Crossover-Use of Human Antibiotics in Livestock in Agricultural Communities: A Qualitative Cross-Country Comparison between Uganda, Tanzania and India

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Aim: provide a cross-country analysis of antibiotic crossover-use in rural, low-intensity production agricultural settings in LMICs, exploring characteristics and drivers which are common and unique across countries.

Introduction

❖ Farms smaller than two hectares produce about 30% of food in sub-Saharan Africa, Southeast Asia and South Asia and are responsible for over 25% of livestock production in these regions.

❖ Antibiotic use in low-intensity production settings impacts a significant proportion of people and requires greater understanding.

What is antibiotic crossover-use?

❖ The use of antibiotic formulations licensed for humans in animals and vice versa.

❖ Potential to cause adverse drug reactions and contribute to development and spread of antibiotic resistance between humans and animals.

Methods

Where was the study conducted?

Rural agricultural areas of Uganda, Tanzania and India characterised by limited access to public healthcare services for humans and animals. Private and informal providers are the first source of human and animal healthcare, including antibiotics, for the majority of people

How was it conducted?

❖ Thematic analysis of in-depth interview and focus-group discussion transcripts (59) from independent studies investigating ABU in humans and animals and antibiotic stewardship in Uganda, Tanzania and India

❖ Participants:
  ❖ medicine-providers - a diverse range of public, private, informal and professional healthcare providers in the human and animal sectors
  ❖ livestock-keepers

Findings

Characteristics of crossover-use

❖ Human antibiotics used in chickens and goats in all three countries.

❖ 26 different human antibiotics told to be used in animals across the countries

❖ Human amoxicillin, tetracycline and penicillin were stated as used in animals in all three countries

❖ Nine of the 26 human antibiotics found to be used in animals in this study are highest priority critically important antibiotics for human health.
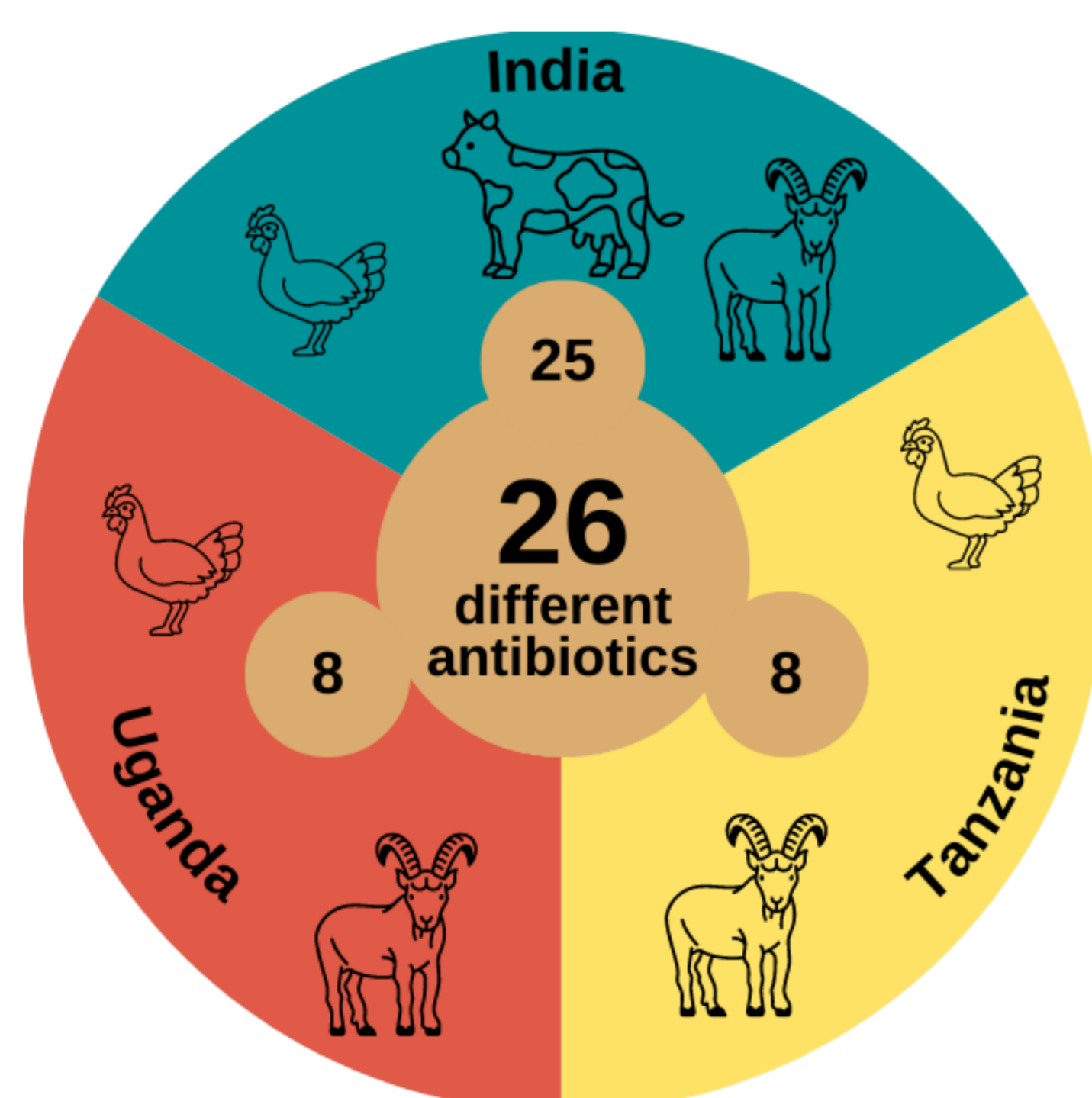
Drivers of crossover-use

Four key themes were identified to be driving crossover-use:

(1) Medicine-providers' and livestock-keepers' perceptions of the effectiveness and safety of antibiotics,

(2) Livestock-keepers' sources of information,

(3) Differences in availability of human and veterinary services and antibiotics

(4) Economic incentives and pressures.

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Findings continued

(1) Medicine-providers' and livestock-keepers' perceptions of the effectiveness and safety of antibiotics

> "Chicken may be sick, cold/influenza... and look for these medicines from the veterinary officer, and give it to them, they do not get well. You use the one called doxy which are human medicines, and the chicken get well." – **Livestock keeper Tanzania**

(2) Livestock-keepers' sources of information

> They [customers] do it as a discovery, they try it and see it working then they come and tell you their success stories that "Doctor for me I gave chloramphenicol to poultry and it got better". – **Veterinary drug shop, Uganda**

(3) Differences in availability of human and veterinary services and antibiotics

> And another thing [reason why people prefer to buy human drugs] is that there are few veterinary drug shops compared to human drug shops. – **Human drug shop, Uganda**

(4) Economic incentives and pressures.

> The human medicine costs lesser than animals, like the medicine for loose motion for human costs 2rs while for cow one tablet costs 40-80rs. Why would we use that? – **livestock keeper, India**

Theme	Sub-theme	Present in the data		
		Uganda	Tanzania	India
Medicine-providers' and livestock-keepers' perceptions of the effectiveness and safety of antibiotics	Human and animal antibiotics are the same	✓	✓	✓
	Human antibiotics are more effective	✓	✓	✓
	Human antibiotics are better quality	-	-	✓
	Safety considerations	✓	✓	✓
	Human antibiotics are safe in animals	✓	✓	✓
	Human antibiotics are dangerous in animals	✓	✓	✓
Livestock-keepers' sources of information	Trial and error (personal experience)	✓	-	✓
	Word of mouth (other livestock-keepers' experience)	✓	✓	-
	Advice from medicine-providers ('expert' opinion)	-	-	✓
Differences in availability of human and veterinary services and antibiotics	Veterinary services less easily accessible	✓	✓	✓
	Veterinary antibiotics less easily available	-	-	✓
	Unsuitable packaging size	✓	-	-
Economic incentives and pressures	Human antibiotics are cheaper	✓	✓	✓
	Economic incentives for selling human antibiotics for animals	✓	-	✓

Implications

❖ To reduce the practice, improving accessibility and affordability of veterinary medicines to both livestock-keepers and medicine-providers is required alongside interventions addressing understanding of the differences between human and animal antibiotics, and potential dangers of antibiotic crossover-use.

❖ Our findings underscore the need for an integrated One Health approach to investigate and understand ABU in both humans and animals in the same setting, in order to inform interventions to optimise antibiotic stewardship.

Conclusions

❖ Antibiotic crossover-use occurs in low-intensity production agricultural settings in geographically distinct low-and-middle income countries, influenced by a similar set of interconnected contextual drivers.

❖ Several animal species treated with a range of human antibiotic formulations.

❖ Commonalities between the three countries regarding species treated and the human formulation antibiotics used.

❖ Fundamental structural change to improve access and affordability of veterinary formulations suitable for use by smallholder producers is needed in order to reduce the practice of crossover-use.

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