Asian Journal of Agricultural Extension, Economics & Sociology

Volume 41, Issue 10, Page 125-130, 2023; Article no.AJAEES.105080
ISSN: 2320-7027

Perception of Veterinarians towards Consequences and Suitability of Sex Sorted Semen Technology

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2023/v41i102150

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/105080

Original Research Article

Received: 13/06/2023
Accepted: 19/08/2023
Published: 30/08/2023

ABSTRACT

An ex-post-facto exploratory research study was carried out in the state of Andhra Pradesh with the specific objective to know the perception of the veterinarians towards consequences and suitability of sex-sorted semen technology. These consequences include Desirable vs Undesirable, Anticipated vs Unanticipated, Direct vs Indirect and in addition suitability was also assessed in terms of sustainability, compatibility, socio-cultural and economic aspects. It was found that three-fourths of the veterinarians (76.67%) had a medium level of perception towards sex-sorted semen

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technology in terms of its consequences and suitability to dairy farmers. The study thus, reveals that innovations that are compatible and in accordance with farmers' situations will be adopted following its diffusion. Consequences and suitability also need to be taken care of while diffusing any innovation among the farming community.

Keywords: Consequences; dairy farmers; perception; sex-sorted semen technology; Veterinarians; Andhra Pradesh.

1. INTRODUCTION

Today, India is the world's largest producer of milk, with 22 percent of global production which is mainly due to the adoption of innovative technologies that are being diffused for adoption by the farmers through different channels. In the recent past, advanced reproductive technology i.e., sex-sorted semen technology was diffusing at an appreciable rate throughout India as its benefits were visible over the years in other countries. Sex-sorted semen technology comprises the separation of sperm into male/Y bearing and female/X bearing sperm cells and then artificially inseminating female with the desired sexed-sorted semen. Adoption of these advanced reproductive technologies has significant economic value in dairy performance De Vries et al. [1]; Seidel 2014. Farmer's adoption decision of these innovative technologies is affected by a number of demographic and socio-economic factors such as age, education, farm size, experience etc. The field veterinarians who are the middle level extension functionaries also play a major role in the diffusion and adoption of an innovation among the farming community and also their perception and knowledge about an innovation play a major role in educating and motivating the farmers in taking up that particular innovation. Thus, the perception studies of veterinarians about innovations help to identify the barriers that may face by the farmers. In this regard the study has been taken up in assessing the consequences and suitability of sex-sorted semen technology to dairy farmers.

2. MATERIALS AND METHODS

A Stratified random sampling method was followed for the selection of the respondents. All three administrative zones (Rayalseema region, central coastal region, North-coastal (*Uttara Andhra*) region) of Andhra Pradesh were selected for the study and from the three zones together, a total of 120 veterinarians were selected through random sampling with a confidence level (90%) and Margin of error (10%). The data was collected from the veterinarians by administering questionnaires through printed and digital forms (Google Forms). Appropriate statistical procedures like frequency, percentage, mean and standard deviation were employed to analyze and interpret the data.

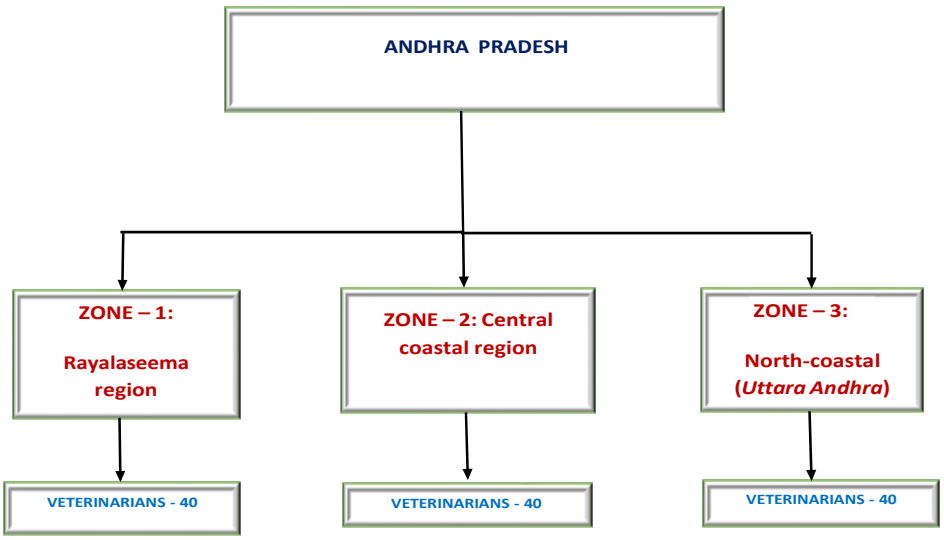

Fig. 1. Selection of veterinarians for the study

To study the findings related to the perception of veterinarians towards sex-sorted semen technology in terms of its consequences and suitability to dairy farmers mentioned above, a schedule was developed consisting of Agree/Disagree type of statements arranged in "18" individual items. The schedule possesses both positive and negative statements with respective scores 1, 0 for Agree and Disagree to the positive items and for negative items the reverse way of scoring was followed. Thus, an individual could get a maximum of "18" and a minimum score of "0". Based on the scores obtained, perceptions of dairy farmers were categorized into low, medium and high-level groups based on mean and standard deviation. The data collected from the respondents were coded, tabulated, analyzed and presented in the form of tables. The inferences were drawn in light of the results obtained, keeping in view the objectives laid in the study.

3. RESULTS AND DISCUSSION

The results from the study (Table 1) indicate that 76.67 percent of veterinarians had a medium level of perception followed by high (13.33%) and low levels (10%) of perception towards sex-sorted semen technology in terms of its consequences and suitability to dairy farmers.

Out of the various consequences expressed by veterinarians with respect to sex-sorted semen technology, though there are desirable consequences like more female calves and improved genetic distribution which fulfills the need of improving milk production Bhalakiya et al. [2]; Cooke et al. [3], there is need to improve the skills and manpower to further facilitate the adoption of this technology Khanal et al. [4]; Kumar et al. [5]. This may also reduce the cost and improve fertility rate depicted from Table 2.

Fig. 2. Map of Andhra Pradesh showing the three administrative zones selected for the study

Table 1. Distribution of veterinarians according to their level of perception towards sex sorted semen technology in terms of its consequences and suitability

S. No.	Category	Veterinarians (N=120)	
		F	%
1.	Low level of perception (<9.95)	12	10.00
2.	Medium level of perception (9.95-16.71)	92	76.67
3.	High level of perception (>16.71)	16	13.33
	Total	120	100.00

Mean: 13.33; Standard Deviation: 3.3

As per the results cited in Table 3, Veterinarians were of the opinion that the innovative sex-sorted semen technology will definitely bring revolutionary changes like that of Artificial Insemination (A.I) as it is the most efficient way to increase the female population leading to farm sustainability [6]. In addition, sex-sorted semen technology offers advantages in terms of meeting the scope of increasing milk production, having the potential to produce a large number of heifers in a herd as compared to conventional semen and thereby resources spent on female calves gives better returns than on male calf Balzani et al. [7]; Campanile et al. [8]. Hence, this technology is more suitable for Indian farmers who were mostly small and marginal farmers and thereby compatible with Indian farming community Mallory et al. [9].

It was observed from the study that the need for female animal over male animal is achieved through sex-sorted semen technology which was mainly developed to have farmer's choice i.e., female calf Herbst et al. [10]; Joshi et al. [11].

Table 2. Consequences of sex-sorted semen technology as perceived by veterinarians

Consequences		Veterinarians (N=120		
		Frequency (F)	Percentage (%)	Total Frequency (%)
A. Desirable vs Undesirable consequences				
1. Production of only female calves is much desirable	Agree	90	75.00	120
	Disagree	30	25.00	(100.00)
2. Sex-sorted semen technology offers greater genetic distribution	Agree	73	60.83	120
	Disagree	47	39.17	(100.00)
	Agree	56	46.67	
3. Sex-sorted semen technology not suitable to Indian conditions which ismostly mixed farming	Disagree	64	53.33	120 (100.00)
4. Lack of trained technicians affecting sorting and efficiency accuracy	Agree	110	91.67	120
	Disagree	10	08.33	(100.00)
1. High costs and low fertility have limited the use of sex-sorted semen technology	Agree	111	92.50	120
	Disagree	09	07.50	(100.00)
B. Anticipated vs Unanticipated consequences				
1. Sex-sorted semen is a revolutionary technology for Indian cattle breeding	Agree	100	83.33	120
	Disagree	20	16.67	100.00)
2. Well established policies have a positive impact on the adoption rate of sex sorted semen technology	Agree	105	87.50	120
	Disagree	15	12.50	(100.00)
3. Farmers acceptance on sex-sorted semen technology is still improving	Agree	106	88.33	120
	Disagree	14	11.67	(100.00)
4. There is a need for standardization ofsex-sorted semen technology in Indian conditions	Agree	108	90.00	120
	Disagree	12	10.00	(100.00)
C. Direct vs Indirect consequences				
1. Change in the social status of farmers	Agree	79	65.83	120
	Disagree	41	34.17	(100.00)
2. Change in the self-sufficiency of farmers	Agree	92	76.67	120
	Disagree	28	23.33	(100.00)
3. More demand for good quality sex-sorted semen-born calves in the market	Agree	89	74.17	120
	Disagree	31	25.83	(100.00)

Table 3. Suitability of Sex-sorted semen technology as perceived by veterinarians

Suitability		Veterinarians (N=120)		
		Frequency (F)	Percentage (%)	Total Frequency (%)
A. Economic Suitability				
1. Sex-sorted semen technology has the potential to produce a large number ofheifers in a herd as compared to using conventional semen	Agree	90	75.00	120
	Disagree	30	25.00	(100.00)
2. Sex-sorted semen technology meetsthe scope of increasing milk production	Agree	103	85.83	120
	Disagree	17	14.17	(100.00)
3. Resources spent on female calf gives better returns than on male calf	Agree	107	89.17	120
	Disagree	13	10.83	(100.00)
B. Sustainability				
1. Sex-sorted semen technology is the most efficient way to increase femalepopulation leading to farm sustainability	Agree	111	92.50	120
	Disagree	09	07.50	(100.00)
C. Socio-cultural suitability				
1. Use of sex-sorted semen will not have an effect on the social values/culture/norms of the farmer	Agree	76	63.33	120
	Disagree	44	36.67	(100.00)
D. Compatability with needs				
1. Need for female animal over male animal is achieved through sexsorted semen technology	Agree	109	90.83	120
	Disagree	11	09.17	(100.00)

4. CONCLUSION

Sex-sorted semen technology is relatively newer and still diffusing technology on dairy farms and is suggested to have a wider adoption and impact in the near future Weigel, [12]; De Vries et al. [1]. Thus, the study reveals that innovations that are compatible and in accordance with farmers' situations will be adopted following its diffusion. Consequences and suitability also need to be taken care of while diffusing any innovation among the farming community [13,14].

ACKNOWLEDGEMENT

I would like to thank NTR College of Veterinary Science, Gannavaram, Sri Venkateswara Veterinary University, Andhra Pradesh Livestock Development Agency (APLDA), Director of Animal Husbandry- Andhra Pradesh, Veterinarians of Andhra Pradesh and Especially Dairy Farmers for Their Valuable Responses in Conducting the Work.

HIGHLIGHTS

State Department of Animal Husbandry has to put more efforts in training all veterinarians to serve the farming community in time to enhance livestock production

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/105080