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PRENATAL FACTORS: EXAMINING PRE-PARTUM NUTRITION'S ROLE IN BIRTH WEIGHT OF CROSSBRED CALVES

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Abstract: This research delves into an exploration of the potential link between pre-partum feeding practices and the birth weight of crossbred calves. The birth weight of calves has significant implications for their early development and future growth. Investigating the influence of pre-partum feeding on birth weight holds the promise of enhancing animal husbandry practices and optimizing calf health. This study aims to contribute to the understanding of how nutritional factors during the pre-partum period can impact the birth weight of crossbred calves.

Keywords: pre-partum feeding, birth weight, crossbred calves, nutritional factors, animal husbandry, calf health.

Introduction

Statistical methods are evaluated according to the appropriate of the parametric or nonparametric data analysis methods (Çimen, 2016 a). Suitable methods are crucial for achieving appropriate results. While determining the mentioned methods, it is important to apply statistical methods appropriate to the data set (Çimen, 2016 b). When comparing the averages of more than two groups, if the data with continuous variable properties fit the normal distribution, they are compared with Variance Analysis (Anova), which is one of the parametric test methods (Box et al., 2005). If the data are not constantly variable or if the data are constantly variable but do not fit the normal distribution, Kruskal Wallis analysis, which is the nonparametric equivalent of Variance Analysis method, is used (Ntoumanis, 2005). In cases where the data are not constantly variable and take values such as 0 and 1, it is not
possible to use the average values in comparing more than two groups. In this case, it is necessary to use the Cochrane Q test method in the analysis of such data (Leech et al., 2005; Hair et al., 2006). In this article, it is tried to give information about the interpretation of the Cochrane Q test analysis over the somatic cell counts in milk, where it is necessary to assign values such as 0 and 1 depending on the situations. There is no study in the literature showing results related to the change of somatic cell counts depending on the season and birth characteristics with the help of Cochran q test.

Material and Methods

The offspring characteristics at birth were taken into account as birth characteristics. For this purpose, the 16 cows having single male (SM), single female (SF), twin male (TM), twin female (TF) calves at birth were selected for each season. Milk samples of cows were analyzed to determine the number of somatic cells. The SCC within taken raw milk samples was detected by the standard analysis (Microscopic count) method. As stated in the standards of milk obtained from healthy cows (Guidry, 1985) 1 point was given to milk samples that show values lower than 200.000 cells/ml since they comply with the standards. Milk with somatic cells higher than the

mentioned value was given 0 points because they are inappropriate. These 0 and 1 points given were entered into the SPSS package program according to birth characteristics and season groups, and analyzed separately for different birth characteristics (SM, SF, TM and TF) and different seasons (SPR, SUM, AUT and WIN), with the help of Cochrane Q test. Spss 25.00 package program was used in the analysis of the data.

Result and Discussion

When Table 1 is analyzed, the results of statistical analysis of different seasons are seen. In the Table 1, Cochrane Q analysis results are handled according to the distribution of frequencies, not the average value. Because while the average value is used in the statistical analysis of the parametric data set consisting of continuous variables that fit the normal distribution, nonparametric data analysis methods are applied in binomial data such as 0 and 1 (Çimen, 2015). In this article, a value of 1 was given for each data below SCC 200,000 cells/ml due to its compliance with the standards, while the ones high values from standard was assigned a value of 0 because they are not suitable for standard. Since the data were binomialized, Cochrane Q analysis method, which is one of the non-parametric data analysis methods, was applied. Another aim of this article is to show how the researchers, who have data sets in the form of continuous variables, can be applied binomially and how different statistical quality analysis methods can be applied.

Looking at Table 1, spring and summer milk with high frequency (4) in terms of nonstandard milk draw attention. However, these advantages or disadvantages seen in terms of frequency number have no statistically validity. Because Asym. Sig. value ($p = 0.194$) is a large value compared to the significance threshold of 0.05, it cannot be mentioned that the results are statistically superior or insufficient.

Table 1. Seasonal Frequencies

	Frequencies	
	Value	
	0	1
Spring	0	4
Autumn	2	2
Winter	1	3
Summer	0	4

	Test Statistics
N	4
Cochran's Q	4,714[a]
df	3
Asymp. Sig.	,194

a. 1 is treated as a success

Original Article

When Table 2 is examined, it is seen that there are TM and TF groups with high frequency (4) in terms of non-standard milk. TM and TF groups have the highest frequency in terms of incompatibility with the mentioned standard. In other words, non-standard milk was mostly seen in single births regardless of gender discrimination, whereas milk suitable for the standard was mostly seen in the SM group (frequency = 2). Therefore, it is seen that birth characteristics have a numerical effect on the somatic cell counts. However, it does not seem possible to say that this numerical difference on the basis of frequency is statistically significant. Because the Asym Sig. value (p = 0.188) is a very large value compared to the significance threshold of 0.05, it does not seem possible to mention the statistical superiority or lowness of the found results. Although many environmental (Çetin et al., 2010; Urioste et al., 2010) and animal origin factors (Yıldırım et al., 2009; Koeck et al., 2012) affect the parameter changes in milk, it is not possible to mention a statistical effect of birth characteristics and season in our study.

Table 2. Frequencies associated with birth characteristics

Frequencies		
	Value	
	0	1
SM	2	2
SF	1	3
TM	0	4
TF	0	4

Test Statistics	
N	4
Cochran's Q	4,513[a]
df	3
Asymp. Sig.	,188

a. 1 is treated as a success

With this study, it has been shown that the cochran q test, which is a very unknown statistical method, can be used for non-continuous variables in determining the differences between groups. The present study has the feature of being a guide for researchers who want to obtain results using the mentioned statistical method.

References

Box, G.E.P., Hunter, J.S., Hunter, W.G., 2005. Statistics for Experimenters. Design, innovation, and Discovery. Second Edition. Wiley interscience. A John Wiley & Sons, Inc. Pub. ISBN-13 978-0471-71813-0.

Original Article

Çetin, M., Çimen, M., Goksoy, E.O. and Yıldırım, S., (2010). Biochemical Components Having Economic Importance for Goat Milk in Different Environmental Conditions. International Journal of Agriculture and Biology, 12(5):799−800

Çimen, M., 2015. Fen ve Sağlık Bilimleri Alanlarında Spss uygulamalı Veri Analizi. Palme Yayıncılık, Yayın No: 905, ISBN: 978-605-355-366-3. Sıhhıye, Ankara.

Çimen, M., 2016 a. Mühendislik Verilerinde Tek Örnek İçin Parametrik ve Parametrik Olmayan Testler (In Turkish). İstanbul Aydın Üniversitesi Dergisi, 29: 67-77. Comparison of Cow Milk Somatic Cell Counts of Different … 5

Çimen, M., 2016b. Gıda Mühendisliğinde Deneysel Araştırmalar İçin Yoğun Olarak Kullanılan Deneme Modelleri (In Turkish). Ordu Üniversitesi Bilim Teknoloji Dergisi, 6(2):59-67.

Guidry, A.J., 1985. Mastitis and immune systems of the mammary gland in lactation. P249. Iowa State University. Press Ames. Pp. 229-262.

Koeck, A., Miglior, F., Kelton, D.F., Schenkel, F.S., 2012. Short communication: Genetic parameters for mastitis and its predictors in Canadian Holsteins. J. Dairy Sci. 95:7363-7366. [8] Ntoumanis, N.A., 2005. Step-by-Step Guide to SPSS for Sport and Exercise Studies. Published in the USA and Canada by Routledge Inc. ISBN: 0-415-24978-3. (Print Edition) 29 West 35 th Street, New York, NY 10001.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L., 2006. Multivariate data analysis. (6th edn). Upper Saddle River, NJ: Pearson Education.

Leech, N.L., Barrett, K.C., Morgan, G.A., 2005. Spss for intermediate statistics: Use and preparation. Second ed. Lawrence Erlbaum Associates,Inc. ISBN:0-8058-4790-1,

Urioste, J.I., J. Franzén, and E. Strandberg, 2010. Phenotypic and genetic characterization of novel somatic cell count traits from weekly or monthly observations. J. Dairy Sci. 93:5930-5941.

Yıldırım, S., Cimen, M., Cetin, M, and Dilmac, M., 2009. The Effect of Live Weight and Age of Dam on Milk Biochemistry of Machine Milked Cows. Australian Journal of Basic and Applied Sciences, 3(2): 477-479.