WVJ
World's
Veterinary Journal

World's Vet. J. 3(3): 55-60, 2013

Original Article

Husbandry Practices and Hygiene in Dairy Farms in Khartoum State, Sudan

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ABSTRACT

This study showed that the status of husbandry practices on the hygiene in 60 dairy farms at different areas of Khartoum, Khartoum North and Omdurman, Sudan (20 farms from each town). Information about dairy management was collected by questionnaire and direct interview with farms' owners. The study found that vaccination against diseases were rarely used in regular way. General hygiene and sanitation measures such as dung removal, disinfection, cleaning programs and maintaining minimal contamination during milking process could not be observed in the majority of dairy farms studied except for few farms in Khartoum (20%) and Khartoum North (10%). Also disposal of abnormal milk were done directly in the pens in 83% of the farms. Moreover, testing, isolation and culling practices were not common. The highest numbers of aborted cows at late pregnancy were showed in 1-16 dairy farms in Khartoum and brucella antibodies were detected in 86.67% of the milk samples. Similarly mastitis was prevalence in the farms with cases ranging from 1–5 cases. The present study concluded that the majority of farms were poorly managed, which might create health risk. Hence training programs are needed for dairy farmers and labours on best dairy farming practices such as housing, milking, general hygiene, proper sanitary practices, diseases prevention measures and culling strategy.

Key Words: Dairy farms, management, husbandry, production, general hygiene, Sudan

INTRODUCTION

The presence of high number of animals with level of dirtiness is the precondition for presence of high number of somatic cells in milk and increased risk of subclinical mastitis (Vasilev et al., 2007). Kelly et al. (2009) reported that management practices associated with low SCC included the use of dry cow therapy, participation in a milk recording scheme and the use of teat disinfection post milking. Mastitis routine testing is very important because most of mastitis infection persist as subclinical, which will not be detected by herdmen (Mohamed et al., 1993 and El Zubeir et al. 2006). Moreover Hamid et al. (2012) reported that in subclincal mastitis, when the farmers were unable to recognize the disease public health hazards might occur due to consumption of infected milk that contains pathogenic bacteria or their toxins.

Kalis et al. (2001) found that management practices were different between herds that were vaccinated and herds that were not. To increase the protective properties of colostrums in dairy herd dry cow should be vaccinated (Roy, 1980). Goodger and Theodore (1985) reported that veterinary advice or services are seldom used for calves and the treatments are performed primarily by calf raisers. Kalis et al. (2001) found that the owners of herds which were not vaccinated followed more preventive management procedures and practiced less feeding of raw milk to calves. They concluded that vaccination of calves with killed vaccine does not prevent transmission of some diseases and therefore, hygienic practices remain essential in herd management.

By identifying some of the diseases that are likely to be of greatest risk, prevention and control measures can be developed and implemented to focus on ones that are most likely to create problems (Wallace, 2003). Faust et al. (2001) reported that most frequently cited reasons for culling were reproductively unsound; low milk production; mastitis, poor udder health and high somatic cell count. Moreover, culling is practiced in order to reduce the opportunity of low yielder to stay in the herd' (Westel et al., 1982). El amin and El Zubeir (2002) reported that infertility (28.9%), mastitis (3.7%), caacidents (3.3%) and low milk yield (2.4%) are the main reasons for culling in Friesan herds kept in Sudan. Moreover the use of a veterinarian to examine purchased cattle before they entered the herd and the proportion of herds that performed reproductive exams was highly associated with herd size (Hoe and Ruegg 2004). Mustafa et al. (2011) reported that the high incidence of infectious diseases may have direct effects on livestock productivity and metabolism, increased mortality and decreases rates of reproduction, weight gain and milk production.

The present study was carried out to investigate the management and hygienic practices in large scale dairy farms, which produced commercial milk.

To cite this paper: Ahmed M.I.A. and El Zubeir I.E.M. 2013. Husbandry Practices and Hygiene in Dairy Farms in Khartoum State, Sudan. *World's Vet. J.* 3(3): 55-60.
Journal homepage: http://wvj.science-line.com/

MATERIALS AND METHODS

Description of the study area

Khartoum State lies within the semi desert ecological zone between latitude 15° and 16.45° North, longitude 31° and 34.4° East (Ministry of Agricultural, Animal Resources and Irrigation of Khartoum, 2005).

Metrological data showed that the average rainfall in the study area was 0.0 mm for the period from March to June. The mean average temperature in the study area was 40.6 °C, with extremes over 42.9 °C during May. Temperature recorded lowest degree during March. The lowest relative humidity recorded during April and the highest during June.

Data collection

This study includes husbandry practices and general hygienic measurement in 60 dairy farms at different locations in Khartoum, Khartoum North and Omdurman of Khartoum State (Sudan). Twenty farms from each town were selected to evaluate the different practices of dairy farming during the period from August 2003 to January 2004. Information about management was collected by questionnaire and direct interview with farms' owners inorder to describe the constrains and to identify the weakness that need correction.

Statistical Analysis

The analysis was carried out using Statistical Package for Social Sciences program (SPSS version 9.5). All the data of this experiment were analyzed statistically by using one way anova in complete randomized design

RESULTS AND DISCUSSION

Most of the pens appeared heavily contaminated with dung especially those in Khartoum (Table 1). Also in this survey, it was noticed that cows in the pens appeard with teat heavily soiled with dung. Mustafa et al. (2011) reported that daily manure disposal by selling was practiced by the majority of farm householders (87.8%) in Khartoum North. Although the cows were heavily visibly soiled, most of the farms owners stated that they removed dung between 3-7 days. These might be due to small size of the pens and the large number of herds enclosed. Lean et al. (2008) reported that larger herds with greater stocking density could increase the risk for infectious. Chassagne et al. (2004) showed that clean farms, houses and milking parlours were strongly associated with lower SCS and that cleaner dry cow sheds were observed more frequently in the lower SCC category.

In this survey, it was observed that one farm in Khartoum North produced milk for cheese making (near the farm). So milk was used without pasteurization or any heat treatment by traditional method for cheese–making and that milk might cause risk hazard as some potential pathogens were detected before by Warsma et al. (2006). This supported Waithaka et al. (2000) who stated that livestock products especially milk is mainly informal and it is the most common channel for milk marketing in some African countries. Although the contribution of livestock to small commercial farmers in Khartoum North was found to be satisfactory but does not fulfill farmers' goals (Mustafa et al., 2011).

The incidence of abortion at late pregnancy was higher at the farms in Khartoum, while those of Khartoum North and Omdurman were relatively lower (Table 2). However testing, isolation and culling were practiced by few of the dairy farms included in the present survey. In some farms culling was practiced to some extend (Table 2). Furthermore, Alkhalaf et al. (1992) reported that effective brucella control is by testing and culling or slaughter of the infected animals and vaccinate the clean ones. However Abd Elrahman et al. (2009) detected no brucella antibodies in pasteurized milk indicating the freedom of the herds from this pathogen. Meeusen et al. (2007) reported that brucellosis continues to be a major zoonotic threat to humans and a common cause of animal disease, especially in developing countries. Vaccines, although providing a fairly high level of protection, also induce antibodies that interfere in subsequent surveillance programs

As shown in Table 3 vaccination against contagious diseases such as rinderpest, anthrax, contagious bovine pleuro-pneumonia, hemorrhagic septicemia, black quarter and brucella were rarely used in the farms under study. Elniema et al. (2011) reported that foot and mouth disease and contagious bovine pleur-pneumonia had frequently (60%) occurred in milk-oriented small and large scale livestock keepers. The veterinary vaccines have had, and continue to have, a major impact not only on animal health and production but also on human health through increasing safe food supplies and preventing animal-to-human transmission of infectious diseases (Meeusen et al., 2007). Mohamed (1995) reported that brucella and foot and mouth disease vaccines were rarely used in the farms in Khartoum State. Moreover, the vaccination provided by veterinary authorities as governmental services available to help owners to maintain animal health was the only dominant vaccine practiced in the farms under study. This because of national interest to preserve livestock wealth of the country (Mohamed, 1995). The less brucella vaccines and foot and mouth disease vaccine were rarely used and that might be due to their unawareness of the dairy keepers on their importance.

Mastitis was found in the farms of Khartoum, Khartoum North and Omdurman as 14 (70%), 12 (60%) and 10 (50%) for the farms under study and the number of cases were range from 1 to 5 cows (Table 4). Environmental and contagious mastitis pathogens were identified in 43.3% of the clinical mastitis cases and the coliform mastitis accounted for 21.1% of the clinical cases, however, out of 90 new cases of mastitis, 21.1% were infected with coliform bacteria (Shathele, 2009). Also the same table indicated that no control programs were used for disposable of abnormal milk. Moreover, in most of the farms, the labours milked the mastitic cows in the floor of the pens (Table 4).

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Table 1: Dung removal programs in dairy farms at Khartoum State

Cities	Dung removal										
	Daily	**Every 2-4 days**	**3 days**	**3 – 4 days**	**4 days**	**4-6 days**	**4-7 days**	**5 days**	**5-7 days**	**Every week**	**Every 7-10 days**
Khartoum	1 5%	0 0.0%	0 0.0%	1 5%	5 25%	0 0.0%	4 20%	0 0.0%	0 0.0%	8 40%	1 5%
Khartoum North	1 5%	0 0.0%	1 5%	4 20%	0 0.0%	0 0.0%	4 20%	1 5%	0 0.0%	9 45%	0 0.0%
Omdurman	0 0.0%	3 15%	0 0.0%	0 0.0%	1 5%	4 20%	0 0.0%	0 0.0%	4 20%	8 40%	0 0.0%
Total	2 3.33%	3 5%	1 1.67%	5 8.33%	6 10%	4 6.67%	8 13.33%	1 1.67%	4 6.67%	25 41.67%	1 1.67%
Level of significant						**0.0007*** **					

***: significant different at (P < 0.001)

Table 2: Incidences of brucella and culling practices of diseased cows in the dairy farms at Khartoum State

Cities	No of abortion at late pregnancy									Brucella test		Number of brucella culled cows						
	0	1	2	3	4	5	10	15	16	No	Yes	0	1	3	4	5	8	15
Khartoum	10 50%	1 5%	1 5%	2 10%	1 5%	2 10%	1 5%	1 5%	1 5%	19 95%	1 5%	13 65%	2 10%	1 5%	1 5%	2 10%	0 0.0%	1 5%
Khartoum North	12 60%	4 20%	1 5%	3 15%	0 0.0	0 0.0%	0 0.0%	0 0.0%	0 0.0%	20 100%	0 0.0%	14 70%	2 10%	1 5%	1 5%	1 5%	1 5%	0 0.0%
Omdurman	18 90%	1 5%	1 5%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	20 100%	0 0.0%	18 90%	1 5%	1 5%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total	40 66.6%	6 10%	3 5%	5 8..33%	1 1.67%	2 3..33%	1 1.67%	1 1.67%	1 1.67%	59 98.33%	1 1.67%	45 75%	5 8.33%	3 5%	2 3..33%	3 5%	1 1.67%	1 1.67%
Level of significant					0.202^{ns}						0.361^{ns}					0.758^{ns}		

NS: non-significant

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Table 3: Comparison of the latest vaccines programs in the dairy farms at Khartoum State

Cities	No vaccine administration	September 2001	March 2002	May 2003
Khartoum	7 (35%)	1 (5%)	5 (25%)	7 (35%)
Khartoum North	8 (40%)	1 (5%)	6 (30%)	5 (25%)
Omdurman	11 (55%)	3 (15%)	1 (5%)	5 (25%)
Total	26 (43.33%)	5 (8.33%)	12 (20%)	17 (28.33%)
Level of significant		**0.36^{ns}**		

ns= non-significant; ***** Foot and mouth disese, brucella, Haemorrahgic septisemea, Anthrax, Rinder pest ect.

Table 4: Incidences of mastitis and its treatment in some dairy farms at Khartoum State

Cities	Number of cases reported					Preventive measure								Disposal of abnormal milk		
	0	1	2	3	5	Preventive measure applied	Udderiod ± neomastipra	Terrexin (Tetracycline)	Udderiod	Antibiotic + udderiod	Udderiod + Terrexin	Strip + iodine	Antibiotic only	In floor of pens	In pot	Cow isolated and milked out of pen
Khartoum	6	7	5	1	1	10	2	2	3	1	1	1	0	14	2	4
	30%	35%	25%	5%	5%	50%	10%	10%	15%	5%	5%	5%	0.0%	70%	10%	20%
Khartoum North	8	4	3	4	1	9	0	1	9	0	0	0	1	16	4	0
	40%	20%	15%	20%	5%	45%	0.0%	5%	45%	0.0%	0.0%	0.0%	5%	80%	20%	0.0%
Omdurman	10	4	4	0	2	12	0	0	4	1	3	0	0	20	0	0
	50%	20%	20%	0.0%	10%	60%	0.0%	0.0%	20%	5%	15%	0.0%	0.0%	100%	0.0%	0.0%
Level of significant			0.395^{NS}						0.172^{NS}						0.011^{*}	

NS: non-significant,*: significant (P<0.05)

Table 5: Comparison of aborted cows and culling practiced in Khartoum State dairy farms

Condition	Khartoum	Khartoum North	Omdurman	Level of significant
Abortion at late pregnancy	3.20±4.948	0.75±1.118	0.15±0.489	0.004^{**}
Number of culled cows	1.70±3.585	1.10±2.198	0.20±0.696	0.16^{NS}
Abortion at late Pregnancy by Duncan test	3.200^{a}	0.8333^{b}	0.1500^{b}	0.004^{**}

**: significant (P<0.05); $^{a, b}$ = means in the same rows with different superscript letters are significant different (P < 0.05)

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Unhygienic condition and low standard of management practices in the dairy farms under study supported El Zubeir et al. (2006) who reported that unhygienic conditions were the reasons for increasing udder infection. Bovine mastitis is one of the important production diseases of dairy animals which directly or indirectly affect the economy of the farmers and ultimately affect the economy of the country (Sharma et al., 2012). However, they stated that mastitis is a global problem as it adversely affects animal health, quality of milk and economics of milk production and every country including developed ones suffer huge financial losses. Karakök (2007) reported that 10 of 35 milking practice critical points scored showed direct correlation with bulk tank coliform contamination and increased somatic cell counts. Moreover Rodrigues et al. (2005) reported that the formation of milk quality teams was helpful for improvements in mastitis control and to reduce losses associated with mastitis. This because mastitis is a complex disease; there is no simple solution to control it as it continues as a problem in many dairy herds despite proper application of proven control methods of teat dipping and total dry cow therapy (Sharma, 2007).

In this survey, it was noticed that many farms owners were used traditional treatment like fire for mastitis and other diseases. El Zubeir and Mahala (2011) reported that most of the farms applied drugs without veterinary instructions or inspections. Also from the survey it was noticed that in most of the farms, diseases control and management were not satisfactory. These facts explained the types of preventive measures that applied for eradication of some diseases like mastitis in the farms surveyed. So many health problems that might arise in those farms are due to the complete absent of veterinary supervision. Since higher correlation was noticed between mastitis and veterinary supervision which supported Babiker (2007).

Hence the present study recommended the establishment of co-operation among dairy farmers with the purpose of improving their managerial and hygienic practices in addition to the health of their animals. Training and extension are urgently needed to meet those goals.

The authors would like to thanks the dairy farmers who participated in the present study. This study was part of a project funded by Islamic Development Bank (Jaddah) and Sudan Ministry of Higher Education and Scientific Research.

Acknowledgement

The results of this research have been presented as an oral presentation at the International Scientific Conference on Health and Environmental Research Challenges in Urban Poor Settlements, 3-5 /9/ 2007, CSRS, Abidjan, Ivory Coast.

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