

ENHANCING MATERNAL COMPETENCE IN PREVENTING STUNTING THROUGH LOCAL FOOD-BASED COMPLEMENTARY FEEDING: A QUASI-EXPERIMENTAL STUDY IN WEST SULAWESI, INDONESIA

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ARTICLE INFO	ABSTRACT
Article history Submitted : 2025-04-28 Revised : 2025-07-17 Accepted : 2025-08-04 Keywords: <i>Maternal Competence; Complementary Feeding; Local Food; Nutrition Education; Stunting Prevention</i>	Stunting remains a major public health concern in Indonesia, particularly among children under five. A key contributing factor is limited maternal competence, including insufficient knowledge of the appropriate age to introduce complementary feeding, poor understanding of dietary variety, and inconsistent feeding practices. This study aimed to evaluate the effectiveness of two educational interventions—cooking demonstrations and emotional demonstrations (emo-demo)—in improving maternal knowledge, attitudes, and practices regarding local food-based complementary feeding. A quasi-experimental study was conducted in Majene Regency, West Sulawesi, involving 184 mothers of children aged 6–24 months. Participants were randomly assigned to either the cooking demonstration group or the emo-demo group. Data were collected at baseline and during three follow-up time points. Maternal competence was assessed using validated indicators covering knowledge, attitude, and behavior. Data analysis employed repeated measures ANOVA, the Friedman test, and Generalized Estimating Equations (GEE). Both interventions significantly improved maternal competence. However, the cooking demonstration group consistently achieved higher mean scores in all post-intervention assessments ($p < 0.001$). Improved maternal behavior was positively associated with weight-for-age in children, although no significant associations were found with height-for-age or weight-for-height indicators. Contextual, interactive, and hands-on educational approaches such as cooking demonstrations proved more effective in enhancing maternal competence for stunting prevention. Integrating culturally relevant, food-based learning into community health programs offers a promising and sustainable strategy to improve child nutrition, especially in regions rich in local food resources. Moreover, these educational interventions may also be incorporated into health education curricula at various academic levels to strengthen future health professionals' competencies in nutrition promotion and stunting prevention.
Kata Kunci: <i>Kompetensi Ibu; Makanan Pendamping ASI; Pangan Lokal; Edukasi Gizi; Pencegahan Stunting</i> <i>This is an open-access article under the CC BY-SA license:</i> 	ABSTRAK Stunting masih menjadi masalah kesehatan utama di Indonesia, khususnya pada anak-anak di bawah usia lima tahun. Salah satu faktor penyebab utama adalah rendahnya kompetensi ibu dalam memberikan makanan pendamping ASI (MP-ASI) yang sesuai usia dan cukup secara nutrisi seperti kurangnya pengetahuan tentang usia yang tepat untuk memulai MP-ASI, pemahaman yang terbatas tentang keberagaman makanan dan porsi yang sesuai, serta perilaku pemberian makan yang tidak konsisten. Penelitian ini bertujuan untuk mengevaluasi efektivitas dua intervensi edukatif: demonstrasi memasak dan <i>emotional demonstration</i> (emo-demo) dalam meningkatkan pengetahuan, sikap, dan praktik ibu terkait pemberian MP-ASI berbasis pangan lokal. Studi kuasi-eksperimental ini dilakukan di Kabupaten Majene, Provinsi Sulawesi Barat, dengan melibatkan 184 ibu yang memiliki anak berusia 6–24 bulan. Peserta dibagi secara acak ke dalam dua kelompok: kelompok demonstrasi memasak dan kelompok emo-demo. Data dikumpulkan pada awal intervensi (baseline) dan tiga kali pada waktu tindak lanjut. Kompetensi ibu diukur menggunakan indikator pengetahuan, sikap, dan praktik yang telah divalidasi. Analisis data dilakukan menggunakan ANOVA pengukuran berulang, uji Friedman, dan Generalized Estimating Equations (GEE). Kedua intervensi menunjukkan peningkatan yang signifikan terhadap indikator kompetensi ibu. Namun, kelompok demonstrasi memasak secara konsisten memperoleh skor rata-rata yang lebih tinggi pada seluruh pengukuran pasca-

	intervensi ($p < 0,001$). Peningkatan perilaku ibu juga berhubungan positif dengan peningkatan indikator berat badan menurut umur anak, meskipun tidak ditemukan hubungan yang signifikan dengan indikator tinggi badan menurut umur maupun berat badan menurut tinggi badan. Pendekatan edukasi yang kontekstual, interaktif, dan berbasis praktik langsung seperti demonstrasi memasak terbukti lebih efektif dalam meningkatkan kompetensi ibu dalam pencegahan stunting. Integrasi pembelajaran gizi berbasis pangan lokal yang sesuai dengan budaya ke dalam program kesehatan masyarakat dapat menjadi solusi berkelanjutan untuk meningkatkan status gizi anak, khususnya di wilayah yang kaya akan sumber daya pangan lokal. Selain itu, intervensi edukatif ini juga dapat diintegrasikan tidak hanya dalam pembelajaran kesehatan masyarakat, tetapi juga ke dalam kurikulum pada jenjang pendidikan kesehatan untuk memperkuat kompetensi calon tenaga kesehatan di bidang promosi gizi dan pencegahan stunting.
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INTRODUCTION

Stunting, a condition characterized by impaired linear growth and development in children, continues to be a pressing public health challenge in many low- and middle-income countries, including Indonesia. According to the Joint Child Malnutrition Estimates 2023 by UNICEF, WHO, and the World Bank, stunting refers to a child who is too short for his or her age. Children affected by stunting may suffer severe, irreversible physical and cognitive impairments, with consequences that can persist throughout their lives and even affect the next generation (UNICEF/WHO/World Bank Group, 2023). This condition reflects long-term nutritional deprivation and repeated infections during critical periods of growth. Stunting is not only a biological issue but also a social one, closely linked to poverty, food insecurity, poor maternal health and nutrition, suboptimal infant feeding practices, and limited access to health care and sanitation (Soliman et al., 2021a). Moreover, stunting has been associated with an increased risk of non-communicable diseases later in life due to early-life metabolic programming (Sahoo et al., 2024).

In Indonesia, despite various national efforts to address malnutrition—including the National Strategy to Accelerate Stunting Prevention (2018–2024)—the prevalence of stunting among children under five remains high. According to the 2024 Indonesian Nutrition Status Survey (SSGI), the national stunting prevalence was reported at 19.8%, with certain provinces, such as West Sulawesi, exceeding the national average (Kemenkes, 2025). This underscores that stunting remains a significant concern in both rural and urban settings, driven by multiple, interrelated factors such as poverty, limited access to health services, inadequate sanitation, insufficient breastfeeding and complementary feeding practices, and lack of maternal education (Laksono et al., 2022).

Complementary feeding, defined as the process of giving additional foods and liquids along with breast milk starting at six months of age, is one of the most critical interventions in preventing stunting. However, evidence suggests that in many regions of Indonesia, complementary feeding practices remain suboptimal due to limited knowledge, inadequate access to nutritious foods, and cultural beliefs surrounding child feeding. For instance, Aprilina et al., (2021) found that many mothers lacked understanding about the appropriate timing and frequency of complementary feeding. Similarly, Ilmani & Fikawati, (2023) reported that cultural beliefs—such as restricting certain protein-rich foods due to local taboos—negatively influenced feeding decisions. Therefore, improving maternal competence in providing appropriate complementary foods, particularly those based on locally available ingredients, has emerged as a strategic priority in tackling child undernutrition (Mulualet al., 2016). In this study, maternal competence is defined as a combination of knowledge, attitudes, and feeding practices related to the provision of age-appropriate and nutritious complementary foods, especially those derived from local ingredients.

The concept of maternal competence encompasses knowledge, attitudes, and practices (KAP) that directly influence child care and feeding behavior. According to Lawrence Green's PRECEDE-PROCEED model, behavior change—including health-related decisions—is shaped by predisposing factors (such as knowledge and attitudes), enabling factors (availability of resources), and reinforcing factors (social support and motivation) (Cho et al., 2018). Educational interventions tailored to these

factors can significantly improve maternal behavior and, consequently, child nutrition outcomes. Among these strategies, cooking demonstrations have shown promise as interactive, skill-building approaches that not only convey knowledge but also empower mothers to utilize available local food resources effectively. This method allows mothers to actively participate in preparing nutritionally balanced meals using culturally acceptable ingredients, thereby reinforcing learning through hands-on experience (Aprilina et al., 2021; Harahap et al., 2023). In contrast, emotional demonstrations (emo-demo) involve persuasive and empathetic communication techniques designed to influence maternal attitudes and motivation. While both methods offer distinct advantages, comparative evidence on their effectiveness in stunting prevention remains limited.

In West Sulawesi, Majene Regency is among the regions with the highest stunting prevalence. Despite its rich biodiversity and abundant local food resources—particularly in districts such as Tameroddo and Pamboang—these assets remain underutilized in child nutrition programs. This study aims to evaluate the effectiveness of two educational approaches—cooking demonstrations and emotional demonstrations—in improving maternal competence in complementary feeding practices. By focusing on the use of local foods, the study seeks to determine whether these interventions can enhance maternal knowledge, attitudes, and practices related to complementary feeding for stunting prevention.

Ultimately, the findings are expected to contribute to the development of integrated and sustainable interventions that empower mothers, leverage local food systems, and improve child nutrition outcomes in underserved areas. In light of the urgency to achieve Sustainable Development Goal 2 (Zero Hunger) by 2030, enhancing maternal competence through context-sensitive education is not only timely but also essential.

METHOD

Type of Research

This study employed a quantitative research approach using a quasi-experimental design to assess the effectiveness of two educational interventions—cooking demonstration and emotional demonstration (emo-demo)—on maternal competence related to complementary feeding. Quasi-experimental designs are commonly used in public health research when randomization is not entirely feasible due to ethical or logistical constraints. These designs allow for intervention evaluation while maintaining a reasonable degree of causal inference by comparing outcomes across non-equivalent groups (White & Sabarwal, 2014).

In this study, a pre-test and post-test design with non-equivalent control groups was applied. Participants were assigned to two intervention groups using cluster randomization at the sub-district level. Two sub-districts in Majene Regency—Tammeroddo and Pamboang—were randomly allocated to either the cooking demonstration group or the emo-demo group. All eligible participants within each cluster were included in their respective intervention groups. This approach was used to minimize selection bias and prevent information contamination between groups. The cooking demonstration intervention consisted of four weekly sessions (approximately 90 minutes each), held at community centers and led by trained facilitators. Mothers were shown how to prepare age-appropriate complementary foods using locally available ingredients such as eggs, fish, and vegetables. The sessions included practical cooking steps, hygiene and portion size tips, and interactive discussions, allowing mothers to directly observe and practice the feeding process.

In contrast, the emotional demonstration (emo-demo) for Group 2 used a behavior change communication strategy designed to engage maternal emotions and social norms. Conducted weekly (approximately 60 minutes), these sessions included storytelling supported by simple visual aids—such as ping pong balls and marbles—to illustrate the actual size of an infant's stomach and help mothers understand appropriate feeding volumes. This was followed by role-playing, group discussions, and reinforcement of maternal identity (“ibu hebat”) to enhance self-efficacy and motivation. Both interventions aimed to improve maternal competence in local food-based complementary feeding but employed distinct educational approaches: practical for cooking demonstrations and affective for emo-demos.

Pre-tests were conducted in both groups before the intervention, followed by three post-tests at different time points to assess changes in maternal knowledge, attitudes, and practices over time. Ethical approval for this study was obtained from the Health Research Ethics Commission of the Faculty of

Public Health, Universitas Hasanuddin (Approval No: 933/UN4.14.1/TP.01.02/2023). All participants provided informed consent prior to data collection.

Place and Time of Research

The study was conducted in Majene Regency, West Sulawesi, a region selected due to its persistently high stunting rates and limited availability of structured maternal education programs.

Population and Sample

The study population comprised all mothers with children aged 6 to 24 months residing in Majene Regency, West Sulawesi Province, Indonesia. This age group represents a critical developmental window, as children are transitioning to complementary feeding—a period essential for stunting prevention and nutritional intervention.

A total of 184 participants were selected through a randomized sampling procedure from two sub-districts with high stunting prevalence: Tammeroddo (91 participants) and Pamboang (93 participants). Participants were then allocated into two intervention groups. Group 1 received education through the cooking demonstration method, emphasizing hands-on experience in preparing local food-based complementary feeding (*MP-ASI*). Group 2 received education via the emotional demonstration (*emo-demo*) method, focusing on persuasive and affective communication to influence maternal behavior.

The inclusion criteria for sample selection were: (1) Mothers with children aged 6–24 months, (2) Willingness to participate in the full study duration, (3) Permanent residence in the respective intervention area. Exclusion criteria included: (1) Mothers who were not the primary caregivers, (2) Mothers who planned to relocate during the study period. These criteria ensured consistent exposure to the intervention and minimized loss to follow-up, which could otherwise bias outcome assessments. The selected age range (6–24 months) aligned with the recommended window for initiating and sustaining complementary feeding. Considering the 3-month intervention duration, children who were older than 24 months at baseline were excluded to ensure they remained within an appropriate developmental range for evaluating feeding practices and nutritional outcomes by endpoint.

This sample size was considered adequate to detect significant changes in maternal knowledge, attitudes, and practices, while also allowing subgroup comparisons between intervention methods. The use of randomized sampling and balanced group distribution helped minimize selection bias and enhanced the internal validity of the study (Handley et al., 2018).

Data Collection

Data collection in this study was conducted using a combination of structured and validated instruments aimed at assessing maternal competence in the context of stunting prevention and complementary feeding practices. To evaluate maternal knowledge, a structured *Stunting Knowledge Questionnaire* was administered to assess participants' understanding of the definition, causes, risk factors, and long-term consequences of stunting. In addition, a *Complementary Feeding Knowledge Questionnaire* was used to measure mothers' knowledge of appropriate *MP-ASI* practices, including age of introduction, food diversity, portion size, and meal frequency. Both questionnaires were developed based on national guidelines and previous literature, and were tested for content validity and reliability prior to deployment.

Dietary intake was assessed using two complementary tools. The Food Frequency Questionnaire (FFQ) captured habitual dietary patterns over the previous seven days, with an emphasis on the consumption of local food groups (e.g., fish, eggs, vegetables, tubers). The 24-hour dietary recall was also administered to collect detailed, recent intake data. Both instruments were administered by trained field staff during scheduled home visits. The tools were adapted from previously validated Indonesian instruments to ensure cultural and contextual relevance. Using both the FFQ and 24-hour recall allowed for cross-validation of dietary intake data, providing a more comprehensive view of maternal feeding behavior. The 24-hour recall offered a time-bound, detailed snapshot of intake, which is considered valid and widely used in child nutrition research (Shim et al., 2014).

Data Analysis and Processing

Data were collected at four time points: pre-intervention, immediately after the intervention, one month post-intervention, and two months post-intervention. To evaluate the effectiveness of the interventions within and between groups over time, both bivariate and multivariate analyses were conducted.

For continuous variables (e.g., knowledge and attitude scores), Repeated Measures ANOVA with Bonferroni post hoc tests was applied for normally distributed data. If the assumption of normality was violated, the Friedman test was used as a non-parametric alternative, followed by Wilcoxon signed-rank tests for post hoc comparisons.

Once continuous data were categorized into binary outcomes (e.g., *good* vs. *poor* knowledge or attitude), Cochran's Q test was used to examine differences across time points within each group, with McNemar post hoc tests applied for pairwise comparisons. A significance level of $p < 0.05$ with a 95% confidence interval was used for all statistical tests.

To compare outcomes between the two intervention groups (Group 1: cooking demonstration; Group 2: emotional demonstration), the following approaches were applied: For continuous and normally distributed variables across multiple time points, the General Linear Model (GLM) for repeated measures was used with post hoc comparisons. For non-normally distributed data, the Mann–Whitney U test with Bonferroni correction was employed.

For categorical variables (e.g., good vs. poor knowledge, attitude, and practice), analysis was performed using Generalized Estimating Equations (GEE). This method is suitable for analyzing repeated categorical response data over time while accounting for within-subject correlations. The classification into “good” or “poor” categories was based on total scores for each component (knowledge, attitude, and practice), where scores equal to or above the group mean were considered “good,” and those below the mean were categorized as “poor”. To support interpretation and validate findings, the final dataset was further analyzed using descriptive statistics (frequency distributions), chi-square tests, and logistic regression to identify predictors of improved maternal competence following the interventions.

RESULT

The results of this intervention demonstrated improvements in mothers' competence (comprising knowledge, attitudes, and behavior) in providing local food-based complementary feeding. These improvements were achieved through educational interventions using both the cooking demonstration and emotional demonstration (emo-demo) methods, targeting stunting prevention in children aged 6–24 months in Majene Regency, West Sulawesi Province.

Maternal knowledge was assessed at four time points: pre-test, first post-test, second post-test, and third post-test. Data were analyzed using repeated measures ANOVA to assess the effects of time and intervention type. The comparison of results between the two groups is presented in Table 1.

Table 1. The Effect of Time, Treatment, and Control Variables on Participants' Knowledge (n=184)

Effect	Greenhouse-Geisser F	<i>p</i> -value
Time	6.973	0.001*
Time & Mother's Age	0.925	0.409
Time & Children's Age	0.813	0.459
Time & Treatment group	24.599	.001*
Time & Mother's Final Education	0.561	0.783
Time & Treatment x Final Education	0.668	0.696

Note: Greenhouse–Geisser corrections were applied due to the violation of the sphericity assumption (Mauchly's Test not met).

(Source: Primary Data March-August 2023)

Table 1 shows a significant increase in maternal knowledge over time ($F = 6.973$, $p < 0.001$), indicating the effectiveness of both interventions. The interaction between time and intervention group was also significant ($F = 24.599$, $p < 0.001$), with the cooking demonstration group demonstrating greater and more sustained knowledge gains than the emo-demo group. No other interactions were statistically significant.

Table 2. Comparison of Knowledge Scores Between Cooking Demonstration and Emotional Demonstration Groups at Four Time Points (n = 184)

Time Point	Group	Mean Score	Mean Difference (Fish-Eggs)	SE	t-value	p-holm
Pre-test	Fish + Emo Demo	55.392	5.257	1.713	3.069	0.010*
	Eggs + Cooking Demo	49.766				
Post-test 1	Fish + Emo Demo	62.951	0.693	1.713	0.405	0.686
	Eggs + Cooking Demo	61.094				
Post-test 2	Fish + Emo Demo	68.48	-2.670	1.713	-0.345	0.364
	Eggs + Cooking Demo	69.063				
Post-test 3	Fish + Emo Demo	73.382	-7.250	1.713	-2.808	0.001*
	Eggs + Cooking Demo	78.125				

Note: Independent t-test with Holm's correction for multiple comparisons.

* $p < 0.05$ indicates statistically significant difference.

Source: Primary Data March-August 2023

Table 2 compares knowledge scores between the two groups across the four time points. Although the emo-demo group had a higher baseline score, only the cooking demonstration group showed a significantly greater improvement by the third post-test (p -Holm = 0.001). These findings suggest that the cooking demonstration method produced more sustained and meaningful knowledge improvements. A visual representation of the progression across all time points is provided in Figure 1.

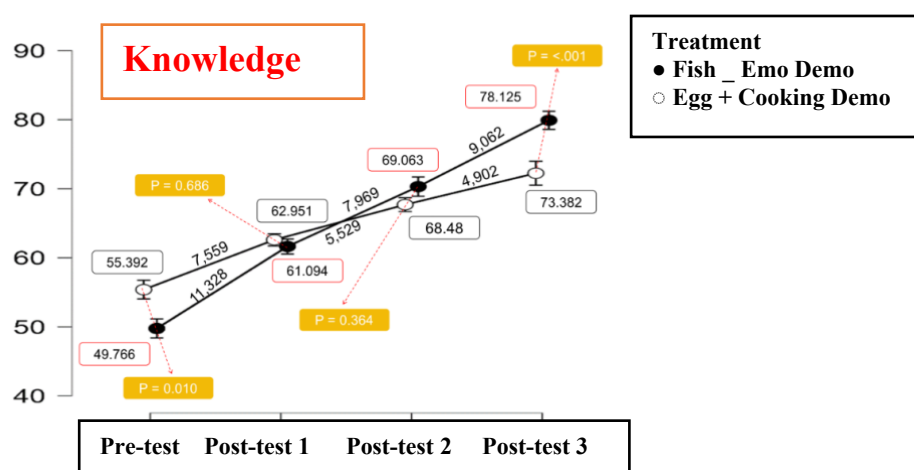


Figure 1. Comparison of Pre-test and Post-test Results in the Two Experimental Groups (Cooking Demo and Emo Demo).

Maternal attitudes were also measured at the same four time points. The analysis using repeated measures ANOVA revealed the results presented in Table 3.

Table 3. The Effect of Time, Treatment, and Control Variables on Participants' Attitude

Effect	Greenhouse-Geisser F	<i>p</i>
Time	9.238	0.001**
Time x Mother's Age	1.048	0.348
Time x Children's Age	0.366	0.673
Time x Treatment group	18.585	0.001**
Time x Final Education level	1.016	0.414
Time x Treatment x Final Education	1.087	0.372

Note: Greenhouse–Geisser correction applied due to violation of the sphericity assumption.

p < 0.01 () indicates statistical significance.**

Source: Primary Data March-August 2023

As shown in Table 3, maternal attitudes significantly improved over time ($F = 9.238, p = 0.001$), with the cooking demonstration group showing more consistent and greater improvements compared to the emo-demo group ($F = 18.585, p = 0.001$). These findings underscore the crucial role of the type of educational intervention in shaping maternal attitudes toward complementary feeding. Demographic factors such as maternal age and education level did not significantly influence outcomes.

Table 4. Comparison of Mean Scores Between Cooking Demonstration and Emotional Demonstration Groups at Four Time Points (n = 184)

Time Point	Group	Mean Score	Mean Difference (Fish-Eggs)	SE	t-value	<i>p</i> -holm
Pre-test	Fish + Emo Demo	55.441	0.514	1.994	0.258	1
	Eggs + Cooking Demo	55.156				
Post-test 1	Fish + Emo Demo	58.505	-3.081	1.994	-1.545	0.494
	Eggs + Cooking Demo	61.762				
Post-test 2	Fish + Emo Demo	61.262	-6.547	1.994	-3.284	0.011
	Eggs + Cooking Demo	68.219				
Post-test 3	Fish + Emo Demo	64.235	-7.643	1.994	-3.834	0.002
	Eggs + Cooking Demo	73.418				

Note: Independent t-test with Holm's correction for multiple comparisons.

* $p < 0.05$; ** $p < 0.0$

Source: Primary Data March-August 2023

Table 4 summarizes the changes in attitude scores between the two groups over time. While improvements were seen in both groups, significant differences favoring the cooking demonstration group emerged at post-test 2 ($p = 0.011$) and became more pronounced at post-test 3 ($p = 0.002$). These results indicate the greater effectiveness of the cooking demonstration method in promoting lasting positive changes in maternal attitudes. The progression is illustrated in Figure 2

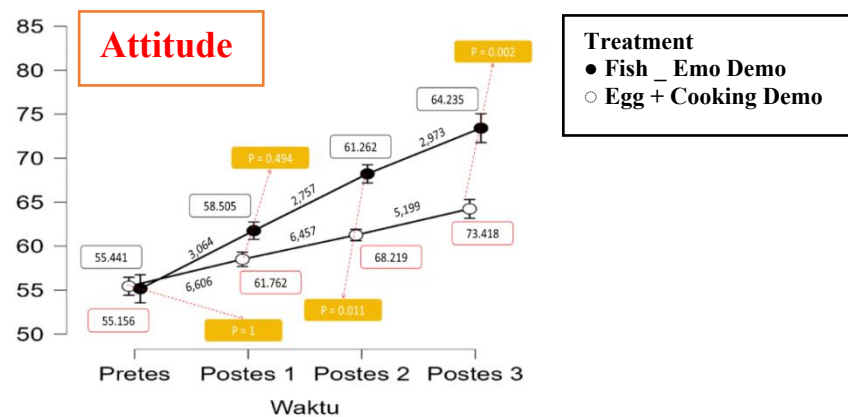


Figure 2. Comparative Analysis of Pre-test and Post-test Attitude Scores in the Two Experimental Groups (Cooking Demo and Emo Demo).

Maternal behavior was also assessed at the same four time points. The impact of time and treatment type on behavior was analyzed using repeated measures ANOVA, with findings detailed in Table 5.

Table 5. The Effect of Time, Treatment, and Control Variables on Participants' behavior

Effect	Greenhouse-Geisser F	<i>p</i> -value
Time	5.472	0.001
Time x Mother's Age	0.963	0.379
Time x Children's Age	0.236	0.773
Time x Treatment group	20.006	0.001
Time x Final Education	1.244	0.29
Time x Treatment x Final Education	1.089	0.371

Note: Greenhouse–Geisser correction applied due to violation of the sphericity assumption.

p < 0.01 () indicates statistical significance.

(Source: Primary Data March-August 2023)

Table 5 indicates a significant improvement in maternal behavior over time ($p = 0.001$), with the cooking demonstration group exhibiting more substantial and consistent improvements than the emo-demo group ($p = 0.001$ for interaction). These results suggest that hands-on, practical education methods were more effective in fostering sustained behavioral change in complementary feeding practices. Variables such as maternal age, child age, and educational background did not significantly affect behavioral outcomes.

Table 6 shows that although both groups experienced behavior improvements, significant differences in favor of the cooking demonstration group appeared at post-test 2 and became more evident by post-test 3 (p -Holm = 0.004 and 0.001, respectively). This supports the conclusion that cooking demonstrations, with their practical and skill-based approach, were more effective in improving maternal feeding behaviors. A comparative timeline of behavior change is visualized in Figure 3.

Table 6. Comparison of Mean Behavior Scores Between Cooking Demonstration and Emotional Demonstration Groups at Four Time Points (n = 184)

Time Point	Group	Mean Score	Mean Difference (Fish-Eggs)	SE	t-Value	p_{holm}
Pre-test	Fish + Emo Demo	55.441	844	1.482	-0.57	1
	Eggs + Cooking Demo	55.156				
Post-test 1	Fish + Emo Demo	58.505	-2.681	1.482	-1.809	0.44
	Eggs + Cooking Demo	61.762				
Post-test 2	Fish + Emo Demo	61.262	-5.448	1.482	-3.676	0.004
	Eggs + Cooking Demo	68.219				
Post-test 3	Fish + Emo Demo	64.235	-8.246	1.482	-5.564	0.001
	Eggs + Cooking Demo	73.418				

Note: Independent t-test with Holm's correction for multiple comparisons.

$p < 0.01$ (**) indicates statistically significant difference.

(Source: Primary Data March-August 2023)

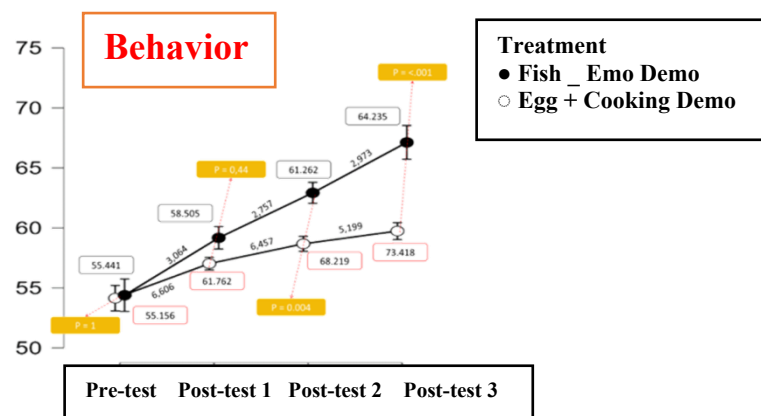


Figure 3. Comparative Analysis of Pre-test and Post-test Behavior Scores in the Two Experimental Groups (Cooking Demo and Emo Demo).

Based on the findings, both the emo-demo and cooking demonstration methods were successful in enhancing maternal knowledge of appropriate child nutrition practices. No significant differences were observed between groups at baseline, indicating comparable starting points. Although both groups improved after the first post-test, only by the second and third post-tests did the cooking demo group show significantly higher knowledge scores. These findings support the superior effectiveness of skill-based, experiential learning over emotion-based approaches in improving maternal knowledge. The potential impact of maternal behavior change on children's nutritional status, particularly weight-for-age, was further analyzed and is summarized in Table 7.

Table 7 indicates that increases in child age and specific behavioral improvements ($\Delta Behavior$ 3) were significantly associated with improvements in weight-for-age (WAZ) scores ($p < 0.001$ and $p = 0.038$, respectively). Other behavioral components, breastfeeding status, and intervention group were not significant predictors of WAZ changes. These findings suggest that targeting specific maternal behaviors—such as feeding diversity and consistency—may influence child growth outcomes.

Table 7. The Effect of Changes in Behavior on Changes in Weight-for-age (n-184)

Variable	Regression Coefficient (B)	t-value	p-value
Age of Child (months)	.007	10.013	< .001***
Breastfeeding Status (Yes vs. No)	0.052	1.382	0.171
Change in Behavior 1 (Δ Behavior 1)	0.001	0.884	0.38
Change in Behavior 2 (Δ Behavior 2)	0.001	-0.871	0.386
Change in Behavior 3 (Δ Behavior 3)	0.002	2.111	0.038*
Treatment group (Cooking Demo vs. Emo-Demo)	0.004	0.523	0.603

Note: Multiple linear regression analysis was applied.

*** $p < 0.001$; * $p < 0.05$ indicate statistically significant association.

(Source: Primary Data March-August 2023)

Table 8. The effect of changes in Behavior on changes in Weight-for-Height (n-184)

Variable	Regression Coefficient (B)	t-value	p-value
Age of Child (months)	3.12×10^{-5}	0.317	0.752
Breastfeeding Status (Yes vs. No)	-0.003	-0.591	0.556
Change in Behavior 1 (Δ Behavior 1)	4.00×10^{-4}	1.971	0.052
Change in Behavior 2 (Δ Behavior 2)	-1.43×10^{-4}	-0.634	0.528
Change in Behavior 3 (Δ Behavior 3)	2.23×10^{-4}	1.423	0.159
Treatment group (Cooking Demo vs. Emo-Demo)	-7.39×10^{-4}	-0.678	0.5

Note: Multiple linear regression analysis was applied.

Source: Primary Data, March–August 2023.

Table 8 shows that no behavioral or covariate variables were significantly associated with changes in weight-for-height (WHZ) scores. Although one variable (Δ Behavior 1) approached statistical significance ($p = 0.052$), it did not meet the conventional threshold. These results imply that, within the study period, the interventions had limited direct effect on WHZ outcomes. Other unmeasured factors—such as illness or food quality—may have contributed to the results.

DISCUSSION

This study provides compelling evidence that structured educational interventions—particularly cooking demonstrations—are highly effective in improving maternal competence, as reflected by statistically significant and sustained improvements in knowledge ($p < 0.001$), attitudes ($p < 0.001$), and behaviors ($p < 0.001$) among mothers in the cooking demonstration group, especially from post-test 2 to post-test 3. These positive effects occurred regardless of maternal demographic characteristics such as age or education, highlighting the intervention's robustness and potential scalability across diverse community settings. Compared to the emo-demo group, the cooking demonstration group consistently achieved higher mean scores across all domains over time, confirming its superior impact. These findings reinforce the value of practical, community-based education strategies in improving complementary feeding practices, particularly in regions with limited access to structured maternal nutrition programs such as Majene Regency.

Among the three domains of competence, maternal knowledge showed the most immediate and measurable improvement. Although both groups experienced significant knowledge gains over time ($p < 0.001$), the cooking demonstration group demonstrated more consistent and substantial increases across all post-test assessments. This confirms that the knowledge domain was the most responsive to the intervention and likely served as the foundation upon which changes in attitude and behavior were established. This finding aligns with previous research by Gumelar & Tangpukdee (2022), which showed that participatory nutrition education significantly enhanced mothers' understanding and

utilization of local food. Hands-on learning tends to foster stronger cognitive retention by integrating visual, verbal, and motor pathways (Davidson et al., 2025). Moreover, the lack of significant associations with maternal age or education level suggests that these interactive approaches are applicable across diverse sociodemographic groups, increasing their public health relevance.

In addition to knowledge, attitudes toward local complementary feeding improved in both groups, with more pronounced changes observed in the cooking demonstration group. According to Sandow et al. (2022), behavioral change is more likely when learners are both emotionally and cognitively engaged. The act of preparing, tasting, and discussing food likely enhanced mothers' self-efficacy and internal motivation. This finding is also in line with the Integrated Behavior Model (Glanz et al., 2015), which highlights attitude and self-efficacy as key predictors of behavioral intentions. The significant interaction between time and treatment group further supports the argument that interactive learning strategies are more effective in transforming attitudes compared to passive communication alone.

Behavioral change was the third and most critical outcome in this study. Improvements in maternal feeding practices were progressive and significantly greater in the cooking demonstration group. Similar findings were reported by Ali et al., (2022), who emphasized the importance of cooking demonstrations in promoting optimal infant and young child feeding practices. The effectiveness of this method lies in its ability to build practical skills, enhance confidence, and provide real-time feedback. Multiple sessions likely reinforced learning, encouraging long-term retention and practical application. As feeding decisions are made daily within the household context, behavior-centered education is essential to ensure sustained impact.

Changes in maternal behavior—especially in the third behavioral domain—were significantly associated with improvements in weight-for-age z-scores (WAZ). This emphasizes the strong link between maternal practices and child nutritional outcomes. The result supports findings by Stiller et al. (2020), who noted that maternal feeding behavior was a critical predictor of child growth. However, the study did not observe significant effects on weight-for-height z-scores (WHZ). Similar to the findings by Mousavi Ezmareh et al., (2024), WHZ may be more sensitive to acute health conditions, such as infections or food insecurity, which were not directly addressed by the intervention. Thus, while educational strategies are vital for addressing chronic malnutrition and promoting long-term resilience, acute malnutrition may require broader, multisectoral approaches.

These findings also affirm the theoretical underpinnings of behavior change models. As emphasized by (Bimpong et al., (2020), improvements in knowledge and attitude are crucial precursors to sustained behavioral change. Nutrition education is most effective when it is culturally relevant, practical, and adapted to local food systems. In this study, mothers were not only introduced to affordable and locally available foods, but also trained on how to incorporate them into daily meals. This local adaptation likely enhanced both the feasibility and acceptability of new practices. Verma et al. (2024) support this notion, suggesting that interventions grounded in participants' lived experiences are more likely to produce lasting outcomes. By integrating education, hands-on training, and contextual relevance, this intervention offers a scalable model for improving maternal feeding practices and child nutrition outcomes in low-resource settings.

Nonetheless, this study has several limitations. First, the duration of the intervention (12 weeks) was relatively short, potentially limiting the ability to assess long-term behavior maintenance and child growth outcomes. Second, reliance on self-reported data for feeding practices introduces potential recall bias and social desirability bias. Third, the study was conducted in a specific rural setting in West Sulawesi, which may limit generalizability to urban or culturally distinct contexts. Lastly, while this study focused on behavior change, broader environmental determinants—such as food insecurity, disease burden, and household sanitation—were not addressed but may have substantial influence on child nutrition.

CONCLUSION AND SUGGESTION

This study demonstrates that cooking demonstrations are more effective than emotional demonstrations in enhancing maternal knowledge, attitudes, and behaviors related to local food-based complementary feeding for stunting prevention. While both interventions contributed to measurable improvements, the cooking demonstration group achieved greater and more sustained gains across all

competence domains. Notably, positive behavioral changes were significantly associated with improvements in children's weight-for-age, although no significant effects were observed on weight-for-height indicators. These findings underscore the value of skill-based, interactive, and culturally relevant educational strategies in building maternal competence and improving child nutrition outcomes. Practical interventions that engage mothers in hands-on learning, particularly using locally available food resources, should be prioritized in community health programs. Future interventions should integrate practical approaches like cooking demonstrations and consider longer follow-up periods to optimize impacts on child growth.

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