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USE OF OXYTOCIN FOR MILK EJECTION IN BUFFALOES AND COWS IN AND AROUND FAISALABAD

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The comparative frequency of the use of oxytocin in buffaloes and cows in urban as well as rural areas, located within the radius of 15 km from the city clock tower, Faisalabad, was datermined. One hundred and sixty respondents, eighty each from urban and rural localities, were interviewed using a pretested interview schedule. The oxytocin was being used in 18.8 per cent of the 1573 buffaloes and 9.7 per cent of the 527 cows, observed in this study. Among the treated animals, more than 70 per cent buffaloes and 80 per cent cows were in Ist to 3rd lactation. The animals receiving oxytocin treatment were predominantly of viscious temperament; other situations requiring the use of oxytocin were death of the calves, improper handling and underfeeding. The oxytocin was being used regularly in 68.2 per cent of the treated buffaloes and 78.4 per cent of the treated cows, while some of the animals required this hormonal treatment only twice or thrice a week during the lactation period. About one-forth treated buffaloes and one-eighth of cows required more use of oxytocin during summer. Since a large majority of the respondents were laymen, their observations could at best be considered a guess work. It would therefore, be rather safe to confirm or reject the views of the respondents by carrying out detailed studies on some of the more pertinent aspects of the use of oxytocin in buffaloes as well as cows.

INTRODUCTION

The process of milk letdown is associated with the release of oxytocin into the blood subsequent to the stimulation caused by calf suckling, udder washing or massaging the udder and teats by the milker and in some cases by audio-visual stimuli such as noises associated with milking, feeding and the presence of milker.

Because of fright, anger, noise, pain, irritation and different milkers/methods of milking, some animals do not respond to normal stimulation, causing total or incomplete inhibition of milk ejection.

To tide over such partial or complete inhibition of milk letdown, the use of synthetic oxytocin has become very widespread with milk producers, who are mostly uneducated people. They use it for their convenience in preparing the animal for quick letdown of milk. The use of oxytocin in a majority of milch animals evidently seems uncalled for and can be safely avoided with a bit of animal conditioning. It appears that the milk producers have become more addicted to its use than their milch animals. It has been commonly observed that milk producers start using oxytocin without any professional advice. It is being so indiscriminately used and the ampoules containing oxytocin are so commonly available that even small grocery shops (Karyana Stores) would keep them for sale. Its use has, thus, become undesirably very wide. Its aftereffects, if any, are utterly disregarded.

The present study based on the survey through personal interviews with milk producers was planned : i) to collect information concerning comparative frequency of the use of oxytocin in buffaloes and cows in urban and rural areas, and ii) to find out the reasons for use of oxytocin in dairy animals.

MATERIALS AND METHODS

A survey was conducted (in October-December, 1985) in urban and rural areas within the radius of 15 km from the clock tower of the city of Faisalabad, using a pretested questionnaire. One hundred and sixty respondents (producers/owners), 80 each from urban and rural areas were interviewed. The respondents were further divided into four categories in each area, in accordance with herd-size, i.e., each having less than 5, 6 to 10, 11 to 20 and more than 20 lactating animals so as to get the representative information about the use of oxytocin. Thus, 20 respondents from each category were interviewed. Each area was further divided in five zones and an equal number of respondents of each of the four categories was interviewed from these zones. The data, thus collected were tabulated and expressed in percentages. An attempt was made to draw a logical inference from these data about the use of oxytocin in milch animals.

RESULTS AND DISCUSSION

Of the 1573 buffaloes and 527 cows observed both in urban and rural areas, 18.8 per cent buffaloes and 9.7 per cent cows were found under oxytocin treatment (Table 1). Both in buffaloes and cows, it was found that a higher percentage of animals was receiving oxytocin in rural areas than those in urban areas. In rural cows the use of oxytocin was as much as 65 per cent higher than in urban cows (Table 1). By splitting the data according to various herd sizes (<5 to >20 animals) and on the basis of weaned and unweaned calves of buffaloes/cows observed for this study, it was noticed that smaller the herd, the higher was the percentage of animals put to oxytocin use and vice versa. This was true irrespective of the type of locality (urban or rural) or species of milch animals involved (Table 2).

Table 1. *Relative use of oxytocin in buffaloes and cows of urban and rural areas*

Locality	Species					
	Buffaloes			Cows		
	Number of animals observed	Treated		Number of animals observed	Treated	
		Number	Percentage		Number	Percentage
Urban	846	151	17.8	323	25	7.7
Rural	727	145	19.9	204	26	12.7
Total	1573	296	18.8	527	51	9.7

The frequency of the use of oxytocin in buffaloes (urban and rural) with weaned calves was three to five times higher than in those with unweaned calves. However, both in urban and rural cows the influence of weaning on the frequency of oxytocin use was comparatively less evident than in buffaloes, being only two to three times higher in weaned than in cows with unweaned calves. The size of the herd also tended to affect the frequency of oxytocin use in animals with weaned/unweaned calves, frequency being lesser in larger herds of either species (Table 2).

Schams and Worstorff (1981) reported that suckling caused a greater increase in blood oxytocin levels than did milking. Akers and Lefcourt (1982) stat-

Table 2. *Influence of herdsize and weaning on the use of oxytocin in buffaloes and cows*

Type of locality	Herdsize (No.)	Species: Buffaloes — No. of animals observed	Buffaloes — Treated — Weaned No.	Weaned %	Unweaned No.	Unweaned %	Total No.	Total %	Species: Cows — No. of animals observed	Cows — Treated — Weaned No.	Weaned %	Unweaned No.	Unweaned %	Total No.	Total %
Urban	⩽ 5	66	16	24.2	3	4.6	19	28.8	4	1	25.0	2	50.0	3	75.0
	6 — 10	135	20	14.8	12	8.9	32	23.7	13	2	15.4	—	—	2	15.4
	11 — 20	221	32	14.4	7	3.2	39	17.6	64	7	10.9	2	3.1	9	14.0
	> 20	424	59	13.9	2	0.5	61	14.4	242	10	4.1	1	0.4	11	4.5
Total		846	127	15.0	24	2.8	151	17.8	323	20	6.2	5	1.5	25	7.7
Rural	⩽ 5	75	17	22.7	7	9.3	24	32.0	5	1	20.0	2	40.0	3	60.0
	6 — 10	135	22	16.3	8	5.9	30	22.2	13	4	30.8	—	—	4	30.8
	11 — 20	204	27	13.2	9	4.4	36	17.6	48	7	14.6	2	4.2	9	18.8
	> 20	313	41	13.1	14	4.5	55	17.6	138	7	5.1	3	2.2	10	7.3
Total		727	107	14.7	38	5.2	145	19.9	204	19	9.3	7	3.4	26	12.7
Grand Total		1573	234	14.9	62	3.9	296	18.8	527	39	7.4	12	2.3	51	9.7

ed that great increase in oxytocin levels was observed in cows housed with their calves. It was suggested that stimuli associated with the presence or absence of calf could alter the maternal secretion of oxytocin. The present results, in this respect, are largely in agreement with these findings, since the frequency of oxytocin use was three to five times and two to three times higher in buffaloes and cows, respectively, with weaned calves than in those with unweaned calves.

Age and stage of lactation

Of 296 urban and rural area buffaloes found treated with oxytocin, 25.3 per cent were in first lactation, 16.9 per cent in second and 28.4 per cent in third lactation. The remaining 29.4 per cent treated buffaloes were in fourth and fifth lactations or beyond these locations. This showed that over 70 per cent buffaloes requiring the use of oxytocin were in first to third lactation. With the exception of buffaloes in third lactation, the percentage of lactating animals requiring oxytocin for milk ejection fell from 25.3 in the first lactation to 11.5 per cent in fifth lactation and above. The cows, urban and rural alike, presented a similar picture. Rather, over 82 per cent cows were such that received oxytocin treatment during first to third lactation. The pattern of percentage of cows requiring the use of oxytocin during first to fifth lactation was essentially the same as that in buffaloes.

Ivanskes and Bider (1931) reported increased milk yield in heifers properly introduced to milking parlour. Injection with 2-4 doses of oxytocin was recommended by them as a means of preventing drop in milk yield among heifers introduced to milking parlour. The pattern showing the relationship between the use of oxytocin and the stage of lactation was almost similar in buffaloes and cows. The tendency towards increased use of oxytocin was clearly noticeable in early part of the lactation. It was more so in cows. However, a marked depression was noticed in oxytocin use during the mid lactation period. The frequency of use again rose to a significant extent during the late part of a lactation, which according to Momongan and Schmidt (1970) was due to decrease in peak levels of oxytocin in blood with advancing lactation. The increased use of oxytocin in earlier part of a lactation in buffaloes and cows, seemed to be a part of an adaptive mechanism involved in secretion and letdown of milk.

Frequency of oxytocin use

Among the treated animals, 68.2 per cent buffaloes and 78.4 per cent cows

were under daily use of oxytocin (morning, evening or at both times), whereas 31.8 per cent of the buffaloes and 21.6 per cent of the cows were being injected at varying intervals, ranging from its use on alternate days to once a fortnight.

Of the animals under daily treatment, 28.0 per cent buffaloes and 64.7 per cent cows were being injected both at morning at evening milkings; only 8.1 per cent buffaloes and 5.9 per cent cows were reported receiving the treatment at the morning milking alone, while 32.1 and 7.8 per cent buffaloes and cows, respectively, were being treated at evening milking alone. These data lend support to the idea that 72.0 and 35.3 per cent of the treated buffaloes and cows, respectively, are responding at least once daily, to the normal stimuli for milk letdown and that there is a possibility that these animals may safely be gradually diverted to a 'no-oxytocin-use' schedule or at least to a programme with much reduced frequency of such hormonal treatment of buffaloes and cows.

Route, site, dose and latent period

A large majority of those who use oxytocin in their buffaloes/cows, do it at their own, without any professional advice. They inject it themselves without observing any precautions and invariably use intramuscular route. The doses most often used in buffaloes and cows were 5 and 10 IU. The dose of 5 IU was used in 12.8 and 41.2 per cent of the treated buffaloes and cows, respectively, while 10 IU dose was employed in 87.2 per cent buffaloes and 58.8 per cent cows from among those treated with oxytocin. The usual sites reported for injecting oxytocin were neck, tail and thigh in the descending order of the frequency of the use of these sites. The choice for site of injection of 84.1 to 86.3 per cent owners/producers was neck of animal, while the use of tail and thigh for injecting oxytocin in buffaloes and cows varied between 5.1 to 10.8 per cent.

Since the owners of dairy animals or producers of milk are mostly illiterate, therefore, in choosing a dosage level of oxytocin, they have no other consideration than the availability in the market of 5 or 10 IU oxytocin injections contained in ampoules of the same size and shape. Moreover, the market price of 5 or 10 IU ampoules does not vary much. Thus, only a few would bother about the dosage being used by them. However, some experienced dairymen might use a 10 IU ampoule for injecting two animals, about 5 IU of oxytocin to each. The time interval, in between the administration of oxytocin and the letdown of milk, designated as latent period, ranged between 2-5 minutes in a large number of treated buffaloes and cows. This period was reported as less

than 2 minutes in nearly one-third animals and more than 5 minutes in 13.8 and 17.6 per cent buffaloes and cows, respectively.

Most of the producers who use oxytocin in their milch animals, inject the drug on hit and trial basis. The syringes used are usually worn out. Thus, with some injectors, there is a possibility of partial loss of oxytocin due to leakage from the syringe or due to a part of the oxytocin remaining unsucked in the vial, causing some variation in the latent period. Premachandra *et al.* (1959) observed the time taken for letdown as 1.5-2.0 minutes and 5-6 minutes with subcutaneous doses of 20 and 10 IU of oxytocin, respectively, whereas the period was reduced to 15-25 seconds for 10 IU oxytocin injected intrajugularly.

Reasons for oxytocin use

The major factors responsible for the use of oxytocin in buffaloes and cows as reported by various respondents were : viscious temperament of the animals, death of the calf, disowning of the calf by its dam, improper handling, underfeeding and poor management. The respondents further told that they were using oxytocin in their animals for ease in letdown and milking of dairy animals. Nearly all the producers considered that the useof oxytocin was a far better measure for causing letdown of milk than other unnatural practices such as inflation of vagina, and insertion of animals' own tail into its vagina. Aliev (1969) found that changes in maintenance conditions of animals or disturbance caused incomplete inhibition of milk ejection with adrenaline released in blood from the adrenal glands. Slobodyanik (1978) stated that adrenaline decreased the motor activity of the mammary gland and reduced milk flow and the oxytocin effect. Adeeva (1983) reported that inhibition of positive emotional stimuli reduced oxytocin concentration in the blood and markedly reduced milk secretion. Akers and Lefcourt (1982) stated that the presence or absence of the calf with its dam could alter the maternal secretion of oxytocin.

Gupta *et al.* (1985) reported that milking ability of the restless, nervous and aggressive animals was less than that of docile animals. Also, the milk yield per milking was significantly higher in docile animals than that of viscious stock. Tulegenov and Kuanyshbekova (1985) observed that under unusual (stressful) conditions, milk release reflex was inhibited.

Another factor responsible for the use of oxytocin especially in rural areas

is the temptation on the part of producers to quickly get milk from the animal for its timely disposal in the market. Thus, any hesitation shown in milk let-down by the buffalo/cow, prompts the producer to inject oxytocin for quicker ejection of milk so that he does not have to wait. At times, middlemen, 'Dodh-ees' themselves milk the animals of different producers and to save their time, they unnecessarily use oxytocin for ready milk ejection reflex. Among other factors responsible for the uncalled for use of oxytocin, its low price and easy availability in the market and utter illiteracy of the milk producers/stock owners, also motivate its unnecessary use in dairy animals.

REFERENCES

Adeeva, V. N. 1982. Effect of negative emotion of milk secretion in goats. Biologicheskaya, 1 : 71-76 (Dairy Sci. Abst., 45 (11) : 7849, 1983).

Akers, R. M. and A. M. Lefcourt. 1932. Milking - and suckling-induced secretion of oxytocin and prolactin in parturient dairy cows. Hormones and Behaviour, 16 (1) : 87-93 (Dairy Sci. Abst., 44 (11) : 7473, 1982).

Aliev, M. G. 1959. Physiology of milk ejection in buffaloes - a review. Dairy Sci. Abst. 31 (12) : 677-680.

Gupta, S. C., M. C. Handa and G. Sahoo. 1935. Dairy temperament of buffaloes in relation to their milking ability. Indian J. Ani. Prod. Management, 1 (3) : 116-119 (Dairy Sci. Abst., 48 (1) : 74, 1986).

Ivancsics, J. and E. Bader. 1931. Intramuscular oxytocin administration as an adaptation procedure in herringbone milking parlours. Moson. Mezog. Kar Kozlemenyei, 23 (1/11) : 95-109 (Dairy Sci. Abst., 45 (10) : 7105, 1983).

Momongan, V. G. and G. H. Schmidt. 1970. Oxytocin levels in the plasma of Holstein-Friesian cows during milking with and without a premilking stimulus. J. Dairy Sci. 53 : 747.

Premachandra, B. N., G. W. Pipes and R. V. Bersvordtwallrabe. 1959. Comparison of the intravenous and subcutaneous injections of oxytocin in lactating cows. J. Dairy Sci. 42 (5) : 918.

Schams, D. and H. Worstorff. 1981. Radioimmunological determination of oxytocin in connection with milk removal. Advances in Physiological Sciences, 20 : 217 (Dairy Sci. Abst., 44 (3) ; 1610, 1982).

Slobodyanik, K. F. 1978. Effect of the sympatho-adrenal system on milk ejection in cows. Fiziologicheskil Journal, 24 (4) : 461-464 (Dairy Sci. Abst., 43 (2) ; 751, 1981).

Tulegenov, B. and G. A. Kuanyshbekova. 1985. Effect of stress factors on catecholamines in the blood and milk of lactating animals (Goats). Seriya Biologicheskaya, 5 : 72-75 (Dairy Sci. Abst., 48 (2) ; 889, 1986).