Myths, perceptions knowledge, attitudes, and practices (KAP) linked to mycobacterial infection management among the pastoralist communities of Uganda

MYTHS, PERCEPTIONS, KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP) LINKED TO MYCOBACTERIAL INFECTION MANAGEMENT AMONG THE PASTORALIST COMMUNITIES OF UGANDA

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ABSTRACT

The present study was conducted to assess community myths, perceptions, knowledge, attitudes, practices (KAP) of the pastoral farmers and explore mycobacterial infection management practices. Both structured questionnaire survey and participatory rural appraisal approaches were used. This study revealed that mycobacterial infection especially tuberculosis as referred to in vernacular as *akakonko, akasubba* or *akafuba* because of the persistent cough and other respiratory symptoms. Knowledge attitudes and practices: congestion under extended family homes, sharing of household utensils, consumption of untreated milk and drinking untreated water as means of mycobacterial infections spread to humans. Perceptions: sharing the drinking straws and cigarette sticks. Community myths: witchcraft, family history and genetic heritability. Mycobacterial infections and Human Immunodeficiency Virus-Acquired immunodeficiency syndrome (HIV/AIDS) were closely linked and these infections issued stigmatisation among the community members. Mycobacterial infection management methods: Sixty five percent (65 %) of the respondents visited traditional healers and used local herbs while 35% visited health centres and used modern medicines. The multivariate model identified sex, marital status, and age influencing the choice of managing mycobacterial infections. Sustainable community intervention require a thorough understanding of traditional indigenous knowledge, attitudes, practices myths, beliefs and perceptions in designing disease prevention and control strategies at the human- environment-animal interface in the pastoral ecosystems of Uganda. Keywords: Knowledge, Mycobacterial infections, Participatory methods, Pastoral communities, Uganda

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INTRODUCTION

Beliefs, myths, values, norms, taboos language, ritual and art are among the cultural aspects that influence health of a given society although the relationship between cultures, health related beliefs and health behaviour is still complex [1]. Culture contributes to differences in health care and the ways in which health is defined. Cultural aspects describe the interaction between people, land and activities that are known to influence the spread of diseases like tuberculosis and Sexually Transmitted Diseases (STDs) [2]. In Uganda various ethnic groups represent unique myths, knowledge, attitudes, practices and perceptions with regard to prevention and control of infections in humans [3]. A better understanding of the knowledge, attitudes and practices (KAP), myths and perceptions is very important for successful control programs of mycobacterial infections[1]. Therefore KAP surveys assess attitudes, behaviours, practices and level of knowledge of different international communities and thus act as suitable entry points for mycobacterial infection prevention and control.

Furthermore, according to the World Health Organisation (WHO), Uganda ranks 16th among the world's 22 countries with the highest burden of tuberculosis (TB) with an estimated incidence rate of 330 per 100,000 people. Despite this, there is no clear community- based mycobacterial infection management strategy developed within the rural pastoral communities of Uganda through a thorough understanding of knowledge, attitudes and practices (KAP), myths and perceptions surrounding mycobacterial infections at the human- animal interface. In this study we emphasized infections caused by various mycobacteria; including classical tuberculosis, zoonotic tuberculosis and non-tuberculous mycobacterial (NTM) infections. It is difficult to distinguish between these as symptoms may be very similar. Besides classical TB, zoonotic tuberculosis (*M. bovis*) is one of the important diseases of economic and public health importance [4 - 6], giving a heavy additional burden to classical TB in many areas in underdeveloped countries. Worldwide, the prevalence of human tuberculosis due to *Mycobacterium bovis* has been estimated at 3.1 % of all human cases [7]. Non-tuberculous mycobacteria (NTM) are known to cause localised and disseminated infections in HIV/AIDS patients and other immune-compromised individuals [8].

In mycobacterial infections, there is a complex interaction due to disease transmission pattern between livestock, pastoral communities and their environments [9.] In the pastoral ecosystems of Uganda, studies have identified mixed infections caused by mycobacteria in humans, animals and their environment [10 - 12]. Mycobacterial species identified in the pastoral communities of Uganda include *M. tuberculosis/ bovis, Mycobacterium avium–intracellulare* Complex (MAC), *M. avium* subsp. *hominissuis, M. intracellulare* and a mixture of *M. bovis* and *M. avium* sp [10 - 11].

In humans, reduced immune-competence as a result of HIV, malnutrition, pre-existing lung disease, excessive alcoholism, and smoking are among the identified risk factors and the root causes for NTM disease [8, 13]. Besides the socio-demographic, environmental and household related factors that influence the risk of occurrence as well as pastoralists' knowledge of mycobacterial infections at the human-environment-livestock/ wildlife pastoral interface areas of Uganda have been documented [14].

The HIV /AIDS prevalence levels are estimated at 17% and 18% in the study areas Nakasongola and Mubende districts respectively, compared to the 7% national HIV/AIDS prevalence[15 - 16]. The increasing role of NTM as opportunistic pathogens in both immuno-competent and immune-compromised individuals is of major importance [8].
In order to fully understand the complex pastoral community social system, there was need to explore the myths, knowledge, attitudes, practices (KAP), myths and perception associated with the mycobacterial infections. To date, both at national and international level, there is very little anthropological, sociological and epidemiological information available with regard to mycobacterial infections and their management. In this current study, finding from pastoral communities of Uganda could be based on as a model in the designing mycobacterial infection prevention and coping strategy. Given this knowledge gap, the aim of this study was to explore the community's mycobacterial infection management approaches and identify the myths and perceptions, knowledge, attitude, practices among the pastoral communities of Uganda.

MATERIALS AND METHODS

1. Study areas

The study was conducted in Nakasongola and Mubende districts of Uganda between August 2008 and February 2009. Mubende district is characterized by livestock farming and crop production in a diversity of socio-ethnic tribes that includes Baganda, Bakiga, Banyoro and Banyankore agro-pastoral farming communities. Mubende district (altitude 1323 metres) is located at 0º 35' 21N latitudes and 31º 21' 36E longitudes with a total area of 4646 km^2 [16]. Nakasongola district is dominated by Baluli, Banyankore, Baganda and Basoga pastoralists. Nakasongola (altitude of 1,079 metres) lies at latitudes 1º 18' 32N and 32º27'23E longitudes, covering an area of 3510 km^2 [15]. Nakasongola is one of the cattle corridor districts that suffer from annual droughts, and pastoralists with their livestock tend to move towards the lake shore area (Lake Kyoga) during periods of extreme droughts.
Two sub counties from each district were selected; Madudu and Kiyuni in Mubende district and Nabiswera and Lwampanga sub counties in Nakasongola district.

2. Data collection

In this study, two methods were used, participatory methods and questionnaire survey. Participatory methods were used to generate information on the myths, knowledge, attitudes, practices and perceptions of the pastoral communities about mycobacterial infections, whereas a questionnaire survey was used to capture the social demographic factors and their relationship with communities mycobacterial infection management approaches.
Quantitative data collection: A structured questionnaire was designed to capture from the respondents the socio-demographic factors (such as age, sex, family sizes, marital status, tribe and occupation) and management practices used. These approaches were considered as an outcome variable and included visiting the traditional healer or use local herbal medicine and use modern medicine from clinics or from a health service provider. Those involved in this survey were not involved in the focus group discussion or not a

key informant through collaboration with community local leaders. Sample size determination was based on previous studies on prevalence; mortality associated with Tuberculosis in HIV infected patients in rural Uganda[17] and high level of nontuberculous mycobacteria (NTM) causing caseous lymphadenitis in pastoral communities in Karamoja region of Uganda [11]. The two studies showed the tuberculosis prevalence of 2-7% (mean=4%). Based on the estimated population in the above four sub-counties and at a confidence interval of 0.95 and allowable error of 0.05. The necessary minimum sample size of 196 individuals was calculated using EpiTools [18]. However, with the interest of study participants and specified time period, face to face questionnaire interviews managed to incorporate a total of 253 study individuals, one respondent from each selected households in the study areas.

3. Qualitative study approach

The first stage of the participatory appraisal involved greeting, introductions and checking that it was convenient time for the pastoralists groups to take part in the appraisal. Local translators and checklists (semi-structured questionnaires) were used to generate information on myths knowledge, attitudes, and perceptions of mycobacterial infections.
For the qualitative component of the study, bias was reduced through triangulation where different Participatory Rural Appraisal (PRA) methods were used. These included:

3.1 Focus Group Discussions (FGDs):

Focus group discussions composed of both women and men, drawn from two sub counties from each of the study districts. In each district, separation of women from men was ensured. Participants were divided in two groups at each study site. Each FGD involved 10 -15 participants and a total of 8 focus group discussions were held across the study area. While conducting the FGDs, the informant groups were asked to list human diseases that affect them and were then requested to compare these diseases in pairs. The most important disease was agreed upon with the local communities involved in the discussion group. Human diseases were generated among the local communities in the local names and were represented with easily memorable objects.
Semi-structured interviews: A total of 23 key informants who included health service providers, local civic leaders, teachers, livestock extension and production officers, agricultural advisory service providers, community rural development workers and borehole repairers were individually were interviewed. Face to face interviews were held with key informants in order to capture their attitudes, perceptions and experiences with regard to mycobacterial infection status in their communities and the factors responsible for their transmission.

3.2 Pre-testing and standardization:

Semi-structured checklists for key informants and focus group discussions and the survey questionnaire were pre- tested in Kayunga district located approximately 30 km from North of Kampala, the capital city of Uganda. Kayunga district has similar geographical features as the study districts with pastoral farming communities. Standardization across

all the study districts was done by translating and re-translating the questionnaire from English to local languages and back to English. This allowed standardization of responses across all different ethnic groups involved in the study. Two trained local interviewer administered a standardized questionnaire to each study participant in the local languages (Ruruli, Luganda and Runyakitara (Runyankore, Runyoro) in the two study sites. Recruitment of two well-oriented medical research assistants in order to ensure over all technical supervision, correct filling of the questionnaire forms and appropriate data compilation and entry was done. A trained interviewer administered a questionnaire during the interviews to capture outcome of interest –i.e. the management approaches in mycobacterial infections.

4. Data analysis

4.1 Quantitave data analysis:

Quantitave data analysis: Statistical analysis was carried out using Stata SE for Windows/ version 11 (StataCorp, College Station, TX). Social exposure variables with respect to the management of mycobacterial infections were summarised using tables and graphs. Management of mycobacterial infections among the pastoral communities was the outcome of interest in further statistical analyses with if they would either: a) visit the traditional healers or use of local herbs or b) modern medicine from clinics or from a health service provider accessed at the health centres or hospitals. In the statistical analyses the last option (modern medicine) was seen as the case outcome (coded as 1) vs traditional (coded as 0). To identify key explanatory variables, a final multivariable logistic regression model was built using a backward selection strategy with a LR test at $p<0.05$ to keep a variable in the model. The validity of the models in explaining usefulness of the explanatory variables and was then assessed using the Hosmer-Lemeshow goodness-of-fit test.

4.2 Qualitative data analysis:

Data was categorised under the themes of myths, knowledge, attitude, perceptions and management approaches using a modified content analysis approach. After the days field work, researchers convened and looked at the texts from the respondent responses. By searching through the context, researchers looked at those that could emerge as major themes (myths, knowledge, attitude, and practices depending on what communities talked about most. The definitions on mycobacterial infections (which mainly centered on symptoms shown in case of illnesses), causes and mode of transmission of mycobacterial infections were generated and recorded. The content was read through again and then we specified the major basing on how often the category appeared.

5. Ethical approval

Ethical clearance was obtained from the Uganda National Council for Science and Technology (UNCST) and approved with a reference: H337.

RESULTS

Management of mycobacterial infections among the pastoral communities Uganda
The majority of the pastoral communities (65%) were visiting the traditional healers or use the local herbs while 35 % used modern medicines acquired from health service providers at the distant located government or privately owned health centres for treatment of mycobacterial infections. Table 1 shows details on this, and their associations with social and cultural factors.

Table 1. Management of mycobacterial infections among the pastoralist communities of Uganda with n=253 respondents (August 2008 to February 2009).

Socio-demographical factors	Level	Traditional healers and use of local herbs (n=164)	Use modern medicines from health service providers (n=89)	Total
Age	10-30	59	63	122
	31-45	55	20	75
	46-80	50	6	56
Sex	Male	46	48	94
	Female	118	41	159
Tribe	Baganda	42	31	73
	Banyankole	18	9	27
	Banyoro	34	17	51
	Baruli	47	23	70
	Other tribes	23	9	32
Marital status	Single	139	25	164
	Married	15	44	59
	Widowed	10	20	30
Sub-county	Madudu	36	14	50
	Kiyuni	56	32	88
	Nabiswera	24	16	40
	Lwampanga	48	27	75
Occupation	Herdsman	80	27	107
	Business	58	53	111
	Other income generating activities	26	9	35

The multivariable logistic model (Table 2) showed that male respondents in pastoral communities tended to choose modern medicine than females (OR =3.7). Married respondents were also found to choose more of modern medicine compared to unmarried (OR=11.4), the same was found for widowed or divorced respondents compared to the singles respondents (OR=7.1). Youths among pastoralists were found to have a closer link to modern medicine the older pastoralists (OR=7.14). Geographical differences were

also reflected by Nabiswera Sub County in Nakasongola showed a higher tendency towards modern procedures compared to those from Mubende district (OR=2.6, P=0.084). Assessment of model fit to observed data showed insignificant difference between the observed and predicted values (HL (χ^2) =8.8; P=0.36).

Table 2. Multivariable logistic regression analysis showing the association between socio- demographic factors and the use of modern health services with n= 253 respondents of pastoral communities in the districts of Nakasongola and Mubende, Uganda (August 2008 to February 2009).

Socio-demographic factor	Level	Odds Ratio [95% CI]	P-value
Sex	Male vs. Female	3.7[1.8-7.7]	0.001
Marital status	Married vs. single	11.4[5.2.-24.9]	<0.001
	Widowed/divorced vs. single	7.1[2.8-18.1]	<0.001
Age	Youth(18-25yrs)vs. Adults (Above 45)	7.14[1.2-40.0]	0.029
Sub-county	Nabiswera vs. Madudu	2.6[0.9-8.2]	0.084

Adding to this, results from the qualitative study indicate that traditional healers were considered easily accessible and had an added advantage over health services in that often times the traditional healers could be paid even after the patient recovery.

Socio-cultural dimensions on pastoral community myths, knowledge, attitudes, practices (KAP) and perceptions on mycobacterial infections.

Pairwise ranking results indicated that mycobacterial infections especially tuberculosis and HIV/AIDS co-infections are among the top most three and fourth ranked human diseases greatly affecting the pastoral communities (Table 3). Mycobacterial infections and especially tuberculosis were well known to communities as it was linked to its respiratory signs. Tuberculosis was referred to in vernacular as *akakonko(Runyakitara) akasubba in ruruli* or *akafuba(Luganda)* because of the persistent coughing and other respiratory symptoms.

Pastoral communities emphasised on the airborne route as the main way of infection transmission through sneezing and coughing. Communities were aware that congestion in extended family system where other relatives and distant relations may live in the same house greatly contributes to this infection transmission. Key informants and focus groups indicated that for security and social capital reasons, small huts were in some instances inhabited by nine or more people. *''Our houses are small, children share bedrooms and beds… a single room accommodates 3-5 people''* Female FGD participant in Nabiswera, Nakasongola district).

Our study also showed that pastoralists shared houses with animals, the main reasons for this was predators, thieves, and night colds that could affect especially young animals. The pastoralists also valued the number of animals they have, thus the need to protect the fragile young stock of animals (calves) was very vital. The numbers of animals kept (owned) particularly cattle determine the social status of the pastoralist in the community. Poultry, goats and calves were the major livestock or animals groups which communities owned and would be allowed to sleep with in human dwellings/houses.

Pastoralists were living under poor hygienic and sanitary conditions characterised by irregular cleaning of plastic jericans and other utensils used for fetching water for drinking and domestic use. Pastoralists indicated that consumption of untreated milk was a likely mode for mycobacterial infections spread. E.g. *''we don't boil milk because un-boiled milk is good for the beauty among our women (okugomoka kwa bakazi) ''* Male FGD Participant in Nabiswera sub-county, Nakasongola District, Uganda
Pastoralists indicated that consumption of water as another mechanism of transmission of mycobacterial infections to humans.E.g. *''I don't boil water because boiled water does not taste good''* Female FGD Participant in Nabiswera sub-county, Nakasongola District, Uganda

Table 3. Human diseases as ranked during the key informant interviews and Focus group discussions held with pastoral communities in Mubende and Nakasongola districts, Uganda(August 2008 to February 2009).

Local name of the disease(Runyakitara(Nyankore)/ganda)	English name	Symptoms	Disease ranking
Omuswijja/omusujja	Malaria fever	High temperatures, nausea, vomiting loss of appetite, acute in children	1
Sirimu/omunywerero	HIV/AIDS	Loss of appetite, loss of weight, chronic disease	2
Akakonko /akafuba	Tuberculosis	Cough, respiratory difficulties	3
Okuturuka /ekidukano	Diarrhoeal disease, water borne diseases and worms	Diarrhoea, loss of appetite, loss of weight	4
Enziku	STIs(gonorrhoea and syphilis)	Difficult urination	5
Kulwara amaso	Eye diseases	Sight irritations and complications	6
Kubotoka omubiri	Skin diseases	Rushes and pimples	7

Farming communities have despaired due to the linkage to stigmatisation having realised the status quo of the mycobacterial infections. Based on the symptoms of some of the mycobacterial infections, participants were able to say. E.g *"Some of us are sick and infected with mycobacterial infections such as tuberculosis, but we fear to disclose since these infections are associated with HIV/AIDS…''* (Male *FGD* participant in Kiyuni sub-county; Mubende Uganda).
FGD and key informants revealed that most pastoralist tend to ostracise family or socially disqualify community member who revealed as tuberculosis positive or show symptoms of any mycobacterial infections would quickly be associated with - HIV/AIDS. For the same reason, people opted to shy away from seeking health service.

The most preferred alternative was to purchase drugs and do self-medication or ultimately opt for traditional healers or local medicines.

Results further showed that a cross section of households among the pastoral communities face limited or total lack of financial resources to meet the costs of transport to district main hospitals. Treatment and medical diagnostic services are only carried out at the main district hospitals. ……*''Moreover testing is only done in main hospitals and we are poor and unable to afford transport costs".* Male FGD participant in Kiyuni Sub county, Mubende district, Uganda.

Results pointed out hard-heartedness among the pastoral community members played a key role in mycobacterial infection transmission. One of the key informants reported as follows: *''we teach community members that drinking un-boiled water is dangerous but they are stubborn as they continue to drink un-boiled water….many times they tell us that they have not died yet they have been drinking un-boiled water for decades"* commented; A female clinical officer Kiyuni Government Health Centre III.

Myths that transmission of mycobacterial infections was through witchcraft, family history and genetic heritability of mycobacterial infections mainly tuberculosis was also reported. Therefore, vertical transmission form of mycobacterial infections was a suggestive mechanism perceived to exist across within and between families.

Across the study districts, smoking of cigarettes and sharing of both sticks and pipes during smoking and sharing of alcohol drinking straws were perceived as modes of transmission of mycobacterial infections among the pastoral communities. At local trading centres in the evenings and while watering and grazing grounds, often times, pastoral communities relax, communicate and share knowledge. Smoking and drinking of alcohol was found as the main uniting social activities amongst the communities on such spots.

DISCUSSION

Our results reveal a social structure with regards to a disparity in the infection management; males as the dorminant group in pastoral communites had a higher propensity towards mycobacterial infection management compared to their female counterparts. The probable reason is that associated with gender household roles in that pastoral females are often times at home and are referred to by the pastoral men in vernacular as follows: *abakazi baitu tibiine maani,borobi ni nkamate* (in runyakitara/nyankore) meaning that "*our women are weak, soft and delicate as milk*". It is the males who are strong and in cases of sickness they easily treck long distances to access the distant located health services from health centres or hospitals. Besides it is the males who trek livestock over long distances in search of pastures and water especially in drought periods with the potential to learn the various herbs or exposure to sharing information about infection management than females.

On the other hand single individuals, widows and married individuals also showed a higher inclination towards management infection. However, it is important to note that majority of these visited traditional healers or used local herbs as compared to medical options. Married and widows have shown more inclination than the single individuals towards mycobacterial infection management probably because the former groups has had experience with other familiar diseases. Similarly [19] had investigated that host-related (male sex, family history) and environment-related risk factors (smoking, alcohol, play a

role in the development of mycobacterial infections (Tuberculosis). Thus this justifies the ability to manage infections around them such as mycobacterial infections.

This study also showed significant difference in how different ethnic groups managed these infections, with Banyankole being more vigilant with regards to management and knowledge compared to their Baganda counter parts. Nakasongola district had more respondents that showed a higher propensity towards infection management in comparison to the agro-based tribes (Baganda and the Banyoro) of Madudu subcounty in Mubende district. The reason for this is not fully understood, however the pastoral communities who predominantly occupy the arid and semi-arid parts of the cattle corridor districts which characterised by extremely difficult weather and scarce water sources [20.] They have kept animals for a longer time are likely to have learnt bitter experience with zoonoses acquired from their cattle over the years have given them the opportunity to understand infection causes, spread mechanisms, prevention and control strategies including those mycobacterial infections. However, it is also justifiable from here that with these social experiences in these ecosystems, the majority of these communities opt to use of local herbs and or visit to the tradition healers.

Our study showed that the communities had knowledge about mycobacterial infections especially tuberculosis which was well known to communities. Definitions surrounded the respiratory signs associated with tuberculosis. In vernacular Tuberculosis was referred to as akakonko, akasubba (coughing), *or akafuba(* chronic coughing*).*

The social aspects of togetherness and social networking and high degree of sharing were reflected by the large extended families living together in small housing units. This effectively contributes to congestion and poor sanitation posing a threat of mycobacterial transmission. Similar results have been reported in a prospective cohort study in Iraq; that a high contact index of mycobacterial infections particularly *Mycobacterium tuberculosis* between family member or co-workers and infected subjects is one of the major risk factors of infection transmission [21]. Similary, human congestion at water points in the drought period, particularly in pastoral communities with large animal herds has further complicated the situation. This not only increases the risk of spread of humans but also amongst the animals which gather from different farming communities. This is in agreement with Munyeme *et al*. [22] who described that sharing water and pastures with during the drier months of the year as one of the possible risk factors of associated with bovine tuberculosis traditional cattle and wildlife in the livestock/ wildlife interface areas in the Kafue basin of Zambia.

The results re-affirmed the pastoral cultural norm of prestige being a function of number of animals owned. In trying to subscribe to this norm, every animal counts and therefore the pastoralists protect the young and sick from ambient temperatures, thieves and predators by sleeping with them in the human shelter. This situation is most likely to predispose humans to zoonotic infections. But also this vulnerable group of animals are likely to acquire infections from humans. This agrees with Greger [23] who emphasised on the increased frequency of emerging and re-emergence of zoonoses and the factors underlying their emergence in the recent decades.

Pastoralists were found to have a belief that plastic water containers such as jericans were among the major contributing factors to infection causation and therefore preferred their own tradition water storage methods. It is however the hygiene state of the container rather than the fabric from which it is made that seems to be the risk, poor hygiene

condition of drinking water vessels used in the internally displaced camps (IDP) in Kitgum Uganda have been documented as a potential source for microbiological contamination [23]. In addition pastoralist had had a belief that they were very immune from most infections "*we have not died yet we have been drinking unboiled water for decades"*. There is a possibility that given that they are exposed to NTM always they have become immune to most infection caused by mycobacteria [8]. According to the results, community health service providers have played their roles such as prompt seeking of medical advice including diagnosis before taking treatment but in vain due to rigid beliefs and attitudes of the community members. There is a high level hard-heartedness towards modern medicine, an attitude that was mostly in male pastoral community members, this is reflected in the low percentage (35%) of pastoralist that manages mycobacterial infection by visiting the health centres or used modern medicines. Understanding the pastoralists' beliefs concerning the cause and spread of disease are important determinants of health seeking behaviour (HSB) [24].

While conducting focus group discussions, we revealed a myth that mycobacterial infections particularly tuberculosis were transmitted within families or families with tuberculosis infection history hence regarded according to the pastoral communities, as genetic heritability of mycobacterial infections. In this regard therefore, there were some "*pointed at families re-known for tuberculosis infections"*. Besides, this acted as a centre of basis for social stigmatisation within the families and between communities. Therefore, affected families were socially disqualified basing on the community- based mycobacterial infection heritable status [25].

The extended family structure, individuals leaving within these family units undiagnosed for fear of stigmatisation has provided a fertile ground for persistent carriers among the pastoral communities. This agrees the basic notion that: these families provide a source (carrier) and a favourable transmission environment (congestion). Similarly, according to [26 - 28], it has also been documented that vertical transmission of tuberculosis to the foetuses in the first year of life is possible where pregnant women have mycobacterial infections (tuberculosis).

Implementation of a sustainable pastoral community-based mycobacterial infections prevention intervention strategy requires a thorough understanding their beliefs, myths, perceptions, traditional indigenous knowledge, attitudes and practices. Integrating both methods in this present study ensured objectivity and reliability without decontextualising the human behavior (quantitative approach). In addition, the qualitative approaches generated rich and detailed data on the social cultural perspectives of the pastoral communities.

To our knowledge, this is the first mixed design study focusing on the community myths, perceptions knowledge attitudes, practices (KAP), and exploring the mycobacterial infection management approaches at the human- environment - livestock/wildlife interface among the central Ugandan pastoral communities. The study encompassed what communities understand about mycobacterial infection and including the signs and symptoms by which the illness is recognised, presumed causes and recommended treatments and prevention measures.

CONCLUSION

This study reveals that a large proportion of pastoral community members having broad knowledge on mycobacterial infections especially TB. Congestion in extended family households, sharing of houses, water and utensils with animals and poor hygiene of the utensils were identified as possible mycobacterial infection transmission routes. Smoking and drinking alcohol using the same straws and consumption of untreated milk and drinking untreated water were perceived to be exposure routes for acquiring mycobacterial infections among the pastoralists. Family history and genetic heritability of mycobacterial infections, and witchcraft were found to be the major myths associated with tuberculosis. Social stigmatisation was linked to HIV/AIDS/Aids- Mycobacterial infections co-infection because of debilitation, coughing and other respiratory symptoms. Among the pastoralist communities of Uganda, mycobacterial infections are managed by traditional healers and use of local herbs compared modern health services. Therefore, there is need to strengthen public awareness efforts against stigmatisation with regards to HIV/AIDS and the mycobacterial infections associated to it.

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REFERENCES

1. Liefooghe R, Baliddawa JB, Kipruto EM, Vermeire C, De Munynck AO. From their own perspective. A Kenyan community's perception of tuberculosis. J Trop Med Int Health, 1997; 2: 809-821.
2. Da Silva EJ. Microbial technology: Some social and intercultural implications in development. International J Intercul Rel .2004; 8: 413-432.
3. Nyanzi S, Nyanzi B, Kalina B. Contemporary myths, sexuality misconceptions, information sources, and risks perceptions of Bodabodamen in Southwest Uganda. Sex Roles. 2005; 52: 111-119.
4. Sudre PG, Teten D, Koch A. Tuberculosis: a global overview of the ituation today. Bull WHO. 1992; 70: 149-159.
5. Sahraoui N, Muller B, Guetarni D, Boulahbal F, Yala D, Ouzrout R, Berg S, Smith NH, Zinsstag J. Molecular characterization of Mycobacterium bovis strains isolated from cattle slaughtered at two abattoirs in Algeria. BMC Vet Res. 2009; 5: 4
6. Biet F, Boschiroli ML, Thorel MF, Guilloteau LA.). Zoonotic aspects of Mycobacterium bovis and Mycobacterium avium-intracellulare complex (MAC). Vet Res. (2005; 36: 411-436.
7. Cosivi O, Grange JM, Daborn CJ, Raviglione MC, Fujikura T, Cousins D, Robinson RA, Huchzermeyer HF, de Kantor I, Meslin FX. Zoonotic tuberculosis due to Mycobacterium bovis in developing countries. Emerg Infect Dis. 1998; 4:59-70.
8. Jarzembowski JA, Young M B. Nontuberculous mycobacterial infections. Arch Pathol Lab Med. 2008; 132:1333-1341.

9. Muwonge A, Kankya C, Godfroid J, Djønne B, Opuda-Asibo J, Biffa D, Anyanaw T, Munyeme M, Skjerve E. Prevalence and associated infections in slaughter pigs from Mubende district in Uganda. Trop Anim Health Prod. 2010; 42; 905-913
KAP linked to Mycobacterial infection Advance Tropical Medicine and Public Health International 2011; 1: 111 - 124.
10. Oloya J, Kazwala R, Lund A, Opuda-Asibo J, Demelash B, Skjerve E, Johansen, TB, Djonne B. Characterisation of mycobacteria isolated from slaughter cattle in pastoral regions of Uganda. BMC Microbiol. 2007; 7: 95.
11. Oloya J, Opuda-Asibo J, Kazwala R, Demelash B, Skjerve E, Lund A, Johansen TB, Djonne B. Mycobacteria causing human cervical lymphadenitis in pastoral communities in the Karamoja region of Uganda. Epidemiol Infect. 2008; 136: 636-643.
12. Kankya C, Muwonge A, Djonne B, Munyeme M, Opuda-Asibo J, Skjerve E, Oloya J, Edvardsen V, Johansen TB. Isolation of non-tuberculous mycobacteria from pastoral ecosystems of Uganda: Public Health significance. BMC Public Health. 2011; 11: 320.
13. Sonneberg P, M J JR, G SS, K B P, GF. HIV-1 and recurrence, relapse and re-infection of tuberculosis after cure: a Cohort study in South African Mineworkers. Lancer .2001; 358: 1687-1693.
14. Kankya C, Muwonge A, Olet S, Munyeme M, Biffa D, Opuda-Asibo J, Skjerve E, Oloya J. Factors associated with pastoral community knowledge and occurrence of mycobacterial infections in Human-Animal Interface areas of Nakasongola and Mubende districts, Uganda. BMC Public Health.2010; 10: 471.
15. District State of Environment Report for Nakasongola District 2004: 67.
16. District State of Environment, Mubende District 2004: 129.
17. Moore D, Liechty C, Ekwaru P, Were W, Mwima G, Solberg P, Rutherford G, Mermin J. UGANDA: Prevalence, Incidence and Mortality Associated with Tuberculosis in HIV-Infected Patients Initiating Antiretroviral Therapy in Rural Uganda. AIDS. 2007; 21:713-719.
18. Epitools 2010. Available online at
Http://epitools.ausvet.com.au/content.php?page=SampleSize. Accessed on 25/1/10
19. Lienhardt C, Fielding K, Sillah JS, Bah B, Gustafson P, Warndorff D, Palayew, M, Lisse I, Donkor S, Diallo S, Manneh K, Adegbola R, Aaby P, Bah-Sow O, Bennett S, McAdam K. Investigation of the risk factors for tuberculosis: a case control study in three countries in West Africa. Int J Epidemiol. 2005; 34: 914-923.
20. Wurzinger M, Ndumu D, MO A, Solkner J. Lifestyle and herding practices of Bahima pastoralists in Uganda. Afr J Agri Res. 2008; 3: 542-548.
21. Al-KubaisyW, Al-Dulaymi A, Selman HD. Active tuberculosis among the Iraqi school children with positive skin tests and their household contacts. East Med Health J. 2003; 9: 1-13
22. Munyeme M, Muma JB, Skjerve E, Namboota AM, Phiri IGK, Samui KL, Dorny, P, Tryland M. Risk factors associated with bovine tuberculosis in traditional cattle of the livestock/wildlife interface in the Kafue basin of Zambia. Prev Vet Med. 2008; 4: 306-17.
23. Greger M. The Human /Animal interface: Emergence and resurgence of zoonotic infectious diseases. Crit Rev Microbiol. 2007; 33: 243-299.
24. Steele A, Clarke B, Watkins O. Impact of jerry can disinfection in a camp environment - experiences in an IDP camp in Northern Uganda. J Water Health. 2008; 4: 559-64.

KAP linked to Mycobacterial infection Advance Tropical Medicine and Public Health International 2011; 1(4): 111 - 124.
25. Jaramillo, E. Tuberculosis and Stigma: Predictors of Prejudice against People with Tuberculosis. J Health Psychol. 1999; 4: 71-79.
26. Pillay T, Sturm AW, Khan M. Vertical transmission of Mycobacterium tuberculosis in KwaZulu Natal: impact of HIV-1 co-infection. Int J Tuber Lung. 2004; 1: 59-69.
27. Gupta, A. Nayak, U.& Ram, M. Postpartum tuberculosis incidence and mortality among HIV-infected women and their infants in Pune, India, 2002–2005. Clin Infect Dis. 2007; 45: 241–249.
28. Adhikari M. Tuberculosis and Tuberculosis/ HIV co-infection in pregnancy. Semin