Diagnostics and control interventions for taeniosis and cysticercosis in Zambia

Chummy Sikalizyo SIKASUNGE

Stakeholder meeting on *T. solium* Taeniais/cysticercosis Diagnostic tools, WHO HQ, Geneva, Switzerland, 17-18 Dec, 2015
Introduction

- Zambia has a population of about 13,460,305 people with 65% of these living in rural areas.

- Human Taeniosis/cysticercosis, caused by the pork tapeworm *Taenia solium*, is one of the most pathogenic tapeworms infecting humans and is highly prevalent in Zambia.

- Overwhelming evidence does exist that cysticercosis is endemic in Zambia.
Pork tapeworm life cycle

Humans:
- Taeniosis
- Cysticercosis
- Neurocysticercosis

Pigs:
- Cysticercosis - cysticerci
Countries and areas at risk of Cysticercosis, 2009*

*WHO (2010). Neglected Tropical Diseases in the World Today*
Prevalence of cysticercosis in pigs in Zambia

- *T. solium* infections first reported in Zambian by Phiri et al. (2002)

- Unofficial livestock market (Chibolya) in the capital Lusaka, showed 20.6% to 56.6% prevalence of porcine cysticercosis and later a pilot study in rural areas showed 20.8% and 9.3% porcine cysticercosis in SP and EP, respectively

- Later studies reaffirmed the endemicity of *T. solium* infection with prevalence by B158/B60 Ag-ELISA of 16.9% Eastern, 28.3% Southern and 30.0% in Western provinces (Sikasunge et al. 2007; 2008)
Human Taeniosis/cysticercosis prevalence has been reported to range from 6.3% to 11.9% and from 5.8% to 14.5% for taeniosis and human cysticercosis, respectively (Mwape et al., 2012; 2013).

In a recent pilot study in people with epilepsy from Katete district in Eastern province, over 50% were found to have brain lesions on CT scan suggestive of NCC (Mwape et al., 2015).
Prevalence of Taeniosis/cysticercosis in Zambia cont.

- In regions where pig cysticercosis is common, human cysticercosis and epilepsy prevalence are also usually high (Diaz et al., 1992; Sciutto et al., 2000)

- We have shown evidence in Zambia, that human NCC is prevalent, and could be an important cause of epilepsy in these endemic areas of the country where pigs are extensively reared.
Identified risk factors

- Free range pigs
Identified risk factors [2]

- Different pig breeds - exotic seems more susceptible
Identified risk factors [3]

- Backyard slaughter without meat inspection
Identified risk factors [4]

- Consumption of undercooked infected pork.
Identified risk factors [5]

- Poor sanitary facilities.
- When present, rarely used.
Proposed intervention strategies for control of taeniosis/cysticercosis

- Properly cook pork
- Control slaughter
- Meat inspection
- Community education

- Mass taeniacidal treatment
- Improve sanitation (CLTS)
- Community education

- Pig confinement
- Pig treatment
- Pig vaccination
- Improve sanitation (CLTS)
Piloting of control strategies[1]

- Evaluation of Community-Led Total Sanitation (CLTS)
Why CLTS?

- Community led programmes are a practical and successful way of promoting control strategies
  - targeted and sustainable way
  - rural and peri-urban areas

- Besides CLTS to some extent combines community education and improved sanitation

- Communities utilize local knowledge on issues of disease occurrence to:
  - develop their own solutions
  - propose alternative solutions
Piloting of control strategies [2]

- Community sensitizations
  - Translation of poster into local languages (Chinyanja)
Piloting of control strategies[3]

- Education campaigns through community meetings in the Eastern province
Presence of pork tapeworm in pigs and humans well established.

Risk factors for infection in both pigs and humans have been identified.

Association of *T. solium* NCC with epilepsy has been reported.

Piloting of control intervention [Community-Led Total Sanitation (CLTS)] and community education
What have been the challenges?

- Difficulties in changing people’s attitudes and behaviour (different beliefs & myths).
  - Lack of compliance
  - Need for intensive follow-up
- Disease is still neglected among the NZDs/NTDs and so little political and partner commitment towards control
- Lack of appropriate screening tests for early detection of cases (diagnostic tools).
Focusing the control of *T. solium* infections in human is proposed.

Should include efforts armed at early detection of cases.

However, it can only be achieved through use of diagnostic tools with high sensitivity and specificity.

In addition, such diagnostic tests should be readily available for use in the most rural settings of endemic countries.
Current diagnostic test used in Zambia

- The School of Veterinary Medicine of the University of Zambia, in collaboration with Institute of Tropical Medicine in Antwerp, Belgium runs a Cysticercosis Working Group in Eastern and Southern Africa (CWGESSA) regional reference laboratory for immunodiagnosis of *T. solium* infections.

- CWGESSA regional reference laboratory runs two diagnostic tests
  - B158/B60 Ag-ELISA /apDIA cysticercosis kit (cysticercosis)
  - Copro-Ag ELISA (taeniosis)
  - Possibilities of using EITB (LLGP, res33 and rT24) from CDC, USA is underway
Reference laboratory for *Taenia solium* infections

- Established in 2002 in collaboration with ITM

- In 2003, it was designated as a regional reference laboratory for CWGESAA member countries

- Analyzing serum and stool samples
  - B158/B60 Ag-ELISA (cysticercosis)
  - Copro-Ag-ELISA (taeniosis)
  - Recently EITB for Cysticercosis (collaboration with CDC, Atlanta, USA)
The Reference Laboratory
Samples analyzed by the Lab since establishment (n = 35,685)

- **Kenya** = 1,412 (pig sera)
- **Uganda** = 1,200 (pig sera)
- **Burundi** = 200 (pig sera)
- **DRC** = 5,387 (4,787 human stool; 600 pig sera)
- **Rwanda** = 212 (pig sera)
- **Mozambique** = 1700 (human sera)
- **Tanzania** = 15,851 (9,000 stool, 6,851 human & pig sera)
- **Ghana** = 780 (400 human sera + 380 pig)
- **Nigeria** = 449 (human stool)
- **Zambia** = 7,693 (4,874 human & pig sera, 882 urine, 1,973 stool)
- **Zimbabwe** = 800 (pig sera)
Lack of rapid diagnostic test

- The endemicity of the disease calls for or necessitates implementation of control measures in the country. However, this is hampered by lack of easy to use diagnostic tests for rapid detection of cases.

- Though we have these diagnostic tests being conducted at this reference laboratory, they are not available for use in rural areas and are not cheap (RESEARCH MODE)

- It is therefore necessary that resources be directed at development of an inexpensive test that is sensitive and specific for use in remote places of the endemic countries.
Acknowledgements

Prof. I.K. Phiri (UNZA)
Prof. P. Dorny (ITM)
Prof. A.S. Winkler (TUM)
Dr. K.E. Mwape (UNZA)
Dr. C. Makungu (UNZA)
Dr. V. Schmidt (TUM)
Dr. S. Gabriel (ITM)

WHO/TDR
Thank you