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## Socio-economic status, health care practices and antibiotics usage adapted by swine farmers in Hassan district of Karnataka in India

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### Abstract

The present study was planned to study the socio-economic, antibiotics usage and health care practices adapted by Swine farmers. A total of 48 pig farmers practising the commercial pig rearing in Hassan district were surveyed using structured questionnaire of socio-economic status, household characteristics, feeding and management practices, health care, hygiene and antimicrobial usage pattern to assess their knowledge, perception and attitude towards antibiotics. Results of the survey indicated that majority of the Swine farmers are marginal farmers (65%) belonging to other backward communities (84%) followed by scheduled caste (8%) and 92 percent of the farmers were Hindus. Majority of the Swine farmers (96%) practiced stall feeding and kitchen/hotel waste was the major source of feed for their pigs and 24 percent practiced vaccination against Foot and Mouth disease (FMD) and swine fever. None of the farmers had records of antibiotic treatment of their pigs and they generally consulted veterinarians (96%) for the use of antibiotics; however the antibiotics were administered by themselves or by the farm workers (96%). The major antibiotics used were enrofloxacin followed by streptopenicillin, tetracycline, fortified procaine penicillin, sulphonamides (Co-trimazole). The antibiotics generally used to treat pyrexia, diarrhoea respiratory/skin diseases, anorexia and urogenital infections/abortion in majority of the farms.

**Keywords:** Swine farmers, antibiotics, survey, swine

### Introduction

Pig rearing is an income generating activity for marginal and small scale farmers in India. With the increase demand for animal protein source, fast-growing pigs with efficient feed conversion rates likely to solve this meat requirement. The small scale pig husbandry has seemingly greater potential to increase the economic status of the farmers (Lanada *et al.*, 2005) [11]. The challenges faced by our country in securing food as well as nutritional security to fast-growing population need an integrated approach for livestock farming. Over the last two decades, livestock sector has grown at an annual rate of 5.6 percent which is higher than 3.3percent growth in the agricultural sector (Ali, 2007) [3]. Rasali *et al.* (1995) [19] investigated that traditional, religious and cultural taboos were the social constraint for pigs rearing in a mixed community. The pig husbandry constitutes the livelihood of rural poor belonging to the lowest socio-economic strata, and they have no means to undertake scientific pig farming with improved foundation stock, proper housing, feeding and management. Rahman *et al.* (2007) [18] also evaluated that traditional methods were used for pig rearing, Scientific pig husbandry can be a source of in come to farmers generates employment and provides a better scope to meet out the requirement in terms of animal proteins. Considering the importance of pig rearing, an extensive study on pig farmers was conducted to find out the existing health care and management practices in the hill zone of West Bengal.

High price of concentrates, shortage of swine feed, lack of knowledge about balanced ration were main constraints faced by swine farmers in adoption of feeding practices. Lack of capital and labour were important constraints in adoption of housing management. Low economic gains were significant constraints in adoption of piglet management. Lack of capital and non availability of medicines were major constraints in adoption of pig farming in Jharkhand. Inadequate knowledge about cause and control of diseases and availability of trained labour were substantial constraints in adoption of health care and disease prevention practices (Asit *et*

*al.*, 2020)<sup>[11]</sup>.

Shivakumar *et al.*, (2022)<sup>[25]</sup> evaluated the socio-economic, health care and antimicrobial usage practices adapted by pig farmers in and around Bengaluru. Regular vaccination against Foot and Mouth disease (FMD) and Swine Fever was being carried out. None of the farmers had records of antibiotic treatment of the pigs and they generally consulted veterinarians before the use of antibiotics; however the antibiotics were administered by themselves or by the farm workers. The major antibiotics used were tetracycline followed by enrofloxacin, sulphonamides (Co-trimazole) and Streptopenicillin. Antibiotics were used to treat respiratory/skin diseases, pyrexia, diarrhoea and urogenital infections / abortion in majority of the farms. Hence documentation of the socio-economic status of pig farmers, farm characteristics, antimicrobial usage and knowledge and perception on antibiotics in pork production system in India is lacking. Hence, the present study was carried out to document the various practices adapted by the pig farmers in and around Hassan district of Karnataka state in India.

### Materials and Methods

The present study was carried out in Hassan district of Karnataka. A total of 48 pig farms were selected and based on mixed method approach of Participatory Rural Appraisal (PRA) and Rapid Ethnographic Assessment (REA) preliminary data regarding socio-demographic characteristics of pig farmers, farm characteristics, farming practices, hygiene and health care and knowledge, perception and antimicrobial usage in the pig farm was collected using a structured questionnaire. The farm socio-demographic characteristics studied included house hold size, land owned, agriculture activities, religion and social group of the farmers involved in pig rearing. The farm characteristics assessed were number of animals, type of housing, feeding practices, breed maintained and production activities. The health care and hygiene measures assessed includes cleaning activities adopted, vaccination protocols, biosecurity measures employed and quarantine facilities for sick animals. Data collection regarding the knowledge, perception and use of antibiotics was carried out to evaluate different aspects of antibiotic usage *viz.*, role of veterinarians, commonly used antibiotics, reason for use of antibiotics and purpose for antibiotic use in pig rearing (growth promotion). The data collected were analysed using Epi Info™ software.

### Results and Discussion

The socio-economic, demographic and antimicrobial usage (AMU) patterns employed by the farmers in the farms under this study are presented though table.

#### Household characteristics of swine farmers

In the present study it was observed that majority of (65%) pig farmers are marginal farmers. This observation is in conformity with the report of Majunder *et al.* (2020)<sup>[12]</sup> who revealed that majority of the pig rearers were landless, marginal and small farmers in Telangana state and also with the results of Shivakumar *et al.*, (2022)<sup>[25]</sup> who investigated that majority of the pig farmers in the study area were small and marginal farmers (66%) belonging to other backward communities (44%). Similar findings have been documented by Tudu *et al.* (2015)<sup>[28]</sup> in West Bengal, Anand Kumar *et al.* (2017)<sup>[4]</sup> in Uttar Pradesh, Ritchil *et al.* (2013)<sup>[20]</sup> in

Bangladesh, Mekuriaw and Asmare (2014)<sup>[13]</sup> in North-western Ethiopia, who also reported that majority of pig farmers, were poor and landless.

Also the majority of swine farmers belonged to other backward communities followed by scheduled caste with a household size of 5-10 members in our investigation. The findings were in accordance with Muhindro *et al.* (2016)<sup>[14]</sup> in Tripura. However, contrary to the findings of this study, Majunder *et al.* (2020)<sup>[12]</sup> in Telangana state and Ahmed *et al.* (2017)<sup>[2]</sup> in Assam observed Majority of pig farmers were schedule tribes (68%) followed by schedule caste (28%) and backward classes (4%). The difference observed may be attributed to the geographical location, the population size of different communities and governmental schemes prevalent in that particular location.

#### Feeding, hygiene and health care

The evaluation of feeding practices of pig farmers indicated that, almost all pig farmers had stall feeding (96%) and kitchen/hotel waste was the major source of feed for their pigs followed by hotel waste (94%). Majority of the pig farmers (85%) had no practices of cooking the kitchen/hotel waste. The findings were on par with observations of Kannan (2005)<sup>[8]</sup> in Kerala, Deka *et al.* (2007)<sup>[29]</sup> in Assam, Radhakrishnan *et al.* (2018)<sup>[17]</sup> in Thrissur and Ernakulam in Kerala, Sangli *et al.* (2018)<sup>[22]</sup> in Tamil Nadu and Majunder *et al.* (2020)<sup>[12]</sup> in Telangana state, who revealed that swill feed (kitchen/hotel waste) and slaughter house offals were the major feed provided to the pigs. The findings in line with findings of Shivakumar *et al.*, (2022)<sup>[25]</sup> who revealed that all pig farmers (100%) practiced stall feeding and kitchen / hotel waste was the major source of feed for their pigs in Bengaluru regions. Also, only 24 percent the pig farmers in and around Hassan have vaccinated their pigs against FMD, swine fever and Hemorrhagic septicaemia. This could be attributed to the availability of vaccines against these diseases in Karnataka. Similarly Nanda *et al.* (2018)<sup>[16]</sup> in organized farms of Mizoram, Majunder *et al.* (2020)<sup>[12]</sup> in Telangana, Sharma *et al.* (2015)<sup>[24]</sup> in Tripura, Sasikala *et al.* (2012)<sup>[23]</sup> in Tamil Nadu, Roy (2014)<sup>[21]</sup> in West Bengal, Ahmed *et al.* (2016)<sup>[2]</sup> in Tripura have reported poor vaccination rate. The reason for poor vaccination rate might be attributed to lack of knowledge of vaccines against most harmful diseases of pigs, ignorance and non-availability of vaccines in rural areas.

#### Antimicrobial usage in pig farms

It was evident from the present study that majority of the pig farmers were aware that the pigs are being administered with antibiotics (96%), but majority of them did not maintain record of antimicrobial usage and antibiotics were generally used for treatment of the diseased animal (92%) rather than as prophylaxis. Administration of antibiotics to animals was done by the owners or the farm workers. All pig farmers of this study had no knowledge of inclusion of antibiotics in feed.

In the present study, the major antibiotic used in pig farms in Hassan district was enrofloxacin (94%) followed by streptopenicillin (23%), tetracycline (21%), fortified procaine penicillin (17%), sulphonamides (Co-trimazole) and both as injectable and oral solutions. The higher use of enrofloxacin, streptopenicillin and tetracycline may be attributed to its broad spectrum of activity, easy availability, lower cost and ease of administration (oral through drinking water)

(Trouchon and Lefebvre, 2016)<sup>[27]</sup>. In addition, farmers prefer to use medicines that gave them quick results, its availability, their previous experience with the drug while managing similar symptoms and advice from veterinarians (Kumar and Gupta, 2018)<sup>[10]</sup>. In similar lines, Kumar *et al.* (2020)<sup>[9]</sup> reported that tetracycline, penicillin, ampicillin, cephalosporin, cephalaxin and amoxicillin plus clavulanic acid were the most commonly used antibiotics in pigs in Arunachal Pradesh, Assam and Meghalaya. Similar to the findings of this study, Donkor *et al.* (2012)<sup>[5]</sup> observed that 98 percent of the livestock keepers used antibiotics and the major antibiotics used were penicillin, oxy-tetracycline, streptomycin, sulphonamides and tylosin in Ghana. In Nepal, the most common antibiotics used in animal sectors were tetracyclines, sulfa drugs, macrolides, polymyxins, quinolones

and aminoglycosides, whereas chloramphenicol was the least antibiotic consumed in the veterinary sector (Subramanya *et al.*, 2021)<sup>[26]</sup>.

The farmers in Hassan district used antibiotics to treat respiratory / skin diseases, pyrexia, diarrhoea and urogenital infections / abortion. The findings were in accordance with Adesokan *et al.* (2015)<sup>[1]</sup> in Nigeria, Gameda *et al.* (2020)<sup>[6]</sup> in Ethiopia, Donkor *et al.* (2012)<sup>[5]</sup> in Ghana, Mutua *et al.* (2020)<sup>[15]</sup> in India, who opined that antibiotics were generally administered to livestock to treat respiratory diseases, fever and in general broad spectrum antibiotics were administered. In similar lines, Gruel *et al.* (2021)<sup>[7]</sup> reported that the main causes for which antimicrobials were given were respiratory diseases in pigs (45.5%), skin diseases in cattle (41.7%), and respiratory and digestive diseases in poultry (66.7%).

**Table 1:** Household characteristics of pig farmers in Hassan district of Karnataka

Sl. No.	Household characteristics	Range	Percent
1.	Household size	0-5	30.00
		5-10	70.00
		>10	0.00
2.	Household type	Agriculture	96.00
		Non-Agriculture	2.00
		Regular wage/salary earning	2.00
3.	Religion	Hindu	92.00
		Christianity	8.00
4.	Social group	Other backward classes	84.00
		Schedule caste	8.00
		Schedule tribe	4.00
		others	4.00
5.	Whether own any Land?	Yes	98.00
		No	2.00
6.	Total possessed land (in acres)	Marginal, <2.5acre	65.00
		Small 2.5-5acre	35.00
		Medium 5-10acre	0.00
		Large >10acre	0.00
7.	Land irrigated (in acres)	Marginal, <2.5acre	77.00
		Small 2.5-5acre	23.00
		Medium 5-10acre	0.00
		Large >10acre	0.00
8.	Land cultivate (in acres)	Marginal, <2.5acre	75.00
		Small 2.5-5acre	25.00
		Medium 5-10acre	0.00
		Large >10acre	0.00
9.	Income of house hold (in lakhs)	0-2.5	94.00
		2.5-5	4.00
		5-10	2.00
		>10	0.00
10.	Sources of Income	Agriculture and piggery rearing	94.00
		Agriculture, animal husbandry and piggery	2.00
		Piggery rearing	2.00
		Piggery rearing and Business	2.00

**Table 2:** Feeding and hygiene practices followed by pig farmers in Hassan district of Karnataka

Sl. No.	Practices	Range	Percent
1.	Feeding mechanism	Stall feeding	96.00
		Both (Stall feeding & Scavenging)	4.00
2.	Main feed for Pigs	Only Edible kitchen / hotel waste	94.00
		Only concentrate feed	0.00
		Mix of both	6.00
3.	Whether Kitchen waste is cooked before feeding?	Yes	15.00
		No	85.00
4.	How often you clean the sheds?	Once a day	89.00
		Twice a day	9.00
		Thrice a day	2.00
5.	Product used to clean the shed	Detergents	2.00
		Only Water	96.00
		KMNO4	2.00
6.	Do you vaccinate the pigs?	Yes	24.00
		No	76.00
7.	What are all the diseases you vaccinate?	FMD, HS and Swine fever	9.00
		FMD, Swine fever	2.00
		FMD	10.00
		Swine fever	2.00
		NIL	77.00
8.	Do you isolate/quarantine the diseased pigs?	Yes	98.00
		No	2.00
9.	Precautions taken while entering the farm	No precautions	90.00
		Head gear, mask, gloves	6.00
		Foot dips/Rubs	4.00
10.	How do you dispose the manure of the farm?	As a manure for farm	92.00
		Land fill/pit	8.00

**Table 3:** Knowledge, perception and antimicrobial usage in pig farms Hassan district of Karnataka

Sl. No.	Practices		Percent
1.	Do you give your pig any antibiotics?	Yes	96.00
		No	4.00
2.	Are you aware of antibiotics included in the feed?	Yes	0.00
		No	100.00
3.	Do you keep records of drugs used in the farm?	Yes	0.00
		No	100.00
4.	Do you usually consult anybody for use of Antibiotics in the farm?	Yes	85.00
		No	15.00
5.	Whom do you consult?	Para Veterinarian	4.00
		Veterinarian	96.00
6.	Who usually administers drugs to the pigs?	Self/ Farm worker	92.00
		Para Veterinarian	4.00
		Veterinarian	4.00
7.	Where do you purchase the antibiotics used in pigs	Human Pharmacy	4.00
		Veterinary pharmacy	96.00
8.	Purpose for which Antibiotics given	Disease treatment	92.00
		Prevention of disease	4.00
		Both	4.00
9.	Antibiotics Usage in the Farm	Co-trimoxazole	13.00
		Tetracycline/OTC	21.00
		Enrofloxacin	94.00
		Streptopenicillin	23.00
		Fortified Procaine Penicillin	17.00
		Ceftriaxone+Tazobactam	2.00
		Azithromycin	2.00
Oflaxacin + Ornidazole	2.00		
10.	Conditions for which Antibiotics are used	Diarrhoea	77.00
		Respiratory/ skin infection	58.00
		Pyrexia	88.00
		Urogenital/ abortions	25.00
		Anorexia	31.00



## Conclusions

The results of the present study clearly revealed that pig rearing has been primarily practised by marginal farmers majorly belonging to the backward community. It was also recorded that majority of the pig farms feed kitchen waste without heat processing and biosecurity measures were not maintained. The antibiotics were administered majorly by farm workers / owner in the absence of Veterinarian, which might result in use of sub-therapeutic or inappropriate doses, which is considered to be one of the major causes for emergence of Antimicrobial Resistance. Based on the findings of this study, it may be concluded that socio-economic status, health care, hygiene practices and antimicrobial usage at the pig farms may have a direct or indirect impact on the emergence of antimicrobial resistant pathogens and commensals in pork production system.

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