RESEARCH ARTICLE

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Inter- and Cross-Sucking in Simmental and Holstein-Friesian Calves with Special Interpretation of Farm and Gender Basis

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Abstract

The aim of this study was to determine the relationship between gender and breed factors on inter and cross sucking calves with abnormal behavior. Present field study was enrolled among 4 different farms located in Aydin Municipality, in the Aegean Region of Turkey. A total of 456 calves, with abnormal behavior characteristics, from those 4 farms, were enrolled, involving neonatal calves. The data collected during half an hour observation session were as follows: a) total suckling period and b) suckling bout attempts. Cross-sucking was frequently detected near the feeder in all 4 farms. Heavier calves were sucked more often. The milk bottle were also sucked often, but never longer than 10 seconds. Calves were frequently active in cross-sucking and it was observed that the cross-sucking calves went into the milk feeder more often for a shorter duration. Simmental calves with cross-suckling per observation time were significantly higher than that of the Holstein ($p<0.001$). Number of Simmental calves was higher for cross- and inter-sucking behavior. Given the individual interpretation of 4 different farms involved in this study, cross-sucking attempts regarding gender indicated significancy for farms I ($p<0.05$) and IV ($p<0.001$). The present study supports a potential preliminary finding for calves with stereotypical behaviors for further studies in Turkey.

Keywords: Behavior, calf, stereotypical, sucking.

INTRODUCTION

Regarding modern dairy farming, which is composed of several management factors, calves are in general separated from their dams' following birth, as accepted believe in that social inter-contact is prohibited. Naturally the cow-calf bonding exists very soon following birth occurring for at least 12 months. It has been well recognized that keeping calves along with dam might result in cow-calf bond (with no nursing) (Johnsen et al., 2015). Natural suckling as a behavior for both mother and offspring, allows milk transfer from the dam to the calves inducing sucking act (Johnsen et al., 2015; Mahmoud et al., 2016). In an attempt to induce natural sucking behavior, under artificial rearing, calves frequently fed via bucket or by artificial teat (Khan et al., 2011).

The artificial rearing subsequently results in emotional and nutritional stressors (Soberon et al., 2012; David et al., 2014). Given the artificially reared calves, which do not receive their dam's assist (Größbacher et al., 2018), might be prone to different sucking behaviour on behalf other relevant calves, with reference terminology [i.e. cross-sucking; denoted as sucking of any relevant location of another calf's body (Jensen, 2003; Margerison et al., 2003; Jung and Lidfors, 2001), and intersucking; defined as sucking through udder region (Keil and Langhans, 2001)]. Several abnormal (non-nutritive) oral activities [i.e. cross-sucking, tongue playing and self-grooming] were detected in calves reared in individual pen or to those of fed with a bucket (Wagner et al., 2012; Webb et al., 2015; Pempek et al., 2011). The vast majority of artificially reared calves presented abnormal oral behavior [tongue rolling or manipulating substrates/pen-mate (Keil and Langhans, 2001; Leruste et al., 2014). Contrarily similar abnormal behaviors are rarely detected to those of naturally reared calves (Das et al., 2000). Milk sucking from the udder of heifers/cows is a common abnormal behavior in dairy herds, subsequently causing mastitis, udder injury, milk loss, and culling. Inter-sucking in cows was well recognized to be a continuation of a habit previously existing in a calf-hood period (Leruste et al., 2014). In the present study the present authors from different scientific disciplines involving Agricultural Science and Veterinary Surgeons performed a field study aimed to detect abnormal behavioral conditions in calves with special reference to inter and cross suckling behavioral abnormalities.

MATERIALS AND METHODS

Study design and calf population

The present field study was enrolled among 4 different farms located in Aydin Municipality, in Aegean Region of Turkey. A total of 456 calves aged between 1 week to 2 months of age from those 4 farms [private dairy farming operated as single/individual enterprises], were enrolled, involving neonatal calves, as related data is given in table 1. Each calf in both of the farms were housed individually and fed with milk bottle twice a day. Ad libitum water and calf started formularized ration was initiated according to the calender and age of the calves at the farm level. This study was performed in accordance with the principles of Helsinki Declaration and all animal owners in the study were informed. Ethics committee approval was not obtained in this study since only the behaviors of the

animals were observed and there was not any contact in the animals within the scope of the study.

Table 1. Descriptive information of location, breed and gender distribution of calves

Farm	Breed distribution	Gender Male-female total population	Location
Farm I	Simmental Holstein	49 60	Isikli village
Farm II	Simmental Holstein	50 33	Bozdogan
Farm III	Simmental Holstein	19 28	Umurlu
Farm IV	Simmental Holstein	82 135	Karacasu

Farm facilities and animal housing

Farm related data was shown in Table 1.

Definition of related stereotypical behaviors

Cross-sucking: denoted to sucking any body parts of pen-mate calves, whereas inter-sucking describes sucking the udder/udder area.

Behavioral activities recorded

The data collected during half an hour observation session were as follows: a) Total suckling period-Advancing duration of calf suckling its dam from end to end half an hour observation involving one/several suckling bouts (Webb et al., 2015). This kind of abnormal behaviors were observed as a differing condition from normal and detected as an inclusion criteria for comprising groups in the present study. This enabled us to observe and perform the calves for enrolling at the study, distinctly separating normal ones and abnormal calves, b) Suckling bout attempts repetition of suckling. Each suckling bout were composed of calf suckling one/more teats at the dam udder (Das et al., 2000). Subsequent bout was recorded even if the animal suckled again after 3 minutes of observational period. Duration of a suckling bout the period initiated even the animal suckled the first teat through the end of suckling, there afterwards moved away from the udder (Das et al., 2000). All observational records were performed via iPhone 8 plus smart phone camera to those of both farms periodically visited by the investigators involved at the study once a week for six months.

Statistical analysis

Distribution of the data was checked by using Shapiro-wilk test and gender and breed information of calves were tabulated. For data analyses chi-square test was performed by using SPSS 21.0 (IBM, Chicago) program and $p<0.05$ was considered significant.

RESULTS

During observation of the farms by both of the authors (D.A.U. and K.U.) and a field veterinary surgeon ccompanied to 2 of the farms involved, short term video camera recording was available before and after milking period. As because of selecting inclusion criteria and to those of calves with abnormal behavior.

Observational data

Cross-sucking was frequently detected near the feeder (at least 15 minutes following feeding) in all 4 farms. Heavier calves were sucked more often. The milk feeders were also sucked often, but never longer than 10 seconds, as reported previously (Das et al., 2000).

Calves were frequently active in cross-sucking (in contrast to inter-sucking) and it was observed that the cross-sucking calves went into the milk feeder more often for a shorter duration. Three hundred forty out of 456 calves, expelled others from feeder, never presented nor tried to suck the other. The number of cross sucking calves (Table 2), gender distribution (Table 3), cross sucking attempts in relationship with individual farm basis (Table 3) were shown.

The frequency of Simmental calves cross-suckling per observation time was significantly higher than that of the Holstein calves ($p<0.001$) (Table 2). Breed distribution of suckling calves were shown in Fig. 1, indicating that Simmental calves were much more suckling. Regarding inter-suckling there was also statistical significance with shorter duration per observation period in Simmental calves in contrast to Holstein calves ($p<0.001$). The numbers of Simmental calves were higher for cross- and inter-sucking behavior. Given the individual interpretation of 4 different farms involved in this study, cross-sucking attempts regarding gender indicated significant differences for farms I ($p<0.05$) and IV ($p<0.001$). Cross sucking calves in farm 1 were shown in Fig. 2.

Table 2. Demographic data regarding 4 different farms enrolled in the present study showing abnormal behavioral alterations among Simmental and Holstein Friesian calves to those of involved.

Farms (n=4)	Cross-Sucking			
	Yes	No	P	TOTAL
Simmental*	67	135	0.001	202
Holstein/Friesian^{+}	49	205		254
	Inter-sucking			
Simmental*	40	162	0.001	202
Holstein/Friesian^{+}	21	233		254

Total number of *Simmental and Holstein calves among 4 different farms

Table 3. Cross-sucking attempts and gender distribution of calves involved within the farms and related numbers.

Gender		Male	Female	Total
Farm I	N	49	60	109
	Cross-sucking attempts (N)	15	8	23
	p	0.05		
Farm II	N	50	33	83
	Cross-sucking attempts (N)	10	9	19
	p	NS		
Farm III	N	19	28	47
	Cross-sucking attempts (N)	6	4	10
	p	NS		
Farm IV	N	82	135	217
	Cross-sucking attempts (N)	44	20	64
	p	0.001		

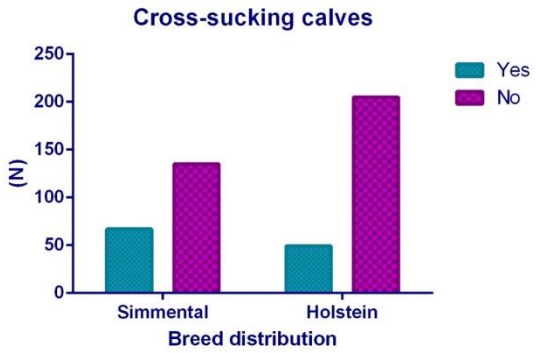

Figure 1. Breed distribution of calves involved in this study [composed of all 4 farms enrolled]

Figure 2. Cross-sucking calves in Farm I.

DISCUSSION AND CONCLUSION

In a previous study investigating impacts of self- and cross-sucking on cattle health and performance it was detected that cross-sucking existed in calves at the 2nd week of age in cross-sucker calves. Milk sucking was higher in primiparous cows starting to suck commonly around the 4th month of milking (observational finding which was observed for cross sucking in general literature). The vast majority of the cows showing self-sucking were sucking another cow with a background of self- or cross-sucking in their calf-hood.[2] In this study all calves involved were at least the age of 2nd week of age, with a calf-hood behavior as reported previously (Mahmoud et al., 2016).

In a prior research 56 female Holstein calves were housed in groups of 8, cross sucking was analyzed by use of overhead video cameras (periods of 72h for 5 cycle). The overall level of cross sucking after weaning, between 4 to 5 months of age, was low with the duration of cross sucking that occurred during this period was correlated with the portion of cross sucking presented prior to and immediately after weaning (Vaughan et al., 2016). In the present study after completion of trial period, the calves were remonitorized monthly interval for their cross- or inter-sucking events, in which frequency of abnormal behavior was declined to exactly half of them did not present at 4 to 5 months of age.

Another study involved cross-sucking calves at the second week of age (Mahmoud et al., 2016). In that research apart from cross-sucker calves, self sucking was higher in primiparous cows [sucking started mostly around the 4th month of milking] in contrast to multiparous ones during the second lactation period. As an observation the vast majority of the cows presenting self-sucking were sucking another cow with an experience of self- or cross-sucking during calf-hood (Mahmoud et al., 2016). In the present study the frequency of Simmental calves cross-suckling per observation time was significantly higher than that of the Holstein calves ($p<0.001$). In addition, inter-suckling Simmental calves were higher in number period in contrast to Holstein calves ($p<0.001$) with a statistical significance [i.e. shorter duration per observation] in the present study.

Individual interpretation of 4 different farms involved in this study showed that cross-sucking attempts regarding gender indicated significant differences for farms I ($p<0.05$) and IV ($p<0.001$). This may be briefly explained with different conditions among farms. In a previous study (Größbacher ve ark., 2018) in which Simmental breed presented high incidence of cross-sucking as a foremost breed was dedicated to the latter breeds prone a genetic predisposition for abnormal sucking (Fuerst-Waltl et al., 2010). Alternatively, some other conditions might be involved. Given ruminants should display certain amount of oral behavior (Lindström et al., 2000), restricted time feeding, restrictive time feeding [which was adapted to all 4 farms involved in the present study] or restricted movements [which was the case in 2 farms (II and III)], should have link or might be the cause of abnormal behavior observed within the calves composed of this study. On the other hand, although the present authors could not speculate that nutritional deficiencies might display a role for cross- and inter-sucking, it must be mentioned that vitamin and mineral status of those calves should be analyzed for better understanding this issue.

Conducting to a search on stereotypical disorders, as inter- and cross-sucking detected in this study, on calves some questions arouse i) does oral stereotypical behaviors emulate emotional alterations?, ii) what about its impact on animal welfare?, iii) someone may speculate that it is a significant welfare indicator?, iv) factors such as hunger, mineral/vitamin [probably 25 (OH) D_3] deficiency, frustration, barren environment, and v) observational approach through stereotypical alterations are individual or an important herd problem? All those questions are of beneficial and significant for understanding and solving this issue, which would be the purpose of our next/subsequent study.

This field study in parallel line with the propose holds a passport for detecting a map of abnormal suckling behaviours in which to the present authors knowledge first observational one in its era. The audiences and the readers after reading this article should be aware of this abnormal behavior. Afterwards veterinary surgeons at the field should investigate for practical treatment applications for this condition.

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Conflict of Interest

The authors declare that they have no conflict of interest.

REFERENCES

Das SM, Redbo I, Wiktorsson H. 2000. Effect of age of calf on suckling behaviour and other behavioural activities of Zebu and crossbred calves during restricted suckling periods. Applied Animal Behaviour Science, 67: 47–57.

David I, Bouvier F, Ricard E, Ruesche J, Weisbecker JL. 2014. Feeding behaviour of artificially reared Romane lambs. Animal, 8(6): 982–990.

Fuerst-Waltl B, Rinnhofer B, Fuerst C, Winckler C. 2010. Genetic parameters for abnormal sucking traits in Austrian Fleckvieh heifers. Journal of Animal Breeding and Genetics, 127: 113–118.

Größbacher V, Winckler C, Leeb C. 2018. On-farm factors associated with cross-sucking in group-housed organic Simmental dairy calves. Applied Animal Behaviour Science, 206: 18-24.

Jensen MB. 2003. The effects of feeding method, milk allowance and social factors on milk feeding behaviour and cross-sucking group housed dairy calves. Applied Animal Behaviour Science, 80: 191–206.

Johnsen JF, Passille AM, Mejdell CM, Bøe KE, Grøndahl AM, Beaver A, Rushen J, Weary DM. 2015. The effect of nursing on the cow - Calf bond. Applied Animal Behaviour Science, 163: 50–57.

Jung J, Lidfors L. 2001. Effects of amount of milk, milk flow and access to a rubber teat on cross-sucking and non-nutritive sucking in dairy calves. Applied Animal Behaviour Science, 72: 201–213.

Keil NM, Langhans W. 2001. Development of intersucking among dairy calves around weaning. Applied Animal Behaviour Science, 72(4): 295–230.

Khan MA, Weary DM, von Keyserlingk MAG. 2011. Invited review: Effects of milk ration on solid feed intake, weaning, and performance in dairy heifers. Journal of Dairy Science, 94(3): 1071–1081.

Leruste H, Brscic M, Cozzi G, Kemp B, Wolthuis-Fillerup M, Lensink BJ, Bokkers EAM. 2014. Prevalence and potential influencing factors of non-nutritive oral behaviors of veal calves on commercial farms. Journal of Dairy Science, 97(11): 7021–7030.

Lindström T, Redbo I. 2000. Effect of feeding duration and rumen fill on behaviour in dairy cows. Applied Animal Behaviour Science, 70(2): 83-97.

Mahmoud ME, Mahmoud FA, Ahmed AE. 2016. Impacts of self-and cross-sucking on cattle health and performance. Veterinary World, 9(9): 922-926.

Margerison JK, Preston TR, Berry N, Phillips CJC. 2003. Cross-sucking and other oral behaviours in calves, and their relation to cow suckling and food provision. Applied Animal Behaviour Science, 80: 277–286.

Pempek JA, Eastridge ML, Botheras NA, Croney CC, Yoho WSB. 2011. Effects of alternative housing and feeding systems on the behavior and performance of dairy heifer calves. The Professional Animal Scientist, 29(3): 278–287.

Roth BA, Barth K, Gygax L, Hillmann E. 2009. Influence of artificial vs. mother-bonded rearing on sucking behavior, health and weight gain in calves. Applied Animal Behaviour Science, 119(3-4): 143–150.

Soberon F, Raffrenato E, Everett RW, Van Amburgh ME. 2012. Preweaning milk replacer intake and effects on long-term productivity of dairy calves. Journal of Dairy Science, 95(2): 783–793.

Vaughan A, Miguel-Pacheco GG, de Passillé AM, Rushen J. 2016. Reciprocated cross sucking between dairy calves after weaning off milk does not appear to negatively affect udder health or production. Journal Dairy Science, 99(7): 5596-5603.

Wagner K, Barth K, Palme R, Futschik A, Waiblinger S. 2012. Integration into the dairy cow herd: Long-term effects of mother contact during the first twelve weeks of life. Applied Animal Behaviour Science, 141(3-4): 117–129.

Webb LE, Reenen CG, Berends H, Engel B, Boer IJ, Gerrits WJ, Bokkers EAM. 2015. The role of solid feed amount and composition and of milk replacer supply in veal calf welfare. Journal of Dairy Science, 98(8): 5467–5481.