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DUCK FARMING EDUCATION ON RECORD KEEPING HEALTH MANAGEMENT AND COOP SANITATION IN PALEMBON VILLAGE INDONESIA

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ABSTRACT

This study assessed changes in participants' knowledge following an educational program on duck farm record keeping, animal health management, coop sanitation, and traditional herbal remedies in Palembon Village, Kanor District, Bojonegoro Regency, Indonesia. A one-group pretest–posttest study was conducted on October 17, 2026, involving 34 volunteers aged 18–68 years, comprising 20 men and 14 women. Interactive education covered flock population records, production costs, egg output, profitability, disease prevention, and coop hygiene. Knowledge was assessed before and after the session using a questionnaire containing 10 true-or-false statements. Paired scores were compared using the Wilcoxon signed-rank test, with a paired-samples t-test as a supporting analysis. Mean knowledge scores increased from 64.1 ± 15.6 to 75.6 ± 11.9 on a 0–100 scale, with a mean paired increase of 11.5 points (95% confidence interval: 7.81–15.13). The median score increased from 60 to 80. Twenty-two participants (64.7%) improved, 12 (35.3%) had unchanged scores, and none had lower scores. The pretest–posttest difference was statistically significant ($W = 0.0$; $p < 0.001$), with a paired standardized effect size of 1.09. The program was associated with immediate

knowledge gains, but the uncontrolled design and absence of follow-up prevent conclusions about sustained learning, adoption of husbandry practices, or farm productivity. The educational focus is relevant to Sustainable Development Goals 2 (Zero Hunger) and 4 (Quality Education).

Keywords: Animal Health; Coop Sanitation; Duck Farming; Extension Education; Livestock Record Keeping

1 INTRODUCTION

Duck production supplies eggs and meat and provides an income-generating activity for rural households. Its performance depends on feeding, health management, housing, sanitation, and the availability of reliable farm records. A survey of Philippine mallard duck farms identified production constraints involving feed costs, disease, and limited capital, while record-keeping practices differed with the scale of operation [1]. In Palembon Village, Kanor District, Bojonegoro Regency, Indonesia, previous educational activities have addressed practical duck management, including appropriate feeding [2]. These activities provide a local basis for further education that integrates business documentation with animal health and coop sanitation.

Farm records document flock numbers, egg production, feed use, production expenses, disease events, treatments, and mortality. These records can help farmers identify production changes and evaluate the financial consequences of husbandry decisions. Luju et al. [3] described community training in livestock recording as an approach to strengthening farmers' data-management capacity. Although that program concerned pig husbandry, its emphasis on simple recording practices is relevant to extension activities in other smallholder livestock systems. For duck farmers, introducing accessible recording methods may therefore support more systematic management without requiring complex technology.

Health management and coop sanitation complement recording by addressing preventable sources of production loss. Cleaning housing, feeders, and drinkers, managing waste, restricting exposure to infection sources, and separating sick birds are practical components of disease prevention. Research in the Coastal and Haor regions of Bangladesh identified deficiencies in vaccination, biosecurity, and access to treatment, supporting the need for farmer education on preventive management [4]. However, improved knowledge of these measures must be distinguished from their implementation on farms.

Education on locally available medicinal plants can also address traditional practices already familiar to rural communities. Hartady et al. [5] reviewed the biological activities of herbal preparations in avian species, including antioxidant and antimicrobial effects. In Palembon Village, Farhanudin et al. [6] reported improved knowledge after an educational intervention on ethnoveterinary herbal medicine. These findings support discussion of plant identification, preparation, and safety within extension programs; they do not establish the efficacy of every traditional preparation. Herbal remedies require consideration of species, dose, preparation, and toxicity and should not replace veterinary assessment when animals are ill.

Previous duck-management education in the same locality reported pretest–posttest knowledge improvements after structured training [7,8]. The present study focused on an integrated educational session addressing farm record keeping, animal health, coop sanitation, and traditional remedies. Its objective was to assess immediate changes in participants' knowledge using paired questionnaire scores before and after the session. Farm-level adoption, animal health outcomes, and productivity were outside the scope of this evaluation.

2 MATERIALS AND METHODS

2.1 Study design and participants

A one-group pretest–posttest design was used to assess changes in knowledge following a community educational session. The evaluation involved repeated assessment of the same participants without a separate control group. The participant was the unit of analysis.

The activity was conducted in Palembon Village, Kanor District, Bojonegoro Regency, East Java, Indonesia, on October 17, 2026. Thirty-four volunteers participated: 20 men and 14 women aged 18–68 years. Participants completed a pretest before the educational session and a posttest after the presentation of the material. The evaluation assessed immediate knowledge change; no subsequent follow-up assessment was included.

2.2 Educational intervention

The session was delivered interactively and integrated farm documentation with health and sanitation education. Record-keeping topics included monitoring flock population, production expenses, egg output, and business profitability. Health-related topics included disease prevention, coop hygiene, and the use of traditional herbal remedies as discussed in the educational material. Knowledge was assessed immediately before and after delivery of the material.

2.3 Instrument and data collection

Knowledge was assessed using a questionnaire containing 10 statements with true-or-false responses. The items covered two main content areas. The record-keeping component addressed flock population, production costs, egg production, profit calculations, and the evaluation of declining production. The health and sanitation component addressed disease prevention, recognition of "blue eye disease" as described in the educational material, initial duckling care, aflatoxin poisoning, and coop environmental conditions. Pretest and posttest knowledge scores were reported on a 0–100 scale. The questionnaire was administered before and after the educational session to compare participants' understanding of the material.

2.4 Data analysis

Participant characteristics and knowledge scores were summarized using counts and percentages, means and standard deviations (SD), medians and interquartile ranges (IQR), and ranges, as appropriate. The primary comparison of paired pretest and posttest scores used the Wilcoxon signed-rank test, reported as an exact test. Use of this test for paired training assessments has also been described by Widiana et al. [9]. Pairs with zero differences were excluded from the signed-rank calculation, leaving 22 non-zero pairs; these participants remained included in the descriptive summaries. A paired-samples t-test was reported as a supporting analysis of the mean difference. The mean paired change and its 95% confidence interval (CI), the Hodges–Lehmann estimate, Cohen's dz, and the matched-pairs rank-biserial correlation were used to summarize the magnitude of change. Cohen's dz represents the mean paired difference divided by the SD of the paired differences. Individual changes were classified as increased, unchanged, or decreased according to the direction of the posttest minus pretest difference.

3 RESULTS AND DISCUSSION

3.1 Participant characteristics

All 34 participants were included in the paired evaluation. Men accounted for 58.8% of the sample and women for 41.2%. Mean age was 44.1 ± 13.5 years, with a median of 44.5 years and a range of 18–68 years (Table 1). The age range indicates that the session reached adults at different life stages; however, the sample size and available summaries do not support comparisons of learning outcomes by age or sex.

Table 1: Participant characteristics (n = 34)

Characteristic	Value (n = 34)
Age, years	
Mean ± SD	44.1 ± 13.5
Median (IQR)	44.5 (33.5–55.8)
Range	18–68
Sex, n (%)	
Male	20 (58.8)
Female	14 (41.2)

SD, standard deviation; IQR, interquartile range (25th–75th percentile).

3.2 Changes in knowledge scores

Mean knowledge scores increased from 64.1 ± 15.6 at pretest to 75.6 ± 11.9 at posttest. The mean paired increase was 11.5 points (95% CI: 7.81–15.13), equivalent to a 17.9% increase relative to the pretest mean. Median scores increased from 60 to 80 (Table 2). The absolute increase describes points on the 0–100 knowledge scale; the relative increase uses the baseline mean as its denominator.

The Wilcoxon signed-rank test indicated a pretest–posttest difference (W = 0.0; p < 0.001). The supporting paired-samples t-test also indicated a difference (t(33) = 6.38; p < 0.001). Cohen's dz was 1.09 (95% CI: 0.66–1.52), indicating a substantial standardized within-participant change. The matched-pairs rank-biserial correlation of 1.00 reflects the direction of the non-zero differences: all participants whose scores changed had higher posttest scores. It does not mean that all participants improved or that the intervention fully explains the observed change.

Table 2: Pretest and posttest knowledge scores and paired changes (n = 34)

Outcome / statistic	Value
Knowledge score, 0–100 scale	
Pretest, mean ± SD	64.1 ± 15.6
Pretest, median (IQR)	60.0 (60.0–70.0)
Pretest, range	30–100
Posttest, mean ± SD	75.6 ± 11.9
Posttest, median (IQR)	80.0 (70.0–80.0)
Posttest, range	50–100
Paired change (posttest − pretest)	
Mean ± SD, points	11.5 ± 10.5
Median (IQR), points	10.0 (0.0–20.0)
Range, points	0–30
95% CI for the mean change, points	7.81 to 15.13
Hodges–Lehmann median change, points	10.0
Relative change vs pretest mean, %	17.9
Statistical test	
Primary test	Wilcoxon signed-rank test (exact)
Test statistic (W)	0.0
Non-zero pairs analysed	22 of 34 (12 tied pairs excluded)
P value	< 0.001
Supporting test	Paired-samples t test
Test statistic (t, df)	6.38 (33)
P value	< 0.001
Effect size	
Cohen's dz (95% CI)	1.09 (0.66–1.52)
Matched-pairs rank-biserial r	1.00

SD, standard deviation; IQR, interquartile range; CI, confidence interval. Knowledge scores are reported on a 0–100 scale. The Wilcoxon signed-rank analysis included 22 non-zero pairs; 12 pairs with unchanged scores were excluded from this calculation. The paired-samples t-test included all 34 participants. Values are rounded to the displayed precision.

3.3 Individual score changes

Twenty-two participants (64.7%) had higher posttest scores, 12 (35.3%) had unchanged scores, and none had lower scores (Table 3). Individual changes ranged from 0 to 30 points, with a median change of 10 points (IQR: 0–20). Figure 1 presents the paired scores and the distribution of individual changes. The unchanged scores show that the overall improvement was not shared equally across participants. Item-level results and follow-up interviews would be needed

to determine whether this reflected prior knowledge, unresolved misconceptions, or limited sensitivity of the questionnaire.

Table 3: Distribution of individual knowledge-score changes (n = 34)

Knowledge-change category	n (%)
Increased (posttest > pretest)	22 (64.7)
Unchanged (posttest = pretest)	12 (35.3)
Decreased (posttest < pretest)	0 (0.0)
Total	34 (100.0)

Increased, posttest score greater than pretest score; unchanged, equal pretest and posttest scores; decreased, posttest score lower than pretest score.

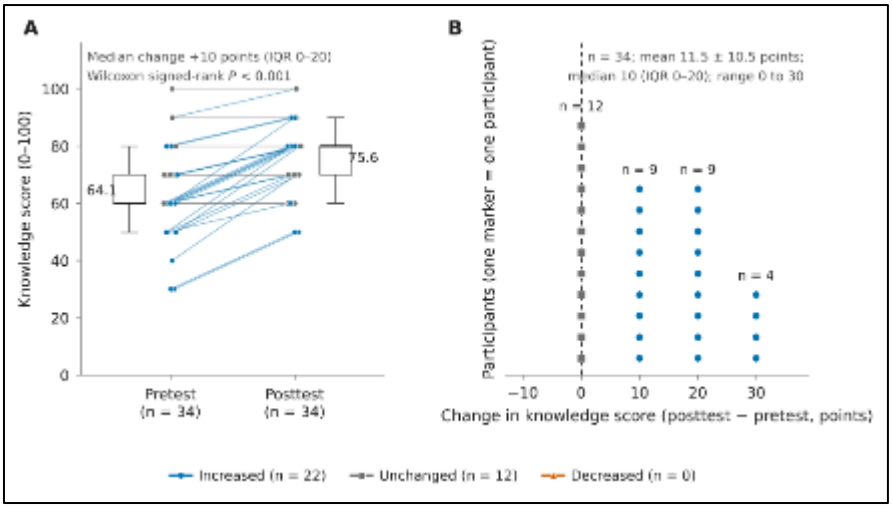


Figure 1: Knowledge scores before and after the educational session and the distribution of individual score changes (n = 34). (A) Paired pretest and posttest scores (0–100 scale). Each line joins the two observations of one participant; points are jittered horizontally to reduce overplotting, with values unchanged. Boxes show the median and interquartile range, whiskers the most extreme observation within 1.5 × IQR, and the printed value the group mean. Median change +10 points (IQR 0–20); Wilcoxon signed-rank test, P < 0.001. (B) Individual paired differences (posttest − pretest); each marker is one participant, counts are printed above each stack, and the dashed line marks zero change. No participant scored lower at posttest.

3.4 Interpretation and comparison with previous studies

The observed knowledge gain is consistent with earlier duck-management education in Palembon Village [7,8]. It also accords with Al Ichsan et al. [2], who reported improved knowledge after feed-management education involving 40 participants. These studies support the practical relevance of locally delivered extension activities, but differences in questionnaire content, scoring, participant composition, and baseline knowledge prevent direct ranking of program effectiveness. For record keeping, the present findings concern understanding of documentation and business evaluation. They do not demonstrate that participants subsequently maintained records, reduced costs, or increased profits. Training in livestock recording described by Luju et al. [3] provides a useful basis for designing subsequent practical support.

The health and sanitation content addressed management areas relevant to disease prevention. The deficiencies in biosecurity and preventive care reported in Bangladesh [4] illustrate why these topics matter to duck production, although that observational evidence comes from a different setting. Similarly, the knowledge improvement reported after ethnoveterinary education in Palembon [6] supports teaching safer and more systematic use of local plant resources. Hartady et al. [5] provide a broader biological basis for discussing herbal preparations, but the current questionnaire evaluation cannot establish clinical efficacy, safe dosages, or reductions in animal disease. Future extension should connect knowledge assessment with observed sanitation practices and access to veterinary advice.

The educational approach is relevant to SDG 4 through adult learning and to SDG 2 through its focus on knowledge supporting smallholder food production. These are potential pathways of contribution rather than measured development outcomes. Practical follow-up could include checking the completeness of farm records, observing coop hygiene, and assessing retention of knowledge. Farm productivity, household income, and food security should be measured directly before claims are made about those outcomes.

3.5 Limitations and implications

The one-group design cannot separate an educational effect from repeated testing, attention from facilitators, or other influences. The volunteer sample from one village limits generalizability, and immediate reassessment does not establish retention. Interpretation of the total score also depends on questionnaire validity and reliability, which were not documented. The total-score analysis does not identify which content areas improved. The findings should therefore be interpreted as evidence of immediate knowledge change rather than a demonstration of farm-level effectiveness.

Future evaluations should specify the educational materials and scoring procedures, assess questionnaire measurement properties, and include later knowledge assessments and observed husbandry outcomes. A comparison group would strengthen assessment of whether changes are attributable to the educational intervention.

4 CONCLUSION

An educational session on duck farm record keeping, animal health management, coop sanitation, and traditional remedies was associated with higher immediate knowledge scores among 34 participants in Palembon Village. The mean paired increase was 11.5 points on a 0–100 scale, with improvement in 22 participants and unchanged scores in 12. These findings support further development of locally relevant extension education. The absence of a control group and follow-up assessment limits causal interpretation and conclusions about sustained learning or adoption. Continued guidance and direct observation of husbandry practices are needed to determine whether the knowledge gains translate into better farm management. This educational focus is relevant to SDG 2 and SDG 4, although effects on food security and longer-term learning were not measured.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no financial or non-financial conflicts of interest related to this study.

Statement of ethical approval

Ethical approval was obtained for the study involving participant questionnaire assessments. The intervention consisted of community education and pretest–posttest knowledge evaluation. No biomedical procedures or animal experimentation were conducted.

Statement of informed consent

Informed consent was obtained from all participants. The purpose of the evaluation, the voluntary nature of participation, and the use of anonymized pretest and posttest data for academic reporting and publication were explained to participants.

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