Relationship between the Feeding Patterns with Health Disorders

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Abstract. The objective of this cohort retrospective study was to determine the association between the influence of feeding patterns with health disorders in the transition period and identifying potential economic losses in KPBS Pangalengan area. Data from 2065 calving event and incidence of hypocalcemia, retension placenta, displasia abomasum, ketosis, mastitis, metritis and lameness from January 2017 until December 2018, from 3 groups of feeding patterns, pattern I (concentrate, Pennisetum purpureun, tofu/cassava by product), Pattern II (Concentrate, rice straw, cassava by product) and pattern III (concentrate, wild grass). Analysis and significances using Relative Risk (RR) and Chi square. The result of analysis, the pattern I had greater risk of hypocalcemia (RR 1.923, 95% CI 1.438-2.571, P < 0.0001) and displasia abomasum (RR 4.962, 95% CI 1.813-19.645, P < 0.0001) than pattern III and pattern II had and greater risk of retension placenta (RR 11.014 95%CI 4.898-24,767, P < 0.0001), metritis (RR 2.415 95% CI 1.626-3,399 P < 0.0001) and mastitis (RR 6.697 95% CI 5.023-8,929, P < 0.0001) than pattern III. Pattern I and II had greater risk of experiencing hypocalcemia, retension secundinae, displasia abomasum, ketosis, mastitis, metritis and lameness than pattern III. The conclusion of analysis there is a significant (P<0.05) relationship or influence between the pattern of feeding in transition period and pattern III is the best in reducing incidence of periparturient diseases. Diseases that arise implicates the economic loss due to health problems in the transition period is calculated from the cost of veterinarians, Labor (producer Labor), milk loss, discarded milk, culling cost, death, extended days open.

Keywords: Relative Risk (RR), feeding pattern, periparturient diseases, transition period

1. Introduction
The high incidence of the disease after calving in KPBS PANGALENGAN area, is one cause of suboptimal productivity of cattle, this being the urge to conduct a study on the causes of the incident with focused on the management of feeding in the transition period and the incidence periparturient diseases. This transition period is a critical period for the productivity of dairy cows, this period was a transition period or the period around calving (periparturient), Which is characterized by high incidence and severity of metabolic and infectious diseases [1].

In this period of frequent of infectious diseases and metabolic disorders, such as milk fever, ketosis, retained fetal membranes (RFM), metritis and displaced abomasum (DA), which affect the economic and animal life [4].
Problem face by farmers there is a complaint began to fall of appetite, diarrhea, mastitis and health problems pre and post calving. From the data obtained in the field (KPBS PANGALENGAN), often culled cows due to cases of gastrointestinal disorders (11%), locomosi (22%), mastitis (22%), metabolic disorders (8%) and of the number of cows in the salvage of the 65-70% occur calving (postpartum), the cases related to the suspected underlying cause feed management that cause health problems during the transitional period.

2. Methodology
This study uses survey research methods retrospective cohort design. This study uses secondary data and interviews with farmers and animal health care workers KPBS PANGALENGAN, held from 01 January to April 2019 with research sites in the region of South Bandung Livestock Cooperative, Pangalengan, Bandung regency, West Java Province. Data taken from the period January 2017 to December 2018.

Assessing the causes of disease by looking at the association of risk factors (pattern of feeding during the transitional period) and the frequency of occurrence of the disease (bivariate analysis). The degree of association used is Relative Risk or Risk Ratio (RR), measure how much the contributing factors to the frequency of occurrence of the disease. To determine whether differences in the association between risk factors and disease rates (bivariate analysis), real (significant) or not statistical Chi-Square test was used to using $\alpha = 0.05$ and 95% confidence level and analyzed using IBM SPSS version 24 program.

3. Result and Discussion
Based on field surveys been TPK purposively based on differences in patterns of feeding and grouped into 3 groups by the characteristic pattern of different feed are: Pattern I (Concentrate KPBS + Pennisetum purpureum, TPK: Los Cimaung, Cipanas, Pattern II (Concentrated KPBS + rice straw), TPK: Mekar mulya, Cisangkuy, PANGALENGAN) and Pattern III (Concentrate KPBS + wild grass) TPK: Cisabuk, Wanasuka.

| Table 1. Patterns of feeding and incidence of disease in each group |
|---|
| No. Pattern | Kel | Pet | Parent | MF | RP | DA | CK | Met | Mas | LAM |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I | 492 | 1.390 | 1.051 | 254 | 151 | 57 | 26 | 157 | 389 | 394 |
| 2 | II | 277 | 720 | 648 | 115 | 117 | 24 | 18 | 137 | 498 | 318 |
| 3 | III | 296 | 657 | 366 | 46 | 6 | 4 | 5 | 31 | 42 | 69 |
| Total | 1.065 | 2.767 | 2.065 | 415 | 274 | 85 | 49 | 325 | 929 | 681 |

Note: Farmer, Ex: Birth, MF: Milk fever / Hipocalsemia, RP: retained placenta, DA: Dysplasia abomasum, CK: Clinical ketosis, Met: metritis, Mas: Mastitis, LAM: Lameness

| Table 2. Description Incidence Rate (%) of disease in feed patterns |
|---|
| Feeding patterns | Kel | MF | RP | DA | CK | Met | gold | LAM |
|---|---|---|---|---|---|---|---|---|
| I | 1.051 | 24.17 | 14.37 | 5.42 | 2.47 | 14.94 | 37.01 | 37.49 |
| II | 648 | 17.75 | 18.06 | 3.70 | 2.78 | 21.14 | 76.85 | 49.94 |
| III | 366 | 12.57 | 1.64 | 1.09 | 1.37 | 8.47 | 11.48 | 18.85 |

Note: Kel: Birth, MF: Milk fever / Hipocalsemia, RP: retained placenta, DA: Dysplasia abomasum, CK: Clinical ketosis, Met: metritis, Mas: Mastitis, LAM: Lameness

Then from these data in measuring the degree of association with a relative risk reduction, p Outcome analysis to measure the relative risk (RR) using IBM SPSS version 24 program, compared to a case between feeding patterns I, II and III as follows:
Table 3. Relationship feeding patterns and Hipocalsemia

| Variables         | Risk Estimate | 95% CI       | Chi-Square | P    |
|-------------------|---------------|--------------|------------|------|
| Pattern I / II    | RR            | 1.362 1.118  | 1.659 9.719| 0.002|
| Pattern I / III   | RR            | 1.923 1.438  | 2.571 21.884| 0.0001|
| Patterns II / III | RR            | 1.412 1.028  | 1.939 4.696 | 0.03 |

Patterns I have a risk (RR 1.362, 95% CI 1.118 to 1.659, P 0.002) occurred hipocalsemia 1.362 times larger than the pattern II. Patterns I have the risk of hipocalsemia 1,923 times greater than the third pattern. Patterns II has had a risk of 1, 412 times more likely to experience hipocalsemia of pattern III. For the case of the feed pattern hipocalsemia I have a greater risk for experiencing hypocalsemia compared to the pattern II and III. In statistik for hipocalsemia case no significant correlation (significant p <0.05) between the pattern of feeding with hipocalsemia incident.

Retained placenta

In Table 4, it is explained that the risk of having a first pattern 8.764 times greater retention of Pattern III. Patterns II has 11.014 times the risk of pattern III. For secundinae retention events, no significant correlation / significant (P <0.05) between feeding patterns and the incidence of retained secundinae.

Table 4. Relationship patterns kejadaian feed with retained placenta

| Variables         | Risk Estimate | 95% CI       | Chi-Square | P    |
|-------------------|---------------|--------------|------------|------|
| Patterns II / I   | RR            | 1.257 1.008  | 1.567 4.104| 0.043|
| Pattern I / III   | RR            | 8.764 3.91   | 19.645 44.637| 0.0001|
| Patterns II / III | RR            | 11.014 4.898 | 24.767 59.137| 0.0001|

Ketosis

For ketosis incidence data from Table 5, it can be concluded that the pattern I and II clinical and statistik not significant (P> 0.05) but to the pattern of the first with the third pattern, and the pattern II / III clinical significance have a positive but not significant relationship statistically. This is due to diagnosing cases of ketosis is based only allegation of the clinical symptoms seen in the field in the form of emaciation decrease in Body Condition Score (BCS) severe after delivery, no strengthening of laboratory examinations to be measured.

Table 5. Relationship of feed patterns with the incidence of ketosis Clinic

| Variables         | Risk Estimate | 95% CI       | Chi-Square | P    |
|-------------------|---------------|--------------|------------|------|
| Pattern I / II    | RR            | 0.891 0.492  | 1.611 0.147| 0.702|
| Pattern I / III   | RR            | 8.764 3.91   | 19.645 1.577| 0.212|
| Patterns II / III | RR            | 2.033 4.898  | 24.767 2.103| 0.147|

Metritis

In Table 6, it is explained that the pattern II has a tendency to 1.527 times greater than the pattern I metritis cases and the risk of having metritis 1.415 times greater than Pattern II. Patterns I have a tendency to 1.898 times greater than the pattern of the third and 1.764 times the risk of pattern III. Patterns II has a tendency to 2.687 times larger than the pattern of the third and 2.351 times the risk of pattern III. For events metritis, there is a positive relationship (RR> 1) and a meaningful relationship / significant (P <0.05) between feeding patterns and the incidence of metritis.

Displaced Abomasum

Dysplasia case abomasum, shown in Table 7 explained that the pattern of feeding patterns I have a greater influence to undergo Dysplasia abomasum than Pattern II and III as well as there is a
relationship or a significant effect (P <0.05) between the feed pattern with the incidence of displaced abomasum.

Decreased feed intake prepartum and slow increase in feed intake post partum risk factors lead to a decrease in the charging rumen, the reduction ratio of forage to concentrate and the increasing incidence of disorders of postpartum such as ketosis, retention of placenta, metritis, and hipocalcemia yangmerupakan risk factor for left displaced abomasum. A large amount of concentrate given in the pre-partum period increases the risk of dysplasia, lowering rumen motility and the high concentration of VFA led to a decline in motility of the abomasum. [9]. At feeding pattern groups I and II risk ratio incidence of dysplasia caused forage and concentrates, where the results of interviews and surveys in this group an increase in the provision of concentrate suddenly, than in group III patterns that give more gradually.

| Variables | Risk Estimate | 95% CI | Chi-Square | P |
|-----------|---------------|--------|------------|---|
| Patterns II / I | RR | 1.415 1.150 1.741 | 10.781 | 0.001 |
| Pattern I / III | RR | 1.764 1.223 1.764 | 9.87 | 0.002 |
| Patterns II / III | RR | 2.351 1.626 3.399 | 23.347 | 0.0001 |

**Table 7. Relationship feeding patterns and the incidence of dysplasia abomasum**

| Variables | Risk Estimate | 95% CI | Chi-Square | P |
|-----------|---------------|--------|------------|---|
| Pattern I / II | RR | 1.519 0.952 2.422 | 3.138 | 0.076 |
| Pattern I / III | RR | 4.962 1.813 19.645 | 12.358 | 0.0001 |
| Patterns II / III | RR | 3.389 1.185 9.691 | 5.938 | 0.015 |

**Mastitis**

The incidence of mastitis (Table 8) on the pattern I have 3.225 times the risk of experiencing mastitis than a pattern III, while the second pattern has a 2.076 times greater risk of Pattern II I. patterns when compared with Pattern III had 6.697 times greater risk. The relationship between feeding patterns with the incidence of mastitis disease was significant (P <0.05) were statistically.

| Variables | Risk Estimate | 95% CI | Chi-Square | P |
|-----------|---------------|--------|------------|---|
| Patterns II / I | RR | 2.076 1.899 2.271 | 254.987 | 0.0001 |
| Pattern I / III | RR | 3.225 3.91 19.645 | 83.645 | 0.0001 |
| Patterns II / III | RR | 6.697 5.023 8.929 | 401.573 | 0.0001 |

**Lameness**

Lameness incidence (Table 9) On the pattern that have a tendency 6.644 times and 2.132 times the risk of experiencing Lameness incidence compared to the pattern II, while the pattern I have a greater tendency to 2.581 times and 1.988 times greater risk of pattern III. Pattern II when compared with the third pattern has a tendency to lameness 17.151 times and 4.240 times greater risk. The relationship between feeding patterns with the incidence of lameness disease was significant (P <0.05) were statistically.

| Variables | Risk Estimate | 95% CI | Chi-Square | P |
|-----------|---------------|--------|------------|---|
| Pattern II / I | RR | 1.607 1.318 1.959 | 22.102 | 0.0001 |
| Pattern I / III | RR | 1.988 1.586 2.494 | 42.856 | 0.0001 |
| Patterns II / III | RR | 2.603 2.075 3.265 | 90.521 | 0.0001 |
From the results of data analysis disease incidence and pattern of feeding during the period of transition committed by farmers in the group pattern I having an inclination and a greater risk of hipocalsemia and Dysplasia abomasum than pattern groups II and III, the second group has a tendency and an increased risk of retained placenta, ketosis, metritis and mastitis than the first pattern groups. Patterns I and II have a tendency patterns and at greater risk for incident hipocalsemia, retained secundinae, displaced abomasum, ketosis, mastitis, metritis and lameness compared with feeding pattern groups III. The conclusion from this analysis that there is a relationship or a significant effect (P <0.005) pattern of feeding during the transitional period with the incidence of disease periparturien disease. In accordance with the opinion [11] that feed at the end of pregnancy showed an important role in regulating the tendency of cattle health problems around keahiran, further explained that the imbalance of specific nutrients in the feed in the final period of gestation have a relationship with an increased incidence of milk fever, hypomagnesemic tetany, retained placenta, downer cow syndrome, mastitis, Udder edema, ketosis, hepatic lipidosis, and displaced abomasum [11].

All of the management of the transition period leads to the importance of the management of nutrients in the pre calving or transition period associated with the rumen adaptation to high feed concentrate and control of the risk of acidosis, an important concern in mineral metabolism as well as attention to metabolism protein and energy adalh important weeks to successfully enter the lactation period and the importance of understanding the concept of homeostatic [8]. Diseases that arise implicates the economic loss due to health problems in the transition period is calculated from the cost of veterinarians, Labor (producer Labor), milk loss, discarded milk, culling cost, death, extended days open.

| Diseases      | Minimal losses | Maximal losses |
|---------------|----------------|---------------|
| Hipocalsemia  | 1.258.867      | 11.258.867    |
| Retensio      | 1.408.177      | 11.408.177    |
| Ketosis       | 669.220        | 10.669.220    |
| Metritis      | 1.762.637      | 11.762.637    |
| Lameness      | 1.098.537      | 11.098.537    |
| Mastitis      | 1.704.237      | 11.704.237    |
| Displasia     | 2.163.737      | 12.163.737    |

4. Conclusion
The conclusion from this analysis that there is a relationship or a significant effect (P <0.005) pattern of feeding during the transitional period with the incidence of disease and the pattern of disease periparturien feed III is a weft pattern transition periods are best for reducing the risk of disease occurrence periparturien. Emerging disease implications for the economic losses resulting from the present of health problems in the transition period is calculated from veterinary bills and handling (veterinary and treatment), labor (producer labor), milk loss, discarded milk, culling costs, death, extended days open

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