado Sub-County was chosen as livelihoods depend more on livestock-keeping in this ward, in comparison to the other wards in the sub-county. North Keekonyokie location, one of the five locations in Ewaso Kedong was chosen as representative of the other locations. This is because there was no significant difference in economic activity in comparison to the other locations in the ward. North Keekonyokie location has five sub-locations. All five sub-locations, namely Inkiushin, Olgumi, Olentoko, Enkorika and Ewaso were included in the study. Households in each sub-location were selected on a pro-rata basis according to the number of households in the sub-location. The number of households in North Keekonyokie location, and in each sub-location was obtained from the Kajiado District Development Plan (2009). The household sampling interval was five. This sampling interval was attained by dividing the total number of households in North Keekonyokie (there were 1980 households), by the desired number of households to interview (384). The primary sampling unit consisted of the household, while the secondary sampling unit was a household member; either male or female, aged 18-55 years old.

Sample size

The sample size was determined using the Fisher formula (Fisher *et al.,* 1978). It was calculated based on a prevalence of 50%. This is because the prevalence for such a study of the disease was unknown. Using the formula, the number of respondents to recruit was established as 384.

Study Variables

The study had both dependent and independent variables. The variables sought to determine the practices in the community that either led to, or prevented

transmission of brucellosis from animals to man. Practice was the dependent variable, while knowledge, socio-economic profile and demographic characteristics were the independent variables. This is shown in Figure 1.

To measure the practices, the respondents were asked questions pertaining to the risk factors of brucellosis. A rating scale (Tebug, 2013; Wright and Masters, 1982) for the practices was developed that had a maximum of eleven questions and with a score ranging between 12-23 based on the minimum and maximum scores. The practice level for each respondent was determined based on the total score from the responses given. Each response had a pre-determined weight. Incorporating all the responses given by each respondent, a practice rating scale was constructed that was used to grade or weigh the respondent as one with either a high or a low practice score (Tebug, 2013).

The scale was categorized into two levels as shown below;

- 12 - 17 correct responses indicated a low level of practice.
- 18 - 23 correct responses indicated a high level of practice.

Knowledge predicted the practices of the community with regards to human brucellosis.

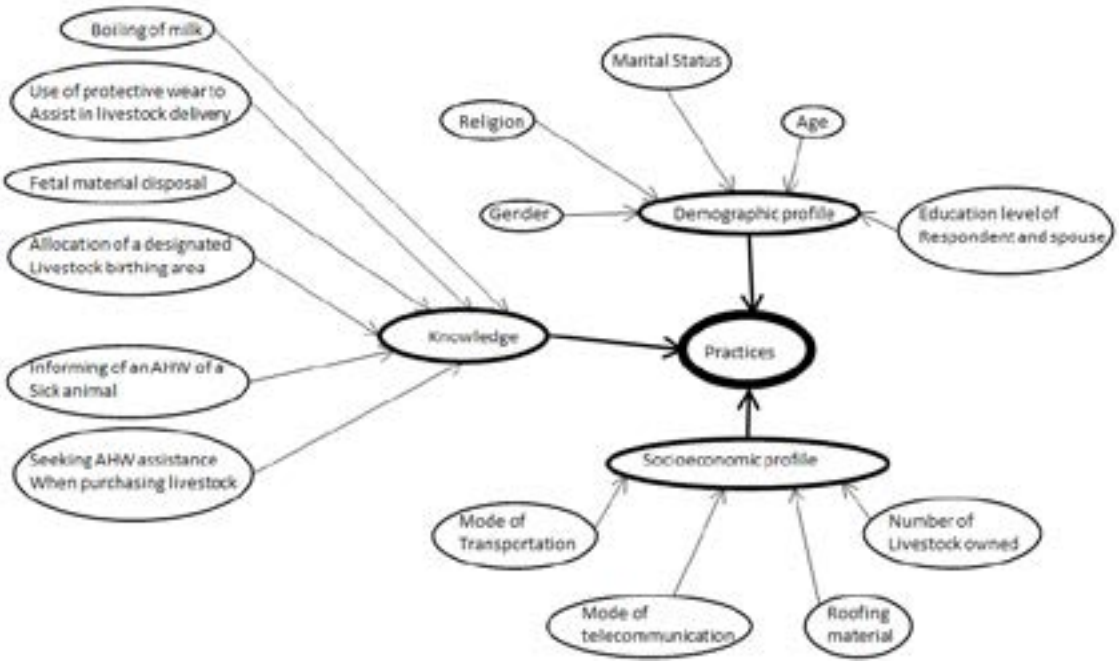

Figure 1. Conceptual Framework: Modified from FAO (2010), Adesiji (2005), Holt *et al.* (2011).

Study Instruments

A pre-coded interviewer schedule was employed in the collection of quantitative data for both the dependent and independent variables from the 384 household members. The codes in the schedule were meticulously developed to ensure that they were mutually exclusive, exhaustive and representative. The interviewer schedule consisted of open-ended and close-ended questions.

Data Analysis

The statistical operations performed were both descriptive and analytical using Special Program for Social Scientists (SPSS), version 18 for analysis, 2003. Data pertaining to the demographic characteristics, socio-economic profiles, knowledge and practices relating to human brucellosis was analyzed using descriptive statistics, that is, mean, median, frequency and range. The relationship between the knowledge level (independent variable) and the demographic characteristics, socio-economic profile and community's practices (dependent variable) was determined using the Chi Square Test. To determine the association between the practice score, and the knowledge, demographic and socio-economic profile, binary logistic regression modeling using Backward Stepwise (Wald) method was employed.

Study Limitation

There was no observation of any of the practices that the respondents indicated that they undertook.

Ethical Considerations

The study approval was sought and granted from the Institutional Research and Ethics Committee (IREC) of Moi University/ Moi Teaching and Referral Hospital. In addition, informed and voluntary oral consent was sought from each respondent prior to enrolment into the study. Privacy rights of the respondents were respected and coded unique personal identifiers were used on the interviewer schedule. Confidentiality of all the information obtained was maintained.

RESULTS

Demographic and Socio-economic Characteristics of Respondents

Data on the demographic and socio-economic characteristics of the respondents were collected as independent variables as shown in Table 1. Descriptive statistics were performed on the data. It revealed that of the 384 respondents interviewed, 74.7% were males and the rest were females. The ages of the respondents ranged from 20 to 55 years, with a mean age of 39.94 years, median of 40 years and a standard deviation of 9.25 years. Regarding the marital status of the respondents, 4.2% were single (they

Table 1. Percentage of respondents interviewed by gender, level of education and marital status in the human brucellosis study

Variables	Number of respondents (%) (N=384)
Gender	
Male	288 (75)
Female	96 (25)
Marital Status	
Single	16 (4.2)
Married	352 (91.7)
Widowed/Separated/Divorced	16 (4.2)
Respondent Educational Status	
No Formal Education	184 (47.9)
Primary School	124 (32.3)
Secondary School	58 (15.1)
Tertiary Level	18 (4.7)

Variables	N = 384
Age	
Mean	39.94
SD	9.25
Median	40
Range	35
Number of cows owned	
Mean	71.23
SD	101.04
Median	34
Number of sheep owned	
Mean	256.07
SD	326.97
Median	126.50
Number of goats owned	
Mean	151.89
SD	227.73
Median	80

had never been married), 91.7% were married and 4.2% were widowed, separated or divorced. Pertaining to the respondents' highest education level, a majority at 47.9% had received no formal education, 32.3% had received primary school level education, 15.1% had secondary school level education and a paltry 4.7% had tertiary level education.

On the socio-economic status, 100% of the respondents indicated that they owned livestock. Of these, 97.9% owned cattle, 96.4% owned sheep and 99.7% owned goats. The number of cattle owned ranged from 1 to 740 with a mean of 71, and standard deviation of 101.04. The number of sheep owned ranged from 1 to 1800; mean owned was 256 and standard deviation of 326.97. The number of goats owned ranged from 2 to 1500, mean of 151 and standard deviation of 227.73.

Practices that predisposes the community to brucellosis

To determine the practices that predispose the community to brucellosis, questions were posed to the respondents. The practices were the` dependent variables of the study. As shown in Table 2, regarding the practice of livestock examination during purchase, 98.4% indicated that they ensured that the livestock they were buying were examined before purchase to ensure they did not display any signs of disease or infection. Pertaining to the person who conducted the livestock examination, 97.9% indicated that they as the buyers conducted the examination, 89.3% indicated that a friend conducted the examination, 44.8% employed the services of a relative to examine the livestock and only 3.9% employed the services of an AHW to conduct the examination.

Pertaining to livestock giving birth, 98.2% indicated that household members assisted in the livestock birthing process. Further, 100% of the respondents indicated that they neither used gloves, polythene bags on their hands, closed shoes, gumboots nor dustcoats as protective gear when assisting delivery.

On the course of action taken when livestock were seen to abort, only 54.2% indicated that they sort veterinary assistance, 87% indicated that they would keep the animal, 1.0% slaughtered the aborting animal, and 0.8% sold it off to a willing buyer, while 1.0% sold it off for slaughter. Of all the respondents, only 2.1% indicated that they separated the aborting animal from the rest of the livestock. Regarding the course of action taken to manage the aborted fetal material, 81.5% disposed-off the livestock fetus into the bush, 1.3% burnt the fetus, 11.5% buried the fetus and 58.1% fed it to dogs and cats.

On the practice of boiling milk for consumption and for tea-making, 100% indicated that they always boiled the milk, 99.5% indicated that during boiling, they allowed the milk to rise to the top of the metal pot ('sufuria') and 100% indicated that when making tea mixed with milk, the mixture was also allowed to rise to the top of the sufuria during the cooking process.

Table 2. Frequency of brucellosis predisposing practices of respondents in the human brucellosis study

Variables	Number of respondents (%) (N=384)
Person who conducted the examination	
Buyer	376 (97.9)
Buyer's friend	343 (89.3)
Buyer's relative	172 (44.8)
AHW	15 (3.9)
Pre-purchase livestock examination	
If the livestock examination is done	378 (98.4)
Livestock delivery	
If assistance of livestock birthing by household members	377(98.2)
Use of protective wear to assist in livestock delivery.	0 (0)
Livestock abortions and action taken on aborting livestock	
Seek veterinary assistance	208 (54.2)
Retain animal in herd/flock	334 (87)
Slaughter the animal	4 (1)
Sell animal to someone else	3 (0.8)
Separated from other livestock	8 (2.1)
Action taken on aborted livestock fetus	
Disposed into the bush	313 (81.5)
Burnt	5 (1.3)
Buried	44 (11.5)
Fed to dogs and cats	223 (58.1)
Treatment before milk consumption	
Boiled always before consumption	384 (100)
Let to rise to sufuria top at boiling	382 (99.5)
Treatment of milk for tea-making	
Mixed milk tea is let to rise to sufuria top at cooking.	384 (100)
Practice Scale	
Low Practice Score	185 (48.2)
High Practice Score	199 (51.8)

Table 3. Frequency of brucellosis knowledge of the respondents in the human brucellosis study

Variables	Number of respondents (%) (N=384)
Pre-purchase livestock examination knowledge	
Pre-purchase examination is important	271 (70.6)
Examination is important in price bargaining	3 (0.8)
Examination is important in ascertaining health status	274 (71.4)
Examination is important in determining breeding soundness	273 (71.1)
Determination of knowledge on signs of illness	
Infected livestock are asymptomatic	11 (2.9)
Infected livestock may abort	373 (97.1)
Infected livestock loose appetite	371 (96.6)
Importance of putting on protective wear when helping in livestock delivery	
We do not need to wear protective items	190 (49.5)
We put on protective wear because others do so	10 (2.6)
We put on protective wear to prevent contracting of disease	316 (82.3)
Knowledge on association between livestock and human disease	
Livestock abortions cause human disease	126 (32.8)
Livestock disease may cause human disease	350 (91.1)
Knowledge on the importance of boiling milk	
To make it safe for consumption	378 (98.4)
To kill germs	363 (94.5)
To make it thicker in consistency	5 (1.3)

The results indicated that 48.2% of the respondents had a low practice score, while 51.8% had a high practice score.

Community's knowledge regarding brucellosis

To determine the community's knowledge on brucellosis, questions were posed to the respondents. The community's knowledge was also an independent variable. As shown in Table 3, on if livestock examination was important before buying, 70.6% of the respondents indicated that it was necessary. Regarding the importance of livestock examination during purchase, 0.8% indicated that its importance was to bargain the buying price, 71.4% indicated that it was for the ascertainment of animal's health and 71.4% indicated that it was for the determination of breeding soundness of the animal. To determine the respondent's knowledge on clinical symptoms displayed when livestock are ill, 2.9% indicated that the livestock were lively during illness, 97.1% indicated that the livestock were likely to have abortions and 96.6% indicated that the livestock developed loss of appetite.

Regarding the importance of protective gear when assisting in livestock delivery, 49.5% indicated that it was necessary to wear protective gear, 2.6% indicated that they wore it because other people did and 82.3% indicated that wearing it prevented the contraction of livestock illnesses.

On the purpose of boiling of milk before consumption, 98.4% indicated that it was to make the milk safe for consumption, 94.5% indicated that it was to kill germs while 1.3% indicated that it was to thicken the consistency of the milk.

Bivariate analysis results

Table 4 shows the relationship between the knowledge level, demographic characteristics, socio-economic profile (independent variables) and community's practices (dependent variable) determined using the Chi Square Test. Sub-location, respondent and spouse education level, socio-economic level, importance of the examination, importance of the examination for breeding soundness, importance of wearing protective attire and human illness resulting from livestock abortions were all significantly associated with the practice score with p value less than 0.05.

Multivariate analysis results

The practice level was modeled against the knowledge, demographic and socio-economic profile. Binary logistic regression analysis using Backward Stepwise (Wald) method was employed.

Table 5 indicates that respondent's education status with p value 0.002 [CI 0.272 – 0.749] OR 0.451, knowledge of the importance of livestock breeding soundness with p value 0.007 [CI 1.207 – 3.356] OR 2.013 and knowledge that

Table 4. Bivariate analysis results of respondent practice level against respondent demographic, socioeconomic and knowledge variables

Variables	Practice Level		Chi-square	*p*-value	Unadjusted OR (95% CI)
	Low	High			
Education status					
No Formal Educ.	116(63)	68(37)	31.273	0.000*	3.24[2.133, 4.919]
Formal Educ.	69(34.5)	131(65.5)			Reference
Spouse Ed. Status					
No Formal Educ.	127(57.7)	93(42.3)	16.151	0.000*	2.47[1.582, 3.856]
Formal Educ.	47(35.6)	85(64.4)			Reference
Exam. Important					
Yes	108(39.9)	163(60.1)	25.562	0.000*	0.31 [0.195,0.493]
No	77 (68.1)	36 (31.9)			Reference
Livestock abortions Cause human disease					
Yes	41(32.5)	85(67.5)	18.367	0.000*	0.38[0.244, 0.597]
No	144(55.8)	114(44.2)			Reference

Key

* = statistically significant ($p < 0.05$)

Reference = Variable held constant during analysis for statistical comparison purposes.

Table 5. Multivariate analysis results of respondent practice level against; respondent demographic, socio-economic and knowledge variables

Variables	Practice Level		*p*-value	Adjusted OR (CI)
	Low	High		
Educ. Status				
No Formal Educ.	116 (63)	68 (37)	0.002*	0.451 [0.272, 0.749]
Formal Educ.	69 (34.5)	131 (65.5)		Reference
Breeding soundness				
Yes	110 (40.3)	163 (59.7)	0.007*	2.013 [1.207, 3.356]
No	75 (67.6)	36 (32.4)		Reference
Livestock abortions Cause human disease				
Yes	41 (32.5)	85 (67.5)	0.027*	1.783 [1.070, 2.974]
No	144 (55.8)	114 (44.2)		Reference

Key

* = statistically significant ($p < 0.05$)

Reference = Variable held constant during analysis for statistical comparison purposes.

livestock abortions could lead to diseases in man with p value 0.027 [CI 1.070 – 2.974] OR 1.783 were the statistically significant predictors of the practices.

DISCUSSION

Nearly half of the respondents had no formal education. This finding was statistically significantly associated with the practices undertaken to prevent transmission of human brucellosis status. The current study indicated that respondents without formal education were nearly half less likely to undertake practices that prevented transmission of human brucellosis than those with formal education. This is in agreement with a study in Malawi (Tebug, 2013) where farmers with above primary education were more knowledgeable of zoonoses such as brucellosis in comparison to farmers with below primary education. This factor could be attributable to a better understanding of the simple basics of diseases and their methods of transmission which would lead to the undertaking of practices to prevent transmission.

Although the study results indicate that nearly all of the respondents ensured that the livestock they were buying were examined before purchase to ensure that they displayed no signs of infection or disease, only a tiny percentage employed the services of an Animal Health Worker (AHW) to conduct the examination. This finding is in concurrence with that of a study conducted in Palestine (FAO, 2010), among livestock farmers and consumers where at purchase of animals, the minority employed the services of an AHW. These studies indicate that there exists a high possibility of the spread of disease.

Pertaining to livestock delivery, most indicated that household members assisted in the livestock birthing process with only a small fraction of respondents having a designated calving area. The study also indicated that the use of a designated birth area was not a priority as members of the community reported it was difficult to implement owing to their nomadic pastoral production system. This indicates the possibility of environmental contamination with bacteria from where infections were picked by healthy animals and hence maintain the disease in the livestock population with a possibility of transmission to humans who are in close contact with the animals. This is in agreement with a study in the Greater Yellowstone Area, USA (Aune *et al,*. 2011) which indicated that *Brucella* persisted in the environment where abortion or calving had occurred for 21-28 days depending on the month, temperature and exposure to sunlight.

A majority of the respondents in the study indicated that it was necessary to conduct the examination. Importance of pre-purchase livestock examination for the determination of breeding soundness of the animal was statistically significant. Respondents who knew that livestock examination was important for breeding soundness were two times more likely to engage in practices that prevented human

brucellosis transmission than those that did not know. Inadequate knowledge of breeding soundness as a risk factor for the spread of brucellosis was proven by a study in USA (Moore *et al.,* 2009). In the study animals were examined before purchase for the presence of infections that could affect among other issues, the animal's breeding soundness. The animals underwent a physical examination and serological tests. Results revealed that 33% of the animals harbored infections. Incoming animals were rarely examined to identify problems such as infertility that could be due to infections such as brucellosis, and it is postulated that the associated costs are the main deterrent.

On the course of action taken when livestock were seen to abort, only slightly above half of the respondents indicated that they sought veterinary assistance, and very few indicated that they separated the aborting animal from the rest of the livestock. The results of this study contrast with those of a study conducted in Egypt (Holt *et al.,* 2011) that revealed that all of the respondents sought veterinary assistance in case abortions occurred. In comparing the two studies, the respondents in Egypt appeared better informed as a larger proportion followed the right course of action by separating aborting animals from the rest, and by seeking veterinary assistance. The results of this study are also in contrast with those of a study conducted in Palestine in 2007(FAO, 2010). The Palestinian study showed that if an animal aborted or was suspected to have brucellosis, most of the respondents would report to a ministry official or seek veterinary assistance. In Kenya, unlike in Palestine or Egypt, challenges of inadequate staff and transport facilities were cited by the key informants as deterrents to seeking veterinary assistance.

Regarding the course of action taken to manage the aborted fetal material, only a few respondents applied the correct disposal method of either burning or burying. This study is in agreement with the Egyptian study (Holt *et al.,* 2011) that revealed that a majority of the community members wrongfully disposed - off fetal material and animal carcasses into water canals thus contaminating the environment. However, the results of this study contrast with those of a study conducted in Palestine (FAO, 2010) which revealed that in the management of aborted fetal material, most respondents either buried or burnt them. The results indicate that the community in Ewaso Kedong was at a higher risk than that in Palestine because disposing - off the fetus into the bush was the most common method used. The high risk is as proven by a study carried out in the Greater Yellowstone Area in the United States (Aune *et al,.* 2011) which revealed that abortion or birth by an animal infected with Brucella led to environmental contamination and the Brucella bacteria were able to survive in the environment (on soil and vegetation) for 21 – 28 days dependent on prevailing weather conditions.

Additionally, in Ewaso Kedong, over half of the respondents indicated that they fed the aborted fetuses to dogs and cats. This practice is risky because according to research in Korea (Baek *et al,.* 2003), interspecies infections were proven where Brucella from cattle was transmitted to dogs. The dogs got the *B. abortus* infection from the aborted material and infected vaginal discharges from the cattle. Based on these results of the Korean study, and also on the close association between the cats, dogs, cattle, sheep and goats in Ewaso Kedong, there exists a potential possibility that the dogs and cats in Ewaso Kedong Ward may be transmitting *B. abortus, B. mellitensis* and *B. ovis* to the cattle, sheep and goats contracted from consuming aborted fetal material; while the sheep, goats and cattle may be infecting and re-infecting each other because they are grazed, watered and housed together which may account for the endemicity of brucellosis in the area.

In the present study, less than half of the respondents indicated that spread of livestock illnesses to humans as a result of abortions was possible. The results indicate that there was low knowledge among the respondents on the transmission of disease resulting from livestock abortions. This thus put the community at great risk because contact with infected livestock placentae is an important means of transmitting brucellosis to humans. Respondents who knew that livestock abortions could lead to diseases in man were nearly twice more likely to engage in practices that prevented transmission of human brucellosis than those who did not know that livestock abortions could lead to diseases in man. Livestock abortions as a risk factor for brucellosis transmission to humans was proven in a case report (Young, 1995) where a farmer developed the clinical signs of brucellosis after his animals had been quarantined owing to bovine brucellosis. The animals suffering from brucellosis had among other signs, abortions and reproductive inefficiency. A second case report (Chahota *et al.,* 2003) proved the transmissibility of the organism owing to livestock abortions when animal handlers developed brucellosis – like symptoms following an outbreak of brucellosis in the dairy farm. The livestock in the farm had abortions, retained placentae and still births.

Personal protective clothing was not used during assistance to livestock delivery. This was in agreement with a study in Egypt (Holt *et al.,* 2011) where none of the study participants wore protective clothing during assistance in livestock delivery. The results are however in contrast to a study conducted in Palestine in 2007 (FAO, 2010) where nearly half of the respondents indicated that they wore gloves for protection. The difference in the results between the Kenyan and the Palestinian study may be attributable to the higher awareness, knowledge and importance associated with brucellosis in Palestine unlike in Kenya.

The results of the present study indicate that the great majority of the

community members understood the need and importance of boiling milk before consumption, and also during the making of tea. These results are in agreement with those of a study conducted in Kyrgyzstan (FAO, 2010) where the majority believed that it was necessary to boil milk to make it safe to drink. The results are also in agreement with those of a study carried out in Tanzania (Swai *et al.,* 2010) where the respondents mentioned boiling of milk as a way to reduce the risk of contracting a zoonotic infection.

All practices undertaken by the community members, with the exception of the milk hygiene practices, placed the community at a risk of contracting brucellosis from livestock and the knowledge on all the risk factors, apart from the importance of boiling milk and tea was low to average.

To reduce the risk of contracting brucellosis due to predisposing practices, the community requires the adopting of protective measures including ensure that pre-purchase livestock examination is conducted always by an Animal Health Worker (AHW), use of protective gear always when assisting in livestock delivery, seek veterinary assistance when livestock abort or have dystocia, and ensure burning or deep burying of livestock abortive material.

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