



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(3): 4124-4127
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www.thepharmajournal.com

Received: 02-01-2023

Accepted: 13-02-2023

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A study on the biosecurity measures followed by dairy cattle farmers in Puducherry region of India

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Abstract

Dairy farming is one of the most common practices followed by the farmers in India. India has a cattle population of 192.49 million during 2022 and 71,984 in Puducherry alone but the biosecurity measures followed for the production of clean and hygienic milk has been lacking. Considering this, a questionnaire was structured and 31 farmers from three different regions of Puducherry were interviewed using Epicollect5 software. Among the respondents all of them reared cross-bred cattle and majority were uneducated and are above 50 years of age. About 55% of the farmers followed semi-intensive type of rearing. Only 32% of the farmers were aware about the importance of vaccination and regularly vaccinated their herd. On the other hand, 38% of the farmers followed regular deworming schedule for their animals. All the farmers in the study followed Artificial Insemination as the method of breeding, none of the farmers were aware of using protective equipment during the milking process and all milk is directly processed by the milk cooperatives. It was observed in this study that the knowledge among the farmers regarding the biosecurity measures is very low necessitating the importance of training programs for safe and hygienic milk production.

Keywords: biosecurity, questionnaire, dairy cattle, bio exclusion, bio containment

Introduction

Cattle population of India is 192.49 million during 2022 which contributes to about 35.92 per cent of the total livestock in the country. Cattle population of Puducherry is 71,984 ^[1] and milk production in 2018-19 was 49.500 metric tons ^[2]. Cattle are an important source of milk, contributing to both the food and financial security of households, particularly to the marginal and small farmers in Puducherry. Milk is considered as a whole some food as it contains all the essential nutrients to meet the daily nutritive need. In order to produce hygienic milk, biosecurity measures have to be followed to prevent milk contamination and to maintain good health status of the herd ultimately preventing the loss of economy of dairy farmers on the treatment of animal.

Biosecurity has been defined as a management strategy for preventing the introduction of diseases and pathogens into an operation and controlling their spread within the operation ^[3]. Biosecurity comprises two components, namely, bio exclusion and biocontainment. Bio exclusion relates to preventive measures (risk reduction strategies) designed to avoid the introduction of pathogenic infections (hazards), whereas biocontainment relates to measures to limit within-farm transmission of infectious hazards and onward spread to other farms ^[4]. In cattle production, the incidence of infectious diseases plays an important role in profitability. Damage due to incidence of any disease can cause severe direct and indirect economical losses due to reduced growth, health and/or production rate, impaired fertility, or increased susceptibility to other diseases ^[5, 6, 7]. Therefore, disease prevention is preferred above cure. Biosecurity includes all measures preventing pathogens from entering (external biosecurity) and spreading within a herd (internal biosecurity) ^[8, 9]. It has already been shown in several production systems that increased biosecurity may lead to better animal health and welfare, increased productivity, decreased use of antibiotics, and to control antibiotic resistance ^[10].

Although biosecurity is usually associated with collective action for disease control in case of large epidemic outbreaks ^[11], it is also a crucial element in the control of endemic diseases, the implementation of biosecurity is even considered as the most essential pillar ^[12].

Following biosecurity measures not only helps in prevention of diseases but it also helps in production of healthy products which are fit for human consumption and also increases the value and shelf life of the product.

As at present all the economy are very aware and concern about their diet, it helps in creating a greater market value for the products.

Materials and Methods

The study was conducted in three different regions of Puducherry producing large amount of fluid milk which include Ramanathapuram, Thondamanattam, Kizhagraharam. Dairy farmers from each of these regions were interviewed with a set of 30 pretested questions pertaining to various practices followed in the farm. Responses related to management practices, housing, breeding, feeding and bio security measures were recorded. Problems faced in cattle rearing in disease control, maintaining biosecurity, issues faced during marketing of milk were enquired and responses were recorded using Epicollect5 software. The collected data was coded and analyzed using MS Excel. The analyzed data was illustrated in the form of tables and graphical representations.

Results and Discussion

Demographic details

It was observed that majority of the respondents were males (61%). Most of the respondents were above the age of 51(74%), followed by those between the ages of 36-50 (20%), and those between the age of 21-35 (6%). Among all the respondents most of them had only school education (87%)

and the remaining (13%) respondents were graduates as shown in Table 1.

Table 1: Demographic details of the farmers

Sr. No.	Particulars	Group	N	%
1	Sex	Male	19	61%
		Female	12	39%
2	Age	21-35	2	6%
		36-50	6	20%
		>50	23	74%
3	Education	School educated	27	87%
		Graduate	3	10%
		Postgraduate	1	3%

Bio Exclusion Measures

The measures that fall under the category of bio exclusion include type of rearing, flooring and cleaning of the shed, foot bath at the entrance of the shed, separate calving pen, following quarantine period and purchasing the animals without proper health certification, dung and waste disposal, deworming and vaccination of the herd, cleaning of udder, washing of hands, method of milking, protective clothing, method of breeding^[4].

Around 55% of the farmers followed semi-intensive type of rearing where they send their animals for grazing in the fields in the morning and rear them in the night as shown in Figure 1.

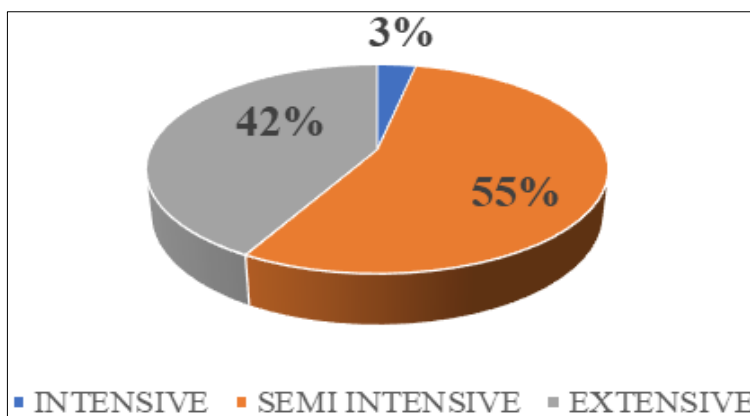


Fig 1: Type of rearing

65% of the farms in the study did not have proper flooring and all the farmers reported that they clean their shed at least twice a week. One out of the 31 farmers mentioned the use of the foot baths while entering the farm and he was found to have higher educational qualification which was similar to the reports of Dhaka P *et al.*, 2020^[13].

None of the farmers had separate calving shed for the management of the newborn calf, and not quarantining the newly purchased animals which were sold and purchased without any health certification and testing in all the cases under the present study and this was found to be similar to a study done by Singh J *et al.*, 2020^[14].

The dung and waste were not properly disposed into a dung pit in almost 78% of the farms which might lead to cross contamination with the food and increased the chances of vector borne diseases in the farm but 22% of the farmers had dung pit in their farm for the safe disposal of farm waste and

the dung. All the farmers in the study followed burial method of disposal of carcass after the careful post-mortem examination of the carcass by the veterinarian and the site of the burial was disinfected by lime.

All the farmers reported that they were deworming their herd. Figure 2 shows that only 12 farmers (38%) followed the proper schedule for deworming i.e., once in 3-4 months and the remaining 19 farmers dewormed their herd irregularly (once in 6 months or 12 months). 68% of the farmers did not vaccinate their herd regularly and 32% followed a proper vaccination schedule. The diseases against which the farmers followed vaccination in the study area were Foot and Mouth Disease, and Haemorrhagic Septicaemia. The deworming and vaccination results were almost similar to that of the study conducted by Sharma A *et al.*, 2020^[15] where the vaccination % was found to be higher.

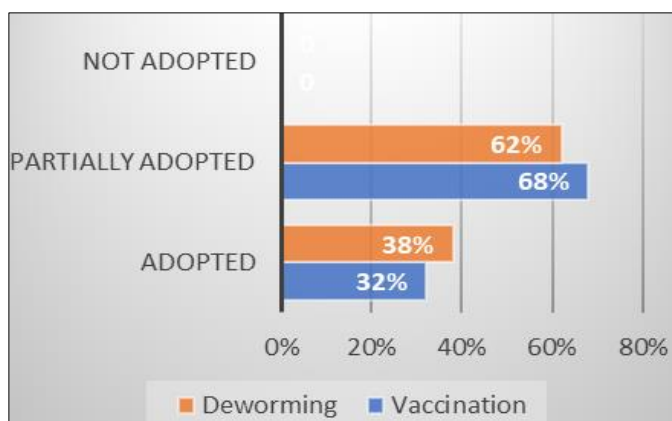


Fig 2: Vaccination and Deworming

In our study it was revealed that 100% of the farmers followed artificial insemination method of breeding which is significantly high compared to the study done by Singh R. 2018 [16] were only 29% followed artificial insemination which is very helpful in reducing the chances of acquiring the zoonotic diseases like trichomoniasis, brucellosis, campylobacteriosis etc., and also due to which the chances of abortions in the herd gets minimized.

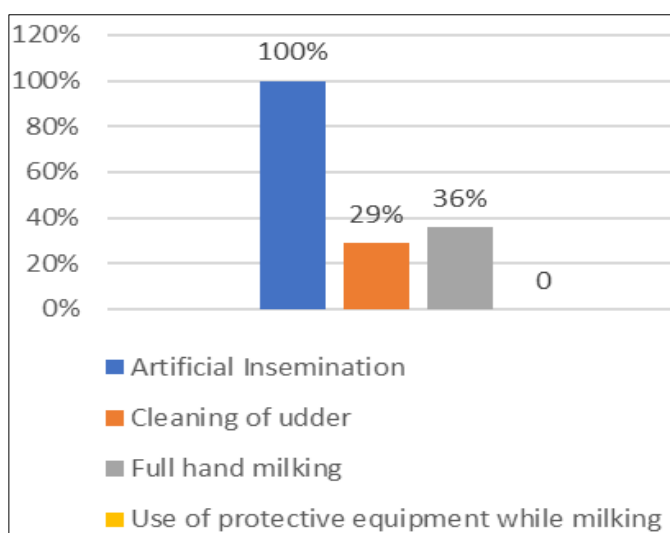


Fig 3: Milking and Breeding Practices

Around 71% of the farmers were not aware of cleaning of the udder with an antiseptic before milking the animal but 29% of the farmers clean the udder with potassium permanganate solution prior to milking the cows, but none of the farmers sterilize their hands prior to milking of the cows. It was found in our study that the most common practice that is followed before milking include the application of the oil as a lubricant prior to the milking of the cows. About 64% of the farmers (20) use knuckling method of milking whereas the remaining 36% farmers followed full hand method of milking as shown in Figure 3. None of the farmers in our study were found to use protective clothing like gum boots, mask, apron, head cap while milking the animal. It was also found that all the milk that has been produced has been sold and processed by the dairy cooperative societies.

Biocontainment Measures

The practices that are included in the biocontainment

measures include control of vectors, isolation of sick animals, disposal of aborted and dead carcass, vaccination of the herd as control measure.

Only 29% of the farmers were aware of isolating the sick animals from the herd and 78% of the farmers were not aware about the risk of the vectors that enter into the farm so they were not following any type of control measures for the prevention of the vector entry into the farm, although 22% of the farmers were following vector control measures like long-lasting insecticidal nets, indoor residual spraying and spraying fly repellents on the body surface of the animals.

All the farmers in the study buried the aborted and the dead carcass to reduce the spread of the infection. 100% of the farmers in the recent outbreak of lumpy skin disease for the prevention of further spread of the disease which was similar to a study by. As mentioned by Zhugunissov K *et al.*, 2020 [17] where goat pox vaccine is used to control the lumpy skin disease, all the farmers in the study population with the help of the local veterinarian have vaccinated their herd with goat pox vaccine against lumpy skin disease.

Conclusion

Biosecurity plays a very important role in prevention and control of the diseases. The above study demonstrates the need for awareness and education of dairy cattle farmers in Puducherry region on biocontainment and bio exclusion measures critical in preventing and controlling diseases that affect both animals and humans. Training programs should be conducted to the farmers on a regular basis and the practices related to biosecurity should be closely monitored. The importance of immunization and deworming the herd should be given top priority for the prevention of diseases.

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