

Incidence of postpartum anestrus among buffaloes in and around Jabalpur

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Abstract

Aim: Postpartum anestrus is one of the major problems in buffalo reproduction; the knowledge of its incidence may be helpful to adopt preventive and therapeutic measures for improvement of reproductive efficiency and thus production of the dairy animals.

Materials and Methods: To investigate the incidence of postpartum anestrus, a total 6105 Murrah and upgraded Murrah buffaloes were surveyed in and around the district of Jabalpur, Madhya Pradesh, India. Among these, 4708 and 1397 buffaloes were surveyed in organized and unorganized rearing system, respectively. Among the organized farms, 2050 and 2658 buffaloes were observed in good and moderate managemental condition, respectively. Anestrus and sub estrus were confirmed by per rectal examination and serum progesterone estimation.

Results: The overall incidence of anestrus was recorded 29.12%. The incidence of anestrus was recorded 25.84% and 40.15%, respectively, in organized and unorganized rearing system, and among organized farms it was 22.58% and 28.36% in good and moderate managemental conditions, respectively. The incidence of anestrus in summer, rainy, and winter season was found to be 66.28%, 22.51%, and 11.25%, respectively. Based on per-rectal examination and serum progesterone concentration, 60.58 per cent buffaloes were classified as true anestrus, 20.88 per cent as sub estrus, and 18.52 per cent anestrus due to other unknown conditions.

Conclusion: These results indicated that the incidence of anestrus, especially true anestrus, was higher at farmer's door. Moreover, the incidence of anestrus was higher in summer season and hence appropriate preventive and or therapeutic measures as per the type of anestrus need to be undertaken.

Keywords: anestrus, buffaloes, incidence, postpartum

Introduction

Buffalo is a most valuable livestock resource in Asian countries including India. Although buffaloes are well adapted to hot and humid climate, their reproductive performance is greatly influence by heat stress [1]. Postpartum anestrus is one of most common reproductive disorder in buffaloes and its incidence is higher during summer season. The estrous cycles, which cease during pregnancy, usually resume within two to three months of calving in buffaloes [2]. Elevated level of progesterone during pregnancy exerts a negative feedback effect on the hypothalamic-pituitary axis that lead to cessation of cycle during pregnancy. After parturition the concentration of these hormones are withdrawn and emergence of follicular waves occurs with the transient rise of Follicle Stimulating Hormone [3]. But subsequent growth of follicle is largely depends upon insulin and insulin like growth factor (IGF)-I whose concentration is greatly influenced by level of nutrition [4]. Negative energy balance during postpartum period reduces pulsatile

secretion of luteinizing hormone (LH) that also affects the follicular growth [3]. Any delay in resumption of cyclicity results into prolonged intercalving period, poor net calf crop and production losses. Postpartum resumption of ovarian activity and subsequent conception may be affected by several factors such as breed, nutrition, milk yield, suckling, body weight, body condition score (BCS), parity, season and uterine involution [5, 6].

Since postpartum anestrus is one of the most frustrating problems in buffalo reproduction, the knowledge of its incidence may be helpful to adopt therapeutic measures for the benefit of dairy farmers.

Materials and Methods

Location and place of work: The study was carried out in private dairy farms located in Jabalpur (Madhya Pradesh) and its surrounding areas such as Pariyat, Panagar, Raipura, Silwa, Gosalpur, Bandarcolla, Menkhedi, Harduli and College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, India.

Meteorological data: Madhya Pradesh is state in central India, located between 17° to 25° N latitude and 72° to 85° E longitudes. Jabalpur, where the present

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Table-1. Different managemental practices

Parameters of managemental practices	Organized rearing system		Unorganized rearing system
	Good managemental practices	Moderate managemental practices	
Feeding Management			
Concentrate	Yes	Yes	Reared entirely on grazing
Greens	Yes	Yes	
Mineral mixture	Yes	No	No
Provision of water	Clean water, ad libitum	Clean water, ad libitum	Pond water, ad libitum
Housing Management			
Floor of house	Cemented	Cemented	Non cemented
Ventilation	Proper	Proper	Improper
Provision of shed	Yes	Yes but not proper	No
Cooling system in summer	Adequate (foggers is used)	Improper (manual sprinkling of water)	Wallowing in ponds, if water is available
Breeding Management			
Estrus detection	Efficient (two times at early morning and late evening)	Inefficient (two times but after sun rise and before sun set)	No detection of estrus
Breeding	Natural service on detected estrus	Natural service on detected estrus	Mates while grazing if buffalo bull is available
Pregnancy diagnosis	Yes and regular	Yes but not regular	No
Diagnosis and treatment of diseases	Adequate	Improper	No

study was carried out is the biggest city of the state by area (5,211 km²) and located at 23.17° N and 79.95° E and 410.87 MLS (Meter above sea level). Jabalpur has a humid subtropical climate being May is the hottest month with temperature reaching up to 45°C. Jabalpur gets moderate rainfall of 890 to 970 mm during July to September due to south-west monsoon. The soil of Jabalpur and its surrounding area is alkaline and low in nitrogen, zinc, manganese and phosphorus whereas high in potassium, copper and iron.

Ethical approval: The experiments and sample collection procedure were approved by Institutional Animal Ethics Committee.

Survey of buffaloes: To investigate the incidence of postpartum anestrus, total 6105 Murrah and upgraded Murrah buffaloes were surveyed, both in organized and unorganized rearing system complaining non return to estrus in 75 days or more postpartum in and around Jabalpur district of Madhya Pradesh (India) during year 2011-12. Out of 6105, 4708 and 1397 buffaloes were surveyed in organized and unorganized rearing system, respectively. Among the organized dairy farms, 2050 and 2658 buffaloes were observed under good and moderate managemental conditions, respectively. The recorded incidence of anestrus from the organized farms was also distributed season wise i.e. summer, rainy and winter season. The body condition score of all surveyed buffalo was in between 2 and 4 in five point scales.

Managemental practices: Different managemental practices have been observed during the investigation of the anestrus buffaloes among the various dairy farms of Jabalpur and its surrounding villages. On the basis of managemental practices, the rearing system has been divided in to two categories; organized and unorganized rearing system. Moreover, managemental difference were also observed among the organized rearing system and thus divided into good and moderate rearing system (Table-1). Concentrate mixture and

greens are offered only in organized rearing system whereas unorganized rearing system is entirely based on grazing. The concentrate feed includes mixture of Maize, Wheat bran, Dal Chuni, Cotton seed and Mustard oil cake and offered @ 5 kg/day/animal, however, some owner drench about 200 ml of mustard oil to their buffaloes once in week to enhance milk production whereas green fodder includes mainly Barseem and Lucern and offered @ 5kg/day/animal, when available. The bulk of feed includes dry fodder particularly wheat straw which has low nutrient value.

Blood sampling: To know the serum progesterone concentration, about 5ml blood samples were collected aseptically in plastic test tubes from jugular vein of anestrus buffaloes. Blood samples were collected randomly from 340 buffaloes in Jabalpur and its surrounding villages. The serum was separated and kept at -20°C until analysis.

Gynecological examination and progesterone estimation: A total of 340 buffaloes which failed to resume estrous cycle within 75 days post-partum during summer were examined per rectally. Further, anestrus and sub estrus were confirmed by serum progesterone estimation using ELISA kit, as most of the buffalo exhibit silent estrus particularly in summer. Based on per rectal examination and serum progesterone level, the postpartum anestrus buffaloes were classified as true anestrus (ovaries with no palpable corpus luteum and/or serum progesterone <1ng/ml); sub estrus (presence of corpus luteum in one of the ovaries and/or serum progesterone >1ng/ml) and anestrus due to other patho-physiological conditions such as unnoticed service, persistent corpus luteum and cystic ovaries.

Results

The overall incidence of anestrus was recorded 29.12% (ranging from 22.58% to 40.15%) in different conditions (Table-2). The incidence of anestrus was recorded 25.84% and 40.15%, respectively in organized

Table-2. Incidence of anestrus under different rearing system

	Unorganized Farms	Organized Farms			Grand Total
		Moderate Management	Good Management	Total	
Animals surveyed	1397	2658	2050	4708	6105
Anestrus animals	561	754	463	1217	1778
% of anestrus	40.15	28.36	22.58	25.84	29.12

Table-3. Season wise distribution of anestrus in buffaloes in organized farms

Animals surveyed	Animals in anestrus	Season wise distribution of anestrus						
		Summer		Rainy		Winter		
		N	%	N	%	N	%	
4708	1217	25.84	806	66.28	274	22.51	137	11.25

Table-4. Types of anestrus cases recorded in buffaloes

Animals examined	True anestrus		Sub/Silent estrus		Other Patho-Physiological conditions	
	N	%	N	%	N	%
340	206	60.58	71	20.88	63	18.52

and unorganized rearing system. Among the organized farms, the incidence of anestrus was observed 22.58% and 28.36% in good and moderate managemental conditions, respectively (Table-2). The incidence of anestrus among the buffaloes of organized dairy farms was also distributed into season wise i.e. summer, rainy and winter season, which was 66.28%, 22.51% and 11.25%, respectively (Table-3). Based on per-rectal examination and serum progesterone concentration, 60.58% buffaloes were classified as true anestrus, 20.88% as sub estrus and 18.52% anestrus due to other conditions (Table-4).

Discussion

Incidence of anestrus under different rearing system: In the present study the overall incidence of anestrus was recorded 29.12%. The incidence of anestrus may vary in different agro-climatic regions (7, 8, 9 and 10). However, quite variations do exist in terms of its percentage wise occurrence because of breed, sample size, criteria for consideration etc. In the present study, a higher incidence of anestrus was reported which might be due to different criteria of consideration i.e. those buffaloes, failed to resume cyclicity within 75 days post parturition as against three months or more by other researchers, were taken into account.

Incidence of anestrus was found to be higher (40.15%) in unorganized rearing system as compared to that of organized farms (25.84%). This might be due to nutritional deficiency and different managemental practices among the unorganized rearing system. Moreover, calves are not weaned after parturition thus suckling results in delayed resumption of postpartum cyclicity, probably due to negative effect of the prolactin that are released in response to suckling [3]. Further, the postpartum anestrus period is higher in the unorganized sector as there is common belief among the villagers that the milk yield would be reduced, if they bred their animals during early lactation period. Among the organized farms, incidence of anestrus was different under good and moderate managemental

conditions, respectively. This difference in incidence might be due to sub optimal managemental practices include housing, feeding and breeding in moderate managemental practices.

Seasonwise distribution of anestrus in buffaloes: Result showed that higher incidence of anestrus in buffaloes was observed during summer (66.28%) as compared to rainy (22.51%) and winter season (11.25%). The possible reason is that buffaloes have less heat dissipating mechanism thus more prone to heat stress during summer as compared to other dairy animals. Heat stress affects folliculogenesis, follicular fluid micro environment and oocyte quality [11]. Moreover, high environmental temperature causes hyper-prolactinaemia, suppressing the secretion of gonadotrophins which leads to an alteration in ovarian steroidogenesis [11] thus this might be the reason of higher incidence of anestrus in summer. In winter, the environmental temperature is low thus no effect on folliculogenesis and steroidogenesis and hence occurrence of anestrus is minimum. The incidence of anestrus in summer in present study is in agreement with the finding of [9] but appeared higher than the result of [12] during summer. Similar seasonal variation of anestrus has also been reported in other countries [13, 14].

Types of anestrus cases recorded in buffaloes: Per rectal examination and serum progesterone estimation of 340 anestrus buffaloes during summer revealed 60.58% true anestrus, 20.88% sub-estrus and 18.52% other conditions such as unnoticed service, persistent corpus luteum and cystic ovaries. Higher incidence of true anestrus might be due to negative energy balance, minerals deficiency as well as high environmental temperature as these factors affect the folliculogenesis and steroidogenesis. Whereas Gupta [9] reported higher incidence of true anestrus (71.42%) and sub-estrus (28.57%), Singh, et. al. [15] reported lower incidence i.e. 33.32% true anestrus with 9.5% sub-estrus. Shah, et. al. [16] has reported only 8.9% true anestrus in dairy buffaloes. However, incidence of true

anestrus was recorded more than the sub estrus by most of the workers [17]. These variations in incidence of anestrus as reported by different workers might be due to differences in breed, number of animals, management, geographic environment and level of nutrition etc.

Conclusion

The results of present study indicated that postpartum anestrus is still a major problem, prevailing among the buffalo dairy farms particularly in unorganized rearing systems. The incidence of true anestrus is higher especially in summer season under field conditions. Therefore, appropriate therapeutic management of anestrus needs to be adopted to minimize the economic losses to the dairy farmers.

Authors' contributions

PRK has done survey work on buffaloes to find out the incidence of postpartum anestrus and also calculated incidence of different types of anestrus particularly postpartum anestrus in different managerial practices as well as different season. SNS has monitored all the activities being a supervisor. OPS and RDP have helped in estimation of progesterone besides helping on analysis. All authors participated in drafting and revision of manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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