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KNOWLEDGE SCORE CHANGES IN A COMMUNITY PROGRAM ON ANIMAL SOURCE FOOD PROCESSING IN ABAR ABIR INDONESIA

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ABSTRACT

Community education on animal source food processing requires evaluation methods that can distinguish learning from high initial performance. This study described changes in recorded pretest and posttest scores from a community program in Abar Abir village, Bungah district, Gresik regency, Indonesia. A secondary analysis linked scores within a register for an activity dated 3 October 2026. Attendance and score completeness were summarized for all 40 registered participants; paired analyses included 29 participants with both scores. Missing entries were retained as missing, and a recorded zero was preserved. Descriptive statistics and an exploratory exact two-sided sign test were used. Mean scores increased from 95.86 ± 18.62 to 97.24 ± 14.86, a mean change of 1.38 ± 4.41 points. Three participants improved, 26 were unchanged, and none declined. Twenty-six participants (89.7%) already scored 100 at baseline. Among the three non-zero changes, the exact sign-test p value was 0.250. Five participants had pretest scores only, one had a posttest score only, and five had neither. The small observed increase was concentrated in three participants and occurred alongside a marked ceiling pattern. These records do not establish causal effectiveness, practical competence, or economic benefit. Future evaluations should document the assessment instrument, improve score completeness,

assess practical food handling performance, and include follow-up measurements. These findings inform efforts to strengthen community learning assessment in support of Sustainable Development Goal 4 (Quality Education).

Keywords: Community Education; Animal Source Foods; Food Safety; Pretest and Posttest; Ceiling Effect; Quality Education (SDG 4).

1 INTRODUCTION

Animal source foods can support household food enterprises, but processing activities require attention to hygiene, handling, and storage. The World Health Organization describes five practical food safety messages covering cleanliness, separation of raw and cooked foods, thorough cooking, safe temperatures, and safe water and raw materials [1]. The Codex General Principles of Food Hygiene provide a broader basis for good hygiene practices and hazard control across food operations [2]. These principles are relevant when community programs introduce household processing of livestock products.

Education is a common component of food safety programs. A systematic review of controlled food handler training studies found evidence of improved knowledge, while effects on other outcomes varied [3]. A separate review of single-group pretest and posttest studies highlights the importance of study design when interpreting training evaluations [4]. Knowledge scores are therefore useful intermediate measures, but cannot by themselves demonstrate safe routine practice, sustained production, or business success.

The community empowerment proposal for Abar Abir village describes a two-year program intended to develop household capacity in processing animal source foods. Proposed activities include chicken floss, salted egg and yogurt processing, standard operating procedures, production costing, packaging, and marketing. The program combines a food processing rationale with a longer-term aspiration for household economic independence. A proposal, however, specifies intended activities and targets; it does not establish that all planned activities have occurred or that economic outcomes have been achieved.

A register from an activity dated 3 October 2026 contains attendance and pretest and posttest scores. These records provide an opportunity to examine the observed score distribution and the completeness of an early evaluation within the program. The objective of this study was to describe within-participant score changes, identify patterns that limit interpretation, and derive practical recommendations for subsequent program evaluation. The analysis was not designed to estimate the causal effect of training or to assess household income.

2 MATERIAL AND METHODS

2.1 Study area and activity design

This was an uncontrolled paired pretest and posttest evaluation based on secondary analysis of a community program register. The setting was Abar Abir village, Bungah district, Gresik regency, East Java, Indonesia. The register identifies the activity date as Saturday, 3 October 2026. The program proposal supplied the background and intended scope of the initiative, while the spreadsheet supplied the observed attendance and scores. Only outcomes recorded in the spreadsheet were analyzed.

The proposal envisaged a two-year sequence of food processing education and practice followed by business development activities. The available evaluation register did not document the session duration, delivered lesson content, demonstration procedures, trainer attendance, or interval between assessments. Accordingly, these implementation details were not reconstructed from the proposed work plan. This report concerns the recorded educational evaluation rather than a verified implementation assessment of the entire program.

2.2 Study design and participants

All 40 entries on the attendance register were considered when describing data availability. Participants were linked across the pretest and posttest columns within the same register entry. The paired analysis included every entry with two numeric scores. No sampling frame, eligibility criteria, recruitment procedure, or individual demographic characteristics were available for analysis. The program proposal had anticipated 20 direct participants; the attendance register contained 40 entries. The observed register size was used as the denominator for completeness, without assuming that the proposed recruitment target described the actual sample.

Names were replaced with sequential analysis identifiers before summarization. Missing score cells were treated as unavailable observations and were not converted to zero. One complete pair contained a pretest score of zero and a

posttest score of 20; both values were retained as recorded. No imputation or exclusion based on score magnitude was performed. Participants without paired measurements contributed to the description of completeness but not to the calculation of within-participant change.

2.3 Instrument and data collection

The primary descriptive outcome was the within-participant difference, calculated as posttest minus pretest score. Secondary summaries included the numbers whose scores increased, remained unchanged, or decreased, and the proportions scoring 100 at each assessment. The recorded scores lay between zero and 100. The assessment items, number of questions, scoring rubric, administration instructions, and validation or reliability evidence were unavailable. Scores were therefore analyzed in their recorded units, without assigning a pass threshold or converting them into a validated measure of competence.

The frequency of scores at 100 was used to describe the observed ceiling pattern. This descriptive use does not establish the psychometric properties of the instrument. Measurement research identifies floor and ceiling effects as relevant considerations when evaluating the interpretability and responsiveness of questionnaires [5]. Here, the absence of item-level information prevented a formal assessment of item difficulty, discrimination, reliability, or sensitivity to learning.

2.4 Data analysis

Counts and percentages described attendance, data availability, and score change categories. Paired scores and differences were summarized using means, sample standard deviations, medians, interquartile ranges, and ranges. Percentages for paired outcomes used 29 as the denominator; completeness percentages used 40. Changes in mean scores were expressed in score points, not as percentage improvements.

An exploratory exact two-sided sign test assessed the direction of non-zero paired differences. The 26 tied differences were excluded from this test, leaving three informative pairs. Under the null hypothesis, positive and negative differences are equally likely; the two-sided probability for three positive and zero negative differences is $2 \times (0.5^3) = 0.250$. This analysis does not use the magnitudes of changes. Given the small informative sample and highly tied distribution, the p value was interpreted cautiously. Descriptive results were prioritized, and no causal or equivalence claim was based on statistical significance.

3 RESULTS AND DISCUSSION

3.1 Attendance and availability of paired scores

Of the 40 registered participants, 34 (85.0%) had a pretest score and 30 (75.0%) had a posttest score. Both scores were available for 29 participants (72.5%). Five participants had a pretest only, one had a posttest only, and five had neither measurement (Table 1). Thus, 11 registered participants (27.5%) could not contribute to the paired analysis. The reasons for missing assessments were not recorded, and no comparison of demographic characteristics between complete and incomplete records was possible.

Table 1: Availability of assessment data among registered participants

Assessment availability	Participants	Percent
Both pretest and posttest	29	72.5
Pretest only	5	12.5
Posttest only	1	2.5
Neither score	5	12.5
Total registered	40	100.0

Missing measurements reduce the coverage of the evaluation and may bias the observed changes if participants with complete scores differ from those with incomplete scores. The present data do not identify the direction or magnitude of any such bias. Reporting all attendance entries alongside the paired analysis makes this limitation visible and avoids presenting 29 complete pairs as the full attendance count.

3.2 Distribution and magnitude of score changes

Among the 29 complete pairs, the mean pretest score was 95.86 ± 18.62 and the mean posttest score was 97.24 ± 14.86 (Table 2). The mean paired difference was 1.38 ± 4.41 points. The median and interquartile range were 100 and 100–100 at both assessments. These summaries indicate that the typical participant was already at the highest recorded score before the activity, while the mean and standard deviation were influenced by the few lower scores.

Table 2: Paired score summaries for 29 participants

Measure	Pretest	Posttest
Mean ± standard deviation	95.86 ± 18.62	97.24 ± 14.86
Median	100	100
Interquartile range	100–100	100–100
Minimum to maximum	0–100	20–100
Score of 100 n (%)	26 (89.7)	28 (96.6)

Three participants (10.3%) improved and 26 (89.7%) were unchanged; none declined. All unchanged pairs were 100 to 100. Two improved from 90 to 100, and one improved from zero to 20 (Table 3 and Figure 1). The sum of within-participant gains was 40 points; the zero-to-20 pair contributed half of that total. Retaining this pair respects the recorded data, while reporting its contribution prevents a small number of changes from being obscured by an overall mean.

Table 3: Exact score transitions in the paired analysis

Pretest to posttest	Participants	Percent
100 to 100	26	89.7
90 to 100	2	6.9
0 to 20	1	3.4
Total paired	29	100.0

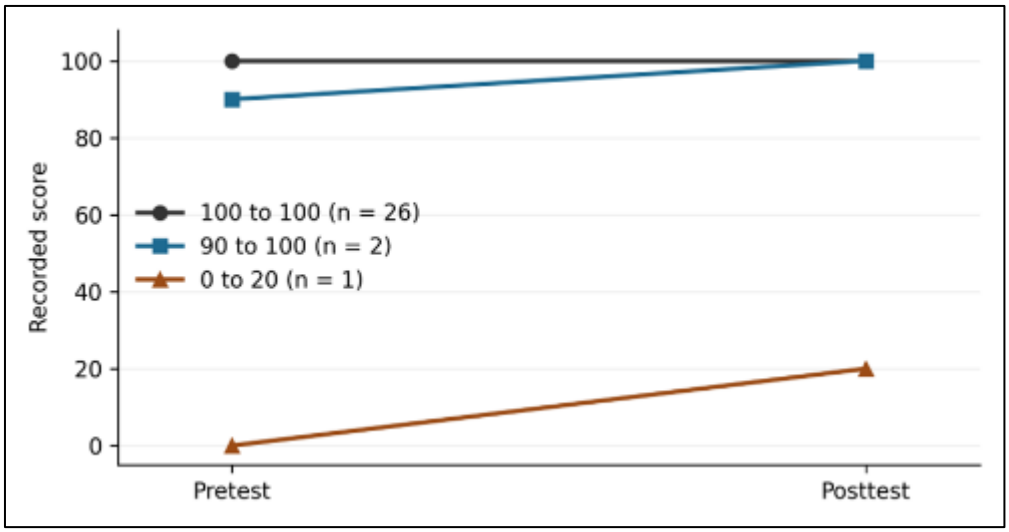

Figure 1: Recorded pretest and posttest trajectories. Each line represents a distinct score transition; the legend gives the number of participants sharing that transition. The figure represents all 29 complete pairs without implying that overlapping records are separate visible lines.

The exploratory exact sign test yielded p = 0.250, based on only three non-zero changes. This result does not demonstrate a statistically significant directional change under that test, but it also does not establish an absence of learning. The 26 ties provide little information about direction because those participants could not score above their

baseline value of 100. The more informative result is the combination of high initial scores, a small number of gains, and substantial incomplete assessment data.

3.3 Interpretation for community food processing education

The ceiling pattern limits the ability of the recorded score to distinguish participants who acquired new knowledge from those whose knowledge remained unchanged. A score of 100 before and after an activity may reflect strong prior knowledge, questions that were too easy for the audience, or an assessment that covered only a narrow component of the curriculum. The aggregate records cannot distinguish these explanations. Future instrument development should match question difficulty to the intended participants and include application-based items rather than relying solely on easily recalled facts.

The small recorded increase should be interpreted within the broader literature without treating the present activity as equivalent to evaluated interventions. Reviews of food handler education describe improvements in knowledge and variable outcomes across attitudes, practices, and settings [3,4,6]. Such findings support assessing several dimensions of learning, but they cannot substitute for missing local implementation details or demonstrate effectiveness in Abar Abir. The present evidence establishes only the observed score transitions among complete records.

Practical evaluation could assess hand hygiene, separation of raw and cooked materials, temperature management, and safe storage using an explicit observation checklist linked to relevant guidance [1,2]. Product-specific procedures could then address the animal source foods actually processed in a session. These measures should be recorded as future evaluation components rather than inferred from a written work plan. Direct observation would provide evidence that aggregate knowledge scores cannot supply.

The proposal connects processing skills with household economic independence. Assessing that objective requires documented production, costing, sales, repeat orders, or income measured over an appropriate follow-up period. None of these outcomes were available in the evaluation register. Consequently, the present analysis cannot claim improved household income, business independence, product quality, or sustained adoption of processing practices. A staged evaluation linking education, demonstrated competence, production activity, and later economic indicators would better align evidence with the program objective.

Limitations and recommendations

This evaluation has several limitations. The single-group design lacks a concurrent comparison and cannot separate an activity effect from repeated testing or other influences. The instrument and administration procedures were not documented, preventing assessment of measurement validity. Eleven attendance entries lacked paired scores, and reasons for missingness were unknown. The small number of non-zero changes and marked baseline ceiling constrain inference. Participant characteristics, delivered curriculum, practical performance, retention, and economic outcomes were not available. Findings therefore apply to the recorded complete pairs and should not be generalized to all villagers or to the full two-year program.

Subsequent activities should retain the assessment questions and scoring instructions, use consistent anonymous identifiers, record reasons for missing tests, and document the content and timing of each session. An assessment with a wider range of difficulty could improve discrimination at baseline. A practical checklist and follow-up assessment would extend the evaluation beyond immediate recorded scores. Where feasible, a comparison group and prospectively defined outcomes would strengthen interpretation. These recommendations follow from the observed data limitations and do not imply that unmeasured benefits have already occurred.

4 CONCLUSION

In the 29 participants with complete paired records, mean scores increased by 1.38 points, with three improvements and 26 unchanged scores. Most participants already scored 100 at baseline, and only three pairs informed the exploratory sign test ($p = 0.250$). The records show a marked ceiling pattern and incomplete assessment coverage, limiting conclusions about educational effectiveness. They do not establish practical competence or economic benefit. Better documented instruments, complete linked assessments, practical observation, and follow-up are needed to evaluate the wider community program.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

Financial and non-financial conflict of interest disclosures have not yet been confirmed by all authors. A finalized disclosure statement is required before submission.

Statement of ethical approval

The analysis concerns educational evaluation records involving human participants. Documentation of ethics approval or exemption and consent for research use or publication was not available. No exemption or consent is asserted. The authors must obtain the appropriate institutional determination and confirm applicable consent requirements before submission. Participant names are not reported in this article.

Statement of informed consent

The article reports aggregate results and all distinct paired score transitions. The source attendance register contains participant names and is not included in the manuscript. Any access to individual records requires authorization and applicable privacy and ethical safeguards.

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