Preventive Veterinary Medicine 153 (2018) 84–93

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

Is syndromic data from rural poultry farmers a viable poultry disease reporting tool and means of identifying likely farmer responses to poultry disease incursion?

C. Mubamba[a,d,*], G. Ramsay[b], C. Abolnik[c], G. Dautu[d], B. Gummow[a,c]

[a] Discipline of Veterinary Sciences, College of Public Health Medical and Veterinary Sciences James Cook University, QLD 4811, Australia
[b] School of Animal and Veterinary Sciences and Graham Centre for Agricultural Innovation Charles Sturt University, Wagga Wagga, New South Wales, Australia
[c] Department of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, Pretoria, South Africa
[d] Ministry of Fisheries and Livestock, Department of Veterinary Services, Zambia

ARTICLE INFO

Keywords:
Rural poultry
Syndromes
Surveillance
Traditional remedies

ABSTRACT

Syndromic surveillance is a well described tool used in developed countries for alerting authorities to livestock disease incursions. However, little work has been done to evaluate whether this could be a viable tool in countries where disease reporting infrastructure and resources is poor. Consequently, a syndrome-based questionnaire study in Eastern Zambia was designed to gather data on previous encounters farmers had with poultry diseases, as well as control measures they use to mitigate them. Descriptive statistics and logistic regression were used to analyse the data.

Farmers reported an overall annual disease incidence in rural poultry for eastern Zambia of 31% (90% CI 29–32%). Occurrence of poultry disease in the last 12 months was associated with use of middlemen to purchase poultry products ($p = 0.05$, OR = 7.87), poultry products sold or given away from the farm ($p = 0.01$, OR = 1.92), farmers experiencing a period with more trade of poultry and its products ($p = 0.04$, OR = 1.70), presence of wild birds near the farm or village ($p = 0.00$, OR = 2.47) and poultry diseases being reported from neighbouring farms or villages ($p = 0.00$, OR = 3.12). The study also tentatively identified three poultry diseases (Newcastle Disease, Gumboro Disease and Fowl Pox) from the thirty-four disease syndromes provided by farmers. Farmers reported an incidence of 27% for Newcastle Disease in 2014. When compared with the state veterinary services data which reported Newcastle Disease incidence at 9% in 2014, it seems syndromic data obtained from farmers may be more sensitive in identifying disease incursion.

Thirty-six remedies and strategies farmers use to treat and control these diseases were revealed. The main control strategy for identified diseases was vaccination and the main treatment was unspecified herbs, which warrants further investigation and presents an opportunity for further research in ethno-veterinary medicine. More still, this study identified chilli, *Aloe Vera,* garlic onion, moringa, and ash as traditional remedies that are commonly being used in Eastern Zambia, and which are also used to treat poultry diseases in Zimbabwe and Botswana. Only fourteen remedies described are conventionally accepted by veterinarians as remedies and disease control measures for poultry diseases.

This study shows that syndromic data obtained from farmers is a useful disease reporting tool and could be used as an effective means of alerting authorities to disease incursion. In addition, it shows that these data may give a more accurate estimate of incidence for certain diseases than current surveillance methods and could be useful in assessing significant risk factors associated with disease occurrence.

1. Introduction

Rural poultry production has a great potential for providing food security in developing countries, because it requires a relatively small investment to initiate its production (Mtileni et al., 2012). The low capital inputs required make small-scale poultry farming ideal for disadvantaged community members, like widows and orphaned children, whose numbers continue to increase because of the huge impact the HIV/AIDS pandemic exerts in these regions (Mutenje et al., 2008; Moreki and Dikeme, 2011). Poultry is a reliable source of protein and as

* Corresponding author at: Discipline of Veterinary Sciences, College of Public Health Medical and Veterinary Sciences James Cook University, QLD 4811, Australia.
E-mail address: Chrisborn.mubamba@my.jcu.edu.au (C. Mubamba).

https://doi.org/10.1016/j.prevetmed.2018.03.002
Received 27 July 2017; Received in revised form 10 February 2018; Accepted 2 March 2018

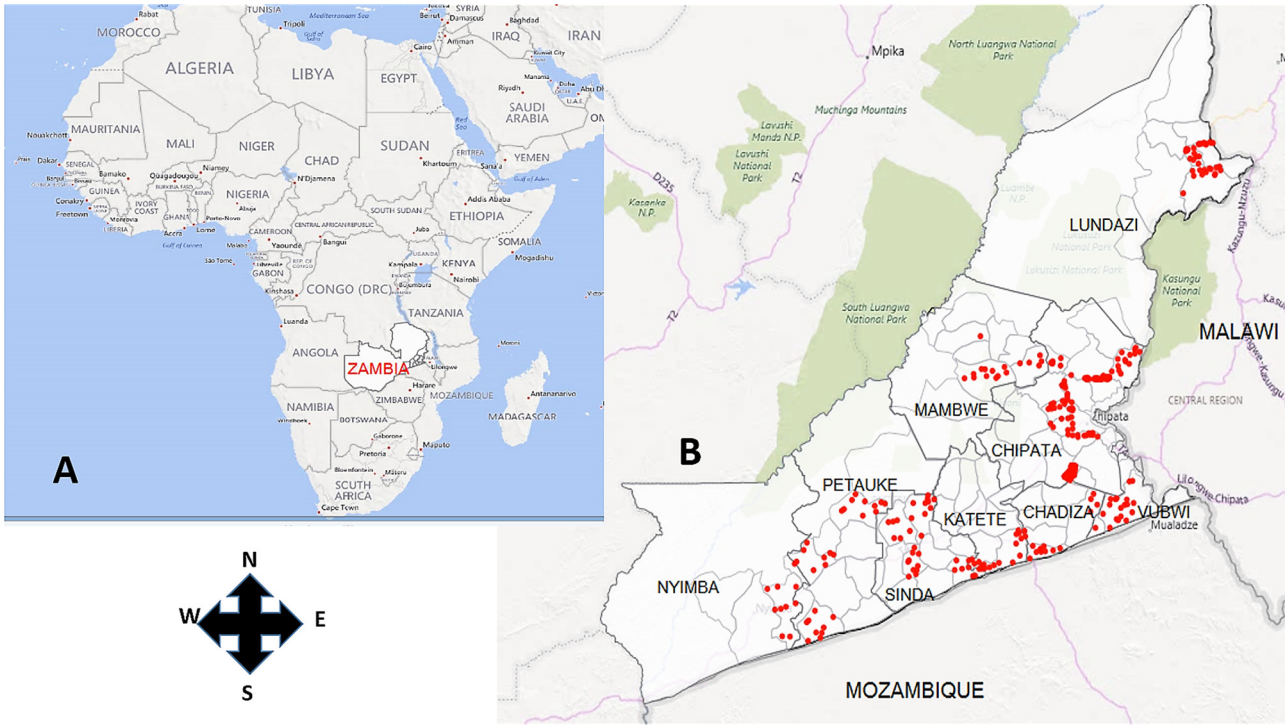

Fig. 1. Location of Zambia and its Eastern province within Africa (A). Nine districts of the Eastern province of Zambia and veterinary camp zones where farmers (dots) were sampled (B) during a survey conducted in 2014.

a commodity, has the potential to increase household income. For instance, Zambia, a developing country within the tropical sub-Saharan region with a human population of 13 million, has over 11 million rural poultry, mostly kept by women and other disadvantaged members of its rural communities (Songolo and Katongo, 2000).

When poultry farming is practised on a large scale and birds are fed on commercial feed and bred for high quality meat or egg production, it is referred to as commercial poultry. When birds are kept on a small scale (usually with less than 100 birds), and mainly meant for domestic consumption, or when birds are meant for sale but reared with minimal resources (even if they are improved breeds), it is often referred to as rural poultry (Sonaiya, 2007; Akinola and Essien, 2011). In Zambia, more than 80% of the poultry farmers are rural poultry farmers who keep indigenous chickens under a free-range system. Indigenous chickens brood an average of 3.1 clutches of 7–18 eggs per year (Songolo and Katongo, 2000). Live poultry and its products are either sold directly to consumers on farm or sold to middlemen who sell them to market traders or consumers (Mubamba et al. 2017).

Unfortunately, successful production of rural poultry in developing countries like Zambia is hindered by high poultry mortalities which are mostly due to infectious poultry diseases (Songolo and Katongo, 2000), like Newcastle Disease (ND). The current disease surveillance strategy for poultry diseases in this region is mainly passive. It involves farmers reporting poultry diseases to the nearest veterinary technician who reports the disease/s monthly to the Zambian livestock diseases epidemiology unit based on clinical cases reported by farmers and collects samples which are submitted to the district and regional veterinary diagnostic laboratories for confirmation. Unfortunately, field technicians often face logistical challenges that prevent them following up cases to confirm disease syndromes (Mumbolomena A., Provincial Veterinary Officer, Personal communication). It is therefore highly likely that this passive nature of disease data collection results in underreporting of outbreaks.

Regular active surveillance for poultry diseases is vital in order to reduce reporting and response times (Pinner et al., 2003). Unfortunately, active surveillance for poultry diseases is infrequently conducted because it requires significant amounts of resources, which the government may not provide because of other socio-economic priorities (Mwacalimba, 2012). Consequently, a form of surveillance which targets areas with a high risk or incidence of poultry disease outbreaks would be beneficial (Brioudes and Gummow, 2015). Syndromic surveillance systems, which seek to use existing health data in real time to provide immediate analysis and feedback to those charged with investigation and follow-up of potential outbreaks (Henning, 2004), may assist if it is placed in identified disease hotspots.

Whereas syndromic surveillance has been utilised for early detection of outbreaks, to follow the size, spread, and tempo of outbreaks, to monitor disease trends, and to provide reassurance that an outbreak has not occurred in developed countries and some countries in Asia (Wu et al., 2008; Van Metre et al., 2009), it has been underutilised in real time detection of livestock diseases in sub-Saharan Africa. Establishing it in such regions requires a reliable and efficient source of disease data, yet little has been published as to availability and reliability of such data sources in these regions. Rural poultry farmers are a possible source of this data as they are usually the first to observe disease syndromes amongst their flocks, but it is not known how viable the data are.

Similarly, knowing how rural farmers respond to poultry diseases and syndromes would be of value to veterinary services, as this would indicate farmers' preparedness to reduce outbreaks if they occurred. Yet little is published in this regard. Although some studies on ethno-veterinary medicine (EVM) in poultry have previously been conducted in Africa (Guèye, 1999), it appears none have been carried out in Zambia.

In this context, rural poultry farmers in Eastern Zambia were interviewed to find out how they would report poultry diseases and how they would respond to them with the view of assessing whether rural farmers in this region would be a viable source of data for a syndromic reporting system for poultry diseases.