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Techno-economics of vitamin E and Se on postpartum complications in Frieswal cows

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Abstract

The present study was conducted on total 32 apparently healthy advance pregnant Frieswal cows divided into 4 groups (Control group =8, Treatment group A=8, B=8, C=8) were selected to explore effect of vit. E and Se on their reproductive performance each cow of group A served as untreated group, Group B, C was treated with α -tocopherol acetate-500mg and sodium selenite 15mg in micelle form intramuscularly thrice and twice, where as Group D treated with oral supplementation of α -tocopherol acetate and sodium selenite. Postpartum complications cause loss due to death of cows costing Rs.1111, immediate culling Rs.389, Veterinary fees Rs.300, drug cost Rs.949, lost milk production @ Rs30/liter. The loss amounted in group I was Rs. 3552.56, group II Rs. 4804.68, and group III Rs. 6057.9, Similarly loss due to delayed conception in group I was Rs.977.26, in group II Rs.2245.46 while in group III Rs. 939.96, the total average financial loss per case in group I was Rs. 7278.82, in group II Rs.9799.14 and in group III Rs. 9746.89.

Keywords: Frieswal cows, α tocopherol acetate, sodium, postpartum complication, culling, veterinary fee

Introduction

Dairy industry plays an important role in the economy of India. India is the largest milk producer in the world, the production is 121 million metric tons close to 17% of the world's total milk production (NDDDB – India, 2010- 2011). For economic dairy farming, dairy cows irrespective of being exotic, cross breed or indigenous must calve regularly at every 12 to 13month interval. Any deviation or prolongation in breeding rhythm result in progressive economic loss due to extension of open days, reduced number of calving and lactations during the life span of the animal.

Postpartum period is regarded as important in the reproductive life of the cow because of its effect on the future fertility. Reproductive problems in cattle are of significant economic concern in dairy farming. Maximizing reproductive efficiency is the goal of reproductive management programs in dairy herds for better economics returns. Infection and subsequent inflammation of the bovine uterus compromise uterine health and contribute to decrease reproductive efficiency in dairy cows (Coleman *et al.*, 1985; Fourichon *et al.*, 2000) [6, 9].

Immunopotentiality with vitamin E and selenium significantly improves reproductive performance of buffaloes in respect to uterine involution period and calving to estrus interval (Qureshi *et al.*, 1997). Deficiencies of either vitamin E or selenium have been associated with increased incidence of clinical mastitis cases and higher milk somatic cell counts (Morgante *et al.*, 1999) [13].

Reduction in number of days for resumption of estrus from 70 to 50 in dairy cows receiving 1000 IU vitamin E per day. (Campbell and Miller 1998) [5]. Administration of vitamin E and/or selenium reduces the incidence of postpartum reproductive disorders such as retained fetal membranes, metritis, cystic ovaries and improved fertility in cattle (Baldi *et al.*, 2008) [2].

Materials and Methods

The present study was conducted on 32 Frieswal cows of 1st to 7th parity in advance pregnancy of about 260 to 280 days belonging to military dairy farm, Mhow (M.P.). All the cows were maintained under standard schedule of feeding and managerial condition. Previous history regarding parity, gestation period, previous breeding record, periparturient complications (pre and post partum prolapse, abortion, premature or still birth, dystocia, retention of fetal

membrane, post partum metritis, pyometra and metabolic diseases), period required for cessation of lochial discharge 1st post partum estrus, service period, services / conception, average milk yield per 100 days, mastitis if any reported were recorded, Two months before expected calving date, cows were kept separately into calving lines and those showing the signs of parturition were kept in calving boxes where they were retained for a week after parturition.

Weaning was practiced and calf separated from dam 2 days after calving. Milk records, calving and treatment registers maintained by farm management were used for techno-

economic studies

These 32 cows were randomly divided into two groups

- 1) Control group 2) Treatment group.
- 1) Control group - 8 apparently healthy advance pregnant Frieswal cows and no treatment was given to these cows.
- 2) Treatment group- treatment group consisted of 24 advance pregnant Frieswal cow and was randomly divided into three sub groups. (Mention below table as table 1)

Table 1: Grouping of Animals

S. No	Groups	Treatment(α - tocopherol acetate @500mg and se sodium selenite @15mg)			
1.	Control Group	No Treatment	1 st dose	2 nd dose	3 rd dose
2.	Treatment Group				
	Group A		2nd -3rd week prior to parturition	During 1st week prior to parturition	Within 4 hrs after parturition
	Group B			During 1st week prior to parturition	Within 4 hrs after parturition
	Group C	Administered 5mg/day oral supplementation of Vit. E And Se for 6 days, 15 days prior to parturition and subsequently the administration was repeated for 6 days after parturition			

Result

Assessment of economic loss due to postpartum complications

Loss due to delay in service period

The average service period in control group was 91.1 ± 36 days. It was minimum (61 ± 5.4 days) in group II, where in the service period was prolonged by 30.10 days as compared to control group. Prolonged serviced period in different treatment groups.

Loss due to prolongation of services period

Losses due to prolongation of service period were calculated according to feeding and treatment registers of dry animals and inquiry from staff engaged in feeding and management of dry cows. It was found that on average 8 Kg roughage (dry and green) @ Rs.3.70/Kg costing Rs. 29.6 and 4 Kg concentrate mixture @ 10.00/Kg costing Rs 40.00 was given daily to the animals. Average cost for light, labour, medicine etc. was calculated as Rs 5 /each cow/day. Thus, the average daily expenditure for feeding and management of a cow was calculated @ Rs.74.6 loss due to delay in service period per day. It was computed to be, Rs.7278.82/cow in group I, Rs. 2245.46/cow group II, and Rs.9746.89/cows in group III with respect to number of days prolonged in each group.

The loss due to prolongation of service period was minimum in group I (Rs.7278.82) and maximum in group III (Rs. 9746.89).

Loss in milk yield due to postpartum complications

Losses due to reduced milk yield were calculated as the group

I cows produced 3406.6 ± 64.1 and the control group cows produced 2459.25 ± 111.2 litres. The loss due to 947.35 liters milk production was Rs. 28420.5 @ Rs.30/ litre and the average loss was Rs.7278.82/cow.

The group II cows produced 3740.5 ± 264.8 liters milk and the control group cows produced 2459.25 ± 111.2 . The control group cows produced 1281.25 liters less milk. The loss due to 1281.25 liter milk production costing Rs. 38437.5 and the average loss was Rs.4804.68 /cow.

Similarly, the group III cows produced 4074.7 ± 187.5 liters milk while the control group cows produced 2459.25 ± 111.2 . The control group cows produced 1615.45 less milk. The loss due to 1615.45 liters less milk was Rs.48463.5, The average loss was Rs. 9746.89.

Loss due to treatment of postpartum treatment

Those cows which were affected with pre and postpartum complications like the case of abortion used the Oxytocine 5ml for 3 days, along with Ketoprofen 10 ml for 3 days or any inflammatory drug was administered intramuscularly for 3 days with other supportive treatment. After 3 days the animal was treated for metritis with 100ml Metranedazol intrauterine for 3 days of drug. The cost of drugs occurred during study period on various ailments (pre and post partum complications) were included for this purpose.

In our study a total of 180 animals were treated. Total cost of the treatment for 180 cows were calculated as Rs.170850 and the average cost of treatment for a postpartum complication in cow was Rs.949

Table 2: Cost of Medicine used in Treatment of pre and postpartum complication (180) in Frieswal cows

S. No	Name of Medicine	Quantity per day	Days	No of animals	Quantity	Rates	Amount
1.	Oxytocine	5 ml	3	20	300 ml	Rs 24/ml	7200
2.	Replenta	50 gm	3	110	16500 mg	Rs 30/100ml	4950
3.	Avil	10 ml	3	150	4500 ml	Rs 18/30 ml	2700
4.	Ketoprofen	10 ml	3	75	2250 ml	Rs 46/10 ml	10350
5.	Furea	4 bolus	3	181	2172 bolus	Rs 20/4bo	10860
6.	Uterotone	100 ml	3	35	10500 ml	Rs 121/900 ml	1142
7.	Dexona	10 ml	1	124	1240 ml	Rs 45/30 ml	1860
8.	Clenex	6 bolus	4	20	480 bolus	Rs 28/4 bolus	3360

9.	Mifex	450ml	1	52	23400 ml	Rs126/450	6652
10.	Metronedazol	100 ml	3	135	40500 ml	Rs 13/100 ml	5265
11.	Zobid	30 ml	2	42	2520 ml	Rs105/30 ml	8820
12.	Lutalyse	5 ml	1	15	75 ml	Rs 368/10 ml	2760
13.	Gentamycin	30 ml	3	32	2880 ml	24/30 ml	2304
14.	Artizone	15 ml	3	40	1800 ml	Rs 45/100 ml	810
15.	Ciprofloxacin	30 ml	3	150	13500 ml	18/100 ml	2430
16.	Prednisone	10 ml	3	112	3360 ml	34/10 ml	11424
17.	Nuroxin-m	15 ml	3	110	4950 ml	38/10 ml	18810
18.	Tonophasphan	20 ml	3	150	9000 ml	124/30 ml	37200
19.	Urimin	15 ml	3	35	1575 ml	Rs 90/30 ml	4725
20.	Duraprogen	500 mg	1	30	15000 mg	Rs 90/750	1800
21.	Enrofloxacin	30ml	3	30	2700 ml	134/100 ml	3818
22.	Oxytetracycline	50 ml	3	180	27000 ml	42/100 ml	11340
23.	Belamyl	10 ml	5	158	7900 ml	13/10 ml	10270
	Total						170850

Loss due to culling of postpartum affected cows

It was found that in the retrospective study (5 years) 250 cows were culled due to different reasons. Further, of the 180 cows suffered, 5 cows were culled due to postpartum complications. Average auction value of cow was calculated @ Rs. 6000/cow. Cow yield on an average 10 liters of milk /day cost Rs. 20000. So, average loss due to culling of one cow was calculated as Rs. 14000. Total cost due to culling of 5 cows was calculated as Rs.70000. out of 180 postpartum complicated cases; loss due to culling after postpartum complication was Rs.70000 and per case of postpartum complication the average loss was calculated as Rs 389.

Loss due to death of postpartum affected cows

Out of post partum complications cases, 5 cows died due to dystocia, or prolapse. All these 5 cows were treated for complication like abortion, dystocia or prolapse @ of 40000 each cow the cost of 5 cows was calculated as Rs. 200000. Thus out of 180 cows which were affected with postpartum complications loss due to death after treatment of complications was Rs. 200000 and loss due to each cow affected with postpartum complication was as Rs. 1111.

Doctor fees

For treatment of cows which was affected with postpartum complication like RFM, on an average three visits were given by the doctor. First visit after 12 hrs of calving for removal of placenta, second visit on 3rd day, and third visit on 7th day after calving. In between this period treatment prescribed by doctor was followed by attendant posted at military dairy farm Mhow. Doctor's charges were calculated @ Rs. 100 for each visit, per case. Total cost of doctor fee was calculated as Rs.300.

Overall economic loss due to postpartum complication

Due to postpartum complications, there is loss of fertility. Overall loss due to postpartum complications in Frieswal cows. Postpartum complications cause loss due to death of cows costing Rs.1111, immediate culling Rs.389, Veterinary fees Rs.300, drug cost Rs.949, lost milk production @ Rs30/liter. The loss amounted in group I was Rs. 3552.56, group II Rs. 4804.68, and group III Rs. 6057.9, Similarly loss due to delayed conception in group I was Rs.977.26, in group II Rs.2245.46 while in group III Rs. 939.96. The total average financial loss per case in group I was Rs. 7278.82, in group II Rs.9799.14 and in group III Rs. 9746.89.

Table 3: Economic loss due to postpartum complications

S. No	Parameter	Rate/Total loss (Rs)	Loss due to each case of postpartum complication (Rs)		
			G I	G II	G III
1.	Delay in service period (days)	-	13.1	30.10	12.6
2.	Loss due delay in service period	@74.6/day	977.26	2245.46	939.96
3.	Reduced milk yield (liters)	-	947.35	1281.25	1615.45
4.	Loss due to 1281.35 liters reduced milk yield	@30/liter	3552.56	4804.68	6057.93
5.	Loss due to culling of 5 cows@14000 / cow	70000/180 cows*	389	389	389
6.	Loss due to death of 5 cows @40000/ cow	200000/180 cows*	1111	1111	1111
7.	Loss due to treatment(drug cost)	170850/180 cows8*	949	949	949
	Doctors Fees @100/each visit	54000/180 cows*	300	300	300
	Overall loss due to each pre and post partum complications suffered cows		7278.82	9799.14	9746.89

*Number of cows suffered with pre and post partum complications as per previous records.

Discussion

Assessment of economic loss due to postpartum complications

Loss due to prolongation of services period

Prolongation of average service period in vit E and Se administered groups, as compared to control group was 13.1 days (group I), 30.1days (group II) and 12.6 days (group III) respectively. The losses calculated for delay in service period @ Rs. 74.6/day amounted to Rs. 7278.82/cow, which was minimum in group I. Borsberry and Dobson (1989) reported slightly higher losses which were comparable to the losses

observed in group II.

Loss in milk yield due to postpartum complications

Losses in milk yield, in vit E and Se administered groups, as compared to control group was 3406.6±64.1 liters (group I);3740.5± 264.8 liters and 4074.7±187.5 liters in group III. The losses calculated for milk yield @ Rs. 30/liter amounted to Rs.7278.82/cow (group I) which was almost similar to that reported by Deluyker *et al.* (1991) [7] who also reported similar amount of milk yield loss due to RFM affected cows.

Loss due to treatment of postpartum treatment

Average cost for treatment of pre and postpartum complicated cows was calculated as Rs. 949. The present findings are in close approximation with the reports of Bartlett *et al.* (1986)^[3] however Dwivedi *et al.* (2009)^[8] reported comparatively lower loss for retention of fetal membrane in crossbred cows.

Loss due to culling of postpartum affected cows

In present study 5 cows were culled due to pre and postpartum complications. Loss due to cows affected with postpartum complication was Rs. 389 per cow. The present findings are in close agreement with the reports of Bartlett *et al.* (1986)^[3].

Loss due to death of postpartum affected cows

In present study 5 cows died due to pre and postpartum complications. Loss due to each cow affected with postpartum complication was Rs. 1111. Similar observations have been reported by Godden *et al.* (2003)^[10].

Doctor fees

The doctor required on an average 3 visits to treat a pre and postpartum complication and thus average fee of a doctor was Rs. Rs.300. The present findings are in close agreement with the reports of Shukla (2005)^[16].

Overall economic loss due to postpartum complication

In present study the total average financial loss per case was calculated as Rs. 7278.82 for group I which was minimum; Rs.9799.14 in group II and Rs.9746.89 for group III cows. The present findings are in close approximation with the reports of Kelton *et al.* (1998)^[12] however Dwivedi reported higher loss due to retention of fetal membrane in crossbred cows.

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