NON-GENETIC FACTORS AFFECTING THE MORTALITY IN KURDI LAMBS

S. O. Raoof
Assist. Prof.
salmomarraoof@yahoo.com
Animal Resources Department - Agricultural College - Salahaddin University–Erbil
Kurdistan Region- Iraq.

ABSTRACT

This study was carried out using 94 ewes at Erbil plain - Kurdistan region-Iraq, during the period from May 2016 to April 2017. The overall mean mortality rates from birth to 7 days and from 8 days to weaning age were 8.6 and 6.6%, respectively. Age of dam, type of birth, weight of the dam at matting, Body Condition Score (BCS) and birth weight had an important significant (P<0.05) impact on lamb mortality from birth to 7 days and from 8 days to weaning age. This research revealed that a higher lamb mortality (4.2%) was registered for dams aged 2 years, while a lower mortality(6.6%) was found in dams aged 5-6 years, no significant differences in mortality among males and females were appeared, male lambs showed a higher mortality than females, type of birth showed an important impact (P<0.05) on lamb mortality. Single born lamb mortality was 5.5%, whereas that of the twin born lamb was significant (13.6%). Ewes with the (BCS) of 2-3 showed a higher mortality (14.2%), while those ewes with (BCS) more than 3 recorded the lowest lamb mortality (5.4%). Lambs weighting less than 3 kg at birth registered a higher mortality compared with lambs weighing 3 kg, or more which showed the lowest mortality. It has appeared from the results of this study that most of the non-genetic factors studied involve: Age of dam, type of birth, birth weight, and weight of the dam, and body condition score showed a substantial significant influence on lamb mortality between birth and weaning of Kurdi sheep.

Keywords: Kurdi lamb, Non-Genetic factor, Birth, Weaning weights and mortality.

تأثير العوامل اللاوراثية في هلاك الحملان الكوردية

سالم عمر رؤوف
أستاذ مساعد
كلية الزراعة – جامعة صلاح الدين –قسم الثروة الحيوانية– اربيل–أقليم كوردستان – العراق
salmomarraoof@yahoo.com

المستخلص

أجريت هذه الدراسة على 94 نعجة كوردية في سهل اربيل – اقليم كوردستان / العراق للمدة بين شهرمايس 2016 لغاية شهر نيسان 2017. كان المعدل العام لنسبة الهلاكات للحملان من الولادة لغاية 7 أيام 8.6% ومن8 أيام لغاية الفطام كان6.6% اثرت العوامل البيئية مثل عمر النعجة،نوع الولادة ، وزن النعجة عند الولادة ، درجة حالة الجسم و وزن الحملان عند الميلاد تأثيرا معنويا (P<0.05) في نسبة الهلاكات للحملان عند الولادة لغاية 7 ايام و من 8أيام لغاية فطام الحملان . لم يلاحظ وجود تاثير معنوي لجنس المولود على نسبة الهلاكات للحملان من الولادة لغاية 7 أيام و من8 أيام لغاية الفطام على الرغم من ان نسبة الهلاكات للحملان الذكور كانت اعلى (10.9%)مقارنة بالحملان الأناث (5.6%) . أظهرت نتائج الدراسة الحالية ان نسبة الهلاكات بين المواليد الناتجة من النعاج بعمر2سنة بلغ 14.2% في حين كانت 6.6% لمواليد النعاج التي عمرها 5 سنوات وأكثر. بلغت نسبة الهلاكات للحملان المفردة 5.5% في حين كانت هلاكات الحملان التوامية 13.6% . كما أظهرت النتائج ان نسبة الهلاكات لمواليد النعاج ذات درجة حالة الجسم2–3 كانت عالية (14.2%) موازنة بولادات النعاج ذات درجة حالة الجسم اكثر من 3 (5.4%)،كما ان نسبة الهلاكات الحملان التي بوزن أقل من 3 كغم أكثرمن الحملان ذات وزن الميلاد3 وأكثر من 3 كغم للفترتين من الولادة الى 7 أيام و من 8 أيام لغاية الفطام .

الكلمات المفتاحية: الحملان الكوردية، عوامل اللاوراثية، أوزان الحملان عند الميلاد والفطام والهلاكات .

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INTRODUCTION

Kurdi Sheep are widely distributed in Erbil plain - Kurdistan region – Iraq, they are a major component of the livestock production system, which is characterized by small flock sizes, lamb mortality is one of the major problems that may adversely influence the success of any sheep enterprise (14). It has been documented that non - genetic factors are largely expected to contribute to lamb mortality (15). Higher survival rates are necessary for replacement of stock and for the efficiency of selection. The causes of lamb mortality are directly related to the production and the management system. The factors that might lamb mortality involve a genetic factors and non-genetic factors such as, birth weight, type of birth, age of dam, sex, season, year of birth and weight of the dam at mating (3).The lamb mortality remains a key economic and welfare issue for Australian sheep producers, with the majority of lamb mortalities occurring within the first three days of postnatal life. It's about half of all pre-weaning deaths occur on the day of birth, but this rate decreases significantly once the lamb is one-week-old (6). Every flock has lamb mortality, as there are so many reasons causing the lambs not to survive. It seems not easy to determine what changes need to be done a flock in order to improve lamb survival. (2) Who reported that the overall lamb mortality from birth until weaning was 11-25% in Awassi. The lamb mortality rate in Pakistan was 7.3, 11.9 and 14.2% in Pak-Karakul, Thalli and Kacchi sheep, respectively from birth to weaning. (10). The aims of this research were to investigate the impact of non - genetic factors, including, age of dam, sex and type of birth, birth weight, weight of the dam at matting, and the body condition score of ewes on lamb mortality from birth to 7 days and from 8 days to weaning age.

MATERIALS AND METHODS

Ninety-four Kurdi ewes on the private farm in Erbil plain were used in this study during the period of May 2016 and April 2017. The ewes were weighed and given of 500g / ewe /day of concentrate ration during the mating and pregnancy period. The concentrate ration: (it was composed of barley, wheat bran, and limestone, salt and trace minerals), was increased up to 750g/ewe/day after lambing with a normal daily grazing (each ewe-received alfalfa). Free concentrate feeding were allowed for the lambs from weaning, milk production measurements one month after lambing and frequently measured monthly. The flock was semi- intensively managed, grazing was allowed for animals four hours in the morning and three hours in the afternoon all over the year except of the pregnancy period. Milk tests were done, week starting 14 days after lambing. During the suckling period (60 days), lambs were staying away from their dams 12 hours before morning milking. Lambs will be labelled (ear tagged) with their dams within 24 hours after birth and were ear tagged and weighed. Then, the data analyzed,

Overall mortality = Total number died /Total number born X 100

Mortality percentage in a year = Number died in a year / Number exposed to risk in a year X 100

Statistical analysis performed by (12) program and using the (Chi-square) test (13).

Results and Discussion

1-lamb mortality of birth to 7 days

The overall mean of lamb mortality was 8.6% of birth to 7 days, these values were lower when compared to values obtained by (4) who reported that lamb mortality ranged between 9 and 20%. Age of dam has an important significant ($p<0.05$) effect on lamb mortality from birth to 7 days. The present study revealed that a high lamb mortality could be attributed to the dam aged 2 years (14.2 %) whereas a lower mortality (6. 6%) was found for dam with 5 years or more (Table1). Many researchers have reported of a lower lamb survival for younger dams as the ewes tend to have lower birth weight lambs and fewer losses due to difficult labor than older ewes. Adult ewes generally do not usually take care of their lambs immediately, leading to an increase in lamb mortality. These results coincided with the findings, obtain by Mustafa et al., (2014),who reported that the major cause associated with lamb losses was pneumonia. The ewes that are at early age/parity are not at mature stage and they require feeding for growth of the ewe and lactation require a non-significant difference

was observed for sex of lamb effect on lamb mortality. Male lamb mortality was not significantly different from those of female lambs either from birth to 7 days (10.9% vs 6.5%) (Table1), the higher mortality in male lambs compared to females is in agreement with other researcher (10 and14). Higher mortality in male lambs may be due to sex-linked determinants, which have not yet been identified (9).These results, however, did not in agreement with the findings obtain by Getachewa et al.,, (2015), who reported the effects of sex of birth on lamb mortality were found to be significant (p<0.05). Type of birth had a significant (p<0.05) effect on lamb mortality from birth to 7 days, twin born lambs had a higher mortality than singles. Mortality in twin lambs was 13.6 %, compared with 5.5% for the singles (Table 1)**.** This might be mainly attributed to higher birth weight of single lambs and less competition for milk from their dams as compared to twines. The effect of weight of the dam at mating on the lamb mortality was significant (P<0.05), the weight of the dam at mating less than 50 kg have highest (16.6%) lamb mortality from birth to 7 days, compared with the weight of the dam at mating 50-70 kg and 70 and more who showed the lowest lamb mortality (4.1% and 9.1%) respectively (Table1).

Table 1. Non-genetic factors affecting lamb mortality from birth to7 days

Factors	No. of birth	No. of Mortality	Mortality%	Chi-square values
Overall mean	**116**	**10**	**8.6**	**-------**
Age of dam(year)				**4.502 ***
2	**21**	**3**	**14.2**	
3	**24**	**2**	**8.3**	
4	**41**	**3**	**7.3**	
5 and more	**30**	**2**	**6.6**	
Sex of birth				**1.494 NS**
Male	**55**	**6**	**10.9**	
Female	**61**	**4**	**6.5**	
Type of birth			**5.5**	**4.627 ***
Single	**72**	**4**	**13.6**	
Twin	**44**	**6**		
Weight of dam at mating			**16.6**	**5.169 ***
(kg)	**24**	**4**	**4.1**	
Less than50	**48**	**2**	**9.1**	
50-70	**44**	**4**		
70 and more				
BCS			**14.2**	**4.683 ***
2-3	**42**	**6**		
More than3	**74**	**4**	**5.4**	
Birth weight(kg) Less				**4.831 ***
than3	**45**	**6**	**13.3**	
	71	**4**	**5.6**	
3 and more				

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

This may be attributed to the fact that ewes with such weights were supplying their fetus with an adequate quantity of feed compared with those having less or higher weight, next to, large-sized ewes are characterized by the expansion of the size of her uterus, which provides a wider space for growth and development of the fetus. The effect of Body Condition Score (BCS) on the lamb mortality from birth to7 days was important (P<0.05). The results of this study showed a higher mortality (14.2%), when the (BCS) of ewes ranged 2-3 and the lowest mortality was that of ewes with (BCS) more than3, (5.4%), (Table1).Lamb will appear, rely on good birth weight and an adequate and specific colostrum intake (11). The weight of lamb at birth has a good impact on the ability of the lambs to survive and stay in life. The birth weight of the lamb has a significant (p<0.05) effect on lamb mortality. Body weight of lambs at birth has a great role in achieving a good sheep production. Lambs weighing less than 3 kg, at birth were the lowest in survivability, and lambs with birth weight 3 kg, or more showed a higher survivability, this is in agreement with the findings of (Boujenane et al., 2013).

2-lamb mortality from 8 days to weaning age The overall mean of lamb mortality was 6.6% from 8 days to weaning weight. The lamb mortality for ewes at 2, 3,4and 5 years of age were 11.1, 9.1, 2.9and7.1%, respectively (Table 2). Higher lamb mortality in the 2-year-old ewes than that at 3, 4 and 5 years old and more .The mammary development is also not at in full stage , this was mean the dam poor and none experience in mothering ability , and again the lamb will poor in survivability, these findings were same to the results of some studies (1 and2) who reported that, the survival rates of lambs were higher in the fifth and sixth parity with a trend towards increased in survival from first to six parities and the general trend for increasing of survival rate with increased parity may be due to improvement in weight of the dam and subsequently to a large quantity of milk produced with increased parity in ewes. This is inappropriate with results of several researchers (5,7and14). However, male and female lambs have similar chances of surviving up to weaning, differences between sexes were non-important due to the adjustment for birth weight, (Table2). This result appeared to be in agreement with those of Boujenane et al.,(2013) who found that males and females have similar survival rates, on the contrary ,our findings does not in agreement with (2and 8) who reported that male

Table 2. Non-genetic factors affecting lamb mortality from 8 days to weaning weight

Factors	No. of birth	No. of Mortality	Mortality%	Chi-square values
Overall mean	116	7	6.6	-------
Age of dam(year)				5.184 *
2	18	2	11.1	
3	22	2	9.1	
4	38	1	2.6	
5 and more	28	2	7.1	
Sex of birth				0.097 NS
Male	49	3	6.1	
Female	57	4	7.0	
Type of birth				2.307 NS
Single	68	3	4.4	
Twin	38	4	10.5	
Weight of dam at mating (kg)				5.266 *
Less than50	20	3	15.0	
50-70	46	2	4.3	
70 and more	40	2	5.0	
BCS				5.394 *
2-3	36	5	13.6	
More than3	70	2	2.9	
Birth weight(kg) Less than3				4.783 *
	39	5	12.8	
3 and more	67	2	2.9	

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

lambs were at greater risk of postnatal mortality. In the present study, type of birth had a significant (P<0.05) effect on lamb mortality from 8 days to weaning weight of Kurdi lamb. Mortality in twin lambs was 10.5 % compared to 4.4 % of singles (Table 2). These findings were similar to the results of (1) and in agreement with the results of (2, 5,7and14) which showed that an increase in litter size frequently leads to a decrease in the survival of lambs, this indicates that type of birth may act on lamb survival not only through birth weight, but also through prenatal Influence on lamb development in larger litters, the competition occur between lambs for the limited milk supply of the ewe in early lactation. The majority of lamb deaths from birth to weaning are most commonly from multiple-born lambs rather than individuals. It's proven that the weight of the dam at mating less than 50 kg has highest (15%) lamb mortality form 8 days to weaning weight,

compared with the ewes having 50-70 and 70 kg at mating who showed the lowest lamb mortality (4.3% and 5%) respectively (Table 2).These findings were same to the results who reported by (1 and 2) Likewis1e , the effect of Body Condition Score (BCS) on the lamb mortality from8days to weaning weights was significant (P<0.05), ewes with the (BCS) 2-3 showed a higher mortality (13.6%), and the lowest mortality was that of ewes with (BCS) more than3, (2.9%), (Table2) .Postnatal mortality was also related to the weak of ewes in poor condition at breeding. The birth weight of the lamb had a significant (p<0.05) effect on lamb mortality from 8 days to weaning age. Lambs weighing less than 3 kg, at birth were the lowest in survivability (12.8), and lambs with birth weight 3 kg, or more showed a higher survivability (2.9%).

REFERENCES

1.Aktas, A.; S.Dursun,; S.Doˇgan,; Z.Kiyma,; U.Demirci1,and I.Halıcı. 2015. Effects of ewe live weight and age on reproductive performance, lamb growth, and survival in Central Anatolian Merino sheep. Arch. Anim. Breed, 58: 451–459.

2.Al-Dlaimy, R.R.2013.Some factors causing mortality among Awassi lambs from birth to weaning. Karbala University Journal Science, 11(4):251-255.

3.Belay,B. and A. Haile.2011.Survivability of lambs under village management condition. Thecase around Jimma, Ethiopia. Livestock Research for Rural Development 23 (4).

4.Binns , S. H.; I. J. Cox ; S.Rizvi, and L. E. Green.2002. Risk factors of lamb mortality of UK sheep farms, Prev. Vet. Med. 52: 287-303.

5.Boujenane,I ; A. Chikhi; O.Lakcher and M.Ibnelbachyr .2013.Genetic and environmental factors affecting perinatal and pre weaning survival of D'man lambs. Trop Anim. Health Prod. 45:1391–1397.

6.Dwyer, C. M. 2013. Personal Communication. Team Leader – Animal Behaviour and Welfare, Animal & Veterinary Sciences, SRUC, Roslin Institute, Midlo thian, Scotland.

7.Getachewa, B. T. Gizawc, S. Wurzinger , M.Haile, A. Rischkowsky, A.M. Okeyo, E. J. Sölkner, G. N. Mészáros. 2015 .Survival analysis of genetic and non-genetic factors influencing ewe longevity and lamb survival of Ethiopian sheep breeds Livestock Science 176: 22–32.

8.Hatcher, S.; K.D .Atkins and E. Safari. 2010 .Lamb survival in Australian Merino sheep: a genetic analysis. Journal of Animal Science 88: 3198–3205.

9.Mandal, A.; H. Prasad; A. Kumar; R. Roy, and N.Sharma. 2007. Factors associated with lamb mortalities in Muzaffarnagari sheep. Small Rumin. Res. 71:273-279.

10.Mustafa,M.I ; M.M.Mehmood,; M .Lateef, ; M.K .Bashir, and A.R. Khalid. 2014. Factors influencing lamb mortality from birth to weaning in Pakistan. Pakistan Journal of Life and Social Sciences. 12(3): 139-143.

11.Nash, M.L.; L.L. Hungerford; T.G. Nash and G.M. Zinn .1996. Risk factors for perinatal and postnatal mortality in lambs. Vet. Rec. 139: 64–67.

12.SAS. 2005. Statistical Analysis System. Users Guide for Personal Computers, Version8.2, SAS. Institute Inc, Cary, NC. USA.

13.Steel, R.G.; J.H .Torrie, and D.A. Dickey. 1997. Principles and Procedures of Statistics. A Biometrical Approach, 3rd Ed. McGraw Hill, Inc. Book Co.New York: 172-177.

14.Vatankhah, M. and M. A. Talebi.2009. Genetic and non-genetic factors affecting mortality in Lori-Bakhtiari lambs. Asian-Aust. J. Anim. Sci.22 (4): 459 – 464.

15.Vostry, L. and M.Milerski.2013. Genetic and Non-genetic effects influencing lamb survivability in the Czech Republic. Small Ruminant Res. 113:47– 54.