

This is an Accepted Manuscript for Parasitology. This version may be subject to change during the production process. DOI: 10.1017/S0031182023001154

Prevalence of cystic echinococcosis among livestock in pastoral and agro-pastoral areas in Uganda

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Abstract

Cystic echinococcosis (CE) remains a significant challenge in Uganda with precise status largely, undocumented in most communities. Postmortem examination to determine CE prevalence was done on 14,937 livestock (5,873 goats, 1,377 sheep, 3,726 zebu cattle and 3,054 Ankole cattle) slaughtered in abattoirs in the districts of Moroto in Karamoja region, Kumi in Teso region and Nakasongola and Luwero in Buganda region. Recovered cysts were further characterized to determine their viability status. The overall CE prevalence was 21.9% in sheep, 15.2% in Zebu cattle, 5.5% in goats and 2.1% in Ankole cattle. Moroto district had a higher prevalence of CE than other districts of 31.3% in Zebu cattle, sheep 28%, goats 29.1% and none (0%) in Ankole cattle. On organ locations, the lungs were the most affected in all livestock in all the study areas. Considering cyst fertility, 33.9%, 1.7% and 6.4% of Ankole cattle, Sheep and Zebu cattle respectively had fertile cysts in the liver while 4.5% of goats and 4% Ankole cattle had fertile cysts in the lungs. No fertile cysts were recovered from sheep, Zebu cattle lungs and liver of goats. In conclusion, CE is widespread and occurs among cattle, sheep and goats in pastoral and agro-pastoral areas in Uganda. Therefore there is an urgent need to create awareness among the communities on role of livestock in CE epidemiology and transmission.

Keywords: Cystic Echinococcus; prevalence; livestock; organs; pastoral; agro-pastoral; Uganda

Introduction

Cystic echinococcosis (CE) is a cosmopolitan often under-reported neglected disease of economic and public health significance (McManus *et al.*, 2003; Nakao *et al.*, 2007; Battelli, 2009; Da Silva, 2010). Although humans are affected as accidental hosts, CE affects both wild and domestic animals. It is caused by the metacestodes of the parasitic tapeworms belonging to the family Taeniidae and genus *Echinococcus* (Spickler, 2020). Extensive research has shown transmission to livestock (intermediate hosts) and humans (accidental hosts) is through consumption of *Echinococcus* spp eggs, from faecal matter of infected, unrestricted, freely roaming and in most cases un-wormed domestic and wild canids (definitive hosts), present in contaminated pastures, water, vegetables and fresh fruits (Torgerson and Budke, 2003; Eckert and Deplazes, 2004). Canids harbour mature adult worms in their intestines, producing eggs that, once ingested by the intermediate hosts, hatch into larvae, enter the circulation, and slowly develop into fluid-filled structures lodged as cysts in various host organs, mainly in the lungs and liver, thus compromising their functions (Eckert and Deplazes, 2004).

Hydatidosis is mainly caused by *Echinococcus granulosus* sensu lato complex comprising of the following strains: *E. granulosus* sensu stricto (G1, G2 and G3 strains), *Echinococcus canadensis* incorporating G6-camel strain, pig strain (G7), G9 up-to G8 and G10 (the cervid strains), *Echinococcus equinus* (G4), *Echinococcus ortleppi* (G5) and *Echinococcus felidis*- the lion strain (Hüttner *et al.*, 2008; Alvarez Rojas, Romig and Lightowlers, 2014; Romig, Ebi and Wassermann, 2015; Shariatzadeh *et al.*, 2015; Thompson, 2017).

Cystic echinococcosis causes considerable losses of productivity in livestock measured in terms of weight loss, lowered meat quality and birth rates, coupled with economic losses as a consequence of organ condemnations during postmortem meat inspections (Craig *et al.*,

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