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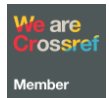
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Community-based education using tempeh nugget modules to increase plant-based protein consumption in preventing stunting



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ABSTRACT

Stunting remains a serious public health issue in Indonesia, including in Karangmuncang Village, Cigandamekar District, Kuningan Regency. One potential solution to this nutritional problem is increasing the consumption of plant-based foods, such as tempeh. This study aims to evaluate the effectiveness of an educational module based on tempeh nuggets in increasing plant-based protein consumption among housewives with children under five in Karangmuncang. The research used a quasi-experimental design with pre-test and post-test, involving 60 randomly selected respondents. The research instrument consisted of a questionnaire with five main sections: demographic data (age, education, employment, number of children, family income), knowledge about plant-based foods (definition, sources, benefits, and their role in preventing stunting), attitudes toward plant-based consumption (confidence, willingness to try tempeh, and perception of food variety), plant-based consumption behavior (frequency, processing method, and frequency of cooking tempeh), and acceptance of tempeh nuggets (interest, taste assessment, routine consumption plan, and perception of benefits). After four weeks of educational intervention, data were analyzed using the paired T-test for knowledge, the Wilcoxon Signed-Rank test for attitudes and acceptance, and the Chi-Square test for tempeh consumption behavior. The results showed a significant increase in knowledge, attitudes, consumption behavior, and acceptance of tempeh nuggets ($p < 0.05$). These findings suggest that the educational module effectively increases awareness and adoption of plant-based protein foods in the community. Future research should involve larger sample sizes, extended intervention periods, and explore other factors influencing behavior change.

Keywords:

Community-based education
Tempeh nugget module
Plant-based protein
Consumption
Stunting prevention
Dietary behavior

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Introduction

Stunting remains a significant public health issue in Indonesia, affecting approximately 30% of children under five, placing the country among those with the highest stunting rates globally (Pitoyo et al., 2022). Stunting impairs children's growth, particularly height, and has long-term consequences on cognitive development and overall health, which undermines the potential of future generations (Febriani et al., 2020). This condition arises from chronic malnutrition, frequent infections, and insufficient psychosocial stimulation (Montenegro et al., 2022). Factors such as low access to nutritious food (Rahayuwati et al., 2020), poor sanitation (Widayati & Dewi, 2021), and suboptimal

parenting patterns also contribute to the high rate of stunting in Indonesia (Yunitasari et al., 2022). This condition requires appropriate nutritional intervention, including increasing protein consumption. These underlying causes demand targeted interventions, particularly those that focus on improving nutritional intake, such as increasing protein consumption from accessible and affordable sources. Globally, stunting poses a significant challenge to food security and human development, underlining the importance of addressing this issue locally while contributing to broader solutions.

Plant-based is vital in preventing stunting and improving children's quality of life (Manary & Callaghan-Gillespie, 2020). Plant-based protein sources such as tempeh, tofu, and beans provide the essential nutrients needed for growth and are also easily accessible and more affordable than animal protein sources (Messina, 2022). Increasing the consumption of plant-based products can be an effective strategy to overcome stunting in Indonesia (Endrinikapoulos et al., 2023). Even though Indonesia is one of the largest tempeh producers in the world, the consumption of plant-based food among Indonesians is still relatively low. Data shows that only around 20% of the Indonesian population's daily protein intake comes from vegetable sources, including tempeh. This low consumption is even more worrying among children, who need adequate protein intake to support their optimal growth and development (Khusun et al., 2022).

This highlights a critical gap in both knowledge and utilization of plant-based foods, particularly tempeh, as an affordable, nutritious option. Several barriers to increasing plant-based consumption in Indonesia include limited public knowledge about its benefits and preparation methods (Ahnan-Winarno et al., 2021). Apart from that, limited access to foods rich in plant-based in some areas, as well as the lack of variety of plant-based-based foods available on the market, are also significant obstacles (Lowe et al., 2021). Many families also still think that animal protein is the only good source of protein, so they do not utilize plant protein sources, which are more affordable and easily accessible (Khusun et al., 2023). Therefore, it is urgent to find practical solutions to increase plant-based consumption in Indonesian society. Appropriate education, innovation in serving plant-based protein foods, and improving access to and availability of quality plant-based foods are urgent steps to overcome this problem and prevent stunting among Indonesian children.

Karangmuncang Village in Cigandamekar District, Kuningan Regency, represents a microcosm of the challenges faced in addressing stunting at the local level. Despite being a region with agricultural potential, many families in Karangmuncang struggle to access and utilize diverse, nutritious food sources due to economic constraints and limited knowledge. These challenges underscore the importance of location-specific interventions tailored to address local needs and constraints. Nutritional programs that consider the cultural, economic, and geographic contexts of communities like Karangmuncang can be more effective and sustainable.

Previous research has explored efforts to overcome stunting through various nutritional interventions (Erlyn et al., 2021; Nur et al., 2023; Sirajuddin et al., 2021). Some studies focus on micronutrient supplementation, such as iron and vitamin A (Manoppo & Huriah, 2022), while others evaluate the effectiveness of animal protein-based supplementary feeding programs (Chandra, 2023). Although the results of these studies show improvements in the nutritional status of children, they often face high-cost constraints and limited public acceptance. In addition, research on plant protein-based interventions is still relatively limited and usually does not involve active community participation. This research offers novelty by focusing on public education using a module based on tempeh nuggets, a local plant-based source easily accessible and accepted by various groups. The innovation of this research lies in a holistic approach that combines nutrition education with daily culinary practices, so it is hoped that it can increase program acceptance and sustainability.

The educational module developed not only contains information about plant-based benefits but is also equipped with practical recipes and a guide to cooking tempeh nuggets that are interesting for children. An educational module based on tempeh nuggets was chosen as a potential solution because tempeh is a food ingredient rich in protein and other essential nutrients and has been proven well-accepted by various age groups in Indonesia. This research seeks to overcome obstacles to food

acceptance and variety and increase people's knowledge and cooking skills by using tempeh nuggets as an educational medium. Thus, it is hoped that the consumption of plant-based products will increase, contributing to reducing stunting rates in Indonesia. This innovation aims to bridge the gap between knowledge and practice, making plant-based nutrition both accessible and attractive to Indonesian families.

This research aims to increase plant-based consumption among Indonesians through module-based education about tempeh nuggets. This research aims to evaluate the effectiveness of this educational module in changing people's knowledge, attitudes, and behavior regarding plant-based consumption. In addition, this research also seeks to provide practical guidance that can be adopted by public health programs to increase nutritional intake in children and prevent stunting. Globally, this research can contribute to efforts addressing stunting through dietary diversification, offering an approach that can be adapted and implemented in other regions facing similar nutritional challenges. The broader implications of this research include improving Indonesian children's quality of life and health, ultimately contributing to better human resource development. With the increase in people's knowledge and cooking skills, it is hoped that plant-based food consumption will become an integral part of the daily diet. This will help prevent stunting and encourage food diversification and local food security. Through this innovative and practical approach, the research results are hoped to significantly contribute to national efforts to reduce stunting rates and improve overall public health.

Methods

Study Design

This study employed a quasi-experimental design without a control group to evaluate the impact of an educational intervention on knowledge, attitudes, and behavior regarding plant-based food consumption. This design was chosen for its practicality in community-based interventions where ethical concerns may arise from withholding beneficial education from a control group. To mitigate threats to internal validity, such as learning effects, the intervention and measurement stages were designed to minimize biases, including standardized instructions and consistent data collection protocols. The pre-test and post-test comparisons ensured robust evaluation of the intervention's effects.

Sampling

A simple random sampling technique was used to select 60 participants from the population of housewives with children under five in Karangmuncang Village, Cigandamekar District, Kuningan Regency. This region was chosen due to its high prevalence of stunting, making it an appropriate target for interventions related to plant-based food consumption. Inclusion criteria included being a housewife with at least one child under five, residing in the study area, and willing to participate. Exclusion criteria encompassed any participants with dietary restrictions preventing them from consuming plant-based foods. The sample size was determined based on a power analysis to ensure adequate statistical power (80%) to detect significant differences, with a significance level of 0.05.

Measures

The main instrument in this research is a closed questionnaire designed to measure three main aspects, namely knowledge, attitudes, and behavior related to the consumption of plant-based foods, especially tempeh nuggets, as an alternative to preventing stunting. The questionnaire consists of several sections, including demographic data, knowledge, attitudes, plant-based food consumption behavior, and acceptance of tempeh nuggets. The demographic data section collects basic information such as participants' age, education level, and economic status. The knowledge section measures how well participants understand the importance of consuming plant-based foods and the benefits of tempeh. Participants' attitudes were assessed using a Likert scale to determine their views regarding the consumption of tempeh and plant-based foods. For the behavioral section, questions were directed at plant food consumption habits before and after the intervention. Finally, the acceptability

of tempeh nuggets was measured to determine how well participants accepted the idea of incorporating tempeh nuggets into their diet.

This questionnaire is completed by respondents at the Integrated Service Post, and it takes 15 to 20 minutes to complete. Before filling out the questionnaire, respondents were given a brief explanation of the purpose of the research and instructions on how to do so.

Table 1. Research questionnaire indicators

Variable	the aspects being measured	Indicators
Demographic Data	Age, Education, Occupation, Number of Children, Family Income	• Age (years) • Last level of education • Work • Number of children • Family income (per month)
Knowledge about plant-based Protein	Understanding of plant-based protein and its benefits	• Definition of plant-based • Source of plant-based • Benefits of plant-based health • The role of plant-based in preventing stunting
Attitudes toward Plant-based Consumption	Attitudes and perceptions towards plant-based consumption	• Belief in the importance of plant protein • Willingness to try tempeh-based foods • Perception of plant-based food variety
Plant-based Consumption Behavior	Habits of consuming and processing plant-based	• Frequency of tempeh consumption • How to process tempeh • Frequently cook tempeh at home
Reception of Tempe Nugget	Response and acceptance of tempeh nuggets	• Interest in trying tempeh nuggets • Taste assessment of tempeh nuggets • Plan to consume tempeh nuggets regularly • Perception of the benefits of tempeh nuggets for children's health

Intervention

The educational module focused on plant-based nutrition, emphasizing tempeh as a protein source to prevent stunting. The intervention spanned four weeks, with weekly face-to-face sessions comprising: (1) Presentations on plant-based food benefits, (2) Demonstrations and hands-on practice in preparing tempeh nuggets, and (3) Distribution of video tutorials and leaflets for reinforcement.

Procedure

Participants completed a pre-test questionnaire before the intervention. Weekly sessions delivered the educational content, and participants practiced preparing tempeh nuggets to integrate knowledge into practice. After the intervention, a post-test assessed changes in knowledge, attitudes,

and behavior. The duration of four weeks was selected based on the focus on short-term behavioral changes, with a follow-up study recommended to evaluate long-term effects.

For data analysis, statistical tests were used. Knowledge, attitudes, and behavior changes before and after the intervention were analyzed using the paired t-test. At the same time, attitudes and acceptance of tempeh nuggets were analyzed using the Wilcoxon Signed-Rank test because attitude data was measured using a Likert scale.



Figure 1. Module for Preventing Stunting with Tempe

Results and Discussion

This research involved 60 respondents who were parents or guardians of children at two Integrated Service Post in the specified area. These respondent characteristics include demographic aspects such as age, gender, education level, and economic status, providing important context for understanding the research results. As part of the analysis, we present a table of respondent characteristics to give an overview of the background of the population involved.

Table 2. Characteristics of respondents

Characteristics	Category	Number of Respondents (n=60)	(%)
Age (years)	20-30	15	25
	31-40	30	50
	>40	15	25
			100
Level of education	elementary school	5	8.3
	Junior High School	10	16.7
	Senior High School	25	41.7
	College	20	33.3
			100
	Private sector worker	15	25
Number of children	Entrepreneur	10	16.7
			100
	1	20	33.3

Characteristics	Category	Number of Respondents (n=60)	(%)
	2	25	41.7
	>2	15	25
			100
Family Income	< Rp 2.000.000	20	33.3
	Rp 2.000.000 - 4.000.000	30	50
	> Rp 4.000.000	10	16.7
Total		60	100

Table 2 shows that in terms of age, most respondents were in the 31-40 year age group, accounting for 50% of the total respondents. The age groups of 20-30 years and over 40 years each accounted for 25% of the total respondents. This shows that most respondents are adults in the productive phase of their lives. Respondents' education levels show significant variations. Most respondents had high school (41.7%) and tertiary education (33.3%), while elementary and middle school education only accounted for 8.3% and 16.7%, respectively. This shows that the majority of respondents have a relatively high educational background. In terms of employment, the majority of respondents were housewives (58.3%), followed by private sector workers (25%) and entrepreneurs (16.7%). This distribution reflects the dominant traditional and economic roles among respondents. The number of children also varied, with 41.7% of respondents having two children, 33.3% having one child, and 25% having more than two children. This shows that most of the respondents are parents with two children. Regarding family income, most respondents had an income between IDR 2,000,000 - 4,000,000 (50%), while 33.3% had an income under IDR 2,000,000, and 16.7% had more than IDR 4,000,000. This shows that most of the respondents are in the middle-income category.

Table 3. Pre-Test and Post-Test Results for Knowledge, Attitudes, Behavior, and Acceptance of Tempeh Nuggets

Measured Aspects	Indicators	Average Pre-Test Score	Average Post-Test Score	Score Difference	sig
Knowledge about Plant-based	Definition of plant-based	2.5	4.1	1.6	0.001
	Source of plant-based	2.8	4.3	1.5	0.001
	Benefits of plant-based health	2.7	4.2	1.5	0.001
	The role of plant-based in preventing stunting	2.6	4.0	1.4	0.001
Attitudes Towards Plant-based Consumption	Belief in the importance of plant protein	3.0	4.5	1.5	0.002
	Willingness to try tempeh-based foods	3.1	4.4	1.3	0.002
	Perception of plant-based food variety	2.9	4.3	1.4	0.002
Plant-based Consumption Behavior	Frequency of tempeh consumption	2.8	3.7	0.9	0.025
	How to process tempeh	3.2	4.0	0.8	0.030

Measured Aspects	Indicators	Average Pre-Test Score	Average Post-Test Score	Score Difference	sig
	Frequently cook tempeh at home	2.7	3.6	0.9	0.028
Reception of Tempe Nugget	Interest in trying tempeh nuggets	2.9	4.3	1.4	0.002
	Taste assessment of tempeh nuggets	3.0	4.4	1.4	0.001
	Plan to consume tempeh nuggets regularly	3.1	4.5	1.4	0.001
	Perception of the benefits of tempeh nuggets for children's health	3.0	4.3	1.3	0.002

The research showed a significant increase in respondents' knowledge, attitudes, behavior, and acceptance of plant-based after intervention through a tempeh nugget-based educational module. In the knowledge aspect, the post-test mean score for all indicators, such as the definition of plant-based, its source, benefits, and role in preventing stunting, increased significantly compared to the pre-test, with a score difference of between 1.4 to 1.6 and a very significant p-value ($p = 0.001$). This shows that the educational module effectively increases respondents' understanding of plant-based importance. Respondents' attitudes towards consuming plant-based have also increased. The average post-test score for indicators such as the importance of plant-based, willingness to try tempeh nuggets, and perception of the variety of plant foods has increased significantly, with a score difference of 1.3 to 1.5 and a p-value of 0.002. This indicates a positive change in attitude after implementing the educational module. In the behavioral aspect, although the increase is smaller than in other elements, the average post-test score still shows significant improvements in the frequency of tempeh consumption, processing, and cooking tempeh at home. The score difference ranges from 0.8 to 0.9, with a p-value between 0.025 and 0.030. This shows that although behavior change takes time, this intervention can have a positive impact. Acceptance of tempeh nuggets as an alternative plant-based protein food has also increased significantly. Interest in trying, taste assessment, consumption plans, and perception of the benefits of tempeh nuggets increased with a score difference between 1.3 and 1.4 and a p-value < 0.05 . This indicates that respondents can accept tempeh nuggets as part of stunting prevention efforts.

It was found that there was a significant increase in respondents' knowledge, attitudes, behavior, and acceptance of plant-based after intervention through an educational module based on tempeh nuggets. In the knowledge aspect, the post-test mean score for all indicators, such as the definition of plant-based, its source, benefits, and role in preventing stunting, increased significantly compared to the pre-test, with a score difference of between 1.4 to 1.6 and a very significant p-value ($p = 0.001$). This shows that the educational module effectively increases respondents' understanding of plant-based importance. Educational modules are proven effective in increasing learning participants' knowledge due to several scientific factors that underlie the module-based learning process (Schneiderhan-Opel & Bogner, 2020). Modules are usually arranged systematically and organized and follow clear learning stages. In this research, the educational module about tempeh nuggets contains information arranged in stages, from basic knowledge about plant-based and its benefits to a practical guide to cooking tempeh nuggets. Information presented in this logical order makes it easier for participants to understand, integrate, and process new knowledge, consistent with information processing theory. Knowledge will be easier to understand and absorb when presented gradually and structured (Russell & Martin, 2023).

The educational module used in this research is equipped with visual materials such as video tutorials and leaflets, which help strengthen participants' understanding. Based on Mayer's

multimedia learning theory, humans find it easier to process information conveyed through text, images, and video than text alone (Cheah, 2020). Visuals can help explain complex concepts (such as the benefits of plant protein in preventing stunting) and strengthen knowledge retention. In addition, interactive methods such as face-to-face meetings and shared cooking practices increase participant involvement and facilitate active learning, which, according to constructivism theory, can increase knowledge acquisition. This module focuses on local food ingredients, namely tempeh, which is well-known and accepted by the local community. Cognitive relevance theory states that participants more easily understand and remember information that is relevant to the context of their daily lives (Skulmowski & Xu, 2022). Using tempeh nuggets as a concrete example in educational modules, participants can connect the material studied more easily with their lives, thereby increasing acceptance and understanding. Education lasting for four weeks provides opportunities for participants to repeat the information learned through weekly face-to-face meetings or direct practice. Repetition of this information plays a vital role in strengthening long-term memory. According to Ebbinghaus' learning theory, regular repetition can help prevent forgetting and increase information retention so that the knowledge gained can last longer (Wollstein & Jabbour, 2022). The practice-based educational module involves direct interaction with ingredients (tempeh nuggets). It also increases participants' self-efficacy or belief in their ability to put new knowledge into practice. Based on Bandura's social-cognitive motivation theory, participants who feel capable and confident in implementing newly acquired knowledge are more likely to absorb and apply the information (Lee & Tseng, 2024). In addition, face-to-face methods and shared practice can create a supportive environment where participants feel motivated to learn and try something new.

This finding aligns with research by Sekriptini et al. (2024), who also reported increased knowledge about nutrition after educational interventions based on local materials. Respondents' attitudes towards consuming plant-based have also increased. The average post-test score for indicators such as the importance of plant-based, willingness to try tempeh nuggets, and perception of the variety of plant foods has increased significantly, with a score difference of 1.3 to 1.5 and a p-value of 0.002. This indicates a positive change in attitude after implementing the educational module. This is consistent with the findings of Wiliyanarti et al. (2022) This shows that local nutrition education can increase positive attitudes towards healthy food. In the behavioral aspect, although the increase is smaller than in other elements, the average post-test score still shows significant improvements in the frequency of tempeh consumption, processing, and cooking tempeh at home. The score difference ranges from 0.8 to 0.9, with a p-value between 0.025 and 0.030. This shows that although behavior change takes time, this intervention can have a positive impact. Previous research by Monterrosa et al. (2020) It also noted that changing healthy food consumption often takes time, but planned interventions can positively impact it.

Acceptance of tempeh nuggets as an alternative plant-based protein food has also increased significantly. Interest in trying, taste assessment, consumption plans, and perception of the benefits of tempeh nuggets increased with a score difference between 1.3 and 1.4 and a p-value < 0.05. The educational module used in this intervention changed participants' attitudes and behavior towards accepting tempeh nuggets as an alternative plant-based food due to several pedagogical and psychological factors that supported this change. The tempeh nugget-based educational module utilizes the Theory of Planned Behavior, which states that attitudes, subjective norms, and perceived behavioral control influence behavior change (Ajzen & Schmidt, 2020). This module changed participants' attitudes towards tempeh nuggets by presenting information about the health benefits of plant-based and tempeh and providing social support through group discussions. A study by Saleh et al. (2023) shows that local food-based nutrition education can significantly increase positive attitudes towards healthy food consumption, which aligns with this intervention's results. According to social learning theory, individuals learn by observing and imitating others' behavior (Rumjaun & Narod, 2020).

This module includes video tutorials and cooking practices that help participants learn how to make tempeh nuggets. Visual learning that involves direct observation is effective in changing consumption behavior, as research also shows Folkvord et al. (2020), where video tutorials improve

skills and behavior in cooking healthy food at home. The educational process carried out repeatedly through this module provides consistent reinforcement. According to the law of effect, behavior reinforced with positive results is more likely to be repeated (Boakes, 2021). Participants who tasted and enjoyed tempeh nuggets felt positive reinforcement from the taste and health benefits, encouraging them to cook them again. A study by Ludwig et al.(2020) shows that reinforcement through direct experience can strengthen changes in healthy food consumption behavior. This educational module is designed to be relevant to participants' cultural context and local habits, using familiar ingredients such as tempeh. Contextual relevance strengthens educational effectiveness because participants more easily accept information related to their daily lives. In addition, cooking together creates a positive experience that helps increase acceptance of new foods.

The comprehensive, evidence-based information presented in the module increases participants' knowledge of the benefits of plant-based protein, ultimately changing their attitudes. Based on the Elaboration Likelihood Model, the information conveyed in-depth and relevant tends to lead to more lasting changes in attitudes. This finding is consistent with Charlton et al. (2021), which shows that nutrition education with an in-depth approach increases positive attitudes toward consuming healthy food. Increasing participants' self-confidence or self-efficacy in cooking and consuming tempeh nuggets also contributed to changes in behavior. A study by Schunk & DiBenedetto (2021) showed that increased self-efficacy through practical education increased participants' likelihood of sustaining behavior changes. This module provides clear guidance and supports participants in cooking tempeh nuggets, increasing their confidence to adopt this food as part of their daily diet.

These findings are relevant in the context of nutritional problems in Indonesia, where stunting is still a severe challenge to public health (Martony, 2023). Plant-based foods such as tempeh have great potential to improve nutritional status, mainly due to their widespread availability, affordable prices, and high nutritional value. The advantage of tempeh compared to other plant-based sources, such as tofu or beans, lies in the fermentation process, which increases the availability of nutrients and probiotics, which are beneficial for digestive health (Teoh et al., 2024). Thus, promoting tempeh consumption can be an essential strategy for reducing the prevalence of stunting in Indonesia. In terms of mechanisms of change, the increase in knowledge, attitudes, and behavior of respondents can be explained by the social learning theory proposed by Bandura, where individuals learn and adopt new behavior through observation and social interaction (Askarizad & Safari, 2020). The educational module presented provides information. It motivates and strengthens respondents' beliefs about the benefits of consuming plant-based foods, influencing changes in attitudes and behavior. In addition, support from family and the availability of food in the neighborhood also likely contributed to the observed changes, although these factors were not explicitly measured in this study.

The practical implications of this research include several policy recommendations. The government and related institutions can consider including nutrition education based on local foods, such as tempeh, into basic education curricula and public health programs. This can increase understanding and acceptance of plant-based foods among the wider community and help reduce the prevalence of stunting. Apart from that, there is potential to develop other processed tempeh products that can attract broader consumer interest through innovation in more varied shapes and flavors so that various groups can more readily accept plant-based foods. Although this study showed promising results, several limitations, such as the small sample size and limited intervention time, are worth noting. Further research on a larger scale and longer duration is needed to confirm the long-term effectiveness of this intervention. Nevertheless, these findings provide a solid basis for additional efforts to promote plant-based consumption as part of the national strategy to overcome the problem of stunting in Indonesia.

Conclusions

This research demonstrated that the tempeh nugget-based educational module effectively increased respondents' knowledge, attitudes, behavior, and acceptance of plant-based consumption. The significant improvement across all measured aspects—knowledge about plant protein, attitudes towards consuming plant protein, tempeh consumption behavior, and acceptance of tempeh nuggets—suggests the potential of this intervention to raise awareness and promote the adoption of healthy plant-based foods. The findings are consistent with previous studies highlighting the role of nutrition education in shaping eating patterns and could contribute to broader efforts to address stunting in Indonesia. However, this study has several limitations that should be acknowledged. The relatively short duration of the intervention, the small sample size, and the absence of a control group may limit the generalizability of the findings.

These constraints suggest that the observed changes should be interpreted cautiously and within the specific context of this study. Future research with a more extensive sample size, a longer intervention period, and the inclusion of a control group is recommended to validate these findings and assess their long-term impact. Further investigations could also explore additional factors influencing consumption behavior, such as family support, product availability, and socio-cultural considerations. Developing diverse processed tempeh products and testing the intervention across different demographic groups would provide more comprehensive insights into its acceptability and effectiveness. By addressing these limitations and expanding the scope of research, a more robust and sustainable strategy can be developed to improve healthy eating patterns and reduce the prevalence of stunting in various communities.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this research. All study aspects, including design, data collection, analysis, and interpretation, were conducted independently of any external influences or biases.

Author Contribution

Both authors contributed significantly to this research. S was responsible for conceptualizing and designing the study and overseeing data collection, while M led the data analysis, interpretation, and writing of the manuscript. Both authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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