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Knowledge, Attitude and Practices of Hydatidosis in Pastoral Community with Relation to Public Health Risks in Ayssaita, Northeastern of Ethiopia

[1]Dawit Gebremichael, [2]Aklilu Feleke, [3]Gebregergs Tesfamaryam, [4]Hasen Awel and [5]Ykealo Tsigab

[1]Aksum University, College of Agriculture, Aksum, Ethiopia
[2]Addis Ababa University, College of Veterinary Medicine and Agriculture, Debre Zeit, Ethiopia
[3]Jigjiga University, Faculty of Veterinary Medicine, Jigjiga, Ethiopia
[4]Misan-Tepi University, College of Agriculture, Mizan Teferi, Ethiopia
[5]Pastoral Agricultural and Rural Development Office, Ayssaita, Ethiopia

Abstract: Hydatidosis is an important public health problem and economic importance worldwide. The main objectives of this study was assess on the knowledge, attitude and practices of public health significance on human hydatidosis. A cross-sectional survey carried out to investigate risk factors on public awareness, attitude and practices of hydatidosis on 280 pastoralists, 80 human health and 20 animal health assistants from October 2013 to May 2013 in Ayssaita district. The questionnaire survey clearly indicated that there is knowledge gap that may predispose the pastoralists to hydatidosis infection. Only 4.29% of pastoralists responded that they were aware of the occurrence of the disease in man. But none of them were knowledgeable on its sources and transmission. 85.7% pastoralists dog ownership in the area. However, none of their dogs have ever been dewormed. Moreover, pastoralists' response also showed that 71.4% had contact with dogs and 90.7% of the pastoralists did not wash vegetables before raw consumption. On the other hand, 80% of the pastoralists confirmed that they provide raw infected organ and inedible offals like lung for their dog and cats. Similarly, small proportions (10.7%) of study participants assume that dogs transmit health risks to human or other animals. Survey on health professionals and animal health assistants in the area have demonstrated very low level of knowledge on hydatidosis. Therefore, it is concluded as the disease is less aware in the pastoral communities and it is highly imperative to impart public health education to build up public awareness about the sources of infection and its control in the pastoral area that are at higher risk and collaboration between veterinary and medical personnel should also be strengthened in Ayssaita in sharing knowledge on zoonoses and working together to identify and control zoonoses.

Key words: Attitude · Ayssaita · Knowledge · Pastoralists · Practices · Questionnaire Survey

INTRODUCTION

Hydatidosis or cystic echinococcosis is a neglected cyclozoonotic disease affecting humans and their livestock, thereby causing significant socioeconomic and public health impacts, mostly in developing countries [1, 2]. Hydatidosis is a major parasitic disease and is caused by the larval stage of the dog tapeworm (*E. granulosus*) and is characterized by the formation of cysts (hydatid cysts) varying in size [3, 4]. Dogs are particularly important in zoonotic transmission due to their close relationships with humans [5]. *Echinococcus* exhibits certain unique characteristics that set it apart from the other major genus in the family, Taenia. An adult *Echinococcus* is only a few millimeters long (rarely more than 7mm) [6].

The emergence and re-emergence of zoonotic diseases are challenges to all professionals concerned with public health. Echinococcosis is emerging or re-emerging zoonotic disease in some areas [7-10]. In spite

Corresponding Author: Dawit Gebremichael, Aksum University, College of Agriculture, P.O. Box: 314, Shire, Ethiopia.

of significant progress achieved in the field of research and control, human cystic echinococcosis remains a considerable public health problem in many regions of the world. Ultrasound surveys of populations at risk have shown that cystic echinococcosis is more prevalent than previously anticipated in many endemic regions. To date, disease transmission has been reduced or interrupted in some limited areas only, especially on Islands, such as Cyprus, New Zealand and Tasmania. In continental situations, however, *E. granulosus* control is more difficult, often less effective, is costly and requires sustained efforts over many decades [11].

The different strains of the parasite were reported to have different epidemiological and socio-economical significances and geographical ranges [12]. Approximately, 2-3 million human cases are thought to occur worldwide [5, 13]. Hydatid disease, not only results in loss of millions of money in terms of public health each year, but also it worsens the protein deficiency for human consumption in terms of condemned organs and lowered productivity of infected animals [14- 16]. The true prevalence of zoonoses is not known in most countries and this often leads to neglecting, due to a lack of evidence for government and donor decision-makers on the importance of these diseases [17]. Epidemiologically, human cystic echinococcosis represents a significant global human disease burden in poor pastoral communities that raise sheep and other livestock and keep dogs for guarding and/or herding animals [18].

It Good, effective medical and veterinary interaction is needed for prevention and control. As the impact of the disease on livestock health and production is not obvious, farmers and official veterinary and livestock services often do not see the relevance of a programme. In endemic areas, however, the impact of these zoonoses on human health is significant and the health sector often leads in echinococcosis control, trying to involve the veterinary sector for animal-related interventions [13].

Afar region is one of the four major pastoral regions in Ethiopia located in north eastern part of the country. Commonly kept livestock include cattle, goats, sheep, camels and donkeys. Like pastoralists from other parts of the world, they will keep dogs to help in herding of their livestock and to guard the livestock at night from marauding wild carnivores such as jackals and hyenas. The current problem of the pastoral and agro-pastoral communities of Afar region is the cumulative effect of the consecutive drought and other factors [19]. Therefore, due to the low income, generally poor knowledge of the disease, the throwing of slaughter wastes on to open ground and the ability of owned non-dewormed dogs to roam freely around and within houses and have none of simple slaughter house in the district are all causes of concern human and animal hydatidosis.

Very few retrospective and case reports of cystic human hydatidosis also indicated the relevance of the disease in human in the country. Though the few available data indicated that hydatidosis is endemic, the epidemiological situation of the problem, its risk factors and knowledge of the communities in Ethiopia is not well documented especially in the pastoral area. However, there is not any research in both human and animal hydatidosis and its risk factors in Afar region, northeastern Ethiopia. The result of the study will help policy makers, professionals, researchers and educational institutions for decision making, conducting research and teaching purposes. Therefore, the objectives of the study were to assess the knowledge, attitude and practices of public health significance of human hydatidosis in pastoralist, health professional and animal health assistants.

MATERIALS AND METHODS

Study Area: The study was conducted in Ayssaita of Afar region. It is 670 km far from Addis Ababa and it is located a latitude and longitude of 11°34' 6"N 41°26'12"E and an elevation of 340-360 masl. The woreda consists of 13 *Kebeles* of which two are urban, five agro-pastoral and six pastoral *Kebeles*. The total human populations are 58, 296 where 31, 202 are males and 27, 094 are females. The major sources of water for pastoral and agro-pastoral communities and their livestock are rivers, ponds and stagnant water. The climate of the study area ranges from semi-arid to arid condition and the average rainfall is about 350 mm, while the minimum and maximum temperature is 28 and 45°C respectively [20].

Study Populations: All Pastoralists, human health professionals and animal health assistants were included in the study that was found in the district.

Study Design: A cross-sectional study was conducted from October 2012 to May 2013 to determine up on knowledge, attitudes and practices (KAP) on the pastoralists, human health professionals and animal health assistants with relation public health significance.

Sample Size Determination: There was no previous information on the level of pastoral community awareness about hydatidosis in the present study areas or in the region as whole. But, 3.9% of the pastoralists in western Uganda had knowledge of hydatidosis [21] and by using the formula of:

$n = (1.96)^2 RD (1-RD)$,

where,

n = Required sample size
d^2 RD = Response Distribution
d = Desired absolute precision [22].

Thus, based on this assumption and 95% confidence and 5% degree of accuracy, therefore, the calculated sample size is 58 and for the higher accuracy, the total numbers of sampling were increased to 280. In addition, 80 human health and 20 animal health assistants were included based on their accessibility and willingness to participate in the study.

Sampling Methods: The district was selected purposively due to number of risk factors of hydatidosis such as common backyard slaughtering, different ecology, over population of dogs and stray dogs and not attempt any study before. Stratified sampling method was used as pastoralists, human health professionals and animal health assistants based on their occupations. Five *Kebeles*, three from pastoral and three from agro-pastoral randomly were selected and 201 households from pastoral and 79 households from agro-pastoral were sampled with simple randomly based on the proportion. Animal health assistants and health professionals were conveniently selected based on their accessibility and willingness to participate in the study after the pilot conducted based on the availability in the district.

Methods of Data Collection: Structured and some open-ended questionnaires were prepared in English for pastoralists, animal health assistants and health professionals to collect information on knowledge, attitude and practices with related risk factors. The questionnaires were translated into local language (*Afarigna*) and pre-tested for clarity and cultural acceptability in the district. During pre-testing, additional information was gathered and some of the questionnaires were modified. The participants were interviewed in their local language by trained data collectors. Questionnaire survey to investigate on public knowledge, attitudes and practices with potential risk factors for hydatidosis acquires infection in human was assessed. Those was included educational level and major occupation, behavior (contact and play with dogs) and consumption habit (wash vs. unwashed vegetable), drinking water sources (river vs. well), slaughtering and disposal of offals practices and knowledge of zoonosis, zoonotic risk of dogs and stray dogs, close contact and mode of contact (delivery or handling of dog feces) with status of knowledge, attitude and practices.

The questionnaire were also organized for health professionals animal health assistants who they were works in Ayssaita districts hospital, clinics, private sectors on knowledge, attitude and practice (KAP) on hydatidosis. These were includes source of infection, way of transmission to human, knowledge of zoonosis, perception, control and prevention.

Data Management and Analysis: Data obtained from questionnaire results were coded and uploaded into Microsoft Excel 2010 spreadsheet computer program and analyzed using STATA version 11.0 for Windows (Stata Corp. College Station, USA). Descriptive statistics, cross tabulation and logistic regression were applied to present the results. Odd ratio and 95%CI were computed and the 95% confidence level was used and results were considered significant at $P < 0.05$.

Ethical Approval: The questionnaire data resulted from pastoralists, health professional and animal health assistants. Study participants were first asked whether they accept to take part in the researcher survey. No approval by an ethics committee is necessary for the applied methodology but consent was also sough on pastoralists, the health professionals and animal health assistants before being involved.

RESULTS

Pastoralists: Two hundred eighty pastoralist participated in the questionnaire survey and the socio-demographic features of the pastoralist showed that 160 (57.15%) male and 120 (42.85%) were females, with a mean age of 39.33 years (SD = 2.28), all were Islam (100%), 201 (71.79%) pastoral and 79 (28.21%) agro pastoral and their level of education, 262 (93.57%) illiterate and 18 (6.43%) primary school.

Table 1: Logistic regression analysis on pastoralists' knowledge of hydatidosis in Ayssaita district, northeastern Ethiopia

			Univariate	
Category	No.	Knowledge (%)	OR[a] (95% CI[b])	P value
Life way				
Pastoral	201	3.98	1	0.68
Agro pastoral	79	5.06	1.29 (0.38, 4.42)	
Educational level				
Illiterate	262	4.58	1	0.02
Primary school	18	16.66	5.60 (1.38, 23.04)	
Sex				
Female	120	4.17	1	0.94
Male	160	4.38	1.05 (0.32, 3.38)	
Age				
>40	120	3.33	1	
30-40	115	4.35	1.18 (0.82, 4.50)	0.09
<30	45	6.67	1.36 (0.55, 3.70)	0.4

a:Odd Ratio, b: Confident Interval

Table 2: Questionnaire survey on public attitude and practices of hydatidosis to identify risk factors of public health significance in Ayssaita district, northeastern Ethiopia

		Respondents	
Questionnaire items	Response	No.	%
Close contact with dogs	Yes	200	71.4
	No	80	28.6
Exposure to dog feces	Yes	82	29.29
	No	198	70.71
Hand washing practice after contact with dogs, dog feces, soil	Yes	48	17.1
	No	232	82.9
Practice washing vegetables before raw consumption	Yes	26	9.29
	No	254	90.71
Infected organ and inedible offals	For dog and cat	224	80
	Disposed in the environment	56	20
Dog housing	Totally indoor	7	2.92
	Totally outdoor	51	21.25
	Mixed	182	75.83
Presence of separate housing for dogs	Yes	11	4.58
	No	229	95.42
Use of veterinary service for dogs for deworm	Yes	0	0
	No	240	100
Do you think that dogs have health risks to you or other animals?	Yes	30	10.70
	No	250	89.30

Knowledge about hydatidosis and its risk factors varied, but in general there was a great deal of uncertainty about the disease. Only less than 5% of pastoralists indicated that they have heard about the disease. Sex, age and living style of respondents did not significantly influence the knowledge about hydatidosis/ echinococcosis. However, literate respondents had more aware than illiterates (P = 0.02) (Table 1).

Attitude and Practices: Large proportion of pastoralists has dogs kept for purposes such as assistance in livestock herding guarding the livestock at night from wild carnivores. Only small proportions (10.7%) of study participants assume that dogs transmit health risks to human or other animals. Moreover, the presence of stray dogs in the immediate environment is not a significant health risk in terms of disease transmission for 89.3% of the respondents. Risk identified as 29.29% reported that the participants exposed to dogs' faeces. A higher proportion (82.90%) didn't wash hands after contact with dogs' feces and soil due to lack of water and high proportion (90.71%) of the respondents didn't wash vegetables food before eating (Table 2).

Table 3: Questionnaire survey responses of human health professionals on knowledge, attitude and practices against hydatidosis/echinococcosis in Ayssaita district, northeastern Ethiopia

	Respondents	
Questionnaire items	No.	%
Know hydatidosis/ echinococcosis	44	55
Is echinococcosis/hydatidosis zoonosis?	29	36.30
Know source of infection to humans	22	27.50
Acquire hydatidosis to human	20	25
Control and prevention of echinococcosis/hydatidosis (> 1 answer possible)		
Create community awareness	42	52.50
Build modern abattoir	23	28.75
Regular deworming of dogs and stray dog control	15	18.75
Total avoidance of contact with dogs and dog feces	22	27.5
Who is responsible to educate the public?		
Public health professionals	44	55
Veterinarians/ animal health assistants	34	42.5
Agricultural extension agent	2	2.5
Risk of hydatidosis to human		
High	8	10.0
Moderate	27	33.75
Low	45	56.25
Did/ do you come across human case of hydatidosis in Ayssaita?		
Yes	-	-
No	80	100

Table 4: Questionnaire survey and responses of knowledge, attitude and practices in animal health assistants in Ayssaita district, northeastern Ethiopia

	Respondents	
Questionnaire items	No.	%
Know hydatidosis/ echinococcosis?	15	75
Is echinococcosis/ hydatidosis zoonosis?	15	75
Which animal excrete eggs of echinococcosis in their feces to the environment?	10	50
Canines acquire hydatidosis	10	50
Herbivores animals acquire hydatidosis	13	65
Human acquire hydatidosis	12	60
Come across animal hydatidosis during diagnosis or inspection		
Yes	12	60
No	8	40
Control and prevention of echinococcosis/ hydatidosis		
Create awareness in the pastoralist	2	10
Build modern abattoir	10	50
Regular deworm of dogs and stray dog control	8	40
Perception about human health risk of hydatidosis?		
High	10	50
Moderate	9	45
Low	1	5

Questionnaire Survey on Health Professionals: Fifty five percent of health professionals knew the disease. However, around one-fourth of the health professionals gave correct answer about the sources of infection, one –third of the respondents have the knowledge of zoonosis and small number of health professionals have awareness human acquire hydatidosis and further information such as prevention and control showed in Table 3.

Questionnaire Survey on Animal Health Assistants: The majority of the respondents have awareness on the

knowledge of hydatidosis and the knowledge of zoonosis. On the other hand, half of them gave their correct answer on the sources of infection. These and other points indicated clearly in Table 4.

DISCUSSION

Education plays a vital role in establishing political participation in control programs at all levels of society and for building consensus amongst stakeholders and professional participants alike. Knowledge about hydatidosis is very low in Ayssaita district. However, relatively have higher awareness in the primary school literate than illiterate. [21] have emphasized that there was a significant association between knowledge and perception about hydatidosis with education levels and pastoralism. Around 2.6% infection rates in illiterate people which showed the highest rate in Ardabil Province, Iran [23].

The results of this study indicated that hydatidosis is not familiar to the pastoral communities in the present study areas, as the majority of the pastoralists reported that they did not hear or aware about hydatidosis. This is consistent with other studies in Tanzania, majority of the respondents have not aware of hydatidosis [24] and in Iran found that very low level of knowledge about hydatidosis in the pastoralist. However, the health education of treated individuals in Izeh city produced a significant increase in knowledge. Similar presentation was in Jordan, had been poor knowledge of the source of hydatidosis infection, of the causative agent and the way in which hydatid cysts were acquired [25]. On the other hand, higher awareness was reported in Switzerland and Germany with a majority of more than 60% knew about the parasite [26].

Higher proportion of the respondents closed contact with non-dewormed dogs. The close association of people with dogs especially children who can acquire this disease when they are still young and signs come later in life further exacerbates this factor. Similar results reported in Tanzania, many households (89.1%) had dogs which did not deworm regularly and managed under free-range system [24]. This idea was supported by Gathura and Kamiya [27] that they reported with high incidence rate in the northern (higher contacted of dogs) than in the southern Kenya due to cultural difference.

Backyard slaughter of small ruminants and camels and disposal of raw condemned organs through offering to dogs were the common practice, a situation which may lead to the increased environmental parasitic load. Similar results were observed in Tanzania, majority of community had their dogs managed freely with feed raw condemned materials to their dogs [24].

The majority (90.71%) of the pastoralist said that they were eaten unwashed vegetables. This indicated that eating unwashed vegetables were common practices in the communities. If the local vegetation is contaminated with the faeces of dogs infected with *E. granulosus*, this behavior may easily carry a high risk of human infection with the parasite and a tendency to eat soil by pregnant women especially in rural areas makes the situation in benefit of infecting with hydatidosis. High prevalence with similar risk factors investigated in Jordan [25].

The study has for the first time documented the animal health assistants and human health professionals on the knowledge and control of zoonoses in pastoral areas of Ethiopia. Only one graduated veterinarian was found in the area. But higher numbers of health professionals were found in the hospital and clinics in the district.

The questionnaire survey of health professional about hydatidosis documented a relatively low level of knowledge about the knowledge of sources of infection, zoonosis, ways of the transmission to human and with dog and stray dog interaction and prevention and control methods. This result showed that health professionals had little impact and did not regard themselves as the professional most responsible for educating and create awareness about zoonoses to the pastoralists but the professionals had never tried to educate people or create awareness about the disease due to various reasons working in public health institutions in Aysaita. The results were in agreement with John, Kazwala and Mfinanga [28] reported that only a few health professionals were observed to have the right knowledge of hydatidosis in Tanzania.

On the other hand, in Switzerland and Germany a majority of more than 60% of non- professional knew about the parasite [26]. From the above statement, two things come to our mind and implied that developed countries have high attention in zoonotic disease and non-professional of developed countries better knowledge than health professional in developing countries and the second point that the prevalence of human hydatidosis is higher in developing countries but gave restrict attention in developed countries that of have low incidence of hydatidosis.

The current study, they had not encountered cases of hydatidosis in Ayssaita district hospital. The study area lack modern diagnostic facilities and there is inability

to afford modern treatment by the most vulnerable section of society could have contributed to the obtained result. The complete absence of reported human hydatid cases from Ayssaita hospital may not suggest that the study region is free of this disease. However, similar living style to Afar pastoralist in Kenya confirmed by Gathura and Kamiya [27] who estimated the incidence at 40 cases per 100,000 populations.

Overall, it was anticipated that the animal health assistants would be relatively higher familiar when compared to health professionals, but not statistical significantly (P = 0.11). However, only around half of them were known the sources of infection of the disease, contamination of the environment and ways of transmission among animals. Similar finding was presented in Kenya, higher number of veterinary have knowledge of hydatidosis than health professionals [29].

The results of the study indicated that it is possible hydatidosis was missed by those delegated with the duty of identifying them in terms of sources of infection, transmission to human, control and prevention methods. Health professionals and animal health assistants concentrated on endemic diseases and ignore zoonoses that are increasingly becoming of public health importance. The location of health professionals and animal health assistants in the distant underprivileged rural areas and lack of facilities such as internet could also explain for the low level of knowledge. Public health promotion on education and inter-disciplinary one-health collaboration between veterinarians, health professionals and policy makers have not practiced in a more efficient and effective joint approach to aware and educate the communities.

Heath education is a basic tool in veterinary public health and in particular in the prevention and control of zoonoses, such as hydatidosis based on life cycle, sources of infection, way of transmission, control and prevention methods in human and animals. Bringing together veterinary and medical organizations, data and control activities at all levels is essential if zoonotic diseases are to be effectively dealt with [17]. In conclusions, the questionnaire survey on public clearly indicated that generally poor knowledge of the disease, its sources of infection and transmission, the eating of unwashed uncooked vegetables, the throwing of slaughter wastes on to open ground, the frequency of dog ownership and the ability of owned non-dewormed dogs to roam freely around and within houses and have none of simple slaughter house in the district are all causes of concern human and animal hydatidosis. Health professionals and animal health assistants determined that they have low knowledge, perception and little impact to educate and create awareness to transmission, control and prevention in the pastoral communities. Therefore, it is highly imperative public health education to build up public awareness about the sources of infection and its control and prevention method in the pastoral, increased awareness and collaboration between animal health assistants/ veterinarian and human health professionals should also be strengthened in Ayssaita in sharing knowledge on zoonoses and working together to identify and control zoonoses.

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