



Integrated Halal Seafood Processing Training for Stunting Prevention and Women's Economic Empowerment in Urban Coastal Communities in Semarang City, Indonesia

Mohamad Sodikin^{1*}, Fadjar Setiyo Anggraeni², Endang Sarwiningsih Setyawulan³, Windi Novia Ratri Wardhani⁴, Ratih Pratiwi⁵, Muhammad Nasir⁶, Any Setyarini⁷, Arif Budiarto⁸

¹Management Program, Sekolah Tinggi Ilmu Ekonomi Cendekia Karya Utama

^{2,3,4,5,6,8}Economic and Business Faculty, Universitas Wahid Hasyim

⁷Economic Faculty, Universitas Semarang

¹email: sodikinmohamad73@gmail.com; ²email: fsanggraeni@unwahas.ac.id; ³email: endangsarwiningsih@unwahas.ac.id; ⁴email: windi@unwahas.ac.id; ⁵email: rara@unwahas.ac.id; ⁶email: doktor.dr.m.nasir@gmail.com; ⁷email: ririnrashyal@gmail.com; ⁸email: arifbudiarto@unwahas.ac.id

Correspondence author email: sodikinmohamad73@gmail.com

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Abstract: *This community service program aimed to improve household welfare, nutritional literacy, and stunting prevention awareness through halal seafood processing training for housewives in North Semarang District, Semarang City, Indonesia. The program involved 42 participants and was implemented using a participatory approach combined with experiential learning methods, integrating theoretical sessions, practical food processing training, nutrition counseling, and basic entrepreneurial education. Program effectiveness was evaluated through participant observation and post-activity semi-structured interviews. Success indicators were determined based on participant responses, with the target that at least 80% of participants reported increased knowledge and understanding of balanced nutrition, seafood utilization, and halal-halal food processing principles. Findings indicated that more than 80% of participants acknowledged improved understanding of B2SA nutrition concepts, seafood-based food processing techniques, and opportunities for small-scale household entrepreneurship. Participants also demonstrated high engagement during practical sessions and expressed interest in developing value-added seafood microenterprises. This program contributes an integrated community empowerment model combining nutrition education, women's economic empowerment, Islamic dietary values, and local resource utilization, which may serve as a replicable strategy for urban communities facing nutritional and economic vulnerabilities.*

1. INTRODUCTION

Stunting remains a serious challenge in Indonesia, particularly in densely populated urban areas such as North Semarang District. According to the Food Security Agency of Semarang City,

this district records the highest stunting rate in the city. Stunting is not only driven by inadequate nutrition intake but also the underutilization of local resources such as seafood, which are rich in high-quality animal protein (Gupta et al., 2020).

Seafood is an excellent source of animal protein and essential micronutrients. However, its consumption remains low in many low- and middle-income countries (LMICs), particularly among women and children, due to limited accessibility, affordability, and knowledge of preparation (Hicks et al., 2019). There is a growing body of literature emphasizing the need for community-based interventions that not only improve access to nutrient-rich foods but also empower women as agents of change in household nutrition (Ruel et al., 2017).

Moreover, there is a lack of integrated approaches that combine nutrition education, food processing skills, religious values, and market access in one model of community engagement. This gap suggests the need for innovative frameworks that address nutrition from a multidimensional lens, particularly in urban poor communities facing both economic and health disparities (Maestre Morales & Poole, 2018).

The objective of this program is to provide seafood processing training that adds economic value, promotes family welfare, and contributes to stunting reduction. The contribution of this initiative lies in its combination of Islamic dietary values, nutrition education, and women's empowerment through practical and sustainable skills.

2. METHOD

This community service was conducted using a participatory approach based on community needs. The target group was 42 housewives in North Semarang District, selected in coordination with sub-district officials and the local PKK (Family Welfare Movement).

The implementation was based on experiential learning methods, which emphasize learning through experience, reflection, and application. This approach is especially effective for adult learners as it facilitates deeper understanding and skill acquisition by involving participants directly in the learning process (Kolb, 1984, 2014). Experiential learning is particularly well-suited for training programs focused on vocational skills, such as food processing, because it aligns with real-life problem solving and hands-on engagement (Yardley et al., 2012). Moreover, it supports learner empowerment and autonomy, which are critical for sustainable community development (Moon,

2013). The one-day activity consisted of the following stages (Figure 1):

1. Delivery of theoretical material on food production and processing from an Islamic perspective, including the halal-thayyib principle (Suleman et al., 2021; Zakaria et al., 2024).
2. Counseling on the importance of B2SA (Balanced, Diverse, Nutritious, Safe, and Halal food) food consumption and its role in preventing stunting (Mahmudiono et al., 2018).
3. Basic marketing training for processed food products, including simple digital marketing strategies and product branding (Bhardwaj, 2018).
4. Practical of seafood processing into marketable products such as shredded fish.

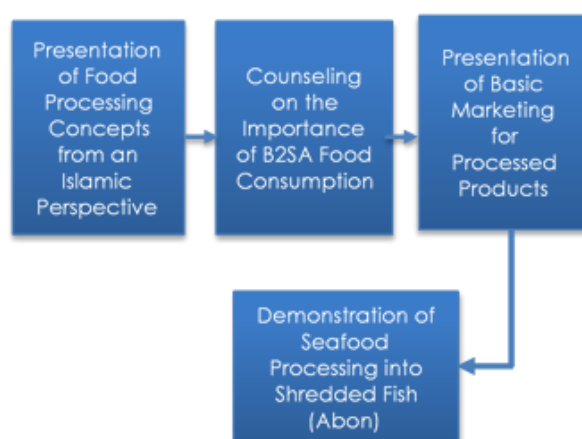


Figure 1. Community service activity stages

Program Evaluation and Success Measurement.

To assess program effectiveness, an evaluation was conducted at the end of the training using semi-structured interviews with participants. The interview instrument explored participants' perceived improvements in knowledge, understanding, and practical skills related to seafood processing, balanced nutrition (B2SA), halal-thayyib principles, and basic entrepreneurial opportunities. The interview guide consisted of several key indicators: (1) increased understanding of the importance of balanced nutrition and stunting prevention; (2) improved knowledge of seafood processing techniques; (3) better understanding of halal-thayyib food concepts from an Islamic perspective; and (4) increased motivation to apply the acquired knowledge for household consumption or small-scale business activities. Program success was defined by the achievement of a minimum benchmark in which at least 80% of participants stated that the training had increased their knowledge and understanding regarding nutrition, seafood utilization, and food processing practices. This indicator was selected as a practical measure of short-term program effectiveness

commonly used in community-based intervention evaluations emphasizing knowledge transfer and participant satisfaction.

3. RESULT

Initial evaluations indicated that most participants had limited prior understanding of the B2SA concept (Balanced, Diverse, Nutritious, Safe, and Halal food) and the optimal utilization of local seafood resources. This baseline finding suggested a gap in nutrition literacy and food processing knowledge among participants, particularly related to child nutrition and the prevention of stunting.

Following the one-day experiential training, participants demonstrated noticeable improvements in several areas. First, participants showed increased knowledge regarding balanced nutrition principles, including the importance of dietary diversity and the role of protein-rich foods in child growth and development. Second, participants acquired practical skills in seafood processing, including the preparation of value-added products such as shredded fish (abon ikan). Third, participants gained basic knowledge of local food marketing strategies, including simple digital marketing approaches for small-scale businesses.

Participants responded enthusiastically throughout the training activities, particularly during the hands-on food processing sessions. Their active involvement was observed during demonstrations, group practice, and discussions, indicating high engagement with the learning materials (Figure 2).



Figure 2. The participants enthusiastically took part in the food processing activity.

The training also generated positive responses regarding household economic opportunities. Several participants expressed interest in initiating small-scale food enterprises using seafood-based products introduced during the training program. This indicates that the program was perceived not only as a nutrition intervention but also as a potential source of income generation for families.

In addition, the incorporation of Islamic dietary principles, particularly the concepts of halal and thayyib, was well received by participants. Participants acknowledged the importance of preparing food that is nutritionally balanced, safe, lawful, and aligned with Islamic values (Figure 3).



Figure 3. Group photo with all participants of the community service activity.

Program evaluation results showed that the intervention achieved its predefined success target. Based on post-training semi-structured interviews, more than 80% of participants stated that they had gained new knowledge and improved understanding regarding balanced nutrition, seafood processing, and halal-thayyib principles in food preparation. Participants particularly highlighted increased awareness of the role of protein-rich local food sources in child growth and family nutrition. These findings suggest that the training effectively delivered short-term knowledge transfer outcomes aligned with program objectives. The overall findings from the community training program are summarized in Table 1.

Table 1. Summary of Problems, Solutions, and Observed Outcomes from the Community Training Program

Identified Problem	Proposed Solution	Observed Outcome
High stunting rates due to lack of protein intake and food diversity	Training on seafood processing to improve nutritional intake	Participants gained knowledge on nutritious and diverse food processing; greater use of local seafood
Limited knowledge and skills in food processing and marketing	Hands-on training with experiential learning on food production and marketing	Improved skills in food preparation and entrepreneurial motivation among participants
Underutilization of Islamic dietary values in nutrition programs	Incorporation of halal-thayyib concepts in training material	Increased awareness of healthy, safe, and religiously compliant food practices
Economic vulnerability of housewives in urban poor areas	Empowerment through value-added food business models and digital marketing	Several participants expressed intent to start small food enterprises

4. DISCUSSION

The findings suggest that experiential training can effectively improve community knowledge and practical skills related to nutrition, local food utilization, and household economic empowerment. The observed increase in participants' understanding of balanced nutrition and food diversity is consistent with previous studies emphasizing the importance of dietary diversification, particularly the inclusion of animal-source foods, in reducing child stunting in low- and middle-income countries (Elisaria et al., 2021; Goudet et al., 2019).

The strong participant engagement observed during practical sessions supports experiential learning theory, which posits that active participation, direct experience, and reflection are critical mechanisms for knowledge retention and skill acquisition among adult learners (Kolb, 2014). The hands-on approach likely contributed to participants' higher motivation and confidence to implement learned practices within their households and communities.

The expressed intention of several participants to establish small food enterprises indicates that nutrition-focused training can generate broader socioeconomic benefits beyond health promotion. This finding aligns with Bhardwaj (2018), who highlights that entrepreneurial marketing training may strengthen women's economic capacity, particularly in underserved communities. Similarly, the Food and Agriculture Organization of the United Nations recognizes food-based microenterprises as an important mechanism for improving household income security and supporting better nutrition outcomes (FAO, 2022).

An important contextual strength of this program was the integration of Islamic dietary principles into nutrition education. The positive reception of the halal-thayyib framework suggests that culturally and religiously sensitive interventions may enhance program acceptability and behavioral adherence among Muslim communities. This finding is supported by prior studies showing that faith-based dietary education can improve healthy eating compliance and strengthen long-term behavioral commitment (Zakaria et al., 2024; Billah et al., 2020; Suleman et al., 2021).

Overall, these findings reinforce the argument that stunting prevention requires more than isolated nutrition messaging. Integrated interventions that combine nutrition education, practical food processing skills, women's empowerment, entrepreneurship, and culturally relevant values are more likely to produce sustainable community outcomes. This is in line with the multisectoral framework proposed by Cesar Victora et al. (2021), which emphasizes the interconnected roles of nutrition, education, gender empowerment, and local cultural adaptation in addressing complex public health challenges such as stunting.

Despite the positive short-term outcomes, the findings should be interpreted critically. The observed improvements primarily reflect self-reported knowledge gains measured immediately after program completion. Therefore, the program cannot yet confirm sustained behavioral change in household nutrition practices or long-term reductions in stunting prevalence. Community service interventions frequently demonstrate immediate enthusiasm but face challenges in translating knowledge acquisition into consistent daily practices, particularly in economically vulnerable households.

Several implementation barriers were identified during the activity. First, the one-day duration limited the depth of material delivery, especially regarding business development and digital marketing competencies. Second, participants demonstrated varying baseline levels of nutritional literacy and entrepreneurial readiness, which influenced learning pace and comprehension. Third, limited access to production equipment, packaging materials, and capital may hinder participants from independently initiating seafood-based microenterprises after training completion.

This community service program has several limitations. The evaluation relied primarily on participant self-reported perceptions obtained through interviews without pre-test and post-test quantitative measurement. Additionally, no follow-up assessment was conducted to examine

medium- or long-term retention of knowledge, business implementation, or changes in household food practices. The relatively small sample size and single-location implementation also limit generalizability to other urban or rural communities with different socioeconomic characteristics.

Future implementation should consider multi-session training models combined with mentoring, follow-up monitoring, and collaboration with local government or microfinance institutions to improve sustainability. Integrating training with business incubation support, packaging assistance, product licensing, and digital marketplace access may strengthen participants' capacity to transform acquired skills into income-generating activities. Moreover, future programs should adopt more robust evaluation designs, including pre-test/post-test instruments and longitudinal follow-up, to better measure behavioral change and socioeconomic impact.

5. CONCLUSION

This community service program demonstrates the effectiveness of an integrated, participatory, and experiential learning approach to addressing both nutritional and economic challenges in urban low-income settings. Through seafood processing training based on Islamic dietary principles and the B2SA (Diverse, Nutritious, Balanced, and Safe) concept, participants significantly improved their knowledge and skills in preparing and marketing healthy, safe, and halal food products. The program not only contributed to enhancing nutritional awareness among housewives who play a central role in household food decisions but also empowered them economically by introducing practical skills for microenterprise development. The alignment of religious values with nutrition education further reinforced behavioral commitment to healthy eating practices. Given its promising outcomes in reducing stunting risk, promoting food security, and supporting women's empowerment, this initiative serves as a replicable model for similar contexts. Future community-based interventions should continue to emphasize context-specific, culturally sensitive, and skill-oriented strategies for sustainable impact. However, sustainability remains a critical challenge, as future success depends on continued mentoring, resource accessibility, and institutional support to ensure long-term adoption of nutritional practices and entrepreneurship outcomes.

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REFERENCES

- Bhardwaj, B. R. (2018). Can education empower women through entrepreneurial marketing: A model for upliftment of community services. *Journal of Enterprising Communities: People and Places in the Global Economy*, 12(1), 19–31.
- Billah, A., Rahman, M. A., & Hossain, M. T. Bin. (2020). Factors influencing Muslim and non-Muslim consumers' consumption behavior: A case study on halal food. *Journal of Foodservice Business Research*, 23(4), 324–349.
- Elisaria, E., Mrema, J., Bogale, T., Segafredo, G., & Festo, C. (2021). Effectiveness of integrated nutrition interventions on childhood stunting: a quasi-experimental evaluation design. *BMC Nutrition*, 7(1), 17.
- FAO. (2022). *Food security and nutrition in the World*.
- Goudet, S. M., Bogin, B. A., Madise, N. J., & Griffiths, P. L. (2019). Nutritional interventions for preventing stunting in children (birth to 59 months) living in urban slums in low-and middle-income countries (LMIC). *Cochrane Database of Systematic Reviews*, 6.
- Gupta, S., Sunder, N., & Pingali, P. L. (2020). Are Women in Rural India Really Consuming a Less Diverse Diet? *Food and Nutrition Bulletin*, 41(3), 318–331. <https://doi.org/10.1177/0379572120943780>
- Hicks, C. C., Cohen, P. J., Graham, N. A. J., Nash, K. L., Allison, E. H., D'Lima, C., Mills, D. J., Roscher, M., Thilsted, S. H., & Thorne-Lyman, A. L. (2019). Harnessing global fisheries to tackle micronutrient deficiencies. *Nature*, 574(7776), 95–98.
- Kolb, D. A. (1984). *Experiential Learning: Experience as The Source of Learning and Development*. Prentice Hall, Inc., 1984, 20–38. <https://doi.org/10.1016/B978-0-7506-7223-8.50017-4>
- Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.
- Maestre Morales, M., & Poole, N. (2018). Value chains for nutrition in South Asia: Who delivers nutritious foods, how and to whom? *IDS Bulletin*, 49(1), 1–20.

- Mahmudiono, T., Nindya, T. S., Andrias, D. R., Megatsari, H., & Rosenkranz, R. R. (2018). Household food insecurity as a predictor of stunted children and overweight/obese mothers (SCOWT) in urban Indonesia. *Nutrients*, 10(5), 535.
- Moon, J. A. (2013). *A handbook of reflective and experiential learning: Theory and practice*. Routledge.
- Ruel, M. T., Quisumbing, A. R., & Balagamwala, M. (2017). Nutrition-sensitive agriculture: what have we learned and where do we go from here? *Intl Food Policy Res Inst*.
- Suleman, S., Sibghatullah, A., & Azam, M. (2021). Religiosity, halal food consumption, and physical well-being: An extension of the TPB. *Cogent Business & Management*, 8(1), 1860385.
- Victoria, C. G., Christian, P., Vidaletti, L. P., Gatica-Domínguez, G., Menon, P., & Black, R. E. (2021). Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda. *The Lancet*, 397(10282), 1388–1399.
- Yardley, S., Teunissen, P. W., & Dornan, T. (2012). Experiential learning: transforming theory into practice. *Medical Teacher*, 34(2), 161–164.
- Zakaria, R., Ahmad, A. N., Nordin, N. F. H., Samsudin, N., Elgharbawy, A. A. M., & Hashim, P. N. P. (2024). Halalan Toyayiban concept as religious-based intervention for healthy diet among youth. *Halalsphere*, 4(1), 59–71.