



Community Perception Towards Zoonotic Diseases Acquired From Foods Of Animal Origin Among Selected Districts Of Jimma Zone, Ethiopia

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Abstract

Zoonoses are infections that are naturally transmitted from vertebrate animals to human beings and vice-versa. A questionnaire-based survey of animal health workers (n=72) and human health workers (n=72) was carried out between the periods of January 2015 to September 2016 in Jimma zone, South West Ethiopia with the intentions to assess perception of zoonoses and risks relating to zoonotic infections among animal health and human health workers in Jimma Zone, Ethiopia. Combinations of closed and open-ended questionnaire survey were performed to gather data. Our study signposted rabies, tuberculosis and anthrax to be among the common zoonotic diseases in the study area. Close contact between human and animals, consumption of raw livestock products and assisting during parturition were professed as routes of transmission. Perception about zoonoses was higher in animal health workers (86%; 62/72) than human health workers (P<0.05). Most of the respondents stated cooking of meat or boiling of milk as a way to prevent transmission. However, there was a significant difference in the perception of the risk posed by contact with potentially infected animals /or animal products with animal health workers having a much higher level of perception compared to human health workers (P<0.05). These results suggest that in Jimma Zone, patchy perception of zoonoses, combined with food consumption habits and poor animal husbandry are likely to expose respondents to an increased risk of contracting zoonoses. Public health promotion on education and inter-disciplinary one-health collaboration between veterinarians, public health practitioners and policy makers should result in a more efficient and effective joint approach to the diagnosis and control of zoonoses in Ethiopia

Keywords: Perception, Zoonoses, Risk, Animal Health Workers, Human Health Workers, Jimma Zone, Ethiopia

Introduction

Zoonosis is a Greek word: Zoon: Animal, Noson: Disease. Zoonosis is any infectious disease that can be transmitted (in some instances, by a vector) from non-human animals (both wild and domestic) to humans or from humans to non-human animals (Freeman, 1985).

Zoonotic diseases represent one of the leading causes of illness and death from infectious disease. Worldwide, zoonotic diseases have a negative impact on commerce, travel and economies (Hagstad and Hubbert, 1986). To survive, a biological pathogen had

to be a chronic infection, stay alive in the host for long periods of time or have a non-human reservoir or waiting for new hosts to infect. For zoonoses, often human is actually an accidental victim and a dead-end host. In recent years, zoonoses and communicable diseases common to man and animals have gained increasing attention worldwide. Human diseases that have their origins in infected animals, such as Bird flu or tuberculosis, have highlighted the need for a better understanding of animal diseases in terms of their epidemiology, mechanism of transmission to man, diagnosis, prevention and control (Ganguly et al, 2012).

Over 200 zoonoses have been described and they have been known for many centuries. They are caused by all types of agents: bacteria, parasites, fungi, viruses and unconventional agents. Zoonoses still represent significant public health threats, but many of them are neglected, i.e. they are not prioritized by health systems at national and international levels. Zoonotic diseases affect hundreds of thousands of people especially in developing countries, although most of them can be prevented (Kerouanton et al, 2007).

Despite advances in hygiene, consumer knowledge, food treatment and processing, zoonotic diseases mediated by pathogenic microorganisms or microbial toxins still represent a significant threat to public health worldwide. Globally, the world health organization (WHO) has estimated that approximately 1.5 billion episodes of diarrhea and more than 3 million deaths occurred in children under 5 years of age, and a significant proportion of these results from consumption of food mainly food of animal origin with microbial pathogens and toxins (WHO, 2012)

Worldwide, zoonotic diseases are an important cause of morbidity and mortality. There is a strong need to strengthen surveillance systems for zoonoses. Surveillance data are used for planning, implementing and evaluating public health policies. Most of the agents associated with the current world-wide increase in cases of zoonoses are salmonellosis, *Escherichia coli*, campylobacteriosis and listeriosis,. In addition zoonoses like rabies, brucellosis, bovine tuberculosis, cysticercosis, hydatidosis, taeniasis, and toxoplasmosis are yet uncontrolled diseases (Ganguly et al, 2012; WHO, 2012).

Despite the discovery of zoonotic agents several years ago and with all the break-through in prevention and treatment, and the still continuing efforts to improve diagnosis and treatment of zoonotic diseases, the

prevalence of the disease is increasing worldwide. This is because a large number of factors such as population growth, movement of people, global travel, movement of livestock, export of livestock and importation of exotic animals, intensive livestock production and increased consumption of food of animal origin. Hence, this study was designed with the objectives to assess perception towards zoonoses and appraise risks relating to zoonotic infections among animal health workers and human health workers in Jimma Zone, Ethiopia.

Materials and Methods

Study Population and Study Area

The study population comprises of animal health and human health workers in four districts (Sokoru, Limmu, Serbo and Omo N'ada) of Jimma zone. Jimma Zone comprised of 17 Districts and had total population of 2,486,155 of whom 1,250,527 are men and 1,235,628 women; with an area of 15,568.58 square kilometers, Jimma has a population density of 159.69. A total of 521,506 households were counted in this Zone, which results in an average of 4.77 persons to a household (Central Statistical Agency, 2007).

Study Design and Data Collection

The study was conducted during the period of January 2015 to September 2016. A semi-structured open-ended questionnaire was developed to assess perception of zoonoses and risks relating to zoonotic infections among animal health and human health workers in Sokoru, Limmu, Serbo and Omo N'ada districts of Jimma zone. A total of 144 respondents (36 from each district) were involved in the study. Hence, 72 Animal health workers and 72 Human health workers were interviewed during this survey. The number of respondents from each district was 18 Animal health workers and 18 Human health workers. The focus of the questionnaire was on animal health and human health workers (in Jimma zone) knowledge considered important for identification and perception of the zoonoses and risks relating to zoonotic infections.

With respect to perception of zoonoses, key information asked included listing and ranking diseases transmitted from animals to humans. Information was sought on views of the most at-risk animal or product as far as zoonoses is concerned and the associated signs of disease. A key question included an understanding of the zoonotic disease

signs, protective measures taken before and after slaughter, pre-treatment of livestock products (meat, milk, blood) before consumption i.e. boiling milk, cooking meat etc and handling practices employed when attending cases of sudden death in animals, aborted foetus or retained placentas. Information was also sought on knowledge of the risks posed by animals and their products and the transmission routes. Respondents were asked to rank the risk to humans of contracting particular zoonoses.

Statistical Analysis

The data collected on the questionnaires and from the focus group discussion were stored and analyzed using version 20 of the statistical package for social sciences (SPSS) software package. The relationships between dependent and various independent factors were

explored in ² tests. A P-value of 0.05 was considered indicative of a statistically significant difference.

Results

Perception towards Zoonoses among Respondents

Most respondents (n=118) knew that there are certain diseases in their area which are zoonoses. Of the respondents involved in the interview only 26 (10 animal health workers and 16 human health workers) replied that they do not have knowledge about zoonoses. Perception about zoonoses was found to be higher in animal health workers (86%; 62/72) than human health workers (78%; 56/72). Statistical analysis of the data showed that there was no statistical difference (P<0.05) on the perception of zoonoses between animal health and human health workers (Table 1).

Table 1: Distribution of zoonoses perception among respondents

Profession	Number Interviewed	Yes (n, %)	No (n, %)	²	P-value
Animal health workers	72	62 (86%)	10 (14%)	0.073	0.787
Human health workers	72	56 (78%)	16 (22%)		
Total	144	118 (82)	26 (18%)		

Zoonotic Diseases and Their Relative Frequencies among Districts

In our survey, rabies, tuberculosis and anthrax were reported as the top three diseases (Table 2). Whereas rabies was identified as an important zoonosis by all respondents, anthrax was mentioned more often in

Sokoru than Limmu, (89% and 42% respectively) which may relate to the fact that anthrax cases are rarely experienced in Limmu. Tuberculosis was mentioned by 83% of all the respondents, equally in Sokoru and Limmu. Notably, tapeworm (CB) and brucellosis were mentioned by only 8% and 19% of the respondents in all the districts respectively.

Table 2: Zoonotic diseases and their relative frequencies among districts

Districts (n=36)	Disease type				
	Anthrax (n, %)	TB (n, %)	Rabies (n, %)	CB (n, %)	Bruc. (n, %)
Sokoru	32 (89%)	30 (83%)	35 (97%)	5 (14%)	6 (17%)
Limmu	15 (42%)	30 (83%)	30 (83%)	6 (17%)	5 (14%)
Serbo	28 (78%)	35 (97%)	24 (67%)	4 (11%)	10 (28%)
Omo N'ada	26 (36%)	34 (94%)	29 (81%)	7 (19%)	6 (17%)

TB= Tuberculosis; CB = *Cysticercus bovis*; Bruc. = *Brucellosis*

Risks Relating To Zoonotic Infections among Respondents

95% of the respondents, (both animal health and human health workers) indicated sharing their house with animals, consumption of animal products, milk or meat, as the primary route for transmission of diseases

to humans. Attending parturition, contact with placenta or intrauterine intervention was mentioned as a secondary route (Table 3). Intrauterine intervention was perceived by animal health workers to be a significantly more important route of transmission of disease to humans when compared to the perceptions of human health workers (P<0.05).

Table 3: Perception of risks relating to zoonotic infections as perceived by respondents

Actions/activities	Level of risk perception	
	Animal health workers (n=72)	Human health workers (n =72)
Attending animals:		
Contact with diarrhoeic animals	1	1
Assisting the cow during birth	3	2
Intrauterine treatment after abortion	3	1
Contact with placenta	3	2
Contact with aborted fetus	3	1
Farm related activities:		
Hand milking	1	1
Cleaning cattle corral	2	2
Walking bare feet in the pen	2	1
Slaughtering livestock	2	1
Contact with animals	2	1
Preparing skin	2	1
Disposing off manure	2	1
Drinking/eating habits:		
Drinking raw milk	3	3
Drinking boiled milk	1	1
Eating raw meat	3	3
Eating well cooked meat	1	1
Eating raw egg	2	1

3 = >75% respondent say yes, 2 = >50 -<75% respondent say yes: 1 = < 50% respondents say yes

Direct transmission of rabies through dog bites was known to all respondents. Other routes of direct transmission, for example by aerosols or direct contact were rarely mentioned, other than in relation to anthrax. Of those who mentioned anthrax as an important zoonosis, only 27% suggested contact with the carcass as a way of transmission. Whereas 92% (n=132/144) of the human health workers perceived certain animal diseases could infect humans. Very few human health workers (31%, 44/144) had adequate knowledge with respect to disease symptoms.

Avoidance of Food-Borne Zoonosis

Most of the respondents mentioned cooking of meat or boiling of milk as a way to reduce the risk of contracting a zoonotic infection and there was a significant difference between the animal health and

human health workers interviewed ($P<0.05$). The main reason given for boiling milk was to prevent tuberculosis and the main reason for cooking meat was to prevent tapeworm infestations. Forty two percent (60/144) of the respondents reported occasionally drinking raw milk, or drinking soured milk prepared without boiling. Some 19.4% (28/144) of the respondents reported eating raw meat or raw offals, such as kidneys, liver, abomasum and raw fat from the hump of a cow or tail of a sheep. Some of the human health workers reported eating meat from animals which died of anthrax, but only after proper cooking with the addition of certain herbs. Raw or undercooked beef, un-pasteurized cows' milk and undercooked eggs were considered the main source of zoonotic diseases to humans by most respondents (Table 5).

Table 4: Risk of contracting zoonoses from the various types of animal products

Animal products	Level of risk perception	
	Animal health workers (n=72)	Human health workers (n=72)
Cow milk	3	2
Beef	3	3
Goat meat	2	1
Mutton	2	1
Chicken meat	1	1
Chicken eggs	2	2

3=>75% respondent say yes, 2 =>50-< 75% respondent say yes: 1 = < 50% respondents say yes

Discussion

The current study has proved that the level of perception about zoonoses and risks relating to zoonotic infections among animal health and human health workers in Jimma *zone* was low. The habit of eating uninspected backyard slaughtered meat was also seen to be very high as reported in a previous study (Avery, 2004; Tamiru et al, 2008). This could be due to the low level of awareness of the public on the importance of using inspected meat because of cultural beliefs that raw meat is better than cooked one and the deeply established traditional habit of eating raw meat in the country. The use of either pasteurized or boiled milk is relatively higher in all segments of the study participants because of better awareness.

Our results indicate that there were differences in risk perception of zoonoses between the groups participating in our study. These results suggest that the limited status of human health workers can be considered a risk factor for having lower risk perception and lower level of perception of zoonoses at work. This could be attributed to the fact that there is lack of training and instruction among human health workers compared to animal health workers as far zoonoses and risks relating to zoonotic infections is concerned.

Consistent with other studies in Ethiopia, this study has shown patchy awareness and poor perception of zoonoses by human health workers (John et al, 2008). Most human health workers are aware of diseases such as rabies, anthrax, or tuberculosis as zoonoses, but the awareness of *Cysticercus bovis* and brucellosis, as a zoonosis were significantly lower. Whereas most human health workers are aware of the risk involved through the consumption of animal products, such as milk and meat, very few are aware of the risk of direct transmission, for example by aerosols or direct contact. This low level of awareness is likely to expose them to an increased risk of contracting zoonoses, as they are unlikely to take proper precautions or use protective clothing when dealing with abortions or calves with diarrhea and during on-farm activities like milking, cleaning the cowshed or slaughtering cattle.

Although human health workers might be aware of the risk of consuming raw milk or meat the habit of consuming raw milk, raw or undercooked meat is, however, still common practice, especially among livestock keeper communities (Shirima et al, 2003). Not only human health workers, but also veterinary

field staff and staff in health facilities, have a low awareness and poor knowledge of zoonoses. This shows that the emergency preparedness for such an epidemic zoonosis is low.

Zoonoses are not part of routine differential diagnosis or of the advisory package to human health workers. Similarly, zoonoses like brucellosis and leptospirosis are not part of the differential diagnosis and testing routines in human health facilities, and consequently the diseases may be under-reported and proper treatment may not be given (Walderhaug, 2007; Jaffry et al, 2009). Limited knowledge at these levels is due to the general lack of data on zoonoses in Ethiopia and inadequate communication between veterinary and human health care professionals.

Conclusion

Local knowledge in both, animal health workers and human health workers is limited to a restricted number of zoonoses inclusive of anthrax, rabies and tuberculosis. An important finding is that the perception of zoonoses and risks relating to zoonotic infections among animal health and human health workers in Jimma *zone* is lacking. Much can be done by education and training to increase the knowledge and skills of different health professionals, and for raising awareness by facilitating communication and inter-disciplinary collaboration on research and/or sharing of information between veterinary, public health, agricultural personnel and policy makers. Our results stress the need for developing education programs on perception of zoonoses and risks relating to zoonotic infections among the animal health workers and human health workers in Jimma *zone*, Ethiopia.

Competing Interests

The authors declare that they have no competing interests.

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