CAPACITY BUILDING ON HEALTHY ANIMAL-SOURCE FOOD PROCESSING TO ENHANCE FOOD SECURITY AMONG PKK MEMBERS IN MENTENG DALAM SOUTH JAKARTA

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ABSTRACT

Family food security is closely related to households' ability to select, utilize, and safely process nutritious foods, including animal-source foods. However, knowledge regarding their nutritional benefits and safe processing practices still requires strengthening. This community service activity aimed to improve PKK members' knowledge of healthy animal-source food processing in Menteng Dalam urban village, Tebet, South Jakarta. The activity included education, technical training (BIMTEK), demonstrations, hands-on practice, and evaluation using pre-test and post-test questionnaires. The evaluation covered ten indicators related to animal protein, nutritional benefits, food processing, and food safety. Results showed that the average proportion of correct responses increased from 80.65% in the pre-test to 82.61% in the post-test, representing a 2.39 percentage-point increase. The largest improvement occurred in knowledge regarding animal protein and stunting prevention, which increased by 6.52 percentage points. Most indicators increased, while one remained unchanged and one decreased slightly. These findings indicate that the activity primarily reinforced participants' existing knowledge, as baseline knowledge was relatively high. However, the evaluation focused on knowledge and did not demonstrate improvements in processing skills, behavioral practices, or household food security. Future activities should include repeated hands-on practice, direct skill assessment, mentoring, and follow-up evaluation to support sustained application of knowledge.

Keywords: Animal-Source Food, Family Food Security, Food Processing, PKK, Technical Training.

1. INTRODUCTION

Family food security encompasses not only food availability and access but also the ability to properly utilize food to meet nutritional and health needs. Food security includes food availability, access, utilization, and stability; therefore, appropriate food selection, processing, and consumption at the household level are essential for optimal nutritional benefits (FAO, 2006). Protein is essential for growth and body functions. Animal-source foods such as eggs, fish, and meat provide essential amino acids that support child growth and development (Parikh et al., 2021). This is particularly relevant in Indonesia, where the prevalence of stunting remained 19.8% in 2024, despite a decline from the previous year (Kementerian Kesehatan RI, 2025).

The utilization of animal protein is also influenced by knowledge of food selection, processing, and safety. Poor hygiene during food handling can increase the risk of contamination and foodborne illness, particularly because food preparation, processing, and storage commonly take place at the household level (Redmond & Griffith, 2009). The WHO Five Keys to Safer Food emphasizes five principles: keeping clean, separating raw and cooked foods, cooking thoroughly, maintaining safe temperatures, and using safe water and raw materials (WHO, 2006). Education and training can improve knowledge as a foundation for health-related behavior (Notoatmodjo, 2014). Studies have shown that food safety education can improve participants' knowledge (Soon et al., 2019; Insfran-Rivarola et al., 2020), while Young et al. (2020) identified knowledge as one of the most frequently assessed outcomes of such interventions. However, pre-test–post-test designs without a control group have limitations; therefore, education should be reinforced through discussion, demonstration, and practice.

This approach is relevant to PKK groups, which play an important role in household food management and health information dissemination. Previous activities have demonstrated the benefits of food safety and food-processing education among women and PKK groups (Pujilestari et al., 2019; Pujilestari & Rahmawati, 2024; Pujilestari et al., 2025), while knowledge also supports food safety practices among housewives (Septiyani et al., 2021). Based on observations and communication with the partner, the PKK Group of Menteng Dalam, Tebet, South Jakarta, has access to eggs, chicken, and fish but faces challenges in food processing quality, food safety, and menu diversity. Key problems include limited understanding of the nutritional functions of animal protein, limited skills in healthy and safe processing, and the suboptimal role of PKK members as agents of healthy food education.

Therefore, the Capacity Building on Healthy Animal-Source Food Processing to Enhance Food Security among PKK Members in Menteng Dalam, South Jakarta was conducted through education, Technical Training (BIMTEK), hands-on practice, and pre-test–post-test evaluation. The activity aimed to strengthen participants' capacity to select, process, and handle animal-source foods safely and healthily. The approach is expected to support household capacity in utilizing animal-source foods and applying food safety practices.

2. METHOD

This community service activity employed a participatory, educational, and practical capacity-building approach through education and BIMTEK on healthy animal-source food processing. The approach combined information delivery with discussion, demonstrations, and hands-on practice. Such education and training approaches have been widely used in food safety interventions and reported to improve participants' knowledge (Insfran-Rivarola et al., 2020).

Target Group and Location
The target group was the PKK group in Menteng Dalam urban village, Tebet District, South Jakarta. The participants were involved in household food management and had the potential to disseminate healthy food information within their families and communities. Based on initial observations and discussions with the partner, the main challenges included limited understanding of the nutritional value and functions of animal protein, limited skills in healthy and safe food processing, limited menu diversity, and the suboptimal role of PKK members in promoting healthy food practices.

Approach and Activity Stages
The activity began with coordination and identification of partner needs with PKK representatives to identify problems related to the utilization and processing of animal-source foods. The findings served as the basis for developing the training materials and BIMTEK activities. A needs-based approach helps align interventions with the characteristics of the target group (Young et al., 2020). This section, the findings should be separated by discussion. Findings or research results are not raw data, but data that has been processed/analyzed by certain methods. The discussion is the result of interpretation of data analysis, if necessary linked to relevant scientific theories/concepts in the literature review. Findings and discussions must answer the formulation of the problem and have the impact of new knowledge. The contents of the findings and discussion can be in the form of interpretation of the results of the discussion.

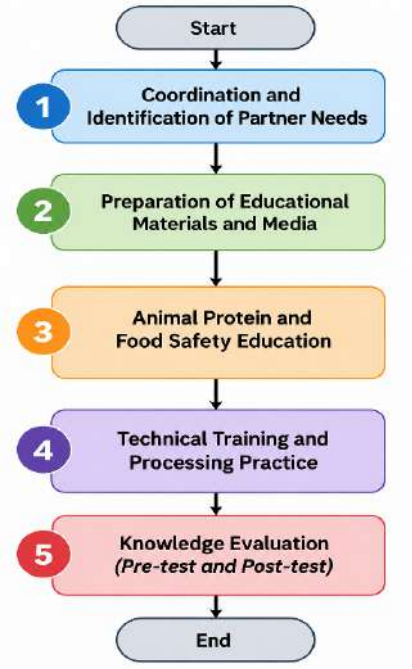

Figure 1. Flowchart of the approach and activity stages

The educational materials and media were then prepared, covering the nutritional value and benefits of animal protein, food selection, healthy processing techniques, and hygiene and food safety principles. Materials were presented in a simple and practical format, supported by modules.

The next stage involved animal-protein and food-safety education, covering protein sources and their benefits for growth and health, as well as cross-contamination prevention through separation of raw and cooked foods and appropriate utensils. Food safety education can improve knowledge of safe food practices (Insfran-Rivarola et al., 2020; Berglund et al., 2024). The activity continued with BIMTEK and processing practice, using demonstrations and hands-on practice in animal-protein food processing while emphasizing appropriate methods, ingredient and equipment hygiene, and process safety. Combining instruction, demonstration, and practice is commonly used in food safety training (Insfran-Rivarola et al., 2020).

The final stage was knowledge evaluation using a pre-test and post-test with a closed-ended questionnaire covering 10 indicators of animal protein, nutritional benefits, and food processing and safety principles. The pre-test was administered before the training and the post-test afterward. Although a single-group pre-test–post-test design can describe changes in knowledge, the absence of a control group means the results are interpreted descriptively and cannot establish causality (Young et al., 2020).

Data Processing and Analysis
The pre-test and post-test data were collected, checked for completeness, and tabulated by question indicator. Each response was classified as correct or incorrect, and the number of correct responses for each indicator was calculated and converted into a percentage. The percentage of correct responses was calculated as:

$$P = \frac{f}{N} \times 100\%$$

where:
P = percentage of correct responses;
f = number of participants providing correct responses;
N = number of participants completing the evaluation.

The *pre-test* and *post-test* percentages were then compared for each indicator. The change in the percentage of correct responses was calculated as:

$$\Delta P = P_{post} - P_{pre}$$

where:
ΔP = change in the percentage of correct responses;
$\mathbf{P}_{post}$ = percentage of correct responses in the *post-test*;
$\mathbf{P}_{pre}$ = percentage of correct responses in the *pre-test*.
A positive value indicates an increase, zero indicates no change, and a negative value indicates a decrease in the percentage of correct responses. The overall mean was calculated by summing the percentages across all indicators and dividing by the number of indicators. The results were presented in tables, graphs, and descriptive explanations to illustrate changes in participants' knowledge.
The analysis was descriptive, without inferential statistical or significance testing, because the available data consisted of aggregate numbers of correct responses for each indicator, rather than individual-level paired data. Therefore, the reported changes represent descriptive patterns and should not be interpreted as statistically significant improvements. The pre-test–post-test approach was used to describe changes in participants' knowledge following the educational and training intervention, consistent with previous food safety education activities (Pujilestari et al., 2025). However, the single-group pre-test–post-test design lacks a comparison group and therefore has limitations in establishing causal relationships (Young et al., 2020).

3. RESULTS AND DISCUSSION

Implementation of the BIMTEK
The BIMTEK on healthy animal-source food processing was conducted with the PKK group in Menteng Dalam urban village, Tebet, South Jakarta. the activity adopted an educational and practical approach through lectures, discussions, demonstrations, and hands-on food processing. the materials covered the benefits and accessible sources of animal protein, appropriate processing methods, and hygiene and food safety principles for household food preparation. these activities followed the program design, which emphasized education and practice to strengthen partner capacity. The activity also emphasized key food safety practices, including separating raw and cooked foods, using clean equipment, preventing cross-contamination, and cooking food thoroughly. combining education, training, and hands-on practice is relevant to food safety interventions because it can improve participants' knowledge of safe food processing practices (insfran-rivarola et al., 2020).



Figure 1. Implementation of the BIMTEK on Healthy Animal-Protein Food Processing

Evaluation of Participants' Knowledge

Knowledge was evaluated using pre-test and post-test questionnaires consisting of 10 indicators covering animal protein, nutritional benefits, and food processing and safety principles. The results showed that the average percentage of correct responses increased from 80.65% before the activity to 82.61% after the activity, representing an increase of 2.39 percentage points.

Table 1. Results of Participants' Knowledge Evaluation Before and After the BIMTEK Activity

No.	Indicator	Pre-test (%)	Post-test (%)	Change (points)
1.	Role of animal protein in child growth and development	76.09	80.43	+4.35
2.	Animal protein and stunting prevention	80.43	86.96	**+6.52**
3.	Eggs, protein, and choline for brain cell development	86.96	84.78	−2.17
4.	Omega-3 in mackerel	76.09	76.09	0.00
5.	Calcium and phosphorus in anchovies	78.26	80.43	+2.17
6.	Iron in chicken liver	82.61	86.96	+4.35
7.	Protein for immunity and energy	82.61	84.78	+2.17
8.	Separation of utensils for raw and cooked foods	78.26	80.43	+2.17
9.	Separate cutting boards and knives to prevent cross-contamination	84.78	86.96	+2.17
10.	Cooking meat/fish until thoroughly cooked	76.10	78.27	+2.17
	Average	**80.65**	**82.61**	**+2.39**

The evaluation showed that most indicators increased after the activity. The largest improvement occurred in Indicator 2, concerning animal protein and stunting prevention, which increased by 6.52 percentage points. Improvements of 4.35 percentage points were also observed for knowledge of the role of animal protein in child growth and the iron content of chicken liver.



Figure 2. Implementation of the Participants' Pre-Test and Post-Test

For food safety, the indicators concerning the separation of utensils and the use of separate cutting boards and knives to prevent cross-contamination each increased by 2.17 percentage points. These findings indicate a tendency toward improved understanding of basic food safety practices following the activity.

Comparison of Pre-Test and Post-Test Results

The comparison across indicators showed varying patterns of change. Most indicators increased, while one remained unchanged and one decreased. Overall, these changes resulted in an average increase of 2.39 percentage points.

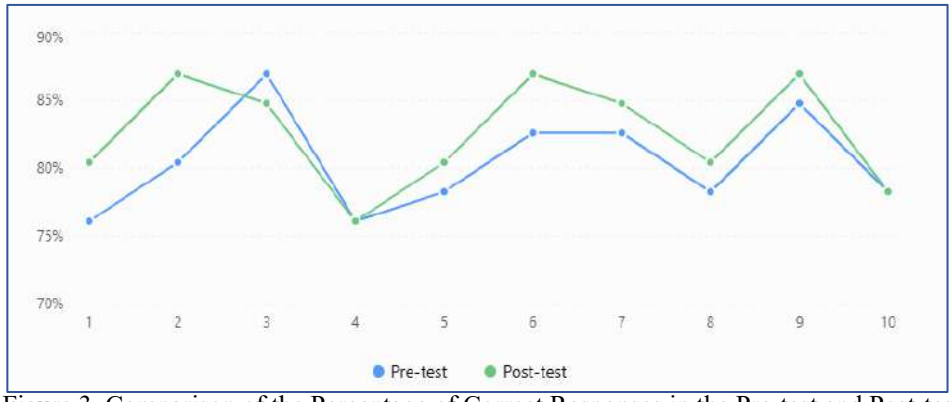

Figure 3. Comparison of the Percentage of Correct Responses in the Pre-test and Post-test

The Figure shows the clearest improvement in indicator 2, while Indicators 1 and 6 also showed relatively higher increases than the other indicators. Indicator 4 showed no change between the pre-test and post-test, whereas indicator 3 decreased by 2.17 percentage points. Overall, the average percentage of correct responses increased from 80.65% to 82.61%. The relatively small increase may be associated with participants' already high baseline knowledge. Thus, the BIMTEK is better understood as reinforcing existing knowledge rather than increasing knowledge from a low to a high level.

Discussion of Activity Results

The increase in most indicators indicates strengthened understanding of the benefits of animal protein and food safety. The largest improvement in the animal-protein and stunting indicator suggests that this topic responded well to the educational intervention. This finding is consistent with Insfran-Rivarola et al. (2020), who reported that food safety education and training can improve knowledge, although changes may vary according to participants' baseline knowledge and the characteristics of the material. For food safety, improvements in the indicators concerning the separation of utensils for raw and cooked foods and the prevention of cross-contamination indicate strengthened understanding of basic hygiene practices. This is important because household food safety is influenced by food handling, processing, and storage practices (Redmond & Griffith, 2009). The decrease of 2.17 percentage points in Indicator 3 does not indicate an overall decline in knowledge. The change occurred in only one indicator and represented a difference of one response, while baseline knowledge was already high (86.96%), leaving limited room for improvement. The change may have been influenced by attention to answer choices, interpretation of question wording, or variation in participant responses; the specific cause cannot be determined from the available data. Furthermore, the single-group pre-test–post-test design lacked a control group, so the observed changes cannot be attributed entirely to the intervention (Young et al., 2020).

Implications for Family Food Security

Improved knowledge of animal protein, its nutritional benefits, and safe food processing can support households in making better use of available food resources. Understanding appropriate protein sources, their nutritional functions, and safe processing practices can help participants make more informed decisions regarding household food preparation and provision. However, the findings do not demonstrate direct improvements in household food security, food-processing skills, or behavioral practices, as the quantitative evaluation focused on participants' knowledge. Therefore, the contribution to family food security should be interpreted as a potential strengthening of knowledge as an important capacity for household food utilization, rather than as direct evidence of changes in household food security. Future activities should strengthen this capacity through repeated hands-on practice, direct assessment of food-processing skills, post-BIMTEK mentoring, and follow-up evaluation to determine whether the knowledge gained is sustained and applied in household food preparation.

4. CONCLUSION

The BIMTEK on healthy animal-source food processing contributed to strengthening participants' knowledge of animal protein, its nutritional benefits, and food safety practices. The average percentage of correct responses increased from 80.65% in the pre-test to 82.61% in the post-test, representing an increase of 2.39 percentage points. The largest increase was observed in the indicator concerning animal protein and stunting prevention, which increased by 6.52 percentage points. The findings indicate that the activity primarily reinforced participants' existing knowledge, as the baseline level of knowledge was already relatively high. However, because the evaluation focused on knowledge, the results do not provide direct evidence of improvements in food-processing skills, behavioral practices, or household food security. Future activities should therefore include repeated hands-on practice, direct assessment of processing skills, post-BIMTEK mentoring, and follow-up evaluation to support the sustained application of knowledge in household food preparation and its potential contribution to family food security.

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5. REFERENCES

Berglund, Z., Simsek, S., & Feng, Y. (2024). Effectiveness of Online Food-Safety Educational Programs: A Systematic Review, Random-Effects Meta-Analysis, and Thematic Synthesis. Foods, 13(5), 794. https://doi.org/10.3390/foods13050794

Food and Agriculture Organization of the United Nations. (2006). Food Security: Policy Brief, Issue 2. FAO.

Insfran-Rivarola, A., Tlapa, D., Limon-Romero, J., Baez-Lopez, Y., Miranda-Ackerman, M., Arredondo-Soto, K., & Ontiveros, S. (2020). A systematic Review and Meta-Analysis of the Effects of Food Safety and Hygiene Training on Food Handlers. Foods, 9(9), 1169. https://doi.org/10.3390/foods9091169

Kementerian Kesehatan Republik Indonesia. (2025). Survei Status Gizi Indonesia (SSGI) 2024. Kementerian Kesehatan Republik Indonesia.

Notoatmodjo, S. (2014). Ilmu Perilaku Kesehatan (Cet. 2). Rineka Cipta.

Parikh, P., Semba, R., Manary, M., Swaminathan, S., Udomkesmalee, E., Bos, R., Poh, B. K., Rojroongwasinkul, N., Geurts, J., Sekartini, R., & Nga, T. T. (2022). Animal Source Foods, Rich in Essential Amino Acids, are Important for Linear Growth and Development of Young Children in Low- and middle-income countries. Maternal & Child Nutrition, 18(1), e13264. https://doi.org/10.1111/mcn.13264

Pujilestari, S., & Rahmawati, R. (2024). Food Poisoning Prevention Efforts through Food Safety Socialization for the Women's Group of PKK RW 013 Jakamulya, South Bekasi. ICCD, 6(1), 467–473. https://doi.org/10.33068/iccd.v6i1.711

Pujilestari, S., Giyatmi, G., Basriman, I., & Batubara, S. C. (2019). Dampak Intervensi terhadap Aspek Keamanan Pangan serta Diversifikasi Produk Olahan di Sentra Usaha Tempe. Jurnal Teknologi Pangan dan Kesehatan, 1(2), 122–131. https://doi.org/10.36441/jtepakes.v1i2.204

Pujilestari, S., Rahmawati, R., & Zuhria, S. A. (2025). Food Safety Education for Elderly Groups in Sunter, North of Jakarta: Preventing Foodborne Illness through Community Empowerment. ICCD, 7(1), 265–272. https://doi.org/10.33068/iccd.v7i1.871

Pujilestari, S., Sabariman, M., & Ratnasari, K. (2019). Socialization of Healthy Oil Use in the PKK group in Bekasi. ICCD, 2(1), 310–316. https://doi.org/10.33068/iccd.vol2.iss1.205

Redmond, E. C., & Griffith, C. J. (2009). The Importance of Hygiene in the Domestic Kitchen: Implications for Preparation and Storage of Food and Infant Formula. Perspectives in Public Health, 129(2), 69–76. https://doi.org/10.1177/1757913908101604

Septiyani, D., Suryani, D., & Yulianto, A. (2021). Hubungan Pengetahuan, Sikap, Tingkat Pendidikan dan Usia dengan Perilaku Keamanan Pangan Ibu Rumah Tangga di Kecamatan Pasaleman, Cirebon. Gorontalo Journal of Public Health, 4(1), 45–54.

Setyawati, E., Pujilestari, S., & Farida, F. (2021). Socialization of Standard Food Packagingin the Women Packaging of Street Food Vendor Community around Kranji Market, Bekasi City. ICCD, 3(1), 359–363.

Soon, J. M., Baines, R., & Seaman, P. (2012). Meta-Analysis of Food Safety Training on Hand Hygiene Knowledge and Attitudes Among Food Handlers. Journal of Food Protection, 75(4), 793–804. https://doi.org/10.4315/0362-

028X.JFP-11-502
World Health Organization. (2006). Five Keys to Safer Food Manual. https://www.who.int/publications-detail-redirect/9789241594639
Young, I., Waddell, L. A., Wilhelm, B. J., & Greig, J. (2020). A Systematic Review and Meta-Regression of Single Group, Pre-post Studies Evaluating Food Safety Education and Training Interventions for Food Handlers. Food Research International, 128, 108711. https://doi.org/10.1016/j.foodres.2019.108711