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Information needs of paravets on artificial insemination in India

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ABSTRACT

The present study was conducted to assess the information needs of the paravets on Artificial Insemination (AI) in India. Paravets (160) were selected having equal representation from 4 different parts of India (Gujarat, Rajasthan, Telangana and Odisha). Questionnaire and telephonic survey method was used for data collection. The information needs on AI among paravets was assessed under four sub-groups, viz. information needs on heat detection, AI techniques, post-AI practices and miscellaneous information related to AI. Results revealed that the most needed information was symptoms of heat in buffaloes and pregnancy diagnosis both bearing 1st rank (MWS=7.22), followed by address of semen stations (MWS=6.09) with 2nd rank, rectal palpation (MWS=5.97) ranked 3rd, signs of heat in cattle (MWS=5.91) ranked 4th and use of crystoscope for checking fern pattern (MWS=5.68) with 5th rank. Earlier researchers have established that proper AI technique is essential for improving conception rate. Hence, along with provision of training courses on AI, there is a need to focus on creating efficient information systems platform incorporating knowledge related to AI which can be easily accessed by the paravets. Further, the paravets need to be trained on the use of digital tools for faster information delivery and ease of use. Efforts are also needed for continuous education of the paravets for enhancing the effectiveness of AI. Convergence of various information dissemination efforts of the government and non-government sector, and more number of multipronged information channels are required to fulfil the information needs of the paravets.

Keywords: Artificial insemination, Crystoscope, Paravets, Pregnancy diagnosis

One of the major challenges which India faces in livestock sector at present is low productivity of livestock. This is mainly on account of insufficient coverage through artificial insemination (AI), low conception rates, non-availability of quality males for breeding, poor management practices, high mortality and morbidity losses due to diseases, inadequate marketing infrastructure and unorganized marketing (National Livestock Policy 2013). Repeat breeding, poor conception and unavailability of qualified technicians are most important constraints in breeding sector (Hamdani *et al*. 2013, Lawrence *et al.* 2015, Ibrahim *et al*. 2014). Capacity of AI technician and insemination technique also plays a major role for poor fertility indices (Samsuddin *et al*. 1997). Hence, special emphasis has been marked in the National Livestock Policy on improving the productivity of livestock through enhanced AI coverage. From the report of BAHS (2018) on artificial inseminations performed by states, it is quite evident that though a total of 73,070,000 AI performed during the year 2017–18, state-wise performance of AI is uneven showing a huge variation among states. As per the information made available by the states, an AI worker only carries out 1.92 AI/day in contrast to the required average of at least 4 AI/day (PIB 2017, Govt. of India). Further as per this report, 3 semen doses are used for accomplishing one successful conception which indicates wastage of high quality semen due to inefficient usage. Directions have been given to states by the DADF to achieve a state wise target of 100 million artificial insemination for 2017–18 which may assist the government's aspiring goal of doubling farmers' income by 2020.

Keeping these fact under consideration, the present study was undertaken to assess the information needs of the paravets in AI services in India.

MATERIALS AND METHODS

The study was conducted during 2017–18 in four states of India, viz. Rajasthan, Gujarat, Telangana and Odisha. Three districts from each states were selected, viz. Sikkar, Jaipur and Jhunjhunu from Rajasthan; Balasore, Nabarangpur and Dhenkanal districts from Odisha; Mahbubnagar, Warangal and Khamam from Telangana and Anand, Banaskanta and Kutch from Gujarat were selected purposively. Questionnaire and telephonic survey methods were used for collecting data. Forty paravets were selected randomly from each state thus making a total sample size of 160 respondents. Data collection was done from month of November to January.

A total of 400 questionnaires, viz. 100 to each state were mailed to the respondents residing in the study areas as the

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response rate of questionnaire is 30–40% only. There were 180 filled questionnaires mailed back from which 40 were incomplete. Hence, telephonic survey method was used for collecting the complete data to achieve the targeted response, i.e. 160.

An exhaustive list of statements indicating the different information needs in case of AI was prepared which was further classified into different groups, i.e. heat detection, AI, post AI practices and miscellaneous practices related to AI. These information were given weightage by 30 experts according to their perceived importance by them in three point continuum, i.e. most needed (3), needed (2) and least needed (1) and mean score was calculated for each information by taking total score given by the experts to a particular information and diving it with the number of respondents. This was considered as weightage of that respective information.

$$MS = \sum_{i=1}^{n} \frac{\text{Total score}_i}{k}$$

where k is total number of respondents.

The paravets were asked to give score to the statements listed according to their perceived need in that particular aspect in three point continuum, i.e. most needed (3), needed (2) and least needed (1) and mean score was calculated for each information again. The responses obtained were then multiplied by the already set standard which was given by experts to get mean weighted score for more valid result.

$$MWS = W_n \times X_n$$

where W_n, average weightage given by the experts to the n^{th} information; X_n, mean score given by the respondents to the n^{th} information.

Comparison of mean was also done among four states by using ANOVA and Dunkan post hoc analysis.

RESULTS AND DISCUSSION

Information needs on heat detection: In case of information needs on heat detection, use of crystoscope for checking fern pattern was perceived as most needed information by 63.1% of the respondents with a mean score of 2.62 whereas most of the respondents (72.5%) felt importance of heat detection as least needed information.

The mean weighted scores of information needs of paravets revealed the highest ranked information need emerged to be about signs of heat in case of buffaloes followed by signs of heat in case of cattle, use of crystoscope for checking fern pattern, estrous cycle phases, sources of crystocope, characteristics of vulvar discharge and importance of heat detection. Significant difference among the states was found in case of information needs related to importance of heat detection and characteristics of vulvar discharge. Rajasthan had less information need (2.67) in the aspect of importance of heat detection and higher information need (5.28) in case of characteristics of vulvar discharge as compared to other 3 states. In case of information needs related to estrous cycle phases, significant difference was seen wherein that Rajasthan is differed from Odisha and Telangana displaying higher information need (5.37) in this aspect. Though signs of heat in buffalo was highest ranked information need among all the information listed in case of heat detection, there was no significant difference found among four states. But there was significant difference among 4 states in case of information needs in signs of heat in cattle which showed that paravets of Rajasthan had significantly higher information need (7.42).

From the results, it was evident that signs of heat in buffalo and cattle were two most needed information perceived by the respondents. This goes in line with the study of Singh *et al.* (2018) who reported that information about estrus detection was highest needed among the farmers. A number of researchers have reported non-adoption of AI in buffaloes due to silent heat which has been reported to be a major problem in heat detection in buffaloes and poor conception rate in field condition (Rajendra and Prabhakaran 1992). Studies on oestrus behaviour and endocrinology in buffalo (Roy and Prakash 2009, Singh *et al*. 2000, Chohan *et al.* 1992) indicated considerable variations in reproductive endocrine activity without external signs of oestrus (silent heat).

Information needs on AI technique: Rectal palpation was the most needed information felt by 32.5% of the respondents with a mean score of 2.11. Results on the mean weighted scores revealed that the highest ranked information need in AI technique was related to rectal palpation followed by storage and handling of semen straw and site of semen deposition. The least important information need emerged to be the sources of AI equipment. Significant differences were found in case of information related to standard method of thawing, wiping, cutting of straw and loading of gun and site of semen deposition in which results of Rajasthan differed from other 3 states. This indicates that paravets of Rajasthan were showing significantly higher information needs in case of information related to standard method of thawing (4.93) and wiping, cutting of straw and loading of gun (3.04) whereas significantly lower information needs in case of site of semen deposition (3.53) as compared to other 3 states.

If rectal palpation is not done properly then there is much chances of getting false information regarding the status of female reproductive system of cattle and buffalo. According to Ybanez *et al*. (2015), several practices (checking of soft cervix, rectal palpation, thawing temperature method, straw cutting method, and semen deposition) also have an influence on the success of AI. From the studies of Kassa and Woretaw (2018), Woretaw *et al.* (2015) and Juneyid *et al.* (2017), conception failure was reported as one of the major animal health problems associated with AI identified in the study area which might be due to deficiency of well trained and inadequate AITs, wrong time of insemination after estrus as described by Gizaw and Dima (2016). From the results of the current study, it is evident that handling of semen straw and site of semen deposition were

considered to be the 2nd and 3rd most needed information. Site of semen deposition plays an important role in conception rate and according to scientifically recommended practices, insemination should be done in uterine body instead of cervix. Williams *et al.* (1988) evaluated uterine body and cornual inseminations (n=2127) over a 3 year period in Holstein and Jersey cattle which showed that conception rate was lower for cervical insemination (39.4%) than uterine body (48.1%) or cornual (49.3%) inseminations. The AI technique if not followed properly, may lead to conception failure and therefore requires well trained inseminators (Farmers' Manual, DAHD&F).

Information needs on Post-AI practices: Pregnancy diagnosis was the most needed information as perceived by 50.6% of the respondents among the all information enlisted in Post-AI practices with a mean score of 2.43. From the mean weighted scores it was evident that the highest ranked information needs for paravets emerged to be on pregnancy diagnosis, followed by precautionary measures for effective AI, follow up of AI and return to oestrous after calving. Significant differences were found among the states in case of information related to follow up of AI, precautionary measures for effective AI and return to estrus after calving. Rajasthan was the most differed state among four for the above mentioned three information needs showing significantly lower information need perceived by the paravets in case of follow up of AI (2.76) and higher information need in case of precautionary measures for effective AI (5.75) and return to estrus after calving (3.52). According to a study conducted by Garcý´a-Ispierto *et al.* (2007), different AI technicians caused great variation in pregnancy rates which could be an important practical limitation for the success of AI and also for herd fertility.

Information needs on other miscellaneous information related to AI: The most needed information perceived by 59.4% of the respondents was information on addresses of semen station with a mean score of 2.57. The mean weighted scores revealed that the highest ranked information need for the paravets emerged to be the address of semen stations, followed by address of AI training centres, feeding strategies for improved conception rate and treatment of reproductive disorders. The least needed information was on average age and body weight of cattle and buffalo at maturity. Significant differences were found in case of information on government schemes and programmes to promote AI, average age and body weight of cattle and buffalo at maturity and address of semen stations. In case of these above mentioned three needs, Rajasthan was the most diverged state among four states which shows that respondents of Rajasthan had a significantly higher information need in case of government schemes and programmes to promote AI (3.39) and average age and body weight of cattle and buffalo at maturity (2.45) whereas a significantly lower information need in case of address of semen stations (5.33).

From the result, it is perceived that information on feeding strategies to improve conception rate was found to be important information needed by the respondents as improper nutrition was the main cause of infertility which continues to be the single largest reason for removal of female animals from the herd in India. In cattle, nearly 10–30% of lactations may be affected by infertility and reproductive disorders (Prabhu 2012).

Prioritization of information needs: Overall ranking based on mean weighted scores for the information needs of various practices of AI revealed that the most important information need was related to signs of heat detection in buffalo and pregnancy diagnosis followed by addresses of semen stations, rectal palpation, signs of heat in cattle and use of crystoscope for checking fern pattern (Table 1).

The most needed information by paravets was on symptoms of heat in buffaloes and pregnancy diagnosis both bearing 1st rank followed by address of semen stations with 2nd rank, rectal palpation ranked 3rd, signs of heat in cattle ranked 4th and use of crystoscope for checking fern pattern with 5th rank. Whereas the least needed information were source of AI equipment, source of LN2, importance of AI, average age and body weight of cattle and buffalo at maturity and wiping and cutting of straw and loading of gun. From earlier studies, it is quite evident that proper AI

Table 1. Prioritization of information needs of paravets

Information	MWS Paravets	Rank
Signs of heat in buffalo	7.22	I
Pregnancy diagnosis	7.22	I
Address of semen stations	6.09	II
Rectal palpation	5.97	III
Signs of heat in cattle	5.91	IV
Use of crystoscope for checking fern pattern	5.68	V
Storage and handling of semen straw	5.42	VI
Site of semen deposition	5.22	VII
Precautionary measures for effective AI	5.21	VIII
Oestrus cycle phases	4.92	IX
Sources of crystoscope	4.58	X
Characteristics of vulvar discharge	4.55	XI
Address of AI training centers	4.25	XII
Standard method of thawing	4.13	XIII
Proper timing of artificial insemination	3.69	XIV
Importance of heat detection	3.18	XV
Follow up of AI	3.18	XV
Feeding strategies for improved conception rate	3.08	XVI
Return to oestrus after calving	3.06	XVII
Treatment of reproductive disorders	3.00	XVIII
Treatment of infertility case	2.88	XIX
Govt. schemes and programmes to promote AI	2.82	XX
Wiping and cutting of straw and loading of gun	2.62	XXI
Average age and body weight of cattle and buffalo at maturity	2.14	XXII
Importance of artificial insemination	1.98	XXIII
Sources of LN2	1.61	XXIV
Sources of AI equipment	1.51	XXV

MWS, Mean weighted score.

technique is essential for improving conception rate. The National Programme for Bovine Breeding has also emphasised on extension of Field AI Network through "MAITRI-Multi-purpose AI Technician in Rural India", for overall improvement of AI sector in country. Along with provision of training courses on AI, there is need to focus on creating efficient information systems platform which can be easily accessed by the paravets. Further, the paravets need to be trained on the use of digital tools for faster information delivery and ease of use. Efforts are also needed for continuous education of the paravets for enhancing the effectiveness of AI. Convergence of various information dissemination efforts of the government and non-government sector and more number of multipronged information channels are required to fulfil the information needs of the paravets.

REFERENCES

Williams B L, Gwazdauskas F C, Whittier W D, Pearson R E and Nebel R L. 1988. Impact of site of inseminate deposition and environmental factors that influence reproduction of dairy cattle. *Journal of Dairy Science* **71**: 2278–83.

Chohan K R, Chaudhry R A, Iqbal J and Rahil T. 1992. Comparative efficiency of male and androgenized female teaser for oestrus detection in buffaloes. *Journal of Applied Animal Research* **2**: 23–26.

Farmers' manual, DAHF &F, Government of Odisha.

García-Ispierto I, López-Gatius F, Santolaria P, Yániz J L, Nogareda C and López-Béjar M. 2007. Factors affecting the fertility of high producing dairy herds in north-eastern Spain. *Theriogenology* **67**: 632–38.

Gizaw T and Dima F G. 2016. Assessment of problems and constraints associated with artificial insemination service in the two selected districts of Arsi zone. *Journal of Harmonized Research in Medical and Health Sciences* **3**(1): 14–37.

Hamdani S A. 2013. 'Role dynamics of para-veterinary professionals in relation to delivery of livestock health services'. PhD. Thesis, IVRI, Izatnagar, Uttar Pradesh.

Ibrahim N, Hailu R and Mohammed A. 2014. Assessment of problems associated with artificial insemination service in selected districts of Jimma zone. *Journal of Reproduction and Infertility* **5**(2): 37–44.

Juneyid R, Hassen A, Kemal J and Welay K. 2017. Assessment on problems associated with artificial insemination service in dairy cattle in Tullo district, West Hararghe, Ethiopia. *Ethiopian Veterinary Journal* **21**(2): 62–74.

Kassa F and Wuletaw W. 2018. Assessment of the problems associated with artificial insemination practices in Essera Woreda, Dawuro zone, Southern Ethiopia. *International Journal of Livestock Production* **9**(2): 24–28.

Lawrence F G, Mutembei H M, Lagat J, Mburu J, Amimo J and Okeyo A M. 2015. Constraints to use of breeding services in Kenya. *International Journal of Veterinary Sciences* **4**(4): 211–15.

Prabhu M J. 2012. Treating infertility, a common problem in cattle. The Hindu, March 26, 2012. www.thehindu.com. Accessed on 9.6.2018.

Rajendra K and Prabhakaran R. 1992. Current status and problems in feeding and breeding management of milch animals. *Indian Dairyman* **XLIV**(6): 274–76.

Roy K S and Prakash B S. 2009. Plasma progesterone, oestradiol-17β and total oestrogen profiles in relation to oestrous behaviour during induced ovulation in Murrah buffalo heifers. *Journal of Animal Physiology and Animal Nutrition* (*Berl*) **93**(4): 486–95.

Singh J, Nanda A S and Adams G P. 2000. The reproductive pattern and efficiency of female buffaloes. *Animal Reproduction Science* **60–61**: 593–604.

Singh P K, Tiwari R and Dutt T. 2018. Dairy husbandry information needs of farmers in different agro-climatic zones of Uttar Pradesh. *Indian Journal of Animal Sciences* **88**(8): 972–76.

Samsuddin M, Bhuian M M U, Chanda P C, Alam M G S and Abedin J. 1997. *Fertility related factors at artificial insemination in cattle in Bangladesh*. Proceedings of the Third Animal Scientific Conference, Bangaldesh Society for Veterinary Education and Research, Mymensingh, Bangladesh, 21–33.

Woretaw A, Admassu B, Shite B and Mohammed S. 2015. Assessment of problems associated with artificial insemination services in dairy cattle in Debre Tabour town, Ethiopia. *Journal of Reproduction and Infertility* **6**(2): 48–55.

Ybañez A P, Ybañez R H D, Caindec M O, Mani L V, Abela J V, Nuñez E S, Royo J T and Lopez I F M. 2017. Profile and artificial insemination practices of technicians and the artificial insemination success rates in Leyte, Samar, and Biliran, Philippines (2011–2015). *Veterinary World* **10**(2): 181–86.