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A community-based participatory study investigating the epidemiology and effects of rabies to livestock owners in rural Ethiopia

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ABSTRACT

A participatory study was carried out in the Oromia region of Ethiopia to ascertain the principal epidemiological features of rabies and its impact on livestock owners. Due to the variation in topography (and therefore livestock and human populations within the study area) villages from both high (>1500 m) and lowland areas were included. Local development agents who had no knowledge of the study's purpose recruited a total of one hundred and ninety six participants from eleven lowland and ten highland villages. A facilitator trained in animal health and participatory techniques conducted the interviews with groups of up to eleven participants. Methods used included ranking, scoring, proportion piling, seasonality calendars and open discussions to investigate a set of questions pre determined from a pilot study. The relative importance of rabies to other zoonoses, temporal distributions of the disease, the species affected, current methods of control within affected species and consequences of their loss were all explored. Data was compared between high and lowland areas and previously published studies.

The study found that rabies was considered the zoonosis of greatest risk to public health in both areas. It reportedly occurred with higher frequency in highland areas and subsequently affected more livestock in these parts. Two distinct temporal patterns within the areas were described and participants provided reasons of biological plausibility for the occurrence. Livestock were found to contribute as a higher proportion of all species affected than previously shown in published material. This is likely to be due to the low level of reporting of affected animals to the available veterinary services, from where comparative data originated. The death of infected livestock species was found to have numerous social and economic implications and the ramifications of this are made greater by the perception that the highest incidence of clinical disease being in areas of greatest livestock density. The underestimation of the burden of disease by central bodies is likely to influence the economic rationale behind effective rabies control in the future.

1. Introduction

Rabies is endemic in Ethiopia (Yimer et al., 2004) where it has been recognised as an important disease for many centuries (Fekadu, 1982). The disease has been identified in a number of other domestic species including cattle, donkeys, horses and sheep (Fekadu, 1982) as well as affecting people and canids. There has been an increase in disease incidence in the last decade in these species (WHO). Whilst attention has been given to the public health impact of rabies, concerns regarding the economic implications as a result of animal loss have also been raised (Knobel et al., 2005). Under representation of cases in species of economic importance is likely to have a significant impact on the

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quantification of disease burden and any economic rationale behind disease intervention.

The Ethiopian Nutrition and Health Research Institute (ENHRI) in Addis Ababa is the sole diagnostic testing facility in the country responsible for relaying data to the World Health Organisation (WHO). It is reliant on voluntary submission of suspect cases from veterinarians. Passive surveillance reportedly underestimates the occurrence of human disease in Ethiopia (Fekadu, 1997) and this is likely to be true in affected animal species due to poor submission rates, in particular from rural areas. This is likely to be a result of the limited surveillance capacities of the country. Whilst the increase in privatisation of veterinary services has improved some services the diagnostic and reporting capacities remain limited (Admassu, 2003).

All rural areas are reliant on ruminant and non ruminant species for agriculture-based activities which contribute up to 85% of household revenue (Benin et al., 2003). Highland areas are more temperate, conducive to crop growth and therefore more densely populated by people and their livestock compared to arid lowland areas where pastoralism predominates (Halderman, 2004). However, very little is known about the perceptions and knowledge of rabies amongst livestock owners in either area. This project sought to meet some of these short-comings by exploring livestock owner perceptions of rabies in two topographical areas of Ethiopia.

Participatory appraisal methods were used and involve the participation of the people being studied and the use of their personal perceptions, experience and knowledge as data (Chambers, 1992, 1994). The in depth knowledge of rural livestock owners and their ability to effectively identify diseases seen in their livestock has been well documented (Catley et al., 2001, 2002; Mariner and Roeder, 2003). Although no absolute measure of disease incidence could be provided the study explored the perceptions of the importance of the disease relative to other zoonotic diseases identified by participants and the difference in the perceived effects between the two rural areas. This provided potential risk factors associated with the disease that could be considered in future disease control. Data was also collected on current preventative measures and treatments used by livestock owners. Finally the relative proportion of mortality of each livestock species from rabies was compared to official reports to ascertain if there was evidence of under reporting.

2. Materials and methods

2.1. Location and participant selection

The study was carried out over six weeks in August and September 2009 in the Oromia region of Ethiopia in an area covering approximately two hundred and fifty kilometres. Ethiopia is divided into nine regions that are, in turn, divided into zones containing a number of small provinces or *woredas*. The study sites in lowland areas, Dugda Bora and Adami Tullu *woredas*, were in the West Shewa zone, whilst the highland sites were within the Tijo *woredas* of the neighbouring Arsi zone. Selection of *woredas* and villages (*kebele*) was dependent on vehicular access (to within a few kilometres) and cooperation of the *woredas* agricultural department (all departments approached agreed to cooperate, so this criterion did not result in any exclusions). From each village groups of up to eleven participants were invited to take part in the study. They were selected by village development agents according to two pre-defined criteria; ownership of ruminant and non-ruminant livestock in the household and agriculture being the predominant source of household income. The development agent had no prior knowledge of the subject matter of the study before recruiting participants. Inclusion of women in the groups was encouraged. There was no prior knowledge by the authors of the government veterinary services available in the *kebele* or of any rabies control programmes in place. The study was approved by the research ethics committee at the University of Liverpool.

2.2. Participatory appraisal methodology

The discussions were conducted in either of the two principal languages of the region, Afan Oromo or Amharic, using a facilitator fluent in both languages and previously trained in participatory methods. During the study, no individuals were encountered that did not speak fluently at least one of these languages.

The methods used were trialled and adapted through pilot meetings in a number of sites not included in the main study and a resulting schedule of open-ended questions was used to guide discussions. The study design was such that participants could visually display their opinions and this, in turn, encouraged debate within the groups and elicited further information. Efforts were made to ensure all members of the discussion group expressed their opinions and that discussion was open and not dominated by one or a few individuals. Nevertheless, with any group discussion, there remained the potential for a subset of people to dominate or for people to voice what they believe to be an acceptable, rather than their own, opinion. Participants in pilot meetings reported finding the use of local materials (e.g. beans, pebbles) to be ill-suited and took more interest when using modern materials. In the face of low levels of literacy, pictures and other visual cues were used where possible and where necessary groups appointed a literate group member to write on behalf of the remaining participants; materials used included a white board, pens of different colours, card counters and photographs. Where written materials were used (for example, disease names were written on cards for subsequent ranking) the local facilitator ensured discussions relied on verbalisation of (rather than reading) the words. The local facilitator also ensured the nominated scribe accurately reflected the views of the group. The first author was responsible for noting key results during discussions and all discussions were recorded. Semi-structured interviews and additional information elicited by debate were translated from local languages to English after the meetings.