Assessment of prevalence of cystic hydatidosis in cattle slaughtered at Busia Town abattoirs and the knowledge, attitude and practices of cattle owners and abattoir workers – Busia Kenya 2018

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Background

- Hydatidosis: neglected parasitic zoonosis: larval stage *Echinococcus* Species
- Four species of *Echinococcus*;
  - ***E. granulosus;*** **cystic hydatidosis** (CH), tropical regions, ungulates prime-intermediate host hence importance in livestock
  - ***E. multilocularis;*** **alveolar hydatidosis** (AH), temperate regions
  - Others; ***E. vogeli*** and ***E. oligarthrus***
- CH**,** endemic in Mediterranean areas, Eastern Europe, Asia, Indian Sub-continent, Middle East and re-emerging in Soviet Republics
- In Africa, CH*;* Northern & Eastern Africa including Kenya, Turkana

Problem Statement

- Affects 2–3m people worldwide in extensive livestock farming areas
  - Tibet where there is close contact between humans and domestic dogs
- Human infestation ranges from <1 to >200/100,000 in rural populations
- Globally, there may be >3,000 human and animal deaths every year
  - Economic losses estimated >3bln USD yearly (cost of treatments & management)
- Prevalence of CH in cattle in Kenya is 25.8%; Turkana
  - Livestock related losses in Kenya are >240,000 USD annually
- The parasite may spread to non-endemic areas like Busia through improper disposal of infested organs from slaughtered carcasses and dog feces
  - Therefore, Kenya public health players need to intervene to prevent spread and reduce economic losses from condemned organs

Justification

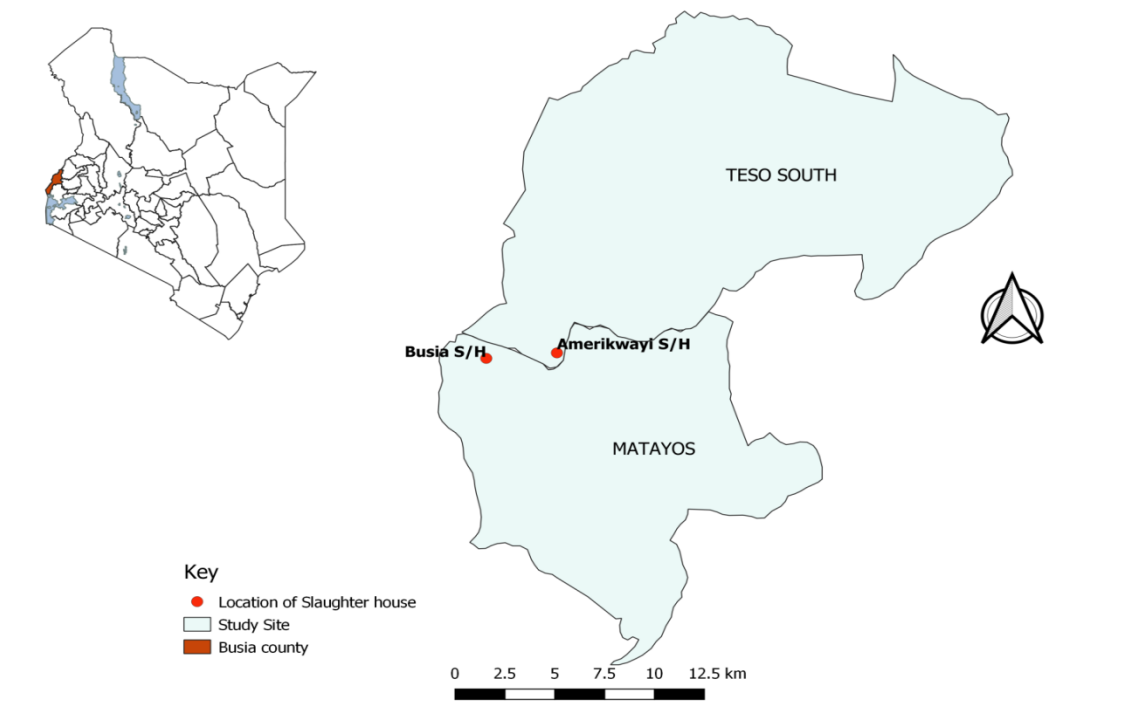
- Busia, a town in western Kenya, livestock market for Kenya & Uganda
- Feared that parasite is being disseminated along livestock marketing chains
- Porous borders, uncontrolled movement of livestock from endemic areas & poor meat hygiene in rural areas may increase the risk of spreading CH
  - This puts human and livestock population in Busia Kenya at risk
  - Because, livestock from perceived endemic areas end up in Busia Kenya for slaughtering
- Previous studies have done little on KAP on CH & on risk of introducing the parasite via livestock marketing chains that connect Busia to endemic areas

Objectives

- To estimate the prevalence of CH in cattle slaughtered at Busia abattoirs
- To determine possible sources for introducing CH to Busia community
- To assess the KAP of cattle value chain actors on CH

Methods (1/4)

Study site



- Busia Municipal & Amerikwayi abattoirs in Busia Town (K); border of Kenya & Uganda

Study design, period & population

- Cross-sectional study within the selected abattoirs
- Study conducted in May & June 2018
- Human pln=111,345, livestock pln=215,871: cattle=132,804 (61.52%)
- Study targeted all male & female cattle destined for slaughter at the two abattoirs

Methods (2/4)

Sample size determination

- Cochrane formula 1977 *priori* prevalence of 25.8%: minimum size of **294**
- The sample size was proportionately divided between the two abattoirs

Inclusion criteria

- All cattle whose owners consented
- Consenting adults (≥18 years) were assessed for KAP

Exclusion criteria

- Cattle whose owners could not be traced for KAP assessment
- Organs & carcasses condemned for other reasons
- Persons (<18 years) were not assessed on KAP
- Shoats, pigs etc not included

Methods (3/4)

1. Ante-mortem (AM) and Post-mortem (PM) Examinations

- Study began by visiting all butcheries in Busia Town: visited abattoirs
- AM inspection conducted to record demographic information of cattle: PM
- Standard meat inspection procedures used to establish infestation status
- Cysts removed whole, put in zipped polythene bags & labelled for PCR test

2. Questionnaire administration and KAP Survey

- Used semi-structured questionnaire; developed on Ms. Word to assess KAP
- Interviewed participants in private set up to maintain confidentiality

  Variables- abattoir, estimated age, breed, sex, body condition & origin
- **K;** We scored one (1) for correct response and zero (0) for incorrect response or *"don't know"* response
  - **Adequate K**; was a score ≥half of overall score

Methods (4/4)

- **Good A:** participant found it important to deworm dogs and livestock
- **Good P:** regularly dewormed livestock/dogs, good meat hygiene and proper disposal of infested organs/dog faeces

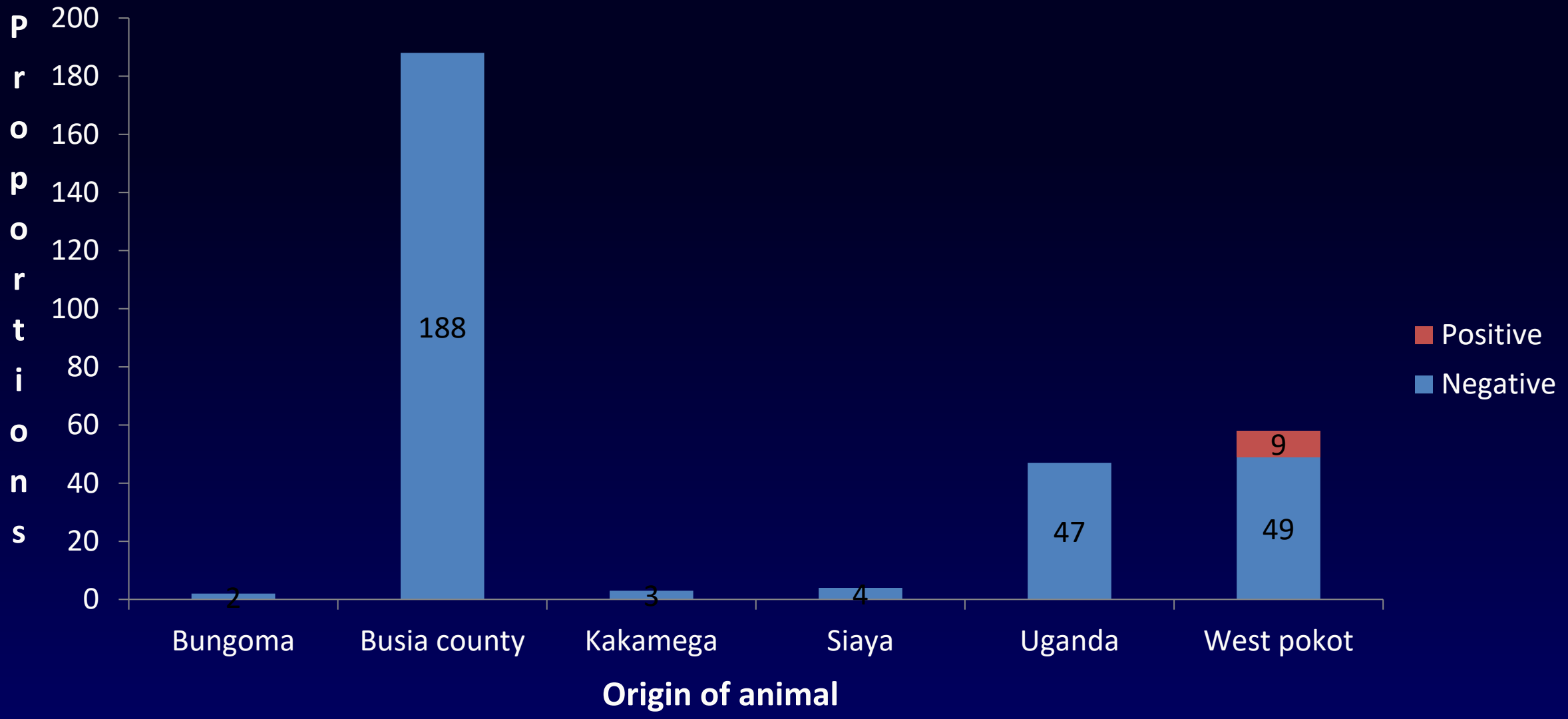
Data management and analysis

- Data entered and cleaned using Ms. Excel; analysis Ms. Excel and Epi Info
- Descriptive statistics was done to summarize the data
  - Measures of central tendency & dispersion for continuous variables were calculated
  - Frequency and proportions for categorical variables also calculated
- Logistic regression used to examine factors associated with knowledge
- P≤ 0.1 from bivariate analysis were entered into logistic regression model
- p≤ 0.05 were considered to have associations with knowledge
- For lab data, DNA was extracted and PCR was conducted to confirm the cysts

Results

- 310 participants assessed, KAP; male=260(83.87%); median age=41(21-69)
- Participants with adequate knowledge on CH=40 (12.90%): with good attitude =108 (34.84%)
- 196 (63.23%) practiced backyard slaughtering; 115 (58.67%) not inspected
- 302 cattle carcasses inspected; positive carcasses=9 (2.98%); female=8
  - Cystic organs; 7livers, 4lungs, 2kidneys and one masseter muscle; 14 samples
- Possibility of missing cysts during PM
- Out of the 14 collected samples, 13 (92.86%) were positive on PCR tests

Origin of cattle and their infestation status, Busia town abattoirs 2018 (n=302)



Disposal of infested organs of backyard slaughters and dog feces by study participants, Busia town- 2018

Factor	Frequency	%
Disposing infected organs at home (n=196)		
Fed to dogs	**85**	**43.37**
Taken to condemnation pit	66	33.67
Buried	17	8.67
Cooked and eaten	14	7.14
Thrown away	11	5.61
Burnt	3	1.54
Disposing dog feces (n=221)		
Burying	**95**	**42.99**
Do nothing	64	28.96
Dumped in pit latrine	43	19.46
Thrown away in the fence or nearby bushes	19	8.59

Multivariate logistic regression with knowledge as random effect variable to other coefficients

Coefficient	Odds ratio (95% CI)	Standard error	Z value	P value
Age (> 35 years)	73.43 (21.71 – 1342.72)	1.0216	3.417	0.0018
Literacy level	56.13 (40.33 – 194.67)	0.27990	- 4.361	0.0001
Gender	83.87 (0.87 – 112.44)	1.0293	4.328	1.5805
Occupation	0.47 (0.12 – 0.86)	0.4361	- 2.800	0.0024
Religion (none)	0.97 (0.56 – 2.44)	0.4361	- 2.800	0.2234

Limitations, Conclusions and Recommendations

Limitations: Estimated prevalence might be lower/higher than true situation

- Molecular test did not go to sequencing level: circulating genotypes

Conclusions: The reported prevalence of 2.98% shows that Busia is at non-negligible risk of infestation with CH

- Furthermore, Busia community is unfamiliar with CH: poor KAP

Recommendations: Improving veterinary public health services among Busia communities

- Poor KAP on CH calls for the need to implement public health education

✓ To create awareness on dangers of feeding dogs on raw infested organs and improve KAP, meat hygiene practices and disposal of dog feces

- Future studies can focus on prevalence of CH in humans in Busia

Acknowledgments

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Thank you