



Improving Knowledge and Practical Skills for Better Farm Management in Body Condition Score Assessment in Pombulaa Jaya Village, Konda District

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ABSTRACT

This study aims to improve the knowledge and skills of prospective cattle fatteners in Pombulaa Jaya Village, Konda District in assessing Body Condition Score (BCS). BCS is an important indicator for assessing body fat reserves, which influences productivity, reproductive efficiency, and sustainability of livestock farming. The program involved 15 participants. The intervention consisted of an interactive educational session, demonstration, and supervised hands-on field practice using visual observation and palpation techniques. Program effectiveness was evaluated using pre-test and post-test questionnaires and direct observation of participants' practical skills. A paired-samples t-test was used to compare participants' knowledge scores before and after the training. The results showed a significant improvement in participants' knowledge, with the mean score increasing from 57.67 ± 7.04 before training to 96.67 ± 3.62 after training ($p < 0.001$). Participants also demonstrated improved competency in identifying BCS categories during the practical assessment. These findings indicate that combining theoretical instruction with demonstration and supervised hands-on practice effectively enhances participants' knowledge and practical competency in BCS assessment. Improved competency in BCS assessment may support better decision-making in cattle nutrition, health monitoring, and reproductive management. Further studies are needed to evaluate the long-term impact of this educational program on livestock productivity and farm performance.

Keyword: Body Condition Score, Education, Cattle Fattening, Productivity, Livestock

ABSTRAK

Penelitian ini bertujuan untuk meningkatkan pemahaman dan keterampilan calon penggemuk sapi di desa Pombulaa Jaya Kecamatan Konda dalam melakukan penilaian Body condition score (BCS). BCS merupakan indikator penting dalam menilai cadangan lemak tubuh ternak yang berpengaruh terhadap produktivitas, efisiensi reproduksi, dan keberlanjutan usaha peternakan. Program ini melibatkan 15 peserta. Intervensi terdiri dari sesi pendidikan interaktif, demonstrasi, dan praktik lapangan langsung yang diawasi menggunakan teknik observasi visual dan palpasi. Efektivitas program dievaluasi menggunakan kuesioner pra-uji dan pasca-uji serta observasi langsung terhadap keterampilan praktis peserta. Uji t sampel berpasangan digunakan untuk membandingkan skor pengetahuan peserta sebelum dan sesudah pelatihan. Hasil menunjukkan peningkatan yang signifikan dalam pengetahuan peserta, dengan skor rata-rata meningkat dari $57,67 \pm 7,04$ sebelum pelatihan menjadi $96,67 \pm 3,62$ setelah pelatihan ($p < 0,001$). Peserta juga menunjukkan peningkatan kompetensi dalam mengidentifikasi kategori BCS selama penilaian praktis. Temuan ini menunjukkan bahwa menggabungkan instruksi teoretis dengan demonstrasi dan praktik langsung yang diawasi secara efektif meningkatkan pengetahuan dan kompetensi praktis peserta dalam penilaian BCS. Peningkatan kompetensi dalam penilaian BCS dapat mendukung pengambilan keputusan yang lebih baik dalam nutrisi ternak, pemantauan kesehatan, dan manajemen reproduksi. Studi lebih lanjut diperlukan untuk mengevaluasi dampak jangka panjang program pendidikan ini terhadap produktivitas ternak dan kinerja pertanian.

Keyword: Skor Kondisi Tubuh, Edukasi, Penggemukan Sapi, Produktivitas, Peternakan



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1. Introduction

Ruminant livestock must continue to be developed because they are one of the main sources of animal protein for the community. Indonesia has great livestock potential due to its tropical climate, especially large livestock such as beef cattle, which produce good meat and can serve as an additional source of income and family savings [1]. The regular increase in body structure during adulthood is known as growth. When livestock grow larger, two things happen: their body weight increases until they reach maturity, and there are changes in shape, composition, and function that become more refined. Farmers usually use the live weight of cattle to determine how well they are raising their cattle and whether they can grow as expected or not. The weight of cattle is one of the indicators of livestock productivity that can be predicted based on the linear measurements of the cattle's body, which consist of chest circumference, body length, and height. In marketing, the live weight of cattle is one of the factors that determines the price of cattle [2].

Assessments such as age, external appearance, growth rate, and temperament are the main factors in selecting breeding or fattening cattle. If possible, the cow's disease history is also recommended. Estimating the weight of cattle is one of the most important skills for farmers. The assessment of body condition score (BCS) is a crucial method in evaluating the fat reserves of livestock through visual inspection and palpation, which has significant implications for reproductive efficiency, milk production, and the sustainability of livestock productivity [3].

In the context of fattening operations, selecting cattle with adequate body condition at the initial stage is essential because it significantly impacts daily weight gain and the quality of the final product [4]. Optimizing BCS value is crucial to ensure adequate nutrient intake, thereby supporting optimal reproductive organ function and hormone synthesis, unlike low BCS, which can hinder the ovulation process or excessive BCS, which has the potential to cover the reproductive tract [5,6,7]. BCS identification is carried out through visual observation and palpation in areas such as the base of the tail, back, ribs, and sirloin, with a scoring scale that varies depending on the breed of cattle [8].

Estimation of cattle body weight can be used to determine the selling or buying price of cattle. Experienced cattle traders and butchers can accurately determine the live weight of cattle, but this ability does not apply to all livestock owners unless they have some indications. Estimates of live weight may be very far from reality. Because of this background, measuring the condition of livestock is necessary.

2. Methods

2.1. Location and Participants

This study was conducted in Pombulaa Jaya Village, Konda District, South Konawe Regency, Southeast Sulawesi, Indonesia. The participants in this activity are members of the Sumber Rejeki Livestock Group. There are 15 participants in this activity. The participants consisted of 12 males and 3 females, aged between 28 and 57 years. Most participants had completed secondary education, while several had primary school or higher education backgrounds. All participants were actively involved in beef cattle farming, either as cattle owners or prospective cattle fatteners, with farming experience ranging from 2 to 15 years. This diversity of age, educational level, and farming experience provided a representative picture of the target community involved in cattle fattening activities.

2.2. Program Design and Implementation

The method of implementing this study uses a participatory education approach combined theoretical instruction with hands-on field practice. Immediately after the completion of the educational session and hands-on BCS assessment practice, participants completed a post-test questionnaire and practical evaluation. Therefore, the outcomes reported in this study represent the participants' immediate improvement in knowledge and practical skills following the training intervention.

The effectiveness of the activity was evaluated through pre-test and post-test using questionnaires and observation of participants' skills. First, the pre-test was conducted using a structured questionnaire that included a basic understanding of participants regarding the BCS assessment in cattle. Subsequently, was education and demonstration by the teaching team, which included a Q&A/discussion session with the participants. Finally, participants completed a post-test to determine the extent of the participants' understanding after being provided with education and training. It also includes demonstrating how to measure

BCS properly.

Following the demonstration, all participants individually performed BCS assessments under the supervision of the instructors. During this practical session, participants evaluated the body condition of cattle by observing and palpating key anatomical landmarks, including the ribs, spine, loin, hooks, pins, and tail head. Immediate feedback and guidance were provided to ensure that participants correctly applied the BCS scoring criteria. Therefore, the educational intervention consisted of both theoretical knowledge transfer and supervised hands-on field practice.

After the overall activities concluded, follow-up assistance was provided to ensure the sustainability of BCS assessment implementation in cattle fattening practices. The assessment technique involves direct observation and palpation of the livestock's body in the field.

2.3 Livestock and BCS Evaluation

The livestock used in this study are Bali cow dams raised by the Sumber Rejeki Livestock Group. The determination of the livestock's body condition is based on initial information from the farmers. To assess the health condition of livestock, a body condition score examination can be conducted with a score range of 1-5 [9,10].

The BCS scale ranges from 1 to 5, where:

- **Score 1 (Very Thin):** The animal has extremely low body fat reserves. The ribs, spine, pelvis, and tail head are highly prominent with little or no muscle or fat covering.
- **Score 2 (Thin):** Bones remain clearly visible, although a small amount of muscle and fat tissue is present. The animal is under-conditioned.
- **Score 3 (Moderate/Ideal):** The animal has adequate body fat reserves. The ribs and spine can be palpated but are not visually prominent. This score is considered the optimal body condition for productivity and reproductive performance.
- **Score 4 (Fat):** Fat deposits are clearly visible around the ribs, loin, tail head, and brisket. The animal has above-optimal body reserves.
- **Score 5 (Very Fat):** The animal has excessive body fat accumulation. Skeletal structures are no longer visible or easily palpable, indicating obesity, which may negatively affect reproductive performance and metabolic health.

Two main methods are commonly used to assess BCS, namely visually and through palpation. Visual assessment involves looking at specific body parts, such as the spine, ribs, hips, and tail, to determine how prominent or covered the fat tissue is on those bony areas. Especially for experienced farmers, this method is quick and easy to use. However, to measure the thickness of the muscles and fat of livestock, the palpation method involves direct palpation at key points on the livestock's body. This method is more accurate, especially in cases where the livestock have thick fur or body conditions that can only be measured through visual inspection. The combination of these two techniques produces more consistent and unbiased assessment results, facilitating the decision-making process regarding feed, reproduction, and livestock health [11;12].

2.4 BCS Assessment Procedure

The BCS value can describe the general health condition of cows, whether they are experiencing reproductive disorders or are normal. BCS can provide a relative value for each dam's level of body reserves in the form of muscle and fat, which are very important [13]. The BCS scale is used to classify the level of body fat reserves in livestock. Although the basic principles are similar, the scale system used may vary depending on the type of livestock. In cattle, especially dairy cattle, the BCS scale usually uses a range of 1 - 5, where:

- Score 1 indicates a very thin condition, with bones protruding without any fat tissue.
- Score 3 is considered the ideal condition, with bones still palpable but covered by a sufficient layer of fat.
- Score 5 indicates extreme excess fat, with the body surface feeling soft and rounded.



Source : <https://www.mdpi.com/2306-7381/11/9/399>

Determination of BCS [14,15] as follows:

1. Very Thin

The cow's growth is very light, and it has a small and angular pelvis, pronounced sitting bones, spine, and ribs, as well as no fat on the brisket, flank, or twist.



2. Thin

The chest (brisket) is thin and non-fatty, the base of the tail and the hollow of the back are prominent, the sitting bones, spine, and ribs are prominent, and the cow's pelvis is narrow and angular. The development of fat on the flank and twist is not covered by any fat.



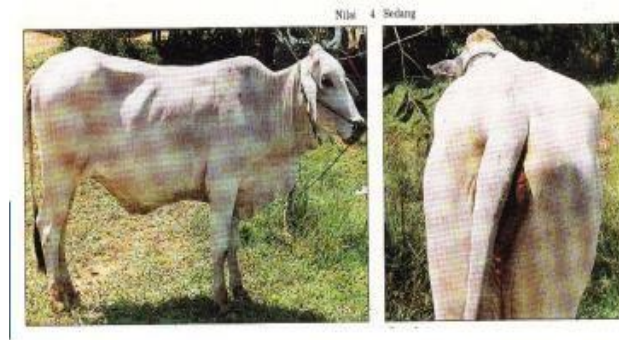
3. Fair

The cow has a fair appearance, with the pelvis, sitting bones, spine, and ribs covered by a thin layer of fat; the hungry curve and base of the tail becoming less visible; and the chest, abdomen, and thigh gap starting to fill with fat.



4. Fatty

With a thick layer of fat covering the pelvis, sitting bones, spine, and ribs, the cow has a deep, robust appearance. The base of the tail is covered in a lot of fat. There is a lot of fat and noticeable gaps between the thighs, chest, and abdomen.



5. Very Fatty

The cow's look is deep and solid, with the pelvis, sitting bones, spine, and ribs all covered in a thick layer of fat. The base of the tail has a lot of fat covering it. The spaces between the thighs, chest, and abdomen are full with fat and noticeable.



2.5 Statistical Analysis

Data were analyzed using descriptive statistics (mean, standard deviation, minimum, and maximum values). Differences between pre-test and post-test knowledge scores were analyzed using a paired-samples t-test at a significance level of $p < 0.05$. Statistical analyses were performed using IBM SPSS Statistics.

3. Results and Discussion

3.1 Socialization and Preparation Stage

This educational activity begins with the socialization stage to ensure smooth implementation. At this stage, coordination is carried out with the head of the Sumber Jaya livestock group. In this meeting, discussions are held to identify the issues occurring in the field and followed by the determination of the activity schedule, location, and needs during the activity.

3.2 Pre Test and Training Stage

The educational activity focuses on the procedure for assessing BCS. Before starting this activity, a pre-test is conducted with the participants to determine the farmers' level of knowledge. After that, the education is delivered. Participants were trained using visual observation and palpation methods. Visual assessment involves looking at specific parts of the body, such as the spine, ribs, hips, and tail, to determine how prominent or covered the fat tissue is. The palpation method involves direct touching of key points on the livestock's body to measure the thickness of muscle and fat. This method is more accurate, especially for animals with thick fur or body conditions that can only be measured visually. The combination of these two methods produces more consistent and unbiased assessment results, making it easier to make decisions about feed, reproduction, and livestock health.

3.3 Evaluation and Post-Test Results

According to the situational analysis and post-educational intervention evaluation, participants have a better understanding of the assessment concepts and methods. Direct practice observations and knowledge questionnaires evidence this improvement. This improvement indicates that the educational program is effective in bridging knowledge gaps and encouraging the adoption of more informed livestock management practices. However, further studies are needed to determine the long-term impact on the productivity and income of farmers [16,17].

The educational activity on BCS (Body Condition Score) assessment provided to prospective cattle fatteners in Pombulaa Jaya village went well and received positive responses from participants of the Sumber Rejeki Livestock Group. The evaluation results from both the pre-test and post-test indicate that the participants have a better understanding of the basic concepts of BCS, how to assess it visually and through palpation, and how to interpret the scores in livestock management.

The results of the observations during the practice also showed that most participants were able to identify the body condition of the livestock more accurately. This is especially true for the ribs, spine, and base of the tail as the main assessment indicators. Additionally, participants showed improvement in distinguishing the types of livestock body conditions based on weight: thin, moderate, and fat. Demonstration and hands-on practice activities are more effective than lectures. This is demonstrated by the increased confidence of participants in conducting BCS assessments independently in the field. The results are shown in Table 1.

Table 1. Pre-test and post-test results of participants training program

Knowledge	Total Participation	Average	Minimum Score	Maximum Score
Before Training	15	57.67	50	70
After Training	15	96.67	90	100

Further analysis regarding the farmers' knowledge after the education provided can be seen from the level of understanding (Table 2). Before the intervention, only 33.3% of participants had a good understanding of the BCS assessment; after the training, participants' understanding increased to 80%.

Table 2. Distribution of participants' knowledge categories before and after the training program

Knowledge	Category	Total Participation	%
Before Training	Poor	0	0
	Moderate	10	66.6
	Good	5	33.3
	Total	15	100
After Training	Poor	0	0
	Moderate	3	20
	Good	12	80
	Total	15	100

Table 2 shows that participants' knowledge level increased after the Body Condition Score (BCS) assessment training in the farmer group in Pombulaa Jaya Village, Konda District. Before the training, most participants were in the average knowledge category (10 people, 66.6%) and the good category (5 people, 33.3%), with no participants in the low category. After the training, the distribution of knowledge shifted, with the good category increasing to 12 people (80%) and the average category decreasing to 3 people (20%). This change indicates that the BCS training significantly enhanced participants' understanding, particularly in identifying livestock body condition as a basis for decision-making in beef cattle management. This increased understanding may support better livestock management by enabling farmers to make more informed decisions regarding nutrition, health, and reproduction.

BCS assessment is a crucial indicator of the nutritional status and productivity of livestock, which affects health, reproduction, and production performance. Therefore, improving farmers' ability to assess BCS can enhance the quality of managerial decision-making in beef cattle farming [18]. Increased understanding of BCS impacts has improved livestock management and performance. Participants' knowledge of BCS will relate to the health and reproductive efficiency of livestock, making accurate assessment the foundation for more productive and sustainable business management [4,17]. Additionally, in livestock, differences in BCS values are associated with health conditions and production performance. Implementing BCS-based

management is an important approach to increasing the productivity of smallholder farming [19,20]. Thus, the increase in the knowledge category of participants after the training in this study indicates that BCS education is effective in improving participants' knowledge and practical competency in Body Condition Score assessment of beef cattle farmers through the enhancement of livestock condition analysis skills, which ultimately may contribute to improved production efficiency in Pombulaa Jaya Village, Konda District.

Table 3. Analysis Pre Test and Post Test

Parameter	Pre Test	Post Test
Participant (n)	15	15
Mean $\pm$ SD	57.67 $\pm$ 7.04	96.67 $\pm$ 3.62
Min	50	90
Max	70	100

Table 4. Analysis Paired T-Test

Variable	Pre Test (Mean $\pm$ SD)	Post Test (Mean $\pm$ SD)	Mean Difference	T (df)	P-Value
Knowledge Score	57.67 $\pm$ 7.04	96.67 $\pm$ 3.62	39.00	17.78 (14)	<0.001

The effectiveness of the educational program was further evaluated using a paired-samples t-test. The mean knowledge score increased from 57.67 $\pm$ 7.04 before the training to 96.67 $\pm$ 3.62 after the training. The analysis revealed a statistically significant improvement in participants' knowledge following the intervention ($t(14) = 17.78$, $p < 0.001$). The average increase in score was 39.00 points, indicating a substantial improvement in participants' understanding of BCS assessment.

The significant improvement in participants' knowledge can be explained by the educational approach used in this program. Demonstration-based learning may have facilitated participants' understanding by allowing them to directly observe the correct procedures for BCS assessment before applying them independently. By combining verbal explanations with visual examples, participants were better able to recognize the anatomical landmarks used in BCS evaluation and reduce errors in body condition assessment.

Hands-on field practice also likely contributed to the substantial improvement in participants' knowledge and practical competence. Through direct observation and palpation of live cattle, participants immediately applied the concepts introduced during the educational session. This experiential learning process reinforced theoretical knowledge, improved skill retention, and increased participants' confidence in performing BCS assessments independently. Immediate feedback from instructors further helped participants standardize their assessment techniques.

These findings suggest that combining lectures, demonstrations, and supervised field practice is an effective educational strategy for improving farmers' competency in BCS assessment. Although this study only evaluated short-term learning outcomes, improved competency may support better decision-making regarding feeding strategies, health monitoring, and reproductive management. Future studies should investigate whether these improvements translate into measurable gains in livestock productivity and farm profitability.

Improved understanding of BCS assessment may support better managerial decision-making in beef cattle farming by enabling farmers to evaluate the nutritional status and health condition of cattle more accurately. By enhancing the mastery of BCS enables farmers to make precise decisions about feed provision and to maintain ideal conditions for reproduction [8,21]. Lack of managerial understanding often leads to economic losses, such as failure to conceive or excessive and inefficient feed costs [22,23].

A limitation of this study is that the post-test was administered immediately after the training; therefore, the findings reflect short-term improvements in knowledge and practical skills. Further follow-up evaluations are required to determine long-term knowledge retention, sustained application of BCS assessment, and its impact on livestock productivity and farm performance.

4. Conclusions

The educational program on Body Condition Score (BCS) assessment effectively improved the knowledge and practical competence of prospective beef cattle fatteners in the Sumber Rejeki Livestock Group, Pombulaa

Jaya Village, Konda District. Participants demonstrated a significant increase in knowledge scores after the training, with the mean score improving from 57.67 ± 7.04 before the intervention to 96.67 ± 3.62 after the intervention ($p < 0.001$). The combination of interactive lectures, demonstrations, and supervised hands-on field practice enabled participants to better understand and correctly apply BCS assessment techniques using visual observation and palpation. Improved competency in BCS assessment may support more informed decision-making regarding cattle nutrition, health monitoring, and reproductive management.

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