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# "AN ASSESSMENT OF THE INFECTION CONTROL TO PREVENT ZOONOTIC INFECTIONS IN PERI-URBAN SMALL HOLDER DAIRY FARMS"

Community Medicine

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## ABSTRACT

**Background-** In order to capture the barrier and facilitators of the practices to prevent zoonotic infections in peri-urban small holder dairy farms a qualitative study was carried out among 15 smallholding dairy farmers in peri-urban areas of Ludhiana from April 2018 to May 2018.
**Methodology-** Interview theme guide was developed. Face to face interviews with farmers were conducted in the local language. All interviews were audio-recorded, transcribed, translated into English. A total of 15 interviews were conducted across the site.
**Results –** Lack of safe dairy practice is due to perceived risk and traditional practices, financial stress, limited time, Risk factors, unplanned infrastructure and limited government support.
**Conclusion-** evidence from this study clearly suggests that there has been a significant change in the knowledge and attitude of dairy farmers. Farmers across Ludhiana demonstrated willingness to adopt most of these good farming practices but their inability to practise considering the legitimate barriers.

## KEYWORDS

Peri-urban setting, small holder Dairy farm, Zoonotic infection, structured thematic guide.

## INTRODUCTION

Peri-urban or urban fringes have today emerged as dominant urban forms. The peri-urban was viewed as a fringe in between the city and countryside or zone of transition. It became more of an in-between, not clearly delineated, hybrid result of different forces operating at different scales. These peri-urban interfaces – zones where urban and rural areas meet – suffer from some of the most acute problems caused by rapid urbanization; these zones are often subject to poor spatial governance. A typical scenario in these ecosystems has been that of small holder dairy farming. These suffer from lack of support and quality control of dairy farming as well as absence of an organised system of farm inspection or screening of animals for disease. As a result, the increasing close contact between animals and humans in work and living environments contribute towards creating hot spots for zoonotic disease transmission in addition to other health hazards associated with food safety, water and sanitation related diseases. Peri-urban areas have additional problems that affect the performance and output of dairy farms viz. these areas do not fall under the jurisdiction of either rural or urban municipal and civic bodies. The resultant lack of stringent policy and legislative provisions have contributed to adoption of questionable farming practices that compromise animal, human and environmental health. In addition to adversely affecting the outputs and profits, dairy farming practices in peri-urban areas also place farmers, their animals and consumers at risk of health hazards. Diseases occurring in animals and farmers due to these health hazards then indirectly affect the productivity of animals and profit for the farmers.

Peri-urban settings and their growing vulnerability to emerging zoonotic diseases in response to increased demand for food, traditional agricultural practices have been supplemented by highly intensified, industrial-style production units that have sprung up without conforming to any norms or city by laws, amplifying the potential for zoonotic disease transmission, emergence of new pathogens and overuse of veterinary antibiotics, which contributes to the development of antibiotic resistance in pathogens affecting humans and animals. In the absence of adequate space, animals are kept clustered, increasing human-animal interaction and amplifying human-livestock interface. With unregulated peri-urban dairies catering to rapidly increasing requirement of meat, milk and dairy products, intensified peri-urban livestock farming demands the attention of policymakers and researchers.

Due to poor dairy farming practices there is increased morbidity among the animals that adds on to the farmers expenses .Some farmers also use antibiotics to prevent infections or to enhance yield which over a period of time results in antibiotic resistance. Therefore, the key to reduce infections in animals and among their handlers and to improve productivity and reduce losses, is to follow good farming practices that are simple to implement and inexpensive but are full of rich returns both in the short and long term. Good farming practices, when adopted, benefit each of them and serve as a preventive step, saving the farmers time, effort and money. In light of limited evidence on the burden of the zoonotic infection and non-prudent use of veterinary antibiotics, a cross-section study was conducted to understand the potential risky practices and factors contributing to the burden. The current study aims at understanding the drivers affecting the uptake of an evidence informed intervention package implemented to reduce zoonotic infections and non- prescribed veterinary antibiotics use in peri-urban small holder dairy farms in select sites of India.

**OBJECTIVE-** To capture the barriers and facilitators of the practices to prevent zoonotic infections in peri-urban small holder dairy farms.

## METHODOLOGY

### Study setting

The qualitative study was conducted among smallholding dairy farmers in peri-urban areas of Ludhiana, north of India (30.9010° N, 75.8573° E) from March 2018 to April 2018. For the current study, the peri urban fridge is defined as the five kilometre radius outside the municipality boundaries of the city.

### Sampling and data collection

We approached all 15 dairy farmers across Ludhiana. Interview theme guides were developed. Structured thematic guides were developed for qualitative data collection using a combination of structured questions and pre-planned probes to create a detailed understanding of the issue. Guides were developed through an extensive review of previously published studies in a similar context across the globe. Face to face interviews with farmers were conducted at their homes. Local site partners help in facilitated the scheduling of interviews as per the time convenient to farmers. Most interviews with farmers were conducted in the local language (Hindi, Punjabi at Ludhiana). A typical interview lasted between 45 minutes to 1 hour. All interviews were audio-recorded, transcribed, translated into English, and crosschecked against the original recordings.

Face to face in depth interviews were conducted by two researchers of the study. Interactions were scheduled at a time and place convenient for the participants.

An intern recorded notes about the interviews. Systematic procedures were employed these procedures included verifying data with participants during and at the end of each interview, conducting a debriefing session between the researchers immediately after each in-depth interviews and using field notes and audio transcripts. IDIs were

digitally recorded and transcribed to maximize data capture and facilitate analyses. All verbatim transcriptions were translated to English.

| S. No. | Broad Domains | Initial themes* |
|---|---|---|
| 1 | Infection control | 1. Isolation of sick animals<br>2. Vaccination of animal<br>3. Maintaining farm hygiene<br>4. Milkman's & equipment's hygiene<br>5. Milking technique |
| 2 | Non-prescribed use of veterinary antibiotics | 1. Accessing trained veterinarian<br>2. Purchasing prescribed OTC |

**Data management and analysis**

Data analyses were done using inductive approach and content analyses. In addition to the interview recordings, each researcher maintained detailed field notes in field diaries. This enabled capturing of details related to the key issues that emerged from the study, concerns regarding the fieldwork, as well as any potential trends that emerged from the participant responses. The field diary provided us with adequate details to discuss during the daily review carried out at the end of the day's work and plan for subsequent data collection. The field diaries also helped in identifying early patterns as well as assessing attainment of saturation of responses. At the end of each phase, data management and analysis of the data was completed, and summary results prepared. This iterative process ensured that the data collected was grounded, rich in details, and saturation obtained prior to termination of data collection.

## RESULTS

A total of 15 interviews were conducted across Ludhiana. These included 15 farmers at Ludhiana. Those who were approached, none of them refused to participate in the study. Mainly four broad themes emerged from thematic analyses of the qualitative data. These are

- Perceived risk and traditional practices;
- Financial stress,
- inadequate space and limited time;
- Unplanned infrastructure and limited government support.

**Perceived risk and traditional practices**

Self-treatment is culturally engraved.

"We have some know-how to examine the cow while purchasing…we see if it looks sturdy or weak… We get to know just by looking at the cow…that's all we know…If there is some sickness in the cow that is not apparent, then how can I know…"(A farmer, IDI, Ludhiana)

**Financial stress, inadequate space and limited time**

**Economic concern**

Nearly all farmers at Ludhiana reported significant investment of money as a barrier to comply with the good farming practices. This includes; practices related to prevention of infections and non-prescribed usage of veterinary antibiotics.

"*We don't want to travel any distance for testing with cattle, as it further adds to cost. We phone the doctor and he comes here…it's a private doctor…charges higher fee…*" (A farmer, IDI, Ludhiana)

"*If the floor is cemented, it is easier to clean…but I have some financial issues so can't make concrete floor…"* (A farmer, IDI, Ludhiana)

"*We wash our hands before milking the cows. But we don't use any disinfectant afterwards. Buying such things will cost money. We don't wear any gloves too for the same reason…we will have to purchase that too…and money is tight*" (a farmer, IDI, Ludhiana).

**Availability of limited space**

Majority of farmers mentioned that they operate in a very small space and most of the space is utilised to accommodate the herd. Left over space is used to build their houses, storage for fodder etc. All of them reported that they very well aware and understand that the sick or newly introduced cattle should be isolated from the main herd but they cannot practise the same due to unavailability of any extra space in their farm. However, some farms and majority of farms in Ludhiana, reported isolation and quarantine of the sick and new introduced cattle. However, a significant change in knowledge and attitude has been noticed among farmers.

"*There are difficulties! Disease is rampant among cows here. They suffer from blisters in mouth and stomach, that disease is a problem. Three of my cattle died from this disease. Last cow died one year back from this problem. The sick cow remains with all the others. When a disease breaks at farm, it affects all the cows. Yes, we were informed to isolate the sick cow, but we don't do it as there is no space to segregate the sick cow…"* (A farmer, IDI, Ludhiana)

*We tie the new cow at the same place as other cattle… My farm is small…there is no space to keep the cow separately…"* (A farmer, IDI, Ludhiana)

**Time constraint**

Farmers reported time as one of the major barrier in uptake of good farming practices. According to them, dairy farming is a labour intensive work and the taught practices are feasible for the progressive farmers who can purchase feed and has dedicated labours for the farm. They said that the small holding dairy farming is managed by 1-2 people mainly. Routine involves going to forest to get the fodder, preparation of fodder, feeding each cattle etc. Considering the busy schedule, washing cow before milking, testing the newly purchased cow immediately (as there is no quarantine space), warm water to wash the udder etc. is practically not feasible.

*"We are unable to maintain hygiene according to good farming practices. We also have to attend to other works like feeding the cows, cutting grass but we wash the cow before milking".* (A farmer, IDI, Ludhiana)

*"I clean the utensil for storing milk properly with surf and water. I sometimes use hot water to clean these utensils when it is stained or milk/cream is stuck to it otherwise I use normal water to clean it. Using hot water every day is difficult because no one at home has enough time to boil water everyday to clean that utensil…"* (A farmer, IDI, Ludhiana)

**Limited infrastructure, veterinarian and support from government**

Farmers, specifically at Ludhiana, have reported limited support from government on vaccination. They expressed their limitation in accessing vaccination for other infectious diseases like brucellosis.

*"All the cows at my farm are vaccinated regularly in every six month…we call a private doctor to do it…they charge Rs. 55 for each cow…government doctor doesn't come here for vaccination"* (A farmer, IDI, Ludhiana)

*"Vaccine is given only for disease of blisters in mouth…we don't know about any other disease..."* (A farmer, IDI, Ludhiana)

*"We flush the dung in the drain and it goes out a farther away from home and falls into the big open area on the back side of the home. Dung from all the nearby farms goes there"* (A farmer, IDI, Ludhiana)
*"See, we are staying here on rent. This land is not owned by us. So it is difficult to invest resource in constructing proper drainage system in it"* (A farmer, IDI, Ludhiana)

**Positive Deviance**

Some farmers at Ludhiana have shared successful compliance with many aspects of the good farming practices.

## DISCUSSION

The evidence from this qualitative inquiry clearly suggests that the farmers are well aware of the practices that reduce the farm level infections and non-prescribed usage of veterinary antibiotics... Farmers demonstrated willingness to adopt most of these good farming practices but their inability to practise considering the legitimate barriers. In the context of small holding dairy farming, cultural issues, financial stress, labor and time constraint and limited support from government both in terms of support schemes and infrastructural planning were reported in the study.

Proper disposal of potential infected waste from the dairy farm is highly essential to prevent spread of various infectious diseases. Pathogens like FMD virus, Bacillus anthracis, Clostridia spp., Salmonella spp., E. coli spp. and Coccidia in animal wastes have frequently been suspected to be the cause of serious out-breaks of diseases (7). Animal wastes are highly conducive for mosquito and fly

breeding. Several kinds of parasitic larvae thrive in wastes. Farm wastes, therefore need to be disposed of properly to eliminate the threat of disease in animal housing set up. Overstrained and practically non-existent solid waste management systems, drainage etc. in congruence with rapidly changing demand and consumption patterns spates the per-urban fridge of the cities. The resulting discrepancy between the current solid waste management systems and the growing need for expanded collection and disposal facilities has left an accumulating amount of solid waste within the peri-urban environment producing unsanitary conditions (8). This could be a potential contributor to transmission of infectious disease. There is no provision of drainage or government facility to clean the accumulated waste. Additionally, Ludhiana has a tradition of using dung cakes as cooking fuel. This partially processes the farm waste. However, improper draining systems and absence of solid waste management systems in peri-urban settings is an issue with varied severity. Initiative to Install '*Gobar gas'* technology at farm or village level could mitigate adverse effects to the environment as well as increased risk to the infection in farm (9). Furthermore, the residual solid waste produced at the end of the process can be dried to be used as organic fertilizer. Peri-urban in developing countries is typified by large areas of informal settlements. These areas often do not adhere to official planning guidelines, construction regulations and quality standards and, as they are not officially recognized by local authorities, are rarely provided with adequate infrastructure and services. Considering the important role of peri-urban areas to serve the ever increasing demand of the urban population, it's important to revisit the infrastructural policies for the peri-urban areas.

## RECOMMENDATIONS

Since controlling of zoonotic diseases at human level requires huge investment and is mostly unsuccessful, it is better to prevent the diseases before their occurrence. There is a need to fill the knowledge gap by creating awareness on zoonotic disease prevention and control mechanisms in the community through health extension workers. Establishing diagnostic and therapeutic facilities of zoonotic diseases in the health centres.Also, farm personnel should be trained on biosecurity protocols, record keeping, and dairy cow handling and behavior. Support from the government is required for vaccination for infectious diseases. There should be some vaccination camps so that will help farmers to access vaccination.

## CONCLUSION

The evidence from this study clearly suggests that the dairy farmers are aware of the good farming practices that reduce the farm level infections. Nearly all farmers can explicitly list the practices been taught to them during the classroom training given to them by government. Farmers demonstrated willingness to adopt most of these good farming practices but due to some barriers they are unable to practice it. In the context of small holding dairy farming, cultural issues, financial stress, inadequate space, labour and time constraint, and limited support from government both in terms of support schemes and infrastructural planning were reported in the study. These areas often do not adhere to official planning guidelines, construction regulations and quality standards and, as they are not officially recognized by local authorities, are rarely provided with adequate infrastructure and services. Considering the important role of peri-urban areas to serve the ever increasing demand of the urban population, it's important to revisit the infrastructural policies for the peri-urban areas.

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