Poultry and antibiotic value chains and farmers' perceptions of antimicrobial usage in Vietnam

– An application of participatory epidemiology and Q methodology

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Aims of the study

The study aims to map out the socio-economic context of antimicrobial usage (AMU) among poultry farmers in the Mekong Delta. This will include: (1) to define the sources of advice and procurement of antimicrobials to farmers; (2) to characterise socio-economic attributes of heavy and light users of antimicrobials; (2) to describe the farmers' individual perceptions of AMU; and (3) to investigate the key motivators and thresholds for farmers to use AMU.

Study area

The study will be conducted in five districts (Thanh Binh, Lap Vo, Tam Nong, Thap Muoi, Cao Lanh) within Dong Thap province (Mekong Delta, Vietnam). The geographical choice was based on three criteria: (1) poultry farms of diverse types such as small chicken farms (household), duck farms and Muscovy farms, (2) the importance of animal movements between provinces and countries. Those districts were also selected in agreement with the sub-DAH of the province under study.

Methodological approach

The methodological approach will apply participatory epidemiology techniques and Q methodology to understand the flow of antibiotic flows to farmers and their perceptions on AMU. Participatory epidemiology can be used to collect qualitative epidemiological intelligence through community observations, existing veterinary knowledge and traditional oral history (Mariner and Paskin, 2000). The Q methodology, which has been mainly used in the sociological domain, is a qualitative method to analyse the subjective perception of individuals faced with a common situation (Brown, 1980). It helps to identify trends and convergences of opinions and patterns within social groups, and can be very useful for operators that intend to explore and describe subjective opinions about a particular phenomenon. Using the two methodologies previously described, our survey will be performed in five steps: (i) generation of opinion statements using participatory tools; (ii) selection of the opinion statements used in Q methodology; (iii) selection of participants; (iv) sorting of statements by participants (Q sorting) and in-depth interview post-sorting; and (v) statistical analysis of each Q sorting (Truong et al., 2017; Webler et al., 2009). The Q methodology will be applied to people who manage, distribute and apply antimicrobials for livestock to compare and contrast how attitudes to their use in the poultry sector.

Study population

The study will include people involved in the poultry value chain (chickens, ducks and Muscovy ducks), as well as the antimicrobial supply chain, either directly or indirectly. These will include: a) farmers; b) poultry and egg traders, c) veterinary shop owners, d) commune animal health workers. This list may be extended depending on the investigation

Poultry producers will be selected according to a stratified random sampling based on the size and production type.

During the course of the field investigation, any other relevant people identified from the poultry value chains will be incorporated. These additional people could be located outside the study area, and may include drug and feed sellers, technicians of feed or pharmaceutical companies.

Steps of the study

The study will be carried out over five phases with different interviewees and objectives. The approximate duration of each step is indicated.

Step 1: Description of the poultry and antibiotic value chains and identification of the key people and organisations using participatory tools.

This step includes three types of interviews within different objectives in three different districts within Dong Thap province: Thanh Binh, Lap Vo and Tam Nong.

- Focus group interviews of key informants (3 days)

A total of 15 chiefs of villages, 3 district vets and 3 animal health workers from will be invited to participate in 3 focus group interviews (one in each district). The aim is to describe the distribution of poultry production in each district, as well as other typical activities related to animal production, animal health services and animal health issues in each area.

- Focus group interviews of farmers (2 weeks)

Three types of farmer will be included: small duck farms (mix of local and Muscovy duck, less than 1,000 heads), medium-sized duck farms (>2,000 heads); and small chicken farms (<2,000 heads). A total of 15 villages comprising at least 10 farms of each production type will be randomly selected from each of the three districts. The numbers of selected villages in each district will be proportional to the number of villages in the district and the livestock population in each district. In total, 150 farmers from 15 villages of 3 districts will be included in the study. The specific aims are:

+To describe the poultry production value chain.

+To characterize the health-related events in poultry flocks perceived as important by producers (clinical and epidemiological description, impact on income of producers), and associated prevention and control strategies (if any) for each pre-defined disease.

+To identification of people contacted by farmers in case of important health-related events and in case of antimicrobial usage decision.

+To identify factors influencing their disease prevention and control strategies (list of different criteria influencing the decision of using/not using antimicrobials and other animal health product).

+To identify their perceived advantages and disadvantages of antimicrobial usage.

- Individual interviews of farmers (1 week)

Approximately 10 farmers enrolled for the ViParc project will be selected for interviews based on the scale of production and their history of antimicrobial usage (characterized as

high- and low- level users). The aims of this step are:

+To describe the poultry production value chain.

+To describe the antimicrobial supply chain.

+Farmers' knowledge on antimicrobial use and its critical importance for public health.

+Identification of their perceived advantages and inconveniences of antimicrobial usage.

- Individual interviews of other people involved in production value chain (1 week)

Other people directly or indirectly involved in the poultry or antimicrobial value chain will be invited to be interviewed. These will be veterinary pharmacy owners, veterinary pharmacists, poultry and egg traders, drug and feed sellers, technicians of feed or pharmaceutical companies. At least three people of each group category will be chosen. The specific aims are:

+To describe of the poultry production value chain and the antimicrobial supply chain.

+To investigate their knowledge on antimicrobial use and its critical importance for public health.

+To identify the perception of the people with regards the advantages and disadvantages of antimicrobial usage in poultry.

Step 2: Selection of the opinion statements to be used in Q methodology

Based on the list of farmers' opinions generated from focus group interviews, a total of 46-60 final statements will be produced, representing the spectrum of opinions on AMU within our population. Different topics will be addressed; (i) farmers' confidence in antimicrobial as a preventive, treatment method or growth promoter (sense of safety given by the antimicrobial; control of antimicrobial production; confidence in suppliers; perception of disease management based on antimicrobial), (ii) logistics/organization of antimicrobial use in the field (possible constraints due to antimicrobial practice, type of preferred antimicrobial, personnel administering the antimicrobial), (iii) cost of the antimicrobials used (affordability for farmers to use antimicrobial on their animal, cost comparison of antimicrobial with other products (probiotic, prebiotic, acidifier…) or measures (good husbandry, quarantine…), and (iv) impacts of antimicrobial use (on animal productivity, public health).

Step 3: Selection of participants.

A Q study requires a number of respondents that is less or equal to the number of statements (Brown, 1980). Based on this concept, farm participants who joined the ViParc project will be randomised selected to form a heterogeneous group based on gender (male, female), age (≤30 years-old, 30 to 40 years-old, 40 to 50 years-old, and > 50 years-old), experience raising poultry (less than or equal to 10 years, between 10 and 20 years, more than 20 years), academic level (no school, unknown, primary school, middle school, secondary school and post-secondary school), production type (small duck farm, small chicken farm and medium duck farm), and location at district level (Thanh Binh, Lap Vo, Tam Nong) in order to capture the points of view of various types of poultry producers. They will be contacted individually, several days after their participation in the focus group. We will invite 60 individuals to participate in the study. Each participant was then personally asked to do the Q-sorting game.

Step 4: Sorting of statements by participants (Q sorting) and in-depth interview post-sorting

This step will be performed in form of individual interviews during three weeks. Each participant was then personally asked to do the Q sorting game. Forty-six cards, representing statements on antimicrobial usage will be given to the participant while one member of the research team explained the game instructions. The sorting will be divided into two phases. First, the farmer will be invited to affirm or deny the proposal by freely placing the card on three piles:

agree, neutral/ambivalent, and disagree. Then, they will continue to put the cards into a quasi-normal grid of 46 boxes. The score given to the statements will be proportional to how strongly they agreed or disagreed with them, −3 for strongly in disagreement and +3 for strongly in agreement. When the grid complete, a discussion with open questions will be held, using sentences such as “you strongly agreed/disagreed with statement n°…, why?”

Step 5: Statistical analysis of each Q sorting.

Each interview (focus group and individual) will last about 1 hour. A financial compensation will be awarded to each interviewee to compensate the time spent for the interview.

Timetable

Works description	November					December				January				February				March				
	1-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-30	1-7	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-4	5-11	12-18	19-25	26-31
Meeting with vet authorities in DT (Commune and district level)		X																				
Training for research team in Dong Thap (2 days)				X																		
Focus group interviews				X	X																	
Data entry and resume						X																
Generate statement								X														
Individual interviews										X	X	X	X									
Data analysis							X							X	X	X	X					
Manuscript preparation																		X	X	X	X	X

References

Brown, S.R., 1980. Political subjectivity, New haven and london, yale university press. ed. United States of America.

Mariner, J., Paskin, R., 2000. FAO Animal Health Manual 10 Manual on Participatory Epidemiology Method for the Collection of Action-Oriented Epidemiological Intelligence. Food Agric. Organ. Rome.

Truong, D.B., Binot, A., Peyre, M., Nguyen, N.H., Bertagnoli, S., Goutard, F.L., 2017. A Q Method Approach to Evaluating Farmers' Perceptions of Foot-and-Mouth Disease Vaccination in Vietnam. Front. Vet. Sci. 4. doi:10.3389/fvets.2017.00095

Webler, T., Danielson, S., Tuler, S., 2009. Using Q method to reveal social perspectives in environmental research.

Check list for focus group interview

1. Description of the animal production value chain

- Source of chicks
- Source of medicines (including antimicrobials, coccidiostats and other animal health products)
- Source of feed
- Selling points (veterinary pharmacy, market, neighbors, trader…)

* Using figure to visualize the value chain.

2. Characterization of the diseases perceived as important by producers (clinical and epidemiological description, impact on income of producers), and associated prevention and control strategies for each predefined disease.

- List the important diseases in poultry production, describe clinical and epi situation.
- Pairwise ranking the important diseases (limit in 5) (need to be fixe after several FG in order to comparing agreement between groups).
- List at least 2 prevention and control methods for each pre-defined disease (pay attention on disease using antibiotic for latter question).

3. Identification of actors contacted by farmers in case of important health-related events.

- List of actors contacted by farmers, role of each actors, important level (proportional pilling).
- Figure out the actors influencing the AMU decision.

4. Identification of factors influencing their prevention and control strategy (List of criteria for using or not using antimicrobials and other animal health product).

- Flow chart for each prevention and control strategy (use, no use)

5. Purpose of AMU in production (list and rank using proportion pilling).

- Relation between seasonal parameters, production activities and AMU volume used (seasonal calendar).

6. Identification of advantages and inconveniences of antimicrobial usage.

- Flow chart