



Gender, livestock, and antimicrobial resistance through the eyes of veterinary pharmacists – A case study from Thái Nguyên Province, Vietnam

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Key messages

- Most drug vendors in Thái Nguyên Province, Vietnam, were men and most sales assistants in veterinary pharmacy shops were women, including wives and relatives with limited technical training.
- Gendered dynamics between farmers and drug vendors influenced how drug recommendations were received.
- Women working in veterinary drug sales need opportunities to improve their formal qualifications.

Introduction

Antimicrobial resistance (AMR) occurs when bacteria, viruses, fungi, and parasites evolve and no longer respond

to antimicrobials such as antibiotics, making it difficult to treat infections in humans, animals, and plants. Drivers of AMR include misuse and overuse of antimicrobials, lack of access to clean water and hygiene for humans and animals, poor disease prevention in health care facilities and farms, limited access to human health and veterinary services, lack of knowledge, and absent or poorly enforced regulation of drugs (Wall et al. 2016; WHO 2021). The appropriate use of antibiotics for livestock production is also determined by whether livestock keepers are prescribed or sold the correct product and use it appropriately (Benavides et al. 2021). Addressing AMR as a global health concern requires considering the ‘human face’ of AMR to change behaviors that contribute to its spread (Jones et al. 2022).

Gender, the socially constructed characteristics of women, men, girls, and boys, is relevant to the human face of AMR because gender norms, roles, and relations affect access to resources and information, health-seeking behaviors, exposure to risk, and antibiotic use (Gautron et al. 2023). Gender changes over time and varies from place to place, meaning findings from one context may not be generalizable to another. When gender interacts with other identity markers such as socioeconomic status, ethnicity, age, or marital status, it can alleviate or compound gender-based disadvantages such as discriminatory attitudes of community members or service providers and access to training and education (WHO 2023).

A 2021 scoping review of antibiotic use, a primary driver of AMR, identified 13 studies in Southeast Asia that considered gender, three of which focused on veterinary antibiotic use (Pham-Duc and Sriparamanathan 2021). Knowledge of best practices in antibiotic use was higher for women in the human health contexts but higher for men in animal health contexts. This difference may be partially explained by social roles in Southeast Asia whereby women are primary caretakers of children and more likely to seek health care for themselves or family members, putting them in closer contact to health care professionals and more likely to receive information about best practices in antibiotic use (WHO 2023). In contrast, men had more personal experience treating livestock and higher levels of education which may have contributed to their increased knowledge about veterinary antimicrobials (Pham-Duc and Sriparamanathan 2021).

A participatory study of pig and poultry smallholder farmers in Phu Binh District, Vietnam suggested top-down regulatory approaches may be poorly received in livestock systems dominated by smallholder farmers whose primary motivation for using antibiotics is disease prevention (Cooper et al. 2019). Unfortunately, the study did not report gender-disaggregated data. In a study of poultry farmers in Vietnam, motivations for farmers who reduced their antibiotic use varied; family commercial farms were motivated to produce good quality chickens in terms of taste and food safety while ensuring sufficient profits while larger, integrated farms desired to comply with national regulations and to adhere to international market trends (Bâtie et al. 2023). Bâtie et al. specifically noted the under-representation of women farmers was a weakness in the study design. While gender considerations are becoming more commonly considered in AMR research and development activities, there is still room for improvement; for example, a recent report co-authored by multiple international organizations outlining a 'One Health Priority Research

Agenda for Antimicrobial Resistance' failed to mention gender at all (WHO et al. 2023).

This brief adds to existing knowledge on the way gender dynamics influence behaviors contributing to AMR with a qualitative case study of the interactions between veterinary pharmacists, sales assistants, and livestock-keeping clients purchasing veterinary products in Vietnam.

Methods

Qualitative interviews were conducted with women and men working as veterinarians or vendors of animal drugs in four communes of Phu Binh district, Thái Nguyên Province, Vietnam in December of 2018. Veterinary pharmacies are registered in the name of the veterinary pharmacist, a person with appropriate education and training, but the business may also be staffed by employees or family members. We use the broader term 'drug vendor' to refer to someone interacting with customers and selling veterinary drugs regardless of their formal qualifications.

The interview tool was designed to answer the following questions:

1. How do women and men vendors of animal drugs differ in the way they provide advice or treatment to their clients?
2. How do women and men clients access and buy drugs from vendors for treatment or prevention of disease in their animals?
3. How do women and men livestock keepers differ in their use of animal drugs?
4. How do animal drug vendors and their clients perceive drug resistance?

Results and discussion

Twenty-five key informants were interviewed: 13 women and 12 men (Table 1).

Table 1. Key informants interviewed by gender and role

Role	Women	Men	Total
Drug vendors	1	9	10
Sales assistants (Spouses/ family)	5	2	7
Sales assistants (Hired)	4	0	4
Commune vet	2	1	3
District vet	1	0	1
Total	13	12	25

Provision of services by vendors

Most of the drug vendors were men, with formal qualifications ranging from vocational experience to university level coursework, which allowed them to provide technical advice to clients when selling veterinary products. The businesses varied in their level of services depending on the expertise of the main vendor, with some offering farm visits and surgery, while others primarily attended to customers in the shop. A male veterinary pharmacist who ran the pharmacy together with his wife, who also had some veterinary education through a primary degree, described his schedule:

I visit livestock-keeping households two to three times per week to treat diseases. Alternatively, households bring their sick chickens to me for surgery and receive medical advice. The pharmacy is open from 7:30 am to 7 pm, but I can open outside of these hours if customers need.

Vendors with more experience and stronger veterinary background described working to increase the knowledge of their longstanding customers over time, such as raising awareness about vaccine schedules or the importance of using high-quality drugs sold with detailed labels.

Sales assistants, primarily women, were a crucial part of the day-to-day operations and described periods of working unsupervised. Some sales assistants were formally hired while others were the wife or family member of the main drug vendor. Of the eleven sales assistants interviewed, five were wives of the veterinary pharmacist. The technical training of the sales assistants ranged from no veterinary training to basic training. Sales assistants advised clients on 'basic diseases' and sold 'common' drugs or 'restorative' products like vitamins. Sales assistants reported calling the main vendor or veterinarian by phone to ask for guidance on more challenging situations.

I mostly only watch the store. I know the restorative or fattening drugs used for chicks, so I can sell those. My husband instructs me on which drugs to sell for treatment of disease. In general, I don't face any difficulty, but I find it hard when I give clients the right drugs, but how come it doesn't cure the disease?

– Sales assistant and housewife

A male graduate of veterinary college who opened the veterinary pharmacy seven years ago with his wife described their collaboration:

My wife has gradually learned the names of the medicines while assisting me. ... She can give general advice to customers when I am not around. Learning through books cannot be better than through practice.

Sales assistants were more likely than drug vendors to describe making sales to customers who already knew which products they wanted, as described by a man in his seventies working in a pharmacy registered to his daughter.

Experienced breeders are knowledgeable about vaccination schedules, so I don't need to give any instructions. I only sell drugs based on their requests. People in this community know the appropriate medications for raising chickens.

Some differences attributed to women and men drug vendors in the interviews included: men are more skillful because they travel to farms and households for treatment, men can inject better than women, men travel farther than women, and women sell drugs better because they are better at communicating with clients through gentle language and more detailed advice.

A saleswoman is more detailed, but a salesman has more practical treatment experience.

– Commune veterinarian (woman)

Client access to veterinary drugs

In this section, we consider livestock keepers' access to veterinary drugs. The clients served by the veterinary pharmacists and veterinarians interviewed were a mix of large scale and small scale farmers, most keeping chickens or pigs. Large scale farming was often led by men or couples while women more often contributed to small scale farming. Men contributed through heavy manual labor, buying animals, and managing transportation while women contributed more through feeding and cleaning. Men were reported to take a leading role in chicken farming in the area. Both women and men purchased veterinary drugs, though men were more likely to inject larger animals while women helped to restrain them. Drugs administered through drinking water were administered by men or women.

After years of farming, men and women can have equal knowledge, but men still make decisions.

– Drug vendor (man)

The point of access for veterinary drugs depended on farm size. Small scale livestock keepers would visit veterinary pharmacies to seek consultation for their animal. The pharmacist or sales assistant would then rely on the client's explanation of symptoms to determine relevant products. Farmers could also take their sick animals, mainly chickens, to pharmacies for more detailed assessment, including surgery. In contrast, large scale farmers were sometimes visited by veterinary service providers at their farm.

Most of the customers who visit our pharmacy are people who raise 500–1,000 chickens, whereas those on large farms typically call us to have the medicine delivered.

- Sales assistant (woman)

My customers are mainly commercial farms that raise thousands of chickens. I frequently visit these farms to provide care for the chickens.

- Drug vendor (man)

Men tend to manage large-scale farms and they benefitted from various services compared to smallholders dominated by women. Large scale farms had a comparative advantage in accessing veterinary services at their farm because the visits are financially worthwhile for service providers. Prudent use of antibiotics by farmers is assumed to be influenced, among other things, by farmer characteristics and the advice of veterinarians (Poizat et al. 2017). Advice of veterinarians depends on the accuracy of information, so larger farms receiving on-site visits from veterinarians may receive better advice and be more likely to apply prudent antibiotic use. Due to the financial incentives to service providers, small scale farms are less likely to receive on-site visits and more accurate veterinary advice. This has implications for antimicrobial use and possibly the health and productivity of women-managed livestock.

My customers are mainly female, small livestock households.

- Veterinarian (woman)

Women are primarily responsible for small-scale livestock farming, with most of them raising 20 to 50 or 100 chickens and a small pig herd as a side income. Men are generally not involved in this activity.

- District veterinarian (man)

Mobile phones were used as a tool for giving and receiving advice, including taking photographs of sick animals, putting reminders about vaccination schedules, and ordering drugs by calling veterinary pharmacists directly. Though mobile phone use between men and women is beyond the scope of this study, there seems to be no difference between women and men in using phone call to report diseases to veterinary services to seek advice and buy drugs. However, women were described as effective communicators, able to give clearer and detailed information about the diseases.

Women are more likely to call to report animal illness....50% of customers calling are women. When calling to describe the disease, there is no difference between men and women. However, when requesting specific information before consultation, women tend to provide more precise and thorough details due to their meticulous and cautious nature.

- Veterinarian (woman)

Observations of drug vendors interacting with clients revealed three recurring practices: self-prescribing, increasing dosages, and combining drugs for treatment. Self-prescribing consisted of farmers asking for a drug by name that they believed would be effective based on their previous experience or advice they had received. Some farmers carried the box or package if available. Most drugs were then dissolved in water and administered at home. Both drug vendors and clients reported the need to increase the dose by 10–30% for it to be effective.

If they (the client) follow the instructions, the disease will not go away, because the instructions are for ideal farming conditions. In practice, the dosage should be increased to effectively cure the disease. Increasing by about 30% is most effective.

*Drug vendor with veterinary qualifications (man)
We increase the dose because of drug resistance and to compensate for drug that spills during treatment. For instance, instead of administering 1cc/10kg, we would use 1cc/8kg. It's based on our experiences; no one teaches us. I have found it an effective way.*

- Hired sales assistant (woman)

Other reported practices included combining drugs for treatment, using veterinary antibiotics to prevent disease, and using human drugs to treat sick animals. The following interaction between a male drug vendor and client highlights the importance of additional

considerations when choosing a drug, such as price, administration method, and presence of restorative properties or ingredients.

Client: Please, give me a drug for pig fever relief.

Drug seller: Is it for a big pig or small pig?

Client: A big one.

Drug seller: What do you prefer, a cheap or an expensive drug?

Client: Not so expensive.

Drug seller: There is a drug for fever relief that also has glucose and a restorative tonic (thu c b).

Client: How much for that?

Drug seller: VND 90,000 (approximately USD 3.90)

Client: It is so expensive.

Drug seller: That is because it contains the restorative tonic and can be injected for various weights.



Gender dynamics in veterinary services

Observed interactions between drug vendors and clients suggested men seemed more confident in their knowledge and women clients were more likely to follow the advice of the drug vendor. 'Women buy whatever they are told to buy,' described a woman working as a full-time sales assistant in her husband's veterinary pharmacy. 'Male customers often bring medicine samples to show what they want to buy,' added a hired woman sales assistant studying veterinary medicine. Planning to buy a certain product is a reasonable strategy if the vendor has or is perceived to have less experience.

An observed interaction between a client and a woman working as a sales assistant in her husband's business revealed she knew the brand name of a drug but not the treatment protocol (how to administer or the appropriate dosage). She sold a client a drug after he asked for it by name, agreeing to switch to another drug later if it didn't cure the disease. She shared that her husband had attended a veterinary drug training, but she had not.

A veterinary pharmacist also noted gendered differences in the way his customers interact with him, with men more likely to ask for a drug or product by name.

Female customers often provide detailed descriptions of their chicken's symptoms or even bring the chickens to me for diagnostic surgery. Meanwhile, male customers typically just request a dose of anti-coccidials or something, without mentioning the condition of their chickens unless prompted.

Gender, age, and other factors can be used to guess about someone's level of experience and the extent they can be trusted, which can also influence business interactions and the final veterinary product used. This was described by a female veterinarian with 15 years of experience treating pigs and cattle.

Men are often conservative and confident in their knowledge about drugs and diseases. As a result, they frequently use drugs habitually and in excessive doses. They often ignore my advice even though I try to guide them. However, if the disease cannot be cured, they will be more open to listening to me next time.

Women's increased tendency to accept advice from the drug vendor could increase their likelihood of getting the correct product, but only if the vendor has the appropriate training and experience to correctly advise.

The extent to which gender dynamics systematically alter the types of drugs men and women purchase is a point to explore in future studies.

Perceptions of drug resistance

The interviewed drug vendors shared a common perception that farmers, both women and men, generally had low awareness about drug resistance. Their awareness was mainly derived from participating in workshops organized by pharmaceutical companies in which drug resistance was sometimes integrated into the overall agenda, or from the advice of fellow drug vendor colleagues. Vendors described that drug resistance occurred because of the overuse, misuse, or continuous use of the same drugs over time with the only solution being to switch to other drugs. However, not many farmers worried about drug resistance and its long-term effects; instead, they cared more about how quickly and effectively a drug helped in treating sick animals.

Not many people understand and care about drug resistance, estimated to be around 20-30%. Their primary concern is whether chickens can be cured. If the chickens do not show signs of improvement within 2-3 days of treatment, people will criticize me for giving them fake drugs.

- Drug vendor (man)

Farmers who raised a large livestock herd and/or had many years of livestock raising experience were more likely to understand and care about drug resistance than small-scale and less experienced farmers. In the study site, the large farms often signed contracts with drug pharmacies to oversee the animal health care of their farms. Under the contracts, the pharmacists came to the farms on a regular basis to do vaccination, disease prevention, and treatment. During visits, the pharmacists updated the farm owners and workers with information about standard procedures of drug use, including drug resistance issues. As a consequence, their awareness about drug use and drug resistance was enriched over time.

Men were perceived as being more active than women in their understanding and willingness to apply solutions for addressing drug resistance, especially in the context of trying new drugs.

When talking about drug resistance, men tend to be more open-minded and less fearful compared to women. Women often express apprehension about trying a different drug, while men are more willing to give it a try.

- Drug vendor (man)

Drug vendors themselves had limited access to information and knowledge about AMR. Information about existence and prevalence of AMR in animals and the negative health consequence as well as the cost of AMR-related illness is lacking in developing countries (Meseko et al. 2019). This was demonstrated by the commonly reported practice of increasing dosages.

I don't have enough knowledge to advise on the matter of drug resistance.

- Sales assistant (woman)

Both farmers and drug vendors had limited to no training on drug resistance. While farmers were not as interested in learning about drug resistance in detail, it was a topic that drug vendors and sales assistants were keen to learn more about.

I care about drug resistance because I am the one responsible for treating the disease. If I don't care, the drugs won't be effective, and people will no longer seek my help.

- Drug vendor (man)

Hired female sales assistants found it hard to arrange their time joining technical trainings on drug resistance if the training were organized on weekdays because of being busy at the shop. Their preferred time for being able to participate in the training was weekends. Sales assistants who are the main vendors' spouses were more likely to prioritize their husbands joining the training because they are busy with the shop and housework.

I will not participate in the drug resistance training due to my busy schedule. Since my husband is the main seller, he should attend the training. I just help look after the counter.

- Sales assistant (woman)

Conclusion

From the interviews, we can see that the participation of women and men in the veterinary drug business contains different kinds of relationships including: a gender relationship (women - men); a relationship between a professional leader (veterinary expertise) and an executor (who carries out 'medical orders'); a family relationship (husband-wife); and a relationship between an employer – a worker. In these relationships, women are in a position with less decision-making power and fewer opportunities for career advancement. Women sales assistants are physically present at the pharmacies,

with fewer opportunities than men to move and increase their veterinary knowledge and experience by regularly visiting animals on the farm. Without access to formal education, the career trajectory for women is to gain experience in sales rather than becoming qualified veterinary pharmacists.

Further, according to Vietnam's Veterinary Law, people selling veterinary drugs must have a Veterinary Practice Certificate (Article 92, Veterinary Law 2015) (WIPO 2016). While the study did not ask whether respondents interviewed had the certificate, based on descriptions of educational backgrounds, it is likely that many women directly selling veterinary drugs in these interviews did not have Veterinary Practice Certificates. In the future, women need help accessing education/training to reach a minimum veterinary intermediate level, not to mention a university degree, to contribute effectively to the field. Without intervention, the veterinary pharmacy industry is weakened in its ability to manage livestock disease and address antimicrobial resistance as a portion of its workforce continues to work illegally without opportunity to improve their formal qualifications.

This study was modest in scale, and the results may not be generalizable to other geographical areas, however it is one of few studies focusing on the gender considerations of antimicrobial resistance, and we hope it can spark additional conversation and research about the role of gender dynamics in influencing the use of veterinary antimicrobial drugs.

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